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BITS & BYTES

March, 1984 Vol. 2, No. 6 ISSN 0111-9826

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BITS & BYTES expanding

BITS & BYTES is pleased to announce two new appointments in Auckla the opening of an Auckland office and another increase in circulation.

Mr Paul O'Donoghue has been appointed Auckland advertising and marketi representative. Paul previously worked for Auckland suburban newspapers an advertising representative. He has almost completed the Auckland Technic Institute advertising and marketing course and has a working knowledge computers.

Ms Gaie Ellis has been appointed Auckland editor. Gaie was previously edit of "New Electronics" and executive director of "Automation and Control" an thus has a thorough knowledge of the high technology field, includin computers, in this country.

Cathy and Selwyn Arrow, who helped launch BITS & BYTES and have bee with the magazine ever since remain as consulting editors.

Paul and Gaie can be contacted at our Auckland office:

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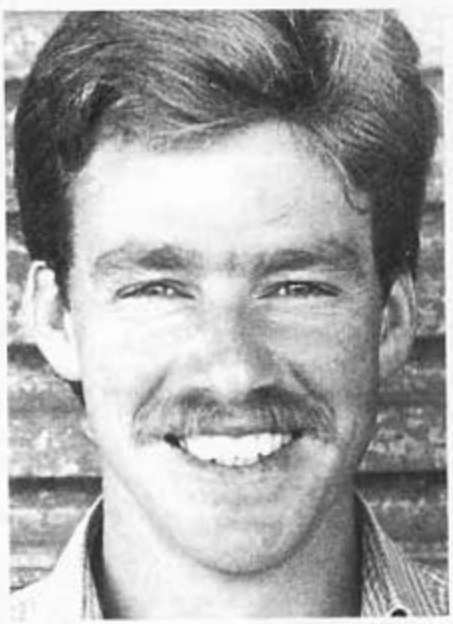

Paul O'Donoghue

Gaie Ellis

Circulation increase

BITS & BYTES paid circulation is now in excess of 8,000 copies per month with a total circulation of 10,000 copies per month making it by far the largest computer magazine in New Zealand. As our circulation continues to grow we would like to thank all those people who have supported BITS & BYTES. We are still analysing the wealth of information generated by the reader survey and will have more on that next month.

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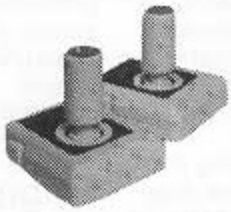

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Fingertip control from HP

By Peter Brown

Code-named Magic by Hewlett-Packard, the HP 150 personal/business computer is a fascinating piece of machinery.

Its smallness is the first thing you notice. Packed into the 1ft square monitor housing are 256K of RAM (upgradeable to 640K), three input/output ports, the system processor unit, two expansion slots, the screen and control circuitry, touch screen electronics, and an enclosure for the optional internal thermal printer.

Underneath, and only a fraction larger, sits the drive unit for, in this case, dual 3.5in floppy, single-sided disks.

Attached to the monitor by six feet of curly-cord is the 107-key keyboard. In addition to the normal typewriter keys and programmable function keys, this contains keys for cursor control, editing, and system control. The numeric keypad can be used for controlling the graphics functions.

Apart from its size, the next, and probably the most exciting, feature is the touch-sensitive screen.

This screen can be used to select commands, applications, or functions; to manipulate data (and the cursor); and, in fact, to do all the things you would normally have to memorise the whole user's manual to achieve.

Set out along the bottom of the screen is a series of eight panels, called "soft keys" each with a label indicating its function. In most cases one is a "Help" key: pressing it will produce a screen showing what each of the other keys is for. To activate the soft key, and thus the operation it represents, all you have to do is point (with your finger or a pencil) at the key.

The whole screen can be programmed to respond in this way, and all the software offered has been written, or revised to incorporate this feature. It is now possible to carry out a wide range of tasks without using the keyboard at all.

Coupled with the touch screen is PAM – the Personal Applications Manager. This provides a very simple and effective user-interface to the system and succeeds in concealing most of the horrors of the operating system (MS-DOS) from the user by translating its complex command structure into a simple series of soft key operations, with minimal keyboard input.

Touch makes applications programs like graphics easy to learn and use on the HP 150 personal computer.

PAM will scan will available disks and list each applications program on the screen, together with a series of special soft keys.

To select an application point to it, on the screen, and the indicated label will light up. Next, after checking you have selected the correct application, you point to the "Start Application" soft key and you're away!

Errors are avoided by ensuring that selection of a particular process does not occur until you *lift* your finger away from the screen. So long as you keep in contact with the screen nothing should happen.

Even so, some funny things can happen to the beginner – particularly if he is a sloppy pointer. Sometimes, too, I noticed that the system seemed to get sulky and take a while to respond to my frantic jabs at the screen.

However, there are usually plenty of "Cancel" keys and other checks built into the software, and "Help" screens really do assist. A couple of times though I had to resort to resetting as the only way out of the mess I'd got myself into.

Touch screens have been around for some time as a very expensive option on larger systems. In these cases the touch-sensitivity has been provided via a special film coating the screen. This has given a fairly high resolution touch screen but has been costly to implement and has occasionally resulted in radiation problems from the signal's going across the screen, and in problems in adjusting and aligning cells. The special film can also reduce the contrast and visibility of the screen image.

Finger interrupts grid of infra-red beams

A common way of achieving the same effect is with a light pen, which can produce an extremely high resolution. Light pens, however, were considered by Hewlett-Packard to be merely another physical device which had to be picked up and manipulated by the operator, and thus less "friendly" than pointing with a finger.

The HP 150's touch screen consists of a grid of infra-red beams

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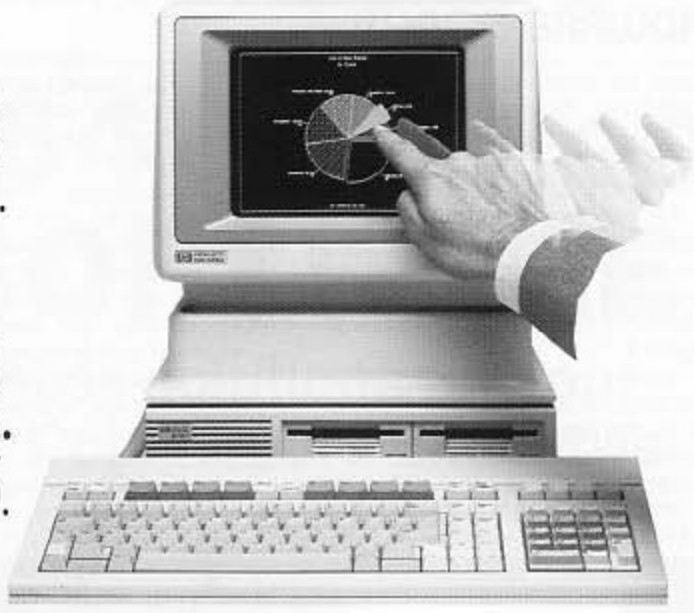

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Get in touch with your Hewlett-Packard dealer. Call Hewlett Packard's Personal Computer Group. Telephone Wellington and Auckland 792-828: from Christchurch collect, to find where to see the Touch Screen Personal Computer. Who knows, you might get in touch with a whole new you.

*With modem at extra cost. WordStar is a registered trademark of MicroPro. VisiCalc is a registered trademark of VisiCorp.

HP 150 at a Glance.

User Memory:	256K–640K bytes
Operating System:	MS-DOS 2.0
Microprocessor:	16-bit, 8088, 8MHz
Permanent Memory:	(ROM) 160K bytes
Diagnostics:	Power-on self testing
Display Screen:	Touch-activated, green phosphor 80 characters x 27 lines, 9 x 14 character matrix, upper and lower case, simultaneous text and graphics capability, 390v x 512h graphics resolution, 1024 characters and symbols in ROM
Keyboard:	107 keys, 8-ft. cord attaches to system unit, 10-key numeric pad, 12 function keys (8 screen labeled)
Compact Size:	2.1 sq. ft. desk space
Communications:	2 RS-232 ports (built-in), HP-IB (IEEE-488) (built-in), IBM 3278 (SDLC, BSC), early 1984, up to 19,200 bits per second
Peripherals:	Choice of printers (including optional internal printer), plotters, 5½" and 5¼" floppy drives (264KB formatted), Winchester hard disks (5 and 15 MB)

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produced by relatively cheap LED's (light-emitting diodes) and photo-diodes. When you place your finger on or near the screen it interrupts these beams and indicates that you are in the process of selecting some function or operation. When you remove your finger this is taken as meaning that you have made your selection and the appropriate activity is triggered.

A very simple idea with outstanding effects, not the least of which is the ease with which the novice can adapt to it.

For instance, the original notes for this article were written on MemoMaker, a simple word-processing program that incorporates the touch screen-feature. I'm certainly no word-processing whizz-kid but I managed to use MemoMaker effectively without once referring to the manual. All I did was use the soft keys and cursor controls provided by the touch screen.

Hewlett-Packard has not made use of the touch screen compulsory, however: all the activities carried out by pointing at the screen can also be entered through the keyboard. The eight function keys can be used instead of the soft keys, and the cursor controls (including the tabulator) can be used to reach and identify the desired screen location – which is then activated using the "Select" key. Most users are thus catered for.

The keyboard itself is quite comfortable to use. It is detached and can be moved around to suit the user. However, having it plug into the *back* of the monitor ensures that most of the six feet of cable is consumed just bringing the keyboard around to where it can be used.

Mass storage is provided by 3.5in, single-sided Sony disks. These are very convenient to use and are sturdy enough to cope with most (reasonable) abuses. One feature of these is the warning they give when they are nearly worn out. If this warning goes unheeded then they reach a stage when they cannot be written to – they just refuse to accept any more work.

Each disk takes about 270K, and I believe a double-sided option will be offered soon, giving 540K per disk. Rumour has it that there are plans to increase the capacity of these disks significantly making them more than a match for their larger cousins.

Also available are 5.25in and 8in drives, as are 5M-byte and 15M-byte hard disks. A tape unit is being developed specifically to provide a back-up facility for the Winchester drives.

HP 150's screen is a 9in, green phosphor, high-resolution monitor. In graphics mode it provides 512 x 390 pixels, and 720 x 378 pixels for alphanumeric use. Graphics and characters are stored separately and can be overlayed on the screen. Unfortunately, it is not possible to easily overlay them on the internal thermal printer (which otherwise does a good job of faithfully recording the screen contents).

On to this small screen are squeezed 27 lines of 80 characters each. The bottom three lines are used by the soft keys and by the system. It is here the clock is continuously displayed (very useful having this available all the time); the rest is available to the user.

The screen only just avoids being too small. It is saved largely by the high resolution, which means it can be easily read from a few feet away – at least if you have reasonable eyesight. It is also quite free of flicker and other nasty tricks (and should be at this end of the market).

The HP 150 personal computer, with HPTouch, supports a full range of peripherals, including the new HP 7475 plotter.

Problems for CP/M users

Hewlett-Packard has provided MS-DOS as the operating system. This is a very nice system and is used by a number of other companies, at least

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as an option. However, HP does not offer, and will not offer, any alternatives – especially CP/M.

This is likely to put off a number of potential users who are at present running CP/M-based applications. Not only do they have to pay to upgrade their hardware, they also have to replace any software not written for MS-DOS. This could make buying an HP 150 a very, very expensive proposition.

The "Copy" command offered by the HP 150's operating system will convert CP/M data disks (but not programs) to MS-DOS, and Hewlett-Packard intends to offer a full range of MS-DOS based applications. These, of course, will have to be purchased.

Hewlett-Packard appears to see the HP 150 as competition for the IBM PC (which does offer both MS-DOS and CP/M) so perhaps this is some marketing gimmick. Nevertheless, it seems strange to disadvantage so many potential users. It is particularly strange considering that, as I understand it, other models in the HP 100 series *are* CP/M machines.

Taking into account the technology being introduced, the elegant but sturdy construction, and the expected market (professional and business users mainly), the prices of the basic systems are probably fair. However, it must be remembered that there are no extras. Everything else is an option, even the internal thermal printer, and must be bought, and paid for, separately. All the applications software must be purchased separately; nothing is thrown in as a bonus.

And the prices of these options can be punishing when taken on top of the cost of the basic system. An extra dual 3.5in disk drive costs $2,885 (single drive $2,054); an extra 128K of RAM will set you back $1069; MemoMaker and Personal Card File each cost $262. Remember that you will have to replace all your existing software unless it is MS-DOS based.

Over all, I think the HP 150 is an excellent machine that is technologically superior to most of its competitors – especially with its touch screen, small size, and flexible configurations. The prices of the basic systems are reasonable considering these advantages, particularly if it will be your first significant computer purchase.

However, if you need more than a basic system, or if you have a heavy investment in non-MS-DOS based software, then the cost will become a major factor for you.

The review machine was provided by Hewlett-Packard (N.Z.) Ltd, Wellington.

Microcomputer summary

Name:	HP 150
Manufacturer:	Hewlett-Packard
Microprocessor:	Intel 8088
System clock:	8 MHz
RAM:	256K expandable to 640K.
Input/output ports:	Three. 2 x RS-232C (1 x RS-232C only, and 1 x RS-232/RS-422 combined), and 1 x HPIB (otherwise known as IEEE-488).
Keyboard:	107 keys including cursor controls, editing keys, numeric pad (that can be used as a graphics control pad), and programmable function keys. QWERTY-style with auto-repeat and n-key rollover. Keyboard is detached with 6ft of curly-cord cable.
Display:	High-resolution 9in green-phosphor monitor. Upper and lower case. 80 characters x 27 lines (24 lines available to user).
Graphics:	512 x 390 pixels.
User interface:	Personal Application Manager (PAM), and HP-Touch.
Special feature:	HP-Touch – optical touch screen.
Options:	Up to 12 floppy disks, hard disk, plotters, dot-matrix printer, letter-quality printer, internal thermal printer, 3.5in disks usual but 5.25in and 8in available.
Languages:	BASIC, Pascal, Assembler, FORTRAN, COBOL.
Applications:	WordStar, MemoMaker, Personal Card File, MicroPlan, VisiCalc, dBase II, Condor, communications (DSN/LINK), graphics.
Cost:	Standard, tax-paid, price of unit reviewed (HP 150 with 256K RAM, dual 3.5in disk drive, MS-DOS, and graphics) is $8460. Optional internal thermal printer costs an extra $1023 (incl. tax).
Operating system:	MS-DOS.
Comments:	Excellent machine, well supported; expensive.

Magician in the team

Wellington correspondent

To emphasise that they consider their HP 150 is magic, the Hewlett-Packard team had a magician in to help them launch their new personal computer in Wellington in January.

According to the publicity blurb, the machine is the "easiest to learn to use personal computer in New Zealand".

HP's retail marketing manager, Srini Nageshwar, who flew in from California for the New Zealand launching, said the aim had been to make the HP 150 easy to use and easy to learn to use.

"With a new automobile you get maximum utility from it immediately. But you could spend the same amount of money on a PC and spend months learning to use it."

So the company focused "extremely heavily on the user interface". A computer illiterate can operate the machine immediately without ever needing to touch the keyboard, let alone know where to find the keys.

The first New Zealand customer for the HP 150 took delivery of his machine at the launching.

Wellington architect, Ian Athfield, who is designing a local building for Hewlett-Packard, had previewed a machine the company has had in its premises since the American launch last year.

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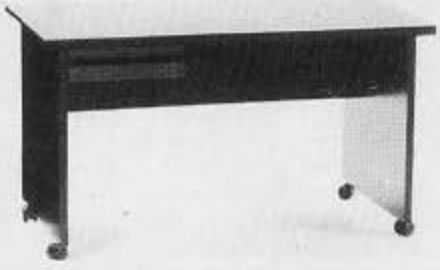
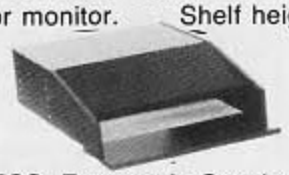


MBS Mobile Work Station 1200 x 660 with Drawer and facility for adding multi-box power outlet. From $149 Auckland.

PM Printer Mobile. Takes most printers Feed from top adjustable shelf to paper tray at back. From $119 Auckland.

MFU. Mobile File Unit. Suspends 2 sizes Computer files and standard files. Extra surface on lid. From $97 Auckland.

PS. Printer Stand. Takes printer with paper below or monitor. Shelf height adjustable. From $39



ECS. Ergonomic Copyholder Stand. Places copy between keyboard and screen. See all three components with just EYE movement. Full adjustment provided to suit most seperate keyboard computers. From $98 Auckland.

Macintosh: A new Apple that shines

By Selwyn Arrow

The result of a three-year project by a 100-strong team working long hours has at last been unveiled by Apple Computer. Macintosh was launched in this country on February, 2, just a few days after its release in the United States.

At present, just a few samples are available for the lucky few to peruse. With only one day to find out as many of its capabilities as I could, here is my review.

Small is the first impression. But it doesn't last. That 230mm (9in) screen crams so much information on its black and white surface that you become so engrossed and overall size means nothing. The keyboard also appears lacking without extra function keys or numeric keypad. But who needs them when you have such a fully integrated mouse to do everything except enter characters?

Mouse? Well I suppose because of its cable "tail" it does have some resemblance to the rodent. It is a hard-size plastic box, 100mm x 60mm x 35mm, with a press button on its upper surface and a roller ball underneath. Simply move it around a smooth surface in any direction and the roller transfers your hand motions into directional signals for the pointer on the screen.

The Macintosh . . . outcome of a three-year project

Place the pointer on any symbol (icon), one click of the button and that function is selected.

For instance in MacPaint there is a selection of drawing materials. The mouse is moved until the pointer is on the item required, e.g. the paintbrush, one click and it is selected. The icon changes to white on black to remind you of this. The mouse then moves the brush anywhere on the working area (sheet). When a mark is required the button is pressed.

It is simpler to do than it is to describe it! After a while you forget you are moving something across the table top. The action becomes automatic as your eye moves across the screen the pointer follows it.

I rate the mouse as the best thing for direct screen control since microcomputers were invented.

The mouse by itself would be nothing without the appropriate software, and here Apple excels in style. The technology introduced by Xerox for its very expensive Star computer, used by Apple for Lisa that was released only last year, is now available at a more affordable level. For under $6000 you cannot expect all the hardware or functions as supplied with the $20,000 Lisa, but you sure get plenty. Mac can handle only one program at a time, but of course the artistic results of MacPaint can easily be appended to a letter produced by MacWrite.

Supplied with each microcomputer are Mac Guided Tour disks one and two. These are used in conjunction with two cassette tapes (also supplied) to provide a running commentary while most of the functions of Macintosh and its two major programs are demonstrated. The only handbooks provided were for these two programs, MacPaint and MacWrite. This amount of documentation does not appear anywhere enough for a micro of this complexity, but it is.

User operates the machine intuitively

The entire system is so "user friendly" that I found I needed an explanation of only a few minor details to become quite familiar with it. This is because a lot of design time has gone into producing a computer that is operated intuitively, and the engineers at Apple have certainly succeeded in accomplishing their object. So after going through the Guided Tours the handbooks are mainly for reference

to more advanced features.

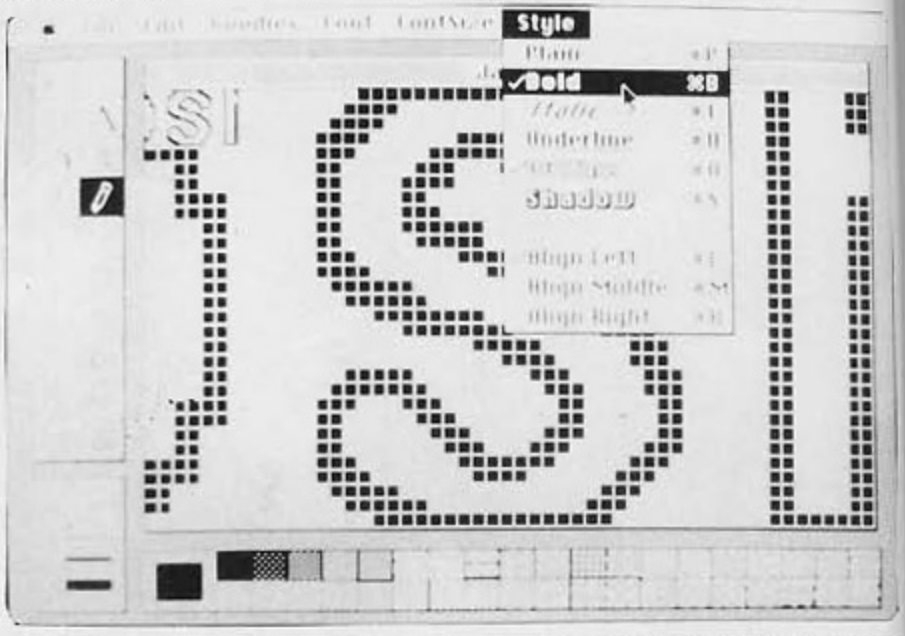
MacPaint is truly great! For some samples of what can be achieved see the accompanying photographs. No, I didn't draw the Geisha, but given time I could produce works of art with this program. The left side of the screen gives the choice of various shapes (shaded or hollow), five line thicknesses, eraser, pencil, paintbrush, paint can (for filling enclosed areas with a pattern selected from the range at the bottom), spray can, text, a hand icon for scrolling the screen area around the "paper", a lasso for "grabbing" an area for moving elsewhere, and a dashed rectangle for selecting a 'box' for manipulation via menu functions.

What do we mean by a spray can? This is used to spray a selected pattern on to the screen: the longer the button is held down the more complete is the pattern!

Across the top of the screen appears the menu bar. The pointer is used to "pull down" a menu by clicking over it. For instance the Goodies menu includes selections for brush strokes, mirror images, and fat bits.

Fat bits magnifies a small section of the picture to fill the screen, allowing changes to individual dots (bits). The pencil is then used to add or delete individual bits to smooth out the fine details

This program is the greatest demonstration of Mac's power. All the above features, and many more, plus extremely fast area filling and scrolling. MacPaint alone will sell Mac faster than hot cakes.



This magnifies the small section in the top left corner to fill the screen, th Style menu has also been "pulled down" to make a selection.

MacWrite uses keyboard only for text

MacWrite is of course a word processor. It is not the greatest of them all but with the mouse to do all the fiddly bits the only time the keyboard is used is to enter text.

The usual menu bar appears across the top of the screen. This includes ecit, file, etc, and a choice of nine fonts (script gothic etc), six styles (plain bold italic underlined outline shadow) and five sizes (nine to 24 point).

A ruler margin provides for setting tabs, text centering, line spacing etc.

MacWrite holds about 12 single-spaced pages of text in RAM, and, of course, this can be saved to disk. What you see on screen is what you get printed on the high quality Imagewriter dot-matrix printer. Multiplan was also supplied but time ran out before I had more than a glance at it. It has certainly been optimised for Mac's 32-bit microprocessor, as it is really fast.

The nearest thing Mac has to a visible operating system is a ROM program called Finder. This finds programs on the disk, generates icons, etc. When first switched-on a disk icon appears with a question mark in it, an invitation to insert a disk. A smile then appears in the icon and the screen zooms in to a desktop covered with folders and file icons, even a rubbish bin for disposing of unwanted items!

When Mac is busy doing disk operations it changes the pointer to a watch icon, meaning wait. It even beeps when you try to make any mistakes such as attempting to edit while in file mode.

Finder can also be selected by clicking over the Apple icon that appears at the top left of each screen. Its menu objects include: calculator, alarm clock, note pad, scrap book, and a control panel which enables you to adjust, on screen, the volume, key repeat rate,

Microcomputer Summary

Name:	Macintosh
Microprocessor:	68000
Clock speed:	8MHz
RAM:	128K
ROM:	64K
Input/Output:	Serial interfaces for printer and 2nd disk.
Mass Storage:	90mm (3.5in) 400K Sony single density disk.
Keyboard:	58 keys, connected by curly cord.
Display:	230mm (9in) diagonal black on white, built into CPU unit.
Languages:	Due later this year; BASIC, DR Logo, Pascal.
Graphics:	512 x 342 bit mapped high definition, used for text as well as graphics.
Sound:	4 voice synthesiser, speech chip, beep.
Cost:	Around $5000 to $6000.
Peripherals:	Mouse, Imagewriter dot matrix printer, second 90mm disk drive, many other items in the pipeline.
Software:	MacPaint, MacWrite, Multiplan available so far, over 100 companies working on programs to date.
Reviewers ratings out of 5:	Documentation 4, ease of use 5, value for money 4, language -, expansion 2, support 5.

Review model supplied by CED Distributors, Auckland.

mouse response, and even the background shading pattern if you don't like the one supplied.

Disks tiny but powerful

The unit appears quite tall in relation to the disk size. Not so, it's only 345mm high, 145mm wide and 290mm deep. It appears tall because the disk slot is only 90mm (3.5in) wide instead of the usual 130mm. Produced by Sony, each disk holds up to 400K, and it is rumoured that Sony is developing an 800K double density drive.

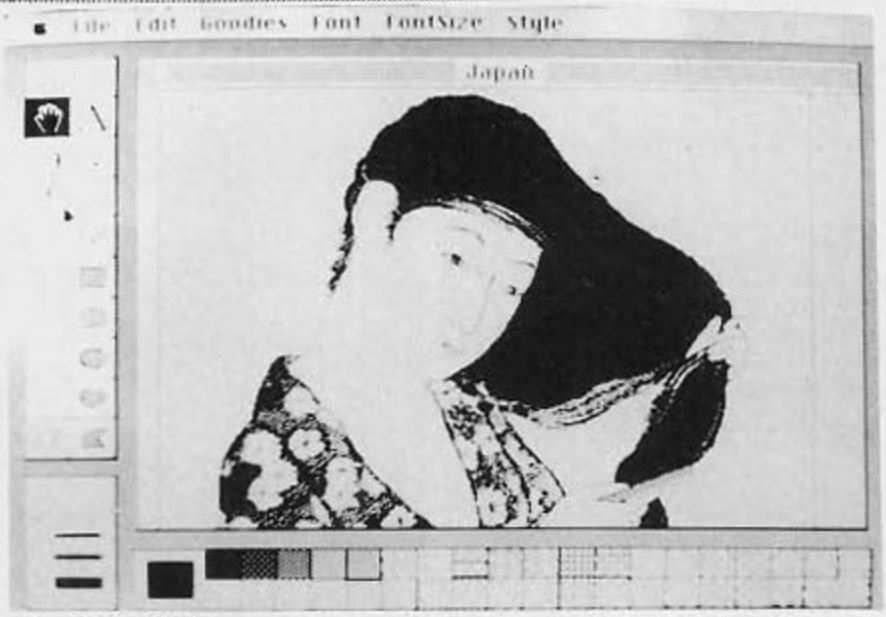
There is no way to remove a disk once inserted, this micro is so foolproof it will automatically eject its disk only when all the files are closed.

Inside the cabinet there is one circuit board which even has the power supply mounted on it. There are no expansion slots but an expansion unit is under development. The keyboard plugs into the front under the disk drive and uses a curly cord to keep it out of the way. On the back are connectors for the mouse, an external floppy disk drive and two serial ports, one each for printer and modem.

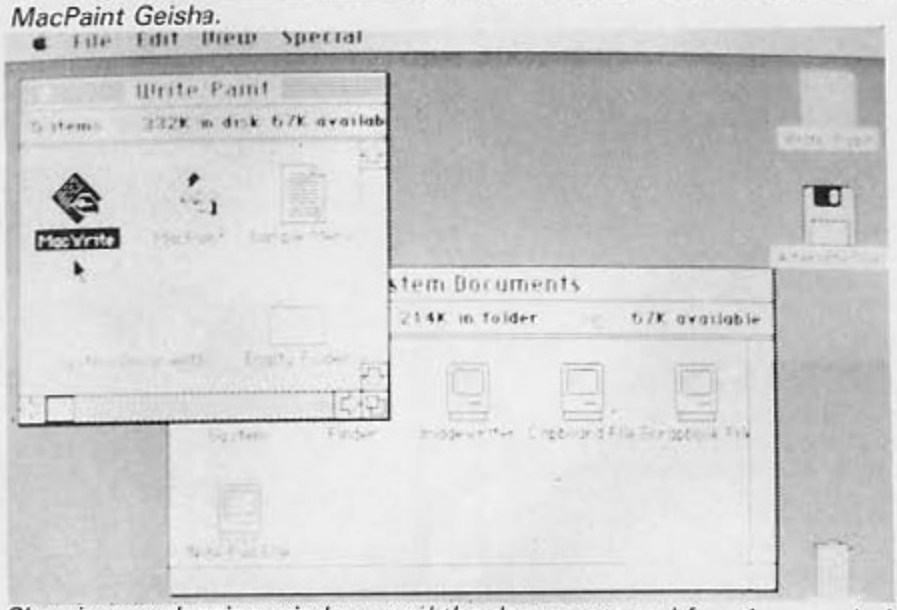
As Mac weighs only 9kg there is also a socket for a security kit to fix the unit and its keyboard to a desk. This kit along with a soft carrying case will be available when Macintosh is released in New Zealand in April.

There are also a lot more programs and peripherals due soon after release. More than 100 United States companies have been working on writing or converting their programs especially for Mac for about a year now. But will there be enough Macs to go around? The answer should be yes. The brand new automated factory built especially to produce Macs is now producing them at the rate of one every 27 seconds, about a million a year!

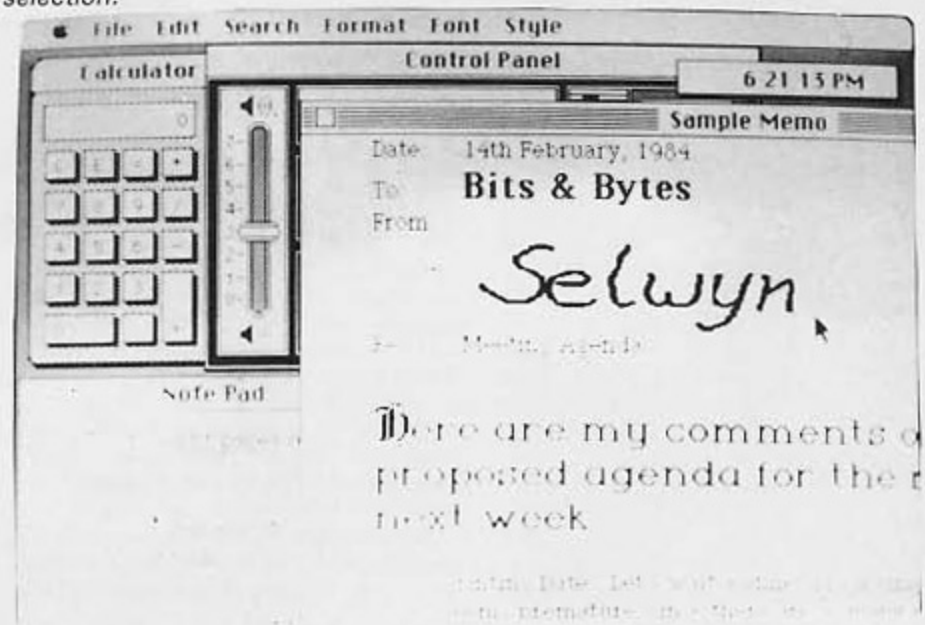
Well, there it is, the latest micro to shake the world and that it will do I'm sure. So it hasn't got colour, but with its crisp black on white display I found it was so much better than a green or amber screen. I guess colour will be with us very soon with this definition. But at what cost?



MacPaint Geisha.



Showing overlapping windows and the documents and functions ready for selection.



MacWrite with several type styles. The signature has been "pasted' into the memo from another program. The memo page, calculator, note pad, control panel and time have been placed in overlapping windows.

Lisa — the art's First Lady

By SHAYNE DOYLE

Lisa and the Mouse — sounds like a fairy tale doesn't it? Well, in a way, some of what Lisa is capable of seems to be magic — computer magic. As a programmer myself, I know the satisfaction when your "cunning bit of code" draws appreciation — the Lisa software writers can be justifiably proud of their creation.

Local Integrated Software Architecture means exactly that here — it's hard to think that any other software would be desired by a Lisa owner/user, everything you would want is there already.

On-board applications software is: LisaCalc for spreadsheet and financial modelling work; LisaList for creation and management of database requirements; LisaProject to handle project planning and scheduling (PERT) applications; LisaGraph to prepare business graphics — bar, line, pie chart, and scatter graphs; LisaWrite for comprehensive word-processing facilities; LisaDraw for totally flexible graphics presentations; LisaTerminal to extend the power of your computer by linking in to other networks or your own network of Lisa machines.

All this marvellous software takes up space of course — some 200K to 300K bytes for each program. However, Lisa does have a megabyte of main memory to play with, and uses 2 megabytes of its ProFile 5Mb hard disk drive for all this software. With this system, a mouse in the hand is worth 20 fingers. You could quite literally sit back with one hand in your pocket and manipulate the mouse/cursor with the other.

The mouse is a palm-size device that is pushed around any convenient flat surface, running on a bearing and transmitting positional data to the computer, where it is converted to an X, Y screen position for the arrow-shaped cursor. On the top of the mouse is a single press button that is read by the computer and responded to depending on what the cursor is currently pointing to.

Figure 1 shows a section of the very high resolution 720 x 364 pixel opening display as you see it before starting work — a clear conceptual 'desktop', menu bar along the top, and unopened graphic images — icons is LisaLanguage. These icons represent the standard office functions — file cabinet, rubbish tin, etc.

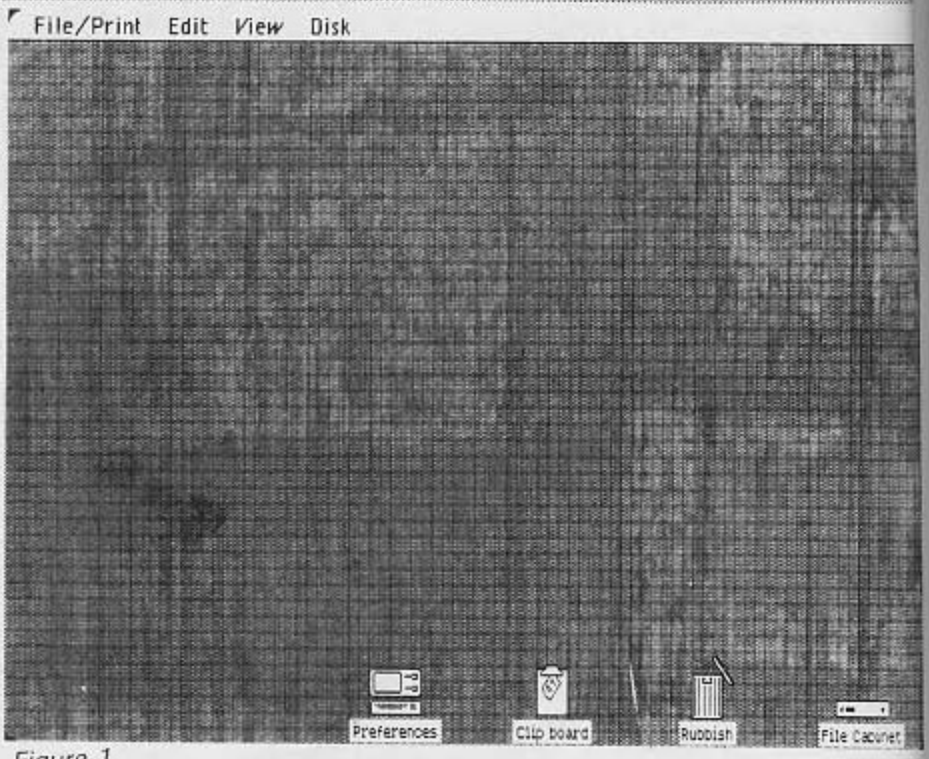


Figure 1

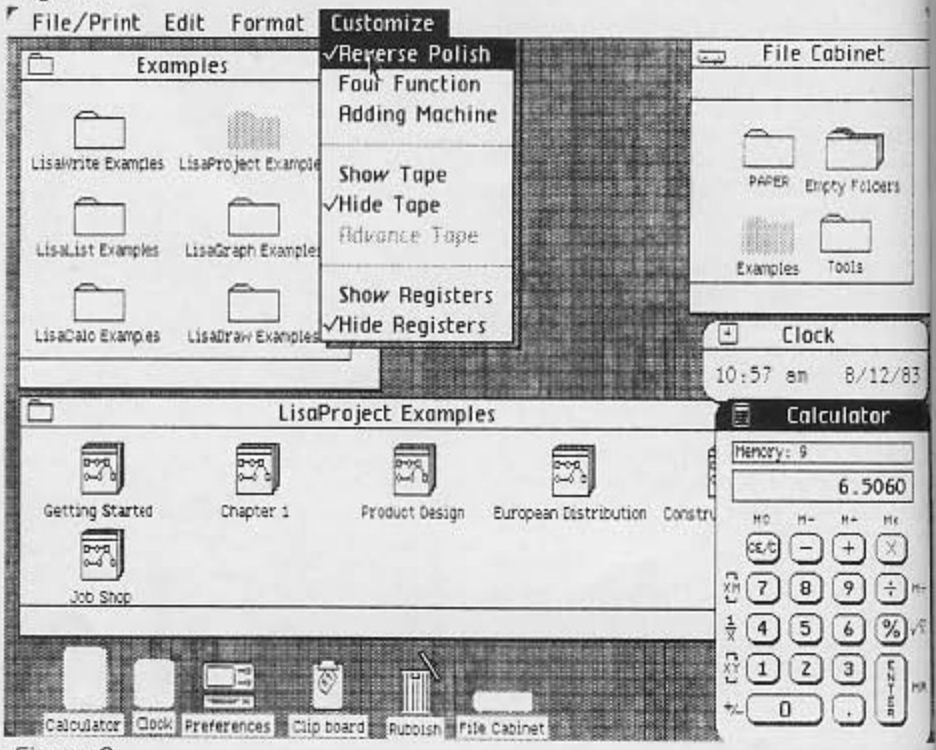


Figure 2

Referring now to figure 2 having decided to open the 'file cabinet', we point to it with the mouse/cursor. click the button twice, and this displays the contents in an expanded window of the same name. The original icon then changes to a white silhouette.

A similar action on the 'Examples' icon within the 'file cabinet' window. Again, from here we choose to open the 'LisaProject examples' folder, and this window occupies the bottom half of the screen. Also on display are the clock and calculator,

selected from 'Tools' within the 'file cabinet'. Moving the cursor to the 'customise' heading in the top menu line, we hold the mouse button down and this has the effect of opening the 'pop-up menu' and displaying its contents. In this case, it refers to the calculator as that was the last selection. Once we point to the required menu option and release the button, the pop-menu disappears and the chosen option is performed.

From the 'LisaProject examples' folder, we select 'European Distribution' and when opened, this gives the display in figure 3. Notice all the symbols around the perimeter of the screen. These are points from which the window may be manipulated. They also show what section of the total 32 square feet of 'drawing board' is in view. The two square white boxes are 'elevators', which, when dragged along with the cursor, shift the viewing window accordingly, up or down, left or right. If the symbol in the top left corner is pointed to and the mouse button pressed twice, the folder will close and the display revert to the image present before the folder was opened. It is obvious that figure 3 is only part of a larger chart, too big to be reproduced here.

Figure 4 is a display of the entire chart reduced in size by using the 'reduce to fit' option of the 'Page Layout' pop-up menu — this clearly illustrates the remarkable 'zoom' facility of the display. Figure 5 displays 'European Distribution' as a schedule chart, with associated resource and task charts below.

In figure 6 we see a screen display from another of the Lisa applications programs, LisaDraw. While this is a printer dump of the screen image, there is very little difference between what you see on the display and what appears on the printer. C.Itoh and Qume supplied customised units with Apple specified hardware and software mods for Lisa.

One experiment we tried with LisaDraw was to write the words *Bits and Bytes* in handwriting on screen with the cursor, surround these words with a box, and instruct the computer to invert the box and contents. We wound up with a reversed mirror image of the box contents!

Figure 8 is a brief example of LisaWrite illustrating two of the many available type styles. Each type style can be made bold, italic, underlined, or a combination of one or more. Subscripts, superscripts, and proportionally spaced styles are also offered. You may move a

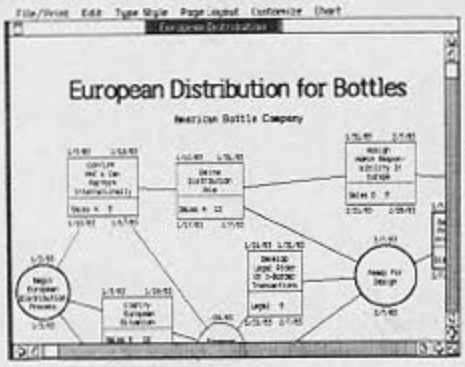


Figure 3

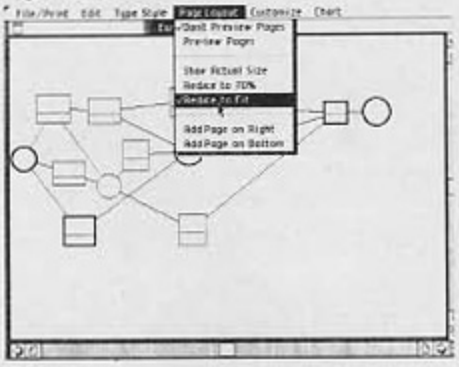


Figure 4

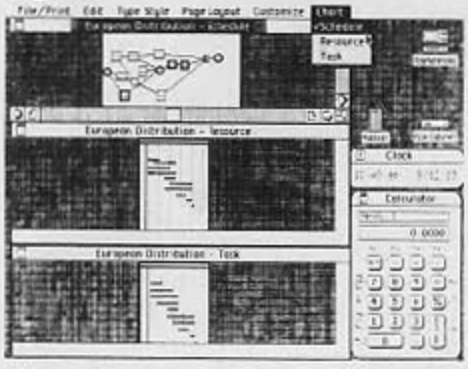


Figure 5

LisaCalc table into your LisaWrite document, edit and format the table just as with text, and enhance it with alternative type styles. Full portability of output between the application programs will come with a new software release later this year.

For the programmer, three languages are available — powerful versions of BASIC, PASCAL, and COBOL. With the Lisa Applications Development Tool Kit, programmers will be able to create sophisticated Lisa style programs to even further extend the computer's power.

I have tried, with this short article, to give you an insight to the marvellous capabilities of 'Lisa and the Mouse'. It may take a bit of effort to break away from conventional concepts to this new one of treating the screen as your 'desktop' upon which you have opened folders, temporary notes, clipboards etc. It is

my opinion that if you have any sort of interest in computers as a tool, you owe it to yourself to at least attend a demonstration of Lisa. The full implications of all that can be accomplished with it can only be realised 'in the flesh', so to speak.

This particular lady was in residence at the MicroShop in Wellington, but there will be an Apple dealer near you who can show you one.

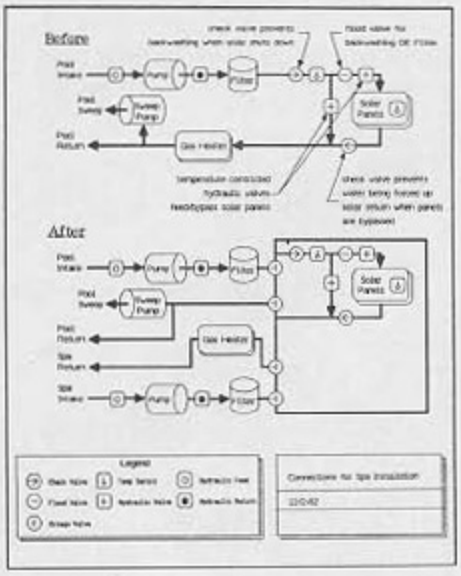


Figure 6

NOVA STEREO INTEROFFICE MEMO

To: All Department Managers

From: Charles Cunningham, Order Processing Manager

Date: July 25, 1982

Subject: Reorganization of Customer Order Processing Department

Effective immediately, order processing will be divided into three departments, each with a supervisor.

Telephone Sales -- Ralph McConnell, Supervisor

Order Entry -- Diane Tucker, Supervisor

Packing -- Linda Hughes, Supervisor

Please give these supervisors your cooperation.

Figure 7

New from Apple products

Apple didn't just announce the new MacIntosh computer (see review this issue) in early February but a range of new products.

At the top of the line these included three new versions of the Lisa called 2.0, 2/5 and 2/10.

Curiously, however, none of these new versions can run existing Lisa software.

The 2.0 comes with the MacIntosh operating system, the 9cm (3½ inch disk drive of the MacIntosh and 512K of RAM enabling it to run all MacIntosh software. But to run Lisa software it needs 1 megabyte of RAM and preferably a hard disk.

Similarly the 2/5 and 2/10 have five and 10 megabyte hard disks but again only 512K of RAM.

CED Distributors Ltd (New Zealand Apple agents) says an upgrade to a full megabyte of RAM will be available and it says the "unbundling" of the Lisa enables those who want to run Unix or other 32-bit software at a lower entry price (not that there is much of that software available in New Zealand yet).

The 2.0 is expected to sell for around $8000 although pricing has not been confirmed as yet and stocks of the new Lisa and MacIntosh are not expected to arrive until April.

Meanwhile production of the original Lisa has stopped, but existing users will be offered a free "upgrade." The upgrade replaces the two 5 inch drives with the higher speed 3½ inch drive allowing the Lisa to run MacIntosh software.

Mouse Paint

Also on display at the MacIntosh launch was the mouse for the Apple IIe and Mouse Paint similar to MacWrite and although not as sophisticated, impressive none the less. Mouse Paint is expected to se for $300-$400 in New Zealand an is the only commercial packag available which uses the mouse a present.

Other new products for the Appl IIe are:

- Applework – an integrated wor processor, spreadsheet, data base package
- Profile hard disk
- Dual disk drive unit
- ProDOS operating system – a adaptation of the Apple III operatin system which promises to be muc more sophisticated than the presen DOS 3.3. Most programs writte under that operating system wi continue to run under ProDOS but a number of software houses are revising their software to take advantage of ProDOS's features.

Also announced was a revamped Apple III (called Apple III plus) with a high resolution video, clock, and different keyboard.

The people at Apple have been very busy over the past year (although it could take several months for all these new products to be readily available in this country) and the Apple II and III are still far from dead computers. No word on earlier reports of a stripped-down Apple II being released at $US500. It seems this is not going to eventuate for a while yet.

NZ Beginning

The new start date for the New Zealand Beginning, the Apple only database, is April 1.

Post your subscription today

Zenith Z-100 – "A real wolf in sheep's clothing"

By George Barna

How would you like to buy a desktop computer you can run IBM-PC software on, does everything an IBM-PC does and more and is cheaper? Look no further than the Zenith Z-100. I had the great pleasure of playing with this machine for about a week, so I will tell you a little about it.

The company that makes this machine make radio and television sets in the USA. They used their experience in making electronic gadgetry to produce a top class personal computer. A real wolf in sheep's clothing by what I gather to be a subsidiary, Zenith Data Systems.

The review machine was the all-in-one model, with integral keyboard, green screen, a 10 Megabyte hard-disk drive, 5.25in floppy drive and a heap of manuals.

Excellent Documentation

I have a rule that I never even switch a machine on until I read the manuals, which meant that my weekend was spent worming my way through these superb volumes of the best documentation I have seen. Yes, I have seen IBM's, and some other good ones, but they could all take lessons from Zenith.

The hardware is fully described in every detail, theory of operation, down to the code listings in the ROMs!! If you need it, it's there. Whether you are a boffin or a casual user there will not be anything you will be left wondering about.

The software manuals for setting the machine up are equally faultless. Zenith went even as far as rewriting the Microsoft Basic manual, adding further explanations where they felt it was necessary. There was certainly no effort spared in producing a complete set of manuals.

Hardware Flexibility

The Z-100 comes in different flavours but they all have one common feature: dual Intel 8085-8088 processors. What does this mean to you? In very simple terms, it means that you can run the thousands of application programs that have been writing over the years for CP/M, plus all the new 16 bit packages.

There is also an S100 bus. A mother board with four open slots (three if hard disk is installed). High resolution green screen (225 lines of 640 dots), and optional colour. With the colour screen the resolution is 320,000 pixels. In addition to R.G.B. there is control of black, white, cyan, magenta and yellow. 128 Kb of RAM, expandable to 758 Kb. The floppies have a capacity of 320 Kb, which I would find restricting, but I am spoilt by 700 Kb 5.25 floppies. For most uses 320 Kb is quite sufficient, especially if you have the 10 Mb, hard disk drives, in which case you would use floppies only for backups.

Hard disk floppies

The hard disk drive is another highlight of this remarkable machine. On the hard disk utilities disk there is a program, PART.COM. With this the 10Mbs can be partitioned into up to 16 segments, (IBM is 4) either in CP/M-85 (the Zenith version of CP/M), or in Z-DOS, which is the Zenith version of MS–DOS. These partitions are formatted accordingly, depending on which system you define for the partition. Further, you can then nominate any partition you want to boot from on start-up, (IBM only 1) and change it any time by re-running PART. COM. The machine senses which operating system is used, and switches in either the 8085 or the 8088 CPUs. It is also possible of course to boot from the floppy, without worrying whether it's CP/M or Z-DOS.

Other hard disk features are programs such as SHIP.COM, which positions the read-write head over an unused cylinder to avoid damage to the disk surface when transporting the machine, programs to flag bad

sectors, etc.

Keyboard

The keyboard is a delight but why is it non-detachable ? Even on the low-profile models it's permanently attached. That kind of physical configuration went out with the Ark. Also, the screen is rather close to the user for eye-comfort. I like to put the keyboard out of the way when I am writing, and with the weight of this machine it just isn't practical. (Desktop yes, portable no!)

As far as functions are concerned there are no complaints. There are a total of 108 keys. Separate numeric pad with 18 keys, 13 special function keys. There is a key labelled HELP. When entering a command after hitting RETURN the whole command is safely resting somewhere in memory, and by simply processing HELP the command is repeated without having to type it again. Very useful when debugging. I imagine it's not what software authors would use it for.

Everything can be software controlled from key-click to . . . you name it. It is possible to set the machine up with different character sets (English, German etc), the files for these are included on the software disks.

Input and Output

I/O to the world is handled by two serial (RS-232) and one parallel ports. Software for configuring the ports is unique in that after configuration a graphic picture fills the screen with an arrow pointing to the physical location of the port you have just configured. A real bells and whistles CONFIGUR.COM.

On the back of the machine there are several sockets for peripherals such as colour monitor, lightpen, modem, etc. Additional cutouts covered with plastic plugs are also provided if later you wish to purchase additional disk drives. The software can handle 8inch drives as you get them. Utilities are provided to convert existing Z-89 format software to the Z-100 format.

IBM PC compatibility

Earlier I said that the Z-100 is IBM compatible. Mostly this is true. The Z-100 will read a data disk straight from an IBM-PC. Some programs from an IBM will run, some won't. This is because Z-DOS is slightly different from PC-DOS, so if the program makes calls to an absolute address it will most likely bomb out. Also Z-BASIC is again different from BASICA. The difference is mainly due to the Z-100's higher resolution. If you have the source code it can be adapted to run on the Z-100 by making minimal changes. Otherwise you might have oval circles, things like that.

These differences are not all in favour of the IBM-PC. Lotus 1-2-3 will run better on the Z-100 than on the IBM, again the result of the better resolution. There is heaps of software available for the Z-100, and looking at the prices they're not only reasonable, but downright cheap, something you don't often see these days.

A shor: list of don't likes: no attached keyboard, heavy weight, noisy fan which I attribute to the small air vent, producing high air speeds. Sounds like a vacuum cleaner, and if I am correct in diagnosing the cause, very easily fixed.

In closing I would like to give Warburton Franki, (importers of the Zenith range of micros, who kindly provided the review machine) a small piece of advice: Hire the most powerful public address system they can find, ug it up to Mt Ruapehu and tell New Zealand buyers all about the Z-100. They keep a very low profile, too low for their own good. This machine deserves better publicity than it's getting.

Stop Press: Z-DOS vers. 3.0 is d any day, with RAM dis multitasking, hierarchial f structure. Next thing, they'll ha Unix. (Sigh!!!)

Microcomputer Summary

Name:	Z 100
Manufacturer:	Zenith Data Systems.
Microprocessor:	Intel 8088 and 8085.
Clockspeed:	5MHz.
RAM:	128K upgradeable to 768K.
Input/Output parts:	Two RS232, one parallel, RGB.
Keyboard:	QWERTY, typewriter style.
Display:	24 lines x 80 cols plus 1 status line.
Languages:	M Basic, Z Basic (for colour) and others.
Graphics:	225 lines of 640 dots, but with video interlacing 50 lines x 640 dots (320,000 pixels). Colours; black, white, red, green, blue, cyan, magenta, yellow.
Sound:	Yes
Cost:	With Twin 5¼in floppy $5,000 plus sales tax With 10 meg Hand Disk $10,000 plus sales tax (mo reviewed)
Options:	IEEE port. Extra RAM in 256K blocks. Operating Systems: ZDos (ie MSDOS) and CPM 85 (ie CPM
Peripherals:	Upgrades by ways of S100 bus; Dual 8 inch floppy drives $3850 Single 8 inch floppy drive $2782 10 megabyte Winchester drive $3900 256K RAM Blocks $1390 All plus Sales Tax.
Other features:	8 bit & 16 bit software compatible. IBM P.C. compatible.
Reviews:	Documentation: 5, Ease of use: 5, Language: 5, Expansion: 5, Value for Money: 5, Support: unable t judge. Note: Was voted with the IBM PC as the best perso computer on the market by Silicon Valley's "Home Brew Computer Club".

Review unit from Warburton Franki, 44 Oxford Tce, P.O. Box 30651, Lower Hutt.

Osborne back

Sirius systems, New Zeala master agents for Osbor computers, report that it is aga receiving stocks from the Unit States – and the prices of both t Osborne 1 and Executive have be reduced.

The Osborne workhorse, t Osborne 1 is apparently bei supplied from stockpiles in t United States and is now retailing $3143 (previously $3850).

The Executive, being man factured under licence in Canad now retails at $5206 (previous $5950).

As well two more Osborne mode are reportedly in the pipeline. T Vixen, smaller Osborne 1 (is th possible?) and the much talked abo IBM compatible Osborne PC.

Sirius systems can be contacted a P.O. Box 9645, Newmarket.

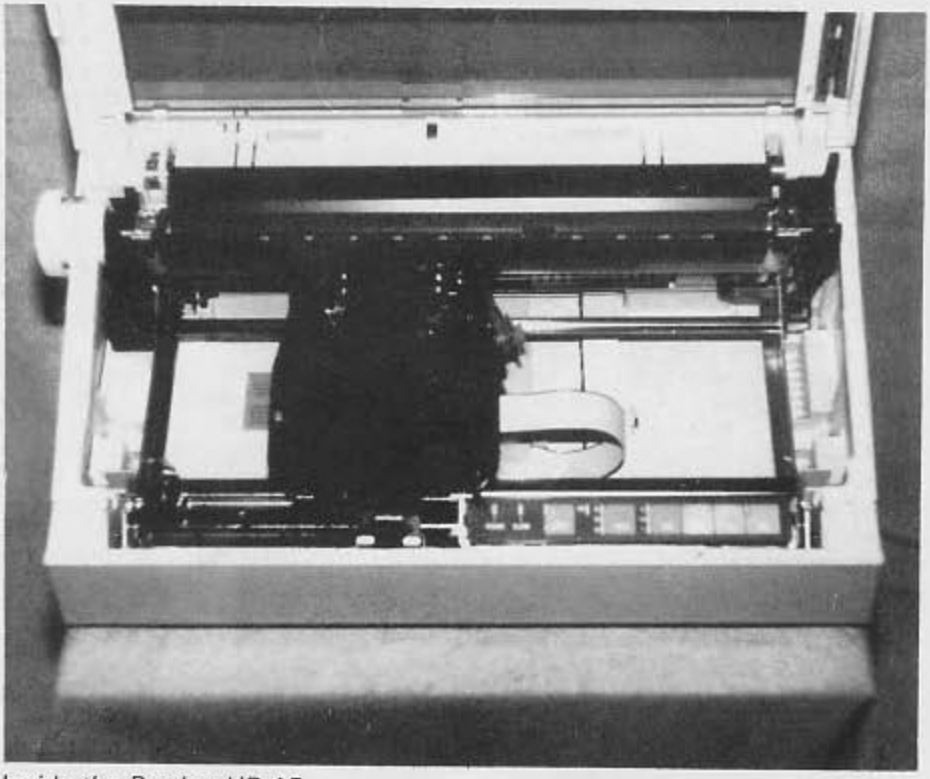
Low cost, letter-quality printing

1: Brother HR-15

By chance, Shayne Doyle was offered a second Daisy Wheel printer to review at the same time as he was starting on the Brother unit. This was a good opportunity to compare two direct competitors at once, and the following are his findings on the two printers. Both these machines are seemingly priced to attract the home-computer user, but Shayne Doyle says that in his opinion the low speed of these printers steers them to a fairly specialised market, and a business or commercial user would certainly require more speed than 13 characters per second.

Typical of most Brother products I have seen, this printer is very smartly styled in the standard stone colour of many printers. The unit has very clean lines and is designed to be extremely convenient to use. The top front surface has the membrane switch and indicator panel – colour coded for quick recognition. Controls are character pitch, line pitch, TOF, LF, select (on line), and copy (see below). Paper release and bail release levers protrude at the right of the carriage, and the paper bail has a 0-110 scale inscribed on it. Roller wind knob is on the left, and a paper rest slots into the rear of the machine. This has a sliding stop for quick positioning of cut sheets. The entire top surface lifts up, and this gives easy access to the interior.

At the right rear are the two interface sockets, with an easily accessible DIP switch bank beside each. The serial interface operates from 110 to 9600 baud and uses the standard DB25S socket. I was not able to get it to operate on my usual "bare bones" serial cable, and after a bit of investigation with a logic probe, I found that pin 4 (RS – always high) and pin 8 (CD – needs to be held high to accept data) had to be strapped together. The parallel interface also was a bit of a problem



Inside the Brother HR-15

– while the manual gives pin-outs for a normal 36 pin Centronics socket, the machine has 24 pin socket fitted. This would cause trouble for anyone buying it without a supplied cable.

This printer has two especially useful features, the top-of-form load and copy function. The former will load a cut sheet to the correct position at the first press, and eject the sheet when pressed again – a delight to use, and a feature more printers should have. The copy feature enables you to send a document to the printer (preferably less than the 2K buffer size), and as well as printing it immediately, it is left in the buffer. Thereafter, each time the copy switch is pressed, another copy of the document is printed. The only drawback is that the switch has to be pressed for each copy.

In practical use, it is not too noisy in operation as daisy wheels go, although obviously slow at 13 characters per second (c.p.s.). When the red ribbon is selected, or bold or shadow mode is used, the speed drops dramatically. To access the red ribbon, the normal black cartridge has to be raised for each character printed, and this slows things down. Bold and shadow mode are also slower due to the need to strike each character twice. I was disappointed in these two modes. I do not think the difference between normal and these type modes was very noticeable at all with the font wheel fitted – Prestige 1012. This font gives an extremely fine character (see print sample).

TEST PRINT - BROTHER HR-15 DAISY WHEEL PRINTER

This is a test print in standard print mode

This line should now be printed in double print

This line should be printed in shadow mode

Underlining is handled

This line is printed at 12 cpi

And this line is printed at 15 cpi

I particularly liked the line feed action – if the switch is held on, it gives a fast continuous feed. Top of form/form feed is also just as fast, and fairly quiet. A serious design error in my opinion is the paper out detector and alarm. This only operates when the optional tractor unit and cut sheet feeder unit are used. In practice, when using single sheet the printer will carry on printing on the bare roller when the paper runs out. This is not good enough, and should be changed with the next version. The machine do not have any form of feed f sprocket-hole continuous station only friction feed.

For a daisy wheel printer, there a quite a few functions available: au LF on/off, bold and shadow print, H and VT positioning, left and rig margin setting, top and botto margin set, red or black print, In and character pitch change, pag length set, reverse and positive ha line feed for subscript/superscrip bidirectional logic seeking mod on/off, proportional spacin underlining, and auto hyphenating. was disappointed to find that I cou not underline spaces – I ha occasion to print a form, and this the way I use to print lines to b completed.

In summary, I would have to sa this was a good machine to use, bu if I had a need for a daisy-whe printer, I would be looking for a un that had built in pin/tractor feet Apart from that and the paper-ou alarm problem, the Brother HR-15 a very versatile printer in this pric range. Adding the optional keyboar would increase its versatility an allow it to be used as a conventiona typewriter.

Printer summary

Name:	Brother HR-15.
Type:	Daisy wheel.
Character set:	96 ASCII, interchangeable daisy wheel. Expected life of 10 million strikes.
Optional wheels:	Quadro 1012, Prestige 1012 (fitted), Quadro 15, Script 1012, Prestige Italic 1012, Pica 10, Grande 10, Elite 12, Brogham 10, Brogham 12, Symbol 10, OCR-B 10.
Print speed:	13 cps max. 10 cps (Shannon font, pica pitch).
Print direction:	Bi-directional, logic seeking.
Line spacing:	3, 4, 6 lines per inch.
Characters/line:	110, 132, 165.
Paper width:	13.5 inches.
Paper feed:	Friction platen.
Copies:	Original plus 4 copies.
Buffer:	2K, future option of 8K.
Ribbon:	Cassette, with secondary red ribbon on micro spool.
Interface:	Non standard 24 pin Centronics parallel RS-232C serial, 110 to 9600 baud.
Noise level:	Less than 65dB.
Dimensions:	464mm (W), 304mm (D), 165mm (H). 8.9 Kg weight.
Price:	$1895.
Options:	Tractor Feed unit $325. Cut sheet feeder $579. Keyboard unit $420.

Review model from Whitcoulls Commercial, Wellington. Distributed by: Brother Distributors.

2: Logitec's WP-550

By Shayne Doyle

This printer, of obviously Japanese manufacture, would be a good choice for the computer user wishing to obtain the high quality print given by a daisy wheel printer, without spending "big bucks". An added advantage of this type of printer is the ability to exchange the print wheel for another with the particular font and pitch one requires for a job.

The Logitec is of average size,

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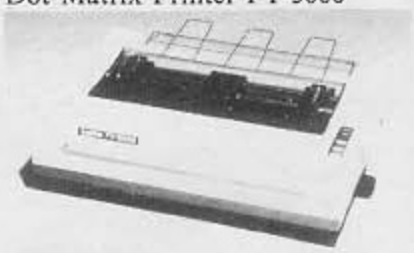

Recommended Retail $779

Daisy Wheel Printer WP-550

Recommended Retail $1350

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WARBURTON FRANKI Trading in Technology

finished in the almost stock stone colour so many Japanese printers come in. Along the front face is the control panel, with online, LF, FF controls, and online, ready, and alarm LED's. The switches are membrane covered microswitches. A paper feed knob protrudes from the left side. On the top right surface are the paper release and bail release levers. The paper bail has the character positions marked on it, and the left side of the roller has calibrated scales inscribed on it also. The power cord plugs into the left side and both Centronics and serial cables enter through the rear of the unit.

A rudimentary tractor/pinfeed facility is provided, somewhat flimsy in construction but nevertheless allowing the use of continuous stationery without added expense. The pinfeed covers hinge vertically and I found it quite a struggle to load fanfold paper easily under the back edge of the raised covers. This printer does have a "paper out" alarm, which is essential if one is using single sheets. The configuration switches for each of the standard interfaces are mounted below each socket: two sets of eight each. They are, however, set half an inch too low to be easily accessible. Fiddly probing is required to operate them without removing the case.

In use, the printer was fairly noisy although this is to be expected of a typewriter-style, hammer-print mechanism. When printing normal mode, the speed seems faster than the 12cps maximum. When printing in bold or shadowed mode, the speed drops to about half, as each character is struck twice, offset by 1/120th of an inch for shadowed mode. Both line feed and form feed are quite fast although the latter is noisy. Line feed auto repeats if the switch is held in. I found the pri quite easy to read, and both the bo and shadowed modes are marked different from the basic print. Th wheel fitted as standard gives strong, well-defined characte Obviously the user will buy and f the font wheel that suits person taste.

In addition to the print option shown on the print sample, th following functions are initiated, b appropriate Escape control codes left and right margin set; 3/4/6 line per inch; bidirectional printing on/off lines per page; negative/positive ha line feed for superscript an subscript print; continuous o individual word underlining Although the user manual with thi evaluation unit was obviously a pre release copy, it covers all facets o the printer's operation, care an maintenance.

Summing up, this is probably on of the least expensive routes int typewriter-quality computer output The Logitec does not offer costl fancy frills and facilities, but good performance for reasonable cost.

TEST PRINT - LOGITEC WP-550 DAISY WHEEL PRINTER

This is a test print in standard print mode

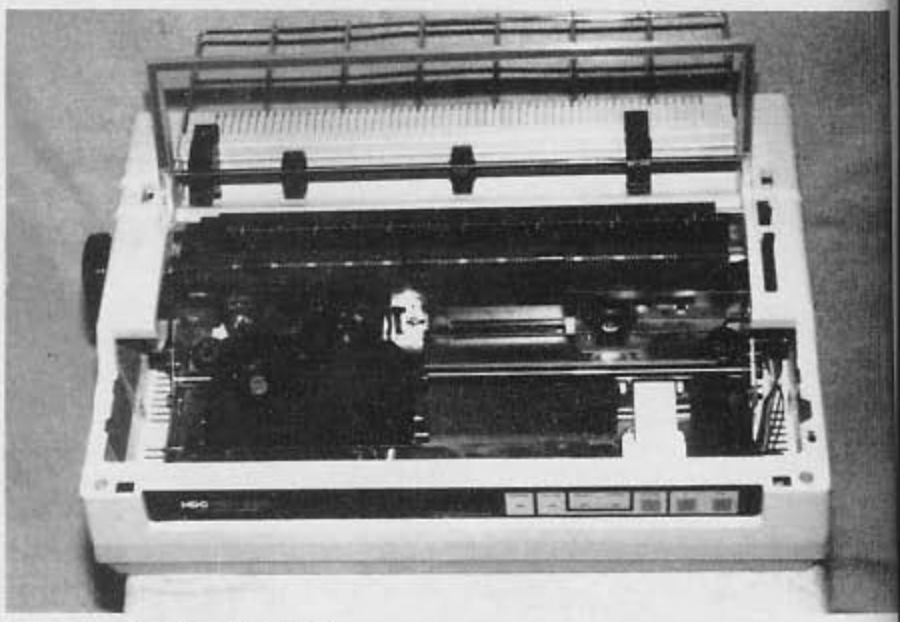
This line should now be printed in double print

This line should be printed in shadow mode

Underlining is handled

This line is printed at 12 cpi

And this line is printed at 15 cpi



Inside the Logitec WP-550

Printer summary

Name:	Logitec WP-550.
Type:	Daisy wheel.
Character set:	100 ASCII, interchangeable daisy wheel, expected life of 6 million strikes.
Optional wheels:	Prestige 1012, Courier 1012, Mikron 15, Cubic 10, Great Script 10, Orator (90) 10.
Print speed:	12cps at 10cpi, 13cps at 12cpi, 14cps at 15cpi.
Print direction:	Bi-directional, logic seeking.
Line spacing:	3, 4, 6 lines per inch.
Character/line:	115, 138, 173.
Paper width:	13.5 inches.
Paper feed:	Friction platen and/or Pin feed.
Copies:	Original plus 4 copies.
Buffer:	Unspecified.
Ribbon:	Cassette.
Interface:	Standard 36 pin Centronics parallel RS-232C serial, 110 to 9600 baud.
Noise level:	Less than 65dB.
Dimensions:	485mm (W), 302mm (D), 130mm (H).
Price:	$1350.

Review model from Moonshine Computers, McDonalds Plaza, Wellington. Distributor: Warburton Franki, Ltd.

TRS80 16-bit launched

The Tandy Corporation, maker of the TRS80, has launched its 16-bit personal computer, the TRS80 Model 2000, in the United States. This is a strong rival for the IBM PC, and Tandy is marketing it on the facts that it sells for 25 per cent less than the IBM PC, and runs three times faster. It incorporates an Intel Corporation circuit which Tandy says is the equivalent of a dozen circuits used in most microcomputers.

The TRS80 Model 2000 is available in two versions. The 128K RAM version has two disk drives storing a total of 1.4 megabytes of data and is selling for $US2750 in America. A hard-disk (10Mb) version is selling for $US4250. Both systems can be expanded to 768K RAM.

Software available for the Model 2000 includes dBasell, MultiMate, and MultiPlan.

American commentators predict that the Model 2000 will force down the price of many IBM PC work-alikes, but foresee problems with a predicted new IBM personal computer, code named the Popcorn, expected out in the northern spring. This is expected to be in effect a Model 2000 work-alike, using the same new Intel chip, the 80186, but expected to be able to serve many users at once rather than the one user served by the Model 2000. Production of the Popcorn, it is predicted, will dry up supplies of the 80186 chip, causing production delays for Tandy.

Sanyo 16-bit

Early April will see the release of the Sanyo MBC 550 and MBC 555 microcomputers. These 16-bit machines have 128K RAM as standard, high resolution colour graphics, either one or two 5¼ in floppy disks. The tax-paid price is $2,300 with one disk or just under $3,000 for two disk drives (the 550 is the one-drive machine; the 555 has two).

The MBC 550

The standard MS DOS operating system gives access to an extensive range of readily available software, and will run most IBM PC programs.

Mr Ken Davis, sales manager of Sanyo, says the MBC 550 brings the latest 16-bit technology within the reach of most New Zealanders.

UK news on hardware

On the sales front the Sirius still led the published polls for business micros in Britain at the end of 1983 with its stablemate, the Apricot, moving up at number 6. IBM-PC and the Apple II are in slots two and three. Meanwhile, the Commodore 64 has moved to No. 1 in the home market ahead of the Spectrum and the BBC. The Electron is beginning to show after the mandatory early supply problems. One British magazine was moved to describe Electrons at Christmas as, "as rare as a win over the All Blacks." The sad news is that the company manufacturing the FORTH-based Jupiter microcomputer went bankrupt in November.

Rumours were also circulating that the awaited BBC second processors would be priced at almost twice their original stated price when released by Acorn. *Personal Computer News* went so far as to publish these comments and attribute them to Acorn staff. This would make a simple 6502 second processor as much as a fully configured BBC computer and a Z80 one the price of a Torchpack, which contains its own processor as well as twin disks. BBC users can relax. Even if the reports were true the only losers would be Acorn. Alternative suppliers have already shown themselves more than capable of delivering such second processors at the original prices and indeed have cut prices in recent months.

Torch models

Torch Computers Ltd, of England, has announced the release of 300 and 700 series computers in addition to the present C series machines. C series models feature colour, high-resolution graphics, CP/M, and come complete with a comprehensive software package, including word processing, database, utilities and communications programs. They have twin processors — a 6502 handling all peripherals and a Z80 running application programs under CPN, Torch's CP/M compatible operating system. The 300 series Torch intelligent, colour work stations are designed for Torchnet, to run programs, use Net-Mail and perform most office functions. They can be used as terminals to other computers, including IBM. Each 300 series model has the same processing power and peripherals as the standard C.

The 700 series Torch computer in addition to the Z80 and 6502 processors, incorporate a 68000 processor, and a minimum extra 256K RAM.

Software scrutiny

The importance of the computer software industry to New Zealand has prompted the DSIR and the Department of Trade and Industry to initiate a study into this area. This joint project was set up late last year. A small team from both departments will be led by Mr Martin Kaiser, of the Physics and Engineering Laboratory, DSIR.

It is proposed that a DSIR Discussion Paper will be produced in mid-1984 to promote a wider understanding of the New Zealand software industry.

To obtain facts and figures on the industry, a questionnaire is being circulated to companies which are producing software in New Zealand, for sale locally and for export.

Mr Kaiser

Sinclair's latest

More news on Sir Clive Sinclair's latest machine, the QL (for Quantum Leap). The retail price in Britain is £399, it has high-resolution colour graphics 128K RAM memory (expandable by a 0.5Mb RAM pack to 640K), two built-in 100K microdrives, and a 65-key keyboard. Capabilities include multi-tasking and window display. It weighs just over three pounds, and offers full networking, dual-joystick, and ROM cartridge expansion capabilities. Up to six of the microdrives can be stacked externally, giving up to 800K maximum storage.

Based on four Sinclair-designed semi-custom IC's, the QL's specification incorporates a 32K ROM containing a QDOS operating system and Sinclair SuperBASIC, an enhancement of Spectrum BASIC. The processor is a Motorola 68008 32-bit processor with one megaby of linear address capability.

Sinclair is developing the follow enhancements: 0.5Mb memo expansion board, Pascal compil assembler, terminal emulat analog-digital interface, hard d interface, modem, parallel print interface with multi-channel sou generator, and a IEEE-488 interfac

Sinclair expected to be supplyi its first British mail-order deliver by the end of February. British reta and American and export sales a planned for the third quarter of t year.

The market is described "serious" home users, small a large businesses, professionals, a education. However, the exter storage and lack of software m well hinder sales to the busine market.

N.Z. assembled

We have received details of tw New Zealand-assembled micr computers.

The IMC-1000 dual micr processor system consists of stylish cabinet which has two di drives, three peripheral board slot plus a cooling fan built in, and detached 97-key keyboard. The Z8 and 6502 microprocessors allo software from both the CP/M an IMC/Apple/Franklin range to b used.

The IMC DOS is provided in 4 ROM, with 64K RAM as standard.

The video provides for both hig (280 x 192, 6 colour) or low (40 48, 16 colour) resolution and software switched 40 or 80 colum text display.

The IMC-1000 MkI has two 163 drives for $3995, the MkII has tw 356K drives for $4995 while th MkIII has one 10 megabyte hard dis plus one 356K floppy disk drive fo $7995.

The IMC-1000 range is available from MicroMart Computers Ltd, 41 Dominion Road, Auckland.

Commodore change

Jack Tramiel, the man who pilote the growth of Commodore International, Ltd, from a typewrite shop in New York 25 years ago, has resigned as president of the company. He owns about 7 per cen of the stock of the company.

Supercuda contest winner
Aaron Crook of Upper Hutt

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32-bit micro from CRDS

Microprocessor Developments, Ltd (MDL) has announced that it is releasing the Charles River Data Systems 32-bit microcomputer in New Zealand.

MDL has produced locally manufactured computers since 1976 with the MX Series multiprocessing systems its current model. It is also the New Zealand distributor for Epson Corporation desk-top computers and dot-matrix printers.

The CRDS computers have full 32-bit data transfer on the 20 MHz band width Versabus, 12.5 MHz clock rate, dual 68020/68000 processors, (initial releases use dual 68000 processors), and high speed cache memory eliminating wait states at full clock speed.

Up to 62 user ports are available with additional specialist hardware boards for floating point accelerators and some very fast array processors.

The operating system is CRDS's own implementation of UNIX and a full range of languages includes C, PASCAL, RM COBOL, FORTRAN 77, BASIC and Data Base Management.

The use of VLSI technology provides exceptionally high reliability and performance. The 68/05 Universe model including 512K RAM, 10 Mb hard disk, 1.2 Mb floppy drive will sell in New Zealand for $20,000 plus software and sales tax.

An immediate customer for the product was Auckland University. Several other universities and research centres are interested.

Access Data out

The putting into receivership of Access Data Corporation Ltd, on February 13 is a reminder that New Zealand is not excepted from the volatility that buffets the computer industry overseas.

NZI Finance Ltd, which had a debenture over the company's undertaking put Access Data, 80 per cent owned by Autocrat Sanyo, into the receiver's hands.

Access Data distributed an American portable computer called the Access, from an unrelated company, but its main line was Altos multi-user microcomputer systems.

A new, New Zealand made microcomputer, the SAM80, had just been launched by Access Data.

Perhaps the most hurt are the staff of 20, who lost their jobs without notice. Whether they would receive any redundancy pay was not clear at the time of going to press.

The IBM PC Junior

This is what the IBM PC Junior (the "Peanut") looks like. Distribution in New Zealand is believed to be still some months away.

Microfloppy

The Shugart Corporation has introduced a double-sided, micro-floppy disk drive capable of storing 1 megabyte on an industry standard hard-shell 3.5in cartridge. The Shugart 350 is a follow up to the model 300 announced a year ago. Occupying just quarter of the volume of a normal 5.25in minifloppy disk drive. It provides 1Mb of unformatted capacity, 6 millisecond track-to-track access time, and 80 tracks per side. Like the 300, the 350 uses a straddle erase head which will support the efficient 10 x 512 byte sector format which yields 409.6 Kbytes per side when formatted. With only nine moving parts, these drives are quieter than most minifloppies. The 300 and 350 are 1.6 inches high, four inches wide and 6 inches deep, and weigh 1.3 pounds. Other key specifications are a transfer rate of 250 Kbits/sec and mean time before failure rating of 10,000 power-on hours. Evaluation units of the 350 will be available for the first quarter of 1984, with volume shipping in the 2nd quarter. The 350 is priced at under $US200 in OEM quantities.

BBC BASIC on Z80

The BBC's widely praised BASIC has just been released to run on a Z80 processor using CP/M disk operations. Apart from the benefits of BBC BASIC's structure this also gives access to facilities to assemble Z80 code from within the BASIC program as in the 6502 version but with Z80 opcodes. Program compatability (apart from certain disk commands) appears to be extremely high between the two BASIC versions. The BASIC is of greatest immediate interest to Torchpack owners who can now work in a BBC language but using the extra memory of their Z80 co-processor. Its eventual value is much wider. The cost is £110.

LANGUAGES: 1

Introduction to Machine Speak

By Gordon Findlay

A programming language is not quite the same as a human language, such as English or French. These languages can tolerate an amount of vagueness, ambiguity, repetition or incorrect construction. Everybody understands the (incorrect) phrase, "I done good in English at school," even though the speaker may not have managed to make a 100% score as far as the grammar is concerned! But the (almost) correct statement in the programming language BASIC "PRINT A.B.C." is completely meaningless! To understand why programming languages are so critically concerned with exact expression, it is necessary to know what happens as a computer tries to follow a program (that is, to 'execute' it).

A program is nothing but a list of precise, unambiguous, all-inclusive list of instructions. Here is part of a "program" for knitting a jersey:
K 2 tog, k 9,, K 2 tog, sl 1, k1, psso, k 9, k 2 tog
P 2 tog, p to last 2 sts, p2 tog . . .

Here is part of a "program" for assembling a Morris Minor gearbox:
1. Refit the reverse gear and selector fork.
2. Place the layshaft gear unit, and the correctly sized thrust washer in position on the bottom of the gearbox.
3. The mainshaft is entered into the gear-box casing, the drive gear fitted in position . . .

That's all a program is — a careful list of instructions. But at heart a computer is just a lump of impure silicon, responding to on-off electrical signals. These signals are represented in the form of binary numbers, or numbers made up from 0 and 1 only. Here is a bit of a program which I wrote once:

00101010 01000000 00100000 11011101
01111110 00000000 11111110 00000000
00101000 00000101 01110111 00100011
11011101 00100011 11101111
00011000. . . .

And that is how programs had to be written once — directly in binary. As you can see, this is likely to be very tedious, and very error prone — it would not be at all easy to find a "1" which should be a "0" in the middle of a few thousand lines like these two.

The translator is either a *compiler* or an *interpreter*. A compiler translates the whole program into machine code, and produces a complete low-level program which is run separately. An interpreter works through the high-level program, translating it statement by statement as it comes to them, and executing the result immediately. This means that a statement which is repeated, say in a loop, must be translated repeatedly. The translation is not kept for re-use. Consequently, interpreted programs usually run much more slowly that compiled ones.

Now I must admit to a bit of simplification in the last few paragraphs, but the general idea is all that matters. Just recently have appeared systems which are a combination of a compiler and an interpreter, but they needn't be treated any differently.

Whether a language is interpreted or compiled is a choice made by the programmer who is writing the translator. Languages such as BASIC are easily interpreted or compiled;

others such as COBOL and Pascal are easier to handle by compilation.

Where do the translating programs come from? At least one comes with your micro. "BASIC in ROM" means that the computer has a BASIC interpreter stored permanently in computer memory. Other compilers and interpreters may be added from disk, or tape.

Generally speaking, interpreters are better for the sort of interaction which goes on between a person using a personal computer and his program. An interpreter makes the work of debugging and altering programs much faster.

There are a lot of programming languages. An American academic, Jean Sammett, has listed over 300. Only a few are in common use. Let's have a very brief look at the main features of a few of the main high-level languages.

FORTRAN

Fortran was one of the earliest, and has gone through many different versions — FORTRAN II, BASIC FORTRAN, FORTRAN IV (the most common), and the latest FORTRAN 77. It was designed for use in scientific and mathematical programs, as the name, which is short for FORmula TRANslation, suggests. It lacks many things which have appeared in programming languages since the mid-fifties, but is still in common use. It includes the major concepts of loops, branching, subprograms and so on, but has little provision for handling non-numerical data.

COBOL

COBOL is also a product of the mid-fifties. The name stands for COmmon Business-Oriented Language, and it was designed, chiefly by IBM and a group of important users such as the U.S. Government, to provide a language for business use. It was intended to be readily understood by laymen, such as accountants, and reads a lot like a carefully selected form of English. Major efforts have been expanded to give COBOL useful and powerful commands for handling business problems, and manipulating data of all types, and especially files of data.

COBOL isn't common on micros, but is very important indeed on larger machines.

ALGOL

ALGOL was the first programming language to be designed from scratch to be machine independent and to be precisely specified in advance. The major version, ALGOL-60, appeared in 1960, a has been a major success. N because many used it, but becaus influenced the development of la programming languages in fundamental way. Anot mathematical language, ALGOL w more popular in Britain and Euro than in the United States, and w primarily used in universities a research establishments. La revision and extension produc ALGOL-68, but this hasn't rea taken off at all.

PL/1

Once a number of languag appeared, it was an obvious idea try to take the best parts of all, a combine them, together with all t other goodies that could be thoug of, and design one language replace the others. IBM (again!) trie with the language PL/1, which neither scientific nor business in orientation, but contains t constructions needed for bot Unfortunately, PL/1 became anoth addition to the language rank rather than a replacement. A immensely powerful language, PL is rarely found in use apart from o the largest machines.

Ada

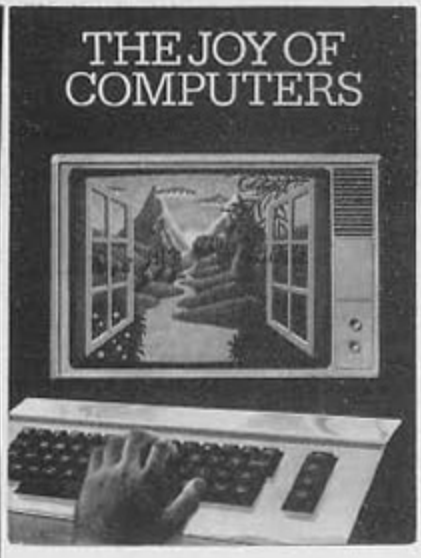
Ada is a very new languag designed for the biggest user c computers in the world — th American Defence Department. Th department found itself with a enormous number of computer being programmed, more or les reliably, in a variety of language The decision was made to design powerful language which could b standardised on, and implemente reliably and easily on virtually an machine. Ada is however not easil implemented on a micro

There are lots of others. APL is strange, very powerful mathematic language. LISP is a language used fo list processing, and for experiment in artificial intelligence.

Logo is a recent addition. Based o LISP, Logo was designed fo teaching children to think, and most famous for its graphic abilities, expressed in the form o "Turtle graphics". But don't thin that there is nothing else to Logo — is a full featured language.

The list is endless. Even the name have a strange ring: JOVIAL FOCAL, ALGOL-W, MODULA, Euler CESIL. But what about the obviou omission — BASIC? Parts two an three of this series will deal with the four most important languages in the small-computer world (BASIC Pascal, FORTH and C) in more detail

The BITS & BYTES Computer Book Club



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Basic Computer Knowledge — **John Moss**

Broadly based foundation for anyone wanting to make a career of data processing, or working in accounting, sales, personnel or production management. Covers use of computers and place of information, coding, program storage, flow charting, programming in BASIC, software, history.

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The Good Computing Book for Beginners — **Dennis Jarrett**

A ready reference to computing — myths, the inside workings, programs and programming, what to look for, glossary, recommended reading, and how to bluff your way through.

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Microcomputer Colour Graphics Systems — **Donald Bell**

A text manual for those reasonably familiar with using and programming microcomputers. Shows how to devise simple and complex colour pictures or diagrams of any type. Features the Apple II and Cromenco Z2H-GS Super Dazzler interfaces.

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Arcade games covering space, mazes, wars, marathons, driving, draughts.

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VIC 20 Starter Book — **Jonathan A. Titus, Christopher A. Titus & David G. Larsen**

An introduction to programming and understanding the VIC-20, written especially for the first-time user who wants to learn quickly. Avoids highly technical details and terminology, and includes diagrams, photographs, programming experiments, and questions and programming problems (with answers provided).

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VIC 20: Games, Graphics and Applications — **David C. Busch**

A teaching book which uses 20 programs to illustrate the VIC's major features. Thorough explanations and joystick games and programs for home applications.

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VIC 20 Programmer's Notebook — **Earl R. Savage**

Collection of programming techniques, hints and kinks, tricks, subroutines and shortcuts. Equally useful for beginners and experienced VIC users.

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Illustrating Computers (Without Much Jargon) — **Colin Day & Donald Alcock**

A snappy little number for anyone curious about computers as hobby, for education, or as a business, scientific or industrial tool. Easy to read with plenty of cartoon-style illustrations.

Pan — **Our price $6.60. Save 35 cents and earn 1 bonus point.**

VIC

The Commodore 64/VIC-20 BASIC Handbook — **Douglas Hergert**

Alphabetical listing and explanation of BASIC commands and functions. Includes special tips and suggests for using BASIC vocabulary to make programming as simple and efficient as possible. Sample programs demonstrate how to use commands in their proper syntax, and sample output screens show exactly what the commands do. Provides knowhow to convert the 64 or VIC to do a multitude of home and office tasks.

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

The VIC-20 Connection — **James W. Coffron**

Shows how easily you can use the VIC along with household devices. Outlined techniques for using the computer to control a home security system, a home temperature system, a voice synthesiser to make the computer talk. The VIC is well suited for connecting to non-computer devices and this book provides many ideas and with the knowhow on what to do.

Sybex — **Our price $17.05. Save 90 cents and earn 1 bonus point.**

VIC Revealed — **Nick Hampshire**

A comprehensive look at the VIC 20's hardware capabilities, uncovering features such as programming power given the limited memory, game and graphics technology in the video interface chip, and I/O capabilities. Detailed VIC memory map, explanations of BASIC ROM variables, user memory and data storage. Complete instruction set for 6502 CPU disclosed, along with options for using machine code subroutines in VIC BASIC programs. Sound-effects programming and graphics programming described and an outline provided on how to extend the VIC's home applications.

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VIC Graphics — **Nick Hampshire**

Explains theory of high resolution graphics plotting and the VIC's multicolour code, with applications ranging from art and games to educational simulations in maths, science and business. All program listings tested and annotated. Programs cover colour plotting, drawing maps, rainbows, geometric figures, pie charts and line graphs, cursor control, character and shape design, and moving shapes on the screen. Requires use of VIC Super-Expander cartridge with high resolution commands.

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VIC Games — **Nick Hampshire**

Collection of 36 programs covering arcade style, strategy and educational world games. These include driving a grand prix, fighting space pirates, manoeuvring through a maze of land mines, solving Rubik's cube, creating colourful images and accompanying music, finding your way out of a jungle, improving spelling and vocabulary skills.

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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.**

IBM

The IBM PC-DOS Handbook — **Richard Allen King**

A complete guide intended to give you confidence to be creative with your computer's capabilities. Reveals features and functions inside PC-DOS, what you can do with them, and how they go together. Second half of book shows how to become adept at using PC-DOS's more advanced features.

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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 calculations, 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.

Sybex — **Our price $18.95. Save $1.00 and earn 1 bonus point.**

TRS-80

TRS-80 Data File Programming: A Self-Teaching Guide — **Leroy Finkel & Jerald Brown**

Learn by working through the many examples of programming and maintaining data files in BASIC on your TRS-80, and use them to keep track of your information. After learning the principles of file organisation, you go on to more advanced programming techniques, writing your own data file programs, modifying programs, adapting other programs.

John Wiley & Sons — **Our price $35.60. Save $1.90 and earn 3 bonus points**

Problem Solving on the TRS-80 Pocket Computer — **Don Inman & Jim Conlan**

Learn at your own speed, working through problem posing and solving exercises to teach you the "nuts and bolts", then progress to using the computer as a practical tool in areas ranging from logic functions to storing, sorting and searching for randomisation.

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Clean Slate Word Processing for the TRS-80 — **Henry Melton**

For the user — full explanation of commands, examples, hints and shortcuts; manual of functions and applications. For the programmer — information from original design to finished commented source code; concepts, suggestions and necessary facts to implement a custom version of Clean Slate.

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Sinclair

101 Projects for the Z80 — **Frank P. Tedeschi & Robert Colon**

Jammed with hardware and software projects to stimulate imagination and expand skills. Collection of practical projects and a thorough grounding in creative programming. Instructions for building and programming a simple micro unit and guidance to expand it into full-blown computer system with a variety of peripherals.

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Timex/Sinclair Color Graphics — **Nick Hampshire**

Forty-five complete programs of colour graphics for the TS2048 and 1068 computers. The theory of high resolution graphics plotting is explained through programming examples, with a wide range of applications. All program listings have been tested and annotated for easy reference and modification.

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

Introducing Spectrum Machine Code: How to Get More Speed and Power — **Ian Sinclair**

Written specially for the beginner who, in easy stages is shown how to program the Spectrum directly in machine code — knowledge which greatly enhances the machine's uses. Working examples consolidate the lessons.

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Timex/Sinclair 1000 Basic Programs in Minutes — **Stanley R. Trost**

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The Sinclair ZX80 Programming for Real Applications — **Randle Hurley**

Aims to develop in the reader an interest in pushing the ZX81 further that anyone expected it to go when it was first launched. The programs show how to store more numbers than there are memory bytes in the 1K ZX81 and then access this idea in many different ways afterwards. Large, "off the peg" programs, but you can also use these as working examples to illustrate the programming ideas at the beginning of the book. Financial, banking and educationa programs, and a lot more.

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

The Spectrum Programmer — **S. M. Gee**

Provides brief history of ZX range, with advice on setting up the machine and using the keyboard. Describes first steps in BASIC, looping and choice, handling test and numbers, and functions and subroutines. Sections on graphics and sound, logic and other advanced topics. Many programming examples and at least one complete listing in most chapters.

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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.

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The ZX Spectrum and How to Get the Most From It — **Ian Sinclair**

Takes a beginner's viewpoint to setting up and operating the machine, highlighting difficulties and showing responses to incorrect commands. Guides beginner through difficult early stages until confident enough to start designing and entering BASIC programs. Also a useful reference for more experienced users.

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

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

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

Software tapes available

The Spectrum Book of Games — **Mike James, S. M. Gee & Kay Ewbank**

Twenty-one games specially written for the ZX Spectrum – both 16K and 48K. All fully tested and crashproof. Each program is accompanied by an explanation of how to play and how it works, including tips on modifying or personalising it for special use.

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Apple

Apple Fortran — **Brian D. & George H. Blackwood**

Detailed language manual specifically on Apple FORTRAN 77. Written for anyone who uses FORTRAN on the Apple, and also directed at business people and professional people wanting to use FORTRAN in writing business or scientific programs. Progressive format expands simple language concepts to advanced concepts. Brief history of computers, FORTRAN. Wide range of example programs.

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Apple II: Basic Programs in Minutes — **Stanley R. Trost**

Collection of versatile, ready-to-enter programs for more than 65 home and business tasks on the Apple II, II-plus or IIe. Programs for home finances, business calculations, real estate, data analysis, record keeping and education. No knowledge of BASIC programming needed to use programs which can be entered and ready to run in less than 10 minutes.

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

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 providing a library of microcomputer graphics. Works from geometric shapes to multicoloured robots and flying saucers, trees, yachts and colourful backgrounds. Also discusses displaying "billboard" messages using giant letters and numbers.

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

Pascal Programming for the Apple — **T.G. Lewis**

Step-by-step guide and examples for both the hobbyist and the professional. Covers fundamentals of Pascal and demonstrates techniques for programming, graphics modules in turtlegraphics, musical tone generators and structure operations. Also many ready-to-run programs for home mortgage repayments, stock market charting and cash flow analysis.

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Software

All About 1, 2, 3 — **Robert Schware & Alice Trembour**

Provides information for potential buyers of the 1, 2, 3 software package. Outlines its capabilities and a general guide to buying a managerial software package for a personal computer. Lots of examples of how it can be used.

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Databases for Fun and Profit — **Nigel Freestone**

For users wanting to do their own programming. Provides straightforward introduction to data processing, with explanations of routines in BASIC. Examples of system designs for home and business use, which you can combine and expand. Systems for names and addresses; catalogue/index; diary; stock control; bank account/budgeting; debtors list/sale/purchase ledger; payroll.

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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.**

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Language/programming

Using COBOL in an MP/M System — **Neil C. Gelb**

Full explanation for programmers, analysts, or anyone wanting to learn how to write COBOL programs for an MP/M system. Examples and discussion of mailing label program, locking out records for updating file records, password protection, relative and indexed data files, status testing.

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Programming With Graphics — **Garry Marshall**

Up-to-date treatment covering the three major methods of computer graphics production. Backgrounds the subject and principles of production, then works through block, pixel and line graphics, colour, movement and three-dimensional drawing. Appendix summarises graphics facilities of various micros. Readily understandable by non-mathematical user and is machine dependent.

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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.

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Introducing Logo for the Apple II, Texas Instruments 99/4A & Tandy Color computer — **Peter Ross**

Thorough presentation of Logo's terms, commands, procedures and turtle graphics. Logo's education orientation used to show adults and children how to think with Logo and create projects and search for solutions. Packed with ideas and practical examples.

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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.

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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.

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Introduction to FORTH — **Ken Knecht**

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

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Micro Cookbook: Machine Language Programming — **Don Lancaster**

Starting with the concepts of addressing and address space, you work your way to microcomputer architecture addressing modes and the toolkit needed for machine language programming. Exercises of programming and a detailed look at input/output. Offers ideas from 63 microcomputer applications.

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The Handbook of Microcomputer Interfacing — **Steve Leibson**

Shows how to put your micro to work, how to attach peripherals from any manufacturer, how to use your computer to control almost any information. Wealth of practical, use-it-now information on all aspects of interfacing, hardware, software, and the history and theory of interfacing practice. Hints, tips, detailed information, practical advice.

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COBOL for Microcomputers: A Self-Teaching Guide — **Ruth Ashley & Judi N. Fernadez**

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

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How to Build a Program — **Jack Emmerichs**

Gives you the chance to look over an experienced programmer's shoulder and see how to develop an original idea into a set of instructions which can be translated into a specific language for a computer. Looks at likely errors and bugs, and valuable testing techniques.

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PET

A PET For Kids (also for Commodore 64 and VIC-20) — **Sharon Boren**

Written by a teacher wanting to teach enthusiastic youngsters computer operation and programming in BASIC. Individualised, self-paced approach encourages creative programming as well as good programming techniques. Snappy illustrations and activity worksheets focussing on solving, higher order thinking skills and creativity.

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Pet Graphics — **Nick Hampshire**

Designed for PET users to program graphic displays, the book provides a collection of machine language sub-routines providing a range of normally unavailable graphic functions. Emphasis on working examples.

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PET Fun and Games — **Jeffries and Fisher**

Selected Cursor Programs

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

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

Commodore

Basic Subroutines for Commodore Computers — **Eddie Adams**

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

Wiley & Sons — **Our price $30.35. Save $1.60 and earn 3 bonus points.**

How to Use The Commodore 64 — **Jerry & Deborah Willis**

Introduction to the computer and its basic components; explains what the components do and how they work together; step-by-step instructions on setting up and installation; shows how to load and save programs on diskette or cassettes; tells how to type in, use and modify programs; presents other sources of information.

dilithium Press — **Our price $8.55. Save 40 cents and earn 1 bonus point.**

Commodore 64 Computing — **Ian Sinclair**

Introductory guide and reference book covering setting up and operation of the computer and its facilities. Explains main features and summarises BASIC syntax with examples as a reference for the experienced user and a guide for the less experienced user.

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More Than 32 BASIC Programs for the Commodore 64 Computer — **Tom Rugg & Phil Feldman**

Chock full of programs covering games, applications, education, graphics, mathematics. Each program is fully documented with a complete source listing, the program's purpose and how to use it. Also information on how to adapt programs by making simple modifications.

dilithium Press — **Our price $45.55. Save $2.40 and earn 4 bonus points.**

BBC

100 Programs for the BBC Microcomputer (Models A & B) — **John Gordon**

Published in association with Acornsoft, this book sets out to answer the question: what do you use a microcomputer for? Routines cover home, business, school and recreational uses. Programs are clearly presented and the author provides a brief explanation with each.

Prentice-Hall — **Our price $25.55. Save $1.35 and earn 2 bonus points. Cassette available: Our price $47.45. Save $2.50 and earn 4 bonus points.**

Structured Programming With BBC BASIC — **Roy Atherton**

Some ideas on exploiting the advanced graphics and control structures of the BBC version of BASIC5. Uses graphics as a major theme for its own sake and as an interesting, visually appealing vehicle for learning the principles of problem analysis and programming. Recognises increasing importance of logic and programming. Practical approach with more than 100 worked examples or solved problems. Structure diagrams and line drawings illustrate discussion.

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

Assembly Language Programming on the BBC Micro — **John Ferguson & Tony Shaw**

Gentle introduction to writing in assembly language and speeding up your program execution. New topics are tackled progressively in accordance with difficulty. Specially written for those with some knowledge of BASIC but starting from scratch on assembly language. Many practical examples and illustrations.

Addison-Wesley — **Our price $28.45. Save $1.50 and earn 2 bonus points.**

BBC Micro Graphics and Sound — **Steve Money**

Practical guide to the BBC's graphics and sound facilities, detailing techniques to make the most of the machine's capabilities. Learn how to produce graphs and charts, draw pictures and use colour. Explains animation, perspective, the world of 3D graphics and the operation of the sound generator. Many short, easily handles illustrative listings, plus complete listings to try yourself.

Granada — **Our price $23.70. SaVe $1.25 and earn 2 bonus points.**

The BBC Microcomputer for Beginners — **Seamus Dunn & Valerie Morgan**

Complete introduction to the machine and programming in BASIC. No computer experience or mathematical skill needed. Each step illustrated with sample programs and screen responses. Detailed description of machine's special features.

Prentice-Hall — **Our price $25.55. Save $1.35 and earn 2 bonus points.**

Discovering BBC Micro Machine Code: How to get more speed and power — **A. P. Stephenson**

Unlocks machine code which holds the key to the BBC's powers. Tells how to generate fast-moving graphics, make effective use of peripherals and ancillary equipment, save memory. Short programs and routines show the way.

Granada — **Our price $23.70. Save $1.25 and earn 2 bonus points.**

The BBC Micro Book: BASIC, Sound & Graphics — **Jim McGregor & Alan Watt**

Starts by describing BBC BASIC clearly and simply; then covers graphics animation and sound facilities. Designed to have you inventing and playing games, writing and listening to music, producing and watching animated graphics.

Addison-Wesley — **Our price $28.45. Save $1.50 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.**

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.**

Word processing

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.

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

Low-Cost Word Processing — **Laurence Press**

Tells you how to produce memos and reports, ready 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.**

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

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

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

Business

Using VisiCalc: Getting Down to Business
Carol Klitzner & Matthew J. Plociak Jr.

A guide to the exploitation of VisiCalc's time saving and business management features. Step-by-step instructions through all VisiCalc commands and 150 figures showing the VisiCalc screen at every step.

John Wiley & Sons — **Our price $37.95. Save $2.00 and earn 3 bonus points.**

Basic for Business — **Douglas Hergert**

Teaches you to read, write and "debug" BASIC programs for business applications. All BASIC vocabulary listed and important programming techniques and concepts discussed. Realistic sample programs illustrate each element and exercises guide you to further exploration. Also an introduction to COBOL, FORTRAN and Pascal, comparing each with BASIC.

Sybex — **Our price $28.45. Save $1.50 and earn 2 bonus points**

Executive Planning with BASIC — **X.T. Burt**

A collection of interactive, oriented business programs. They can be used in their existing form or as tools for management and planning decisions. Finding breakeven point, linear programming, inventory management, critical path analysis, moving averages, linear regression, financial ratio analysis, portfolio managment . . . these are some of the topics covered.

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

Using Programmable Calculators for Business
C. Louis Hohenstein

A non-technical guide stacked with illustrations and samples of program output. Assumes no prior calculator or computer knowledge and sets out to show how the programmable calculator can work for you every day.

John Wiley & Sons — **Our price $26.10. Save $1.40 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.**

How to Use SuperCalc — **Deborah and Jerry Willis and Merl Miller**

A guide to the applications and implementation of spreadsheet programs in general, and to SuperCalc specifically. Simple language, down-to-earth directions. Tells you how to organise, arrange, and manipulate your data, and is also a reference manual.

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

Mastering VisiCalc — **Douglas Hergert**

Written both for newcomers to the spreedsheet 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.**

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**

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.**

VisiCalc: Home and Office Companion
David Castlewitz, et al

Provides extensive coverage of popular VisiCalc program, 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.**

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.

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

Microcomputer Design and Troubleshooting
Eugene M. Zumchak

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

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

Computers: Information and Data
Barbara & John Jaworski

Describes the principles behind the use of computers rather than details of how they work. Concentrates on what they do, why they are required to do these things and how they fit into the world. Explains why computers are what they are.

Nelson — **Our price $19.70. Save $1.05 and earn 1 bonus point.**

Computer Peripherals
Barry Wilkinson & David Horrocks

Introduces the underlying principles of operation of the major types of peripheral likely to be encountered and some likely to be marketed in the future. Should be valuable for engineering and computer technology students.

Hodder & Stoughton — **Our price $28.25. Save $1.50 and earn 2 bonus points.**

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

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

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

Troubleshooting and Repairing Personal Computers — **Art Margolis**

Sets out to take the mystery out of those "little black boxes" which control your computer and demonstrate how anyone can diagnose and repair many problems which strike home computers. Covers most of the common machines in an easy-to-follow style.

TAB — **Our price $30.35. Save $1.60 and earn 3 bonus points**

Keyboarding

Quick Keyboarding — **Vonnie Alexander**

Sub-titled "Competent Keyboarding in 6 Hours", this book by New Zealand Vonnie Alexander has a unique method for teach-yourself competeat 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.**

General

Microcomputer Math — **William Barden Jnr**

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

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

Boolean Algebra for Computer Logic
Harold E. Ennes

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

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

Introduction to Electronic Speech Synthesis
Neil Sclater

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

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

Education

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.**

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.

Sybex — **Our price $28.45. Save $1.50 and earn 2 bonus points.**

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.

Nelson — **Our price $17.60. Save 90c and earn 2 bonus points**

CP/M

CP/M Revealed — **Jack D. Dennon**

Explains technical aspects of CP/M, including console monitor (CCP), system manager (BDOS) and input/output driver package (CBIOS). 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.**

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.**

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**

Osborne CP/M User Guide
Thom Hogan

Bridges the gap between technique 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.**

Introductory

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

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

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

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

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

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

Disks and disk drives

By Gerrit Bahlman

It may seem silly if you are not a novice but the most difficult idea, initially, for someone getting into computing is this business about memory. Intuitively, people know what memory is. You are told something, read something, see something, do something and after that you can remember it. Simple. Or is it?

The human memory mechanism is extremely complex. Little is known as to how it works. What is of value is realising that for humans there are different sorts of memory. Long-term and short-term memory, for example. By this I mean being able to remember experiences over extended periods of time such as where you began this oh-so-enjoyable evening. Or the short-term memory, which allows you to recall the number plate of the car that ran over your cat, long enough to write it down.

Certainly there are things we need to remember only for a few moments before we discard them and then there are things that we want to remember for a long time such as your name.

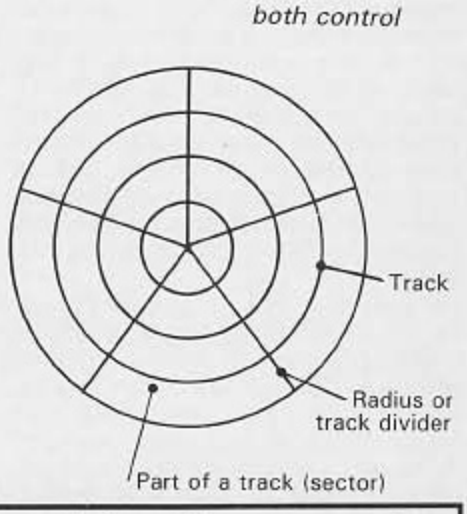
The analogy to short-term human memory is the "memory" of a computer. The long-term memory of the human is available to computers via secondary storage devices. Cassette tape, floppy disk drives, hard disks, drums, tape, etc, are all examples of secondary storage. Primary storage is the "core," random-access memory that constitutes the computer's short-term memory. This is what is usually cited when salesmen say a computer has 8K of memory, which is expandable to 64K of memory. (You will recall that a K is approximately 1000 letters or bytes of memory.)

In this article I will describe one of the secondary storage devices, the floppy disk drive. To forestall any question as to why floppy disks and not cassettes, this quote from a home computer user may help: "Cassette tape is slow. All the rewinding and checking the tape counter may not seem bad, but if you're trying to program, it's just a pain in the neck. Disk drives are fast, reliable, easy to use and store large amounts of data on each disk." Needless to say, I agree.

A floppy disk drive consists of an electric motor that rotates a disk-shaped, magnetically coated, flexible piece of plastic inside a paper jacket. A read-and-write head similar to those on a cassette drive puts on and takes off information from the disk surface.

The information is stored in circles on the disk called "tracks" and each track is divided into "sectors" which are sections of track divided by straight lines that radiate from the centre of the disk. By means of these the read-write head can find out where information has been stored. Knowing on which track and which sector on that track gives a map reference for finding information.

While we cannot see the disk



inside the package or in fact where the tracks are, the computer keeps a record of where everything is and even stores that on the disk in a special place called the directory. Whenever the computer is ordered to read information from the disk it checks the directory first to find out where it has saved it. This all happens without your knowing it's happening.

A disk-drive storage system is fast for the same reason that a record is fast. If you want to find a particular song, you check the directory for the correct track and then move the needle there. If you were using a tape you would need to wind through yards of tape first before getting to that song.

There are two types of floppy disks: 8 inch and 5¼ inch. The 5¼ in disks are called mini-floppies and are the ones usually found on home-computer systems.

Information stored on floppy disks is not lost and will keep for as long as the disk surface is in good order.

There are a number of important do's and don'ts in handling floppy disks which you ought to know.

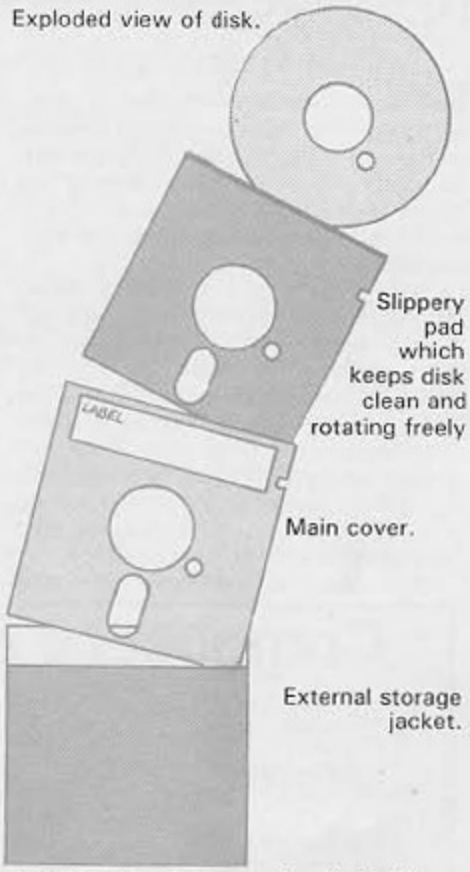
Do:

- Make copies of disks with important information stored. Disks, like tapes, can be damaged although they appear more resilient.
- Keep the disk in its cover when not using it.
- Store it in a cool, dry, dust-free place when not using it.

Don't:

- Use disks as mini place mats for ashtrays, coffee cups, etc.
- Leave them in the sun to dry after the coffee has poured over them. If the coffee hasn't ruined it the sun will.
- Finger the actual surface of the disk. Always grab the disk by its label.
- Write on the cover of the disk with the disk inside it. This will damage the surface.

Exploded view of disk.



- Force the disk into the disk drive. Bending the disk is not good practice even if they are called "floppy".
- Leave the disk in the disk drive whirring happily. Wear and tear is a fact and like your favourite L.P. it will result in needless wear.

Finally, a piece of advice about the disk drive itself. They are remarkably reliable and tough but at the same time they are delicate and bouncing them off hard surfaces is not recommended. In fact the drives are the most common piece of equipment damaged by rough handling, second only to the television screens (VDU's or visual display units). The computers themselves seem to be able to cope with most things – dropping on to floors, being hit by petulant fists and battered by indignant pointer fingers – but the cabling to the disk drives can be stretched and broken.

Writing adventure programs

By Arnaud Wylie

This article is to explain the structure of adventure programs, and how to go about writing one. It looks at variable and program structure and should give anyone with a knowledge of BASIC the ideas necessary to write adventure programs.

Three main types of variables and strings are used in an adventure program.

1. Data regarding descriptions of places – PN = Number of Places. Place 1 = carried by the player, so that if an object moves from a place to place 1 then the player has picked it up. E%(D,R) = exit to what room. (The % sign means the variable is an integer, range -32768 to 32767.) For every room, there are six possible exits. The value of E%(D,R) = the number of the room in which that particular direction leads. D = which direction (N,S,E,W,U,D) and R is the room number in question. If E%(D,R) = 0, then there is no exit in that particular direction.

PS$(R) = small description of a place. This description is given upon moving to a particular place.

PL$(R) = large description of a place. This description is given upon the command, "LOOK". It may give clues to help the player.

Here is a sample routine which could be used to read this data. It is better to have data in this format because you can see at a glance what the numbers mean.

```
10 READ PN : REM Number of places. Remember no data for places 0 + 1.
20 FOR L1 = 2 to PN
30 READ PS$(L1) : READ PL$(L1)
40 FOR L2 = 0 TO 5
50 READ E%(L2,L1) : NEXT L2
60 NEXT L1 : RETURN
70 DATA 2
80 DATA in a small hut. Some of the planks on the hut are rotten,0,0,5,7,0,0
```

2. Objects –

NO = Number of objects.
L%(OB) = location of each object.
OS$(OB) = full description of object eg "Green Bottle".
S%(OB) = status of object (optional).

You could define monsters which move from room to room by

themselves, or special objects which have certain properties under certain conditions. Treasures do not need to be defined by this method if you define them by fitting them with stars on either side, eg "*Golden Sword*".

3. Commands — Only two arrays are needed here if you intend to accept only two-word commands. If you want more than two words, you will need a complete restructuring of these ideas. For two word commands you will need:
VN = Number of verbs.
NN = Number of nouns.
V$(V) = All legitimate verbs.
N$(N) = All legitimate nouns, including objects and treasures.

It is a good idea to arrange all objects, then treasures in N$(N) at the front of the array. After your adventure splits the input line up into two words, assign N+V (noun and verb variables found from the arrays) so the program can handle the program more easily.

Program Structure

Structure of an adventure program is very important because it makes debugging, and understanding your program very much easier. The first thing your adventure needs to do is to set up all the variable arrays mentioned beforehand. Also, here is the place to load a saved game from disk or tape. Now, get your command and break it up into two words. Check that the words are legal, then go to the appropriate command routine. There should be one command routine for every verb. These routines see which noun has been used and perform the appropriate action.

For example:

```
10 REM Process Inventory command.
20 PRINT "I am carrying the following:"
30 FOR L1 = 0 TO NO
40 IF L%(L1) = 1 THEN PRINT OS$(L1)
50 NEXT
60 GOTO Command Handler.
```

```
10 REM Process GO command.
20 IF NT<23 OR NT>28 THEN XXXX : REM. If not NOR,SOU,WES,EAS, UP,DOW must be specialised eg "GO WINDOW"
30 IF E%(N-23,P_) = 0 THEN PRINT "There's no exit that way.":GOTO Command Handler.
40 PL = E%(N-23,PL):GOTO Description. The "Description" section of the program is used when the player moves to a new location. It then goes to the command handler
XXXX Do specialised movement commands here, i.e. you must check PL,N, and any flags.
```

The numbers 23 and 28 are the start and finish positions of the six directional nouns in the noun array.
PL = Location of the player.

```
10 REM Take command.
20 IF L%(N) = 1 THEN PRINT "I've already got it!" : GOTO Command Handler.
30 IF L%(N)      PL THEN PRINT "It's not here!" : GOTO Command Handler.
40 IF NC>6 THEN PRINT "I'm carrying too much!" : GOTO Command Handler.
50 L%(N) = 1 : NC = NC+1 : GOTO Command Handler.
```

The only new variable here is NC, which is the number of objects carried.

If something goes wrong with your adventure program, see which variables are wrong, and find the place(s) in the program which use these variables. Good luck, and happy adventuring.

Australia BBC

Acorn Computers International has entered an agreement with Barson Computers paving the way for manufacture of the BBC in Australia.

ZX81 Alien

This game by John Kamp for the 16K ZX81 has you in command of a space ship. You must stop the aliens from passing you. To do this you must throw your Deadly Star. If you hit one another will appear. There are two different attacks — one from in front of you, and the other from above.

To control your ship use: "5" to go to the left; "8" to go right; "6" to go down; "7" to go up; "0" to fire.

When loading the program type "run 4101". This will make the program start automatically next time it is loaded.

```
  0 LET A=20
  1 POKE 16389,76
  2 PRINT "ENTER SKILL LEVEL (1
TO 9)"
  3 INPUT C
  4 CLS
  5 LET T=0
  6 LET S=-1
  7 FOR Z=0 TO 20-(C+1)
  8 LET M=29
  9 LET B=INT (RND*20)
 10 PRINT AT A,Z;"■+)";AT A-1
,Z;"  ";AT A+1,Z;"  ";AT B
,M;"=";AT B,M;")"
 11 LET M=M-1
 12 IF M<Z THEN GOTO 1000
 20 LET A=A+(INKEY$="6")-(INKEY
$="7")
 90 IF A=21 THEN LET A=20
 95 IF A=-1 THEN LET A=0
100 IF INKEY$="0" THEN GOTO 200
150 GOTO 10
200 FOR X=Z+3 TO 30
210 PRINT AT A,X;" *"
400 NEXT X
410 LET T=T+1
420 IF A=B THEN GOTO 1500
500 IF INT (RND*10)<C THEN GOTO
 10
1000 NEXT Z
1500 LET S=S+1
2000 NEXT Z
2100 LET Z=Z-1
2110 CLS
2120 LET T=T-1
2130 PRINT AT 15,0;"YOU KILLED "
;S;" GOBBLERS OUT OF ";AT 16,0;Z
;" WITH ";T;" STARS"
2140 PRINT AT 18,0;"A ";S/T*100;
" PERCENT RATING A!";AT 19,0;"LE
VEL ";C
2500 FOR Z=0 TO 120
2510 NEXT Z
2520 CLS
2540 PRINT AT 10,0;"      PREPARE
 FOR NEXT ATTACK"
2541 FOR Z=0 TO 70
2542 NEXT Z
2543 CLS
2550 REM **********************
2560 LET G=C
2605 LET R=0
2606 LET S=0
2610 LET Z=15
2615 FOR X=1 TO 10
2620 LET B=2
2700 LET C=INT (RND*26)
2710 IF C<3 THEN GOTO 2700
3000 PRINT AT A,Z;"■+) ";AT B,
C;"  (O)";AT B-1,C;"  "
3010 LET B=B+1
3020 IF B=22 THEN GOTO 3600
3100 LET Z=Z-(INKEY$="5")+(INKEY
$="8")
3200 IF Z=-1 THEN LET Z=0
3210 IF Z=26 THEN LET Z=25
3300 IF INKEY$="0" THEN GOTO 345
0
3350 GOTO 3000
3450 IF A>B THEN FOR D=A-1 TO 1
STEP -1
3460 IF A<B THEN FOR D=A+1 TO 20
3500 PRINT AT D,Z+3;"+";AT D+1,Z
+2;"  ";AT D-1,Z+2;"  "
3550 NEXT D
3555 LET R=R+1
3560 IF Z<>C THEN GOTO 3000
3565 LET S=S+1
3600 NEXT X
3650 CLS
3701 PRINT AT 0,0;"YOU SHOT ";S;
" INVADERS OUT OF ";X;AT 1,0;"WI
TH ";R;" SHOTS"
4000 PRINT AT 10,0;"PRESS ANY KE
Y TO PLAY"
4010 IF INKEY$>"0" THEN RUN
4020 GOTO 4010
4100 STOP
4101 SAVE "STAR WAR■"
4102 RUN
```

```
THE POKE IN LINE 1 IS TO SPEED
UP THE PRINTING AND THERE FOR
SPEED UP THE GAME
NB: WHEN LOADING THE PROGRAM
TYPE "RUN 4101"
THIS WILL MAKE THE PROGRAM
AUTOMATICALLY START NEXT TIME IT
IS LOADED.
```

Trail Blazer

Trail Blazer is a game by Jeremy Hollobon for the 1K ZX81. The program takes about 10 seconds to set up the display file, and then a plus sign will appear about half way down the left hand side of the screen, indicating how low you are permitted to ride your trailbike.

If you go any lower than this point, you will leave the course and crash. Next your trail bike (+) will appear in the middle of the course, moving in a random direction. You leave a trail behind you, and must avoid touching the sides of the course, guiding yourself with the four cursor keys. You cannot stop your bike, but can only change direction. You crash if you touch the side of the course, your own trail, or one of the rapidly appearing mole hills. When you crash, the computer display is your score, depending on how long you keep cycling.

```
  1 LET X=VAL "5"
  2 LET Y=VAL "16"
 10 FOR L=-256 TO 0
 20 PRINT "";
 30 NEXT L
 50 LET Z$=CHR$ (INT (RND*4)+30
)
 90 PRINT "+";AT RND*10+INT (RN
D*2),INT  (RND*2)*RND*31;""
 95 LET L=L+1
 96 LET X$=INKEY$
100 IF X$="4" AND X$="9" THEN L
ET Z$=X$
110 LET X=X+(Z$="6")-(Z$="7" AN
D X=0)
120 LET Y=Y+(Z$="8" AND Y=31)-(
Z$="5" AND Y=0)
150 PRINT AT X,Y;
250 IF PEEK (PEEK 16398+256*PEE
K 16399)=0 THEN GOTO CODE "0"
300 PRINT ,"SCORE=";
```

Asteroid Attack

This game for the ZX81 by Danny Greenfield fits in 1K. The object is to get through an asteroid belt to the "edge of space," says Danny. A "1" moves you to the left and zero moves you to the right. "P" takes you forward at warp speed. "In this game not only are you moving forward, but the asteroids are coming at you head on. When you have completed one screen another screen is started," says Danny.

```
  5 LET S=0
 10 LET A=1
 15 LET B=4
 20 SCROLL
 25 LET S=S+10
 30 PRINT AT A,B;
 35 LET R=PEEK (PEEK 16396+256*
PEEK 16397)
 40 PRINT "X"
 45 IF R=52 THEN GOTO 250
 50 IF A=20 THEN GOTO 300
 55 PRINT AT 20,0;"■";AT 20,0;"
■"
 60 FOR I=1 TO 2
 65 PRINT AT 20,INT (RND*7+1);"
O"
 70 NEXT I
 75 PRINT AT A,B;""
 80 LET A=A+(INKEY$="P")
 85 LET B=B+(INKEY$="0" AND B<=
6)-(INKEY$="1" AND B>=2)
 90 GOTO 20
200 FOR I=1 TO 20
205 SCROLL
210 NEXT I
215 LET S=S+250
220 GOTO 10
250 PRINT "CRASH-";S
```

Race Track

Another motor racing special. This time it's from Peter Passeullo, of Greymouth. Called "Race Track," the object of this game, which runs in 1K, is to drive through a moving track without hitting the sides of the road, or the oncoming cars. The sides of the road and the cars are represented by the letter, "I". The player is represented by the letter, "V", and control is by keying in the numbers "8" and "5" respectively.

When a player hits a car or the roadside, the distance travelled is given.

When run in 16K the road width can be varied as the player travels along.

```
  10 LET X=12
  20 LET M=0
  30 LET Y=16
  40 LET Q=0
  50 PRINT AT 21,X;"I";AT 21,X+(
INT (RND*7)+1);"I";AT 21,X+8;"I"
  60 PRINT AT 15,Y;
  70 IF PEEK (PEEK 16398+256*PEE
K 16399)=46 THEN GOTO 170
  80 LET X=X+INT (RND*3)-1-(X=15
)+(X=0)
  90 PRINT "V"
 100 LET M=M+.1
 110 LET Q=Y
 120 LET Y=Y+(INKEY$="8")-(INKEY
$="5")
 130 PRINT AT 15,Y;""
 140 SCROLL
 150 GOTO 50
 170 PRINT AT 10,10;((INT (M*100
)/100)+0)
 180 IF INKEY$="" THEN GOTO 100
 190 CLS
 200 GOTO 10
```

The Grub

The inspiration for this ZX81 game by Ken and Nicolas Allan, of Hataitai, Wellington, is a TRS80 game. The object, if it is similar to the TRS80 game, "Snake", is to stop the ever-growing grub from bumping into itself or into the margins of the screen. 16K needed.

```
   1 REM THE GRUB-FOR ZX-81
       BY K ALLAN,WELLINTON.
   2 REM COPYRIGHT 1983.
   3 DIM C(301)
   4 DIM L(301)
   5 LET A=16598
   6 LET B=16599
   7 LET F=0
   8 LET H=2
   9 LET U=256
  10 LET T=1
  11 LET U=.3
  12 LET V=.03
  13 LET W=T
  14 LET X=11
  15 LET Y=15
  16 LET C(T)=Y
  17 LET L(T)=X
  20 PRINT AT 0,2;"5=LEFT,6=DOWN
,7=UP,8=RIGHT"
  50 FOR I=4 TO 26
  55 PRINT AT 2,I;"▚";AT 20,I;"▚
"
  60 NEXT I
  70 FOR I=3 TO 19
  75 PRINT AT I,4;"▚";AT I,26;"▚
"
  80 NEXT I
  90 GOTO 180
 100 IF NOT F AND RND<U THEN GOS
UB 1000
 110 IF F AND RND<V THEN GOSUB 2
000
 120 IF H>300 THEN LET H=W
 130 IF T=301 THEN LET T=W
 140 LET H=H+J
 150 LET T=T+J
 160 LET C(H)=Y
 170 LET L(H)=X
 180 PRINT AT X,Y;
 185 LET P=PEEK (PEEK A+0*PEEK B
)
 190 IF P=23 THEN GOSUB 3000
 195 IF P=134 OR P=136 THEN GOSU
B 4000
 200 PRINT "▓";AT X,Y;"▒";AT L(T
),C(T);" "
 210 LET C(T)=0
 220 LET L(T)=0
 250 LET K$=INKEY$
 300 IF CODE K$<33 OR CODE K$>36
 THEN LET K$=K$
 500 IF K$="5" THEN LET Y=Y-W
 600 IF K$="6" THEN LET X=X+W
 700 IF K$="7" THEN LET X=X-W
 800 IF K$="8" THEN LET Y=Y+W
 900 GOTO 100
1000 LET D=RND*16+3
1020 LET E=RND*20+5
1040 PRINT AT D,E;
1050 IF PEEK (PEEK A+0*PEEK B)<>
136 THEN LET F=W
1060 IF NOT F THEN GOTO 1000
1080 PRINT "*"
1090 RETURN
2000 PRINT AT D,E;" "
2010 GOTO 3020
3000 LET H=H+INT (RND*10)+W
3020 LET F=0
3030 RETURN
4000 IF X=11 AND Y=15 AND H-T=W
THEN RETURN
4010 IF H<T THEN LET H=H+301
4020 PRINT AT X,Y;"▒";AT 21,4;"P
OINTS=";H-T
4030 PAUSE 2000
4040 CLS
4050 RUN
```

Spectrum

Some music

Here's a bit of music for Spectrum users. This is a computerised version of a well-known popular piece from North America. The tempo can be changed by pressing "F" for faster and "S" for slower. The program comes from 13-year-old Peter Smith, of Christchurch.

```
   5 BORDER 7
   6 CLEAR
   7 FOR a=0 TO 2: FOR n=0 TO 7:
 PRINT INK n;AT a*7+n,a*7+n-5;"E
ntertainer": NEXT n: NEXT a
   8 LET d=1
  10 LET c=1
  20 READ a: READ b
  25 IF INKEY$="f" AND d>=.5 THE
N LET d=d*1.1
  26 IF INKEY$="s" AND d<=20 THE
N LET d=d*.9
  30 IF b>=0 AND b<=14 THEN BORD
ER b/2
  40 IF a=255 AND c=1 THEN LET c
=2: RESTORE 140: GO TO 20
  45 IF a=255 AND c<>1 THEN GO T
O 20
  50 BEEP a/d,b
  55 IF b=-12 THEN PAUSE 200: RU
N
  60 GO TO 20
 100 DATA .2,26,.2,28,.2,24,.4,2
1,.2,23,.4,19
 110 DATA .2,14,.2,16,.2,12,.4,9
,.2,11,.4,7
 120 DATA .2,2,.2,4,.2,0,.4,-3,.
2,-1,.2,-3,.2,-4
 130 DATA .4,-5,.4,-10,.4,-17
 140 DATA .2,2,.2,3
 150 DATA .2,4,.4,12,.2,4,.4,12,
.2,4,1.2,12
 160 DATA .2,12,.2,14,.2,15
 170 DATA .2,16,.2,12,.2,14,.4,1
6,.2,11,.4,14
 180 DATA 1.2,12,.2,2,.2,3,.2,4,
.4,12,.2,4,.4,12,.2,4,1.4,12
 190 DATA .2,9,.2,7,.2,5,.2,9,.2
,12,.4,16,.2,14,.2,12,.2,9,1.2,1
4
 200 DATA .2,2,.2,3
 210 DATA .2,4,.4,12,.2,4,.4,12,
.2,4,1.2,12
 220 DATA .2,12,.2,14,.2,15
 230 DATA .2,16,.2,12,.2,14,.4,1
6,.2,11,.4,14,1.2,12
 240 DATA .2,12,.2,14
 250 DATA .2,16,.2,12,.2,14,.4,1
6,.2,12,.2,14,.2,12
 260 DATA .2,16,.2,12,.2,14,.4,1
6,.2,12,.2,14,.2,12
 270 DATA .2,16,.2,12,.2,14,.4,1
6,.2,11,.4,14,1.2,12
 280 DATA 255,0
 290 DATA .2,0,.2,-12
```

TRS80/System 80

Watching sorts

This is a program to demonstrate the various types of sorting programs in action. It is based on an American program completely rewritten and extended by A.G. Briggs, of Hastings, and C.J. Donoghue, of Levin. Anthony Briggs writes:

"In March, 1982, I came across an interesting program in what was then *'80 US JOURNAL*. This purported to demonstrate three different sort of routines on the screen. At the time I was attending night classes on data processing, so I set to and typed the program in. It proved to be clever, but limited in scope. Over the next year I progressively improved it, and finally got it to the stage where it kept track of all comparisons and exchanges, and now had seven different sorts. The final stage was when a friend in Levin added the Quicksort routine which brought it to the present stage of development.

"The only original part of the program is now the 'Switchem' and 'Pointer' routines. Although it is a long program to type in, if you are interested in gaining and understanding of sort routines, I have never come across a better method of demonstrating these. It has been show both at the night classes and our local miro club, several times. Some of the routines could have beer made more elegant using disk BASIC, however my main aim was to keep it compatable with Level II BASIC, Disk BASIC, System80 and TRS80 as far as possible.

"For those who because of its length do not feel like typing it in, I am happy to provide copies on any either cassette or 40T track disk. Please send a cassette or formatted disk with $5 to cover costs to:
Anthony G. Briggs,
580 Lowe Street,
Hastings.

```
90 CLS: CLEAR 500: DIM S9(20,2),A$(14),S$(14):
   X1=400:X2=25
100 PP=68:N1=307:N2=499:N3=371:N4=12:N5=17:
   N6=883:A1=62:A2=76:A3=72
110 PRINT@460,CHR$(23)"-=( VISISORT )=-"
120 PRINT@896,CHR$(34);"TRS-80";CHR$(34);
   " OR ";CHR$(34);"SYSTEM-80";CHR$(34);" (T/S)"
130 FOR J=0 TO 0:CC$=INKEY$:J=((CC$<>"T")
   AND (CC$<>"S")):NEXT
140 CLS:IF CC$="T" THEN PRINT CHR$(23):
   PP=72:N1=310:N2=502:N3=374:N4=0:
   N5=0:N6=886:A1=60:A2=78:A3=72
150 PRINTTAB(5+N5)"# V I S I S O R T #"
160 PRINTTAB(N5) STRING$(30,61)
170 PRINTTAB(N5)"(1)..STANDARD BUBBLE SORT"
180 PRINTTAB(N5)"(2)..BUBBLE SORT WITH SINKER"
190 PRINTTAB(N5)"(3)..SUPER BUBBLE SORT"
200 PRINTTAB(N5)"(4)..EXCHANGE SORT"
210 PRINTTAB(N5)"(5)..DELAYED REPLACEMENT SORT"
220 PRINTTAB(N5)"(6)..SHELL SORT"
230 PRINTTAB(N5)"(7)..SHELL - METZNER SORT"
240 PRINTTAB(N5)"(8)..QUICK-SORT"
250 PRINTTAB(N5)"(9)..EXIT PROGRAM"
260 PRINT@896+N5,"SELECT SORT ROUTINE .....";
270 FOR J=0 TO 0:
   CH$=INKEY$: J=((CH$<"1") OR (">9"<CH$)): NEXT
280 CH=VAL(CH$): IF CH=9 THEN 2320
290 CLS: IF CC$="T" THEN PRINT CHR$(23)
300 GOSUB 490
310 FOR K=0 TO N5:A$(K)=S$(K):
   PRINT@64*K+64,A$(K);: NEXT
320 NE=0: NC=0: ND=0: NI=186
330 IF N5>9 THEN NI=184
340 PRINT@152+N4,
   "NO OF ITEMS ... ";USING"##";N5+1;
350 PRINT@216+N4,STRING$(18,61);
360 PRINT@280+N4,"COMPARISONS ...  0";
370 PRINT@344+N4,"EXCHANGES .....  0";
380 PRINT@408+N4,STRING$(18,61);
390 PRINT@472+N4,"TOTAL ACTIONS .  0";
400 PRINT@536+N4,STRING$(18,61);
410 ON CH GOSUB1210,1480,1330,
   1590,1690,1840,1970,2120
420 GOSUB 860
430 PRINT@600+N4,"##################";
440 PRINT@664+N4,"# SORT  COMPLETE #";
```

```
450 PRINT@72B+N4,"********************";
460 PRINT@856+N4,"RE-SORT ORIGINAL";
470 PRINT@920+N4,"LIST.....(Y/N)";
480 FOR J=0 TO 0: RF$=INKEY$:
    J=((RF$<>"Y") AND (RF$<>"N")): NEXT: GOTO 140
490 IF RF$="Y" THEN 750
500 FF=0:NS$=""
510 PRINTTAB(N5)"HOW MANY ITEMS TO SORT"
520 PRINTTAB(N5)"SELECT BETWEEN 4 AND 15 == ";
530 SS$="": SS$=INKEY$: IF SS$="" THEN 530
540 IF SS$="1" AND NS$<"1" THEN NS$=NS$+SS$:
    F=1: PRINTSS$;: GOTO 530
550 IF (FF=1 AND (SS$<"0"ORSS$>"5")) OR
    (FF=0 AND (SS$<"4" OR SS$>"9")) THEN 530
560 PRINT SS$: NS$=NS$+SS$: NS=VAL(NS$)-1
570 PRINT:
    PRINTTAB(N5)"SUPPLIED BY COMPUTER OR USER ?"
580 PRINTTAB(N5)"PRESS ";CHR$(34);"C";CHR$(34);
    " OR ";CHR$(34);"U";CHR$(34);"...";
590 RI$=INKEY$: IF RI$="U" THEN 680
    ELSE IF RI$="C"THEN PRINT"COMPUTER":
    GOTO 600 ELSE 590
600 PRINT: PRINTTAB(N5)"NUMBERS OR LETTERS ?"
610 PRINTTAB(N5)"PRESS ";CHR$(34);"N";CHR$(34);
    " OR ";CHR$(34);"L";CHR$(34);"...";
620 FOR J=0 TO 0: R$=INKEY$:
    J=((R$<>"N") AND (R$<>"L")): NEXT
630 IF R$="N" THEN PRINT"NUMBERS"
    ELSE IF R$="L" THEN PRINT"LETTERS"
640 FOR K=0 TO NS
650 IF R$="L" THEN S$(K)=CHR$(RND(26)+64)
    ELSE S$(K)=STR$(RND(89)+10)
660 NEXT K
670 GOTO 750
680 CLS: IF CC$="T" THEN PRINTCHR$(23)
690 PRINTTAB(N5) "ONE CHARACTER PER LINE MAXIMUM"
700 PRINTTAB(N5)"(LETTERS OR NUMBERS ONLY)"
710 FOR K=0 TO NS
720 PRINTTAB(N5)"ITEM #" K"= ";
730 FOR J=0 TO 0: S$(K)=INKEY$:
    J=(S$(K)("0") OR ("Z"<S$(K))
    OR (("9"<S$(K)) AND (S$(K)<"A")): NEXT
740 PRINT S$(K): NEXT K
750 RF$="N"
760 CLS: IF CC$="T" THEN PRINT CHR$(23)
770 RETURN
780 PRINT@918,"PRESS <ENTER> TO";
790 PRINT@982,"START THE SORT..";
800 KI$=INKEY$: IF KI$<>CHR$(13) THEN 800
810 GOSUB 860
820 PRINT@856+N4,"SPEED SET AT :-";SQR(X1/25);
830 PRINT@920+N4,"0 - 9 ALTERS SPEED";
840 PRINT@984+N4,CHR$(34);".";
    CHR$(34);" TERMINATES SORT";
850 RETURN
860 FOR SCX=1 TO 7: PRINT@530+SCX*64,
    CHR$(30);: NEXT: RETURN
870 '
                    POINTER ROUTINE
880 NC=NC+1: PRINT@N1,USING"###";NC;
890 NO=NC+NE: PRINT@N2,USING"###"; NO;
900 PRINT@64*X+PP,"<=-";
910 PRINT@64*Y+PP,"<=-";
920 FOR TI=1 TO X1: NEXT
930 PRINT@64*X+PP,"  ";
940 PRINT@64*Y+PP,"  ";
950 W$=INKEY$
960 IFW$<>""THENX1=VAL(W$)[2*25:
    X2=SQR(X1):PRINT@N6,VAL(W$);
970 IF W$="." THEN GOSUB 860:
    PRINT@664+N4,"SORT TERMINATED.";:GOTO 460
980 RETURN
990 '
                  "SWITCHEM"  ROUTINE
1000 FOR K=0 TO 8 STEP2
1010 PRINT@64*I+K+64,"  ";A$(I);
1020 PRINT@64*J+K+A1,"  ";A$(J);
1030 NEXT K
1040 PRINT@64*I+74,"  ";A$(I);
1050 DF=J-I
1060 FOR K=1 TO DF
1070 PRINT@64*(I+K-1)+A2,"    ";
1080 PRINT@64*(I+K)+A2, A$(I);
1090 FOR TI=1 TO X2: NEXT
1100 PRINT@64*(J-K+1)+A3,"    ";
1110 PRINT@64*(J-K)+A3, A$(J);
1120 NEXT K
1130 FOR K=8 TO 0 STEP -2
1140 PRINT@64*J+K+64,A$(I);"    ";
1150 PRINT@64*I+K+64,A$(J);"    ";
1160 NEXT K
1170 NE=NE+1
1180 PRINT@N3,USING"###";NE;
1190 TE$=A$(I): A$(I)=A$(J): A$(J)=TE$
1200 RETURN
1210 PRINT@N5,"========= BUBBLE SORT =========";
1220 GOSUB 780
1230 FL=0
1240 FOR I=0 TO NS-1
1250 X=I: J=I+1: Y=J: GOSUB 880
1260 IF A$(I) <= A$(J) THEN 1290
1270 FL=1
1280 GOSUB 1000
1290 NEXT I
1300 IF FL=1 THEN 1230
1310 GOSUB 420
1320 RETURN
1330 PRINT@N5,"====== SUPER BUBBLE SORT ======";
1340 GOSUB 780
1350 FOR I=0 TO NS-1
1360 J=I+1: X=I: Y=J: GOSUB 880
1370 IF A$(I) <= A$(J) THEN 1460
1380 GOSUB 1000
1390 I1=I
1400 IF I=0 THEN 1450
1410 J=I: I=I-1: X=I: Y=J: GOSUB 880
1420 IF A$(I) <= A$(J) THEN 1450
1430 GOSUB 1000
1440 GOTO 1400
1450 I=I1
1460 NEXT I
1470 RETURN
1480 PRINT@N5,"=== BUBBLE SORT WITH SINKER ===";
1490 SS=NS: GOSUB 780
1500 FL=0: SS=SS-1
1510 FOR I=0 TO SS
1520 X=I: J=I+1: Y=J: GOSUB 880
1530 IF A$(I) <= A$(J) THEN 1550
1540 FL=1: GOSUB 1000
1550 NEXT I
1560 IF FL=1 THEN 1500
1570 GOSUB 420
1580 RETURN
1590 PRINT@N5,"======== EXCHANGE SORT ========";
1600 GOSUB 780
1610 FOR I=0 TO NS-1
1620 FOR J=I+1 TO NS
1630 X=I: Y=J: GOSUB 880
1640 IF A$(I) <= A$(J) THEN 1660
1650 GOSUB 1000
1660 NEXT J,I
1670 GOSUB 420
1680 RETURN
1690 PRINT@N5,"== DELAYED REPLACEMENT SORT ==";
1700 GOSUB 780
1710 J=0: R=0: I=-1
1720 I=I+1
1730 IF I=NS THEN 1820
1740 J=I: R=J+1
1750 X=J: Y=R: GOSUB 880
1760 IF A$(R) >= A$(J) THEN 1780
1770 J=R
```

```
1780 R=R+1: IF R(=N5 THEN 1750
1790 IF I=J THEN 1720
1800 GOSUB 1000
1810 GOTO 1720
1820 GOSUB 420
1830 RETURN
1840 PRINT@N5,"********* SHELL SORT *********";
1850 GOSUB 780
1860 M=N5
1870 M=INT(M/2): IF M=0 THEN 1950
1880 H=0
1890 I=H: FL=0: J=I+M: X=I: Y=J: GOSUB 880
1900 IF A$(I) <= A$(J) THEN 1930
1910 GOSUB 1000
1920 FL=1
1930 H=H+1: IF J<N5 THEN 1890
1940 IF FL=1 THEN 1880 ELSE 1870
1950 GOSUB 420
1960 RETURN
1970 PRINT@N5,"==== SHELL - METZNER SORT ====";
1980 GOSUB 780
1990 M=N5
2000 M=INT(M/2): IF M=0 THEN 2100
2010 P=N5-M
2020 H=0
2030 I=H
2040 J=I+M: X=I: Y=J: GOSUB 880
2050 IF A$(I) <= A$(J) THEN 2080
2060 GOSUB 1000
2070 I=I-M: IF I>=0 THEN 2040
2080 H=H+1
2090 IF H>P THEN 2000 ELSE 2030
2100 GOSUB 420
2110 RETURN
2120 PRINT@N5,"********* QUICK-SORT *********";
2130 GOSUB 780
2140 I1=0: J1=N5: P=0
2150 PRINT@600+N4,"STACK COUNTER..";USING"###";P;
2160 I=I1
2170 PRINT@664+N4,"SUPER-RECORD...";A$(I);
2180 J=J1: S=-1
2190 X=I: Y=J: GOSUB 880
2200 IF A$(X) <= A$(Y) THEN 2230
2210 GOSUB 1000
2220 S=-S
2230 IF S=1 THEN I=I+1 ELSE J=J-1
2240 IF I<J THEN 2190
2250 IF I+2>J1 THEN 2270
2260 P=P+1: S9(P,1)=I+1: S9(P,2)=J1
2270 J1=I-1
2280 IF I1<J1 THEN 2150
2290 IF P=0 THEN 420
2300 I1=S9(P,1): J1=S9(P,2): P=P-1
2310 GOTO 2150
2320 CLEAR 50: CLS: END
```

PROGRAMS

VIC 20

Alien Attack

This VIC 20 space game by 15-year-old Andrew Gordon, of Waipu, Northland, is for the unexpanded machine.

You move left and right to shoot the aliens — gradually moving up towards them. Occasionally a mother ship moves across the top of the screen for 200 bonus points. You have three lives and there is a high score.

Program outline —

1–37	Initialisation/instructions
38–80	Screen set up
200–250	Main routine
260–300	Move ship
500–590	Fire missile
600–610	Screen cleared
700–750	Life lost/game over
2000–2130	Define graphics

```
READY.

1 RESTORE:GOSUB2000
2 POKE36879,15:POKE650,255:POKE36879,25:POKE198,0
3 PRINTCHR$(14):CHR$(8)
4 S1=36877:H=INT(RND(1)*22)+7834:CO=30720:LL=3:G=40
30 PRINT"■■■ L I E N   A T T A C K"
31 PRINT"■■MOVE SHIP LEFT AND    RIGHT TO SHOOT ALIENS.■■AUCER IS WORTH 200,"
32 PRINT"ALIENS 10,CLEAR SCREEN500 POINTS."
33 PRINT"■■■O MOVE SHIP:-          ■Z■=LEFT,■C■=RIGHT          ■F7■=FIRE"
34 PRINT"■■■RESS ANY KEY TO PLAY"
35 GETR$:IFR$=""THEN35
38 POKE36867,34:POKE36879,8:POKE36869,255
40 PRINT"■"
45 D2=7724:A=8E42:F=38:M=12
50 FORW=7746TO7766STEP2:POKEW,33:POKEW+CO,4:POKEW+23,33:POKEW+23+CO,3
60 POKEW+44,33:POKEW+44+CO,6:POKEW+67,33:POKEW+67+CO,7:NEXT
80 PRINT"■■■■
200 PRINT"■■■"■"SC:PRINT"■■■■■■■■■■■■()■"HI:PRINT"■■■■■■■■■"LL
210 POKEH,36
220 D=INT(RND(.)*6)+1
221 IFRND(1)<.01THEND1=1
222 IFD1=1THENPOKED2,32:D2=D2+1:POKED2,34:POKED2+CO,5
223 IFD1=1THENIFD2=7745THENPOKED2,32:D2=7724:D1=0
230 IFD=1THENF=F+1:POKE36865,F:POKEH,32:H=H-22:POKEH,36:M=M+INT(RND(1)*3)-1
233 POKE36864,1
234 POKEH,32:H=H+22:POKEH,37
236 IFH>8076THENH=INT(RND(1)*22)+7834
237 IFPEEK(H+22)=36THEN700
245 IFH<7878THENPOKEH,32:GOTO700
249 GOSUB260:IFNN=1THENNN=0:GOTO40
250 GOTO200
260 K=PEEK(197)
270 IFK=33THENH=H-1:POKEH+1,32
280 IFK=34THENH=H+1:POKEH-1,32
290 IFK=63THEN500
300 RETURN
500 B=H-22:POKES1,140
520 POKEB,32:B=B-22:POKEB,38:POKEH,32:H=H+22:POKEH,37
536 IFH>8076THENH=INT(RND(1)*22)+7834
537 IFPEEK(H+22)=36THEN700
540 IFPEEK(B-22)=33THEN580
541 IFPEEK(B-22)=34THENPOKEB,32:POKEB-22,32:POKES1,0:D1=0:SC=SC+200:D2=7724:RETU
RN
542 IFB=HTHENH=INT(RND(1)*22)+7834
545 IFB<7746THENPOKES1,0:POKEB,32:RETURN
550 GOTO520
580 POKEB,32:POKEB-22,32:POKES1,0:SC=SC+10
582 C=C+1:IFC=44THEN600
590 RETURN
```

```
600 PRINT"▒▒▒▒▒▒▒▒▒▒▒ELL DONE!!":SC=SC+500
605 C=0:G=G-5:IFG<1THENG=1
606 FORN=128TO255STEP.5:POKES1-2,N:NEXT:POKES1-2,0
610 NN=1:RETURN
700 PRINT"▒▒▒▒▒▒▒▒THEY'VE KILLED YOU!!!!"
705 POKES1,0:FORT=128TO255:POKES1-1,T:POKES1,T:NEXT
706 FORY=255TO0STEP-1:POKES1-1,Y:NEXT:POKES1,0
710 LL=LL-1:IFLL=0THEN717
711 G=G-5:IFG<1THENG=1
712 PRINT"▒▒▒▒▒▒▒                          ":A=8042:GOTO200
717 IFSC>HITHEN725
720 GETA$:IFA$=""THEN720
721 SC=0:C=0:POKE36867,174:POKE36869,242:GOTO1
725 PRINT"▒▒▒A NEW HI!!"SC
726 HI=SC
740 POKE198,0
750 GOTO720
2000 PRINT"▒"
2010 FORQ=7424TO7503:READA:POKEQ,A:NEXT:RETURN
2100 DATA0,0,0,0,0,0,0,0,60,126,153,153,255,255,66,66,0,60,126,199,199,126,60,0
2110 DATA0,0,219,146,210,82,219,0,0,0,24,24,255,255,255,255,0,0,0,0,0,0,16,16
2120 DATA16,16,0,0,0,0,0,0,0,0,187,170,179,170,171,0,0,0,85,85,117,85,85,0
2130 DATA0,0,212,20,28,84,212,0

READY.
```

VIC Bloopers!

Something happened to our print routine when we laid out Tony Graham's print and plot routines for the VIC in our February issue (page 54).

Cut off the top of both the print and plot routines was line 1 which reads:

```
1 REM*******************************************************
```

As well part of the explanation for the print routine became mixed up with that for the plot routine. So all the text from — "To test the program try this line!" — on page 54 is in fact the end of the print routine article and not part of the plot routine article.

Our apologies to Tony Graham and confused VIC users.

Sirius problems

Victor Technologies, the American maker of the Sirius, is in serious trouble after the successful filing of a receivership petition by one of its creditors. Victor lost $US38 million in the third quarter of last financial year and laid off about 3000 workers.

However the British distributor of the Sirius, the consortium; ACT Ltd, is planning to continue production of the machine at its plant in Scotland's "Silicon Glen," the Glenrothes Valley, according to Barson Computers in Australia, the distributor for Australia and New Zealand.

Commodore 64

Word Test

This Commodore 64 program by Matthew Ross, of Palmerston North, is a vocabulary expander. Matthew says he wrote it to help him keep track of words he learned in language classes at school.

"Although I wrote it on my Commodore, it will run on most computers," he writes.

"It has the ability to test you either way, i.e. word and you give the meaning of, or, meaning and you give the word.

"You enter the words you want to be tested on in data statements at the end of the program. You must keep the data in the order of 'word followed by meaning' so that the program will test properly.

"Lines 50 and 70 allow you to start at any point in the data you wish."

```
10 rem Word Test
20 rem By Matthew Ross
30 print "Shift Clr/Home":printchr$(14):print" W O R D T E S T
40 print:print:print:print"How many words do you want to be tested":print"on";
50 inputn:print:print"Where do you want to start";:inputs
60 print:print"Do you want word-meaning or meaning-":print"word";:input o$
70 print:for i=lto s:readq$:reada$:nexti
80 if o$="mw"then goto 140
90 fori=l to n:readq$:reada$:
100 print:print:print:print"Give the meaning of ";q$; :inputb$
110 if b$=a$ then gosub 190
120 if b$<>a$ then gosub 200
130 nexti:goto 210
140 for i=lton:reada$:readq$
150 print:print:print:print"Give the word "; q$;: input b$
160 if b$=a$ thengosub190
170 if b$<>a$ thengosub200
180 nexti:goto210
190 print:print"That is correct.":r r l:return
200 print:print"No -- the answer is ";a$:return
210 print:print"You got ";r;" right out of";n
220 end
250 rem ---Example Data---
260 data"RAM", random access memory, "ROM", read only memory, byte, 8 bits, kilobyte, 1025 bytes.
```

PROGRAMS

Commodore 64

Chopper Strike

In this game for the Commodore 64 by Daniel Moore you manoeuvre the sight around the screen until it is situated on the helicopter; you then push the fire button. Use joystick port 2. Enter "Shots" which is the number of times the fire button can be pressed and you lose one shot when the helicopter wraps around the screen.

```
10 REM ***CHOPPER STRIKE***
20 REM ***  BY D.MOORE  ***
30 POKE53280,0:POKE53281,5:PRINT"■"
40 PRINT"□       *** CHOPPER STRIKE ***■■"
50 PRINT"     POSITION SIGHT ON HELICOPTER■■"
60 PRINT"     AND FIRE.USE JOYSTICK PORT#2"
70 PRINT"■■■ SPEED  (1-3)BEGINNERS"
80 PRINT"■■ SPEED  (4-8)INTERMEDIATE"
90 PRINT"■■ SPEED  (9-11)EXPERT"
100 INPUT"■■ SPEED ";SP:SP=SP+10:IFSP<10ORSP>21THENPRINT"□□□□":GOTO100
110 INPUT"■■ SHOTS ";SH:IFSH<1THENPRINT"□□□□":GOTO110
120 CO=0:HI=0:VP=100:HP=100
130 FORN=1TO10:READS1(N):READS2(N):NEXT
140 :
150 :
200 REM *** SET UP SPRITES ***
210 PRINT"□":V=53248:POKEV+21,3:POKE2040,13:POKE2041,14:POKEV+40,5:POKE53281,6
220 FORN=0TO62:READQ:POKE832+N,Q:NEXT
230 FORN=0TO27:READQ:POKE896+N,Q:NEXT
240 FORN=1TO35:POKE823+N,0:NEXT
250 POKEV+23,2:POKEV+29,2:POKEV+8,100:POKEV+1,100:PRINT"□"
300 REM *** GET SPRITE POSITIONS ***
310 VE=INT(RND(1)*(240-48)+48)
320 FORHO=23TO255STEPSP:POKEV+2,HO:POKEV+3,VE
330 :
340 :
400 REM *** JOYSTICK ROUTINE ***
410 JV=PEEK(56320):FR=JVAND16:JV=15-(JVAND15):POKE(V+30),0
430 IFFR()16THEN600
440 IFJV=1THENVP=VP-SP
450 IFJV=2THENVP=VP+SP
460 IFJV=4THENHP=HP-SP
470 IFJV=5THENVP=VP-SP:HP=HP-SP
480 IFJV=6THENVP=VP+SP:HP=HP-SP
490 IFJV=8THENHP=HP+SP
500 IFJV=9THENVP=VP-SP:HP=HP+SP
510 IFJV=10THENVP=VP+SP:HP=HP+SP
520 IFHO>235THENCO=CO+1:GOSUB540:GOSUB560:GOTO310
530 GOSUB560:POKEV+0,HP:POKEV+1,VP:NEXT:GOTO400
540 PRINT"■■SCORE■";HI;"■■SHOTS■";CO:IFCO>=SHTHEN900
550 RETURN
560 IFHP<24THENHP=HP+SP
570 IFHP>254THENHP=HP-SP
580 IFVP<48THENVP=VP+SP
590 IFVP>240THENVP=VP-SP
595 RETURN
600 REM *** ANTI-AIRCRAFT GUNS ***
610 FORI=0TO24:POKE54272+I,0:NEXT:CT=0
620 POKE54278,5
630 POKE54277,5 CT=CT+1
640 POKE54276,129
650 POKE54295,241
660 POKE54293,5:POKE54294,20
670 IFS1(CT)<0THEN750
700 POKE54273,S1(CT):POKE54272,S2(CT)
710 POKE54296,73
720 POKE54276,128
730 GOTO630
740 :IFCT+1<6THENFORT=1TO100*CT:NEXT
750 POKE54296,0
760 :
770 :
800 REM *** CHECK FOR HIT ***
810 IFPEEK(V+30)AND1=1THENHI=HI+1:CO=CO+1:GOTO830
820 CO=CO+1:GOSUB540:NEXT
830 FORN=1TO4:FORJ=1TO20:POKEV+40,J:NEXT:NEXT:POKEV+40,5
840 GOSUB540
850 GOTO310
860 :
870 :
900 REM *** END OF GAME ***
910 PRINT" YOU GOT ";HI;" OUT OF ";SH
920 PRINT"%";(HI/SH)*100
930 PRINT"PRESS FIRE TO RESET "
940 JV=PEEK(56320):FR=JVAND16
950 IFFR()16THEN:POKEV+21,0:CLR:RESTORE:GOTO10
960 GOTO940
1000 REM *** DATA ***
1010 REM*** SOUND ***
1020 DATA17,37,19,63,21,154,22,227,25,177,28,214,32,94,34,175,34,225,-1,-1
1030 REM *** SIGHT ***
1040 DATA255,255,255,136,24,17,144,24,9,160,24,5
1050 DATA192,24,3,128,24,1,128,24,1,128,24,1,128,24,1
1060 DATA255,255,255,255,255,255,128,24,1,128,24,1,128,24,1,128
1070 DATA24,1,128,24,1,192,24,3,160,24,5,144,24,9,136,24,17,255,255,255
1080 REM *** HELICOPTER ***
1090 DATA0,255,254,32,1,0,112,3,192,32,7,160,48,15,144
1100 DATA31,255,252,0,63,192,0,10,64,0,63,240,0

READY.
```

M23P gives glimpse of micro-floppy

By Warren Marett

Sord's new M23P microcomputer gives one of the first glimpses in this country of the micro-floppy. Being the only visible change in floppy-disk technology since the 5¼-in. mini-floppy was released, the new disk drives and its media are a sight for sore eyes.

The new technology has definite advantages:

- The medium is a smaller, very convenient size.
- It has a hard plastic case, making it less susceptible to damage.
- The disk drive is often faster than the 5¼-in. drive (in Sord's case).
- There is only a small loss in capacity over the 5¼-in. diskette.

Inside the micro-floppy diskette's blue plastic case is the same mylar, circular sheet that we are familiar with in other floppies. It has, in the case of the Sord M23P (which is to the Sony specification) 70 tracks, instead of 80 tracks on the 5¼-in. diskette. This gives it a capacity of 280K bytes, versus 320K bytes on the 5¼-in. diskette. Only one side is used.

The plastic case is quite rigid — sufficient probably to entrust it to the tender loving care of the Post Office without additional packing material. The 3½-in. by 3½-in. size make it possible to slip it in your shirt pocket.

A metal slide, which appears to be spring-driven, covers the recording surface when the media is outside the drive.

The mylar sheet has a metal centre hub attached to it, so the sheet rotates by the drive engaging the hub — a more encouraging way than the cone that grips the mylar in other floppy drives.

There is a nifty little plastic write-protect tab in one corner of the case which is snapped off and re-inserted in one of two ways to allow or disallow writing. As it comes, the diskette can be read and written.

The diskette revolution speed in the 3½-in. drive, at 600 revolutions per minute, is twice the speed of the 5¼-in. drive. This makes for a faster transfer of information. However, the average seek time is slower (15 msec versus 10msec) and the head load time is slower (60 msec versus 35 msec). Over all this makes the new drive faster on the vast majority of disk accesses.

In operation, the drive has a reassuring "click" when it is seeking and an absence of whirring noises at other times. The diskette snaps into the drive easily and a small button is pushed to release it.

No price was available for the media, but Mr Mike Cambridge, a Blenheim Sord dealer who showed me the M23P, believes they will not be too much more expensive than 5¼-in. diskettes. His estimate of $15 for a 3½-in. diskette might be optimistic.

The Sord M23P, which has two 3½-in. drives built in to its keyboard/CPU enclosure, is about $300 cheaper than a Sord M23 Mark III with dual 5¼-in. detached disk drives.

Familiar, but tidier

Those familiar with the Sord M23 series of microcomputers will find the new M23P familiar. It has the same keyboard (ugh!) and the same exterior connectors. With built-in disk drives, the keyboard/CPU enclosure is slightly bigger and is now grey.

It is a tidier package, eliminating

the ribbon cable to the drives and the separate drives, which were a nuisance when you wanted to move the microcomputer around. The new packaging makes the system considerably more portable.

The characters on the M23P screen now are made with a bigger matrix, giving a much needed improvement to the quality of the display.

An improved hardware manual for the M23 series comes with the M23P, although it doesn't describe the M23P as such. The operating system manual and the BASIC language manual are unchanged (i.e. pitiful).

Many Sord users are devotees of the PIPS file-management system which Sord makes its hallmark. The latest version of PIPS, called PIPS III, has an excellent-looking manual and many new features. Sord oversells PIPS, but I have grudgingly to admit that PIPS III is a feasible way for the unsophisticated user to develop applications — and the product now has advanced features that the owner can use as his level of sophistication increases.

Mike Cambridge demonstrated a new optional product, B-Graph, which is a business graphics package for PIPS data. It looks very impressive, especially on the colour screen. B-Graph can generate bar graphs, line graphs, pie charts, point graphs and many variations of these from the PIPS data.

PILOT: Great for questions and answers

By Stanley Stokowski

For most people, BASIC is the first and sometimes only language learned. It is an excellent general-purpose programming tool and despite the derision from some computer "professionals", it is quite capable of many complex and demanding tasks.

However, BASIC is only one of at least a dozen high level languages available for use on microcomputers. Examples include FORTRAN, COBOL, FORTH, PASCAL, C, LISP, and others.

Although all programming languages overlap each other in functions and are sometimes interchangeable in terms of a specific task, most of them are designed for a special class of programming jobs. PILOT (Programmed Inquiry, Learning Or Teaching) is such a language.

Developed by Dr John A. Starkweather, PILOT is a programming language for controlling interactive conversation between the computer and the user. It is the language of choice for educational and tutorial programs and any application involving "question and answer" interchange.

In addition to providing powerful routines for asking questions, evaluating responses and executing conditional routines, many versions also provide for the operation of peripheral devices such as printers, speech synthesisers and so on.

Moreover, since PILOT versions usually accomplish everything with less than 20 simple commands, it is about as easy to learn as the alphabet!

The following is an excerpt of a simple PILOT program:

```
*START
T: This is a test of your ability to identify the capitals
T: of some countries. You will be given only one try on each
T: country so give each question a lot of thought.
T: To begin, press the [RETURN] key.
A:
CLS:
T: The country is New Zealand.
U: *ASK
M: WELLINGTON, Wellington, wellington
(and so on)
```

In the example above, the command "T" indicates text to be printed on the CRT (or the printer or voice synthesiser or whatever). The "A" instructs the program to accept an input command, in this case a [RETURN]. Next the "CLS" command quite logically clears the screen and the following "T" prints the question. The "U" command tells the program to use subroutine "ASK" and the "M" command matches the response with the examples provided. The three versions of the correct response allow for variations in the typed reply. Admittedly the third choice is incorrect because it is not capitalised, but this example is from a test for rather young children.

Turn to page 59

Machine code and compiled languages

By Gary Parker

Spectrum owners soon discover that BASIC is not fast enough for many game applications, and that most commercial games are written in machine code. So one of the questions I am most often asked is, "How do I learn machine code for the Spectrum?"

In this month's column I look at the options available to the Spectrum user who wants faster programs, and the feasibility of using machine code.

BASIC programs can be made to run faster by designing them to be easy to interpret by the computer. But such techniques are enough for another article.

Other high-level languages are available for the Spectrum which are faster than BASIC. This is because they are compiled rather than interpreted. With BASIC, each line of the program is converted to machine code as the program runs, and much time is wasted. With compiled languages, the whole program is converted to machine code before the program is run, so no time is wasted during execution.

FORTH and Pascal are two compiled languages which are available for the Spectrum. Both run tens to hundreds of times faster than BASIC. Pascal can be thought of as a sort of "super-BASIC": it has commands which are very similar to BASIC, such as

FOR x:= 1 TO 10 DO

but it also has extra commands, such as

REPEAT . . . UNTIL

There are several versions of FORTH, and two versions of Pascal, available in England for the Spectrum. FORTH is also available in New Zealand.

BASIC programs can also be compiled, using a compiler program. However, the Spectrum compilers available at present can cope only with a limited subset of the normal BASIC commands, so you would have to modify your BASIC programs extensively before you could successfully compile them into machine code.

Last, we come to machine code, which is even faster than compiled languages. Machine code is usually written using an assembler program, which converts assembly language written by humans into machine code understood by the Spectrum.

Assembly language is directly equivalent to machine code, so each assembly language word (called a mnemonic) has a machine-code number which represents it.

But assembly language is very tedious to write, since many commands which are taken for granted by the BASIC programmer are not available in machine code. To give just one example, there is no command such as PRINT; rather, the machine-code programmer must define, using many commands, exactly how to print each pixel or dot of a shape. Because of the design of the Spectrum's display file (the area of memory used to produce the screen picture) this is very difficult.

I believe that machine code programming is too difficult to be worth the effort for most Spectrum users. If you require speed, a compiled language such as Pascal is generally much easier to write, and almost as fast.

However, Spectrum owners ought to possess enough knowledge of machine code to enable them to enter and use the machine code routines often found in magazines, since the use of such routines can make the Spectrum seem much more powerful than when restricted to BASIC alone.

Instructions for entering such routines usually accompany them. Generally, a short BASIC routine is typed in and run, which gets machine-code numbers (usually from DATA statements) and POKEs them into a suitable area of memory. Then the machine code can be accessed with USR command.

Here is an example which you can use within your own BASIC programs. It is a machine-code routine which will cause everything on the screen to scroll one pixel to the left. This can be used to produce very smooth movement. It will work with the 16K or 48K Spectrums.

Type in the following two lines:

```
10 FOR k= 23296 TO 23312 : READ m : POKE k,m : NEXT k
20 DATA 33, 255, 87, 14, 192, 6, 32, 167, 203, 22, 43, 16, 251, 13, 32, 245, 201
```

Check that you have not made any mistakes, and RUN this program. Line 10 will read the machine code contained in line 20, and POKE it into a spare area of memory (the printer buffer).

Now that your machine code is in place, you can test it by replacing lines 10 and 20 with these lines:

```
10 FOR k= 33 TO 143 : PRINT PAPER RND*4 + 4; CHR$ k; : NEXT k
20 LET k= USR 23296
30 GOTO 20
```

In case USR is new to you, it is a keyword; SHIFT SYMBOL SHIFT L.

This routine can be saved with

```
SAVE "scroll" CODE 23296, 18
```

Any time you want to make the screen scroll a pixel left, just have

```
LET x= USR 23296
```

in your BASIC program, where x can be any variable. USR is a command which causes the processor to jump to the machine code contained at the specified address, in this case 23296.

All machine-code routines are used in a similar fashion. Do make use of the routines given in magazines, as they are almost invariably worth the trouble of typing in.

Joysticks, circuit and I/O

By R. McFadgen

At $495 the Dick Smith Wizzard represents fairly good value. The main drawbacks seem to be lack of hardware (joysticks mainly), software, and detailed machine/memory information. Here are three items that may help make this into more the powerful graphics/games machine it should be.

1. Joysticks:

Here is a circuit (figure 1, figure 2) to build your own joysticks. No mechanical details have been given, but I suggest the switches/contacts used should be positioned such that an intermediate angle will cause both adjacent contacts to make. The fire two button is optional as it is only ever used separate to the fire one in the cartridge game, 'Astro Pinball'.

If the fire buttons are too hard to include they can be omitted and the existing keyboard keys used as below. No attempt has been made to provide for the start button as it is rather difficult and key 6 will do all starts.

Keyboard fire functions:

Player one (left): Fire one = Shift
: Fire two = Ctrl

Player two (right): Fire one = Minus
: Fire two = Right arrow

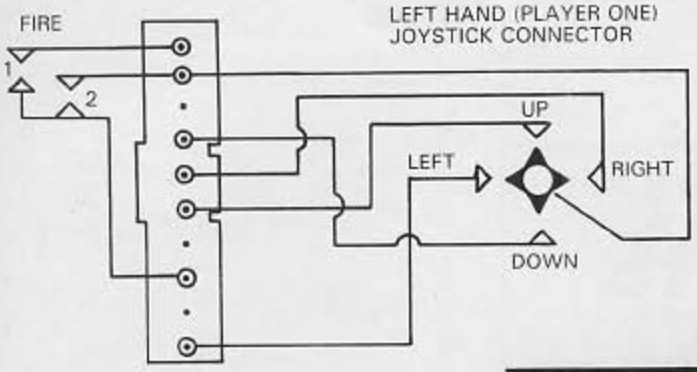


Figure 1

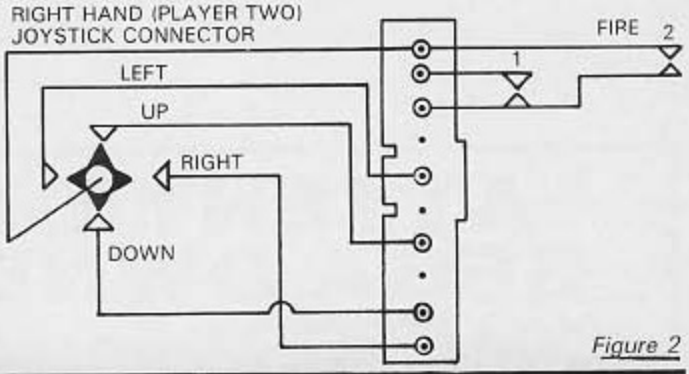


Figure 2

2. Memory investigation program (Inc Typewriter):

The program reprinted will help with software and detail of the machine and memory.

Be careful peeking and poking at location (Dec) 12289 or any location 12289 plus multiples of 256 (e.g. 12289+(256*2)=12801). These areas are visual display processor RAM and can dump the contents of the character generator to the screen. The screen will blank with just this program in memory (peek 12289) but if a graphics intense program such as Hangman has been in and running the results are quite different as the machine retains characters until they are overwritten. To regain normal screen display, reset then printpeek (13313). Some lines may be overwritten with @@@ or the like but they are easily found as Syntax errors when the program is run. Be very careful poking these areas as it can lead to your whole program being overwritten and only power down and reload will work.

Another good area to play with is DEC 4098. This is the sound generator chip and by poking various combinations at it all games sounds can be made. The sound will go on until a machine made sound overrides it, e.g. key entry sound. Trial and error works well.

The program has been with no rationalisation or reduction so it is easier to decode the various sections which have been separated as much as possible for use as is in other programs.

Memory investigator program.

```
10  CLS
20  REM ## A.ZZARD MEMORY ##
30  REM ## INVESTIGATION  ##
40  REM ## UTILITY, DISKS ##
50  REM ## & KEYBOARDS    ##
100 PRINT"THIS PROGRAM ENABLES YOU TO"
110 PRINT
120 PRINTTAB(5)"PEEK"
130 PRINT
140 PRINT"DISPLAY IN MEMORY LOCATION
```

VZ200

```
150  PRINT"CONTENTS ON EITHER THE SCREEN"
160  PRINT"OR TO A PRINTER IF AVAILABLE."
170  PRINTTAB(10);"OR B:"
180  PRINT
190  PRINT"INPUT ANY VALUE ( 0 TO 255   "
200  PRINT"DECIMAL ONLY ) TO ANY MEMORY "
210  PRINT"LOCATION IF THE MACHINE WILL "
220  PRINT"ALLOW THAT LOCATION TO CHANGE"
230  PRINT"CHOOSE  A  OR  B"
240  REM ## PARTIAL KEYBOARD SCAN ROUTINE ##
250  POKE18,0
260  IFPEEK(18)=129THEN300
270  POKE18,0
280  IFPEEK(18)=144THEN2000
290  GOTO250
300  REM ## SELECT I/P O/P AS HEX OR DEC ##
310  REM ## AND O/P TO SCREEN OR PRINTER ##
330  CLS
340  PRINT"## LOOK AT MEMORY CONTENTS ##"
350  PRINT
360  PRINT"## OPTIONS AVAILABLE ARE : ##"
370  PRINT"A: DEC INPUT WITH DEC OUTPUT "
380  PRINT"B: HEX INPUT WITH DEC OUTPUT "
390  PRINT"C: DEC INPUT WITH HEX OUTPUT "
400  PRINT"D: HEX INPUT WITH HEX OUTPUT "
410  PRINT
420  PRINT"CHOOSE A TO D"
422  PRINT
424  PRINT
426  PRINT
430  POKE18,0
440  IFPEEK(18)=129THEN490
445  POKE18,0
450  IFPEEK(18)=144THEN520
455  POKE18,0
460  IFPEEK(18)=136THEN550
465  POKE18,0
470  IFPEEK(18)=137THEN580
480  GOTO430
490  I$="DEC"
500  O$=I$
510  GOTO600
520  I$="HEX"
530  O$="DEC"
540  GOTO600
550  I$="DEC"
560  O$="HEX"
570  GOTO600
580  I$="HEX"
590  O$=I$
600  PRINT"CHOOSE OUTPUT DEVICE"
610  PRINT
620  PRINT"E: FOR SCREEN, F: FOR PRINTER"
630  POKE18,0
640  IFPEEK(18)=138THEN670
645  POKE18,0
650  IFPEEK(18)=141THEN690
660  GOTO630
670  J=0
680  GOTO700
690  J=1
700  CLS
1000 REM ## DIPLAY MEMORY ##
1010 CLS
1020 PRINT"START ADDRESS IN ";I$;" =";
1030 INPUTA$
1040 L=LEN(A$)
1050 IFI$="HEX"THENGOSUB5000
1060 IFI$="HEX"THEN1110
1070 FORN=1TOL
1080 IFASC(MID$(A$,N,1))>58ORASC(MID$(A$,N,1))
     <48THEN1010
1090 NEXT
1100 A=VAL(A$)
1110 IFA)65535THEN1010
1115 CLS
1120 PRINT"START ADDRESS (";I$;") =";A$
1125 IFJ=1THENLPRINTTAB(20);"START ADDRESS
     (";I$;")=";A$
1130 PRINT
1140 PRINTTAB(5);"CONTENTS (";O$;")"
1150 PRINT
1160 FORN=1TO8
1170 IFO$="HEX"THEN1400
1180 PRINTPEEK(A),PEEK(A+1)
1190 IFJ=1THENLPRINTTAB(24);PEEK(A),PEEK(A+1)
1200 A=A+2
1210 NEXT
1220 PRINT
1230 PRINT"CONTINUE              :PUSH KEY A"
1240 PRINT"NEW START ADDRESS :PUSH KEY B"
1250 PRINT"TOTAL RESTART      :PUSH KEY C"
1260 POKE18,0
1270 IFPEEK(18)=129THEN1330
1280 POKE18,0
1290 IFPEEK(18)=144THEN1010
1300 POKE18,0
1310 IFPEEK(18)=136THENRUN
1320 GOTO1260
1330 IFA)65535THEN1010
1335 B=A
1340 IFI$="HEX"THENGOSUB6000
1350 IFI$="HEX"THENA$=C$
1360 IFI$="DEC"THENA$=STR$(A)
1390 GOTO1040
1400 B=PEEK(A)
1410 GOSUB6060
1420 F$=C$
1430 B=PEEK(A+1)
1440 GOSUB6060
1450 G$=C$
1460 IFJ=1THENLPRINTTAB(22);F$;"
     ";G$
1470 PRINTF$,G$
1480 GOTO1200
2000 CLS
2005 REM ##MEMORY CHANGE ROUTINE ##
2010 PRINT"## MEMORY CONTENTS CHANGE ## "
2020 PRINT
2030 PRINT"INPUT MEMORY LOCATION TO BE  "
2050 PRINT"CHANGED (0 TO 65535 DEC ONLY)"
2060 INPUTM
2065 PRINT
2066 PRINT
2070 PRINT"UP TO 10 VALUES CAN BE INPUT "
2080 PRINT"HOW MANY VALUES (1 TO 10)";
2090 INPUTP
2095 PRINT
2096 PRINT
2100 PRINT"A DELAY BETWEEN CHANGES MAY  "
2110 PRINT"BE USED. (RANGE 1 TO 10";
2120 INPUTD
2140 IFM)65535ORM<0THEN2030
2150 IFP)10ORP<1THEN2080
```

```
2160 IFD(10RD)10THEN2100
2165 CLS
2170 DIMV(10)
2180 FORN=1TO9
2185 PRINT
2190 PRINT"INPUT VALUE ";N;" 10 TO 255";
2200 INPUTV(N)
2205 E=V(N)
2210 IF(V(N))255OR(V(N))(OTHEN2190
2220 NEXT
2225 CLS
2230 PRINT"LOCATION","CONTENTS"
2235 PRINT
2240 PRINTM,PEEK(M);" (ORIGINAL)"
2250 FORN=1TO9
2260 POKEM,V(N)
2270 PRINTM,PEEK(M);" NEW","(";N;")"
2290 FORE=1TO(D*10)
2300 NEXTE
2310 NEXTN
2315 PRINT
2320 PRINT"SAME LOCATION      :PUSH KEY A"
2330 PRINT"NEW LOCATION       :PUSH KEY B"
2340 PRINT"TOTAL RESTART      :PUSH KEY C"
2350 POKE18,0
2360 IFPEEK(18)=129THEN2065
2370 POKE18,0
2380 IFPEEK(18)=144THEN2000
2390 POKE18,0
2400 IFPEEK(18)=136THENRUN
2410 GOTO2350
5000 REM ## HEX TO DEC      ##
5002 REM ## CONVERSION      ##
5003 REM ## A$=I/P A=O/P     ##
5010 M=1
5020 A=0
5030 IFL)4THEN1010
5040 FORN=LTO1STEP-1
5050 C=ASC(MID$(A$,N,1))
5060 IFC)64THENC=C-7
5070 C=C-48
5080 IFC)15ORC(0THEN1010
5090 A=A+(C*M)
5100 M=M*16
5110 NEXT
5120 RETURN
6000 REM ## DEC TO HEX      ##
6002 REM ## CONVERSION      ##
6003 REM ## B=I/P C$=O/P     ##
6010 REM ## I/P=0 TO 65535 ##
6020 M=4096
6030 C$=""
6040 FORK=1TO4
6050 GOTO6100
6060 REM ## I/P=0 TO 255    ##
6070 M=16
6080 C$=""
```

VZ200

```
6090 FORK=1TO2
6100 C=INT(B/M)
6110 B=B-(C*M)
6120 IFC)9THENC=C+55
6130 IFC(=9THENC=C+48
6140 C$=C$+CHR$(C)
6150 M=M/16
6160 NEXT
6170 RETURN
7000 REM # TYPEWRITER ROUTINE
7001 REM # TO USE PRINTER AS
7002 REM # TYPEWRITER RUN7000
7010 A$=""
7020 B$=""
7030 CLS
7040 PRINTA$;B$
7050 PLOT32,24,95
7060 INPUTA$
7070 PLOT32,24,95
7080 INPUTB$
7090 PRINT
7100 PRINTA$;B$
7110 IFJOY(3))0THEN7030
7120 IFJOY(4))0THEN7140
7130 GOTO7110
7140 LPRINTA$;B$
7150 GOTO7030
```

3. New Product: Parallel I/O Module (Y-1606): Having seen these come on the market for $99 I was most interested in their performance. Dick Smith kindly lent me one for evaluation and this complete article is the result.

It was produced using the Wizzard, the interface, and a U82A Microline printer. As can be seen the trio gave excellent results. Sadly, the printer I used had no graphic capability but the interface appeared able to transfer at least some form of graphics output.

As seems usual with Wizzard products the documentation was lamentable. Only a single diagramatic sheet came in the box and it wasn't very good. The only commands for the printer are LLIST and LPRINT.

LLIST: after trying all types of LLIST commands I decided LLIST on its own is the only one that works. This led to many tries to get a single line or group of lines only to be presented with a full listing each time. Apart from that, Oh the joys of hard copy. It is so much easier to work from.

LPRINT: at first glance this appears of little value as the only command left, but after the limitations are realised and compensated for most things seem possible.

This article was made using lines 7000 to 7150 of the program above, and it suited my typing skills to the ground.

The problem is the characters per line allowed by the Wizzard: LPRINT about 50 or 30 as a string. The printer I had allowed 80 or 160 characters per line and half the page went to waste, until I used line 7140 type ways around it. Once I tried this and similar I found the interface invaluable. Given a lot more time I feel I could have it doing all I wanted and more.

The other good sign was the second I/O BUS on the back of the interface which augers well for a disk drive in the near future. (We can but hope.)

All in all the Wizzard is slowly becoming the original promised thing: a full-blown, powerful, games/graphics home micro . . .

Flood of new software

By Steven Darnold

The last few months have seen a flood of new software for the 64 released in Britain and America. Atari and Apple programs are being converted as quickly as possible, and many new programs are being developed specifically for the 64. The sight of all these software houses jumping on the 64 band-waggon is a bit overwhelming.

In New Zealand we get a good mix of British and American programs. In Britain and America, however, each country stocks relatively little of the other country's software. This shows up clearly in the latest charts of top selling games for the 64.

AMERICAN TOP 10 GAMES

1. Jumpman
2. Temple of Apshai
3. Frogger
4. Fort Apocalypse
5. Choplifter
6. Gridrunner
7. Neutral Zone
8. Planetfall
9. Telengard
10. Witness

BRITISH TOP 10 GAMES

1. Gridrunner
2. Renaissance
3. Panic 64
4. Sprite Man 64
5. Souper Fruit
6. Lazer Zone
7. Crazy Kong 64
8. Hovver Bovver
9. Frogrun
10. Tornado

Only one British program, Gridrunner, is in the American chart, and no American programs at all are in the British Top 10 (although Choplifter is on the way up). It is interesting to note that the American market appears to be orientated towards the more expensive, disk-based games while in Britain the cheaper, cassette-based programs are more popular. No doubt this is at least partly because of the lower hardware prices in the United States. When disk drives cost $200, why bother using cassettes?

Gridrunner

Although Gridrunner is No. 1 in Britain and No. 6 in America, I don't recommend it. Certainly, Gridrunner is an excellent game for the unexpanded VIC, and it makes good use of the VIC's sound, graphics, and limited memory. However, the 64 is a much more capable computer, and any unexpanded VIC program is bound to look insipid when put on the 64. Gridrunner is well done, but it compares unfavourably with games which fully use the 64's graphics, sound, and memory.

Another reason to avoid Gridrunner is that an expanded and upgraded version called Matrix has been released by the same author. Matrix plays exactly the same as Gridrunner, but the graphics and sound have been improved, and some new features have been added. Gridrunner and Matrix both sell for $23.95 in New Zealand, so you would be silly to buy Gridrunner.

Jumpman

Jumpman has been No. 1 in America for several months running, and it certainly deserves to be. It is by far the best arcade game I have seen on the 64. In fact it is just about the best game I have seen anywhere. If you buy just one game for your 64, this must be it.

Jumpman is very easy to learn. On the screen are several trinkets. Your job is to move a little man around the screen, collecting the trinkets and avoiding the obstacles. You will have to guide the man up ladders, down ropes, and across chasms. You will have to dodge hailstones, bullets, and bombs. You will be chased by vampires, robots, and giant chickens. In all you will face 30 levels, each one different, each one better than some complete games which sell for $39.

Jumpman isn't just a game of reflexes and hand-eye co-ordination. Some levels involve puzzles which can be solved only by careful planning and deduction. Some levels are invisible and require careful mapping. Some levels are incomplete and need to be built piece by piece. The variety of challenges in this game is simply amazing.

Jumpman makes very good use of the 64's graphics and sound. You can see the bombs spinning as they fall, you can hear the giant chickens flapping their wings. There is a wide variety of sound effects, and everything is tied together with pleasant, unobtrusive music.

Jumpman is available on either tape or disk. It sells for $89 in New Zealand. Don't let the price put you off; this one is worth it.

Beach-head

Beach-head is really four different games brought together under one theme. First, you steer a fleet of ships through a minefield. Second, your ships are attacked by enemy planes and you shoot them down. Third, your ships are shelled by enemy ships and you return fire. Fourth, you guide tanks around obstacles and shell enemy gun emplacements. These four segments are neatly linked together into one big game. For example, each ship is assumed to carry two tanks — the more ships you lose in the first three stages, the fewer tanks you have at the end.

Beach-head is a very enjoyable game, but its most interesting aspect is the superb 3D graphics and sound. Attacking aircraft are carefully detailed. They start as dots in the distance and grow steadily larger till they pass overhead. Shells whistle realistically and make nice splashes when they land in the sea. Burning ships light up the horizon.

The audio-visual effects in Beach-head are the best I have seen on the 64. They make the game something special and justify the $79 price. The only reservation I have about Beach-head is that it is relatively easy to master. A dedicated games fanatic will be able to finish off Beach-head in a few days. This contrasts with the weeks needed to master Jumpman.

Turn to page 60

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Bits and pieces

By Shayne Doyle

I must start with a correction to the December/January item on serial printer cable pin-outs — just in case you didn't pick it. The SG and CTS pins shown at the MicroBee end should be: SG pin 7, CTS pin 5. At the printer end, SG is obviously 7.

There is a very good 4 slot EPROM extender board available from a local MBEE enthusiast — it's marketed by Checkpoint Computers and I believe it costs around $60. I use one of these boards and could not do without it now, and I hear the Australian multiprom board costs around $295 by the time it gets to you. While on the subject of locally produced add-ons, I am desperate to hear from any hardware genius out there who has developed a disk controller board for the MicroBee. The forthcoming availability of Shugart's new 350 3.5 inch 1 Megabyte microfloppy drives sounds a very attractive proposition.

On the software side, routines I have come across or which have been passed to me include the proper 32-line display routines with redefined character set, left and right screen scroll routines, screen save and restore routines. These come from varicus sources. So if you haven't seen them and would like a copy, send a note with a stamped self-addressed envelcpe.

Other recent worth-while software has been the MYTEK Forth language and word processor — both EPROM sets. Try to get a hands-on on these. Forth is worth a play with, but in my opinion has a couple of serious limitations that prevents me taking it up seriously — it does not access HIRES graphics, it does not appear to be possible to print a program once al the words have been defined, and thirdly, there appears to be no way to re-edit a word once it has been placed in the dictionary and is removed from the edit buffer. If anyone has found a way around these problems, please write to me. I have only praise for the Mytek word processor however, having held off from WordBee until I could evaluate this one. I am glad I did that, and I suggest if you are looking for a word processor, check the Mytek one first. Most noticeable features are the 32 line by 120 character display, rapid sideways scrolling for page widths, more than 63 characters, easy inclusion of printer control commands in the text, printer configuration options, macro processing, etc etc.

Finally, a couple of hardware mods some of you may not have seen yet, the first from A-T, the second from BeeLine 9 . . . .

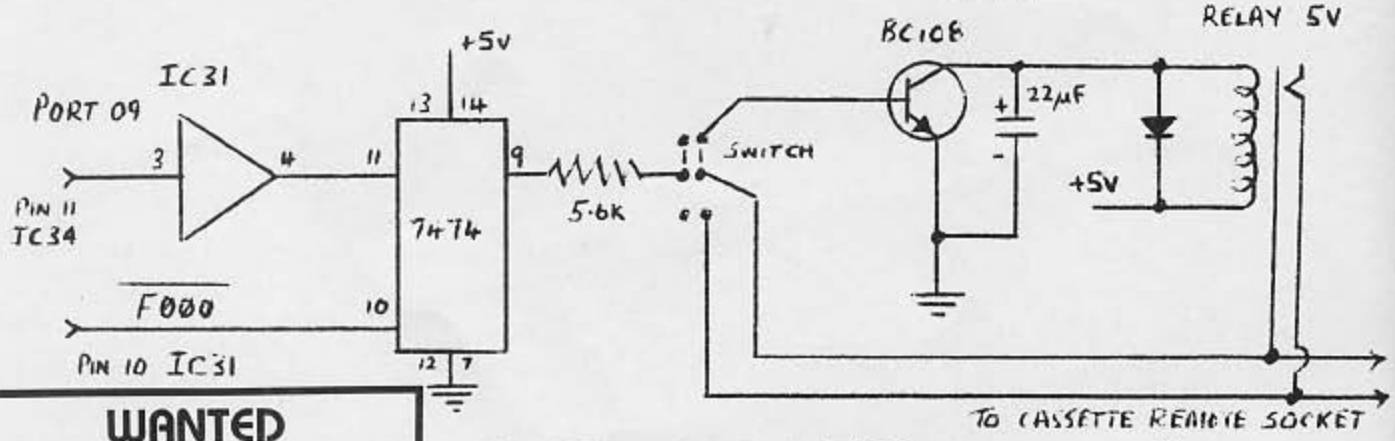
Cassette Motor Control for Loading on MicroBees with 5.22e Basic

Components:

1 x 7474 or 74LS74
1 x 5k6 resistor
1 x 1N914 diode

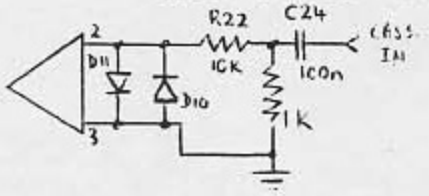
1 x 5V relay
1 x BC108 transistor
1 x 22uF tag capacitor

Circuit:



The 7474 can be placed in IC32 position (cut board tracks first) Reconnect pin 1 IC30 to ground. The relay can be mounted in the spare IC socket. *** Don't attempt to do this mod unless you have some electronics construction experience. ***

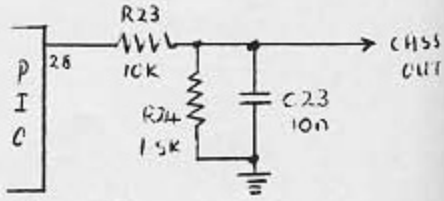
Operation: Press PLAY on cassette recorder
Enter LOAD and CR
Tape motor will run and stop when program is loaded or Bad Load condition
PLAY, LLIST, SAVE also cause the relay to operate, SAVE won't switch relay until after SAVE delay.



Input Circuit: R22, C24 positions reversed from the original and extra 1K resistor fitted from the junction to ground.

Circuit 2 — Improve 1200 baud tape loading reliability.

Problems have occurred with 1200 baud load because the MicroBee output level is too high, overloading the input circuit of many tape recorders, especially those with only microphone inputs.



Output Circuit: R23, R24, C23 values all changed. Link in original C23 location. C23, .01uF is fitted to TP8/9. R24 track to +5V is cut and grounded.

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Make your programs user friendly

By Pip Forer

Computer programming has its own rewards. Many hackers like myself enjoy simply the challenge of teaching the machine to do some trivial task for us. These home-brewed programs communicate with us very easily: after all we wrote them and know just what they were designed for. We may have a bald question mark appear on an otherwise blank screen and know that the computer wants a number between 0 and 100. If a file name is asked for we probably have only a few possible names to remember and these are all our pet files. However, if our program is going to be used by other people we need to make it much friendlier, or, in the jargon of the times, we need to improve its user interface. This is true of business programs where the user needs to know just what is happening when and why. It is even more true of programs in education where we cannot rely on the user to be a trained operator. For the program to run smoothly we need to minimise the possible errors and make absolutely sure the user is not left sitting looking at an apparently comatose computer.

The next few issues of the column will have some hints on user friendliness and developing a useful user interface with the use of various facilities on the BBC. Later on we will look at graphics and text windows, but this month the topic is encouraging user inputs without errors.

There are three possible sources of errors when people communicate with the computer. One is that they successfully enter a name or number just as they want it . . . but the input was wrong; wrongly measured or wrongly recorded. Frankly, there is not much you can do about these errors. The second problem is making a typing mistake. In many cases the program can do nothing to recognise these but in some cases it can know that the input makes no sense. A lot of scope exists for helping the user in these cases. The final input problem is when the user just does not know what to enter or which buttons to push. This is more common than you might think.

Coping with these problems can take a great deal of skill. Consider some of the tools the BBC gives you for coping, however. We might start at the INPUT statement. In most BASICs this statement lets you define a prompt such as "Please enter the date" and a list of expected variable values. The computer then awaits input terminated by a RETURN. On many machines a separate command GET will take a single key stroke, without a RETURN being needed, as an alternative. The INPUT statement appears neat but in fact is very messy. The user is often unclear how many variables are expected from him or her, or whether they must be numbers or mixed numbers anc letters. The example above is a good one. To that request for the date any user could be excused for typing back 'HOW?'. For many users, too, the facts that commas are taken as dividing lines between values, and that RETURN must be hit to complete the transaction, are unknown. The date may be entered in some way and the user sit for hours waiting for something else to happen. In addition f the input values are not to the computer's liking (letters instead of numbers for instance) a completely unhelpful message may appear, the worst example of which is RE-ENTER. You can get caught in a pretty endless loop that way.

BBC input statements are no better than most, but have a look at INKEY and INKEY$. These only take a single character keystroke at a time but have all sorts of nice features. First, you can specify a "wait time" for either instruction. If nothing comes in by that time the program continues. Clearly you can use this to direct the program to a "HELP" function guiding the user on what to do or sound a note and tell the user to hurry up if you think he or she is just lazy. Second, if you use these instructions in a procedure you can have a standardised way of inputting data that is much more powerful and potentially friendly than INPUT. As each character comes in it can be examined, checked as reasonable and if suitable added to the string of characters already input. If numeric data only is expected, for example, you can discover if a letter is input as soon as it happens and send a special message back to the user requesting only numbers. As soon as the character input is the code for return (the ASCII value 13) you can process the whole collection of input values in what ever way you want. Although implementing this greater control takes time it means you can be much clearer with the user.

Another area where problems arise is with programs that ask you to name a file you want input from or run.

Suppose for instance that the computer asks you for the name of a data file and you mistype it. On a disk system you swiftly get the message "FILE NOT FOUND". With tape it takes you longer but you get the same idea in the end. In either case this is normally a terminating error: your program ceases to run and the user drops out into the operating system. Very often the user has just mistyped a file name, or possibly cannot remember what file he needs. You can help him quite a lot by simply using the ON ERROR command. This directs the program to specified line or subroutine when an error condition occurs. You can handle the error here in a variety of ways.

The BBC is particularly nicely set up since discovering the error and expressing it in words is easily handled by BASIC. ERR gives the error number, ERL the line of the program it occurred on and REPORT prints the description of the current error condition. Armed with these you can get the program to deduce what went wrong where, guide the user, and then resume the program. In the case of the file name suggested above if the error found was &D6 (214) then you could REPORT the message "FILE NOT FOUND", PRINT "Here are the current files" and do a directory of file names available to help the user. You could then return to the original spot where the problem occurred.

Of course, it is better to avoid the first error if you can. Where you know just what the possible responses are in the first place, offering a cursor-driven menu can simplify the user input and minimise errors. Such menus are used by much commercial software and are very useful for selecting choices within a program. They can be extended to handle options such as file selection. The basic idea is that the possible choices are displayed on the screen with the current choice highlighted (say by being in inverse text). Two keys, normally the arrow ones, are used to move the highlighting bar around and so alter the user's choice. When he has decided on his selection he enters RETURN and the choice is actioned. Doing this is not difficult, especially in teletext, and it leaves the user with little room for error. Next month we will discuss a procedure using Mode 7 to implement such a menu in any program.

Hardware news

At least one BBC hard-disk system is now in Christchurch but not quite yet finally tuned up. We really will report in April! Meanwhile, overseas several interesting enhancements have been released that help get round memory restrictions. Although Acorn's second processors have yet to appear in force a 6809 processor plus two Z-80 ones are scheduled for release. One Z-80 is from Torch and is essentially the Torchpack without the pack. The other is from Pace. Both have software plus hardware packaging. The value of these is enhanced by the release of a Z-80 BBC BASIC.

At the same time two products using the sideways ROM facilities for RAM have appeared. Cambridge Computer

BBC

Consultants have produced a 20K RAM that sits in one socket and (for £100 and a claimed 1 percent speed loss) will carry all screen memory demands. This means a typical quadrupling of ROM word processor file size in Mode 0 and similar benefits for programmers. A more general development has been Solidisk's sideways RAM system. Apart from emulating a ROM in its 16K version this system is expandable to 128K at which point it can act like a 100K virtual disk drive at lower cost but much greater speed to a real floppy. Reviews of the 16K version in *Beebug* have been very favourable.

TRS80/SYSTEM 80

Of lines and 'stairs'

By Gordon Findlay

One of the problems with TRS-80 graphics is that diagonal lines are not easy to draw. Not only is there a need to calculate which points lie on the line, it is also necessary to decide exactly how the line is to be drawn. I have shown in the diagrams two different sets of "stairs", approximating the same diagonal line between the two points (X1, Y1) and (X2, Y2). Which should be used? Unless the line is at forty-five degrees (exactly) to the horizontal, there is always more than one way of connecting the two endpoints.

```
10 CLS:INPUT X0,Y0,X1,Y1
20 IF X0 <0 THEN STOP
30 CLS:GOSUB 100
40 GOTO 10
90 '-------------------------
91 'subroutine draws a line
92 'joining points (X1,Y1) and
93 '(X2,Y2) no matter where
94 'they are on the screen.
95 '-------------------------
100 DX=X1-X0
110 DY=Y1-Y0
120 R=DX/2
130 AX=SGN(DX):DX=ABS(DX)
140 SY=SGN(DY):DY=ABS(DY)
160 FOR I=1 TO DX
170 X0=X0+AX
180 R=R+DY
190 IF R)= DX THEN Y0=Y0+SY:R=R-DX
200 SET(X0,Y0)
210 NEXT I
220 RETURN
```

To really appreciate the method, add the line
195 PRINT AT 0, X0, Y0, R;
and you will see the way the Y-value is manipulated.

Whether or not the method makes sense, it is very effective, and probably the best that can be done. Naturally it is faster in machine code than BASIC, but if you try it, you will find it isn't that slow even in BASIC. As I say, it is a method which has been around for a long time: I first saw it in 1973. The same technique can be used for moving a ship along a line, or even plotting on a printer.

(X1, Y1)
(X2, Y2)
(X1, Y1)
(X2, Y2)

Mainframe programmers have, for many years, used the technique shown in the listing printer here for approximating a diagonal line:

One point is plotted for each X-value between X1 and X2, that is, each time around the loop the value of X changes by 1. The value of Y changes by the SLOPE of the line, which in terms of the subroutine below is DY/DX. This value may not be an integer (whole number), so it must be truncated. The subroutine keeps track of the amount of error this introduces, and as soon as this exceeds 1, Y-values are incremented an extra time. The subroutine is confused a little by the need to plot lines from left to right or right to left, and by the fact that the method I just explained only works if the slope is less than 45 degrees. Hence the bother with the SGN(X) function, which is rarely used, but returns 1, -1, or 0 depending on whether X is positive, negative or zero.

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BOOKS

Read it before you buy

"Bits, Bytes and Buzzwords" by Mark Garetz, dilithium Press. 138pp. $19.95. Reviewed by Gerrit Bahlman.

If you are contemplating a small business computer and you want a simple, readable text which will give you sound advice and an introduction to the jargon of the machine, this is the book for you.

Written in a relaxed, if slightly patronising style, it offers four sections which cover the basic computer system, the peripherals, software, and buying the computer. The chapters are designed to give the newcomer to the field an idea as to what to look for. A recurrent theme is "and we'll help you make the right choice".

The advice offered is sound although there is a strong tendency to lean on CompuPro computers which may reflect a personal preference on the part of the author but then again, he is currently employed at CompuPro. This element of subjectivity is rather obvious and somewhat disconcerting in a text designed (it is hoped) to give the newcomer a fair and unbiased overview.

The S-100 bus and the corresponding standard, IEEE 696s-100 product gains a high profile in the book which is understandable in terms of the author's commitments but does beg the question as to the technical depth needed for a novice.

The book is broken into short chapters with a very useful chapter summary that notes the main points raised in each chapter. Overall, I was impressed by the readability and simplicity. There were a few points which were inconsistently simple such as the reduction of the term, "mainframe", to the "brain of the computer" when the term is more commonly understood to mean the central, major processor which is capable of supporting other processors or terminals. However, this was the only example that actually moved me sufficiently to comment.

Apart from the price, which struck me as expensive for such a short booklet, I enjoyed reading it and I can recommend it as a pre-purchase book which will give you a basis upon which to ask sensible questions about the computer products available.

A bit too bland

"Programming with Graphics" By Garry Marshall, Granada Publishing. 118pp. $19.95. Reviewed by Martin Downey.

The first two chapters, which give an introduction to graphics, are fairly light-weight material. Chapter 3 is concerned with character graphics (referred to as block graphics) with examples suitable for the PET. Chapter 4 would be of most use to TRS-80 and ZX81 owners covering block graphics (referred to as pixel graphics). Line graphics are covered in chapter 5 and, according to the book, are relevant to Apple, Atari, BBC, DAI and Tandy Color computers. The final chapter gives an overview of such topics as Turtle

graphics.

Sample programs are given throughout and they would provide a good starting point for the beginner with a TRS-80, ZX81 or PET. Other computer users would be better off with a book specific to their machine.

As a generalised text on computer graphics it lacks depth, largely because of its intended aim to use as little mathematics as possible. An appendix gives a fairly good description of the graphic capabilities of 20 well known computers from the Apple to the BBC. Exercises are given at the end of each chapter but answers are not given and they are not even discussed.

As well as the confusing use of the terms, pixel graphics and block graphics, there are some fairly dubious conclusions made. For example, "graphics images should, as far as possible, fill the screen." There are also too many bland statements for a book of this size costing almost $20.

British bias but useful

"Computer Studies – A Practical Approach" by G.M. Croft, Hodder & Stoughton. 216pp. $16.95. Reviewed by Gerrit Bahlman.

Oriented towards the data processing side of computer studies, this book was written with British courses in mind. The trend away from teaching programming is evident in this text book which makes no effort to teach a computer language. BASIC is used as the illustrative language for examples that relate to file handling, sorting and simulation but overall the programming component is limited.

The book is divided into four major parts: the material, data; the tool, the computer; basic skills, using the tool; the product, applications and their importance to society.

The main emphasis on data processing results in considerable effort being dedicated to data representation coding, computer storage, binary arithmetic, switching theory, and file handling. Searching, sorting, simulation and iteration are given limited treatment.

The usual test for ineffective treatment of sorting is to determine whether the bubble sort is the solitary exchange sort offered on the grounds that it is easy to understand and implement. The actual utility of the method is not examined. This text makes this same error but does gain some credence by introducing the "two way merge sort" as a fast and frequently used commercial sorting technique.

The simulation used is that of a queue building up at a garage. Iteration covers Newton-Raphson method for the calculation of square roots, solution of polynomials and histogram plotting.

The section on problem solving techniques was well presented and logically laid out. Sound and systematic methods of problem solving are advocated with due weight given to test data, desk checks and documentation but this lends itself more to the 7th form applied mathematics course rather than 6th form computer studies work.

The use of flow charts and the failure to illustrate the importance of structuring in both the problem solving and programming examples was the single most disappointing feature.

In summary, the book is out of phase with New Zealand prescribed courses in terms of emphasis but there is sufficient overlap to justify its inclusion as a reference to teachers at the very least, and it may well prove of use as a course text for some schools.

CLUB CONTACTS

BBC MICROCOMPUTER USERS' GROUP OF NZ. Local meetings – Auckland: 2nd Wednesday of month at VHF Clubrooms, Hazel Ave, Mt Roskill. Ph. Dave Fielder, 770-630, ext 518 (b). Wellington – meets last Thursday of each month in staffroom, first floor, Correspondence School, Portland Cres, Thorndon. Local contact, Anton, 286-289. Hamilton – Waikato Tech B-block staffroom; last Wednesday of the month 5 p.m. Local contacts Peter (Ham) 393-990 or Alison (Morrinsville) 6695. Hawke's Bay – Hastings and Napier alternate months. Local contacts: Kendall (Napier) 435-624, Bob (Taradale) 446-955; Mitch (Hastings) 778-235. Christchurch – fortnightly, Tuesdays, 7 pm, Hagley High School. Local contact Michael, 582-267.

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

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.

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

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

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

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

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

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

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

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

NZ OSBORNE USER GROUP (NZOG): Brian Jones, ph 659-738 (h). Meetings: 1st Thursday, 20 Kingley St, Grey Lynn.

POCKET COMPUTER USER GROUP: Peter Taylor, 14 Gollan Rd, Mt Wellington 6, phone 576-618 (h).

SINCLAIR USERS GROUP: Doug Farmer, phone 567-589 (h). Meetings: 4th Wednesday *.

SORCERER USER GROUP (NZ): Selwyn Arrow, ph 491-012 (h). Meets at Micro Workshop.

SORD USER GROUP: Graeme Hall, 5 Brouder Pl, Manurewa, ph 266-8133 (h).

TI 99/4A USER GROUP: Ray Tucker, ph 568-155 (h).

WIZZARD USER GROUP: Richard McFadgen, 11 Hilling St, Titirangi, ph 8178-219 (h).

1802 USER GROUP: Brian Conquer, ph 695-669 (h).

2650 USER GROUP: Trevor Sheffield, phone 676-591 (h).

68XX (X) USER GROUP: John Kucernak, ph 606-935 (h).

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

Other Auckland-based groups:

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

ATARI MICROCOMPUTER USER GROUP: Ian Mason, 24 Sequoia Pl, Glenfield 10, ph 4789-556 (h). Meets 2nd Tuesday, Western Suburbs Radio Club, Gt North Rd, New Lynn.

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., Titirangi. Phone 817-8698 (h). Meets first Tuesday OSNZ Hall, 107 Hillsborough Rd, Mt Roskill.

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

SYMPOOL IN Z. SYM user group): John Robertson, PO Box 580, Manurewa, ph 2675-188 (h).

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

BAY MICROCOMPUTER CLUB (Tauranga): G.L. McKenzie, Secretary, Snodgrass Road, Tauranga. Phone: 25-569.

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

BEACH COMPUTING CLUB (Waihi): Jamie Clarke, Box 132, Waihi (Ph: 45-364 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.

WAIKATO COMPUTERS IN EDUCATION SOCIETY. Chairman, Derek Greenfield, 33 George St, Morrinsville, (h) Morrinsville 7767. Secretary, Geoff Franks (h) 81-050.

MORRINSVILLE COMPUTER SOCIETY: Contact: Alison Stonyer, 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 486, Gisborne. Phone 88-828.

ROTORUA COMPUTER CLUB: Contact: Ken Blackman, 6 Urquhart Place, Rotorua. Third Tuesday of each month at 7pm, Waiariki Community College, Rotorua.

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

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

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

HASTINGS COMMODORE USERS' GROUP: Contact, Mike Phillips, 401 Lascelles Street.

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

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

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

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

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

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

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

NEC COMPUTER USERS' GROUP: C/- P.O. Box 3820, Wellington.

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

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

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

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

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

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

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

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

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

CANTERBURY COMPUTER EDUCATION SOCIETY: Secretary, Neil Fleming, 798-800, Box 2612, Christchurch.

CHRISTCHURCH ATARI USERS GROUP: Contact Edwin Brandt. Phone 228-222 (h); 793-428 (w).

CHRISTCHURCH '80 USERS' GROUP: David Smith, P.O. Box 4118, Christchurch. Phone 63-111 (h).

CHRISTCHURCH PEGASUS USERS' GROUP: Don Smith, 53 Farquhars Rd, Redwood, Christchurch. Phone (03) 526-994 (h), 64-544 (w), ZL3AFP.

OSI USERS' GROUP (CH): Barry Long, 377 Barrington St., Spreydon, Christchurch. Phone 384-560 (h).

CHRISTCHURCH SINCLAIR USERS' GROUP: Mr J. Mitchell, Phone 385-141, P.O. Box 33-098.

CHRISTCHURCH COMMODORE USERS GROUP: John Kramer, 885-533 and John Sparrow. Phone 896-099.

CHRISTCHURCH BBC USERS' GROUP: Contact: Michael Hopkins (h) 582-267 or Rodney Derham (h) 893-215.

PANASONIC (JB-3000) USERS' GROUP: Contact: Prof B.J. Clarke, Dept of Accountancy, University of Canterbury, Private Bag, Christchurch, 1.

CHRISTCHURCH COLOUR GENIE USERS' GROUP: Meets 2nd Wednesday, 7.00p.m., Abacus Shop, Shades Arcade. Secretary, Andy Russell, 27 Caudron Road, Sockburn, Christchurch 4. Ph (h) 497-546.

ASHBURTON COMPUTER SOCIETY: Mr. J. Clark, 52 Brucefield Avenue.

SOUTH CANTERBURY COMPUTER GROUP: Caters for all machines from ZX81 to IBM34. Geoff McCaughan. Phone Timaru 84-200 or P.O. Box 73.

NORTH OTAGO COMPUTER CLUB: Contact: Peter George, P.O. Box 281, Oamaru. Phone 29-106 (b) 70-646 (h).

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

DUNEDIN COMMODORE USER GROUP. Contact: Mrs S.I. Downes, C/- The Micro Shop, P.O. Box 5518, Dunedin. (w) 740-469. Meetings: second Monday of month, 7pm-9pm.

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

CENTRAL CITY COMPUTER INTEREST GROUP: Contact Terry Stevens, Box 5260, Dunedin. Phone 882-603. Meetings every second Tuesday.

OTAGO COMPUTER EDUCATION SOCIETY: 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.

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

MICRO NEWS

Shugart drives

The Shugart Corporation has announced a series of intelligent 5.25 inch Winchester disk drives. The 700S series combines the capabilities of the company's 1600 series intelligent SCSI (Small Computer System Interface) controllers and half-height drives in a fully integrated, system level product. The new series offers formatted capacities of 5 and 10 megabytes. Unlike traditional Winchester drives, the Shugart 700S series has the intelligence to handle many of the housekeeping functions normally handled by the host processor and controller, including data error detection and correction, formatting, defect mapping, data buffering, self arbitration, and automatic retries. These capabilities, achieved through the use of a custom LSI controller chip set, frees the host processor from handling peripheral functions, reduces software and memory requirements in the host RAM and speeds communications between the CPU and peripherals. Evaluation units of the 700S were available in the first quarter of 1983, with production scheduled for the second quarter. In OEM (system manufacturer) quantities, the 706S is $US661 and the 712S $US716.

GLOSSARY

Algorithm: A list of instructions for carrying out some process step by step.
Applications program: A program written to carry out a specific job, for example an accounting or word processing program.
Array: A data type found in high level languages, which is stored in a contiguous block of memory. Accessed by the array name and an index making it easier to process groups of data in many situations.
ASCII: American Standard Code for Information Intercharge. An 8-bit code.
BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language for microcomputers.
Baud: Speed of transferring data, measured in bits per second.
Beeb: The BBC microcomputer.
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.
Bubble memory: A non-volatile memory (i.e., it is not erased when the power is turned off). The information is stored as microscopic pieces of magnetic polarisation.
Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.
Bug: An error in a program.
Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".
CAL: Computer Aided Learning CAL programs are written to take different actions on different student answers.
Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer. See also Programming languages and Machine language.
Courseware: Name for computer programs used in teaching applications.
cpi: Means character per inch. A common way of describing character density, i.e., how close together characters are in printers.
CP/M: An operating system for Z80 based machines. It is by far the most widely used DOS for Z80 based machines and there is an extremely large software base for it. See also disk operating systems.
cps: Characters per second. A common way of describing speed in printers.
Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.
Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.
Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5¼ inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several disks of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes – while floppy disks typically hold between 140,000 and three million bytes.
Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.
Diskette: Another name for a 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.
Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.
EPROM: Erasable, user-programmable, read-only memory.
Execute: A command that tells a computer to carry out a user's instructions or program.
Fanfold: A type of paper that although a continuous sheet folds into set length sheets. This is achieved by way of a perforated line at set intervals. It also maces it easy to tear off a length of paper.
File: A continuous collection of characters (or bytes) that the user consders 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).
LCD: Liquid-crystal display.
Line feed: A control code character found in the ASCII character set. Its normal purpose is to move the cursor down one line (on screen) or move paper up one line (on printer). Does not return the cursor to the left-hand margin.
Machine language: The binary code language that a computer can directly "understand".
Mainframe: The very large computers that banks and other large businesses use are called mainframes. Also in microcomputers the term is sometimes used to describe the core of the machine, i.e. the CPU plus memory.
Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.
Megabyte (or Mb): Represents a million bytes.
Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory. There is internal memory inside the microcomputer itself, and external memory stored on a peripheral device such as disks or tape.
Memory capacity: Amount of available storage space, in Kbytes.
Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one. Menus allow user to easily and quickly set into programs without knowing any technical methods.
Microcomputer: A small computer based on a microprocessor.
Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.
Modem: Modulator-demodulator. An instrument that connects a microcomputer to a telephone and allows it to communicate with another computer over the telephone lines.
Network: An interconnected group of computers or terminals linked together for specific communications.
Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.
Parallel interface: A type of communications interface used mostly for printers. It sends a whole character of data down eight (commonly) lines, one bit down each line. The most common type of parallel interface for printers is the centronics interface.
Pascal: A high-level language that may eventually rival BASIC in popularity.
PEEK: A command that examines a specific memory location and gives the operator the value there.
Peripherals: All external input or output devices: printer, terminal, drives etc.
Pixel: Picture element. The point on a screen in graphics.
POKE: A command that inserts a value into a specific memory location.
Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.
RAM: Random access memory is the very fast memory inside your computer. The access time for any piece is the same. Your program and run-time data are usually stored in RAM.
REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.
Resolution: A measure of the number of points (pixels) on a computer screen.
ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.
Serial interface: A type of communications interface used for a wide variety of purposes (printers, terminals, telephone correction etc.). It uses a minimum of two wires, and sends the data one bit at a time down one wire. The most common type of serial interface is RS232C.
Sheet feed: A type of paper feeding system normally used for high-quality document printers. A special device picks up a sheet of paper and feeds it into friction rollers.
Simulation: Creation of a mathematical model on computers that reflects a realistic system.
Software: Any programs used to operate a computer.
System: A collection of hardware and software where the whole is greater that the sum of the parts.
Tractor feed: A type of paper feeding system for printers. Special computer paper with holes along both sides is fed by the tractors gripping these holes.
VDU: Visual display unit. A device that shows computer output on a television screen.
Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

LANGUAGES

From page 45

The above is only an excerpt. The program would continue to ask more questions, branch to various subroutines on correct and incorrect answers, provide feedback to the student, tally the results and so on. Functions that can be used include logical branching, conditional responses, simple computation, subroutine branching and others depending on the sophistication of the version being used.

The beauty of this language is that it is simple enough to use for teaching programming to first formers and versatile enough to use for writing the most complicated tutorial and educational programs.

Versions of the PILOT language are available for most microcomputers.

COMMODORE

From page 50

Note: Some versions of Beach-head have a line of flickering garbage in the middle of the screen. This is easily eliminated by loading the first part of Beach-head and inserting POKE 12443,205 at the beginning of line 9.

Free programs

At $80 per program, few of us are rich enough to collect a large number of programs. However, there is an alternative: hundreds of free programs for the 64 are available in the public domain.

The quality of public-domain programs varies considerably. You will have to sort through a lot of dross, but you will find gold. In particular, the utilities and adventures in the public domain are usually good value. In fact some are superior to similar commercial programs selling for $30 or $40.

Some dealers are selling disks of public-domain programs for as much as $45. This is a very expensive way to get "free" programs. You are much better off joining a user group and getting the programs from them. The Nelson Commodore Users' Group has the best collection of public-domain programs in New Zealand, and they send them to members all over the country. Write to Box 860, Nelson, for details.

Function Keys

Last month's competition called for a program to read two of the function keys. Those of you who tried to get this information from the *User Manual* were out of luck. Even the *Programmer's Reference Guide* does not specifically explain how to read the function keys.

A function key is just like any other key. If you use a GET statement and someone presses a function key, then it will register. For example, GET A$: IF A$=CHR$(133) THEN STOP will stop if f1 is pressed. Each function key has its own CHR$ code. The code for f1 is 133; the codes for the other keys are on page 136 of the *User Manual*.

Another way of reading the function keys is by doing a PEEK(203). This gives you the present keyboard matrix value. While f1 (or f2) is being pressed, the matrix value is 4. Therefore, if PEEK(203)=4 THEN STOP will stop if f1 is pressed. The keyboard matrix value for f3/f4 is 5, for f5/f6 is 6, and for f7/f8 is 3.

Competition

The winner of February's competition will be announced in next month's column. I don't know the results yet because my deadline for this issue is weeks before February 20, the closing date of the competition. Similarly, this month's competition closes on March 20, and the winner will be announced in the May issue of *Bits & Bytes*.

The prize for this month's competition is a cassette tape of Pegasus Odyssey (donated by Alpine Computing). The winner will be selected randomly from among the correct entries. Only one entry will be accepted per person.

Your task this month is to write a program which asks the user to type in his name and then tells him how many times the letter e appears. Send this program with your name and address to Pegasus Contest, P.O. Box 201, Alexandra.

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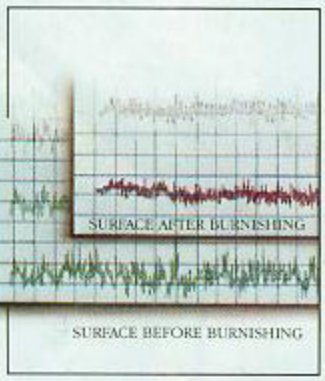

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