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The one thing you won't need a computer to work out is that the Amstrad CPC6128 represents outstanding value for money. You only have to check the cost of buying all the elements separately, 128K RAM computer, disc drive and monitor to realise that the Amstrad package is very hard to beat.



Wordprocessing and Amsword can improve the productivity of everyone from unskilled typist to trained secretary.

An Expanding System

There is a complete range of peripherals available to CPC6128 which plug into built in interfaces. These include a joystick and printers. The Centronics compatible parallel printer interface connects to a vast range of printers, from low cost dot matrix through to daisywheel printers giving superb print quality.

The expansion connector at the rear of the CPC6128 contains all the signals necessary to implement a wide range of add-on peripherals. Modems, light pens, speech synthesizes and serial interfaces are amongst products already available or in development by either Amstrad or independent vendors.

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The Amstrad Serial Interface (RS232C) is much more than just a complete means of connecting serial printers and modems. It's a complete extension and expansion system that incorporates its own ROM software to emulate terminals so that your CPC system can work in conjunction with mini and microframe computer systems.

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BITS & BYTES



December 1984. Vol 4, 4.







An apology (on behalf of the NZ Post Office) is due those Bits and Bytes subscribers who did not receive the November issue until very late in the month. Maybe it was because of the Christmas mail deluge — whatever, last month the Post Office delivered unsorted bundles of up to 40 copies to individual subscribers, resulting in re-posting and the delay.

The Post Office assures us the problem's now been sorted out . . .

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Amstrad's challenge

The success story that is Amstrad progressed further when the UK computer and audio group recently announced a 121 percent leap in profits for the year to $50m.

The group's shares consequently leapt 34 cents to a high of $3.35 each. As chairman Alan Sugar has 50.2 percent of the shares, his personal fortune overnight increased $22.5m to $160m.

A significant contribution has come from a dramatic leap forward in overseas sales — from 13 percent of total sales last year to 53 percent of turnover this year (the group's total turnover being $340m).

Sugar claims his group is poised to fill some up-market niches in its computer range.

The Amstrad micro is now challenging the BBC for places in British schools. And in New Zealand, Grandstand Leisure, the Amstrad distributor here, is attempting to make the same inroads.

The local school package includes a 128 K ram micro with monitor, disc drive and software for less than $2000.

Grandstand is backing its educational assult with a teacher- education campaign "to lessen the risk factor for schools buying the system, and reduce teachers' problems in accepting the new technology", according to Grandstand managing director Bill Fenton.

He has organised a test and trial exercise at Henderson South Primary School in West Auckland in conjunction with the school principal, John Hope, a member of the Computer Education Society.

Only in Spain

The long-awaited 128K Spectrum has finally been launched, but only in Spain. This means the ROM, the software and documentation are all in Spanish.

Sinclair Research argues that "market conditions" forced the Spanish launch.

In the UK, the Dixon's retail chain has effectively bailed out Sinclair by buying up stocks of the 48K version. It wouldn't look too clever to launch the 128K Spectrum until these have been cleared.

Pssst...want a cheap IBM?

Dick Smith Electronics has just launched an IBM-clone retailing for under $2000.

Sourced from Multitech, a Taiwanese manufacturer gaining wide respect for its production and support abilities, the DSE Multitech in its basic configuration, of one 360 K drive, 128 K ram, MS-DOS 2.11 and a three-month warranty, will cost $1995.

The System Two version, costing $2495, has two 360 K drives, 256 K ram and includes MicroPro's EASY wordprocessing software.

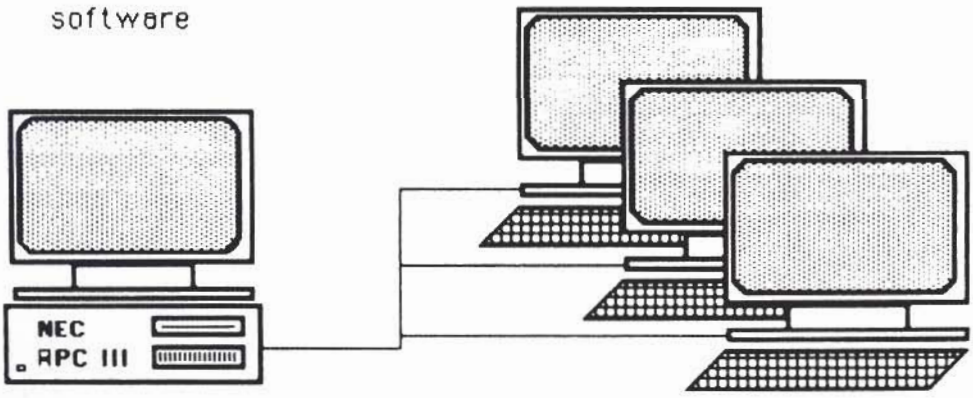
The computer's specifications are similar to the IBM PC (General) — 8088 processor, running at 4.77 Mhz, detached keyboard... The package includes an IBM-compatible graphics interface with "flicker-free" circuitry.

At the time of launch, in DSE's Christmas catalogue, a servicing contract with Tisco was still being negotiated.

In Auckland, DSE reports that inquiry about the clone was strong within a few days of the catalogue release.

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MULTI-USER

AT battle hot

At least 20 different manufacturers are scrambling for a share of the market created by the IBM PC AT, IBM's most powerful micro.

Sperry could be setting the tone of the looming battle with its advertisements in the US which read: "The next time an IBM sales rep tells you he'll meet you halfway, you'll know what he means". Below this header is a picture of the new Sperry IT, which is claimed to be twice as good as the IBM AT.

Sperry is also attempting to build on a fledgling dealer network in the US.

For its sales push Compaq is equipping its dealers with a "major accounts sales kit" comprising a 3 minute video tape, a slide show and other in-store promotion material. The briefcase of promos has been consigned to more than 2500 dealers internationally.

Meanwhile Hewlett-Packard has followed Sperry into the IBM AT field with heavy advertising of its Vectra — a campaign which began running last month in this country before the machine had even landed here.

Barson Computers is releasing here in February the Apricot XEN, an 80286 chip, 3.5-inch disc, Microsoft Windows software micro which also features an expansion box to enable IBM emulation.

It is claimed to run 60 percent faster than the IBM PC AT, but is to be priced significantly below the IBM AT.

Barson dealer manager Clive Raines says the dealer network is being well prepared for the launch of XEN, which will be priced from $9000, depending on the configuration. The 20 Meg version will be at least $3000 less than the current AT price.

Commodores to Tisco

With Fountain Marketing's exit from the home micro market, as a result of its Commodore distributorship terminating on December 4, has come the need to reorganise support and servicing

All servicing is now undertaken by Tisco, which had previously been handling Fountain's Commodore servicing commitments only outside of Auckland.

Jnr pushed again

Early last month IBM commenced a two- month advertising campaign in the US to stimulate sales of its PC Jnr.

Unlike last Christmas when IBM blitzed all media with its PC Jnr ads, this year's campaign is confined to print and local radio.

The ads feature the "exceptional value" of the micro — many retailers offering the Jnr for under US$700 ($1195)...as well as IBM's commitment to service the product.

'Computer Olympics'



Dunedin's Computer Olympics in October had 105 competitors from 12 schools pitting their programming wits against the clock, and each other.

The Logo section was also a practice run for a nationwide contest next year — to involve a networking of terminals in halls throughout the country.

Bits and Bytes was among the sponsors of the Dunedin contest — we supplied competition badges for identifying those having legitimate access to computers.

The results were:

One hour event: 1st, Bayfield High School IV, Philip Smith, Greg Holden. **2nd,** Bayfield High School III, Sang- June Park, Peter Scott. **3rd,** Logan Park High School, Andrew Trotman, Brendon Downey, Tony Doig.

LOGO: 1st, Queens High School II, Julie Mackie, Carolyn Moen, Catherine Sansom. **2nd,** Arthur Street School I, Nina Rillstone, Katie Pascoe, Diane Pettit. **3rd,** Kings High School II, Richard White, Jason Cox, Richard Young. **Beat the Buzzer: 1st,** Bayfield High School, Greg Holden, Philip Smith, Andrew Robertson. **2nd,** Logan Park High School, William Jones, Brendon Downey, John Marshall. **3rd,** Kings High School I, Alan Barr, Craig McNaughton, Alistair Stevens.

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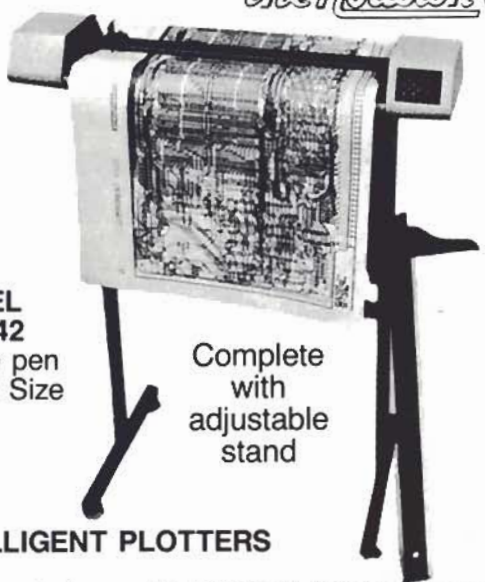
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Buy one, get one free

Software Architects Ltd is again trying its pre-Christmas sales campaign by offering home computers as give-aways to purchasers of NEC APC III computers.

The freebie is again a Spectravideo home computer, the SVI 328 package, valued at close to $1000 when the campaign was launched in November.

The freebie promotion was mail-dropped to 27,000 business box holders and supported with advertisements in newspapers.

Software Architects' marketing director Chris Johnson says the two reasons for this type campaign were that the avialability of a home computer enabled businesses a less forbidding and serious start to practising their computer system start-ups, and that most business people have children.

The campaign was a success last year without the mail-drop.

Johnson says Spectravideo machinery was chosen because the distributor, CDL, was efficient and reliable, and the hardware itself "reputable as a home computer".

Advanced course

Argos Data Systems is offering an advanced one-day course to teach more complicated applications of Lotus 1-2-3, including macro-programming, data handling and file combining.

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Open letters:— Acorn answers Electron's critics

Dear Bits & Bytes readers,

In order to answer several criticisms regarding the Acorn Electron Microcomputer, I have received the following statement from Acorn Computers Ltd Cambridge UK:—

Acorn remains fully committed to production and support of the Acorn Electron microcomputer and its peripherals. The current reports of instability in the UK low priced market should not be misinterpreted.

In recent months we have rationalised the methods of distribution within the UK retail market. The purpose has been to limit senseless cut-throat competition between large retail chains.

The effect will be seen in the quality of resourcing that is now being given to customers who purchase an Electron this Christmas.

The home computer marketplace is subject to rapid change and frequent innovation and therefore it would be impossible for Acorn to make a statement regarding the expected lifetime of the Electron, or what might follow it.

We have said however, that we will resource spares and components for another three years at least, and will continue to supply the Electron computer as long as there is sufficient demand for the product.

Bob Coates
Product Manager
Acorn Computers Ltd

I should like to add that, contrary to media speculation in the UK and elsewhere, Acornsoft has not been sold off. Indeed, the Acornsoft division has been moved into the main company offices in order to strengthen the relationship with the parent company and to improve the daily interchange between staff.

Undoubtedly, Acorn may wish to supercede the Electron in time, in the same way that the BBC Micro superceded the Acorn Atom. That is progress!

The company has always made a strong committment to compatibility but at this stage makes no statement on any new Electron-type product. Any speculation in that area would be counter-productive.

It is certain however, that Acorn is anxious to move its image away from the very low-end machines, in due course.

Barson Computers (Australasia) have recently completed the design of an Econet interface, the Plus 1e for the Electron, and these machines are now being used in conjunction with BBCs in network installations on both sides of the Tasman.

Other companies have also become involved in further development work for the Electron. For example, an RS423 interface with Viewdata/terminal software will be released on the UK market before Christmas and will be available in New Zealand early in the new year.

This will enable the Electron to be used as a low-cost videotex terminal for Aditel and other videotex systems.

Finally, a two-rom expansion board for the Electron Plus 1 and Plus 1e has been developed by an Australian company.

This unit allows Rom-based software, written for the BBC, to be used on the Electron.

Joe Joyce
Acorn Products Manager
Barson Computers (NZ) Ltd





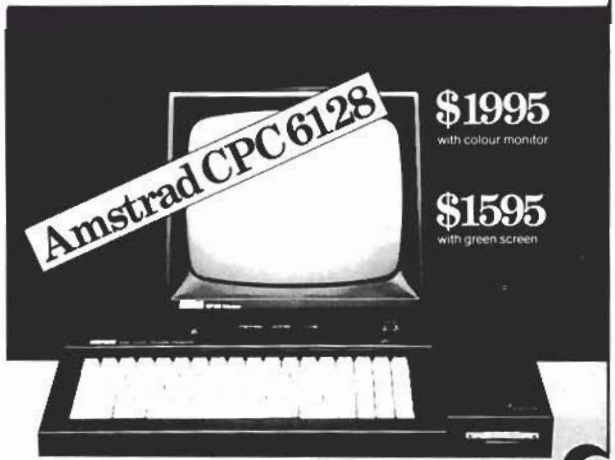
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Acorn cuts losses

Acorn, the Cambridge microcomputer group rescued by Olivetti 10 months ago, in October reported a £22.2 million loss on the year — £800,000 worse than the company had predicted in August.

The board explained that disposal of surplus computers during the intervening period had led to a more accurate valuation. Also, there had been a small increase in costs connected with Acorn's ending of direct marketing in the United States and Germany.

Turnover in the year to June 30 was £77.9 million, a drop of 16 per cent. The profit in 1984 was £10.3 million.

Although Acorn has supplied most of the computers in Britain's schools, it was hit even more than most by the end of the home computer boom.

With the comfort of government (and BBC) backing for its machines in the schools, it failed to cut prices when its less complacent competitors did. Now the Italian group Olivetti owns 79.8 per cent of Acorn.

Acorn's managing director, Mr Brian Long, said the group was making good progress in reducing both its own stocks and purchase commitments with suppliers. "Availability of product is now moving into balance with sales projections."

Hopes on Amiga

Instead of the $80m estimated, Commodore US lost US$124m in the three months to June 30, on sales down by more than half. The losses include a stock write-down of $63m, which suggests that Commodore 64's will be going cheaply in the US and probably other markets.

Commodore has just started a reported $40m advertising campaign for its new Amiga computer, which in October was reaching US dealers.

Amiga software is, however, very limited, to less than a dozen programmes. Commodore is effectively betting the company on the new machine, which it obtained by buying Amiga Corp.

Amiga was formed by a breakaway group from Atari and other companies. The Amiga's special chips were designed by Jay Miner, who had earlier designed similar chips for the Atari 800. Commodore still faces a $100m lawsuit from Atari over the use of these chips.

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Ashton Tate seeks IBM status

Ashton Tate, the company manufacturing dBase II and III and Framework is seeking to establish a more prominent "corporate identity" in the computer scene, as well as stronger support for its distributors and dealers.

The US company has only just established an Ashton Tate office in Sydney, ultimately to employ about 10 staff, which will initiate marketing strategies which go beyond the "rudimentary level of software marketing" prevailing up till now.

"The plan is to develop a more analytical, more professional approach to the software market; for instance, more careful packaging, as happens with frozen beans," says AT's California-based international account executive, Leslie Barner, recently in Auckland.

Ashton Tate Australia's first staffer, general manager Bill Bolton, who was previously a manager of AT-appointed distributor Arcom Pacific, says the software market will further segregate into either low-priced options (sold via "supermarkets") and value-added options (sold via supportive dealers).

"Long term Ashton Tate will be doing the IBM act, of establishing a long term confidence in its products," says Bolton.

He admits also to such a strategy enabling Ashton Tate to be less vulnerable to "the red-hots" which can dominate software sales from time to time.

In the US, dealer support from AT has extended to them receiving giveaway cars, cruises and computers. According to Miss Barner, this was to retain the better dealers during the past year's dogfight for retention of market shares.

Another tempter for dealers is the offer of payments for time taken by a prospect's staff to attend a dealer's demonstration of AT software.

Despite the revitalised dealer push, AT claims to be confident of holding its domination of the database management software market — claiming 60 percent of the US market, and 75 percent of Australia.

But Ashton Tate does see battles on other fronts — in establishing a multi-user database manager called dBase III Plus, of which exports have been stalled by a US Defence Department veto; and in further promoting Framework against Lotus Corporation's Symphony, which continues to dominate the integrated market.

DG seeks dealers

Last month Data General joined the growing list of mainframe-size corporations who have opted to follow IBM's lead down-market, by initiating its own network of independent dealers to specialise in the "low-end" micro market.

The move, initiated in the US , is in line with heavy price cuts previously announced for the lap-portable DG One and other DG equipment.

The DG One, with 256 K ram, and two 720 K drives, had been reduced almost 40 percent to $5,121. The desk-top Dasher One, with a 10 Mb drive and 720 K floppy, now costs $7,673.

ADE carve-up

Anderson Digital Electronics, which went into receivership in late March following the winding up of its Australian parent, is due for the final carve-up as the company's unsecured creditors begin organising a liquidation of ADE's remaining assets.

The remaining value in ADE is mainly of its stock of unsold printers. ADE was a distributor of OKI and Qume printers and DEC micros.

At its peak ADE had a staff of about 30 in Auckland and about 10 in Lower Hutt. Several had left for other jobs when notice of receivership was posted.

From the remaining funds likely to be available the unsecured creditors will be paid 20-50 cents in the dollar owed — depending on the outcome of an outstanding legal claim against ADE.

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Commodore C-128

Crammed with commands

By Steven Darnold

Since the beginning Commodore has specialized in producing inexpensive computers. In order to keep prices down they have made economies. That is why the first PET had a calculator keyboard. That is why the VIC had a 22-column screen and 5K of memory. That is why the C-64 had a primitive BASIC and slow disk drive. These were all cheaper options.



The problem with such economies is that there are always people who feel the cheap options ruin the computer. As a result, Commodore computers have come in for a fair bit of criticism.

The new C-128 marks a turning point for Commodore.

There are no compromises, no cheap options.

Commodore has pulled out all the stops and put in every feature they could think of.

It is positively bursting with interesting bits. The C-128 is so full of special commands and modes that most people will never use half of them.

The C-128's lavishness begins at the keyboard. In addition to the standard C-64 keys, it has a numeric pad, individual cursor keys, a reset button, an ESCAPE key, a TAB key, a HELP key and several other special keys.

Commodore has thought of everything — there are even pimples on the F, J and 5 keys so you can be sure of your place when touch typing. The four "dead" function keys from the C-64 now have eight preprogrammed commands and it is easy to change them to whatever you want.

W/p power

A particularly powerful addition to the Commodore keyboard is the use of the ESCAPE key to do such things as scrolling up/down, erasing to end of line/screen, auto- inserting, cancelling quote mode, inhibiting scrolling, and setting tab stops. This gives you almost as much power for editing the screen as a word processor.

The C-128 displays either 40 or 80 columns on the screen. In addition, you can set up a window of any size (up to the 80x25 maximum).

Thus, if you wanted to simulate a VIC screen, you could display a 2x23 window on the 40 column screen. Such a window would only cover about half the screen, but the text would wrap around just like a VIC. These windows function exactly like the full screen.

There is no problem writing and editing programs while in a window. In fact, I wrote a short program in a window only one column wide. It looked strange, but it worked fine.

More accessible

The C-128 contains the same graphics and sound chips as the C-64, so its potential is exactly the same.

However, the C-128 makes those chips' capabilities much more accessible to the average programmer.

It contains a powerful selection of commands for manipulating graphics and sound. It takes just a few lines of code to produce effects that would have taken a week of hard programming on the C-64. It's a real joy to use.

Sprites are simple to define and they move automatically. Geometric shapes are easy to draw and colour in.

If you want text with your graphics, it can be printed on the graphics screen, or you can simply split the screen at any of the 200 lines.

Sound is just as straightforward. Commands are available for you to set envelopes and frequencies or you can simply play notes by name (CDEFG etc).



More commands

The graphics and sound commands are an important part of the C-128's BASIC 7.0.

Many people complained that BASIC 2.0 on the C-64 didn't give adequate support to graphics and sound. As a result, Commodore put numerous sound and graphics commands into the new BASIC.

They also took the opportunity to add many commands for disk handling, structured programming and program editing. They have also included a good machine language monitor.

BASIC 7.0 provides an almost overwhelming collection of commands. There is error trapping, in-string matching, print using, do looping, joystick reading, number converting, and much more. There is also a command to increase processing speed from 1 MHz to 2 MHz.

Add to this all the disk and editing commands, and even experienced C-64 programmers will have a huge amount to learn. In total I get the feeling that someone at Commodore said: "Stick everything you can think of into BASIC 7.0".

Tripled memory

Not surprisingly, the C-128 comes with 128K of RAM.

At first glance this might appear to be twice the memory of the C-64, but in fact BASIC programmers will find that they have more than three times the space.

The C-64 has only 38K available to BASIC, whereas the C-128 has 122K.

Add this to the fact that the C-128's better BASIC enables much more compact program to be written, and in effect the C-128 has room for BASIC programs four or five times bigger than the C- 64.

This is not true for all 128K computers — the Atari 130XE has a BASIC area of only 37K and the Amstrad CPC6128 has only 42K. They all have the same amount of RAM, but the C-128 makes three times as much available to BASIC.

Software

The big problem with a brand new computer like the C-128 is that during the first year or so there is relatively little software. So far I have seen only a handful of programs written for the C-128. It will be some time until there is a good selection.

However, Commodore has neatly avoided this problem. When you buy a C-128, you get two other computers "free". Under the C-128 keyboard, Commodore has included C-64 and CP/M operating systems. These are the two most popular OS's of all time and thousands of programs are available for them.

By putting both of them in the C-128, it confers an ability to run more programs than any other computer in the world.

Moreover, since C-64 software is mostly recreational/educational and CP/M software is mostly business- orientated, the combination of the two produces an enormous range of programs.

This gives the C-128 a remarkable compatibility with most 8-bit software.

Hardware compatibility

In order to maintain compatibility, the C-128 uses all C-64 peripherals. This includes the slow 1541 drive.

To rectify the often-criticised slow disk access, Commodore has introduced a new disk drive. The 1571 drive is advertised as being five times faster than a 1541, but I found it could load long programs ten times faster.

Saving was slower, at only 50% faster than a 1541.

The drive happily loads C-64 disks and CP/M disks (Osborne/Kaypro format).

When in C-128 mode it uses C-64 format, but writes on both sides of the disk (1328 blocks free).

The C-128 and 1571 drive put paid to just about every criticism of the C-64.

Despite my glowing comments about the C-128, it is not a perfect computer. I could, for example, criticize the arrangement of the cursor keys or suggest a command that should be in the BASIC.

However, such comments would be nit-picking. Both the keyboard and the BASIC are very impressive.

It would be unfair to highlight minor omissions when both keyboard and BASIC contain several delightful features which I never would have thought of.

Besides, what we are talking about is a computer selling for less than $1000.

It would be unreasonable to expect it to have 640x400 resolution, to be super fast, or to support multi-tasking. For what it is, the C-128 is a remarkably well-endowed computer.

For C-64 owners

If you already own a C-64 system, then the C-128 is well worth considering.



You'll be able to take advantage of the C-128's extra features, while still having use of your C-64 software and peripherals.

Eventually you may want to get the fast disk drive or an 80- column monitor, but initially you should get along fine with your present peripherals.

The C-128 is only one inch wider than the C-64 across the front so it will probably fit nicely in the C-64's space.

However, the C-128 is quite a bit deeper from front to back, and you'll probably have to push your monitor back a bit or put it on a shelf.

All your cables will plug into the C-128 in pretty much the same position as on the C-64.

Program writing

If you are writing programs on your C-64, then you'll find the C-128 much easier and much more satisfying.

If you are just running other people's programs on your C-64, then there may be no real advantage in upgrading. After all, there are as yet few C-128 programs to take advantage of its features.

There's little point in buying a C-128 and running it in C-64 mode all the time.

If you don't already have a computer, then the C-128 is well worth considering.

It's a good choice for people interested in writing their own programs.

It's a good choice for people interested in games or education (although a C-64 would be a cheaper alternative).

It's a good choice for people interested in combining business use (CP/M) with games for the kids (C-64).

On the other hand, the C-128 may not be the best choice for people interested solely in running business programs. Certainly a businessman could get good service from the C-128, but he would probably be better off with a straight business computer.

Wide appeal

The C-128 will appeal to many people. Its lavish keyboard, comprehensive BASIC and extraordinary triple- headed processor give it a flexibility unmatched by other inexpensive computers.

If you want to play games, it offers excellent graphics and sound.

If you want to run business programs, it offers a numeric pad and 80-column screen.

If you want to write programs, it offers an excellent editor and 122K bytes free.

(Continued on page 15)



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(Continued from page 13)



These physical attributes, however, are just half the story. Perhaps more important is the legacy of software available via CP/M and C-64.

Whether for business, education, or recreation, the C-128 has access to an extremely rich collection of mature programs.

Commodore is to be congratulated. Instead of compromising and choosing cheap options, it has packed the C-128 with interesting feature. It deserves to succeed.

MICROCOMPUTER SUMMARY

Name:	Commodore 128
Microprocessor:	Z-80 and 8502 (6502 compatible)
Clock speed:	selectable
RAM:	128K (122,365 bytes free for Basic)
ROM:	32K
Input/Output:	buffered cassette port (500 baud), buffered RS-232 interface (50-19200 baud), parallel user port, serial port for standard Commodore peripherals, cartridge slot, audio-video ports (audio in, audio out, modulated video out, composite video out, RGBI video out), two joystick ports.
Keyboard:	full-size 92-key typewriter style with numberic pad, auto repeat on all keys, 4 programmable function keys, 4 cursor keys, 8 special purpose keys, 10-stroke buffer.
Display:	25 lines by 40 characters, 25 lines by 80 characters, user-definable windows, upper/low case, inverse video, 16 colours.
Operating systems:	CP/M 3.0, Commodore Basic 2.0, Commodore Basic 7.0 (with full support for graphics and sound)
Languages:	any language available under CP/M or C-64
Graphics:	Text mode – 64 standard graphics characters, up to 256 user-definable characters Hi-res mode – 64,000 pixels, 16 colours (but only 2 in each 64-pixel block) Multi-colour mode – 32,000 pixels, 16 colours (but only 4 in each 32-pixel block) Sprites – 16 colours (but only 4 per sprite), sizes from 1 pixel to 48 x 42 block, 8 priority levels for 3-D graphics, sprite-sprite and sprite-background collision register
Sound:	3 voices, each totally addressable through 9 octaves, attack/decay/sustain/release, filtering, modulation and white noise
Cost:	under $1000
Peripherals:	1571 fast disk drive (under $1000), 1902 dual-mode monitor (under $1000), can use all C-64 peripherals

Review Unit from Commodore Computer (N.Z.) Ltd.

Ratings (5 highest):	
Documentation	5
Ease of Use:	5
Language	5
Expansion	5
Value for money	5
Support	5

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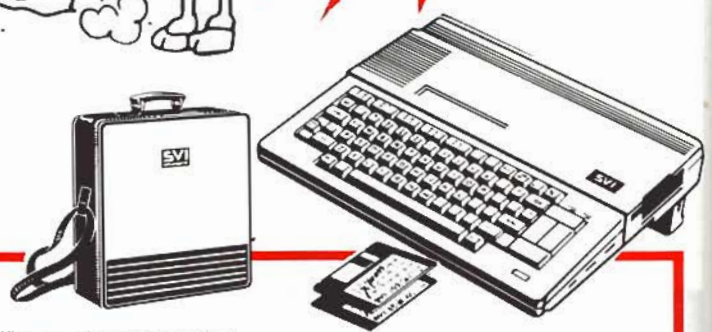
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KDA 6015

Aquarius — is it a toy?

By Rod Prater



Computers are not my thing. I use them (with very friendly software) and help some of NZ's distributors market them. I know the computer market well but when it comes to understanding the technicalities of the beasts I am way out of my depth.

Initially it came as something of a surprise when I was asked to review the Aquarius. But if you think about it, I'm really the obvious type to do it.

The Aquarius was developed by Matell at the request of the Tomy Toy company of Japan, who had perceived the need for a relatively inexpensive computer designed for first-time users.

The idea was that the computer should be exciting, simple to use, have built-in colour and Basic, be designed to allow extensive expansion and, most importantly, be set up in a way which



would encourage the very young (starting age 4-5 years) to develop computing skills while having fun.

The Aquarius I was given for review is the mark-I version. It has what I understand is considered "unfortunate" amongst computer purists — a "rubber ducky" keyboard.

Let the purists say what they will. For a non-typist, particularly one with small, young hands, the keyboard on the Aquarius is perfectly adequate.

The basic unit is loaded with Microsoft Basic and colour capabilities that would put many PCs to shame.

It has input and output 'din' plugs for printer and recorder operation, a cartridge port to accomodate the range of optional programme cartridges and expansion modules, a power pack and the leads necessary to connect to the family TV and power.

With the basic unit I received a carton containing the following:

1. The Mini Expander Module which plugs into the expansion port and allows the use of 4k or 16k memory cartridges together with programme cartridges.
2. A thermal 80 c.p.s. 4" printer.
3. A datasette.
4. A 16k expansion cartridge.
5. A set of joystick controls.
6. Fileform, a cartridge-based basic word processor.
7. Finform, a simple spreadsheet on cartridge.
8. Extended Microsoft Basic, on cartridge.
9. Logo, a tutorial cartridge programme.
10. A big box of assorted cassettes containing a whole range of games.

The basic unit and all of the major peripherals came complete with very well written instruction books. In fact the instruction books are a major feature of the system.



Care has been taken to ensure that the information contained in them is presented in a very clear and well laid out way. This is no doubt due to the fact that Aquarius was designed from the outset as a tutorial computer system.

Having transported all of the bits home, taken over the lounge floor and commandered the family TV, I began my voyage of discovery into the world of "toy" computers.

I loved it, and so did everyone else who came by — despite any initial prejudices, they became intrigued and involved.

At least half of the enjoyment of the excercise came from the discoveries we made along the way. As soon as the unit was plugged in and the TV tuned we were greeted by a welcome message and the request that we type in our name.

From then on we felt that the system and instruction books were leading us through a gentle process of learning.

Once we had experimented with the Basic language capabilities, the 16-colour drawing functions, and learned to mix the two we decided it was time to try out the expansion module cartridges and peripherals.

The printer (also made by Matell) connected easily and proved to be very efficient. Not what you would term a "quality printer", but just right for the production of hard copies for filing or sending notes to mates.

The datasette (this was a Dick Smith model) did its job efficiently and gave us the ability to store programmes and graphics and more importantly (at least for one of us) the ability to load the games cassettes.

Fileform turned out to be a very easy to use and simple word processor with a simple "mail merge" capability and filing system. Once again the friendliness of the programme is obviously designed for young users and we first-timers had no difficulty in coping with it.

Finform is an efficient calculator and simple spreadsheet. More of a learning tool than a useful software package, but

(Continued on page 19)

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Oxford Pascal

Oxford Pascal is a full extended implementation of standard Pascal running on the Commodore 64, and the BBC computer. The compiler supports every feature of the Pascal language and is capable of compiling very large and complex programs.

The Oxford Pascal package, which is supplied in an attractive carrying case, comprises a 100 page manual, a disk and, in the case of the BBC version a 16K ROM.

Speed

Oxford Pascal compiles down to fast, compact P-code, providing the real speed and power of Pascal, together with the ability to compile very large programs.

Because it compiles into P-code, Oxford Pascal reduces programs into the most compact form possible. In fact it allows more code to be packed into a micro than any other language. Features such as the CHAIN (overlay) command and the LINKER allow complete exploitation of the memory available.

Extensions

In addition to the entire Pascal language, Oxford Pascal features a range of Graphics and sound extensions designed to make maximum use of the computer. Considerable care has been taken in each implementation to allow full use of all graphics facilities and modes. User written machines code, which can be called with parameters, is supported and fully documented.

Oxford Pascal also provides numerous extensions such as hexadecimal arithmetic and bit manipulation, random numbers, internal clock access, input of string variables and program chaining.

Other Pascal Benefits

- Oxford Pascal ideal for education
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- Friendly error messages
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(Continued from page 17)



ideally suited to its primary purpose of computing education.

Extended Microsoft Basic used in conjunction with the 16k expansion cartridge really opened out the capabilities of the machine and is obviously designed to take young users to the next level of competence. By connecting this cartridge it is possible to undertake a more complicated range of programming tasks.

Logo proved to be probably the most exciting cartridge of all. Very cleverly written, this programme, by the use of excellent graphics capabilities, advances the young user by stages to a quite high level of competence. It is all done in a way which is designed to keep interest levels high while at the same time offering encouragement by achievement and reward.

The games cassettes were what you would expect. From the quite standard "Hangman" to a very good version of "Muncher", the games proved to be a lot of fun. In fact as a games playing unit alone Aquarius is worth the purchase price.

My view of the Aquarius is that it's good value, particularly if purchased for the purpose it was designed: as a home computing education tool it has few competitors in its price range. It's well worth considering — if only to keep small hands away from your "grown-up" PC.

The Aquarius System supplied was provided by Dick Smith Electronics.

Retail prices are:

Basic Aquarius unit	$ 99.00
Thermal Printer	$179.00
Dick Smith Datasette	$ 64.95
16k expansion cartridge	$109.95
Joysticks/Mini expander	$ 89.95
Fileform cartridge	$ 79.95
Extended basic cartridge	$ 79.95
Logo cartridge	$ 69.95
Games cassettes	$ 12.95
or	$ 18.95

MICROCOMPUTER SUMMARY

Name:	Aquarius
Manufacturer:	Radofin Electronics – Hong Kong
Microprocessor:	Z-80
Clock Speed:	3.5 MHZ
Memory:	2K, expandable to 32K.
Input/Output:	Cassett interface, T.V. output, serial printer output.
Keyboard:	Rubber dudey, 49 keys, querty.
Display:	40 columns x 24 lines, 320 x 192 pixels, 16 colours.
Language:	Microsoft Basic
Sound:	One sound channel
Reviewers ratings: (5 highest)	Use of 5, expansion 4, support 4, docementation 5, language 5, value for money 5.

Reviewed unit supplied by Dick Smith Electronics.

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Monkey Academy

by Barbara Bridger

Here is the most marvellous piece of educational (in the sense of encouraging children to persevere with learning basic facts) software that I have seen. The excellent graphics, jaunty tunes and sound effects combine to make a very appealing and addictive game that had my two sons striving to cope with maths questions 2-4 years ahead of them schoolwise.

There are five types of questions available, addition, subtraction, multiplication, division, and a combination of these, and the level of difficulty is about appropriate for 10 to 12 yr olds.

A monkey is guided about the screen searching for the correct answer by jumping up to unroll scrolls one of which will have the correct answer. While doing this he must evade a crab which appears periodically and has to leap amongst 3 different levels during his search. The crab can be evaded by jumping over it or by fetching a piece of fruit and hurling it at him. Once the correct scroll is found it has to be delivered to the monkey's girlfriend waiting anxiously at the top of the screen.

After getting 3 answers correct you move into a different stage with an altered screen layout and a different point of entry for the crab and have the chance to alter the type of question you want to answer. There is a time limit at each stage and the faster you complete each stage the more bonus points you get.

The ROM cartridge is produced by Kjonami and costs $85. I wish there was more of this standard of educational software and that the price was not so high.



A sound keyboard

COLOURTONE KEYBOARD $99.95
A Review by A.R. Mitchell
Supplied by Fountain Marketing.

This keyboard is an attractive item of hardware which contains a full two octave range. Also on the board is a 'harp' strip and a row of 14 'buttons'. It plugs into the first joystick port and comes complete with instruction booklet, rapid reference card and the software disk.

The keyboard first needs to be tuned to the C64 and this is quite simple with the programme supplied, and the on screen instructions. Then the music making can begin.

The CTONE programme is the basis of the Colourtone Keyboard's operation. With this loaded you are able to listen to the tunes provided or play along with them or just play solo.

There are 13 tunes which can be played on 8 instruments in any of 13 scales — that's quite a combination.

You can play along with any of the tunes, hear what you've created played back and then save it to disk. However, you can only save 13 tunes; one 'creative' version of each of the original tunes.

There is included as a tune, a metronome which can be turned off so that all you save is what you have created.

There's a photo of the keyboard in the Fountain User News in the July issue of Bits and Bytes.

The 14 'buttons' across the top are your mode selectors and although the handbook only covers 11 of them, there is an extra page called "bonus features" which outlines the other three plus some extra computer keyboard functions.

One feature I liked was the 'harp' strip. This is a strip between the buttons and the keys (refer photo) which acts as a continuous keyboard.

The good feature is that this harp will only play the "sweet" notes, that is, only the notes that are used by the key that the current tune is played in.

That means if you have no music sense at all, you can still play along without sounding really strange.

It's also possible to turn off the sour notes on the keyboard itself to do the same thing.

Two major criticisms:—

First, the reaction time of the keyboard is too slow regardless of what speed you have the tune playing.

I guess the computer is busy playing the tune as well as scanning the joy port to the extent that it looks away from the port for intervals that are too long.

I have some musical ability but could not get the keyboard to play along in time with the tune at most reasonable speeds.

Second, for the price there are not enough tunes available — 12 tunes (plus the metronome) soon bored my family and I could see the keyboard being left in the corner and forgotten. Surely it would have been not too difficult to put more tunes on the disc accessed by combination of button and key?

In general then, a good concept making 'sound' use of the SID chip but which could have done with a little more thought and a cheaper price tag, in the writer's opinion.

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B/Graph's ups & downs

by Colin Marshall

System: C64, disk drive. Printer.
Programme: B/Graph
Retail: NZ $49.95
Rating: 5/5
Distributor: Commodore NZ.

B/Graph is a graphics charting and statistical analysis package for the businessman, educator and home user.

And while retailing at $49.95, it has to be a gift.

Over a year in the programming, B/Graph gives the user an extremely useful utility that provides high resolution screen graphics and printouts of any numerical data. The printouts are of a quality expected on much more expensive systems.

B/Graph allows configuration of the user's system to cater for a variety of printers, drive numbers and screen colours.

The manual for this software is exemplary.

All options are clearly explained. Pictures of the screen show you what should be happening in front of you.

The tutorials are simple, clear and easy to follow with disk based sample files for each type of graph. Even the errors you could possibly make are detailed to help you avoid them. This manual is a standard other companies should look up to.

Modules

B/Graph is written as a series of modules on a single disk. These modules are all menu driven and have a loading time of around two minutes.

The graphing package is the first main block of the programme and is driven with an easy to follow menu. There is a large variety of graphing forms available. Bar graphs can be produced in bar, 3D and segmented bar forms. Point and line graphs are straightforward to use.

Scatter, market, and pie graph options all add to the range instantly useable.

Data entered to create a graph is entered on to a graph data record. These can be saved to disk using up very little disk space (2-5 blocks).

Data can be recovered, manipulated, exchanged and erased. Once the data has been entered the output can be customised to the user's liking. Grids can be imposed, overlays can be put in place, colours can be selected, labels changed and areas under line and point graphs filled in.

Anything created on the screen and all data pages can be dumped to the printer.

One aspect that every politician and salesman will like is the rescaling function. When you have entered your data the programme asks for the type of graphic you require.

Your data is presented to you on the screen in what the programme analyses as the most applicable scaling. For many, as most politicians have proven, the direct presentation of data does not always portray facts as we would like them shown. B/Graph allows the user to adapt the scale and interval of the charts to their own liking.

For sales presentations, committee work, classroom displays and the like this is excellent material.

Photocopying the printouts and adding a splash of colour results in a highly professional presentation.

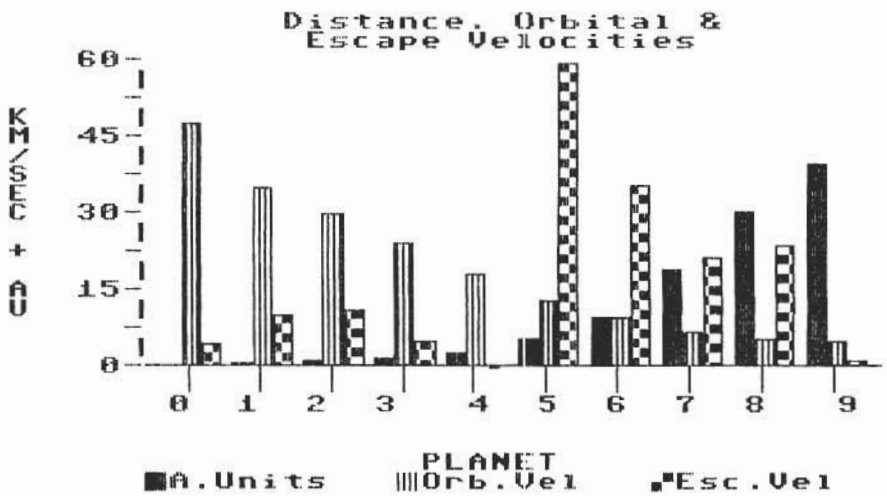
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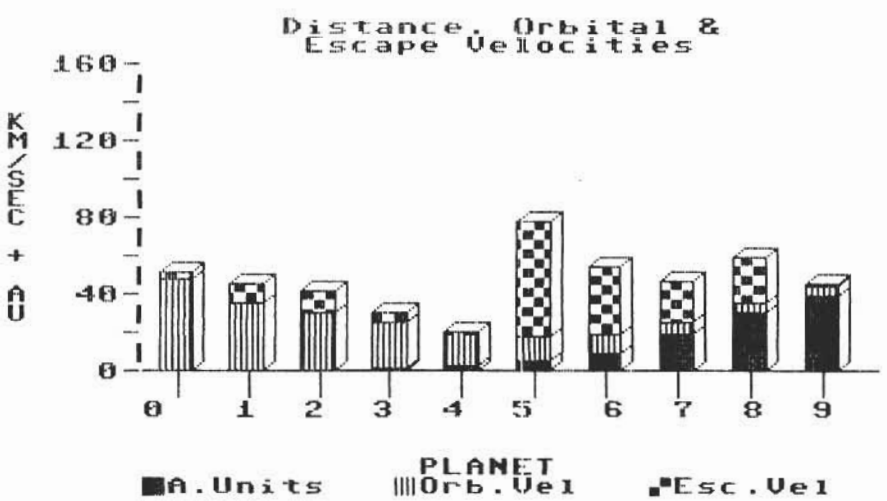
B/Graph also has the ability to save graphs and charts as images and effectively present a slide show of data at the speed and rate you require on the screen. As colours are saved as well as the data these displays can be made to be very impressive.

Screens can be superimposed on each other. There is also the ability to place text on the screen in a selection of four sizes.

The type of graph is changed easily. For example, the line graph can be changed to a bar graph or pie chart with a single key stroke. Most charts are interchangeable.

(Continued on page 23





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(Continued from page 21)

There are some restrictions. 3D bar graphs will only be produced for up to 19 bars on one screen. One hundred data points on the x axis is the maximum accepted, though this is five screens of data. The labelling facilities vary according to the option. Up to three factors can be produced for any one graph or chart.

Two market graphs are available. The Tic market graph and the Connected market graph. People following the stock market will be familiar with the high, low, close model these two graphs use. By entering stock market movements the amateur market follower can produce charts and predictions similar in nature to those of top financial houses.

Analysis

The second part of the B/Graph package is the analysis package. The manual makes a good job of summarising some of the main statistical formulas and theorums used today; however, as the manual recommends, it is best to spend some time reading up and learning about these before diving in with both feet. The manual supplies a bibliography of recommended texts.

Every Masters student at university should have a copy of this programme. Rather than spend endless nights waiting to use the university computer, why not do the same work at home (and not have to pay for the coffee!).

T-Tests (remember students?) and F-Tests are catered for, along with a quick summary of degrees of freedom, variance, mean, T and % above values, all of which can be calculated. Special testing can be carried out when there is a limit on the data to be tested.

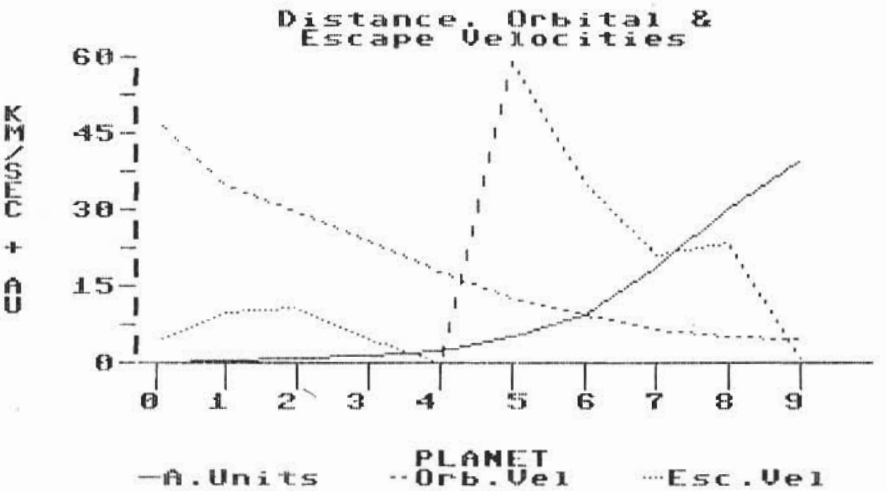
Social statistics rely heavily on the Chi square test. B/Graph can only handle two factors but a cunningly written utility enables the user to get around that problem.

Normal distribution and Poisson distribution probabilities can be calculated using the appropriate options as can the Binomial distribution probability.

Standard statistics, means, medians, variances and standard deviations are all catered for and can be charted. Skewness and Kurtosis has long been a pain to analyse but is clearly displayed and the amounts calculated. Quartiles and range values are other bread and butter chores to the statistician that are equally well covered.

B/Graphs Correlation analysis section allows you to test the correlation between any two factors and is a very handy utility for anyone involved in social science testing.

Regressions are often harder work than they would seem to the layman. (Regressions involve finding a formula, hence a curve, that will match a series of points.) B/Graph has an entire section directly related to regressions and gives the user the opportunity to try fitting their own selected formula to their series of points or data. A knowledge of how formulas are entered in Basic is essential to this part of the programme.



Conclusions

B/Graph is recommended because of its clear and concise manual, in plain English, with ample disk-based examples to follow.

The screen menus are easy to follow and understand.

Once data is entered it can be manipulated and reused in a large variety of ways.

A selection of graphic forms are available that can be printed, viewed and even made into a slide show.

The analytical package is the solution to many students' and scientists' problems with computer access time.

The businessman and salesman can use the package to promote and display clearly a variety of promotions and data.

In schools, charts and graphs are used daily at a great cost in time, but with B/Graph this would be a thing of the past.

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Sparks flying in Taiwan

by Peter Parsonage

Bits and Bytes' last two issues reported first-hand accounts of the major computer shows in San Francisco and London — now we take a look at Taiwan's big electronics show, which is to be expanded five-fold next year.

In October I spent a week in Taiwan visiting the "Electronics Trade Show" organised by the China External Trade Development Council. To say that it was interesting would be a gross understatement. It was outstanding. In 22,000 square metres there was displayed an enormous variety of electronic products. Computers and their peripherals were displayed alongside medical, communications, automation and test equipment. Domestic and industrial equipment vied for space.



People of all nationalities crowded every display. Many millions of $US for order transactions changed hands daily. Coming from a small country like N.Z. I was very impressed.

I systematically examined the whole exhibition area, making notes of displays worth returning to.

Over the following days I visited selected displays and discussed their products. Without exception I found the Taiwanese people to be very courteous and helpful.

They are always keen to transact business and the only really difficult part was to determine when their prices were competitive.

Some will fall

As in any marketplace there were some poorly designed products. Taiwan is just getting established in the electronics field and there are many companies that are likely to fall by the wayside in the process.

The vast majority of electronic companies in Taiwan would fit our description of "small business", with a typical staff size of 20 and a turnover of about $US4 million.

Growth prospects are phenomenal, for those who survive, and frequently exceed 100% p.a. for consecutive years.

The products I saw covered the entire range.

Overall, the quality was good with general weaknesses in presentation (particularly eye-appeal for the Aust./NZ/US markets) and in mechanical componentry.

Printers I looked at were not competitive with Japanese equipment.

Many components used were sourced in Japan, e.g. blank circuit boards, keyswitches, disk drives.

I did see a few well made mechanical items and I am sure that within a year or two Taiwan will have developed the necessary expertise to compete worldwide with units such as disk drives.

Two advantages

At present Taiwan enjoys two major advantages over US manufacturers.

The labour costs are very low (about 20% of US rates), and this is the advantage often cited.

But the other advantage may prove more important in the long term: the total dedication of the Taiwanese employees.

They do not really understand the meaning of the word "holiday". They commonly work ten hours a day, six days a week. If overtime is required they do it — no mention of extra payment, conditions of employment etc.

Many workers see their employing company as an extension of themselves.

Personal decisions are frequently made only after considering "how will it affect my company?"

In speaking with employees I couldn't help wondering how different NZ would be if their attitude to work prevailed here.

It is not practical in an article like this to discuss the quality of life in Taiwan but I enjoyed it and could live there quite happily.

Plant visits

While in Taiwan I had the opportunity to visit some manufacturers' premises. Two in particular stood out in my mind.

One was Multitech (now MSC Group), the largest manufacturer of personal computers in Taiwan. The other was Trun Sole Enterprise Company (TSE), a typical small computer manufacturer.

A comparison between the two is shown in the table below:

	MSC	TSE
Years of operation	9	3
Turnover (1984)	US$80m	US$4m
Staff	1200	20
% Technical Staff	60	40

Not just copyists

Multitech is clearly a leader in Taiwan. They spend large amounts on research and lead the world in developing certain products.

To say that the Taiwanese can only copy is completely wrong. They do have very skilled and capable engineers.

An example of innovation at Multitech was their "Dragon Project".

This provides the Chinese people with computers and software using a reduced Chinese character set. Results I saw were very impressive.

Now where could you hope to find a bigger market?

(Continued on page 26)

(Continued from page 25)

At Multitech's factory in the Hsinchu Science Park I saw monochrome monitors with a resolution that was unbelievable.

The efforts of companies such as Multitech enhance the reputation of the whole Taiwanese electronics industry whilst providing a model for smaller companies.

It is interesting to note that their start-up capital nine years ago was only $US25,000. The owners' equity is now over $US12 million!

Quality control

TSE has only been in operation for three years. What they lack in buildings and plant they make up for in hard work and careful quality control.

They are very conscious of the growth paths open to them and realise only too well the need to produce a first-class product.

Companies such as TSE obviously hope to emulate the progress of Multitech.

The manufacturing methods of the two companies were surprisingly similar.

High quality Japanese boards are stuffed (that means the components are inserted in their correct locations) on an assembly line using Taiwanese labour. Soldering is done using a solderbath.

Rigorous tests

Multitech socket only MOS devices whereas TSE socket almost all devices using good quality sockets.

Boards are visually inspected and then tested.

Multitech use a sophisticated automatic testing machine, TSE plug in the necessary test equipment.

Both companies then subject every board to a rigorous 24 hour test period. Their standards of quality control ensure an overall defect rate below 1%.

Many companies in Taiwan have despatched equipment for extended periods with zero defects. As an electronics engineer I can appreciate just how difficult that is to achieve.

With international companies such as IBM and Philips now manufcturing or sourcing equipment in Taiwan there is no room for copyright infringement or substandard workmanship.

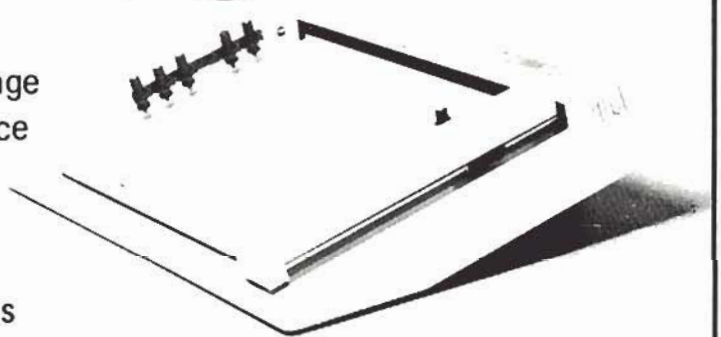
The stories of hand-soldered boards etc. are myths.

The reputable companies in Taiwan plan to stay just that way — reputable.



Editor's Note: Peter returned form Taiwan with Australasian distribution rights (including New Zealand) for TSE's 256K ram, dual drive, 16-bit IBM-compatible PC called the HCP1000.

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A look at The Source

By Paul White.

The most powerful resource any personal computer can have is a larger and less personal computer — well perhaps that's not absolutely true, but "The Source" is certainly a storehouse to impress any computer buff.

A database like source is run by several mainframes connected to the public telephone lines, via Packet Switch (Pacnet in our case) and offering users vast quantities of information, and an equally varied ways of getting it.

The Source, based in Virginia, U.S.A, serves around 500,000 users throughout the world including the 16 in New Zealand.

Upon paying your user subscription costs, Source sends you a small 250 page users guide, a reference guide, an account number and your personal password (along with warnings about not giving your password to anyone except upon Login, as any usage of your account is at your cost).

The User Guide reveals Source divided into six main parts, each accessed from the main menu.

One part is the news: giving a 'Bulletin' for the top news stories of the hour, or 'Bizdate' for the top business and financial news, or 'Sports' for the leading sports stories, or 'Focus' for an overall view of the day's events.

The stories also appear summarised in "News at a Glance".

All items may be scanned for interest, selected from menu, or retrieved by use of keywords, such as 'Rainbow Warrior' for example, and then the article in full can be read.

Getting lost, or into a long search, is easy.

Business and investing is also covered, Source permitting online investing, quotes for stock options and portfolio reviews.

Communications is one of Source's more interesting areas. It is from here you can communicate with other members of Source, and to a limited extend the outside world.

As a member, you are given a mailbox where all SourceMail will be sent.

SourceMail enables you to send correspondence in various ways — Express, Carbon copy, Blind copy and Acknowledgement Requested are some of the options.

You can create distribution lists for regular multiple mailings, i.e. to members of a User Group who are also members of the Source.

Mail is sent by typing in the I.D. of the recipient, then the message, which you are able to edit, send, read or print.

As well as electronic mail, Source also provides Mailgram messages, and E-Com. Mailgram allows you to send Western Union telegrams around the world from your own micro.

E-Com stands for Electronic Computer-Originated First Class Mail, and allows you to send a First Cass letter to anyone in the U.S, including Alaska and Hawaii.

I think by now we've all heard about Bulletin Boards, and Source has 60-plus of them, covering antiques, aviation, travel, the various makes of personal computers, games, adventures, sports, hobbies, ham-radio, music, education and other topics.

Bulletin Boards allow you to scan, or read messages left by other users, and you in turn may leave replies or questions. These areas are for public viewing, i.e. everyone has access to them.

Chatting

Online "chatting" is perhaps the most interesting way to make Source contacts — you can chat to anyone concurrently using Source.

Typing "online" calls on screen a list of all the people using the Source at the same time as you, and the members directory will give you their interests.

By simply typing "chat" and their I.D. number you can interrrupt a person with a friendly greeting and ask if they would like to chat. The other person can then break out of what they were doing, or ignore you, or type "chat-off" to prevent any further interruptions. But on the whole Source members are a pretty friendly lot.

Some regarded the one-to-one affair too restrictive and so created Computer Conferencing, whereby any number of members could chat at once, like a discussion.

From there its grown into advertised topics for discussion.

A conference can also be held privately.

Source members list in a directory their occupations, interests, city, and country along with their type of computer; you can scan the directory by any of those categories.

Member Publishing is an area of Source where individuals have the opportunity to publish magazines, catalogs, newsletters and to provide services. Member publishers ask the Source if they may provide a service which will benefit other members.

They can publish anything from 'Apple City' to 'Vault of Ages', and usually format a bulletin board-type of structure.

Source also provides consumer information in the form of Microsearch, a buyers' guide to microcomputer hardware and software, and related equipment and services. It contains summaries of product literature and specifications provided by manufacturers and computer publications.

Travel services are available online, such as air schedules and fares, a hotel guide, and the Mobil Travel Service guides.

Consumer items can be purchased on-line by designating your credit card account.

Entertainment

Entertainment is a section which no database should be without, and Source offers card games, adventure, board, word/number and educationl games.

If you get stuck in an adventure there's an online bulletin board in which you can ask for help.

Since Source requires you to manually logoff, a Pacnet error could mean that when you try to logon again you will find yourself already logged in, and waiting until Source decides that you had, in fact, left — meanwhile it's charging you.

All Source services can be accessed by keywords, such as MEMBERS for the members directory, and the more familiar you are with these the less time you need to spend gazing at menus, and more time spent downloading useful data.

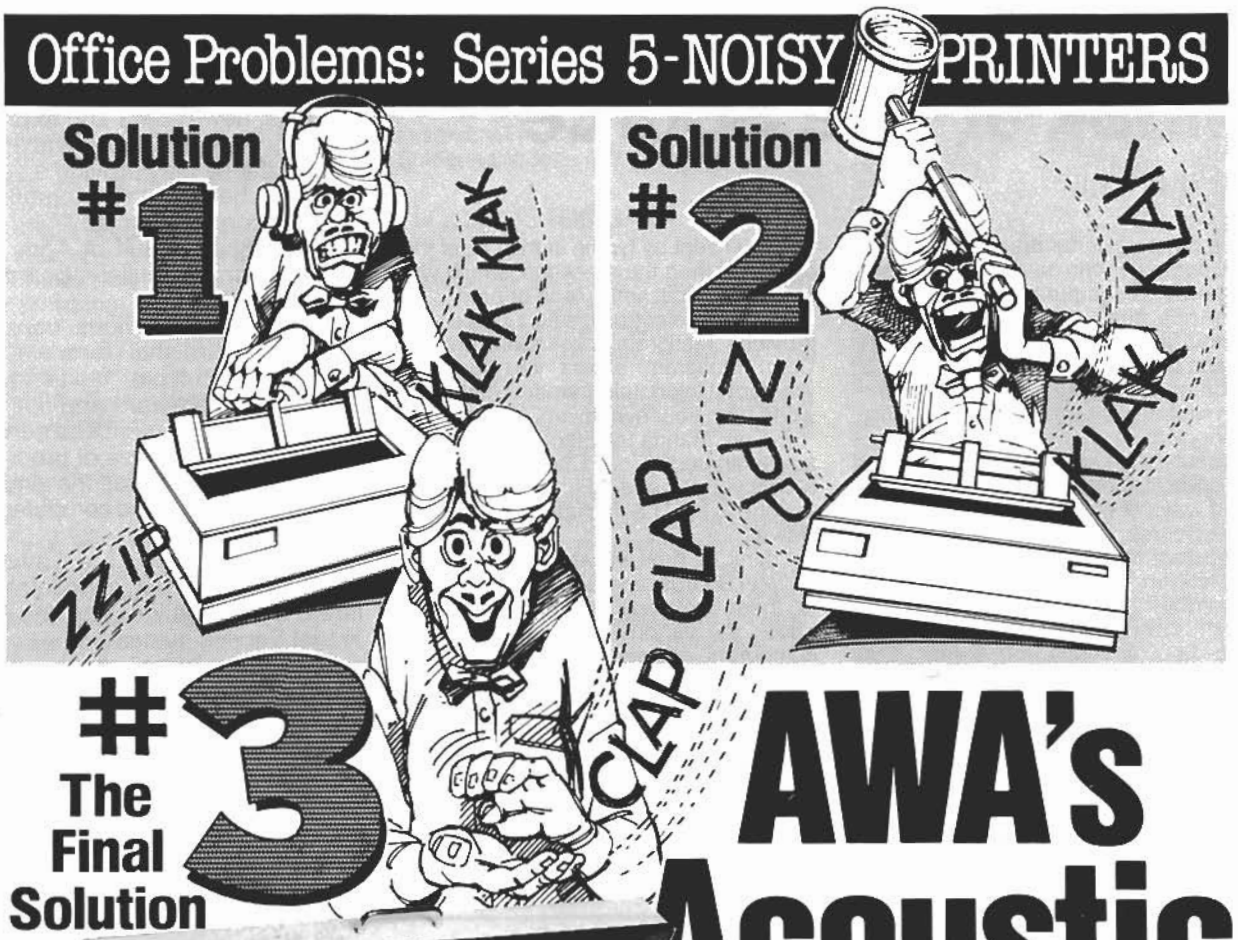
To access Source you need a modem capable of operating at 300 baud, a subscription with the N.Z. Post Office for Pacnet, and membership with Source.

Sharing these costs is a good idea.

Source charges an initial subscription, a monthly rental, and usage charges, presented in a monthly bill. Payment is by credit card.



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AWD 2602

Long wait for saintly OS

By Pip Forer



Operating systems, like top civil servants, have little glamour but much influence. Forming the foundation of all the user does the operating system (known to its acquaintances, for it has few friends, as OS) is often invisible, normally unremarked by the new user and not infrequently verbally abused by the afficionado. The OS is a villain: the blame for non-portable software, that great curse of modern microcomputing, is often laid at the gate of machine specific OSs.

The OS is a potential saint: the solution to the same problem is now ironically being seen as the emergence of a standard OS, the "we'll all be alright when Unix (universal MS- DOS or whatever) is here" syndrome.

OSs govern what can be done, who can do it, how it is to be done and the costs of not doing it right.

The OS basically determines the power and the personality of the computer's operations. In the 8-bit arena most machines come with proprietary OSs although some standards can be found which are quasi-portable across machines (i.e. perhaps just the disk formats may vary).

CP/M is the most common of these, MSX a new innovation and the UCSD P-System the academics' favourite.

However the best and most popular 8-bit machines outside of business run the huge majority of their software on their own, brand-specific OSs.

Four camps

At the 16-bit level and beyond four camps are most widely known.

Three are OSs found on various systems: the PCDOS/MSDOS cadre, the upmarket versions of CP/M (the most recent of which is CPM/68 for the Motorola 68000 chip) and the largely 32-bit UNIX and its clones.

The fourth, the exception, is a brand-specific proprietary OS: that of the Apple Macintosh. This is a so-called WIMPs system (Windows, Icons and Mouse Programming) designed integrally to support a graphics user interface.

All of the systems are more powerful than their 8-bit counterparts. However not all offer the degree of software portability between machines that some proponents suggest.

In a paper at the COMDEX 84 conference American writer John Little noted the enormous variations in (and problems with) different Unix implementations, and pronounced UNIX dead.

This is surely an overstatement, but it's food for thought. Assorted comments in several computer publications fill out a groundswell that questions Unix as a universal operating system...despite Unix, arguably, being the best bet for OS standardisation.

Best for teaching?

Most OSs are used by, but not designed for, education. What is the best OS for a teaching environment? Is there a single answer and if so, what is it?

Education has unusual needs. Its users are not grinding through word-processing or spreadsheeting interminably as many business users may do...their activities are far wider.

For them the OS cannot be guaranteed to be hidden behind the screens of an application program. Many educators need to work more closely with files and interfaced devices than any business executive. At the same time both they and their pupils have quite breathtaking skills at crashing software.

The acquisition of skills to cope with computing is a slow business for a teacher provided with little time or cash to retrain.

If we seek the ideal Educational Operating System (EOS) we have to add robustness and simplicity to power (and possible portability) as criteria for judgement. Here is some more food for thought.

Firstly a few comments on current OSs which, if you work on several brands of micros, you may come to echo.

Eight bit computers came to the marketplace aimed at first-time users. All but CP/M machines tailored their OSs to two constraints: the memory addressable on 8-bit systems and the ability of their users to cope with commands.

Most OSs were set up so that, if you crashed, then whatever you were doing you almost always fell back to a friendly 'start-up' position. Things were pitched at a fundamental level. These machines grew from the user upward and it could be that their continued development has moved at an easier pace than their more advanced relations in order to remain in tune with the general body of current users.

16-bit action

Most of the recent action and publicity has been at the 16-bit level.

The two main systems, MS-DOS and CPM/86, came from two dubious sires: the business community programmers, and mainframe concepts of requisite power.

They have grown from the top down and are complex and non- robust for the new user.

I still cannot believe my early experiences under MSDOS where printer configuration procedures were so abysmally arcane. Or when I tied up a 'hacker's delight' program under standard BASIC on such a machine only to have RESET throw me back to the OS and lose both program and BASIC.

It still galls me that when in BASIC many OS operations, such as copying, are no longer available except under other command names.

None of these shortcomings occur on the best 8-bit machines I have used, which incidentally outperformed the 8088-based BASICs hands down.

I will argue long and volubly over the after-dinner port that the IBM-PC Jr. went to the great computer network in the sky not just because it was a poor machine or over emasculated to reduce competition with the PC senior, but because PC-DOS in the home market is like tensor algebra over breakfast: totally inappropriate.

Educational computing is currently far closer to home than to business.

(Continued on page 31)

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"When you look at the C128, consider these factors: The wealth of existing software that is compatible with the C128 system in the areas of business, education and entertainment; The amount of that software taking full advantage of the sound and graphics features; The quality and extensiveness of its built-in BASIC; The cost of peripherals and hardware. Considering all it has to offer, the C128 is a personal computer that should make Apple cringe and IBM raise its eyebrows."
Run Magazine

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(Continued from page 29)

More power

The problem in the early 1980s was that if you gave an OS designer more memory room and a free rein, most tended to go straight for power in their designs. So, traditionally, as machine power has increased so too has the complexity of the standard OS to the user: it got harder initially to handle but would do far more for the full-time, competent user.

But what educational users want are easier and friendly ways to do relatively simple things. They need a standard user interface for all their software that offers friendly access to all their needs.

Of desk-top systems available in New Zealand, as I write only the Macintosh system has started from the premise of user needs and built an OS around that rather than adding on a variety of friendly but software specific interfaces.

It is doubtless the first of many proprietary 16/32-bit systems which will follow the same design philosphy: make it easy on the user while compromising some elements of power for more ease of use (and minimise the impact of this by using a powerful processor).

Look at the two most recent new-wave small systems: the 68000-based systems from Atari and Commodore.

The 'Jackintosh' employs the GEM interface on a proprietary OS while the Amiga uses a UK-authored OS called TRIPOS. No standardisation here (nor from WICAT who design systems solely for education and training) but I guarantee that the best educational software will emerge on genuinely configured WIMPs systems.

Too complicated

There is little doubt that Educational Operating Systems need this sort of design philosophy.

Many users, on both sides of the desktop, are learning the game for the first time and cannot conceive how to make full use of sophisticated commands if offered them. For these a good 8-bit system will do fine.

Even the more experienced users may be willing to forego a small loss in power if they no longer need to remember that the generalised syntax for copying a file is:

COPY filespec[+filespec][/A:/B][filespec][A/:B/]

(and if I got that wrong it just proves my point).

In the same article on UNIX mentioned earlier, John Little predicted that MS-DOS was heading towards Unix-like qualities. This seems very much to be what is happening. If so, then for the current educational scene, is it heading up a dead end?

Administratively it may seem that the MSDOS/BIOS combination offers an OS Lingua Franca and may also offer business studies access to complex business software and let the headmaster keep his school records.

If these items are (respectively) illusory, marginal and irrelevant to the main applications of educational computing, which they are, where are we left?

Still waiting

The hard truth is that education needs its own operating system, albeit with handles to link in to other environments. Without doubt it still awaits a fully appropriate solution.

I can hear the MS-DOS brigade wailing that the solution is to hand in GEM (or Windows, or the poorly rated Top Down). We just modify MSDOS into a WIMPs system with these add-ons which give MS-DOS machines an icon-based (or at least window-based) front end.

Show that to the users and let the programmers wallow in MS-DOS.

At present GEM is the frontrunner in this field. However GEM is not the first product to attempt this (remember Visi-On).

Because of constraints GEM under MS-DOS is not as pretty as it seems at first. It is slow on an 8088 and ugly without a better monitor than most machines possess (for some primaeval brands you may need to get a graphics adaptor too, to make it function).

It is not currently portable across machines (a deliberate design baffle that Digital Research are reworking).

More to the point, it is a WIMPs front end bolted on to a (rival) OS of some age, which will never be as good as a ground-up design with tailored software.

WIMPs systems need a ground-up approach to be optimal and (a cautionary note when assessing prices of colour WIMPs machines) a very good monitor.

Compatibles

The education market is a huge market with special needs.

Between the robust and practical 8-bits and the appropriate 16/32 bit WIMPs lies the current 16-bit land of 'compatible' systems where developments have been largely driven by purchasing decisions of small and large businesses.

Before education embraces the path followed by many businessmen and rushes to MS-DOS we might ask one question: Are the advantages of market share and compatibility claimed by MS-DOS proponents the key to success, or a mirage disguising an OS that is typical of the awkward adolescence of personal computing?

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The search begins

By Gordon Findlay

The remaining stages of our name and address program are the most machine specific, and some alternatives will be given. Not all are tested — I haven't got access to all the machines — so there will be lots of room for your own creativity and for you to practise debugging!

The search option is the most difficult module of all in our little data handler. The sort of facilities which are available in larger programs would allow searches like:

— find all the members in the list whose name starts with "P",
— find all the members whose names do not start with "P" or "W",
— find all the members who live in Main Street
— find the member who lives in Main Street and whose name starts "Par"
— find all the members who live in Main Street, or whose names start with "Par".

Not all of these searches would make sense in the context of a list of names, addresses and telephone numbers; but they are typical of searches involving one or more fields, in combinations. These are sometimes called multiple filed, or Boolean, searches.

We should be a little less ambitious. We will settle for a listing of all the records in which one of the fields (name, address or telephone) contains, in whole or part, a given "search string". Thus if the search string was "RE", and we searched names, "REID", "WETERE" and "KAREN" would be reported. To narrow the search it is only necessary to make the search string more specific.

A "wildcard" facility as is found in many opearying systems would also be easy to incorporate — let me know if you do!

The basic tool at our disposal here is the INSTR function, which isn't in all Basics, but is easy enough to duplicate using MIDS$ if not. INSTR(A$,B$) gives the position of B$ in A$ — INSTR("BANANA", "ANA") is 2, as "ANA" appears starting at the second position in "BANANA". INSTR("BANANA", "SKIN") is 0, as "SKIN" doesn't appear anywhere in "BANANA". This is the basic (pardon the pun) weapon in our armoury. If the result of the INSTR function is 0 the record we are searching is not required; if the result is non-zero we have a match.

Those who don't have INSTR in their repertoire can use MID$

The rest of the "save" routine is relatively straightforward. We first obtain a search string, and the field to search (name, address or telephone number). We then pass through the whole array, testing each in turn. If we find a match, that record (all fields) is displayed, using a subroutine we already have. Here's what it looks like:

```
7000 IF N=O THEN PRINT "Nothing to
     search! Press return": INPUT
     X$:RETURN
7005 CLS
7010 PRINT"Search string:";
7020 GOSOB 30
7030 SE$ = X$
7040  PRINT"Search which field:"
7050 PRINT"1 — name"
7060 PRINT"2 — adress"
7070 PRINT"3 — phone number"
7075 PRINT
7080 CH 3: GOSUB 10
7085  REM CS will be the field number
     to search
7090 FOR I = 1 to N
7100 ON CS GOTO 7120,7130,7140
7120  FOUND                    =
     INSTR(N$(I),SE$):GOTO 7150
7130  FOUND                    =
     INSTR(A$(I),SE$):GOTO 7150
7140 FOUND = INSTR(PH$(I),SE$)
7150 IF FOUND = 0 GOTO 7170
7160 GOSUB 40
7165  PRINT:PRINT  "Press return to
     continue";:INPUT X$
7170 NEXT I
7180 RETURN
```

In line 7000 we check that there actually is data to search, just as we did in line 8000 before trying to list anything. The search string is obtained, and the number of the field also, using the subroutine previously introduced.

This is used in an ON-GOTO statement to choose the right version of the FOUND = statement. If the result is zero we skip the display of the record, otherwise we display it, and pause before moving on (line 7160).

Nothing here about the problem of upper and lower case. There are two ways to avoid matches failing because the search string and the record are in different cases — "Findlay" isn't the same as "FINDLAY" in the comparison of strings.

One way is to avoid input in lower case altogether. Another is to convert the search string, and the data being searched, to the same case, using techniques such as those in line 23.

The remaining modules are the hardest to write about — saving and loading to disk or tape. This is very machine specific, and varies even between different dialects of Microsoft Basic.



Loading comes first in programming, as it determines the way in which data is saved.

There are two alternatives to cope with the fact that the number of records to save, N, varies from time to time. One way is to let the computer (the operating system actually) tell us when there is nothing else to load. The other way is to save, and hence load, the number of record ourselves.

The first alternative looks something like this, using the EOF (End of File) function of MBASIC:

```
2000  OPEN "I",1,"DATAFILE/ASC:1"
2010 N = O
2020  IF EOF(1) THEN CLOSE 1:RE-
      TURN
2030 N = N + 1
2040 INPUT #1,N$(N)
2050 INPUT #1,A$(N)
2060 INPUT #1,PH$(N)
2070 GOTO 2020
```

Line 2000 opens the data file; the number of records starts at 0, and then we input data from the data file until EOF is true, updating N as we go.

The second alternative would look like this:

```
2000 INPUT #-1, N
2010 FOR I 1 TO N
2020 INPUT #-1, N$(I)
2030 INPUT #-1, A$(I)
2040 INPUT #-1,PH$(I)
2050 NEXT I
2060 RETURN
```

In this variety of Basic the INPUT #-1 statement reads information from tape rather than keyboard, but otherwise behaves exactly as INPUT.

In Applesoft INPUT does the job from disk as well, but first we must open the disk file for reading. The string D$ is a special signal to Apple DOS that the

(Continued on page 35)

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(Continued from page 33)

PRINT statement is actually a disk command:

```
2000 D$ CHR$(4)
2010 PRINT D$;"OPEN DATAFILE"
2020 PRINT D$;"READ DATAFILE"
2030 INPUT N
2040 FOR I = 1 TO N
2050 INPUT N$(I)
2060 INPUT A$(I)
2070 INPUT PH$(I)
2080 NEXT
2090 PRINT D$;"CLOSE DATAFILE"
2100 RETURN
```

Line 2090 is important! Unless the file is closed, all future input statements will look to the disk rather than the keyboard, with most unpleasing results.

For the Commodore 64, the load routine will be something like this —

```
2000  OPEN
      8,8,8"0:DATAFILE,SEQ,READ"
2010 INPUT #8,N
2020 FOR I = 1 TO N
2030 INPUT #8,N$(I)
2040 INPUT #8,A$(I)
2050 INPUT #8,PH$(I)
2060 NEXT I
2070 CLOSE 8
2080 RETURN
```

In the best C64 circles a check would be made to the error channel after opening the file, before reading from it each time: use a subroutine call GOSUB 11000, and open the error channel first:

```
2000 OPEN 1,8,15
2001  OPEN
      8,8,8"0:DATAFILE,SEQ,READ"
11000 INPUT #1,ER,ER$,ET,ES
11010 IF ER < 20 then return
11020 PRINT "DISK ERROR"
11030 STOP
```

Of course, more sophisticated error messages are there for the asking! For tape use, open the appropriate channel in the usual way.

Spectrum users have the LOAD filename DATA statement and the corresponding SAVE statement; the rest of you have to look to the manuals!

The save routines for the various machines are all related very closely to the load routines given, and I won't bother listing them all here.

And that is about it. A very minimal program, but with potential for expansion and adaptation. Hopefully you will have learnt about a modular approach to the problem of programming as well. A complete listing (using MBASIC for the machine-dependent bits) is at the end of the article.

I'd be glad to see what flesh can be put on these bones.

I hope to do a round-up of some of these problems later if enough people send their comments and/or questions.

```
1 GOTO 1000
10 PRINT"Your choice: 1 - ";CH;" ";
12 INPUT CS
14 IF CS < 1 OR CS > CH THEN GOTO 10
16 RETURN
20 INPUT X$
22 X$ = LEFT$(X$,1)
23 IF X$ >= "a" THEN X$=CHR$(ASC(X$)-32)
24 IF X$ <> "Y" AND X$ <> "N" THEN GOTO 20
26 RETURN
30 X$="" :REM see text
32 INPUT X$
34 RETURN
40 PRINT "Name: "; N$(I)
42 PRINT "Address: ";A$(I)
44 PRINT "Phone: "; PH$(I)
46 RETURN
1000 CLEAR 1000 : REM if necc.
1020 MAX = 200
1030 NO = 0
1040 DIM N$(MAX), A$(MAX), PH$(MAX)
1050 CLS : REM clear screen
1060 PRINT "Main menu: options"
1070 PRINT
1080 PRINT "1. Clear the database"
1090 PRINT "2. Load data from tape"
1100 PRINT "3. Save data to tape"
1110 PRINT "4. Type new data"
1120 PRINT "5. Delete data"
1130 PRINT "6. Change data"
1140 PRINT "7. Search for data"
1150 PRINT "8. List data"
1160 PRINT "9. Exit this program"
1170 PRINT
1180 CH = 9 : GOSUB 10
1190 ON CS GOSUB 10000, 2000, 3000,
     4000, 5000, 6000, 7000, 8000, 9000
1200 GOTO 1050
2000 OPEN "I",1,"DATAFILE/ASC:1"
2010 N = 0
2020 IF EOF(1) THEN CLOSE 1:RETURN
2030 N = N + 1
2040 INPUT #1,N$(N)
2050 INPUT #1,A$(N)
2060 INPUT #1,PH$(N)
2070 GOTO 2020
3000 OPEN "O",2,"DATAFILE/ASC:1"
3010 FOR I=1 TO N
3020 PRINT #2,N$(I)
3030 PRINT #2,A$(I)
3040 PRINT #2,PH$(I)
3050 NEXT
3055 CLOSE 2
3060 RETURN
4000 CLS:REM clear screen.
4010 PRINT "There are "; N; " records in
     the file"
4020 PRINT"Enter new records: give a
     blank name to stop entering."
4030 PRINT:PRINT :REM give a bit of room
4040 PRINT"Name: ";: GOSUB 30
4050 IF X$="" THEN RETURN
4060 N=N+1
4070 N$(N) = X$
4080 PRINT"Address: "; : GOSUB 30
4090 A$(N) = X$
4100 PRINT"Phone: "; : GOSUB 30
4105 PH$(N) = X$
4110 PRINT:PRINT
4120 PRINT"Is this entry correct (Y/N)";
4130 GOSUB 20
4140 IF X$ = "N" THEN N = N - 1
4150 GOTO 4000
5000 CLS
5010 PRINT"Delete a record!"
5020 PRINT:PRINT
5030 INPUT "Which record should be deleted
     (number)"; I
5032 IF I < 0 OR I > N THEN
     PRINT"There is no such record":PETURN
5040 GOSUB 40 :REM display the ith record
5050 PRINT:PRINT "Delete THIS record (Y/N)"
5060 GOSUB 20
5070 IF X$="N" THEN RETURN
5075 IF I = N THEN GOTO 5130
5080 FOR J = I + 1 TO N
5090 N$(J-1) = N$(J)
5100 A$(J-1) = A$(J)
5110 PH$(J-1) = PH$(J)
5120 NEXT
5130 N = N - 1
5140 RETURN
6000 CLS
6010 PRINT"Change which record"; : INPUT I
6020 IF I < 0 OR I > N THEN
     PRINT "no such record!":RETURN
6030 GOSUB 40
6040 PRINT:PRINT
6050 PRINT "New name: ";
6060 GOSUB 30
6070 IF X$ <> "" THEN N$(I) = X$
6080 PRINT "New Address: ";
6090 GOSUB 30
6100 IF X$ <> "" THEN A$(I) = X$
6110 PRINT "New phone: ";
6120 GOSUB 30
6130 IF X$ <> "" THEN PH$(I) = X$
6140 CLS
6150 PRINT "New record "; I
6160 PRINT:PRINT
6170 GOSUB 40
6180 PRINT:PRINT
6190 PRINT"Is this correct now (Y/N)";
6200 GOSUB 20
6210 IF X$ = "N" THEN GOTO 6050
6220 RETURN
7000 IF N=0 THEN PRINT "Nothing to search!
     Press return":INPUT X$:RETURN
7005 CLS
7010 PRINT"Search string:";
7020 GOSUB 30
7030 SE$ = X$
7040 PRINT"Search which field:"
7050 PRINT"1 - name"
7060 PRINT"2 - adress"
7070 PRINT"3 - phone number"
7075 PRINT
7080 CH = 3: GOSUB 10
7085 REM CS will be the field number
     to search
7090 FOR I = 1 TO N
7100 ON CS GOTO 7120,7130,7140
7120 FOUND = INSTR(N$(I),SE$):GOTO 7150
7130 FOUND = INSTR(A$(I),SE$):GOTO 7150
7140 FOUND = INSTR(PH$(I),SE$)
7150 IF FOUND = 0 GOTO 7170
7160 GOSUB 40
7165 PRINT:PRINT "Press return to
     continue"; :INPUT X$
7170 NEXT I
7180 RETURN
8000 CLS
8005 IF N=0 THEN PRINT "No data to list!
     Press return":INPUT X$:RETURN
8010 PRINT "Start list at which record
     (default = 1)"
8020 GOSUB 30
8030 ST = VAL(X$)
8040 IF ST < 1 THEN ST = 1
8045 IF ST > N THEN ST = 1
8050 PRINT
8060 PRINT "Finish listing at which record
     (default = last)";
8070 GOSUB 30
8080 FI = VAL(X$)
8090 IF FI > N THEN FI = N
8100 IF FI = 0 THEN FI = N
8110 FOR I = ST TO FI
8120 CLS
8125 PRINT "Record number: "; I
8126 PRINT
8130 GOSUB 40
8140 PRINT:PRINT
8150 PRINT"Press return to continue.....";
8160 INPUT X$
8170 NEXT I
8180 RETURN
9000 PRINT "Do you really want to exit";
9010 GOSUB 20
9020 IF X$ = "N" THEN RETURN
9030 CLS
9040 END
10000 PRINT "Do you really want to clear
      everything";
10010 GOSUB 20
10020 IF X$ = "Y" THEN NO = 0
10030 RETURN
```

WOT? NO INSTR?

The INSTR function isn't in all Basics. Those who don't have it can use this subroutine, which returns the position at which SE$ begins in P$, as the result II.

The returned value II will be zero if SE$ cannot be found in P$.

Use the subroutine by assigning P$ and SE$, GOSUB 100, and look at the value of II.

```
100 SL = LEN(SE$)
110 PL = LEN(P$)
120 II = 0
130  FOR J = 1 to PL — SL
140  IF MID$(P$,J,SL) = SE$ THEN
       II = J
150 NEXT
160 RETURN
```

The subroutine actually finds the LAST occurence of SE$ in P$ (if there is more than one) rather than the first, as INSTR does. This doesn't matter in our application: all we need to know is whether the search string occurs, not exactly where.

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Musical 'interrupts'



By Joe Colquitt

As a departure from graphics, this month we'll take a look at sound; especially with the use of machine code and interrupts. I will be returning to graphics later.

For the purpose of this article, I'll assume that readers have a resonable knowledge of using the sound registers or at least know what they are. An understanding of machine code is not required, but is helpful if you want to make any modifications.

A basic failing of a lot of sound routines for the beginner, is that they nearly always use BASIC and cannot be used with other programs because they slow them down to a crawl. The programming in this article uses an Interrupt.

Here an explanation of Interrupts is needed.

Every 1/60th of a second, the computer stops what it is doing and enters a ROM routine that does the 'housework'.

This includes such things as updating the cursor flash, incrementing timers, scanning the keyboard, refreshing the screen etc. So even if you are sitting at the keyboard doing nothing, the computer is still very busy.

You can use this system to great advantage.

If you enter ?PEEK(788)+256*PEEK(788), you will find the address that the operating system jumps to every 1/60th sec. This is known as a Vector. Normally it is 59953 ($EA31 in hex).

The lurk is to change that vector so that the computer performs YOUR routine first, then does its own housekeeping.

In the particular application I'm presenting, this means that all note timing loops are performed as part of the computer's housekeeping, and therefore do not affect the speed of any BASIC program. Even more, they do not affect machine code programs to any noticeable extent.

Anyway, I can leave the detailed explanations for later.

To give you something to play around with till next month, here is the program. When you run it, try some of the SYS numbers to get the hang of changing the sound.

Because the note timers are incremented every 1/60th sec, a value of 60 for duration will make a note last 1 sec.



Type the program in and save it. After you've checked the listing, run it. The machine-code is read into 49152 to 49473. To save this as a file, enter (in direct mode):

```
POKE43,0:POKE44,192:POKE45,66:
POKE46,193:POKE52,194:POKE56,
194:CLR
SAVE"filename1",Device,1
```

To reload it, use this line at the beginning of your user program:

```
0       IFPEEK(49152)<>120THEN-
LOAD"filename1",DEVICE,1
```

This ensures that once the MC is installed, it isn't reloaded every time you re-run the user program.

Your note/register values will be in the area 36832-38656, which needs protection from string variables. Do this by POKE52,143:POKE56,143 in your user program. To save this area, use:

```
POKE43,224:POKE44,143:POKE45,0:
POKE46,151:CLR
SAVE"FILENAME2",DEVICE,1
```

To load it, find PEEK(36864) after you've saved the file, then use

```
1       IFPEEK(36864)<>valueTHEN-
LOAD"filename2",DEVICE,1
```

in your user program.

Alternatively:

```
0 C=C+1
1   IFC=1THENLOAD"filename1",DE-
VICE,1
2   IFC=2THENLOAD"filename2",DE-
VICE,1
10 REST OF PROGRAM...
```

After running the program for the first time, you could change line0 to GOTO 10, to avoid re-loading the files.

To change voice characteristics whilst the tune is playing, you could have the module like the one below, which would have been previously executed in the main body of the program:

```
500  FOR
     I=0TO24:READD:POKE36800+I,
     D:NEXT
```



```
510 DATA0,0,0,2,0,85,21
515 DATA0,0,0,10,0,23,23
520 DATA0,0,0,4,0,7,63
525 DATA0,7,248,47
```

The changes to all registers would be immediately implemented in your program by:

(Continued on page 38

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DEALER ENQUIRIES WELCOME

(Continued from page 37)

POKE253,192:POKE254,143:SYSRE
Remember, to find the LOW & HI values
HI=INT(ADDRESS/256):LOW=ADDRESS-HI*256

```
0 REM DATA LOADER
1 FOR I=0TO32:READML$
2 IFLEFT$(ML$,1)="X"THENI=I-1:GOTO5
3 ML=VAL(ML$):POKE49152+I,ML
4 A=A+ML:GOTO8
5 AA=VAL(RIGHT$(ML$,5))
6 IFA<>AATHENPRINT"ERROR",ML$:END
8 NEXT
10 DATA120,169,36,141,20,3,169,192
11 DATA141,21,3,88,169,X01272
12 DATA15,141,24,212,96,120,169,49
13 DATA141,20,3,169,234,X02665
14 DATA141,21,3,88,169,0,141,24,212
15 DATA96,72,138,72,152,X03994
16 DATA72,206,112,201,173,112,201,201
17 DATA0,200,00,172,254,143,X06137
18 DATA169,0,141,4,212,141,11,212,141
19 DATA18,212,165,0,144,X07727
20 DATA141,0,212,165,0,145,141,1
21 DATA212,165,0,146,141,7,X09243
22 DATA212,165,0,147,141,8,212,165
23 DATA6,148,141,14,212,X10848
24 DATA165,0,149,141,15,212,165,0
25 DATA150,141,112,201,200,X12539
26 DATA140,254,143,173,96,201,141,4
27 DATA212,173,97,201,141,X14515
28 DATA11,212,173,98,201,141,10,212
29 DATA204,255,143,208,X16391
30 DATA5,168,0,140,254,143,164,168
31 DATA184,170,104,76,49,X17869
32 DATA234,162,0,130,157,0,212,232
33 DATA224,25,200,248,96,X19004
34 DATA160,0,177,253,153,0,212,200
35 DATA192,25,200,246,96,X21726
36 DATA0,160,0,177,251,145,253,200,200
37 DATA249,230,252,230,X24001
38 DATA254,165,254,201,151,200,237
39 DATA96,162,0,30,0,150,X25889
40 DATA232,208,250,96,162,0,94
41 DATA0,150,X27181
42 DATA232,208,250,96,162,0,157
43 DATA0,150,232,208,X28676
44 DATA250,96,130,72,162,0,30,0,144
45 DATA62,0,145,232,208,X30415
46 DATA247,104,170,96,138,72,162,0,30
47 DATA0,146,62,0,147,X31789
48 DATA232,208,247,104,170,96,138,72
49 DATA162,0,30,0,148,X33396
50 DATA62,0,149,232,208,247,104,170,96
51 DATA138,72,162,0,94,X35130
52 DATA0,145,126,0,144,232,208,247
53 DATA104,170,96,138,72,X36812
54 DATA162,0,94,0,147,126,0,146,232
55 DATA208,247,104,170,96,X38544
56 DATA138,72,162,0,94,0,149,126,0
57 DATA148,232,208,247,104,X40224
58 DATA170,96,169,0,141,254,143
59 DATA96,X41293
60 REM SET VARIABLES, TABLES, ETC
70 NOISE=49152:OFF=49170:CLEAR=49299
72 REGMV=49311:TRAN=49325:RSET=49468
75 DOUBLE=49345:HALVE=49354:SAME=49363
80 U1=49372:U2=49388:U3=49404
85 D1=49420:D2=49436:D3=49452
90 L1=36864:L2=37376:L3=37888
95 HI=37120:H2=37632:H3=38144:DU=38400
100 FOR I=0TO24:READA:POKE36832+I,A:NEXT
110 DATA0,0,0,0,0,24,116:REM REGISTER DATA 0-6
115 DATA0,0,0,0,0,24,0  :REM              7-13
120 DATA0,0,0,0,0,0,9,9 :REM             14-20
125 DATA0,0,0,15        :REM             21-24
130 POKE253,224:POKE254,143:SYSRE
135 Z=0
140 READA,B,C,D:IFA=-1THEN165:REM READ NOTES
145 H=INT(A/256):L=A-H*256:POKEL1+Z,L:POKEH1+Z,H
150 H=INT(B/256):L=B-H*256:POKEL2+Z,L:POKEH2+Z,H
155 H=INT(C/256):L=C-H*256:POKEL3+Z,L:POKEH3+Z,H
160 POKEDU+Z,D:Z=Z+1:GOTO140
165 POKE51552,128:POKE51553,65
166 POKE51554,33:REM SET WAVEFORMS
170 REM SET COUNTER/NUMBER OF NOTES
171 POKE36866,6:POKE36863,Z
172 SYSNO: REM START
175 REM SYSNO TO START
180 REM SYSOF TO HALT
185 REM SYSRS TO RESET TO NOTE=1
190 REM SYSCL TO CLEAR SID REGISTERS
195 REM SYSTR TO TRANSFER A BLOCK OF NOTE
196 REM DATA INTO L1-H3 SPACE
200 REM SYSDO TO DOUBLE LENGTH OF NOTES
205 REM SYSHA TO HALVE LENGTH OF NOTES
215 REM SYSRE TO MOVE 25 VALUES FROM RAM TO 54272+
220 REM SYSU1 TO RAISE VOICE 1 UP AN OCTAVE
225 REM SYSU2,SYSU3 VOICES 2,3 UP AN OCTAVE
230 REM POKE788,XXX:SYSSA TO MAKE ALL DURATIONS=XXX
235 REM SYSD1,D2,OR D3 TO LOWER VOICE AN OCTAVE
300 REM NOTE 1,NOTE 2,NOTE 3,DURATION
301 REM ENTER UP TO 256 LINES
305 DATA8181,4050,1351,10
310 DATA10207,5103,0,10
315 DATA12139,6069,0,10
320 DATA10814,5407,1517,10
325 DATA8181,4050,0,10
330 DATA6812,3406,0,10
335 DATA9094,4547,1804,10
340 DATA7217,3606,0,10
345 DATA6069,3035,0,10
350 DATA6812,3406,0,10
355 DATA8181,4050,3035,20
360 DATA8181,4050,0,10
365 DATA10207,2550,0,10
370 DATA12139,3034,0,10
375 DATA10814,5407,1517,10
380 DATA8181,2024,0,10
385 DATA6812,1702,0,10
390 DATA9094,2272,0,10
395 DATA7217,1804,0,10
400 DATA6069,3035,0,10
405 DATA5407,1351,0,40
410 DATA-1,-1,-1,-1
```


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Fastest second-processor in town?

By Pip Forer

Several months ago I vowed not to mention a certain add-on from Acorn until I had one in my sights.

Well, the 32016 chip is now provisionally released as a second processor for the BBC and so this month we start a two-part review of what is an intriguing and strategically important product from Acorn.

I sit here now with a megabyte of memory and power approaching a good-sized minicomputer plugged into my faithful Beeb.

The National Semiconductor 32016 chip (which comes as a second processor (2P) with a 32081 floating point unit) has a direct addressing range of 16 megabytes — although at present the physical limit on a second processor is 1 megabyte, the standard 256K.

It is said to provide comparable number-crunching capabilities to a smaller Digital Equipment mini with an appreciable raw-processing edge over the popular 68010 version of the Motorola 68000 chip (used by the Macintosh, Amiga, Stride, Wicat, Atari 530).

When beefed up to 1 megabyte of RAM the 2P user has approximately 195 times the space for a BASIC program than on a model B in mode 1.

All in all the hardware specifications are impressive and given the likely asking price in New Zealand the system offers one of the cheapest ways into working with this chip.

But does all this hype with a hardware emphasis actually add up to anything useful?

Lesser-known chip

The chip itself is important to Acorn. As I write Acorn continues to sidestep involvement with the two currently popular chips (8088 family and 68000), although both Intel and 68000 co-processors are available for the BBC.

Acorn utilised the more advanced Intel 80286 in one model of its aborted business computer (ABC) and this may yet re-emerge in a new guise.

However at an early date Acorn backed the lesser-known 32016 prototype. It used this in another version of the business computer and is building its Cambridge Workstation for universities around it.

Unless it reverses this commitment (or moves some of its ideas on to its new RISC chip) we might anticipate that future products under the influence of Olivetti and AT&T will also seek to capitalise on this work with a WIMPs environment machine (the ABC used a GEM interface).

It may well be that the 32016 forms the basis for at least four products:

1) A BBC second processor
2) A university workstation [similar to 1) but bundled]
3) An enhanced Econet fileserver
4) A new WIMPs machine

The distinction between 1-3 and 4 is that the first three will use the current BBC system as input-output system. The fourth may see a significant augmentation of the old core operating system, especially the graphics.

No pretence

At present we are looking just at 1). The bundled package for this is impressive in scope.

Apart from the standard processor box the system has four volumes of documentation and five languages plus a 32016 assembler.

The languages offer a wide range of development potential : Pascal, Fortran, C, Lisp and BBC BASIC (compilers for the first 3 and interpreters for the last two).

In some ways it is a machine for advanced programmers in a traditional environment and does not currently make any pretence to support a WIMPs interface.

What it does offer are several professional development systems and a lot of raw power. For the ambitious BBC hacker with an eye to the future it also has appeal for the room it gives.

I intend to deal with it in its simplest form first : as an extension of the BBC for someone who is not seeking to change their working habits/languages dramatically.

From this viewpoint it is unbelievably simple to install and gets full marks for realising the philosophy of ongoing compatibility with earlier material. I just unplugged my 6502 2P and plugged in the 32016.

On power up the prompt appeared 'Pandora Operating System, 1024 kbytes of RAM'. Every standard * command to the normal DFS (or NFS or tape) was then immediately available.

Pandora is a ROM in the 2P which interfaces the 32016 to the normal system in the BBC and it does a pretty seamless job. All the languages can be run on DFS or on Econet using the BBC as a workstation without any real departure from the usual ways of using the filing systems.

To get BBC BASIC up requires loading a file from disk (*BAS32). You can then LOAD normal Basic files from any normal filing system and just run them.



Modified

Basic 4, as it is known, is a very neat translation with several enhancements and only a few avoidable differences. For a start it includes a full editor, enhanced error reporting and a nice facility called LIST IF.

This last option allows you to list only those lines including a particular sequence of characters and is very powerful.

The VDU command has been modified to allow dropping of the trailing zeros, the ON statement can now be used for PROCs (very useful) and a new command, OSCLI, allows easier access to the command line interpreter.

Indirection operators (PEEKs, POKEs and the like) can now refer to locations in any part of the RAM. CALLs to traditional 6502 operating system locations are intercepted by the 32016 and actioned correctly by Pandora.

The two losses in Basic 4 are the removal of an inbuilt assembler and the inability to use array elements as formal parameters in procedure definitions.

Also some old limitations persist; you do not get better error trapping within procedures or the ability to pass arrays across.

However, translating a BBC program onto the 32016 is a delight. Just LOAD it, modify any *LOADs or indirections that used to use low address areas of RAM such as the character definition buffer, and RUN.

Basic software is clearly portable across the processor divide. When you look at the experience of other machines this really is quite an achievement, and made worthwhile by the intrinsic quality of the Basic.

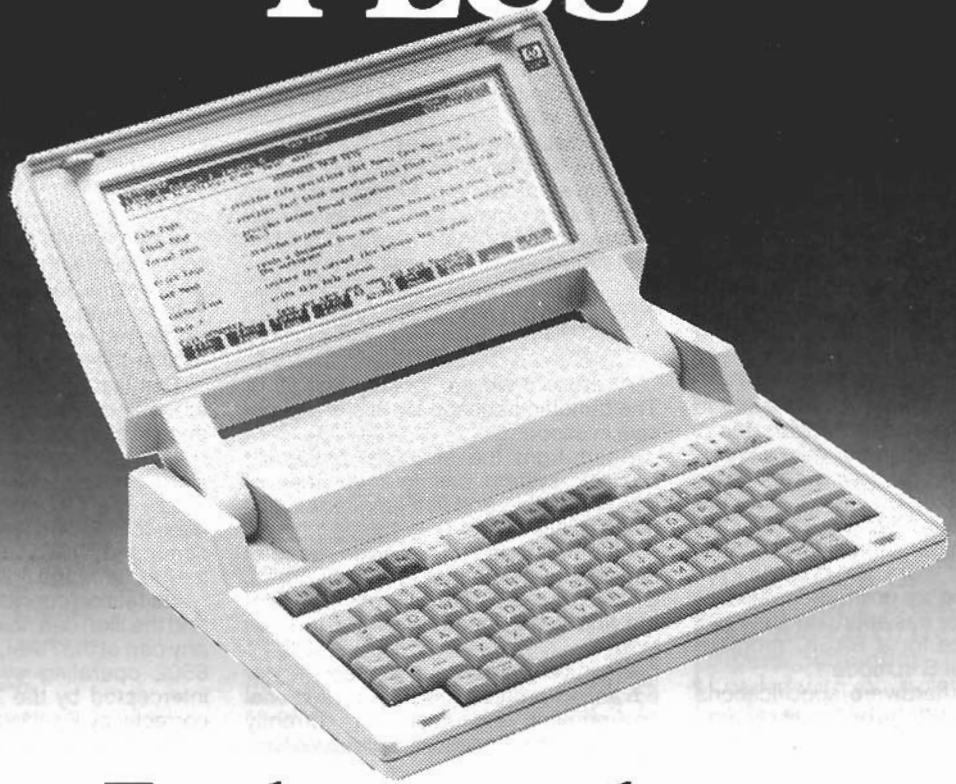
Unsegmented

A nice aspect is that, unlike many MS-DOS Basics, the 32016 Basic operates in an unsegmented memory space so programs can be any length within RAM without any overheads to the user.

It also (not expectedly) is faster, although not as much as one might first

(Continued on page 41

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1-2-3 from Lotus is a trademark of the Lotus Corporation Microsoft Word is a registered trademark of the Microsoft Corporation

BURNETT 3254

(Continued from page 39)

think.

Of course anything you do is still constrained by the I0 speed of your original disks and screen handling.

I ran three tests to compare the BBC/32016 combination with a lone BBC. On a numeric task (10000 square roots) the 32016 was four times faster. Another task set up a random list of 100 pairs of characters and sorted them alphabetically. On the random generation the 32016 was 3 times faster but on the sort was still taking 60% of the stand-alone time.

(The figures compared to a 6502 2P suggest the 32016 is two and a half times faster on the square roots but only marginally faster (possibly even slower) on the sorts).

Finally we ran a contouring routine that involves calculations with ongoing graphics display. The 6501 2P runs this about twice as fast as a single BBC, the 32016 a little faster again.

Useful speed

Remembering that the BBC Basic on a B alone outperforms most 16-bit Basics and that this is still an interpreted product, this is a useful speed enhancement.

(The square root program took 80% longer under MS-Basic on a PC and fifteen times longer under Microsoft Basic on a Macintosh, the sort 3½ times longer on the PC and 2½ times longer on the Mac).

However it may also have some room for later improvement, especially in non-numeric tasks.

What the comments above suggest is that Acorn has produced a computationally enhanced and almost seamlessly portable upgrade.

For an industry where 'compatibility' has become a hollow term this is an impressive and significant achievement.

Such enhancement confers almost boundless room and a degree of speed enhancement.

Given the current pricing however, the 32016 is likely to be initially used more with professional users wanting other languages.

In many ways comments on Basic speed are irrelevant since the real plus of the 32016 is the room it gives to compile and run large, demanding programs. The environment for this is a further level of the operating system called PANOS.

We will cover PANOS and the powers of its languages in the next issue where contacts for further information on network-utilising software and significant enhancements to the AMX mouse interface will also be covered.



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This is a quiz with a difference: the questions are all related to computing and have been designed by Bits & Bytes regular columnist, Gordon Findlay who says he'll be surprised if anyone gets them all right. So pick up your pen, put your thinking cap on, hunt out the information from the many sources available and be in to win this great package of goodies.



ANSWERS TO BOTH SETS OF QUESTIONS BEFORE SENDING IN YOUR ENTRY — DON'T SEND THEM IN SEPARATELY!

RULES

1. Answers must be written on plain paper, and clearly numbered to correspond with the questions.
2. All entries must have the NAME and FULL ADDRESS and TELEPHONE NUMBER of the entrant. Entries without these will be disqualified.
3. Correct answers to the questions have been agreed on by a panel of experts. If more than one fully correct or equally correct entry is received they will all be mixed, and the winner drawn at random from them.
4. The judges' decision is final and no correspondence will be entered into.
5. All entries become the property of Bits & Bytes Ltd and will not be returned.
6. Employees of Bits & Bytes and their immediate families are not eligible to enter. Employees and their immediate families from Commodore (NZ) Ltd and Genesis Systems Ltd are not eligible to enter.
7. The winner will be contacted before February 1 1986 and details of the winner/s and correct answers published in the January/February issue of Bits & Bytes.
8. All entries must be received on or before December 24th 1985

Part 11

16. How many nanoseconds in a microsecond?
17. Name a programming language named after a man, and one named after a woman.
18. What, in Microsoft BASIC, is the result of the expression
    RIGHT$(LEFT$("Bits and Bytes", LEN(MID$("Limited",3))),1)
    (We know it looks strange!)
19. Name one of the registers the Z80 has which its predecessor, the 8080, doesn't.
20. There was a tin man in the "Wizard of Oz" stories. In what computing connection did a later 'Tinman' appear?
21. Which computer introduced the notion of "player-missile" graphics to the world?
22. One portable (reviewed in Bits & Bytes some time ago) had 384K of ROM! What was the name of the computer, and what major integrated software package was in some of that ROM?
23. ACIA, PIO and VIA are not three secret service organisations. What are they in full?
24. Which range of printers has been astronomically successful?
25. There are computer magazines other than Bits and Bytes (none so good of course!). What was the original full title and subtitle of Dr. Dobbs Journal?
26. Reader remember if you can,
    Aussi Dick, the electronics man,
    He sold a machine which was really dandy,
    Worked just like the One from Tandy.
    It's the subject of this "sonnet"
    What's the name that Dick put on it?
27. How much did the very first issue of Bits and Bytes cost?
28. Which of the many companies in the IBM empire builds the IBM JX computer?
29. MSX computers use which microprocessor as CPU?
30. O.K., an easy one to finish with. Name three computers which have been mentioned in Bits & Bytes sometime which are named after fruit.

Hewlett Packard's Portable Plus:

An up-market package



By Peter Biggs

Portable computing has been a diffident market for computer companies and consumers alike. First of all there was Osborne with his 3 inch CRT (Cathode Ray Tube) screen — and semi-portable (now called 'luggable'!) computing had successfully arrived.

The primary constraint for 'portables' is of course weight, which is primarily related to power consumption and screen type. Up until two years ago, the CRT screen ruled supreme on 'portables' — but it needs a lot of power and takes up a lot of space.

Then 15 line LCD (Liquid Crystal Display) screens began to make an appearance. Here at last was a light, flat and low power- consumption screen.

Now, within the last 18 months, 25 line, 80 column LCD displays have begun arriving — the DG (Data General) One and Apple IIc led the way, with the DG One incorporating two built-in disk drives (more than even the desktop Macintosh or Amiga can manage!)

These are truly portable 'lap-top' computers. Others followed soon — Morrow with the Pivot II, Hewlett Packard with their Portable Plus to mention just two. These either had internal or external drives and printers.

The problems with current LCD screens is that they are slow to 'refresh' themselves and unfortunately, tend to be somewhat unreadable. The Pivot II even has a 'back lit' screen to aid visibility.

Recently gas plasma screen displays began appearing on portables such as the Panasonic Exec. Partner, the Grid compass Portable and the Ericsson Portable. The screen is a red colour and has a much faster refresh time than the LCD screens more readable (and more expensive).

The next breakthrough is likely to come with an electroluminescent screen offering improved visibility.

Business look

The HP Portable Plus that I reviewed had arrived, along with a portable 3½-inch disk drive and a portable Thinkjet Printer, in a convenient carry-case, looking a "nifty" set of tools indeed.

This machine had been released in New Zealand on September 1, the Press Release and accompanying manual revealing the following:

1. This is an enhanced version of HP's original portable. It runs PC applications and communicates with desktop computers such as the HP touchscreen and IBM PC and close compatibles.
2. Its flip-up LCD screen is 80 col and 25 line with 200 x 480 bit mapped graphics.
3. The basic model comes with 128 K RAM with MS-DOS 2.11 and PAM (Personal Applications Manager program), both held in a 192 K ROM. Both ROM and RAM is CMOS for low power consumption. Tax-paid this will cost you $5290.
4. It has two new features — a RAM disk (they call it E- disk) and ROM software capability. The RAM disk is fully configurable and usually occupies Drive A and B. Drive C is the external disk drive. Up to 8 external HP drives can be added.
5. Keyboard is a 72 key keyboard, 8 function keys, an equivalent 'ALT' key to bring up a numeric keypad and a contrast control for the screen. Anyone familiar with the IBM PC keyboard would have no difficulty recognising the keys although one or two are special to this computer. The keyboard has a very pleasant tactile feel.
6. An external monitor can be attached using an special HP connector. A 'Freeze frame' capability exists which will freeze the display on the external screen while the LCD screen continues to operate. This can be useful to compare spreadsheets or data.
7. The internal battery will allow 20 hrs continuous use and the computer will run while recharging. Two systems give ample warning when the battery is low on charge. The computer will even switch itself off and hibernate for a month before all RAM memory and the clock is lost. Overnight charging for 10 hrs powers it up to 100% and, according to the Manual, this takes 18 hrs when the computer is being used.
8. The CPU is a CMOS 80C86 running at 5.3 MHz and the computer is claimed to be BIOS compatible with IBM-PC. If this is so, many standard software applications should run off-the- shelf.
9. A serial RS-232C port can be used for a modem or serial printer. A parallel printer is not supported.
10. There is a Reset button at the back of battery compartment which unfortunately clears Drive A when pressed. I pressed it — and cleared Drive A (in RAM). I then had to reformat it using the FORMAT command.

Additions costly

To add ROM software, a 'software drawer' needs to be purchased. It can hold up to 24 plug-in ROMS.

In the review model were ROM versions of Lotus 1-2-3, Microsoft Word, Memomaker and Time Manager as well as HP and VT-102 Terminal Emulators. All this, including the software drawer, would set you back about $4000.

To add more memory, a 'memory drawer' needs to be purchased. The drawer and a 128K memory card would cost you $1500.

The RAM is expandable to 896K. The review computer had 512K — at an extra cost of $3984.

Thus, the computer as I got it, including software and 512K memory, costs around $13000.

The peripherals that came with it were the Thinkjet Printer and the portable 3½-inch disk drive. Together they cost $3200. The HP Plotters start around $3000.

The carrying case for the computer and peripherals is around $300. And if you're keen on some blank plastic overlays for your function keys, be prepared to spend $65 for 5 of them.

HP also offer a maintenance contract.

Mobility

Now, to the computer itself.

It's light yet reassuringly solid and feels a professional product — there's a lot packed in its small case.

This computer is aimed at mobile professionals such as middle managers and sales professionals. With it they could connect to a mainframe back at the office and download sales information,or process a memo or report, set an alarm and diary or operate a spreadsheet such as Lotus 1-2-3.

Opening up the top revealed the screen and keyboard. One touch of a key brought up PAM — the Personal Applications Manager — which is a menu for applications programs instal-

led both as ROMs and otherwise.

The first thing you notice is that the screen is difficult to read. The press release asserts it is an 'anti-glare' screen but it is still not 'easy to read' unless your head position and the light are just right.

I finally got a readable position in muted light shining directly on the screen — against a window it is almost impossible.

This is the unredeeming feature on all LCD screen portables. The Data General One and the Morrow Pivot are the same.

Ghostly images

I tried to use MS Word to write this review but gave up as my eyes peered sightlessly at ghosts of words that appeared to shift every time I blinked.

Using the cursor keys to choose from the PAM menu, another keystroke got me into another application.

First of all, MS-DOS.

As MS-DOS 2.11 is built-in, all the standard commands and files are there at your fingertips. CHKDSK, EDLIN and even DEBUG are there although the manual only discusses a few of the DOS commands. These are:

CD (Change Directory), COPY (Copy or Append a file), DIR (List a directory), EXIT (a special HP command to exit from DOS to PAM), FORMAT (Format a Disk, external or internal), MORE (Used to display a file page by page), PRINT (queue a file for printing), REN (Rename a file) and TYPE (Display a text file).

Any more and you will need to buy the HP MS- DOS Users Guide from HP ($80).

There is a mistake in the Manual, Page 10-2, where they state that REN is used to renumber (instead of rename-a-file).

Another nuisance was that if I tried to access external drive C when it was not connected, the computer 'hung' and needed a warm reboot (with CTRL SHIFT BREAK) to start again.

No warning

The system can be configured to divide the memory between the E-disk (RAM disk) and Program and user RAM.

I entered the System Configure area and changed the length of the 'beep' from long to short. On exiting I found I had destroyed my data on Drive A, which needed formatting yet again.

No warning on screen or in the Manual was given that it would do this. A few traps for young players.



Using the ROM version of Lotus 1-2-3 Version 1A — it's the real thing and very fast. I rapidly produced a graph from data and it looked very good. The pie graph is a little distorted but quite adequate.

Recalculation is fast as well.

The Utilities, Tutorial and Printgraph come on a separate disk.

The ROM version of MS-WORD is probably more sophisticated than necessary for most word processing needs. It is cetainly powerful and fast on this HP. Again, the Utilities and Tutorial come on a separate disk.

Printing text on the battery-operated thermal Thinkjet printer was easy and the final product looked professional.

Running your own software requires that you load it from your desktop PC using a special HP connection or download it directly from the HP Portable 3½-inch drive. The drive formats disks to 710K.

Uncertainty

Not having the connectors, I could not try this function. My gut-reaction would be that MS-DOS comaptible software would run easily and PC-DOS software like BASICA and SIDEKICK would probably have BIOS compatibility problems.

This isn't unusual and most commercial software is MS-DOS oriented rather than specifically PC-DOS.

The Manuals accompanying the computer and software were clear but perhaps a little cluttered.

They would definitely be useful for a first-time user.

That's about it. The HP Portable Plus computer and accessories could be very useful for those who need the capability of ROM software or terminal emulation away from the office.

The screen readability varies with the light and is a problem.

It's also expensive by today's standards but stands as a good, solid, respectable piece of hardware.

(Continued 47)

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(Continued from page 45)

Dave Holland, of Hewlett-Packard NZ,comments on the HP 110's "value for money":

An evaluation of "value for money" requires three processes:
—Quantify the cost;
— Quantify the benefits;
— Compare the above.

Quantifying benefits is not easy and requires a detailed knowledge of user requirements. For this reason, "value for money" requires that each prospective portable computer purchaser needs to do his/her own evaluation.

The "Portable Plus" is aimed at the "mobile executive" market. To the executive who commits himself to a portable computer, it becomes a critical tool for his job and company. It needs to be physically as reliable as a diary (indeed they often double as diaries), available for use at all times, and as portable as possible — as well as being able to perform the required tasks.

The executives who purchase Hewlett-Packard's Portable and Portable Plus computers tend to be in medium to large organizations and in a dynamic environment. One of the most successful areas of the market for the Portable and Portable Plus is that of multinational accounting firms. These very companies are those who most closely scrutinize return on investment (or "value for money".

In conclusion:
— The Portable Plus is not cheap;
— As an executive, you should evaluate its value to *you*;
— The Portable Plus *may* be the best value for money on the market for you — depending on your requirements.

MICROCOMPUTER SUMMARY

Name:	HP Portable Plus
Manufacturer:	Hewlett Packard
Size:	13 x 10 x 3 inches (32x25x7.5cm)
Weight:	under 4 Kgms
Display:	25 line x 80 col 200 x 480 graphics 'flip top' LCD Screen
Keyboard	typewriter-style 75 key matrix
Battery Life	20 hours. Rechargeable Lead-acid internal batteries.
CPU	CMOS 80C86 running at 5.33 MHz
Memory	192 K CMOS ROM 128 K CMOS RAM expandable to 896K.
In ROM	Diagnostics, Security, Clock/Alarm, HP Link.
Operating System	MS-DOS 2.11 in ROM
Terminal Emulation	HP and IBM. DEC VT 102
Disc Drive	Internal electronic RAM Disk (called E-disk) External portable 3 1/2 inch drive available
Price	$5290
Peripherals	Battery-powered Thinkjet printer and 3 1/2 inch disk drive. Plotters.
Software:	ROM-based: Lotus 1-2-3, MS-Word, PC 2622 (Ver. 3.0), Memomaker/Time Manager, Executive Card Manager Disk-based: Most of the popular range of business software and Infocom games
Ratings: (5 highest)	Documentation 4, Expansion 4, Portability 5, Software availability 3, Value for money 2.

Packet Switching PCs

The Auckland-based consultancy Topcode has developed X25 protocol software for IBM personal computers and compatibles. The software package allows direct connection of PC's to the NZPO packet switching network, with speeds up to 9600 BPS, thereby providing access to world-wide packet switching commnications.

Previously, direct "packet mode" connections were restricted to mainframe or mini computers, claims Topcode.

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Achieving the 'impossible'

By Grant Collison

Have you ever wondered whether you should believe that something is impossible just because the local dealers inform you that it "can't be done"?

Is it really possible to boot a disk in drive two, or to erase a write protected disk without making hardware modifications?

February last year I tackled the first problem: that of booting a disk in the second drive. My method is revealed below.

It didn't stop there though. The Apple //c now has this capability built in. Who else wanted to do the impossible?

Brief overview of the bootstrap process

When the computer is first switched on the user types PR#n, IN#n, Cn00G or n<ctrl>P (where n is the disk drive controller card slot), control is eventually given to a small 250 byte program (called BOOT 0) which is in ROM on the disk controller card.

We only need know that BOOT 0 performs all disk reading and decoding until the Read and Write a Track and Sector (RWTS) routine is loaded. BOOT 0 cannot write to the disk, nor can it move the drive head to another track.

BOOT 0 is responsible for reading track 0 sector 0 (called BOOT 1) into the computer at $800. It then passes control to BOOT 1.

BOOT 1 uses BOOT 0 as a subroutine, and loads the first ten sectors from track 0 (called BOOT 2) at $B600 for a machine with at least 48k memory ($3600 master disk). BOOT 2 also contains the RWTS subroutine.

At this stage control is passed to BOOT 2 which loads the rest of DOS and your HELLO program. Control is then given to the Hello program.

The problem

The prime objective is to alter any preset drive defaults to 'drive two'. We will need to maintain overall control until our prime objective is complete.

We shall assume that your disk controller card is in slot 6. Memory size is not important since this routine will alter itself accordingly.

1. First get into the monitor (not literally) by typing CALL-151 (from the Basic prompt). You should now see a '*' prompt.

   CALL-151

   Enters the monitor

2. Move BOOT 0 to RAM, since ROM cannot be modified.

   4600<C600.C6F7M

   Relocates BOOT 0.

3. The instruction for selecting drive one is now located at $4635. 4635- BD 8A C0 LDA $C08A,X When the location $C08A+$60 (for slot 6) is referenced drive one is selected. To select drive two we must reference $C08B,X. Hence perform the change below.

   4636:8B

   Forces BOOT 0 to use drive two

4. We perform the following routine before jumping to BOOT 1, so that control comes back to us after BOOT 2 has been loaded.

```
46F8- A9 4C LDA #$4C
46FA- 8D 4A 08 STA $084A
46FD- A9 0A LDA #$0A
46FF- 8D 4B 08 STA $084B
4702- A9 47 LDA #$47
4704- 8D 4C 08 STA $084C
```

Forces BOOT 1 to jump back to $470A (our program) when BOOT 2 has been read into memory.

```
4707- 4C 01 08 JMP $0801
```

Jumps to BOOT 1

5. Now that we have control again we must alter the drive default used by BOOT 2 to 'drive two'. Where BOOT 2 first loads depends upon the computers memory size, and whether the disk contains a Master or Slave version of DOS. However the memory page that BOOT 2 was loaded at is stored at $8FE. We will get this value and alter the location that we must change, just before we get to the instruction.

```
470A- AD FE 08 LDA $08FE
470D- 8D 14 47 STA $4714
```

Finds out where BOOT 2 was loaded and store this value at 'XX'.

```
4710- A9 02 LDA #$02
4712- 8D 07 B7 STA $XX07
```

Tells BOOT 2 that we are using drive two now.

```
4715- 6C FD 0B JMP ($08FD)
```

Jumps to BOOT 2 (at the location pointed to by $8FD and $8FE.

To save this routine on disk type: BSAVE BOOTDR2, A$4600, L$118

To boot drive two either BRUN BOOTDR2 or type 4600G from the monitor.

Comments

The BOOTDR2 routine will only work with standard DOS disks or protected disks that follow a DOS type approach in bootstrapping.

BOOTDR2 is superior to other drive boot programs in that the disk is actually booted. Some programs read the boot files name and execute this.

BOOTDR2 does not alter your disk or computer in any way. Disks will only boot in drive two if this program is used to boot the disk.

The great equaliser

Computers could be the great equaliser as far as children from less favoured areas are concerned. That's the word from Mrs Anne Gluckman, principal of the Nga Tapuwae school in the Auckland suburb of Mangere.

She says that even those children who have not previously done particularly well in traditional academic schooling, "seem to go for computers like ducks to water."

She was commenting on her experience since her school bought 15 Apple IIe computers about ten months ago.

She says that her predominantly Maori and Polynesian children originally became familiar with computer technology in video game parlours. Now every pupil is gaining 'hands on' experience and seniors are working on complex programmes.

She said their attitude has been highly enthusiastic and the problem has been more one of getting them off the computers rather than getting them on.

"Not only have their skill levels increased since we installed these computers, but their self confidence has increased also, because they feel now for the first time they can compete equally in the job market."

She cautions against seeing computers as some kind of universal panacea for the ills of the education system. "There's still a long way to go, because the fact remains that for academic success and vocational awareness, the input from home is still very important in helping young people reach their full potential."

"Perhaps it is just our unique combination of pupils, staff and computers which has worked for us, but the early successes of our experiment with computers have exceeded our boldest expectations."



Instant quotes

An Auckland contractor is saving 40 hours a week preparing quotes on the garages he builds.

Brian Keane now has his secretary spending half-an-hour a day working on quotes that used to take him a ful working week, by using an Apple Macintosh XL (formerly Lisa) computer and a programme written by engineer David Best, the owner of Computer World in Auckland.

Clashes and commands

By Savern Reweti

The fight between Atari and Commodore for the lucrative home computer market is really hotting up.

This is demonstrated locally by the price discounting of both Atari and Commodore machines.

In the USA the competition has been particularly fierce, Commodore recently budgeting US$40m for advertising alone, mainly pinned on the Amiga computer.

Atari has responded with its new ST computers (how about a 512K machine for NZ$1,800?).

Whatever the outcome, their futures will depend on software support. But industry reports suggest software houses are suffering from an industry "fatigue", and are not eager to respond to these mega-machines.

When the smoke clears an eventual winner should emerge.

I've got my money on Atari, under the aggressive leadership of its new boss Jack Tramiel.

But let's put corporate blood-letting to one side, and turn to more grassroots matters.

The Atari computers have in most models five extra command keys i.e. HELP, START, SELECT, OPTION and RESET. Although commercial programs use them extensively I suspect the amateur programmer tends to avoid them.

To ascertain whether or not these keys have been pressed we have to PEEK into certain memory locations. If we PEEK (764), we find the internal code for the last key pressed. This function is ideal for interrupting a program, and avoiding the use of delay loops.

The HELP key should be utilised for program instructions. To check if it has been pressed we need to PEEK into memory location 732. Pressing the HELP key returns a value of 17, SHIFT-HELP returns a value of 8, and CTRL-HELP returns a value of 145.

The OPTION, SELECT, and START keys are accessed at memory location 53279. Pressing these keys, individually or in combination, returns values ranging from 0 to 7.

It is then quite easy to PEEK into these memory locations, check the value rturned, and then conditionally branch to a subroutine or to another part of the program e.g. 20 IF PEEK (732) = 17 THEN GOSUB 1000.

You must remember that these numbers are internal codes and not ASCII codes.

I have written a very simple program to demonstrate the use of these keys, and to display the appropriate codes.

Please note the three different methods of clearing the screen.

Also, as a little test, try and find the key to end the program.

In conclusion, I will leave you with a few powerful Atari pokes.

POKE 752, 1 — turns cursor off
POKE 752, 0 — turns cursor on
POKE 16, 64, POKE 53774, 64 — disables the Break key
POKE 202, 1 — clears current program from memory

P.S. Next month we will have a look at Atari string arrays.

```
1 REM * DEMO KEY PRESS*
2 REM * BY SAVERN OCT 85 *
3 GRAPHICS 0:SETCOLOR 2,3,4:POKE 752,1
4 GOSUB 50
5 POSITION 10,15
6 ? "PRESS ANY KEY TO START"
7 IF PEEK(764)=255 THEN 7
8 POKE 732,0:POKE 764,255:POKE 53279,7
9 ? CHR$(125):GOSUB 45:GOSUB 50
10 POSITION 2,10:? "OP/SE/ST "¦A
20 POSITION 17,10:? "HELP "¦B
22 POSITION 26,10:? "ANY KEY "¦C
23 POSITION 12,15:? "PRESS KEY FOR CODE"
25 GOSUB 45:GOSUB 54
30 POSITION 11,10:? A:POSITION 22,10
35 ? B¦" ":POSITION 34,10:? C¦"  "
40 GOTO 25
45 A=PEEK(53279):B=PEEK(732):C=PEEK(764)
46 IF C<>28 THEN RETURN
48 POKE 752,0:? "■":END
50 POSITION 14,8:? "DEMO KEY PRESS"
52 RETURN
54 IF D=C THEN RETURN
55 FOR Z=16 TO 0 STEP -1:SOUND 1,C,10,Z
56 NEXT Z:D=C:RETURN
```

'Impossible' revenge

By Michael Fletcher

Montezuma's Revenge follows the pattern of Shamus II, and is packed with nasties which you encounter while finding keys to unlock cavern doors through which you progress to reach levels two and three.

The revenge aspect may be that of the programmer's, because I found level two impossible to battle through — mainly because of parts of the cavern being in darkness and there being no way of knowing where there await holes in the platforms.

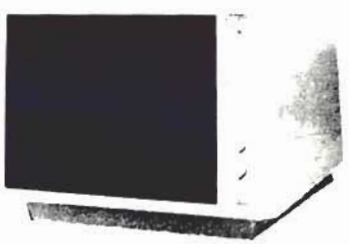
You have just two defences, a bonus sword, and a jump option — the basic skill required, as in most games, is timing.

You learn some action tips on the way: act fast on platforms, take your time with fire hazards.

Graphics are fast, detailed and run smoothly, while sound is almost non-existent.

This game was purchased directly from a US outlet, Huntington Computers Ltd, and requires 32 Kram.

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More and More Games!



Reviewed by Andrew Mitchell

Here are another five games, all on tape, which Alpine Computing has supplied for review.

I'll remind you of their postal service again, as my recent visit to a large rural city showed that it was not well serviced by one dedicated computer shop.

Bumping Buggies

Basically you're driving a car in the original Pitstop style, but there's more to it than that. You are able to bump and bounce the other cars off the track — and get points for it.

But be careful, the same can happen to you.

In adition to the usual speed up, slow down, left and right joystick control, the fire button allows you to jump, as long as you're doing more than 100km/hr. This is necessary to avoid some of the hazards ahead.

The graphics are fairly basic and blocky, but I think the action makes up for it, and although the action is also fairly simple, it is as addictive as the cassette cover suggests.

Nothing really original but if you're looking for another, or a first, care-race game (costing $19.95) then this certainly deserves more than a passing glance.

Aqua Racer

Another Bubble Bus beaut! Drive a speedboat through up to 20 different courses against other boats.

Graphics are good enough for the price ($19.95), the action is very good, with an excellent choice fo playing speeds.

Of course, you have to be fast to be competitive. A real plus for me is the inclusion of demo and practice modes, something missing from many expensive programmes these days.

(Continued on page 52

PITMAN NEW ZEALAND

SAMS

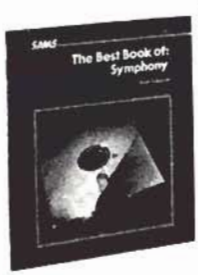
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Redesigning characters

By Craig Beaumont

About one in 700 people in New Zealand owns an Amstrad and 30% use diskdrives — figures from Grandstand.

Another figure from Grandstand is the price of the 6128.

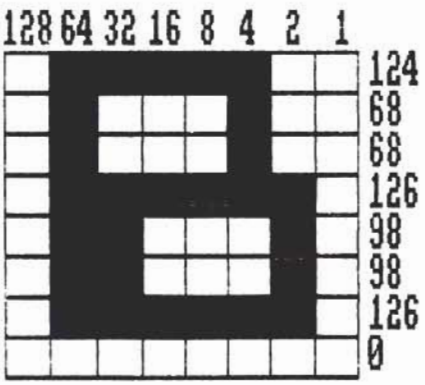
Probably Grandstand cannot face pricing the 6128 lower than its stocks of the 664 (held by dealers).

To get away from figures we'll take a small step in semantics to characters.

The SYMBOL command allows any character to be redesigned to look as you wish. If we view a character as 8 rows of 8 pixels, then the SYMBOL command gives us the ability to turn on or off each pixel in each row.

The arguments of the command are first the ASCII code of the character to be redesigned then a list of numbers corresponding to the 8 rows from top to bottom.

What number to use in specifying each row is best explained by this diagram (which was drawn using Screen Designer).



Each pixel has a value for when it is on — determined by which column it is in. When a pixel is off it has a value of zero. To specify a whole row just add together the values for the pixels you want on. So the top row of the "B" has a value of *64+32+16+8+4=124*.

The "B" is one of the characters in the attached program which sets up the alphanumeric parts of the character set to look like the title on the cover of Bits & Bytes.

Before you start redisigning characters you must use the SYMBOL AFTER command to allocate memory for storing the characters. Its argument is the ASCII code of the character before the first one you want to change.

If you want to return back to the built-in character set just execute SYMBOL AFTER again and it will clear whatever characters you have designed.

If you need to use the MEMORY command in a program, then execute it after the SYMBOL AFTER command.

When typing in the program I found it helped to redefine the ENTER on the keypad by entering — KEY 139, "DATA". The program only gives upper case letters — I'm sure you can design your own lower case letters and punctuation symbols. Perhaps you could even design a character set that links each letter like hand writing.

Another use of the SYMBOL command (apart from making "space invaders") is the creation of characters that are repeatedly needed to build up pictures — multi-screen games use this technique to save memory.

Screen designer

While using Screen Designer I found among its other features is the ability to locate characters anywhere on the screen. While you can do this using the TAG command it is a lot easier with the graphics cursor before your eyes.

Screen Designer has all the usual features of a graphics package like fill, circles and magnify — all accessible from keyboard in a way that makes use of the program relatively fluid after a little practice.

One omission is that it does not display the co-ordinates of the graphics cursor in numerical terms — this can be helpful when working on geometric designs.

This package is being eclipsed by LP-1, the light pen, which comes with software to allow you to do similar operations as Screen Designer but through a more user-friendly medium than the keyboard.

The LP-1 requires a colour monitor and at about $70 is good value for budding computer artists.

Another peripheral being released is the DMP-2000 — an Amstrad version of the Riteman C+ which gives NLQ (near letter quality) print. The DMP-2000 is a great improvement over the DMP- 1 and *it sells for the same price — $695.*

Well the first contribution to this column is from Geoff Jacobson of Naenae. He says you can get infinite lives on Manic Miner by Software Projects by following this procedure.

1. Type MEMORY &506D
2. Load the set of blocks after the screen.
3. Type POKE &6E25,0:CALL &506E

It should now be much easier to complete the game.

I think software Projects realises the sales of Manic Miner were increasd due to the popularity of pseudo-hacking like this — so they have put the Amstrad version out without protection.

Whatever I said about the price of the 6128, it still represents good value for money.

I expect it is the final version of the 8-bit line of Amstrads — the 664, it seems, was really just a trial model for the incorporation of a diskdrive.

```
10 REM Character Set
20 SYMBOL AFTER 47
30 DATA 60,36,36,126,98,98,98
40 DATA 124,68,68,126,98,98,126
50 DATA 126,66,64,96,98,98,126
60 DATA 124,66,66,98,98,98,124
70 DATA 126,64,64,124,96,96,126
80 DATA 126,64,64,124,96,96,96
90 DATA 126,66,64,110,98,98,126
100 DATA 66,66,66,126,98,98,98
110 DATA 16,16,16,24,24,24,24
120 DATA 4,4,4,6,70,70,126
130 DATA 68,68,68,126,98,98,98
140 DATA 64,64,64,96,96,96,126
150 DATA 126,74,74,106,106,106,106
160 DATA 126,66,66,98,98,98,98
170 DATA 126,70,70,70,66,66,126
180 DATA 124,68,68,124,96,96,96
190 DATA 126,66,66,66,66,94,126
200 DATA 124,68,68,126,98,98,98
210 DATA 126,66,64,126,6,70,126
220 DATA 126,16,16,24,24,24,24
230 DATA 66,66,66,98,98,98,126
240 DATA 98,98,98,102,36,36,60
250 DATA 74,74,74,106,106,106,126
260 DATA 36,36,36,126,98,98,98
270 DATA 66,66,66,126,24,24,24
280 DATA 126,66,6,126,96,66,126
290 DATA 126,66,66,70,70,70,126
300 DATA 8,8,8,24,24,24,24
310 DATA 126,66,2,126,96,96,126
320 DATA 124,68,4,62,6,70,126
330 DATA 124,68,68,126,12,12,12
340 DATA 126,66,64,126,6,6,126
350 DATA 126,64,64,126,70,70,126
360 DATA 126,2,2,6,6,6,6
370 DATA 60,36,36,126,70,70,126
380 DATA 126,66,66,126,6,70,126
390 FOR i=65 TO 90
400 READ a,b,c,d,e,f,g
410 SYMBOL i,a,b,c,d,e,f,g,0
420 SYMBOL i+32,a,b,c,d,e,f,g,0
430 NEXT
440 FOR i=48 TO 57
450 READ a,b,c,d,e,f,g
460 SYMBOL i,a,b,c,d,e,f,g,0
470 NEXT
```



(Continued from page 50)

A new variation on an old theme and good value for money. Certainly a holiday consideration.

Wizzards Lair

Rather like "Sorcery", reviewed in the last batch.

Call me simple perhaps, but I object to having to belt around at full speed, trying to find something in what seems an endless maze of rooms.

Of course it isn't really endless, and if you had the time (and patience) you could map them out.

There are so many meanies around, sapping your energy (including two who mean instant death), that you spend most of the time avoiding them.

The graphics are certainly good, and there's action aplenty, but when I finished the session, wringing wet from the tension, I wondered whether it was all worth it.

Zaga Mission

A helicopter mission after the style of "Zaxxon", flying over and under walls, down narrow corridors and through randomly opening and closing electronic fields.

The graphics are a little shoddy, the helicopters's tail actually sticks through walls on occasions.

Control was very responsive with the joystick and movements of the helicopter reasonably realistic.

I think this is a little overpriced (at $29.95) considering what is available at the same price — "Super Huey" immediately springs to mind.

Slapshot

What a great game, but only for two players, so be warned those that only have one joystick or only play on their own.

Ice hockey is the game and it's as near as a programme can get in my estimation.

You can hit the puck with varying degrees of strength, and you can body-check other players.

However be careful — this game does have rules you know.

The goalies also have a certain amount of extra movements that allow for goal saves.

There is a speech synthesiser which adds a little to the interest although I don't think that it is much of an additional selling point.

If you have a partner or friend and you both enjoy competing then this (at $29.95) is the game for you.

Muddy vision

British Telecom has opened its new version of Mud, the multi-user dungeon adventure game, and there will be intense competition to be first to gain the limitless powers of a wizard (then try to stop everyone else).

The battle will not be short as it requires 204,800 points.

The Mud manual is coy about the advantages: "Once you become a wizard (says BT) we will make contact with you and tell you what you need to know, and exactly what you can do with your new powers."

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Run-down on Add-ons

By Gary Parker

Nobody can deny that the Spectrum is a bit short of connections to the outside world.

It has no in-built printer interface, no joystick ports, no disk interface, no sound chip...the list goes on.

Of course all these things and more are available as separate plug-in interfaces, but this variety can be confusing for the user wishing to expand the Spectrum.

So this month I'll take a generalised look at the types of add-ons that are available for the Spectrum.

First choice

The add-on most people seem to want first is a joystick interface. Since there are many types available, this is also perhaps the most difficult interface to choose. The most important question you will need to ask when shopping for a joystick interface is "How many games will it work with?"

Some joysticks imitate the cursor keys, and so will only work with software which uses these keys. Others, such as Sinclair's Interface Two, imitate other keys.

The Sinclair interface allows two joysticks to be used, one imitating keys 1-5, and the other 6-10. Quite a few games offer a Sinclair option, buy many others don't support Sinclair's unusual choice of keys.

Kempston-type joystick interfaces don't imitate keys at all. Instead, they use an IN command, so only software which specifically offers a Kempston option will work with this type of interface.

More recently, interfaces have appeared which combine several joystick interfaces. They can act as a cursor, a Sinclair, or a Kempston joystick. Such interfaces will work with more software, but also cost more.

The most versatile joystick interface is a programmable one. This type of interface allows you to tell it which keys it should mimic, and so works with practically all software.

There are several types of programmable joystick interface available. Some require a short program to be loaded before you can program the keys, while others have this program in their own memory. With these you only have to push the joystick in each direction followed by the appropriate key before you can begin loading the game.

Others have a grid of sockets representing the keyboard, and you push five plugs into the appropriate sockets to program the keys to be mimicked.

Printers

Now that full-size printers are coming down in price, printer interfaces are becoming popular.

Most printers have a Centronics-type interface, and so require a Centronics-type interface on the Spectrum. Several brands are available, and there isn't a lot to choose from between them.

The major difference is that some require a short program to be loaded, while others have the program held in their own memory.

Sometimes interfaces are advertised which appear cheap, but beware — the cost of the connection ribbon is often not included with these. The wire ribbon can cost about a third as much as the interface.

Some combination interfaces are available which will work with both Centronics-type and RS-232 printers, and these seem good value for money, although I haven't actually used one.

Music

Music synthesizer interfaces with a programmable sound chip allow you to produce music with several simultaneous voices, similar to that available with the BBC and other computers.

Most of the sound chips available produce similar sound with a similar number of voices (often three musical voices plus a white noise generator).

The feature to look for with a sound chip interface is ease of programming — just how easy is it to produce music?

Having to use scores of POKES to play a tune is no fun, and a piece of good software to do the hard work for you is necessary.

Voice

Similar to music synthesizer interfaces are voice synthesizer interfacs. As with sound chips, ease of programming is important. Most voice synthesizers require that you write the speech as phonemes, held in a string variable.

Interfaces are available which allow any program in memory to be saved to tape or microdrive. In effect these are a sophisticated copying program. Since the program is in the interface, none of the computer's memory is taken up, and even very large programs can be copied.

Whether such an interface is worth buying depends on how important it is to you to have back-up copies of your commercial software. By the way, you can't use the interface to pirate software, because the copied software will only run with the same interface in place.

I've seen one interface advertised which allows you to 'slow down and live longer' — intriguing! What the interface actually does is allow you to slow down the speed of programs. Of course some games have several speed options built-in, but you might enjoy playing other games in slow motion.

Disk interfaces

Disk interfaces are among the more expensive Spectrum add-ons. Some include the disk drive in the price, while with others you choose your own drive.

Generally the ones with a drive supplied work out cheaper, but use a cheap drive with low capacity (100-200K).

If you want a 'real' disk of 500-1000K you should get an interface which allows you to connect a variety of interfaces, such as the Kempston interface reviewed in this column a couple of months ago.

Similar to disk interfaces are waferdrive and tape-cartridge interfaces. Most well-known of these is, of course, Sinclair's Interface One, which allows microdrives to be connected.

A good alternative is a waferdrive unit. These use cassettes roughly the same size as audio cassettes, and contain a long continuous loop of tape similar to microdrives.

The access times and storage capacities are similar to microdrives, but shorter cassettes are also available (such as 16K) which have faster access times.

The Rotronics waferdrive system contains two waferdrive units, an RS-232 and a Centronics interface, and comes with an excellent word processing program.

Graphic aids

There are a few graphic-aid interfaces available, such as light pens, drawing arms, and graphics tablets.

Light pens are relatively inexpensive, but only allow you to draw things directly on the screen.

Graphics tablets allow you to draw on a board, with a pen or an arm. These are very useful if you use your Spectrum for drawing, but are also quite expensive.

I have also seen digital-analog inter-

(Continued on page 84)

Opening & closing files

By Don Stanley

There are a number of devices that SVBasic can open for writing to or reading from. In this article I will explore each of these in detail with examples of how to use them. Anything which is not applicable to MSX is marked as such in the text.

Device 1 — CAS:

CAS: is the default device. Whenever you use an OPEN statement (or a BLOAD/LOAD/BASAVE/SAVE) without a device Basic assumes CAS:. Thus the statements:

OPEN "FRED" FOR OUTPUT AS 1

and

OPEN "CAS:FRED" FOR OUTPUT AS 1

are considered identical by Basic. The statement causes a tape header to be written on the tape at the current point, and prepares for data to be written to the tape.

To write to the tape you generally use a PRINT statement with a file number option. This takes the form:

PRINT #1,var

The #1 refers back to the OPEN statment. You can have up to 15 files OPENed at once, and the #n identifies which file the current operation refers to. *var* is the variable whose value you wish to write onto the file. In order to OPEN more than 1 file, put the statement:

MAXFILES = nn (nn between 1 and 15)

before you attempt to OPEN any files.

When writing to a tape you may find that the tape output appears not to occur — i.e. the LED does not come on and the cassette motor does not start. This is because the cassette system will not attempt to write a record until either the buffer is full (255 bytes) or you CLOSE the file. Try this to see what I mean:

```
10 OPEN "FRED" FOR OUTPUT
AS 1
20 PRINT #1, "LINE 1"
30 A$=INPUT$(1)
40 PRINT #1, "LINE 2"
50 A$=INPUT$(1)
60 CLOSE
```

You should notice that nothing is written to the tape until the CLOSE statement is encountered, because the buffer is not yet full. Thus you must be careful that you never remove a tape before the file is CLOSEd, as all the data may not have been written to it.

Inputting from the tape is similar to the above, except you replace OUTPUT with INPUT and replace PRINT with INPUT (or one of the other input statements — LINE INPUT/INPUT$). The following segment of code demonstrates this:

```
10 OPEN "FRED" FOR INPUT AS 1
20 INPUT #1,A$ : PRINT A$
30 PRINT "Press a KEY ";: A$=IN-
PUT$(1)
40 INPUT #1,A$ : PRINT A$
50 PRINT "Press a KEY ";: A$=IN-
PUT$(1)
60 CLOSE
```

You should notice that the cassette did not operate after the first "Press a KEY" prompt. This is because the cassette operating system (COS ?) always attempts to fill the buffer on each input operation.

Successive inputs are from the buffer until 255 bytes are read, then another 255 bytes are read from the tape and so on until the file is CLOSEd.

These are the only 2 operations you can carry out on a tape file — INPUT and OUTPUT. Both work only on ASCII files, you cannot OPEN any of BINARY (BSAVE'd), TOKENISED (CSAVE'd), or SCREEN DUMP files to read from. But you can OPEN files which were saved using the SAVE command as these are just ASCII files.

Device 2 — Disk Files (1: and 2:)

1: and 2: refer to disk files. All the above CAS: information (except the last paragraph) is applicable here. There are a number of extensions, allowing appending data to the end of a file and use of random access files.

To OPEN a file for sequential I/0 use:

OPEN "1:FRED" FOR <mode> as 1

where <mode> is one of APPEND/INPUT/OUTPUT.

File handling on disk is much different to cassette. Firstly when OPENing for INPUT a "FILE NOT FOUND" message will occur if the file is not on disk. The cassette system will just keep searching and probably issue a "DEVICE I/O ERROR" at the end of the tape.

Secondly, when OPENing for OUTPUT, if the file already exists on the disk it is destroyed at the time of the OPEN statement. The cassette system just starts the file at the current point of the tape, and several files with the same name can exist.

Thirdly notice we now have an APPEND option. This option causes writes to the file to occur at the end of any data which already exists. You cannot use APPEND on a non-existent file.

A fourth difference is that under the DOS you OPEN any sort of file to INPUT from. BINARY, TOKENISED and SCREEN SAVE files can all be OPENed for input. However they should not be OPENed for OUTPUT as this would destroy the file.

I have been able to OPEN all file types for APPEND, but as PRINT always assumes the file is ASCII, unexpected results could occur doing this.

One point to be aware of when using disks : ALWAYS CLOSE files before removing a disk.

If disks are exchanged with a disk file OPEN, the effect on the new disk may be to corrupt the ALLOCATION TABLE. You will get a "BAD ALLOCATION TABLE" message if this happens.

When you get a BAD ALLOCATION TABLE, do not remove the disk from the drive, but type CLOSE:FILES, and if you are lucky, the table will be restored.

This is not the only reason why a BAD ALLOCATION TABLE occurs, however at this stage the only way I know of which may restore the table is to type CLOSE:FILES immediately.

Device 3 — LPT:

You can open the LinePrinTer for OUTPUT only. This is an alternative to using LPRINT. You need the following

OPEN "LPT:" FOR OUTPUT AS 1

and then to PRINT on the lineprinter use

PRINT #1, var

This works exactly as a screen print. A line feed/carriage return occurs immediately after printing, or if a ; follows the PRINT, the printer position is held for the next PRINT.

You can use PRINT USING as follows with the lineprinter OPEN for OUTPUT:

PRINT #1, USING "!\\"; "LINE 2"

Device 4 — CRT:

CRT: refers to the screen in either 40 or 80 column mode. It is the default when using PRINT and cannot be OPENed for INPUT. All comments for LPT: apply.

Recently I saw a program where the writer had provided facility to PRINT to the screen and a separate facility to PRINT the identical output to the printer using LPRINT.

Effectively what this means is that the PRINT code is double in size.

It is far more effective to have the CRT: OPEN when writing to the screen and the LPT: OPEN as required, then use a single set of PRINTs as follows:

```
10 OPEN "CRT:" FOR OUTPUT AS
1 : A$="PRINTER"
20 ON KEY GOSUB 50 : KEY(1) ON
30 LOCATE20,20 : PRINT "PRESS
F1 to Toggle ";a$;" On"
40 PRINT #1, "OUTPUT ON ";A$ :
GOTO 40
50 IF A$="PRINTER" THEN A$=
"SCREEN " : DV$="LPT:"
60 ELSE A$="PRINTER" :
DV$="CRT:"
70 CLOSE #1 : OPEN DV$ FOR
OUTPUT AS 1 : RETURN 30
```

The only problem with is is that LOCATE does not work with the lineprinter outputs so you need to format your output to avoid using LOCATE.

Device 5 — KYBD:

Have you ever tried to use INPUT in a GRAPHICS mode in SVBasic or MSX Basic?

The system resets for text mode, and any graphics you had done are gone.

You can get round this in SVBasic by using the KYBD: device, but it is NOT applicable to MSX. Try the following program

```
10 SCREEN 1
20 OPEN "KYBD:" FOR INPUT AS
1
30 LINE (10,10)-(170,90),1,BF
40 LOCATE 30,20 : PRINT "Enter A
String";
50 INPUT #1, A$ : LOCATE
140,20: PRINT A$
60 CLOSE
```

This OPENs the keyboard as the input device and so the system believes it is reading a file originating from the keyboard.

Everything you enter will go into a file buffer (255 bytes) and will not be echoed on the screen.

Furthermore, since input is from a file, an end of file character needs to be entered to signal the end of the input.

The character is a Ž (CTRL/Z), or you press ENTER followed by any other character.

Device 6 — GRP:

SVI Basic allows you to PRINT text on a graphics screen just by using the PRINT command in graphics mode.

MSX does not, you need to OPEN the graphics screen for OUTPUT as follows:

```
10 SCREEN 2
20 OPEN "GRP:" FOR OUTPUT AS
1
30 LINE (10,10)-(200,70),1,BF
40 PSET (50,40) : PRINT #1,
"TEXT RULES"
50 CLOSE
```

A couple of problems exist. Firstly LOCATE has no meaning in this situation; by default the PRINT will start at the pixel where the last graphics operation finished. Thus you need a PSET wherever you would normally use a LOCATE.

The second problem is caused by this need to use PSET. As it stands in the above program, the PSET will light up a pixel which we don't want lit.

To get round this, replace the PSET with

```
PSET (50,40),POINT(50,40)
```

to prevent the pixel being lit.

Device 7 — MDM:

This OPENs the Modem for INPUT or OUTPUT. It is not really applicable in New Zealand as no modem is available.

These are all the devices that can be used with OPEN. You can use up to 15 files and any mixture of devices in a program, but don't forget to set MAXFILES first.

Be very careful to ensure that files are CLOSEd before removing tapes or disks from their respective devices.

To finish off, it is sometimes useful to be able to determine from within a program whether a file already exists on a disk before OPENing it for OUTPUT. Here is one way of doing it.

```
10 INPUT "Enter Filename ";A$
20 ON ERROR GOTO 500
30 OPEN "1:"+A$ FOR INPUT AS 1
: CLOSE
40 PRINT "FILE ALREADY EXISTS
— OVERWRITE (Y/N)"
50 B$=CHR$(ASC(INPUT$(1))
AND 95)
60 IF B$ <> "Y" THEN 10
70 ON ERROR GOTO 0
80 OPEN "1:"+A$ FOR OUTPUT
AS 1
...
500 CLOSE : RESUME 70
```

Essentially what is going on is that you OPEN the FILE for INPUT and if no error occurs, then the OPEN was successful, which means the file already exists, so you check that the user really wants to overwrite it.

If not, go back to the start.

If the OPEN was not successful, and error occurs (as you are trying to OPEN a non-existent file for INPUT), so control passes to line 500 and from there straight back to normal processing at line 70.



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SANYO MBC-550:

Insignias

by Richard Pierre

This program will draw and label the insignias of six air forces: French, British, United States, German, Japanese, and Israeli.

```
10 LOCATE 1,1,0:PRINT ""
20 COLOR 1,5
30 CLS
40 CIRCLE(90,40),50,0,1,,5,6
50 PAINT(90,40),6,6
60 CIRCLE(90,40),40,0,1,,5,4
70 PAINT(90,40),4,4
80 CIRCLE(90,40),25,0,1,,5,7
90 PAINT(90,40),7,7
100 CIRCLE(90,40),10,0,1,,5,1
110 PAINT(90,40),1,1
120 LOCATE 10,4:PRINT "FRENCH AIR FORCE"
130 CIRCLE(240,40),50,0,1,,5,1
140 PAINT(240,40),1,1
150 CIRCLE(240,40),30,0,1,,5,7
160 PAINT(240,40),7,7
170 CIRCLE(240,40),10,0,1,,5,4
180 PAINT(240,40),4,4
190 LOCATE 10,24:PRINT "ROYAL AIR FORCE"
200 CIRCLE(450,40),50,0,1,,5,1
210 PAINT(450,40),1,1
220 LINE(370,30)-(530,50),1,BF
230 LINE(375,35)-(405,45),7,BF
240 LINE(525,35)-(497,45),7,BF
250 LINE(375,38)-(405,42),4,BF
260 LINE(525,38)-(497,42),4,BF
270 LINE(450,20)-(440,35),7
280 LINE(450,20)-(460,35),7
290 LINE(440,35)-(420,35),7
300 LINE(460,35)-(480,35),7
310 LINE(480,35)-(460,43),7
320 LINE(420,35)-(440,43),7
330 LINE(440,43)-(430,55),7
340 LINE(460,43)-(470,55),7
350 LINE(470,55)-(450,47),7
360 LINE(430,55)-(450,47),7
370 PAINT(450,40),7,7
380 LOCATE 10,46:PRINT "UNITED STATES AIR FORCE"
390 LINE(80,105)-(100,150),0,BF
400 LINE(45,122)-(135,132),0,BF
410 LINE(77,105)-(80,122),7,BF
420 LINE(102,105)-(100,122),7,BF
430 LINE(45,120)-(80,122),7,BF
440 LINE(100,120)-(135,122),7,BF
450 LINE(102,150)-(100,132),7,BF
460 LINE(77,150)-(80,132),7,BF
470 LINE(45,132)-(80,130),7,BF
480 LINE(135,130)-(100,132),7,BF
490 LOCATE 21,5:PRINT "GERMAN AIR FORCE"
500 CIRCLE(250,125),50,0,1,,5,7
510 PAINT(250,125),7,7
520 CIRCLE(250,125),45,0,1,,5,4
530 PAINT(250,125),4,4
540 LOCATE 21,24:PRINT "JAPANESE AIR FORCE"
550 CIRCLE(450,125),50,0,1,,5,7
560 PAINT(450,125),7,7
570 LINE(420,115)-(480,115),1
580 LINE(420,115)-(450,145),1
590 LINE(450,145)-(480,115),1
600 PAINT(450,125),1,1
610 LINE(450,105)-(420,135),1
620 LINE(450,105)-(480,135),1
630 LINE(420,135)-(480,135),1
640 PAINT(450,110),1,1
650 PAINT(430,134),1,1
660 PAINT(470,134),1,1
670 LOCATE 21,49:PRINT "ISRAELI AIR FORCE"
680 GOTO 680
```

SPECTRUM:

Diversion

by Paul Johnson

This version of the well-known 'Light-cycles'-type game allows two people to play against each other.

You must trap your opponent in the trail left by your cycle.

Player 1 uses keys 2,Q,W,A, and player 2 uses 0,O,P,L.

The game features a wrap-around screen, so that when you move off the screen you reappear on the opposite side.

Instructions are given in the program.

```
  1 REM DIVERSIONS by Paul John
son
  10 PAPER 0: INK 0: BORDER 0: C
LS
  15 GO SUB 9900
  21 LET s2=0: LET s1=0
 990 BORDER 4: PAPER 0: INK 0: C
LS : LET x2=30: LET y2=10: LET x
x2=-1: LET yy2=0
 991 LET xx=0: LET yy=0: LET x=0
: LET y=0: LET x1=1: LET y1=10:
LET xx1=1: LET yy1=0
 992 PRINT #1;AT 0,0;"PLAYER 1="
;s1;TAB 22;"PLAYER 2=";s2
 993 IF s1=10 OR s2=10 THEN  GO
TO 3000
1001 LET b=IN 61438: LET a=IN 63
486: LET c=IN 65022: LET d=IN 49
150: LET e=IN 64510: LET f=IN 57
342: LET g=IN 65278: LET h=IN 32
766
1100 IF a<>191 THEN  LET yy1=-1:
 LET xx1=0
1101 IF b<>191 THEN  LET yy2=-1:
 LET xx2=0
1102 IF c<>191 THEN  LET yy1=1:
LET xx1=0
1103 IF d<>191 THEN  LET yy2=1:
LET xx2=0
1104 IF e=190 THEN  LET yy1=0: L
ET xx1=-1
1105 IF e=189 THEN  LET yy1=0: L
ET xx1=1
1106 IF f=189 THEN  LET yy2=0: L
ET xx2=-1
1107 IF f=190 THEN  LET yy2=0: L
ET xx2=1
1150 IF y2<1 THEN  LET y2=20
1151 IF y1<1 THEN  LET y1=20
1152 IF x2>30 THEN  LET x2=1
1153 IF x1>30 THEN  LET x1=1
1154 IF x1<1 THEN  LET x1=30
1155 IF x2<1 THEN  LET x2=30
1156 IF y1=21 THEN  LET y1=1
1158 IF y2=21 THEN  LET y2=1
1200 LET x=x1+xx1: LET y=y1+yy1:
 LET xx=x2+xx2: LET yy=y2+yy2
1201 IF ATTR (y,x)=16 AND ATTR (
yy,xx)=8 OR ATTR (y,x)=8 AND ATT
R (yy,xx)=16 THEN  BEEP .01,10:
BEEP .005,14: BEEP .01,17: BEEP
.01,10: GO TO 990
1211 IF ATTR (y,x)=16 OR ATTR (y
,x)=8 THEN  BEEP .01,10: BEEP .0
05,14: BEEP .01,17: BEEP .01,10:
 LET s2=s2+1: GO TO 990
1212 IF ATTR (yy,xx)=8 OR ATTR (
yy,xx)=16 THEN  BEEP .01,10: BEE
P .005,14: BEEP .01,17: BEEP .01
,10: LET s1=s1+1: GO TO 990
1500 LET x2=x2+xx2: LET y2=y2+yy
2
1510 LET x1=x1+xx1: LET y1=y1+yy
1
2000 PRINT AT y1,x1; PAPER 1;" "
;AT y2,x2; PAPER 2;" "
2990 GO TO 1000
3000 CLS : PRINT AT 10,5; INK 6;
```




```
 FLASH 1; PAPER 2;"G A M E  O V
E R !"
3001 IF S1=10 THEN  PRINT AT 15,
5; PAPER 1;"BLUE"; INK 6; PAPER
0;" IS VICTORIOUS": GO TO 3003
3002 PRINT AT 15,5; PAPER 2;" RE
D"; INK 6; PAPER 0;" IS VICTORIO
US": GO TO 3003
3010 PRINT AT 21,2; INK 1; PAPER
 5;"PRESS ANY KEY TO PLAY AGAIN"
: FOR N=0 TO 150: NEXT N
3020 BEEP .002,RND*20: BEEP .005
,RND*20+20: BEEP .005,RND*20+10:
 BEEP .004,RND*20-10
3030 IF INKEY$="" THEN  GO TO 30
20
3040 GO TO 20
9900 INK 1: PAPER 5: BORDER 2: C
LS
9905 RESTORE 9920
9910 READ a$: FOR N=1 TO 257: PR
INT A$(N);: BEEP .01,-15: NEXT N
9911 READ a$: FOR N=1 TO 256: PR
INT A$(N);: BEEP .008,-10: NEXT
N
9912 READ a$: FOR N=1 TO 128: PR
INT A$(N);: BEEP .005,-5: NEXT N
9920 DATA "          INSTRUCTIONS
          You and your opponen
t are out  for each others throa
ts you eachmust each defend your
selves as  best you can.You each
 leave a   trail behind you whic
h is deadlyto anybody.
                  FIRST ONE TO
 10 WINS                    GO
OD LUCK                "
9930 DATA "
                  CONTROLS

                1-5  =   UP   =
 6-0
                Q    =  LEFT  =
   O
                W    =  RIGHT =
   P          "
9940 DATA "
                A-G  =  DOWN  =
 H-enter
                PRESS ANY KEY MO
RTALS        "
9950 FOR n=0 TO 200: NEXT n: PAU
SE 0
9990 RETURN
9998 SAVE "DIVERSIONS" LINE 0
```

SEGA

A plane

By Dick Williams

```
10 SCREEN 2,2:COLOR1,15,,1:CLS
20 LINE(220,20)-(215,35),1
30 LINE(215,35)-(170,75),1
40 LINE(170,75)-(165,95),1
50 LINE(165,95)-(160,125),1
60 LINE(160,125)-(160,160),1
70 LINE(160,160)-(150,170),1
80 LINE(150,170)-(130,135),1
90 LINE(130,135)-(125,115),1
100 LINE(125, 115)-(115, 100),1
110 LINE(115,100)-(115,130),1
120 LINE(115,130)-(125,140),1
130 LINE(125,140)-(130,135),1
140 LINE(105,140)-(105,85),1
150 LINE(105,85)-(120,70),1
160 LINE(120,70)-(160,50),1
170 LINE(220,20)-(205,20),1
180 LINE(205,20)-(150,55),1
190 LINE(170,75)-(150,80),1
200 LINE(150,80)-(115,100),1
210 LINE(165,95)-(130,135),1
220 LINE(160,125)-(140,150),1
230 LINE(105,140)-(115,130),1
240 CIRCLE(120,120),5,9
260 LINE(120,125)-(65,190),9
270 LINE(25,190)-(120,115), 9
280 LINE(25,190)-(65,190),9
290 PAINT(110,130),9
300 PAINT(120,120),9
310 PAINT(120,125),9
320 PAINT(155,155),4
330 LINE(190,30)-(195,35),1
340 LINE(195,35)-(210,25),1
350 LINE(210,25)-(210,20),1
360 LINE(195,25)-(200,30),1
370 LINE(215,20)-(215,25),1
380 LINE(125,115)-(170,75),1
390 PAINT(180,95),1
400 LINE(105,95)-(100,95),,
410 LINE(100,95)-(90,105),1
420 LINE(90,105)-(95,115),1
430 LINE(95,115)-(105,120),1
440 LINE(90,105)-(65,120),1
450 LINE(65,100)-(80,90),1
460 LINE(80,90)-(115,75),1
470 LINE(90,85)-(75,100),1
480 LINE(100,95)-(105,90),1
490 CIRCLE(100,105),5,1
500 LINE(100,100)-(15,155),9
510 LINE(100,110)-(15,,30),1
520 LINE(100,110)-(15,190),9
530 LINE(15,190)-(15,150),9
540 LINE(75,100)-(70,100),1
550 PAINT(75,95),4
560 LINE(105,95)-(160,,20),4
570 LINE(105,95)-(150,30),1
580 PAINT(135,65),1
590 PAINT(100,105),9
600 PAINT(95,110),9
610 PAINT(90,110),9
620 PAINT(100,135),9
630 LINE(105,100)-(195,35),4
640 LINE(215,25)-(105,105),4
650 PAINT(170,55),4
660 LINE(60,175)-(45,190),1
670 LINE(45,150)-(15,175),1
680 LINE(100,100)-(15,150),4
690 LINE(100,100)-(15,145),7
700 LINE(100,100)-(15,140),2
710 LINE(125,120)-(70,190),3
720 LINE(125,120)-(75,190),8
730 LINE(125,120)-(80,190),5
740 LINE(100,110)-(55,155),4
750 FOR P=1 TO 1200:NEXT:CLS:GOTO 10
```



SPECTRAVIDEO

Club Accounts

By Vic Whyman

This program allows a balance sheet to be produced, such as for a club financial report. It uses a Spectravideo 328 and a Shinwa CP-80 printer in 142-column mode, as set up by line 110.

```
10 REM Balance sheet program
20 REM by Vic Whyman
30 REM for the SPECTRAVIDEO
40 'Variables: IN=income: EX=expenditure: T
V=temp variable
50 'B1=excess income: B2=excess expenditure
60 'The strings are self explanatory
70 S$=SPACE$(39)
80 IN=0:EX=0:TV=0
90 'Set up screen and printer output
100 CLS:PLAY"o4ee":LOCATE11,5:PRINT"TURN PR
INTER ON":LOCATE5,7:PRINT"Press any key whe
n ready...";:A$=INPUT$(1):PLAY"o4abd"
110 LPRINTCHR$(&HF)
120 CLS:LOCATE0,0:INPUT"Org/Business:";OB$
130 LOCATE2,1:INPUT"For period:";PD$:GOSUB5
20
140 LOCATE15,2:PRINT"BALANCE SHEET":PRINTST
RING$(39,"-")
150 Y=6:LOCATE4,4:PRINT"Income"
160 IS$="":LOCATE1,20:INPUT"Income source:"
;IS$:GOSUB510:IFIS$=""THEN220
170 LOCATE1,Y:PRINTIS$
180 LOCATE1,20:INPUT"Amount:";TV:IN=IN+TV:G
OSUB510
190 LOCATE30,Y:PRINTUSING"####.##";TV:Y=Y+1
200 LPRINTIS$;TAB(60);USING"$####.##";TV
210 GOTO160
220 LOCATE30,Y:PRINT"______":LOCATE29,Y+1:
PRINTUSING"$####.##";IN
```



```
230 GOSUB570
240 CLS:LOCATE15,2:PRINT"BALANCE SHEET":PRI
NTSTRING$(39,"-")
250 Y=6:LOCATE4,4:PRINT"Expenditure"
260 ES$="":LOCATE1,20:INPUT"Expenditure sou
rce:";ES$:GOSUB510:IFES$=""THEN320
270 LOCATE1,Y:PRINTES$
290 LOCATE1,20:INPUT"Amount:";TV:EX=EX+TV:G
OSUB510
290 LOCATE30,Y:PRINTUSING"####.##";TV:Y=Y+1
300 LPRINTTAB(80);ES$;TAB(130);USING"$####.
##";TV
310 GOTO260
320 LOCATE30,Y:PRINT"______":LOCATE29,Y+1:
PRINTUSING"$####.##";EX
330 GOSUB570
340 CLS:LOCATE15,3:PRINT"BALANCE SHEET":PRI
NTSTRING$(39,"-")
350 LOCATE4,6:PRINT"INCOME:":LOCATE30,6:PRI
NTUSING"$####.##";IN
360 LOCATE4,8:PRINT"EXPENDITURE:":LOCATE30,
8:PRINTUSING"$####.##";EX:PRINT
370 IFIN<EXTHENGOTO440
380 PRINTUSING"Excess income over expend.
  $####.##";IN-EX:B1=IN-EX
390 LPRINT:LPRINTTAB(80);USING"Excess incom
e over expend.                    $###
.##";B1
400 LPRINTTAB(61)"-------"TAB(131)"-------"
410 LPRINTTAB(60);USING"$####.##
        $####.##";IN;EX+B1
420 LPRINTTAB(61)"-------"TAB(131)"-------"
430 GOTO490
440 PRINTUSING"Excess expend. over income:
$####.##";EX-IN:B2=EX-IN
450 LPRINT:LPRINTUSING"Excess expend. over
income                            $##
##.##";B2
460 LPRINTTAB(61)"-------"TAB(131)"-------"
470 LPRINTTAB(60);USING"$####.##
        $####.##";IN+B2;EX
480 LPRINTTAB(61)"-------"TAB(131)"-------"
490 GOSUB570
500 CLS:PLAY"o4bad":LPRINTCHR$(18):END
510 LOCATE0,20:PRINTS$:RETURN
520 LPRINTOB$
530 LPRINT"Balance sheet for period ";PD$
540 LPRINT:LPRINTTAB(60)"BALANCE SHEET":LPR
INTTAB(60);STRING$(13,"-")
550 LPRINTTAB(16)"INCOME";TAB(90)"EXPENDITU
RE"
560 LPRINTTAB(16)"------";TAB(90)"---------
--":LPRINT:RETURN
570 LOCATE5,20:PRINT"Press any key...";:A$=
INPUT$(1):RETURN
```

ATARI:

Maths Test

by Stephen Botha

This programme will help the user learn multiplication tables. Ten questions are asked for each of the tables from 0 to 12.

If the user gets all the questions correct, weird sound effects are played.

```
10 REM *MATHS TEST*-BY STEPHEN BOTHA.
50 CLR :DIM A$(20),Z$(50)
100 GRAPHICS 17:POSITION 5,0:? #6;"MATHS
 TEST":POSITION 2,1:? #6;"BY STEPHEN BOT
HA"
105 FOR K=0 TO 60:I=INT(RND(0)*255)+1:SE
TCOLOR 0,I,6:SOUND 0,I,10,INT(RND(0)*15)
+1:NEXT K:FOR J=1 TO 450:NEXT J
200 POKE 82,2:GRAPHICS 0
210 ? "THIS PROGRAM IS DESIGNED TO TEST"
211 ? "YOU ON MULTIPLICATION PROBLEMS,"
212 ? "INVOLVING NUMBERS BETWEEN 0 AND 1
2"
213 ? "THESE QUESTIONS WILL BE ASKED IN
"
214 ? "ORDER OF NUMBER SIZE."
215 ? "IF YOU GET AN ANSWER INCORRECT,"
216 ? "YOU WILL HAVE TO BEGIN THAT CERTA
IN"
217 ? "TIMES TABLE AGAIN.(10 QUESTIONS W
ILL  BE ASKED ON EACH TIMES TABLE(0 TO 1
2))YOU WILL RECIEVE A";
218 ? " RANKING AT THE END TO SEE HOW GO
OD YOU ARE AT MATHS(THE  LESS MISTAKES,T
HE BETTER THE RANK)."
219 ? "PRESS START TO BEGIN"
220 IF PEEK(53279)=6 THEN SOUND 0,0,0,0:
SOUND 1,0,0,0:GOTO 1000
221 SOUND 0,255,10,4:SOUND 1,254,10,4
225 GOTO 220
1000 A=0:B=0:E=1:Z=0
1100 ? CHR$(125):? "WHAT IS ";A;" X ";B:
E=E+1
1105 TRAP 1105:INPUT C
1108 IF C=A*B THEN ? "CORRECT":FOR Q=1 T
O 250:NEXT Q:GOTO 1150
1109 ? "INCORRECT.THE ANSWER TO ";A;" X
";B;" IS ";A*B:Z=Z+1:E=0
1110 ? "YOU HAD BETTER START THE ";A;" T
IMES TABLE AGAIN.":B=0:FOR Q=1 TO 1000:N
EXT Q
1111 GOTO 1100
1150 IF E<>11 THEN B=INT(RND(0)*12)+1:GO
TO 1100
1151 A=A+1:B=0:E=1:? "GOOD!!!":FOR M=1 TO
 250:SOUND 0,M,10,A:NEXT M:SOUND 0,0,0,0
:IF A<>13 THEN 1100
2000 IF Z>30 THEN Z$="VERY POOR"
2001 IF Z<30 AND Z>=24 THEN Z$="VERY
    UNSATISFACTORY"
2002 IF Z<24 AND Z>=20 THEN Z$="
    UNSATISFACTORY"
2003 IF Z<20 AND Z>=16 THEN Z$="BELOW
    AVERAGE"
2004 IF Z<16 AND Z>=12 THEN Z$="AVERAGE"
2005 IF Z<12 AND Z>=8 THEN Z$="ABOVE
    AVERAGE"
2006 IF Z<8 AND Z>=4 THEN Z$="VERY GOOD"
2007 IF Z>=1 AND Z<4 THEN Z$="EXCELLANT"
2008 IF Z=0 THEN 3000
2100 ? "YOU HAVE COMPLETED ALL OF THE
     QUESTIONS.YOUR RANKING IS ";Z$;"."
2101 ? "(YOU GOT ";Z;" QUESTIONS WRONG.)
":GOTO 4000
3000 ? "YOU GOT ALL THE QUESTIONS CORREC
T!!!!"
3001 FOR H=1 TO 480:SOUND 0,H,10,4:SOUND
 1,H+10,10,4:SOUND 2,H+20,10,4:SOUND 3,H
+30,10,4:SETCOLOR 2,H,6:NEXT H
3002 ? "YOU ARE A MATHS GENIUS!!!!!"
3003 FOR W=480 TO 1 STEP -1:SOUND 0,W,10
,4:SOUND 2,W+20,10,4:SOUND 3,W+30,12,4:S
ETCOLOR 2,W,6:NEXT W
3012 FOR S=0 TO 3:SOUND S,0,0,0:NEXT S:S
ETCOLOR 2,9,5:GOTO 4000
4000 ? "PRESS START TO RE-RUN."
4010 IF PEEK(53279)=6 THEN RUN
4011 GOTO 4010
```

COMMODORE 64:

Galactic Gladiator

by Robert Groofhuis

In this game you are being attacked by a UFO and an alien fighter which you must try to shoot as may times as possible.

If the fighter hits the UFO, if the aliens crash, you will be awarded a bonus score.





BBC:

Sound Forth Command

by Usman Ali

The Acornsoft version of the programming language FORTH lacks some BASIC commands.

This set of Forth routines implements the SOUND command, and is an example of how to implement other commands.

Screen 1 (SCR # 1) defines SOUND, and screens 2 to 5 use this to play 'The Young Prince and the Young Princess' from Rimsky-Korsakov's Scheherazade.





APPLE

Super Plotter

By S. Shearman

Super Plotter is a hi-res drawing program which makes ingenious use of four cursors, allowing boxes and lines to be easily drawn. You control one cursor, and the other three follow it around the screen. Use A and Z to move up and down, and the left and right arrows to move left and right. SPACE toggles between Plot (where a line is left by the cursor) and Move (where no line is left). RETURN shifts the slave cursors to the main cursor's position.

Other commands are shown on a menu at the bottom of the screen. Pictures are saved to disk as standard 34-sector files, and can be loaded from within another program with:

HGR
PRINT CHR$(4);"BLOAD v pic name v ,A$2000"

```
0  SCALE= 1: ROT= 0
1 MM$ = "<MOVE>"
2 MO = 9:D$ =  CHR$ (13) +  CHR$
     (4)
3 X = 100:Y = 80:XL = X + 5:YL =
     Y - 5
4 OX = X:OY = Y
5 CC = 3
10  FOR I = 768 TO 787: READ D: POKE
     I,D: NEXT
11  POKE 232,0: POKE 233,3
15  TEXT : HOME
20  VTAB 3: INVERSE : HTAB 3: PRINT
     "SUPER PLOT"
30  VTAB 10: PRINT "CLEAR HI-RES
     SCREEN ?";: GET A$
31  NORMAL
40  IF A$ = "Y" THEN  HGR : GOTO
     55
45  IF A$ <  > "N" THEN  GOTO 15
50  GOSUB 5000
55  GOSUB 2500
60  HOME : VTAB 21: PRINT "1=COLO
     UR   2=CLEAR SCREEN 3=SAVE/L
     OAD"
70  PRINT "4=SQUARE   5=FILL SQUA
     RE   6=STEPPING"
80  PRINT "7=DIAGONAL 8=FULL SCRE
     EN   9=QUIT"
90  INVERSE : HTAB 3: PRINT MM$;:
      NORMAL : PRINT " X=";X;" Y=
     ";Y;: VTAB 1: GET AA$
100 I =  PEEK ( - 16336)
110  IF AA$ = "A" THEN  GOSUB 200
     0
120  IF AA$ = "Z" THEN  GOSUB 205
     0
130  IF AA$ =  CHR$ (8) THEN  GOSUB
     2100
140  IF AA$ =  CHR$ (21) THEN  GOSUB
     2150
150  IF AA$ = " " THEN  GOSUB 240
     0
160  IF AA$ =  CHR$ (13) THEN  GOSUB
     2600
170 AA =  VAL (AA$)
180  IF AA  < 1 OR AA  > 9 THEN  GOTO
     60
190  ON AA GOSUB 11000,12000,1300
     0,14000,15000,16000,17000,18
     000,19000
1000  GOTO 60
2000  GOSUB 2500:Y = Y - MO: IF Y
     < 0 THEN Y = 0
2005  IF MM$ = "<MOVE>" THEN  GOSUB
     2500: RETURN
2010  GOSUB 2200: RETURN
2050  GOSUB 2500:Y = Y + MO: IF Y
     > 191 THEN Y = 191
2055  IF MM$ = "<MOVE>" THEN  GOSUB
     2500: RETURN
2060  GOSUB 2200: RETURN
2100  GOSUB 2500:X = X - MO: IF X
     < 0 THEN X = 0
2105  IF MM$ = "<MOVE>" THEN  GOSUB
     2500: RETURN
2110  GOSUB 2200: RETURN
2150  GOSUB 2500:X = X + MO: IF X
     > 279 THEN X = 279
2155  IF MM$ = "<MOVE>" THEN  GOSUB
     2500: RETURN
2160  GOSUB 2200: RETURN
2200  HPLOT X,Y TO OX,OY: GOSUB 2
     500: RETURN
2300  HCOLOR= CC: RETURN
2400  IF MM$ = "<PLOT>" THEN MM$ =
     "<MOVE>": RETURN
2410 MM$ = "<PLOT>"
2420  RETURN
2500 OX = X:OY = Y: XDRAW 1 AT X,
     Y: XDRAW 2 AT XL,Y: XDRAW 2 AT
     XL,YL: XDRAW 2 AT X,YL
2510  RETURN
2600  GOSUB 2500:XL = X:YL = Y: GOSUB
     2500
2610  RETURN
2800  HOME : VTAB 21: PRINT "0/4=
     BLACK 1=GREEN 2=BLUE 3/7=WHI
     TE": PRINT "5=? 6=?INPUT COL
     OUR ";: GET SS$:SS =  VAL (S
     S$): IF SS > 7 THEN  GOTO 28
     00
2810  RETURN
4000  END
5000  POKE  - 16304,0: POKE  - 16
     297,0: POKE  - 16300,0: RETURN

11000  GOSUB 2800:CC = SS
11010  GOSUB 2300: RETURN
12000  GOSUB 2800: HOME : VTAB 22
     : PRINT "ARE YOU SURE ?";: GET
     A$
12010  IF A$ <  > "Y" THEN  RETURN

12020  HCOLOR= SS: HPLOT 0,0: CALL
     62454: HCOLOR= CC: GOSUB 250
     0: RETURN
13000  HOME : VTAB 21: PRINT "1=S
     AVE 2=LOAD 3=CATALOG 4=RETUR
     N"
13010  VTAB 1: GET Z$
13020  IF Z$ = "1" THEN  VTAB 22:
      GOSUB 2500: INPUT "NAME: ":
     FI$: PRINT  CHR$ (4);"BSAVE
     ";FI$;",A$2000,L$1FFF": GOSUB
     2500
13030  IF Z$ = "2" THEN  VTAB 22:
      INPUT "NAME: ";FI$: PRINT D
     $;"BLOAD";FI$;",A$2000": GOSUB
     2500
13040  IF Z$ = "3" THEN  TEXT : HOME
     : PRINT D$;"CATALOG": INPUT
     "HIT RETURN";FI$: GOSUB 5000

13050  IF Z$ = "4" THEN  RETURN
13060  GOTO 13000
14000  GOSUB 2500
14010  HPLOT X,Y TO X,YL TO XL,YL
     TO XL,Y TO X,Y: GOSUB 2500:
     RETURN
15000  GOSUB 2500
15010 J = 1: IF X > XL THEN J =  -
     1
15020  FOR I = X TO XL STEP J
15030  HPLOT I,Y TO I,YL
15040  NEXT : GOSUB 2500: RETURN

16000  HOME : VTAB 22: PRINT "INP
     UT STEPPING DISTANCE = ";: GET
     MO$
16010 MO =  VAL (MO$): IF MO = 0 THEN
     GOTO 16000
16020  RETURN
17000  GOSUB 2500: HPLOT X,Y TO X
     L,YL: GOSUB 2500: RETURN
18000  IF PP = 1 THEN  POKE  - 16
     302,0:PP = 2: RETURN
18010 PP = 1: POKE  - 16301,0: RETUR

19000  TEXT : HOME : END
60000  DATA  2,0,6,0,12,0,56,30
     ,174,101,60,0,7,193,22,13,4,
     193,7,0
60001  DATA  0
```



SPECTRUM

Easy Draw

By Peter Ward

This is a simple picture-drawing program. You move the cursor using keys Y,G,J,N for horizontal and vertical, and T,U,B,M for diagonals. Press V to clear the screen, H to draw a circle, L to load a picture previously stored on tape, and S to save a picture to tape. Pressing keys 0 to 7 changes the colour to that marked on the key.

```
  10 LET c=0: LET x=125: LET y=1
00
  20 PLOT  INK c;x,y
  30 LET x=x+(INKEY$="j" AND x<2
50)-(INKEY$="g" AND x>0)
  40 LET y=y+(INKEY$="y" AND y<1
75)-(INKEY$="n" AND y>0)
  50 IF INKEY$="u" THEN  LET x=x
+1: LET y=y+1
  55 IF INKEY$="1" THEN  GO SUB
1000
  60 IF INKEY$="h" THEN  GO SUB
500
  65 IF INKEY$="s" THEN  GO SUB
2000
  70 IF INKEY$="m" THEN  LET x=x
+1: LET y=y-1
  80 IF INKEY$="b" THEN  LET x=x
-1: LET y=y-1
  90 IF INKEY$="t" THEN  LET x=x
-1: LET y=y+1
 100 IF INKEY$="v" THEN  CLS
 110 IF CODE INKEY$>=46 AND CODE
 INKEY$<=55 THEN  LET c=CODE IN
EY$-48
 120 IF c>7 OR c<0 THEN  LET c=0
 130 GO TO 20
 500 INPUT "Radius:";r
 510 CIRCLE  INK c;x,y,r
 520 RETURN
1000 PRINT "Loading": LOAD ""SC
EEN$
1010 RETURN
2000 INPUT "What Name?";a$
2010 SAVE a$SCREEN$
2020 RETURN
```



BBC

Snake

By C. Fawcett

This is a fast machine code game for a tape-based BBC, although it could be converted to disk with a downloader. There are three programs to type in. Snake sets PAGE to &2000 and CHAINs Snaketitle which loads the code, Snake-S.

First, you should type in the two-line Snake program (listing 1) and SAVE it, then type in Snaketitle (listing 2) and SAVE it after Snake. Then set PAGE to &2000, and type in Snake-S (listing 3), and SAVE it in a different place from the previous two programs. Now RUN it and type *SAVE"SNAKE-M" E00 +800 to SAVE it after Snaketitle.

When you want to load and play Snake, type CH."Snake". Instructions will appear on the screen while the machine code is loading.

```
10 MODE7
20 PAGE=&2000:CHAIN"Snaketi"
```

```
   10 MODE7:VDU31,12,0,157,129,141:PRINT
"Snake !  "CHR$156
   20 VDU156,31,12,1,157,129,141:PRINT"S
nake !  "CHR$156
   30 PRINT'CHR$132"The idea of this gam
e is to guide your"'CHR$132"hungry snake
 around to eat all the"'CHR$132"deliciou
s"CHR$136"blue"CHR$137"hamburgers."'
   40 x=12
   50 PRINTCHR$130SPC(x)"The keys are :-
"'CHR$130SPC(x)"Z _ left"'CHR$130SPC(x)"
X _ right"'CHR$130SPC(x)"/ _ down"'CHR$1
30SPC(x)": _ up"
   60 PRINT'CHR$133"Avoid the bombs arou
nd the board !"'CHR$134"Each time you e
at all food,"'CHR$134"you go up a stage
 which increases"'CHR$134"the rate of gro
wth of the snake"'CHR$134"and the amount
 of bombs and hamburgers."
   70 VDU28,0,24,39,19,12
   80 *L.
   90 VDU157,136,129:PRINT"   Hit (SPACE
 BAR) to continue."
  100 VDU23,128,24,60,126,255,255,0,255,
255
  110 VDU23,129,0,12,16,16,60,126,126,60
,3
  120 REPEATUNTILGET=32
  130 CALL&E00
```

```
   20 REM Copyright C.Fawcett (1984)
   30 REM Make sure PAGE=&2000 before st
arting
   40 REM Dont type \ and REM statements
   50 MODE7:code=&0E00:data=code+&400:x=
data+&400:y=x+&100:w=&FFEE:os=&FFF4
   60 FORp=0TO2STEP2:P%=code:[OPTp
   65 \Initialize game, 4 lives, stage 1
   70 .rgame:LDA#04:STA&74:STA&80:LDA#01
:STA&73:STA&81:LDA#00:STA&72:STA&75
   80 LDA#100:STA&8E:LDA#10:STA&8D
   85 \Main game loop
   90 .start:JSRrestart:JSRgame:LDA&74:B
NEstart:JSRagain:JMPrgame
   95 \Set data for snake going left
  100 .restart:LDA#&FF:STA&76:LDA#&00:ST
A&77:LDA#&13:STA&78:LDA#&10:STA&79
  105 \Set start and end of snake data
  110 LDA#&00:STA&71:LDA#&02:STA&70:LDA#
&14:STAx:LDA#&15:STAx+1:LDA#&10:STAy:STA
y+1:LDX#0
  115 \Set up screen
```

```
  120 .14:LDAdata,X:INX:CMP#&FE:BEQ11:JS
Rw:JMP14
  125 \Draw Snake
  130 .11:LDA#&1F:JSRw:LDAx:JSRw:LDAy:JS
Rw:LDA#&2A:JSRw
  140 LDA#&1F:JSRw:LDAx+1:JSRw:LDAy+1:JS
Rw:LDA#&2A:JSRw:LDA&72:CMP&75:BMIskip:ST
A&75
  145 \Draw bombs and hamburgers
  150 .skip:LDA#128:STA&89:LDX#1:JSRplot
:LDA#129:STA&89:LDX#2:JSRplot
  160 LDA#&11:JSRw:LDA#3:JSRw:RTS
  165 \Main game loop
  170 .game:JSRdelay:LDA#0:STA&7B:STA&7C
:STA&7D:STA&7E:LDA#&81
  175 \Read key
  180 .1:LDY#&9E:LDX#&9E:JSRos:CPX#&FF:B
NEr:LDA#&FF:STA&76:STA&7D
  190 .r:LDY#&BD:LDX#&BD:JSRos:CPX#&FF:B
NEd:LDA#&01:STA&76:STA&7E
  200 .d:LDY#&B7:LDX#&B7:JSRos:CPX#&FF:B
NEu:LDA#&FF:STA&77:STA&7C
```

```
  210 .u:LDY#&97:LDX#&97:JSRos:CPX#&FF:B
NEn:LDA#&01:STA&77:STA&7B
  215 \Both down and up keys pressed ?
  220 .n:LDA&7B:ORA&7C:BEQn2:LDA#0:STA&7
6:BEQn3
  225 \Both left and right keys pressed
  230 .n2:LDA&7D:ORA&7E:BEQn3:LDA#0:STA&
77
  235 \Update head position
  240 .n3:CLC:LDA&76:ADC&78:STA&78:CLC:L
DA&77:ADC&79:STA&79
  245 \Off screen
  250 LDA&78:CMP#1:BMIe:CMP#39:BPLe:LDA&
79:CMP#2:BMIe:CMP#30:BPLe:BMIn4
  255 \If so write message
  260 .e:DEC&74:LDA#0:JSRm:RTS
  265 \Write space at Snakes tail
  270 .n4:LDA#&1F:JSRw:LDX&71:LDAx,X:JSR
w:LDAy,X:JSRw:LDA#&20:JSRw
  275 \Read character at Snakes head
  280 LDA#&1F:JSRw:LDA&78:JSRw:LDA&79:JS
Rw:LDA#&87:JSRos
  285 \If food lengthen tail,If no food
left next stage
  290 CPX#128:BNEt1:LDA&73:ASLA:ASLA:STA
&8A:LDA&71:SEC:SBC&8A:STA&71:DEC&7A:BNEt
1
  300 INC&73:LDA#3:JSRm:RTS
  305 \Collide with rest of snake
  310 .t1:CPX#42:BNEt2:DEC&74:LDA#1:JSRm
:RTS
  315 \Strike a bomb
  320 .t2:CPX#129:BNEt3:DEC&74:LDA#2:JSR
m:RTS
  325 \No collision so write Snakes head
  330 .t3:LDA#42:JSRw
  335 \Store new position
  340 LDX&70:LDA&78:STAx,X:LDA&79:STAy,X
:INC&71:INC&70
  345 \write scores
  350 LDA#&1F:JSRw:LDA#5:JSRw:LDA#0:JSRw
  360 LDA&70:SEC:SBC&71:STA&8A:LDA#&FF:S
EC:SBC&8A:CMP&8A:BPLn5:LDA&8A
  370 .n5:STA&72:JSRdec:LDA#&1F:JSRw:LDA
#15:JSRw:LDA#0:JSRw:LDA&74:JSRsdec
  380 LDA#&1F:JSRw:LDA#21:JSRw:LDA#0:JSR
w:LDA&7A:JSRdec
  390 LDA#&1F:JSRw:LDA#31:JSRw:LDA#0:JSR
w:LDA&73:JSRsdec:JMPgame
  400 .again:LDX#0
  405 \Ask if to play again
  410 .111:LDAdata+&100,X:CMP#&FE:BEQ113
:INX:JSRw:JMP111
  415 \Find best length
  420 .113:LDA&75:CMP&72:BPLwr:LDA&72:.wr
:JSRdec
  430 .k:JSR&FFE0:BCSb:CMP#89:BEQye:CMP#
78:BNEk:BEQb
  440 .ye:RTS
  445 \Stop
  450 .b:BRK:EQUB255:EQUS CHR$22+CHR$7:B
RK
  455 \Purge keyboard buffer
  460 .space:LDA#15:LDX#1:LDY#0:JSRos
  465 \Wait for space bar
  470 .wait:JSR&FFE0:BCSes:CMP#32:BNEwai
t:RTS
  480 .es:BRK:EQUB&FF:EQUS"Game broken":
BRK
  485 \Genarate a random number
  490 .ran:SEC:LDA&81:ADC&84:ADC&85:STA&
80:LDX#4
  500 .18:LDA&80,X:STA&81,X:DEX:BPL18:RT
S
  510 .plot:LDA#&11:JSRw:TXA:JSRw:LDA&73
:ASLA:ASLA:STA&8A:STA&7A
  515 \Find a random number within scree
n coordinates
  520 .16:JSRran:CMP#0:BEQ16:CMP#38:BPL1
6:STA&87
  530 .17:JSRran:CMP#2:BMI17:CMP#29:BPL1
7:STA&88
  540 JSRchar:CPX#&20:BNE16:LDA&89:JSRw:
LDA#8:JSRw:DEC&8A:BNE16:RTS
  545 \Read character on screen
  550 .char:LDA#&1F:JSRw:LDA&87:JSRw:LDA
&88:JSRw:LDA#&87:JSRos:RTS
  555 \Write message A to screen
  560 .m:ASLA:ASLA:ASLA:ASLA:ASLA:TAX:LD
A#&1F:JSRw:LDA#8:JSRw:LDA#15:JSRw
  570 .110:LDAdata+&300,X:CMP#&0D:BEQem:
JSRw:INX:BNE110
  580 .em:LDX#&80:LDA#&1F:JSRw:LDA#5:JSR
w:LDA#31:JSRw
  590 .112:LDAdata+&300,X:JSRw:INX:CMP#&
D:BNE112:JSRspace:RTS
  595 \Delay relative to stage
  600 .delay:LDA#&8:SBC&73:ASLA:ASLA:ASL
A:ASLA:TAX
  610 .x1:LDY#&FF:.y1:DEY:BNEy1:DEX:BNEx
1:RTS
  615 \Convert binary to decimal
  620 .dec:LDX#2:STX&8F
  630 .kx:LDY#&30
  640 .ky:CMP&8C,X:BCCkz:INY:SBC&8C,X:BC
Sky
```

```
  650 .kz:CPY#&30:BNEkw:CPX&8F:BNEkw:LDY
#&20:DEC&8F
  660 .kw:PHA:TYA:JSRw:PLA:DEX:BNEkx:ADC
#&30:JSRw:RTS
  670 .sdec:ADC#&30:JSRw:RTS:]:NEXT
  675 REM error messages
  680 $(data+&300)="You went off the scr
een."
  690 $(data+&320)="You went over your s
nake."
  700 $(data+&340)="You struck a bomb."
  710 $(data+&360)="You finished that lo
t."
  720 $(data+&380)="Press space bar to s
tart again."
  730 RESTORE:FORmem=0TO1:poke=data+mem*
&100:info$=" ":REPEAT:READinfo
  740 IFinfo<>&FF ?poke=info:poke=poke+1
 ELSE READinfo$:$poke=info$:poke=poke+LE
Ninfo$
  750 UNTILinfo$="":?poke=&FE
  760 NEXT:CALLcode:STOP
  770 DATA22,1,19,1,5,0,0,0
  780 DATA12,17,2,30,&FF,"size      lives
   food     stage    "
  790 DATA18,0,1
  800 DATA25,4,16,0,48,0
  810 DATA25,5,240,4,48,0,25,5,240,4,192
,3
  820 DATA25,5,16,0,192,3,25,5,16,0,48,0
  830 DATA23,1,0,0,0,0,0,0,0,0,&FF,""
  840 DATA12,17,3,31,2,5,&FF,"You don't
seem to enjoy eating "
  850 DATA13,10,17,1,&FF,"  blue ",17,3,
&FF,"hamburgers !"
  860 DATA10,10,10,10,13,&FF,"  Your bes
t length was ",17,1
  870 DATA10,10,10,10,13,17,1,&FF,"  Pla
y again ?",31,23,10,&FF,""
```



APPLE

Triangle Solver

By Joseph Albahari

This program computes the sides and angles of a triangle from information given by the user. Enter the available information in the order a,b,c separating each by a comma. Enter unknown sides and angles as a zero.

The user should enter only three numbers, as that is all that is necessary to solve the triangle if it is solvable. When first trying the program, leave out line 10 to make detection of typing errors easier.

```
10  ONERR  GOTO 700
15  REM
17  REM  TRIANGLE SOLVER
20  REM  BY JOSEPH ALBAHARI
22  REM
25  REM
30  HOME
35  GOSUB 1000: REM  DRAW TRIANGL
    E
36  VTAB 1
40 Q = 57.29578: REM  RADIANS TO
    DEGREES
45  PRINT "ANGLES: A,B,C ";
50  INPUT A,B,C
55  PRINT "SIDES: A,B,C ";
60  INPUT A1,B1,C1
70  IF A + B + C = 0 THEN 300
80  IF A + B = 0 OR B + C = 0 OR
    A + C = 0 THEN 400
90  REM  TWO ANGLES & ONE SIDE KN
    OWN
100 Y = 180 - (A + B + C)
101  IF A2 = 0 THEN 110
102  IF A1 > 0 THEN A1 = 0: GOTO
    110
103 B1 = 0
110  IF A = 0 THEN A = Y
120  IF B = 0 THEN B = Y
130  IF C = 0 THEN C = Y
140  IF A1 > 0 THEN  GOSUB 200: GOTO
    5000
150  IF B1 > 0 THEN  GOSUB 170: GOTO
    5000
160  IF C1 > 0 THEN  GOSUB 230: GOTO
    5000
170 A1 = B1 *  SIN (A / Q) /  SIN
    (B / Q)
180  IF Z = 1 THEN Z = 0: RETURN

190 Z = 1
200 C1 = A1 *  SIN (C / Q) /  SIN
    (A / Q)
210  IF Z = 1 THEN Z = 0: RETURN

220 Z = 1
230 B1 = C1 *  SIN (B / Q) /  SIN
    (C / Q)
240  IF Z = 1 THEN Z = 0: RETURN

250 Z = 1: GOTO 170
300  REM  KNOW ALL SIDES BUT NO A
    NGLES
305  DEF  FN R(X) =  ATN ( SQR (1
     - X * X) / X)
310 X = (B1 ^ 2 + C1 ^ 2 - A1 ^ 2
    ) / (2 * B1 * C1)
315  IF X = 0 THEN A = 90: GOTO 3
    30
317  IF X < 0 THEN A = 180 - ( FN
    R( - X)) * Q: GOTO 330
320 A =  FN R(X) * Q
330 X = (C1 ^ 2 + A1 ^ 2 - B1 ^ 2
    ) / (2 * C1 * A1)
335  IF X = 0 THEN B = 90: GOTO 3
    50
337  IF X < 0 THEN B = 180 - ( FN
    R( - X)) * Q: GOTO 350
340 B =  FN R(X) * Q
350 X = (A1 ^ 2 + B1 ^ 2 - C1 ^ 2
    ) / (2 * A1 * B1)
355  IF X = 0 THEN C = 90: GOTO 3
    70
357  IF X < 0 THEN C = 180 - ( FN
    R( - X)) * Q: GOTO 370
360 C =  FN R(X) * Q
370  GOTO 5000: REM  DONE
400  REM  ONE ANGLE & TWO SIDES K
    NOWN
405  IF A > 0 THEN I = 1: IF A1 >
    0 THEN 500: REM  OPPOSITE SI
    DE KNOWN
410  IF B > 0 THEN I = 2: IF B1 >
    0 THEN 500
420  IF C > 0 THEN I = 3: IF C1 >
    0 THEN 500
430  ON I GOTO 440,450,460
435  REM  USE COSINE RULE TO FIND
     THE THIRD SIDE
440 A1 =  SQR (B1 ^ 2 + C1 ^ 2 -
    2 * B1 * C1 *  COS (A / Q)):
     GOTO 300: REM  ALL THREE SI
    DES ARE NOW KNOWN, SO FIND A
    NGLES
450 B1 =  SQR (C1 ^ 2 + A1 ^ 2 -
    2 * C1 * A1 *  COS (B / Q)):
    GOTO 300
460 C1 =  SQR (A1 ^ 2 + B1 ^ 2 -
    2 * A1 * B1 *  COS (C / Q)):
     GOTO 300
500  DEF  FN S(O) = (90 - ( ATN (
     SQR (1 - O * O) / O) * Q)) /
    Q
505 A2 = 1
510  ON I GOTO 515,535,555
515  IF B1 > 0 THEN 520
517 T = C1 *  SIN (A / Q) / A1
518 C =  FN S(T) * Q: GOTO 100
520 T = B1 *  SIN (A / Q) / A1
530 B =  FN S(T) * Q: GOTO 100
535  IF C1 > 0 THEN 540
537 T = A1 *  SIN (B / Q) / B1
538 A =  FN S(T) * Q: GOTO 100
540 T = C1 *  SIN (B / Q) / B1
550 C =  FN S(T) * Q: GOTO 100
555  IF A1 > 0 THEN 560
557 T = B1 *  SIN (C / Q) / C1
558 B =  FN S(T) * Q: GOTO 100
560 T = A1 *  SIN (C / Q) / C1
570 A =  FN S(T) * Q: GOTO 100
700  PRINT : PRINT "  NO SUCH TRI
    ANGLE, RE-ENTER": VTAB 1: GOTO
    40
1000  VTAB 14
1005  PRINT "              A"
1010  PRINT "             /\"
1020  PRINT "            /  \"
1030  PRINT "           /    \"
1040  PRINT "         c/      \b"
1050  PRINT "         /        \"
1060  PRINT "        /          \

1065  PRINT "       /            \
    "
1070  PRINT "     B------------
    C"
1080  PRINT "              a    "
2000  RETURN
5000  REM  ROUND FIGURES TO 4.D.P
    .AND PRINT OUT ANGLES AND SI
    DES
5001  HOME : GOSUB 1000: VTAB 1: REM
     DRAW TRIANGLE
5002 A =  INT (A * 10000) / 10000
    :B =  INT (B * 10000) / 1000
    0:C =  INT (C * 10000) / 100
    00
5003 A1 =  INT (A1 * 10000) / 100
    00:B1 =  INT (B1 * 10000) /
    10000:C1 =  INT (C1 * 10000)
```

```
    / 10000
5005  PRINT "ANGLES ARE:": PRINT
5010  PRINT "A= "A;"  B= "B;"  C=
    "C
5020  PRINT : PRINT
5030  PRINT "SIDES ARE:"
5040  PRINT
5050  PRINT "A= "A1;"  B= "B1;"
    C= "C1
5080  PRINT : GET A$: IF  ASC (A$
    ) = 27 THEN  END
5090  GOTO 30
```

MICROBEE

Centipede

By Robert Douglas

This is a two-player game in which each player must try to force the opponent's centipede into a wall or a centipede tail. Full instructions are included in the program.

Lines 580 and 590 POKE a short routine into place which checks if a specified key has been pressed. This is used by the command USR(15000,"*") in lines 260 to 330.

This program, along with a single player version and another game, is available on cassette for $12 from: Robert Douglas, 22 Arawhata St, Porirua.

```
00100 CLS:GOSUB 580:POKE 257,2
00110 DIM X(1),Y(1),D(1),W(1,4)
00120 CLS:CURS 20,4:INVERSE:PRINT"    C E N
T I P E D E    ":NORMAL:CURS 40,5:PRINT"Two
Player Version"
00130 PRINT "Do you want instructions? <Y or
 N>"
00140 IF USR(15000,25) THEN 490 ELSE IF USR(
15000,14) THEN 150 ELSE 140
00150 A1$=KEY$:CURS 1,8:PRINT "Seed Factor <
0 to 9>?"\"        Fast       Slow"
00160 A1$=KEY$:IF A1$="" THEN 160 ELSE LET S
=INT(VAL(A1$)):IF S<0 OR S>9 THEN 160 ELSE C
LS
00170 E=-1:F=-1
00180 CURS 20:PRINT "C E N T I P E D E":CURS
 0:LORES:PLOT 0,0 TO 0,44 TO 127,44 TO 127,0
 TO 0,0
00190 X(0)=1:Y(0)=23:D(0)=2:X(1)=126:Y(1)=23
:D(1)=4:SET X(0),Y(0):SETX(1),Y(1)
00200 FOR I=0 TO 1:ON D(I) GOTO 210,220,230,
240
00210 Y(I)=Y(I)+1:GOTO 250
00220 X(I)=X(I)+1:GOTO 250
00230 Y(I)=Y(I)-1:GOTO 250
00240 X(I)=X(I)-1
00250 IF POINT(X(I),Y(I)) THEN NEXT: I 350 E
LSE SET (X(I),Y(I)):NEXT I
00260 FOR J=0 TO 5:IF USR(15000,26) THEN LET
 D(0)=3
00270 IF USR(15000,47) THEN LET D(1)=3
00280 IF USR(15000,0) THEN LET D(1)=2
00290 IF USR(15000,19) THEN LET D(0)=2
00300 IF USR(15000,23) THEN LET D(0)=1
00310 IF USR(15000,27) THEN LET D(1)=1
00320 IF USR(15000,43) THEN LET D(1)=4
00330 IF USR(15000,1) THEN LET D(0)=4
00340 NEXT J:GOTO 200
00350 A1$=KEY$:PRINT:PLAY 7;5;4;3;7:PRINT"S
T O P":PLAY 0,16:IF I=1 THEN LET F=F+1:W(0,F
)=-1 ELSE LET E=E+1:W(1,E)=-1
00360 CLS:CURS28,3:PRINT"H U S T L E":PLOT 4
1,36 TO 41,12 TO 90,12 TO 90,36 TO 41,36:PLO
T 41,32 TO 90,32:PLOT 64,36 TO 64,12:PLOT 65
,36 TO 65,12
00370 CURS 23,5:PRINT "Player 1";:CURS 36,5:
PRINT "Player 2";
00380 FOR J=0TO4:CURS 27,7+J:IF W(0,J) THEN
PRINT "X"
00390 IF W(1,J) THEN CURS 39,J+7:PRINT"X"
00400 NEXT J
00410 IF W(0,4) OR W(1,4) THEN 420 ELSE 440
00420 CURS 20,13:PRINT "Player";:IF W(0,4) T
HEN PRINT 1; ELSE PRINT 2;
00430 PRINT " has won":GOTO 460
00440 CURS 1,15:PRINT "Press <SPACE BAR> to
continue";
00450 IF USR(15000,55) THEN CLS:GOTO 180 ELS
E 450
00460 CURS 1,15:PRINT "Another game? <Y or N
>"
00470 IF USR(15000,14) THEN 610 ELSE IF USR(
15000,25) THEN FOR G=0 TO 4:W(0,G)=0:W(1,G)=
0:NEXT G:GOTO 120 ELSE 470
00480+61471
00490 CLS:PRINT:PRINT"The object of this
 game is to force your oponent to ma
ke his or her centipede hit ";
00500 PRINT"either the wall, your"\"tail
 or their own tail. To control the cen
tipedes use the following keys:"
00510 CURS 10,7:PRINT"Player 1";:CURS 45,7:P
RINT "Player 2"
00520 CURS 12,8:PRINT"UP <W>":CURS 47,8:PRIN
T"UP <I>"
00530 CURS 5,10:PRINT"LEFT <A>      <S> RIGH
T":CURS 40,10:PRINT"LEFT <;>      <@> RIGHT
"
00540 CURS 10,12:PRINT"DOWN <Z>":CURS 45,12:
PRINT"DOWN </>"
00550 PRINT:PRINT"  NOTE : If you turn back
on youself you will hit your own tail.
   To avoid this turn 90 degrees at a time."
00560 CURS 30,16:PRINT"Press the <SPACE BAR.
 to continue";
00570 IF USR(15000,55) THEN 120 ELSE 570
00580 RESTORE 590:FOR I=15000 TO 15009:READ
J:POKE I,J:NEXT I
00590 DATA 121,205,10,165,1,0,0,192,11,201
00600 RETURN
00610 CLS:PRINT "Bye Bye":END
```


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COMMODORE 64

Martian Lander

By P.A. Gordon

Your spaceship is sinking fast. It is your responsibility to pilot it through a cavern, and land it as gently as possible. A limited amount of fuel is available. Full instructions are included in the program. The listing uses the normal Commodore 1520 printer codes, but in case any readers are not familiar with these, here they are:

```
S =..... HOME"
S =..... CLR"
Q =..... CURSOR DOWN"
Q =..... CURSOR UP"
J =..... CURSOR RIGHT"
J =..... CURSOR LEFT"
E =..... F1"
T =..... F2"
T =..... F4"          FOR C-64 ONLY"
A =..... F5"
K =..... F6"            A =.... ORANGE
N =..... F7"            W =.... BROWN
L =..... F8"            R =.... LIGHT RED
B =..... BLACK"         Y =.... GRAY 1
F =..... WHITE"         X =.... GRAY 2
M =..... RED"           Z =.... LIGHT GREEN
C =..... CYAN"          Z =.... LIGHT BLUE
_ =..... PURPLE"        T =.... GRAY 3
H =..... GREEN"
H =..... BLUE"
G =..... YELLOW"
R =..... REVERSE
L =..... REVERSE OFF"
```

```
3 REM BY P.A.GORDON 1985
4 REM  CHRISTCHURCH. (1985)
10 PRINT "SCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCMARSI
AN LANDER"
15 PRINT"QQQQQQQQQR                    PRESS AN
Y KEY                 "
20 GETA$:IFA$="" THEN20
25 PRINT "TQQ  LAND YOUR SHIP ON THE MAR
SIAN SURFACE.  REMEMBER, THE SOFTER
30 PRINT "^^^^^^^^^^^^^^^^^^  THE LANDING
. THE MORE POINTS.
35 PRINT "QE111COMMA KEY = LEFT"
36 PRINT
37 PRINT "111FULL-STOP KEY = RIGHT"
38 PRINT
```



```
39 PRINT "111F1 KEY = FULL THRUST"
40 PRINT
41 PRINT"111F7 KEY = HALF THRUST"
45 PRINT"QQQQQQR                    PRESS ANY K
EY                 "
47 U=53248:V0=54296:WA=54283:H=54280
50 GETA$:IFA$="" THEN50
51 POKEV+21,15:POKE2040,192:POKE2041,193
:POKE2042,133:POKE2043,195:POKEV+40,5
52 X=35:Y=60:POKEV+39,1:S=.01:POKEV+41,5
:BH=109:BV=217:BX=232:BY=217:FU=900
53 FORN=12288TO12350:READQ:POKEN,Q:NEXT
54 FORN=12352TO12414:READQ:POKEN,Q:NEXT
56 FORN=12416TO12478:READQ:POKEN,Q:NEXT
57 FORN=12480TO12542:READQ:POKEN,Q:NEXT
60 PRINT "SA"
65 PRINT "QQQQR T  DT          R)      DT
   R)          T
70 PRINT "R      DT    R              DT
  R          T"
75 PRINT "S      T     R              DT
  R          T"
85 PRINT "R      DT    DR             T)
R)          T"
90 PRINT"R       DT    R              T   R
)           T"
95 PRINT "R            T     R         DT
  DR           T"
100 PRINT "R           DT    DR             T
   DR          T"
105 PRINT "R           T     R              DT
  R           T"
110 PRINT "R           T)    R)             T
  R           T"
115 PRINT"R            T)    R)             T)
  R)          T"
120 PRINT"R            T)    R)             T)
  R)          T"
125 PRINT "R           T     R              DT
  DR          T"
130 PRINT "R           DT    DR             T
  R           T"
135 PRINT "R           DT    DR             DT
  DR          T"
140 PRINT "R           T     R              T
  R           T"
145 PRINT "R           T     R              T
  R           T"
150 PRINT "R           T"
155 PRINT "R           T"
```

```
160 POKEV+21,7:POKEV0,15
200 POKEV+2,BH:POKEV+3,BV:POKEV+4,BX:POK
EV+5,BY
210 P=PEEK(197)
222 IFP=4THENY=Y-(S+1):S=S-.02:POKEWA,12
3:POKEWA+2,129:POKEH,10:FU=FU-3
230 IFP=3THENS=S-.05:POKEWA,123:POKEWA+2
,129:POKEH,10:FU=FU-2
240 IFP=42THENX=X-3:Y=Y+(.05*S):FU=FU-1
250 IFP=44THENX=X+3:Y=Y+(.05*S):FU=FU-1
260 IFPEEK(V+31)=1THEN400
270 IFS>3THEN300
280 S=S+.01
290 IFFU<1THEN800
300 Y=Y+S
350 PRINT"SJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJRV
ELOCITY:"INT(20S-2)
355 PRINT JJJJJJJJJJJJJJJJJJJJJJJJJJJJJRTF
UEL:"FU
360 POKEV,X:POKEV+1,Y
362 POKEWA,17:POKEWA+2,17:POKEH,7:POKEH,
12
365 IFPEEK(V+31)=3THEN450
370 IFPEEK(V+31)=5THEN450
375 GOTO210
402 POKE WA,2:POKEWA,0:POKEWA+2,0:POKEH,2
412 POKEWA,123:GOTO212
420 NEXT:IFS<0.45THEN500
430 POKEWA,2:POKEWA+2,0:POKEH,0
432 GOSUB822
450 PRINT"QQQQQ I'M SORRY, EVEN THOUGH Y
OU CRASH
460 PRINT"QQYOUR OBJECTIVE WAS TO CRLAT
470 PRINT"QQIT WAS  S.  U METRES PER
SECOND
472 PRINT"QQAND IT SHOULD BE LESS THAN
.45 METRES PER SECOND.
480 GOTO550
500 FORT=1TO10
501 POKEWA,33:POKEWA+38,33:POKEH,20
502 FORA=1TO20:NEXT
503 POKEWA,0:POKEWA+38,0:POKEH,0
504 FORA=1TO5:NEXT
505 NEXT
509 PRINT"S":POKEV+21,0:PRINT"QQQQQQQQQQ
QQQQQQQQJJJJJJJJJJJJJJJSAFE LANDING!!!"
520 LR=INT(-100*S/(-2))
530 PRINT"QQEYOUR LANDING RATE IS :"LR;
"OUT OF 22."
540 PRINT"Q (1=THE BEST, 22=WORST.)"
550 PRINT"QQ              ANOTHER GAME?  (Y
/N)"
560 GETA$:IFA$=""THEN560
570 IFA$="Y"THENPOKE(V+31),0:RUN
575 IFA$<>"N"THEN560
580 PRINT"SQQQQQQQQQQQQQQQ                THANK
S ANYWAY!!!!!!!
590 GOTO590
800 POKEV+21,14:POKEV+42,7
810 FORZ=1TO10:FORT=1TO10
820 POKEV+6,X:POKEV+7,Y:NEXTT
830 POKEV+23,8:POKEV+29,8
840 FORT=1TO10
845 POKEV0,15:POKEWA,129:POKEWA+4,129:PO
KEH,8
850 POKEV+6,X:POKEV+7,Y:NEXTT
860 POKEV+23,0:POKEV+29,0:NEXTZ
865 X=35:Y=60:POKEV,X:POKEV+1,Y
867 POKEV0,0:POKEWA,0:POKEWA+4,0:POKEH,0
870 IFQ=1THEN460
880 GOTO550
1055 DATA0,0,0,0,0,0,0,0,0,15,224,0,16,1
6,0,16,16,0,32,8,0,32,8,0,63,248,0
1056 DATA191,250,0,255,254,0,191,250,0,1
7,16,0,19,144,0,39,200,0
1057 DATA32,8,0,112,28,0,0,0,0,0,0,0,0,0
,0,0,0
1065 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1070 DATA255,255,255,255,255,255,255,255
,255,255,255,255,0,0,0,0,0,0,0,0,0,0,0
,075 DATA2,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1077 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1080 DATA255,255,255,255,255,255,255,255
,255,255,255,255,0,0,0,0,0,0,0,0,0,0,0
1085 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1090 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1100 DATA0,0,0,32,0,0,0,0,0,64,0,4,0,3
2,0,4,0,0,0,0,32,32,0,0,0,0,0,16,64
1110 DATA0,16,0,2,0,0,0,0,2,0,32,32,0,4,0,
64,0,0,0,0,0,0,0,68,0,0,0,0,32,0,0,0,0,2
```

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Hangman

The words in the data statements can be changed so long as 100 words are in the list



```
10 CLS
20 SCREEN 1,3
30 COLOR 15,1,1
40 LOCATE 80,90
50 PRINT "  BRIDGER HANGMAN"
60 FOR I= 1 TO 500:NEXT I
70 CLS:PLAY"t250","t250","t2
50"
80 LINE (128,1)-(255,192),4,
BF
90 LINE (128,160)-(252,168),
2,BF
100 LINE (152,44)-(156,160),
1,BF
110 LINE (152,44)-(216,48),1
,BF
120 LINE (214,44)-(214,76),1
130 CIRCLE(214,84),8,8
140 LINE(212,92)-(216,124),1
0,BF
150 LINE (136,158)-(152,144)
,1
160 LINE (156,144)-(172,158)
,1
170 LINE (156,64)-(172,48),1
180 LINE (212,100)-(200,112)
,10
190 LINE (216,100)-(228,112)
,10
200 LINE (212,124)-(200,140)
,10
210 LINE (216,124)-(228,140)
,10
220 LINE (214,80)-(214,86),1
0
230 CIRCLE(210,83),1,1
240 CIRCLE(218,83),1,1
250 CIRCLE(214,92),3,8,.5,2.
64
260 FOR M= 1 TO 999:NEXT M
270 LINE(128,1)-(255,192),4,
BF
280 LOCATE 10,10
290 PRINT " Letters used so
far"
300 REM select word
310 AW$=""
320 RN=RND(-TIME)
330 RN=INT(RN#100) + 1
350 FOR J= 1 TO RN
360 READ AW$
370 NEXT J
380 BW$=AW$
390 LW=LEN(AW$)
400 FOR P= 1 TO LW
410 LOCATE 10+(P#12),100:PRI
NT" "
420 NEXT P
430 LH=0:PR=30:PC=6
440 AC$="ABCDEFGHIJKLMNOPQRS
TUVWXYZ"
450 AS$="abcdefghijklmnopqrs
tuvwxyz"
460 FOR K= 1 TO LW+26
470 LINE(10,150)-(120,192),3
,BF
480 LOCATE 11,160
490 PRINT " Enter next lette
r"
500 Z$=""
510 Z$=INKEY$:IF LEN(Z$)=0 T
HEN GOTO 510
520 LI=0
530 FOR I= 1 TO 26
540 IF Z$=MID$(AC$,I,1) THEN
 Z$=MID$(AS$,I,1)
550 IF Z$=MID$(AS$,I,1) THEN
 LI=1
560 NEXT I
570 LOCATE 30,170
580 PRINT Z$
590 IF LI <>0 THEN GOTO 670
600 LINE (10,150)-(124,192),
12,BF
610 LOCATE 10,160
620 PRINT"  "; Z$;" is NOT i
n the "
630 PRINT "      alphabet":PR
INT
640 PRINT "      TRY AGAIN"
650 FOR M= 1 TO 2500:NEXT M
660 GOTO 470
670 PC=PC+12
680 IF PC>100 THEN PC=10:PR=
PR+15
690 LOCATE PC,PR
700 PRINT Z$
710 LF=0
720 FOR M= 1 TO LW
730 IF Z$=MID$(AW$,M,1) THEN
 LF=M:MID$(AW$,M,1)="0":GOTO
 750
740 NEXT M
750 IF LF=0 THEN LH=LH+1 ELS
E GOTO 800
760 W1$="o2gecc":W2$="o2eco1
aa"
770 PLAY W1$,W2$
780 ON LH GOSUB 970,990,1010
,1030,1050,1070,1090,1110,11
30,1150,1170,1190,1210,1230,
1250,1270,1290
790 NEXT K
800 LF=10+(LF#12):PS$="o5ce-
ge-c"
810 PLAY PS$:LOCATE LF,98:PR
INT Z$
820 FI=0
830 FOR N= 1 TO LW
840 IF MID$(AW$,N,1)<>"0" TH
EN FI=1
850 NEXT N
860 IF FI=1 THEN GOTO 790
870 LINE(1,125)-(130,192),8,
BF
880 C1$="t250o5ccdco4bo5cco4
bagfo5ccdco4bo5c"
890 C2$="t250o5eefedeedco4ba
o5eefede"
900 C3$="t250o6ccdco5bo6cco5
bagfo5ccdco4bo5c"
910 PLAY C1$,C2$,C3$
920 LOCATE 5,130:PRINT" CONG
RATULATIONS !!!"
930 LOCATE 5,150 :PRINT"  yo
u have guessed"
940 LOCATE 5,170:PRINT"   co
rrectly"
950 FOR N= 1 TO 3500:NEXT N
960 END
970 LINE (128,160)-(252,168)
,2,BF
980 RETURN
990 LINE (152,44)-(156,160),
1,BF
1000 RETURN
1010 LINE (152,44)-(216,48),
1,BF
1020 RETURN
1030 LINE (214,44)-(214,76),
1
1040 RETURN
1050 CIRCLE(214,84),8,8
1060 RETURN
1070 LINE(212,92)-(216,124),
10,BF
1080 RETURN
1090 LINE (136,158)-(152,144
),1
```

(Continued on page 66)

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(Continued

```
1100 RETURN
1110 LINE (156,144)-(172,158
),1
1120 RETURN
1130 LINE (156,64)-(172,48),
1
1140 RETURN
1150 LINE (212,100)-(200,112
),10
1160 RETURN
1170 LINE (216,100)-(228,112
),10
1180 RETURN
1190 LINE (212,124)-(200,140
),10
1200 RETURN
1210 LINE (216,124)-(228,140
),10
1220 RETURN
1230 LINE (214,80)-(214,86),
10
1240 RETURN
1250 CIRCLE(210,83),1,1
1260 RETURN
1270 CIRCLE(218,83),1,1
1280 RETURN
1290 CIRCLE(214,92),3,8,.5,2
.64
1300 LINE (10,140)-(124,192)
,12,BF
1310 LOCATE 5,130:PRINT" <<
BAD LUCK >>"
1320 LOCATE 5,150 :PRINT"
the word is"
1330 LOCATE 20,170:PRINT BW$
1340 F1$="v10o112cr64c214e-1
4d":F2$="v10o212cr64c214e-14
d":F3$="c2r64c"
1350 PLAYF1$+F1$,F2$+F2$:PLA
YF3$,F3$:FOR N= 1 TO 3500:NE
XT N
1360 END
1370 DATA open,zero,knock,so
ft,caught,suddenly,young,yel
low,doctor,kept,gnaw,build,f
rightened,notice,night,green
,red,brown,black,blue,pink,h
undred
1380 DATA boy,girl,soccer,te
nnis,green,purple,cold,tempe
r,sadly
1390 DATA where,under,over,t
able,chair,bedroom,win,lose,
money,deceive,is,why,dinner,
here,racer
1400 DATA hard,softly,plane,
salt,pepper,human,world,fore
ign,because
1410 DATA walk,think,until,c
lothes,fence,trouble,heard,t
hirsty,hand,brother,sister
1420 DATA after,day,will,dow
n,five,where,like,he,not,the
y,helped,played,this,looked,
she,airport,little,with,goes
,helping,get,big,meet,playin
g,today
1430 DATA surprise,word,sent
ence,hope,cat,dog,mother,fat
her,mummy,daddy,mum,dad,brot
her,sister,teacher,televisio
n,gun,forest,bush,tree,invad
er,alien,onion
1440 DATA carrot,banana,appl
e,orange,tea,tee,fejioa,gyps
y,paua,shell,six,ostrich,fiv
e,one,two,three,four,eight,n
ine,ten
```

VIC 20

Death Mission

By Julian Murphy

In Death Mission, for the unexpanded VIC, you are in a spaceship which is slowly falling towards an abandoned city on the planet below. Your mission is to land safely by destroying the city, using bombs which you release by pressing the SHIFT key.

The bomb's speed and trajectory can be controlled by holding down the SHIFT key. If you successfully complete a mission, the game begins again, with a larger city.

Control characters are printed in the listing with a line beneath them.

```
1 REMxxxxxxxxxxxxxxxxx
2 REMxxDEATH MISSIONxx
3 REMxxxxxxxBYxxxxxxx
4 REMxxJULIAN MURPHYxx
5 REMxxxxxxxxxxxxxxxxx
10 POKE36879,110:CH=7:R=1
20 GOSUB1000
25 PRINT"S":POKE36879,110:GOSUB1300
30 GOSUB900
40 FOR MOVE=0TOMAXSTEPINC
50 S=PEEK(653)
60 IFSANDF=0THENGOSUB800
70 IFS=0ANDF=1THENF=2
100 ONFGOSUB400,510,600
150 IFFANDB>=8185THENGOSUB700
200 PRINT"SRESCORE"SC;
210 IFF=0THENPRINTTAB(16)"FIRE!"
300 NEXT MOVE:GOTO30
400 REMxxUPDATE BOMBxx
410 POKEB,32:B=B+1:P=PEEK(B)
420 IFP=30THEN700
430 POKEFNC(B),13:POKEB,27
440 Z=B-7680/22:POKES2,220+22x(Z-INT(Z))
450 U=U+A
490 RETURN
510 U=U-D
520 POKEB,32
530 IFU<=0THENF=3:RETURN
540 B=B+1:IFPEEK(B)=30THENSC=SC+5:GOTO70
0
550 POKEFNC(B),5:POKEB,31
560 POKES2,200+UAND255
590 RETURN
600 REMxxxxxDROPxxxxxx
610 POKEB,32
620 B=B+22:IFPEEK(B)=30THENSC=SC+10:GOTO
700
640 POKEFNC(B),5:POKEB,33
690 RETURN
700 REMxxxEXPLOSIONxxx
710 POKES1,0:POKES2,0:POKES3,0:POKES4,20
1
720 POKEFNC(B),2:POKEB,34
730 FORI=1TO100:NEXT
740 POKES4,0
750 POKEB,32
780 F=0
790 RETURN
800 REMxxxxLAUNCHxxxxx
810 POKES3,220:PRINT"S"TAB(16)"
820 B=X+22
840 POKES3,PEEK(S3)-10
850 POKEB,32
860 B=B+22:POKEFNC(B),5:POKEB,31
880 POKES3,0:F=1
890 RETURN
900 REMxxxMOVE SHIPxxx
910 POKEX,32
920 X=X+1
930 IFPEEK(X+1)=30THEN2000
940 POKEX,28
950 POKEFNC(X+1),13:POKEX+1,29
960 IFX=8134THEN3000
999 RETURN
1000 REMxxxxSET UPxxxx
1010 PRINT"Cs":POKE36879,110
1020 POKE36878,44
1030 POKE51,0:POKE52,28:POKE55,0:POKE56,
28
```



```
1040 FORI=27x8TO7+8x(27+7)
1050 READA:POKEI+7168,A:NEXT
1100 DATA32,32,40,250,250,40,32,32
1110 DATA0,3,10,43,191,191,42,10
1120 DATA0,192,160,232,254,254,168,160
1130 DATA126,126,66,66,126,126,66,66
1140 DATA48,48,60,63,63,60,48,48
1150 DATA0,0,0,0,0,0,0,0
1160 DATA0,0,126,126,60,60,24,24
1170 DATA0,68,16,56,16,0,68,0
1300 REMxSHIP & CITYxx
1310 A=1:D=2
1320 X=7701
1330 MAX=1:INC=1
1360 CH=CH+1
1370 CW=10
1380 CC=8175
1400 FORI=0TOCW
1410 P1=CC-I:P2=CC+I
1420 FORJ=0TOCH-I
1430 POKEP1-22xJ,30:POKEP2-22xJ,30
1440 NEXTJ,I
1500 DEFFNC(X)=X+30720
1510 DEFFNR(X)=XINT(RND(1)xX)
1600 S1=36874:S2=S1+1:S3=S2+1:S4=S3+1:Z=
36878
1700 POKE36869,255
1999 RETURN
2000 REMxxxFAILURExxxx
2010 POKES1,200:POKES2,0:POKES3,0:POKES4
,0:POKE36879,42
2020 POKEX,32:POKEX+1,32
2030 X=X+22:IFX>=8185THEN2070
2040 POKEFNC(X),13:POKEX,28
2050 POKEFNC(X+1),13:POKEX+1,29
2060 GOTO2020
2070 FORI=1TO50
2080 FORJ=-1TO1
2090 POKE36864,PEEK(36864)+J:POKE36865,P
EEK(36865)-J
2100 NEXTJ,I
2110 POKES1,0:POKE36879,8
2115 PRINT"S"
2120 PRINT"R       YOU FAILED"
2130 FORI=1TO200:NEXT
2140 PRINT"QRHIT A KEY TO TRY AGAIN"
2142 PRINT"EROQQQQQ       SCORE";SC
2150 POKE298,0:WAIT198,1:POKE198,0
2160 RUN
2888 REMxxxMISSIONxxxx
2999 REMxxCOMPLETEDxxx
3000 POKE36879,8:R=R+1:PRINT"S":SC=SC+15
0
3010 PRINT"R     YOU SUCCEEDED"
3020 PRINT"RQ-BUT WILL YOU"
3030 PRINT"R  SUCCEED THIS TIME"
3040 PRINT"REQQQQ       SCORE";SC
3050 PRINT"R=QQ   HIT A KEY TO PLAY"
3060 PRINT"R      ROUND   ;R
3070 GETA$:IFA$=""THEN3070
3080 GOTO25
```


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HAND-HELD

Germ Warfare

By R. Gibberd

This game for the Sharp PC1251 should run on other models, except that the screen addresses may have to be altered, since the program uses POKEs for the graphics.

There are five types of germs, two of which are good and three of which are evil. The good guys have starry eyes and should be injected using the decimal point button. The bad germs should be fired at with the minus button. If you inject a bad germ, an invasion occurs and three goodies die.

```
    GERM WAREFARE
 5:WAIT 80: PRINT "
     GERM WARFARE"
10:CLEAR :M=50:A=9:
   INPUT "SKILL <1(FST)
   -10(SLW)> ";M:M=M*7:
   A=9: RANDOM
15:DIM Q$(1)*17,T$(5),U
   $(1)*17
18:U$(1)="-------------
   ----"
20:Q$(1)="
          "
22:T$(1)="(*J*)"
24:T$(2)="(*Y*)"
26:T$(3)="(+J+)"
28:T$(4)="(0<0)"
30:T$(5)="(-.-)"
40:WAIT ABS (M): PRINT
   ""
45:I= RND 5:E=I+ RND 12
50:PRINT "."; LEFT$ (Q
   $(1),E);T$(I)
55:O=0
60:W$= INKEY$
65:IF W$ GOSUB 200:R=R+
   1: GOTO 90
70:IF O<>1 LET O=1:
   GOTO 60
80:R=R+1: IF S>8 LET M=
   M-2:R=R-1
85:IF S>10 PAUSE "BONUS
   ":R=R-1:B=B+1
90:IF R<=15 GOTO 40
95:PAUSE "       GAME O
   VER"
100:WAIT : PRINT "YOUR S
   CORE IS "; INT ((S+B
   )*100-.2*M)
110:INPUT "NEXT GAME? (Y
   /N) ";Z$
120:IF Z$="Y" GOTO 5
130:IF Z$="N" END
140:GOTO 110
200:REM **FIRE??**
210:IF W$="." GOSUB 400:
   GOTO 240
220:IF W$="-" GOSUB 300:
   GOTO 260
230:S=S-1:A=A-1: GOTO 28
   0
240:IF I<3 LET S=S+2:
   PAUSE "          THANK
   S": PAUSE "     I NEE
   DED THAT": RETURN
250:GOSUB 500:S=S-2:A=A-
   3: GOTO 280
260:IF I<3 LET S=S-2:A=A
   -1: PAUSE "
    UGG ! !": GOTO 280
270:S=S+2: RETURN
280:PAUSE "       MEN LEF
   T : ";A
```



```
290:IF A<=0 PRINT "
     GAME OVER": GOTO 1
   00
295:RETURN
300:REM **YOU ATTACK**
320:WAIT 20: BEEP 1
350:PRINT "."; LEFT$ (U
   $(1),E);T$(I)
370:PRINT "."; LEFT$ (Q
   $(1),E); CHR$ 95;
   CHR$ 95; CHR$ 95;
   CHR$ 95
380:WAIT M
390:RETURN
400:REM **IMMUNISATION**
410:RESTORE : BEEP 2
420:READ C,D,E,F,G,H,N,J
   ,K
440:PRINT "     )    )--
   -";T$(I)
445:CALL &11E0: FOR Y=1
   TO 4
447:POKE C,0,0,0,0,0
450:POKE D,0,65,127,127,
   0: POKE E,28,28,28,2
   8,28: POKE F,28,28,2
   8,28,28: POKE G,28,2
   8,28,28,28
460:POKE H,28,28,28,127,
```



```
   127: POKE N,127,127,
   127,127,127: POKE J,
   127,127,127,127,127
470:POKE K,127,127,127,1
   27,127: POKE L,127,1
   27,127,127,127
480:C=D:D=E:E=F:F=G:G=H:
   H=N:N=J:J=K:K=0
485:NEXT Y: CALL &11E5
490:RETURN
500:REM **ENEMY ATTACK**
510:WAIT 15: PAUSE "
      OH NO!": BEEP 3:
   PAUSE "      INVASIO
   N!!"
530:PRINT T$(I);"=)(*J*)
   (*Y*)(*J*)"
540:CALL &11E0
550:FOR J=1 TO 15
560:READ D
570:POKE D,30,121,63,121
   ,30
580:NEXT J
585:CALL &11E5
590:RETURN
800:REM **DATA**
810:REM *INJECT. DATA.*
820:DATA &F800,&F805,&F8
   09,&F80F,&F814,&F81E
   ,&F823,&F828,&F82D
830:REM *INVADE DATA*
840:DATA &F823,&F828,&F8
   2D,&F832,&F837,&F877
   ,&F872
850:DATA &F86D,&F868,&F8
   63,&F85E,&F859,&F854
   ,&F84F,&F84A
```


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SANYO MBC-550:
Dogfight

by Chris Miller

This is a 'shoot-em-up' game where you have to attack enemy aeroplanes before they shoot you. As you progress the game gets harder and faster.

The game contains strange sound effects, and full instructions.

You can obtain this game and two others by sending $5 and a formatted disk to Chris Miller, 23 Haronga Road, Gisborne.

```
2 COLOR 0,1:CLS:SYMBOL(100,50),"DOGFIGHT
",5,4,0:SYMBOL(110,55),"DOGFIGHT",6,4,3:
SYMBOL(471,123),"DOGFIGHT",6,4,0,2:SYMBO
L(481,128),"DOGFIGHT",6,4,3,2:LINE(0,0)-
(639,199),,3,B:LINE(90,40)-(491,138),,3,B:
BF=2:DN=50
3 SYMBOL(50,160),"BY CHRIS MILLER",4,2,0
:SYMBOL(55,162),"BY CHRIS MILLER",4,2,3:
DIM BS(100),NP(100):GOSUB 1500:PUT(300,1
40),NP:FOR Q=95 TO 445 STEP 50:PUT(Q,140
),BS:NEXT:FOR Q=1 TO 2000:NEXT:CLS:GOSUB
 500
4 CLS:DIM NT(24,5),TG(24,5):GET(300,100)
-(320,110),NT:LINE(300,100)-(320,110),0,
B:LINE(300,105)-(320,105),0:LINE(310,100
)-(310,110),0:GET(300,100)-(320,110),TG:
COLOR 2,0
5 CLS:LINE(0,0)-(639,199),3,B:LINE(79,19
)-(561,141),1,BF:CIRCLE(300,170),40:LINE
(260,170)-(340,170):PAINT(300,171):SYMBO
L(286,175),"FUEL",1,1,0:SYMBOL(250,165),
"E              F",1,1:LINE(300,169)-(330,1
67),1:SYMBOL(420,150),"DAMAGE:",2,1
10 FOR Q=400 TO 550 STEP 15:CIRCLE(Q,165
),5,,,,3:NEXT:SYMBOL(20,150),"HITS:",2,1
:LOCATE 21,4,1:PRINT HT:PUT(300,100),TG:
DAM=550:X=300:Y=100:O=300:P=40:TIME$="00
:00:01":FA=330:FD=167:LOCATE 2,10,1:PRIN
T"SCORE"SC:SYMBOL(20,170),"SHOTS:",2,1
15 PUT(X,Y),TG,AND:IF RIGHT$(TIME$,2)="0
0"OR RIGHT$(TIME$,2)="30" THEN GOSUB 300
0 ELSE IF INT(RND*DN)=0 THEN GOSUB 4000
16 LOCATE 2,60,1:PRINT TIME$;:Q$=INKEY$:I
F Q$="" THEN 30
20 PUT(X,Y),NT:IF Q$="8"AND Y>20 THEN Y=
Y-10 ELSE IF Q$="5"AND Y<130 THEN Y=Y+10
 ELSE IF Q$="4"AND X>80 THEN X=X-20 ELSE
 IF Q$="6"AND X<540 THEN X=X+20 ELSE IF
Q$=" "THEN PUT(X,Y),TG:OUT &H38,255:LINE
(X+10,140)-(X+10,Y+10),3:GOSUB 1000
30 PUT(O,P),NP:O=O-SP:P=P-(SP/2):IF O<82
 THEN O=520 ELSE IF P<21 THEN P=130
35 PUT(O,P),BS:GOTO 15
500 SYMBOL(60,10),"DO YOU WANT INSTRUCTI
ONS?  (Y/N)",2,1
510 X$=INPUT$(1):IF X$="Y"OR X$="y" THEN
 600 ELSE IF X$<>"N"AND X$<>"n" THEN OUT
 &H38,255:OUT &H38,255:GOTO 510
520 RETURN
600 LOCATE 10,10:PRINT"   YOU ARE IN A P
LANE  FLYING OVER  ENEMY TERRITORY,  YOU
R"
610 PRINT TAB(10)"MISSION TO SHOOT DOWN
AS MANY  OF THE  ENEMY AS  POSSIBLE."
620 PRINT TAB(10)"IF YOU HIT YOUR TARGET
,  YOU LL  GET ANOTHER ONE THAT WILL"
630 PRINT TAB(10)"APPEAR RANDOMLY ON THE
 SCREEN.  AFTER YOU'VE  SHOT DOWN 50"
640 PRINT TAB(10)"PLANES, YOU'LL GRADUAT
E ONTO THE NEXT ROUND  -  HARDER AND"
650 PRINT TAB(10)"FASTER THAN BEFORE - A
S WELL AS GAINING A FREE MAN."
660 PRINT TAB(10)"  OCCAISIONALY YOU WIL
L BE DAMAGED BY ENEMY FIRE AND EVERY"
670 PRINT TAB(10)"30 SECONDS YOUR FUEL D
ROPS. IF YOU RUN OUT OF FUEL OR YOUR"
680 PRINT TAB(10)"DAMAGE REACHES 10, YOU
 LOSE A LIFE."
690 PRINT TAB(10)"MOVE USING THE UNSHIFT
ED CURSOR KEYS, WITH THE SPACE BAR TO"
700 PRINT TAB(10)"FIRE.          G O O D
   L U C K ! ! !":X$=INPUT$(1):RETURN
1000 SH=SH+1:LOCATE 24,4:PRINT SH
1001 OUT &H38,255:LINE(X+10,140)-(X+10,Y
+10),1:OUT &H38,255:IF ABS(X-O)<30 AND A
BS(Y-P)<10 THEN PUT(O,P),NP:O=INT((RND*2
0)+7)*20-10:P=INT((RND*5)+2)*20-10:HT=HT
+1:LOCATE 21,4,1:PRINT HT:SC=SC+B+SP:LOC
ATE 2,10,1:PRINT"SCORE"SC:IF HT=50 THEN
1015
1010 RETURN
1015 DAM=550:FOR Q=400 TO 550 STEP 15:PA
INT(Q,165),0,3:NEXT:LV=LV-1
1020 COLOR 0,1:R=R+1:HT=0:SP=SP+2:DN=DN-
2:PUT(X,Y),NT:PUT(O,P),NP:X=300:Y=100:O=
300:P=40:LOCATE 10,30:PRINT"ROUND"R+1:FO
R Q=1 TO 1000:NEXT:LOCATE 10,30:PRINT"
      ":COLOR 2,0:LINE(300,169)-(FA,FD),
0:FA=330:FD=167
1030 RETURN
1500 READ EXA,EXD,N,C
1510 FOR Q=1 TO N:READ X1,Y1,X2,Y2,TP$:L
INE(EXA+X1,EXD+Y1)-(X2+EXA,Y2+EXD),C,BF:
NEXT
1520 GET(300,140)-(340,150),BS:GET(350,1
40)-(390,150),NP:RETURN
2000 DATA 300,140,9,0,18,4,22,7,L,19,2,2
1,1,L,0,3,40,3,L,0,7,40,7,L,18,7,18,9,L,
22,7,22,9,L,15,5,25,5,L,3,3,3,7,L,37,3,3
7,7,L
3000 LINE(300,169)-(FA,FD),0:FA=FA-4:IF
FA>299 THEN FD=FD-2 ELSE FD=FD+2
3010 LINE(300,169)-(FA,FD),1:IF FA<270 T
HEN 5000 ELSE IF FA<280 THEN SYMBOL(250,
165),"E",1,1,7:OUT &H38,50:RETURN ELSE R
ETURN
4000 FOR Z=1 TO 10:OUT &H38,0:FOR Q=1 TO
 20:NEXT Q,Z:PAINT(DAM,165),2,3:DAM=DAM-
15:IF DAM<400 THEN 5000 ELSE RETURN
5000 FOR Q=1 TO 1000:NEXT:OUT &H38,50:OU
T &H38,50:OUT &H38,50:LV=LV+1:IF LV<3 TH
EN PUT(O,P),NP:PUT(X,Y),NT:OUT &H38,200:
OUT &H38,100:OUT &H38,0:FOR Q=1 TO 20:OU
T &H38,50:NEXT:COLOR 2,0:GOTO 5 ELSE COL
OR 0,1:CLS:SYMBOL(50,50),"GAME OVER",5,3
,0
5010 SYMBOL(55,55),"GAME OVER",5,3,2:SYM
BOL(100,100),"DO YOU WANT TO PLAY AGAIN?
",2,1,3:Q$=INKEY$:Q$=INPUT$(1):IF Q$="y"
OR Q$="Y"THEN RUN ELSE END
```

ZX81:
Big Characters

by Anthony Luton

This machine code routine for the 16K ZX81 will produce enlarged characters on the screen.

First type in the Basic program listing (Listing 1) and enter a line 1 REM containing at least 108 x's.

RUN the program, and when it asks for the address, enter 16516. Enter the hex dump data (Listing 2), and then POKE 16510,0 to make the line number of the REM statement 0. Delete the hex laoder program and SAVE line 0 on tape.

To print a big character, POKE 16417 with the code of the character (0-63). You can print the character in inverse with POKE 16562,128.

To set it back to normal, POKE 16562,0.

To set the place on the screen where the character is printed, POKE 16507 with column number and 16508 with the line number. LET XUSR 16579 will print the character.

Listing 3 is a Basic program which will print a message held in A$ in large lettering.

Have a look at how that program works if you want to know more about how to use the routine.



```
  5 GOTO 100
 10 FOR A=1 TO LEN A$-2 STEP 3
 15 PRINT A$(A TO A+2)
 20 LET B=CODE A$(A+1)+16*CODE
A$(A)-476
 25 LET S=S+B
 30 POKE P,B
 35 LET P=P+1
 40 NEXT A
 45 RETURN
100 PRINT "ADRESS?"
105 INPUT P
110 LET L=0
115 PRINT "ENTER LINE ";L
117 LET S=0
120 INPUT A$
125 GOSUB 10
130 PRINT "ENTER CHECK"
135 INPUT M
140 IF M=S THEN GOTO 200
145 PRINT "THE CHECK DOES NOT M
ATCH,"
150 LET P=P-INT (LEN A$/3)
155 GOTO 115
200 LET L=L+1
210 CLS
215 GOTO 115
```

0-87	87	6F	26	00	29	11	00	477
1-1E	19	0E	04	56	23	5E	23	323
2-E5	2A	3C	40	06	04	AF	CB	783
3-10	17	0F	CB	10	17	17	CB	528
4-10	17	0F	CB	12	17	17	CB	525
5-5F	28	02	EE	8F	C6	80	77	963
6-23	10	E3	11	1D	00	19	22	383
7-3C	40	E1	0D	20	CE	C9	ED	1036
8-48	78	40	79	FE	1D	D0	78	994
9-FE	15	D0	87	87	87	6F	26	1037
10-00	29	29	78	81	3C	85	6F	535
11-30	01	24	ED	5B	0C	40	19	514
12-22	3C	40	3A	21	40	CD	84	650
13-40	C9							265

```
  5 GOTO 110
 10 POKE 16507,0
 12 POKE 16508,0
 14 FOR A=1 TO LEN A$
 15 POKE 16507,(PEEK 16507+4) A
ND PEEK 16507<28
 20 POKE 16417,CODE A$(A)
 30 RAND USR 16579
 40 IF PEEK 16507=28 THEN POKE
16508,(PEEK 16508+4) AND PEEK 16
508<20
 50 NEXT A
 55 PAUSE 100
 57 CLS
 60 RETURN
 90 LET A$=""
 92 POKE 16507,0
 93 POKE 16508,0
 95 POKE 16562,0
110 REM [redacted]
120 LET A$=""
130 FOR A=0 TO 63
140 LET A$=A$+CHR$ A
150 NEXT A
152 CLS
155 POKE 16562,0
160 POKE 16562,0
170 GOSUB 10
180 POKE 16562,128
190 GOSUB 10
200 REM [redacted]
202 POKE 16562,0
205 LET A$=" TYPER [redacted] USE
THE ARROW KEYS TO MOVE."
210 GOSUB 10
225 LET L=0
230 LET C=0
235 POKE 16508,L
240 POKE 16507,C
243 POKE 16417,0
245 LET A$=INKEY$
260 POKE 16562,128
265 RAND USR 16579
270 POKE 16562,0
275 RAND USR 16579
280 IF A$="" THEN GOTO 245
285 IF A$>CHR$ 63 THEN GOTO 325
295 POKE 16417,CODE A$
296 RAND USR 16579
298 LET C=C+4
300 IF C<29 THEN GOTO 240
310 LET L=L+4
320 GOTO 230
325 LET C=C+4*((A$=CHR$ 115)-(A
$=CHR$ 114))
330 LET L=L+4*((A$=CHR$ 113)-(A
$=CHR$ 112))
340 GOTO 235
```

JX software 'serious'

By Richard Gorham

To coincide with the recent unveiling of their new JX computer, IBM NZ has also released a range of software specifically for use with the machine.

The quantity, and probably more importantly, quality of the software announced is proof of the seriousness with which IBM intends to market the machine.

Each of the more than 100 packages is presented in a large plastic box similar to an overgrown audio cassette jacket, and shrink-wrap sealed for perfect "freshness".

The package will typically contain one or more of the JX's sensible 3.5 inch diskettes encoded with the software, together with comprehensive documentation in paperback-bound A5 format.

Over 95 percent of the packages will run on the standard 128k single 3.5 inch drive JX. The exceptions require either more memory, usually 256k (although one package does require 384k), or extra peripherals specific to the application (such as a host PC- XT in the case of the cluster program).

The applications covered range from the surprisingly comprehensive education software to the inevitable spreadsheet, work-processor, and other business programs, through the program development area (with no less than seven languages supported), and into the domestic "entertainment" area.

Co-operative

Most of the packages are IBM-sourced with nine being marketed in conjunction with the original software company.

Examples of this co-operative approach are the release of Multiplan on diskette, and the stated "imminent" release of Lotus 1-2-3 on JX ROM cartridge.

A large quantity of the software is aimed at the educational market, with a variety of primary, intermediate and senior levels being addressed.

The JX machine provided for review last month was delivered with five educational packages, and four packages aimed at the general business and domestic areas.

The first of the educational programs was "Picture Play" — a word and memory development program aimed at the 3 to 6 year age range.

My two-year-old daughter and I found this to be an amusing and relatively challenging application, and it was run several times in succession before the novelty began to wear off (I don't know if it's significant, but she tired of it before I did!)

The program allows the participant(s) to either match a word to a range of symbols, match a symbol to a range of like-symbols (eg a picture of a hammer with a picture of a screwdriver), or play a game of matching a number of hidden symbols with other hidden symbols — each turn revealing a symbol then hiding it again in the same manner as the age old "battleship" game.

Rewards

Correct replies are greeted with electronic chirps, much to the glee of the younger viewers. Completing each set of questions results in an amusing graphics interlude (even greater glee!)

There are six different quizzes to try. Each of the quizzes' 12 questions are randomly picked from a pool of 30 possible ones so the same quiz can be run more than once in succession without losing too much audience attention.

The only slightly distracting aspect is the use of a few symbols (for example a street-side fire-hydrant) that are glaringly specific to the USA. I'm sure that the programmer(s) could have used more universal symbols without sacrificing any of the value of such icons.

From the technical point of view I can say that the program has been well thought out, with a pleasing balance of simple commands and sophisticated graphics.

Whilst I am not qualified to make an assessment of the educational value of such a product I am informed by my local primary-school teacher (i.e. spouse) that it would be fairly useful in either a group classroom situation or on an individual pupil basis — providing of course that the classroom in question had access to the necessary JXs (said in a tone of some scepticism, I must report).

I would give the package 8 out of 10 for general ease of use, quality of programming and value for money.

Scientific

The other four educational packages supplied comprise the "Earth Science Series", designed to be used by high-school or college level students in either group or self- study science/geography environments.

The objectives of the series are to give the student an insight into the processes at work in the physical environment, and identify how these processes affect people and in turn how people change the environment.

The general format of each of the programs is to describe a particular concept by means of screens combining text, diagrams, and at times moving graphics (i.e. clouds moving from the oceans across the land and raining).

Key concepts and words are reinforced by short quizzes interspersed throughout the course of the program, together with a comprehensive test after the summary.

I skimmed through two of the four programs and found them stimulating enough to maintain interest without any difficulty. I also did fairly well in the tests, which may or may not indicate that the material was well presented.

Usefulness

I would rate the programs as being technically very well presented, making good use of the relatively limited graphics facilities available together with well timed "refresher" quizzes.

However, I do feel that real usefulness of the programs would be very much a question of integrating them into other course material to extract the full potential — perhaps courses would have to be established around the programs?

This does raise a question in my mind, as to the suitability of overseas educational software to the local educational curriculum — especially if teachers are expected to devise all the support material themselves.

Nevertheless, the programs themselves would seem to achieve what they set out to do in an effective and stimulating way.

The other supplied packages were four programs from the "Assistant" series of home and small business applications software. This series, nine packages in total, is an integrated set of straight-forward programs designed to address the usual PC applications of word processing, spreadsheeting, simple database storage and retrieval, graphing, and communications.

All the programs are available for both PC senior and JX machines. To give a comprehensive review of each of the packages in this small space would no be realistic. Each would warrant a col umn to itself.

Instead, I will give a brief overview of their function and make comment on their general suitability for their intended market (typically this would be first-time PC users, small businesses, or experi-

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(Continued from page 69)

enced users requiring only infrequent access to PC applications software).

Assistants

The four programs evaluated were: Filing Assistant (a simple data storage and retrieval package), Reporting Assistant (companion to Filing Assistant, providing hardcopy reports from the stored data), Graphing Assistant (giving business graphics such as bar-charts, and line graphs), and Writing Assistant (a simple word-processing program).

Each of the programs follows a similar format, being menu- driven, with options selected by entering the appropriate choice by means of an option number, and with a consistent screen layout and sequence of operation.

There are no "windows", fancy graphics, or provision for electric rodents. In short, no frills.

This style of application design, simple as it is, goes somewhat against the current trends in PC application software. Most of the recent PC packages released seem to be trying to fit more and more features into what are basically simple applications, presumably as a one-up-man-ship, window dressing attempt to outsell their competitors.

No wonder then that the average first-time PC purchaser/user can become rather bewildered when it comes to buying software. It can be very difficult to separate essential from non-essential ingredients in a software package without in-depth experience of utilising such products.

One statistic may highlight my concern more dramatically. Two years ago I did a mini-survey of word-processing packages available for the IBM PC and clones. The staggering thing was that there were 80 different packages available on the NZ market alone (I wonder how many now?). How on earth should you choose one?

Bare essentials

This is where the Assistant series' "bare-essentials-only" approach could score well in the market.

My experience of assisting first-time users is that they want simple applications packages which may be limited in facilities but which can be used without a long training and familiarisation period. If the package is going to be used infrequently then this will also be a factor.

One other point is that the easier it is for users to become totally familiar with a package then the more confident they will be when it comes to solving those awkward real-life type problems that never seem to be examples in the training manual.

With complex packages the user may well give up trying to solve this type of problem — the solution may take more time to research and craft than resorting to manual methods, and given that choice most users will opt for the method they feel most comfortable with.

Word-processor

Writing Assistant is a very simple word- processing package giving full-screen editting of text files.

All of the text formatting commands are either menu-driven or by extensive on-screen prompting.

The program is of the "what-you-see-is-what-you-get" variety. If you tell the program to underline characters, it will show them underlined on the screen (as well as in printout), if you emphasize characters then they will be highlighted on screen.

This is in contrast to some other well known word processing packages, where formatting commands have to be embedded in the text for subsequent printing operations to unscramble.

In line with the integrated approach of the rest of the Assistant series, Writing Assistant provides some powerful facilities for interchanging data with the other packages.

Form letters can easily be produced using Filing Assistant files. For example the same letter could be produced for all the names and addresses in a file disk, substituting the correct name and address in the appropriate places on the letter.

The package even has a rather handy facility for labelling envelopes (something I still have problems doing with my old favourite — Wordstar).

Files

Filing Assistant (as its name suggests) allows the user to set up simple files of data for subsequent retrieval or update.

The method of defining the file to be stored is by creating an input/output "form" on screen by simply typing in a field-name (terminated by a colon) anywhere on the screen.

Data can then be entered into the file by calling up the "form" in insert mode, and typing in the relevant field data.

Various records in the file can be retrieved by means of field selection criteria. For example, any record having a name-field containing "Smith" could be retrieved for viewing or printing.

Selection criteria can be quite complex if desired, with combinations of fields being selected. Exclusion of certain records can also be achieved.

The program teams up with all the other Assistant programs to provide the means of storing data for use in Graphing Assistant, Writing Assistant, or Reporting Assistant.

Report sort

Reporting Assistant is the natural companion (sic) to Filing Assistant in that it provides the means of producing reasonably complex hard-copy reports with simple formatting commands.

Reports can be sorted on up to four different key-fields, with automatic subtotalling and grand-totalling on change of key- fields.

Edit masks can be provided for fields to be printed (i.e. to insert decimal points, dollar signs etc).

Graphing Assistant allows the user to produce on-screen or printed graphs of data input directly through the keyboard or via Filing Assistant files previously established. Data can also be utilised from some other (non-Assistant) packages.

Graphs can be produced in either line or bar format. Pie-charts cannot be produced, but I can't say I miss them.

Graphs can be stored on disk for subsequent incorporation into Writing Assistant document files, thus a report on sales this year might include a bar chart of the sales by month.

All in all I found the Assistant programs to be straight- forward and easy to use.

Limitations in each of the programs may cause some of the more experienced users to search for more sophisticated packages to meet their needs, but they would probably be surprised at what an enterprising "novice" could achieve with the facilities provided here.

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Sorting files

by Noel Weeks

SORT.COM is found on the Sanyo System Disk and is essentially used for the sorting of text files in to ASCII order.

One use is for sorting directories, especially when files are numerous.

Frequently, to make the most use of SORT, you need to use it in conjunction with the PIPE command of MS-DOS. The PIPE command joins the output of one program to the input of another.

PIPE is represented by a symbol consisting of two vertical bars (|). This key is found to the left of the back-spacing arrow key, with the Shift key held down. The following are a few suggestions:

DIR | SORT Sorts dir in alpha order.
DIR | SORT /+9 Sorts dir in alpha order of file name extension.
DIR | SORT /+??

Replace ?? with the following numbers

15 By file size
24 By month
27 By day
30 By year
34 By hour
37 By minutes
39 By AM & PM

Some other uses:

SORT [filename.extn] (Text files only)
SORT /R [filename.extn] (Reverse order)
SORT /+xx [filename] (xx =column No. to be sorted.

Try this too:

Enter SORT (ret)

Now enter lines of text you would like to sort e.g. Names and Addresses or just words. Like this:—

SORT <ret>
NOEL <ret>
BEN <ret>
FRED <ret>
APPLE <ret>
Ž (ends input)(also try PF6, gives the same)

Screen now displays the list, try your own experiments.

Another useful feature found in MS-DOS is the ability to be able to re-direct the output of a program to somewhere other than the screen. To do this we use the (>) greater-than sign above the lock key, beside the LH Shift.

For example, the command DIR Displays a directory listing of the current disk. Simply by issuing this command, DIR > CONTENT.DSK will place the directory listing into the file called "CONTENT.DSK".

If you like sorted directories, try this...

DIR | SORT > CONTENT.DSK.

The last comand will read the directory, give it to SORT, which will sort it and place it in the file called "CONTENT.DSK". Of course the file name used is at your discretion.

One other command which is appropriate to mention here is the command used for re-directing input. This command is signified by the (<) less-than sign.

Often it is useful to have input come from a file rather than a terminal. An example of this would be SORT < NAMES > NAMES.SRT.

The above command will read from the file called "NAMES" its contents, pass them to SORT, and after sorting, pass them to the file NAMES.SRT. The file "NAMES" would normally contain a whole list of names in an unsorted order.

To make the most use of these commands, you should try various experiments with them. It's really the only way that you can become familiar with them and put them to good use.

Don't forget, SORT.COM may be missing from your SYSTEM Disk, if your machine was bought very early during the launch. According to Sanyo Business Systems, it is available from your Sanyo Dealer free of charge.

Power supply modification

Some users have found that after adding a video board, RS232 Board or Quad density drives that their computer no longer runs.

There is a current limiter on the +5 volt power supply that starts limiting, running the voltage down. By changing the value of the two resistors in the power supply, you can increase the current limit. They are:

Resistor	Old Value	New Value
R4	2.4k	1.0k
R5	68 ohm	82 ohm

All resistors rated ¼ watt. Mod needs to be made to power supplies marked PS-55 and only if voltage falls below 4.75 volts. The model PS-54 does not have this problem.

Did you know that Turbo Pascal and Basic can read Datastar datafiles? Works fine.

Ever find when using a RAM disk drive that on exit from a program you are asked to insert COMMAND.COM in default drive? If the default drive happens to be your RAM drive you've got big problems.

The only way out is to push reset, which means all those files you've been busy updating are lost.

O.K., if you're proficient in the use of debug you can get them, but it'll take hours. Besides there's a much simpler method, providing you do it first thing on booting.

Method One:

Either at the prompt of your operating system, or through an AutoExec file, issue the following command:

COMMAND A:

This will tell the operating system where to look for Command.Com should it need to be re-read.

Method Two:

This method is the way suggested by MS-DOS...In a Config.Sys file, enter the following command:

SHELL = A:COMMAND.COM A: /P

This configuration statement sets the MS-DOS command EXEC to the Command.Com file, located on Disk A:. The /P tells Command.Com that it is the first program running on the system.

Why does MS-DOS overwrite Command.Com?

Various programs do not need Command.Com for their successful running, thus should available RAM become a bit short, Command.Com can be over-written. The operating system in such instances notes that Command.Com has been overwritten, and notes that it has to be re-read Command.Com from disk.

Since most people find their ram drives lacking in room, Command.Com invariably is not copied to the RAM drive. Therefore on return to the operating system MS-DOS tries to re-read Command.Com, and if it can't find it asks you to insert the disk with Command.Com into the default drive. Well that's fine if we're talking about A: or B: but not E:.

Software

Judging by the number of inquiries received over recent months as to what does and doesn't run on the Sanyo, I figure software is still the number one question.

Judging by comments received, some NZ software suppliers do not appear to be seriously addressing themselves to users' software needs.

Unfortunately, my personal experience confirms that view. I have invited various suppliers to demonstrate their programs at our user group meetings,

(Continued on page 84)

MAKING SPRITES: Part 2

Sprites, mags & collisions

By Dick Williams

After our introduction to sprites in the November issue we are now ready for the next part.

First the mag statements: there are four of these — mag 0, mag 1, mag 2 and mag 3. Their function is to set the size of the sprites.

Mag 0 is the simplest and tells the computer that all sprites are to be 8 pixels square. Only one pattern is required per sprite and if you want to you could define a pattern and place that sprite on each or any sprite screen in which case it will stay on each screen where you put it, or you can place it in different positions on the same sprite screen and in that case it will move very rapidly to each different position stopping at the last.

Each time you place a sprite even if it's always the same pattern it can have any legal colour number. Mag 2 has the same way of working as mag 0 except it sets the size of a sprite to 16 pixels square making it double size. Thus mag 0 and mag 2 only affect the size of a single sprite.

Mag 1 is a bit tricky, but it takes four patterns and joins them together to create a larger size sprite which can then be placed and/or moved as one sprite. Mag 3 does the same as mag 1 and also doubles the size to a total of 32 pixels by 32 pixels.

Sprites which are doubled in size by mag 2 (double size single sprite) or mag 3 (double size four sprites) still have the same shape as before but lines previously one pixel thick are reproduced two pixels thick. The general sprite code is:—

20 sprite SC, (X,Y), SP,C where SC is the sprite screen, X and Y the normal co-ordinates, SP is the sprite (pattern) number and C is the colour.

With double size sprites, SP can be any number being joined together, for example if the group of patterns being joined to make a large size sprite are patterns 0-3 then SP can be either 0 or 1 or 2 or 3.

I always use the first number from a group so in this case I would use SP=0.

Similarly if the group of patterns I wanted was 8-11 then I would use SP=8.

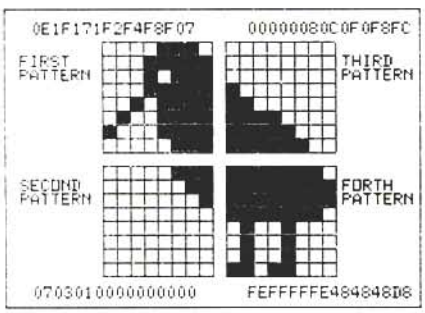
Now there is one very important point to bear in mind with sprites: that you must decide before going to too much trouble, whether you want single sprites or grouped sprites.

If you decide on single sprites then you can use either mag 0 (small size 8*8 single sprites) or mag 2 (double size 16*16 single sprites).

It's O.K. to switch between the two if you want but you can't have some small and some big on screen at once.

You can change the mag number during program run but if you do then all small sprites get bigger or big sprites get smaller.

If you decide to use grouped sprites by using mag 1 (normal size 16*16 four grouped sprites) or mag 3 (double size 32*32 four grouped sprites) then you can rule out using any single sprites in the same program. The reason for this is that mag 1 or mag 3 says to the computer that four sprites are to be grouped together and positioned or moved as one.



If you try to place a single sprite you will only end up with a group of four and because you probably didn't intend that to happen the resultant sprite could be a bit strange.

Using grouped sprites, you always have to work with four patterns, however you can set up one of the four patterns and not worry about the other three. This will give you a quarter of a grouped sprite.

Always bear in mind that in mag 1 or mag 3 mode the patterns must be in groups of four so if you do use only one pattern to get a quarter of a group, the next group of patterns must still start at the next legal group of four.

This example for mag 1 or mag 3 shows how it works:

```
PATTERN S#0,"pattern"
PATTERN S#4,"pattern"
PATTERN S#5,"pattern"
PATTERN S#6,"pattern"
PATTERN S#7,"pattern"
```

As you can see I have created an imaginary sprite using one pattern for sprite 0 and nothing for the rest of the group.

The result will still be a normal group of four sprites but only one part of the group will be visible and the other three parts will not be seen because there is no pattern for them.

The important point is that I have had to use the next group of four (S#4,S#5,S#6,S#7) for my next mag 1 or mag 3 sprite group.

The next part deals with the actual pattern for a sprite. Look at the diagram on page 115 of the manual. This show a grid 8 dots wide by 8 dots high with one half white and the other half black. The top row is a byte and so on. Counting down from the top there are 8 bytes.

Look at the top byte. There are 7 white spaces and one black one at the right hand side. this is a way of expressing what will be seen on the screen. White is not seen, and black is seen.

Look at the top row again and also at the row of numbers just to the right of the block. these are 00000001. Each pixel on the screen is either on or off and a zero represents off, a one represents on.

Conversion

In this case we have seven screen pixels turned off (not seen), and one pixel turned on (visible). The number 00000001 is binary. This is the language the computer understands but it's not easy for us to understand and also it's too long, so we must convert this to hexadecimal.

The first step is to separate the 8 bit binary number into two four bit numbers as follows:

00000001
0000 0001

This is necessary for the conversion.

After that, the two four bit numbers can be directly converted to hex by looking up the hex equivalent table on page 117. The first group 0000 is 0 and the second group 0001 is 1.

The full conversion process is:—

00000001
0000 0001
0 1
01

Using the pattern on page 115 as an example; the first hex number is 01, the second is 03, the third is 07 and so on.

Now putting them all together you get: 01 03 07 0F 1F 3F 7F FF, and squeezed up, 0103070F1F3F7FFF as shown on page 116.

This is the process used to create the patterns for sprites and the pattern is then used as shown on page 16 lines 10, 20 and 30, I suggest you add the following line to keep the sprite visible: 40 GOTO 40. And you may also find it an

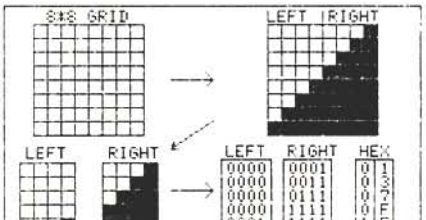


advantage to separate the code in line 20,
FROM THIS:20 PATTERN S#0,"etc
TO THIS:20 PATTERN S#0,"etc.

The added space can make it much easier to understand — that it means pattern for sprite number 0 or pattern for sprite number 4 as the case may be.

It can be very time consuming to create the patterns for sprites using graph paper and you might find the pattern editor program useful.

I have also included sprite 6 which shows some sprites expanding and contracting, sprite 7 which shows how to make sprites follow a circular path, sprite 8 a space ship and sprite 9 two horses having a race.



Collisions

Collisions between one sprite (torpedo) and another (alien space ship) can be easily tested for, and if a hit registered, goto an explosion routine. Sprite program 10 shows the detection code and how to use it.

The collision detection routine shows an aspect of computing not fully understood, which includes the logical operations viz:— AND,NOT,OR,XOR. These are shown on page 54 of the Sega manual but not explained.

The subject is a bit complicated but adds considerably to the power of programming.

Logical operations take place at binary level and in this case I am using the "and" logical operator in the following manner.

I want to know when one sprite has collided with another one. The video display processor chip has a status register byte which will indicate a hit by setting bit 5 to 1 (on). Now if the fifth bit is on, this is decimal 32.

If we put in our own 32 and tested to see if the fifth bit was 32, and if so to tell us, the problem would be solved.

This example shows how:

"Bit number	7	6	5	4	3	2	1	0
Status reg byte	0	1	1	0	0	1	0	1
Our test byte	0	0	1	0	0	0	0	0

And result —>1

The status register fifth bit is on, and our test byte has the fifth bit on (in binary,32 is bit 5 on). The logical operator "and" says if both bits are on the result is a 1. Having tested at the fifth bit we can now say that a collision has taken place.

The pattern code for sprites is usually as shown in the Sega book but an alternative is to use a string for the pattern as this example shows:
10 PATTERN S#0,"pattern"
10 PATTERN S#0, A$ or A$(P)

Where A$,or A$(P) is 16 characters long and contains the hex characters that make up a legal pattern, example A$="FFFF0000FFFF0000".

Reasons for using this alternative would be to quickly alter a sprite's pattern by string manipulation, or to initially hold the patterns in data statements and read them in as needed.

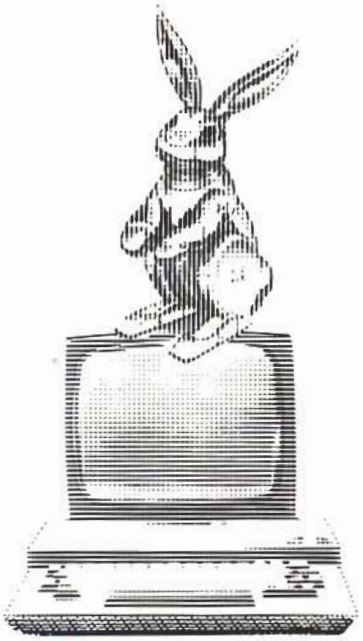
```
10 REM sprite 7----circular path--
12 SCREEN 2,2:COLOR 1,1,,1:CLS
14 CIRCLE (116,96),51,15
16 CIRCLE (116,96),90,15
20 PATTERN S#0,"0103070F1C3F70FF"
22 PATTERN S#1,"FF703F1C0F070301"
24 PATTERN S#2,"80C0E0F038FC0EFF"
26 PATTERN S#3,"FF0EFC38F0E0C080"
30 MAG 3 : FOR P=2 TO 15
32 SPRITE 0,(30 , 80),0,P:GOSUB 50
34 SPRITE 0,(50 , 32),0,P:GOSUB 50
36 SPRITE 0,(100,  9),0,P:GOSUB 50
38 SPRITE 0,(150, 32),0,P:GOSUB 50
40 SPRITE 0,(170, 80),0,P:GOSUB 50
42 SPRITE 0,(150,130),0,P:GOSUB 50
44 SPRITE 0,(100,150),0,P:GOSUB 50
46 SPRITE 0,( 50,130),0,P:GOSUB 50
48 NEXT P : GOTO 30
50 FOR D=1 TO 1000/(P*P):NEXT:RETURN

10 REM sprite 8----space ship----
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 MAG 3
16 REM ----first pattern---------
18 PATTERN S#0,"0103070D1F357FFF"
20 PATTERN S#1,"92FF92FF723F1F0F"
22 PATTERN S#2,"80C0E0B0F8ACFEFF"
24 PATTERN S#3,"49FF49FF4EFCF8F0"
26 REM ----second pattern--------
28 PATTERN S#4,"0143271D1F357FFF"
30 PATTERN S#5,"92FF92FF723F1F0F"
32 PATTERN S#6,"80C2E4B8F8ACFEFF"
34 PATTERN S#7,"49FF49FF4EFCF8F0"
36 REM ----place sprites --------
38 SPRITE0,(100,90),0,9:GOSUB 46
40 SPRITE0,(100,90),4,4:GOSUB 46
42 GOTO 36
44 REM delay----------------------
46 FOR D=1 TO 75:NEXT:RETURN

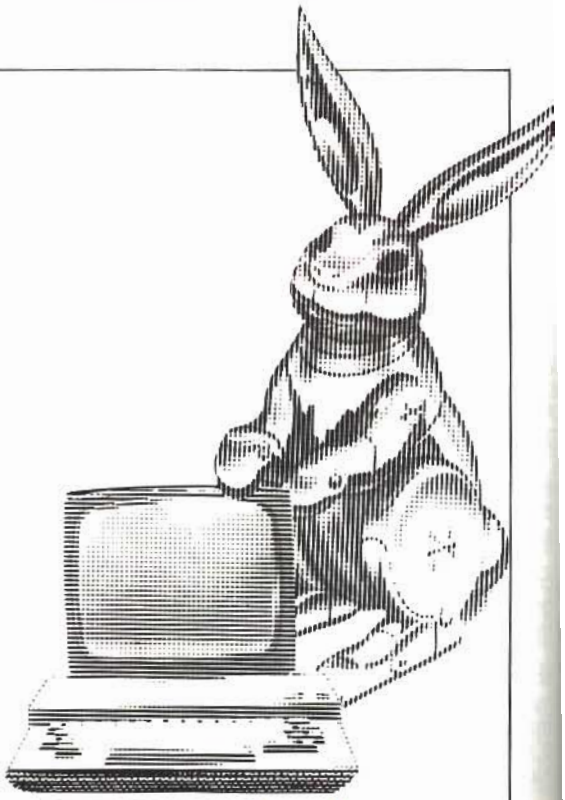
10 REM -sprite 9----horse race---
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 MAG 3
16 PATTERN S#0,"0000000001227F8F"
18 PATTERN S#1,"3F1108042020000"
20 PATTERN S#2,"00000818342EFFF3"
22 PATTERN S#3,"F2F020406000000"
24 REM ----------------------------
26 PATTERN S#4,"000000000F2F3F"
28 PATTERN S#5,"3F1022408000000"
30 PATTERN S#6,"00002018342EFFF3"
32 PATTERN S#7,"F0700C0201000000"
34 REM ----------------------------
36 SPRITE0,(X   ,60),0,1:GOSUB 48
38 SPRITE0,(X+10,60),4,1
39 REM ----------------------------
40 SPRITE1,(X   ,80),0,4:GOSUB 48
42 SPRITE1,(X+10,80),4,4
44 X=X+10:GOTO 34
46 REM ----------------------------
48 FOR D=1 TO 10:NEXT:RETURN

10 REM sprite 10----collision------
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 MAG 2
16 PATTERN S#0, "008864FFFF648800"
18 PATTERN S#1, "183C6699FF423CFF"
28 SPRITE 1, (220,80),1,1
30 SPRITE 0, (X  ,80),0,9:X=X+10
35 B=INP(&HBF):IF(B AND 32)=32THEN 50
36 GOTO 30
50 CURSOR 70,170:PRINTCHR$(17); "COLLIS
ION" :BEEP:FOR P=1 TO 200:NEXT:CURSOR 70,
170:PRINTCHR$(5):X=0:GOTO 30

10 REM ------PATTERN EDITOR--------DW
   LIST,CHANGE TO GRAPH MODE,MOVE
   ANYWHERE WITHIN GROUP OF 8'S,USE
   GRAPH U KEY TO CREATE PATTERN,WHEN
   FINISHED CHANGE BACK TO NORMAL
   CURSOR AND ENTER LINES 43-58 - RUN
11 COLOR1,15:GOTO 19
12 IFMID$(B$,1,1)=CHR$(229)THENA1=8
13 IFMID$(B$,2,1)=CHR$(229)THENA2=4
14 IFMID$(B$,3,1)=CHR$(229)THENA3=2
15 IFMID$(B$,4,1)=CHR$(229)THENA4=1
16 C$=HEX$(A1+A2+A3+A4)
17 A1=0:A2=0:A3=0:A4=0: RETURN
18 REM ----------------------------
19 FOR P=1 TO 16:READ A$
20 B$=MID$(A$,1,4):GOSUB12:D1$=C$
21 B$=MID$(A$,5,4):GOSUB12:D2$=C$
22 D$=D$+D1$+D2$:NEXT:RESTORE:BEEP
23 FOR P=1 TO 16:READ A$
24 B$=MID$(A$, 9,4):GOSUB12:E1$=C$
25 B$=MID$(A$,13,4):GOSUB12:E2$=C$
26 E$=E$+E1$+E2$:NEXT:BEEP
27 S0$=LEFT$(D$,16):S1$=RIGHT$(D$,16)
28 S2$=LEFT$(E$,16):S3$=RIGHT$(E$,16)
29 REM ----------------------------
30 SCREEN 2,2:COLOR1,15,,1:CLS:MAG 3
31 PRINT CHR$(16)
32 CURSOR 10, 81:PRINT S0$
33 CURSOR 10,105:PRINT S1$
34 CURSOR150, 81:PRINT S2$
35 CURSOR150,105:PRINT S3$
36 PATTERN S#0,S0$
37 PATTERN S#1,S1$
38 PATTERN S#2,S2$
39 PATTERN S#3,S3$
40 SPRITE 4, (110,80) ,0 ,1:GOTO 40
41 REM -set pixels with graph U key
       any not set must show 0
42 REM  <---8--><--8--->
43 DATA 0000000000000000
44 DATA 0000000000000000
45 DATA 0000000000000000
46 DATA 0000000000000000
47 DATA 0000000000000000
48 DATA 0000000000000000
49 DATA 0000000000000000
50 DATA 0000000000000000:REM
51 DATA 0000000000000000:REM
52 DATA 0000000000000000
53 DATA 0000000000000000
54 DATA 0000000000000000
55 DATA 0000000000000000
56 DATA 0000000000000000
57 DATA 0000000000000000
58 DATA 0000000000000000
```



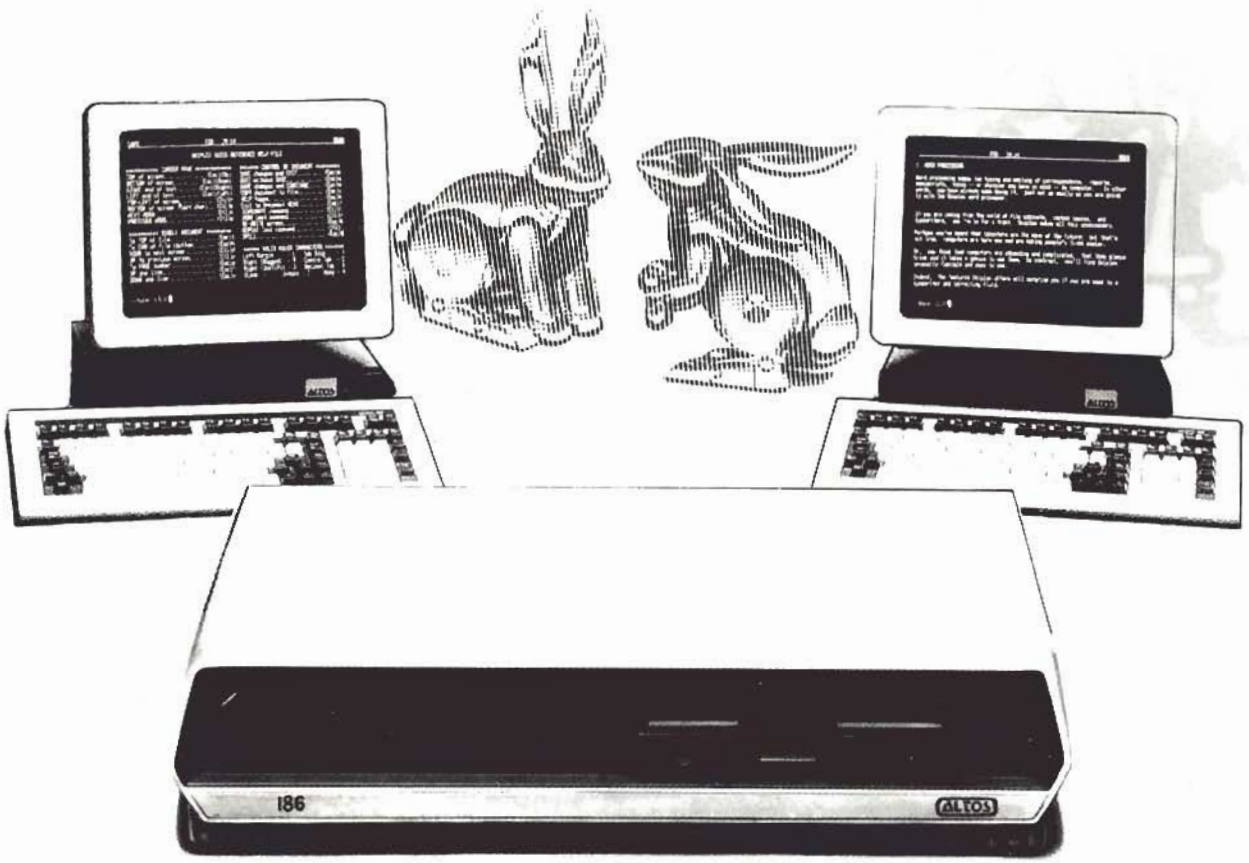
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Unravelled String

By Joe Colquitt

Most 6502/6510 machines will run these routines, as long as absolute addresses are taken into account.

In BASIC, there are two common ways of handling strings to or from the most often used device, the screen.

Messages, scores, etc. are PRINTed or POKED. The same procedures can be adopted in ML, but it can get a little cumbersome for larger strings.

Of course the increased speed is an advantage. **Example 1** shows two examples for putting a white 'A' at the top left of the C64 screen. Note that 1a uses CHR$ values, and **1b** uses ASCII values.

A mention should be made of Jump Tables. 6502 chips have an area set aside on them for various vectors, such as OUTPUT, OPEN, SAVE etc.

There is a twofold advantage in doing this.

First, newer machines which may have small ROM re-writes can use old software and second, converting programs from one model to another is much simpler.

For example, the C64 and VIC20 have many routines in common. In Example 1, when the computer 'GOSUBs' to $FFD2, it finds JMP$F1CA. The PRINT routine goes from $F1CA to $F207, where there is an RTS.

Actually, the routine is 'Output a character' and handles outputs to the printer, RS-232 etc. as well as the screen, which just happens to be the default device.

Big & small

The first routine is only space effective when small strings are to be handled. Loops are needed for larger operations.

Example 2 uses a string stored at $C100 (49408) onwards, with an '0' as an end of string marker. This means that the loop will keep getting characters until either the '0' is reached or the loop reaches 255+1.

To get the string into memory use something like **Example 3**.

By changing start addresses and loop pointers, many different strings could be accessed with the same routine. To make things a bit easier, there is a ROM routine that prints a string whose address is held in the Accumulator (lo) and the Y register (hi). To use it, set these two, then JMP or JSR to $AB1E. The string should be terminated in a carriage return, CHR$(13). $AB1E is 43809 decimal.

Keywords

The keywords LEFT$, RIGHT$ and MID$ can also be performed in ML. **Examples 4a, b, c** use the same data (A$) as Example 2.

In **Example 4c**, we will assume that LEN (A$) is unknown, so a function for finding LEN(A$) is included.

Inputs in BASIC can be examined by user ML. A ROM routine puts an INPUTted string into location $0200 onwards and terminates it with a '0'. In this state it is ideally suitable for routines of the sort covered.

Try this demonstration program. CHR$ values are in Appendix C of the User's Guide.

```
10 INPUTA$
20  FOR I=0TOLEN(A$):C=I+512
30
    PRINTC,PEEK(C),CHR$(34)CHR$
    (PEEK(C) )
40 NEXT:PRINT:GOTO10
```

Example 5 is a piece of code that comes in handy. It's a string compare, often found in adventures, data searches etc.

String(2) must be in memory before calling the routine. String(1) comes from the INPUT buffer, which is a volatile area of memory that gets refreshed with every new INPUT.

Assume that String(2) is at $C100, and a match will result in the Y register being set to 1, with the X register holding LEN(String(1)).

This routine is not very selective and really does a LEFT$ test. To completely match two strings, a test length match should be done as well.

Another useful ROM routine is 'PLOT', which you can use to set or read the cursor position. Access is by SYS65520 or JSR$FFF0. If you call PLOT with the carry flag set, a 'read' is done, and the cursor position is held in X (row) and Y (column). PLOT is very handy for avoiding strings of cursor moves. See **Example 6**.

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```
Example 1a:?"{home}{white} A"

C000 LDA#$13   ;printchr$(19)
C002 JSR$FFD2
C005 LDA#$05   ;printchr$(5)
C007 JSR$FFD2
C00A LDA#$41   ;printchr$(65)
C00C JSR$FFD2
C00F RTS

b:POKE1024,1:POKE55296,1

C000 LDA#$01   ;poke1024,1
C002 STA$0400
C005 STA$D800 ;poke55296,1
C008 RTS


Example 2

C000 LDX#$00    ;set counter
C002 LDA$C100,X;get character
C005 BEQ$C00D   ;if A=0 then exit
C007 JSR$FFD2   ;else print it
C00A INX        ;increment counter
C00B BNE$C002   ;(could use JMP$C002)
C00D RTS
Data
C100 31 32 33 34 35 36 37 38
C108 39 30 41 42 43 44 45 46
C110 47 48 49 4A 00 00 00 00


Example 3

10 A$="12345678ABCDEFGHIJ"+CHR$(0)
20 FORI=1TOLEN(A$)
30 B=MID$(A$,I,1):B=ASC(B$)
40 POKE49407+I,B:NEXT


Example 4a:LEFT$(A$,6)

C000 LDY#$00    ;set counter
C002 LDA$C100,Y;get character
C005 JSR$FFD2   ;print it
C008 INY        ;increment counter
C009 CPY#$06    ;test limit
C00B BNE$C002
C00D RTS

b:MID$(A$,7,4)

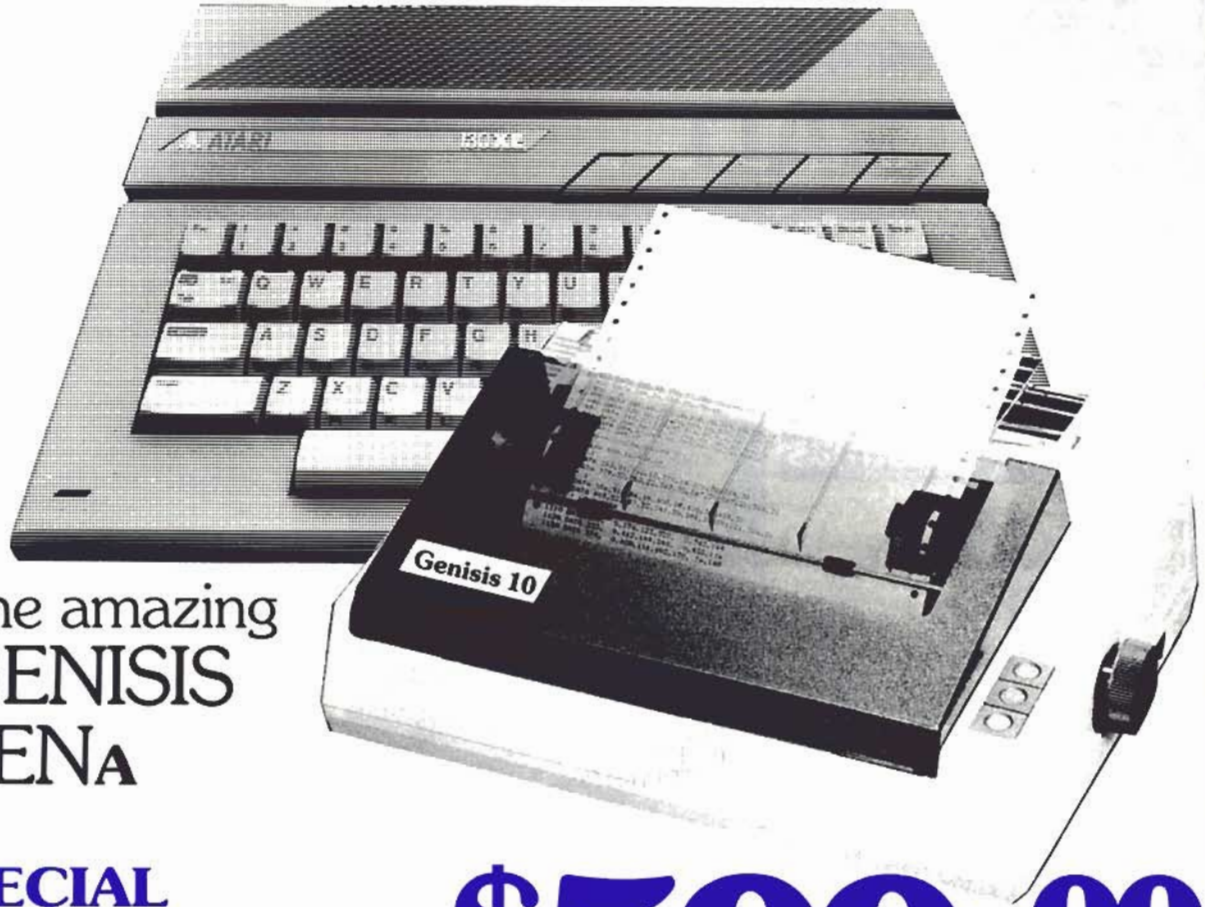
C000 LDY#$07    ;set counter to 7
C002 LDA$C0FF,Y;C0FF because counter
C005 JSR$FFD2   ;starts at C0FF+1
C008 INY
C009 CPY#$0B    ;test limit
C00B BNE$C002
C00D RTS

c:RIGHT$(A$,10)

C000 SEC        ;sub-routine to find
C001 LDX#$FF    ;"0" at end of string
C003 LDA$C100,X
C006 BEQ$C00C   ;found, go to 2 routine
C008 INX        ;with LEN in X register
C009 BNE$C003   ;
C00B RTS        ;not found, return
C00C TXA        ;put LEN into Acc
C00D SBC#$0A    ;set X to LEN-10
C00F TAX        ;
C010 LDA$C100,X
C013 BEQ$C01B   ;exit if limiter found
C015 JSR$FFD2   ;output char
C018 INX        ;repeat
C019 BNE$C010   ;
C01B RTS        ;
```

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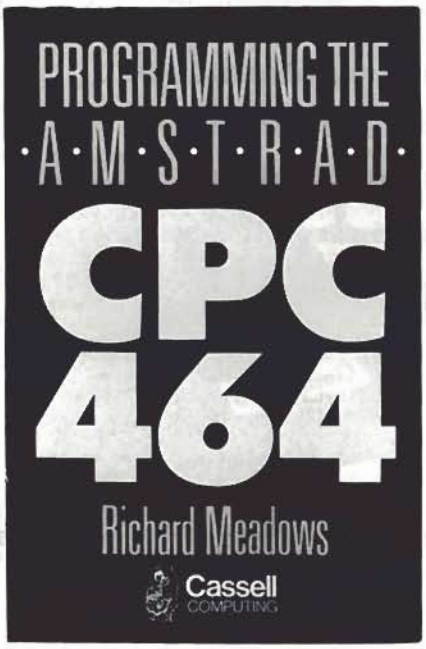
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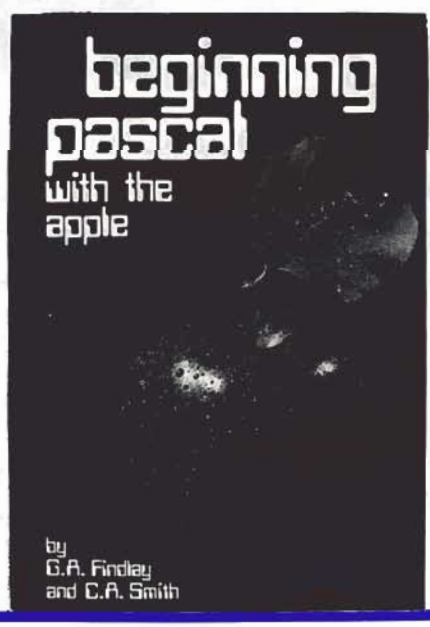
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Written as a companion to the manuals for the Apple II Plus, IIe and IIc, providing additional information. Each chapter stands on its own, covering DOS; disk and diskette formatting; volumes, directories and files; structure of ProDOS; using ProDOS from assembly language; customising ProDOS; ProDOS global pages; example programs; disketter protection schemes; nibblizing; the logic state sequencer; ProDOS, DOS and SOS.
Brady **Our price $55.35. Save $4.30**

What Every Kid and Adult Should Know About Computers **Arthur Naiman**

Written for teenagers and bright 8-12 year olds, this book tells you what computers do, how you can use them for drawing, making music, writing, playing games and learning. Also covers programming and all sorts of oddball sidelights.
Hayden **Our price $17.10. Save $1.40**

IBM

IBM PC Programming
Richard Heskell & Glenn A. Jackson

Hands-on step-by-step approach for beginners and advanced programmers. Uses actual photographs taken from the computer screen in graphic examples to develop many fundamental programming concepts. Includes information on string variables and functions, IBM PC DOS: numerical variables and arithmetic; expressions; sound effects; medium resolution graphics; loops and subroutines; bar graphs; animated graphics.

Prentice-Hall **Our price $27.10. Save $2.20**

The IBM Connection — James W. Coffron

From the author of the popular Apple Connection, VIC-20 Connection and Z80 Applications, this book shows how easy it is to use your computer with common household devices. Explains techniques for setting up your IBM to control a home security system, home temperature and control system, voice synthesizer to make your computer talk, as well as other home appliances.

Sybex **Our price $55.45. Save $4.50**

Data File Programming on your IBM PC
Alan Simpson

Presents the techniques for writing BASIC programs for mailing list systems, grade books, library referencing system, graphic displays. Covers adding files, searching, sorting, editing and printing formatted reports.

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Your IBM Made Easy — Jonathan Sachs

Covers the fundamentals and details major features of the system, including coverage of DOS 2.0 and the PC XT. Step-by-step operating instructions, and a guide to resources — what you need to know about dealers, software, services and accessories. Reference guide to operations and troubleshooting for common problems.

Osborne/McGraw-Hill **Our price $29.55. Save $2.40**

Science & Engineering Programs for the IBM PC — Cass Lewart

Presents 19 programs designed to make optimum use of scientific and engineering applications. Thorough documentation, sample runs, formulae, illustrations and listings. Includes programs for plotting and interpretation, numerical function evaluation, modulation schemes, system reliability evaluation, base-to-base conversion. All programs in IBM PC BASIC and compatible with BASIC versions of 1 10 and 2.0.

Prentice-Hall **Our price $28.85. Save $2.30**

Computer Graphics for the IBM Personal Computer — Donald Hearn & M. Pauline Baker

Discusses basic concepts and techniques of graphics and explores IBM PC's capabilities for these applications. Examines methods for creating two and three-dimensional pictures and graphs, and shows how to manipulate and animate displays. Also analyses make-up of PC and its graphic features.

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Your IBM PC Made Easy (includes IBM PC (DOS 2.0) and PC XT) — Jonathan Sachs

Covers the fundamentals and details the major features.Step-by-step operating instructions and a guide to resources telling you what you need to know about dealers, hardware, software, services and accessories. There's also a reference guide for operations and troubleshooting common problems.

McGraw-Hill **Our price $29.55. Save $2.40**

Animation, Games and Sound for the IBM PC — Tony Fabbri

Learn by having fun through brief discussions and programs at first, and ready-to-use examples to help you create new games and practical explanations. You learn programming skills in the process.

Prentice-Hall **Our price $54.10. Save $4.40**

Easy Writer for the IBM Personal Computer
Don Cassel

Designed to help you learn Easy Writer and evaluate its capabilities before buying. Your system needs 64K RAM, a single floppy disk drive, a monochrome 80-column monitor and a printer.

Prentice-Hall **Our price $35.95. Save $2.90**

Software Construction Set for the IBM PC & PC Jr — Eric Anderson

Complete package of software tools to help in designing programs. Contains techniques, advice and individual routines to help you build custom-made programs. References for information storage and retrieval, data searches, sorts, window building, using disk files, display charts and graphs.

Hayden **Our price $51.75. Save $4.20**

WordStar on the IBM PC — Richard Curtis

Complete guidebook written in clearly understood style. Assumes no prior knowledge of WordStar or the IBM-PC. Includes all enchancements the IBM-PC brings to WordStar along with add-ons such as MailMerge, Spellstar, StarIndex and CorrectStar.

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Handbook for Your IBM PC (includes XT version)
Louis E. Frenzel & Louis E. Frenzel, Jr.

Experienced users will find it a handy reference, with a concise summary of key operational information and as a source book of information about non-IBM accessories. Beginners will find it step-by-guide to using the computer and a source for "what to do and how to do it".

Sams **Our price $35.15. save $2.85**

Software Solutions for the IBM PC: A Practical Guide to dBASE II, Lotus 1-2-3, VisiCalc, Wordstar & More
Thomas H. Willmott

Sets out to answer the question: what can a microcomputer software system do for my business?... and how do I get started? Conversational style explains how to steamline office procedures and solve business problems using leading software programs. Also converts fundamentals of PC DOS IBM hardware components, BASIC language and the strengths and limitations of canned software products. Exercises and sample programs throughout.

Prentice-Hall **Our price $32.95. Save $2.65**

Science Computer Programs for Kids & Other People (Apple II version)
Tom Speitel, Mike Rook, Khan Pannell, Cornelia Anquay & Danny Speitel

Introduction to scientific concepts through graphics-orientated BASIC programs. Original, fun representation covering topics such as elementary electronics , physics, biology, weather and astronomy, and space. Each program is interactive, educational and easy to understand.

Prentice-Hall **Our price $21.20. Save $1.70**

Here Come the Clones: The Complete Guide to IBM PC Compatible Computers.
Melody Newrock

Explains which compatibles run what and which are hardware compatible, where the differences in design are critical, how the clones compare in overall performance, why some are and some are not real bargains, and where their hidden costs lie.

Osborne/McGraw-Hill **Our price $48.95. Save $4.00**

Atari

Assembly Language Programming for the Atari Computers — Mark Chasin

Routines follow the rules established for assembly language programmers and will work with any Atari computer. Examples given in both assembly language and, where possible, BASIC incorporating assembly language routines to perform tasks in BASIC.

Osborne/McGraw-Hill **Our price $41.60. Save $3.35**

How to Excel on Your Atari 600XL & 800XL
Timothy O. Knight

Chapters on programming, graphics , sound and music in straightforward terms. All key terms defined, and many accompanied by illustrations. Suggests many uses for business and fun.

Osborne&McGraw-Hill **Our price $25.85. Save $1.90**

BBC

Handbook for Procedures & Functions for the BBC Micro — Audrey & Owen Bishop

Variety of procedures and functions that can be used with programs of all types. Description of what each does, followed by a listing and explanation of how it works. Example of a calling program showing how to incorparate each procedure or function into your programs.

Granada **Our price $25.90. Save $2.05**

Exploring Music With the BBC Micro & Electron — Kevin Jones

Explores creative ways of using the computers to make music. Shows how to generate sounds, and to combine sound characteristics and rhythms. Covers wide range of styles — pop, folk, classical and modern. Examines many musical ideas and techniques.

Pitman **Our price $36.00. Save $2.95**

Getting the Most From Your BBC Micro
Clive Williamson

Introduction intended to complement the User Guide supplied with the machine. Contains many hints and tips on programming and general use. Explores many possible uses and the computer's potential for expansion to suit individual needs. Some features and accessories, undocumented in the User Guide, are investigated, with specific advice on connecting printers, TV monitors and disk drives.

Penguin **Our price $13.80. Save $1.15**

BBC Micro: Music Masterclass — Ian Ritchie

Professional musician starts with the essentials of programming sound and music, harnesses bytes and beat to show the way to the harmony of clefs and chips of electronic music. BBC can be a drum machine or synthesiser, instrument or interface, component or composer. Introduces music notation and theory of chords and harmony.

Pan **Our price $27.70. Save $2.25**

21 Games for the Acorn BBC Micro
Mike James, S.M. Gee and Kay Ewbank

Collection of games programs specifically written to exploit the BBC's sound, colour and graphics capabilities, and learn BASIC programming skills as you go. Each game comes with an explanation of how its program works, along with tips on how to modify or personalise it to create variations.

Prentice-Hall **Our price $37.15. Save $3.00**

The BBC Micro Gamemaster
Kay Ewbank, Mike James & S.M. Gee

Shows you how to devleop your own games as you learn the techniques of the professional games programmers. You also pick up the skill of solving programming problems as they arise. Programs are structured so that each procedure, or module, performs a distinct task allowing variations on the "core" program to be written by substituting new modules. Also advice on how to customise your programs.

Granada **Our price $20.30. Save $1.65**

Cracking the Code of the BBC Micro
Benni Notarianni

Practical guide to machine code programming introduces you to the 6502 hardware and instruction set, then teaches you to combine the separate elements of machine code into the fast code of commercial programs. You learn creation, manipulation and the animation techniques for arcade graphics, there is a set of arithmetic routines for calculation within machine code programs, and appendices on the instruction set, BASIC 1 differences and fixes, and OSWORD calls.

Pan **Our price $24.95. save $2.00**

Games for the Acorn BBC Micro
Mike James, S.M. Gee and Kay Ewbank

Collection of games programs specifically written to exploit the BBC's sound colour and graphics capabilities, and learn BASIC programming skills as you go. Each game comes with an explanation of how its program works, along with tips on how to modify or personalise it to create variations.

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Software

The Complete Guide to Software Testing
William Hetzel

Explains how software can be tested and how testing should be managed within a project or organisation. Aimed mainly at the software practitioner, it covers concepts of testing, testing techniques, methodologies, and management perspectives. Each chapter contains examples and checklists to help the reader understand and adapt material to personal needs. Case studies based on the author's experience.

Collins **Our price $65.60. Save $5.35**

Whole Earth Software Catalog
Stewart Brand

A comparative guide and recommendations on software, hardware, magazines, books, and accessories, suppliers and online services for personal computers. Lots of tips on buying and shopping around, and warnings on what to beware of.

Corgi **Our price $27.70. Save $2.25**

pfs Software Made Easy — Carl Townsend

Step-by-step tutorial to the pfs series — pfs Write, pfs File, pfs Report, pfs Access and pfs Graph. Programs will work on the IBM PC and XT, Apple IIe IIc and III, and the TI Professional — and you will need at least one disk drive, preferably two, or a hard disk system. Book includes tips for intergrating programs and working with advanced applications.

Osborne/McGraw-Hill **Our price $41.60. Save $3.35**

Business

Multiplan Home & Office Companion
Elna Tymes & Peter Antoniak

Collection of models covering a broad Spectrum of business and personal applications, personal finance, household management Ready-to-use model described and accompanied by the listing needed to create the model and sample data with your own. As you become familiar with Multiplan, the modelling techniques help you to create customised models.

Osborne/McGraw-Hill **Our price $36.95. Save $3.00**

Lotus 1-2-3 Simplified — David Bolcan

Designed for all levels, it starts with installing and using Lotus 1-2-3, then moves through designing and using spreadsheets; formatting spreadsheets and making them aesthetically pleasing; generating printouts; working with oversized spreadsheets; graphics functions, data management; advanced spreadsheet applications and programming with macros. Attractive presentation includes many diagrams and graphs.

TAB: **Our price $31.70. Save $2.55**

Guide to using Lotus 1-2-3 — Edward M. Baras

Detailed comprehensive guide to help you make full sense of Lotus 1-2-3's integration of spreadsheet, database and graphic functions. Includes step-by-step instruction on implementing practical application models for financial forecasting consolidating business statements, simulating dynamic processes, electronic forms management. Equally useful to beginners and experienced users.

Osborne/McGraw-Hill **Our price $38.80. Save $3.15**

Business Program Portfolio for your Apple IIe; An Integrated Office System
George H. Hildebrand

Collection of 61 BASIC programs covering such office tasks as interest calculation, financial analysis, depreciation, property management and real estate, cash receipts and disbursements, job cost, payroll. All programs documented for implementation and modification. There is also a guide to printing out business forms, creating a menu system, and securing business records with password programs.

Hayden **Our price $51.75. Save $4.20**

On-Line Computing for Small Businesses - Silver's Wall — Maurice A. Silver, John Jeacocke & Ray Welland

Sets out to provide managers of small businesses with a clear, concise but non-technical instruction in the use of on-line computing based on the pratical experience of the authors. No prior knowledge of computing assumed and only essential technical definitions are included.

Pitman **Our price $9.70. Save 70 cents**

The ABCs of 1-2-3
Chris Gilbert & Laurie Williams

Hands-on approach using detailed step-by-step instructions. Lessons involve tackling projects such as building a worksheet, displaying the worksheet as a graph, building a database, simplifying several operations using micros, performing calculations and printing graphs and reports. Remains a handy reference once you are familiar with 1-2-3.

Sybex **Our price $37.85. Save $3.05**

Taking care of Business with your Commodore 64 — David P. Dautenhahn

More than 100 brief BASIC and financial programs, each documented with a short explanation of what the computer will do and a BASIC listing. A real-life scenario follows, with a sample run and more instructions on how to combine two or more applications. Programs include: interest, depreciation, retailing, real estate, loan analysis, savings, lease analysis, time value for money, stocks and bonds analysis, sinking fund analysis, forecasting inventory needs, payroll, insurance, metric conversion.

Hayden **Our price $35.60. Save $2.90**

1-2-3 Run: 41 ready-to-use Ltous 1-2-3 Models — Robert & Lauren Flast

Collection of models that run on Lotus 1-2-3. Each model presented with a step-by-step description, complete listing, an illustration with sample data (you simply replace this with your own), and where applicable, instructions to produce bar and line charts. Designed to simply work, the models include applications for sales, accounting, real estate and the classroom.

Osborne/McGraw-Hill **Our price $38.80. Save $3.15**

Database for Fun and Profit — Nigel Freestone

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

Granada **Our price $18.45. Save $1.50**

Electron

Getting the Most From Your Acorn Electron
Clive Williamson

Comprehensive introduction to the Electron, exploring its potential and possibilities to suit each owner's needs. Intended to complement the user guide, and contains many tips on programming, software and the general use of the computer. Some features and accessories not documented in the user guide are investigated.

Penguin **Our price $14.75. Save $1.20**

The Electron Gamemaster
Kay Ewbank, Mike James & S.M. Gee

Programs structured so that each procedure, or module, performs a distinct task, allowing variations on the "core" program to be substituted. You also learn how to customise your own programs, improving your programming skills along the way.

Granada **Our price $20.30. Save $1.65**

Adventure Games for the Electron
A.J. Bradbury

Numerous examples and ready-to-run program modules in a book which lets you in on the secrets of professional games programming. Takes you through the whole process of writing an adventure, with a chapter on the type of instructions you are most likely to need. All programs in MODE 6 unless otherwise stated.

Granada **Our price $25.85. Save $2.10**

Apple

Getting Started With ProDos
B.M. Peake & D. Rorke

Aimed at Apple II and IIe users, this is needed for someone familiar with the existing Apple DOS 3 3 systems. Comprehensive guide to ProDos, with exercises for practice. Reference section goes over commands and comments on their use, and there is a discussion on the advantages and disadvantages of the system. A list for further references is included.

Bluewater Press **Our price $6.45. Save 50 cents**

Applesoft BASIC: A Teach-Yourself Introduction — B.M. Peake

Second edition revised to cover the Apple II Plus and IIe. A manual for New Zealanders to learn BASIC with the Apple, instead of picking information from two or three sources includes model answers. Enquiries for class sets welcome.

McIndoe **Our price $12.90. Save $1.05**

Fun, Games & Graphics for the Apple II, IIe & IIc. — Paul Garrison

Collection of more than 75 ready-to-run programs which you can use, study, modify, combine and experiment with. Complete listings written in standard Applesoft BASIC and CP M-Supported BASIC-80, and explanations. More than 20 financial and record keeping programs, and a wealth of graphics and education programs, a word processing organ and some small-scale database programs.

TAB **Our price $39.75. Save $3.20**

Ken Uston's Illustrated Guide to the Apple IIe

No-nonsense illustrations which allow the reader to master any application without reading the whole book. Self defined chapters deal with buying a computer, which Apple IIe components to buy, how to create a database, word process and perform spreadsheet calculations, how to tap into electronic information services, how to do fundamental BASIC programming, video games.

Prentice-Hall **Our price $35.95. Save $2.95**

Applied Apple Graphics — Pip Forer

Step-by-step introduction to graphics and their applications using BASIC. Suitable for Apple II, IIe and II-Plus. Covers hardware and software enhancements as solutions to graphic problems, in particular, reviewing the software utilities that can make BASIC programming pointless in some cases. Special disk, with 30 programs and 24 other files, is needed to understand many parts of the book.

Prentice-hall **Our price $66.75 (includes disk) Save $5.40**

The Apple House — John Blankenship

Explains how to compose your Apple to control your house security, lights, heat, telephone etc. This system allows the house to accept verbal commands and respond with its own voice. Shows how to build some items from scratch, and how to use some of the equipment you already own.

Prentice-Hall **Our price $41.50. Save $3.35**

Commodore 64

Cracking the Code on the Commodore 64
John P. Gibbons

Introduction to 6510 instruction set and how to combine the elements of machine code into commercial-style speed. Full machine code monitor with 14 commands gives you the tools to interface with the 64's architecture. Learn good programming practice and trade tricks while using the sprite, sound and hi-res graphics, and get to grips with the interrupt handling for multiple sprites and smooth screen scrolls.

Pan **Our price $24.95. Save $2.00**

Getting the Most From Your Commodore 64
Simon Potter

Uses diagrams, colour photographs, programs and examples to introduce you to the machine. Moves from starting through writing programs to graphics and sound, printers, disks, and extras and troubleshooting.

Penguin **Our price $12.90. Save$1.05**

First Steps in Machine Code on Your C64
Ross Symons

Clear concise explanation of machine code – introduction to the disassembler and its use; instructions for the 6510 chip with the aid of a demonstration program; discussion of the kernal operating system and its applications such as printing, input/output devices and scanning the keyboard. Two complete machine code games show you how to create your own high speed, animated arcade-like games.

Corgi **Our price $12.00. Save 95 cents**

Data handling on the Commodore 64 Made easy
James Gatenby

Data processing – sorting raw facts to produce useful information – can be just as rewarding as playing games. Explains how to use the Commodore 64 to process information for the home and small business. Uses straightforward examples to demonstrate storage of large quantities of data, attractive and readable on-screen display, and searching and print-outs.

Granada **Our price $20.30. Save $1.65**

Commodore 64: Basic Programs in Minutes
Stanley R. Trost

Collection of versatile, ready-to-enter programs for more than 65 home and business tasks on the Commodore 64. Programs for home finances, business calculations, rea 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 $37.30. Save $3.05**

The Commodore 64 Experience
Mike Dean Klein

The many and varied uses of a home computer .. programs for the home (recipes, shopping, phone books, kitchen metrics, budgeting); education programs (maths, geography, spelling, languages, graphics); entertainment programs, business programs (appointments, cash flow, interest, cheque books, inventory); utility programs (sprite creation, charater design, memory loader, saver and clear, disk menu ideas). All programs can be modified.

Reston **Our price $31.80. Save $2.60**

The BASIC Explorer for the Commodore 64
Lee Berman & Ken Leonard

Combination of suspense novel and instructional text, it teaches introductory programming in BASIC. Elements of Commodore 64 BASIC and the thought processes that go into designing a computer program to solve a problem are introduced through the adventures of three modern-day explorers.

Osborne/McGraw-Hill **Our price $29.95. Save $2.40**

Commodore 64 Machine Language Tutorial
Paul Blair

Gets to grips with the intricacies of machine language programming, helping to overcome the demanding exacting and sometimes exasperating requirements. But master it and tasks such as sorting, searching and some graphics become much quicker. Judicious use of machine language also allows you to use larger and more complex programs. Demonstration program provided, with examples of short machine language routines.

Holt-Saunders **Our price: Book & disk $53.20. Save $4.30 Book & cassette $50.85. Save $4.10**

Language/programming

Structured Programs in BASIC — Peter Bishop

Opens with a discussion of program structure and design. The rest to the book comprises example programs, with the complete program design process (from initial specification to final listing) carried out. Excellent source of programming techniques, algorhythms, program modules, ready-to-run programs and ideas.

Nelson — **Our price $25.65. Save $2.10**

MS-DOS User's Guide — Paul Hoffman & Tamara Nicoloff

Sets out to familiarise you with MS-DOS in all versions — IBM PC-DOS, and Versions 1.0, 1.1, 1.25, 2.0 and 2.11. Covers each computer running MS-DOS, gives the versions it runs and lists any improvements the manufacturer has made to the system. Complete information on software that runs under MS-DOS and products available to enhance the system.

Osborne/McGraw-Hill — **Our Price $41.61. Save $3.35**

The MBASIC Handbook — Walter A. Ettlin & Gregory Solberg

Concise, graduated tutorial to help you build programming skills for use in business, education and personal applications. Covers MBASIC tools; describes statements, functions, commands and sequential and random access files; debugging and documenting programs. Includes five fully documented business programs which can be customised.

Osborne/McGraw-Hill — **Our price $40.75. Save $3.30**

The Second Book of Machine Language — Richard Mansfield

Written for programming with Commodore 64, VIC-20, Atari Apple and PET/CBM computers, this book contains the powerful LADS machine language assembler. As well as being a sophisticated program, the book is a tutorial on how large, complex machine language programs can be constructed out of manageable subprograms. Extensive documentation provided.

Compute — **Our price $36.95. Save $3.00**

The CP/M-86 User's Guide — Jonathan Sachs

Comprehensive guide covering everything from Concurrent DOS CP/M-86 and Concurrent CP/M-86 to MP/M-86. Thorough explanation of commands, menu systems and files, then coverage of more advanced features such as DR Talk, DR EDIX or DR/Net. Advice on troubleshooting, full index and bibliography, and three machine-specific appendixes on the IBM PC and XT, DEC Rainbow and CompuPro.

Osborne/McGraw-Hill — **Our price $41.60. Save $3.35**

Adventures With Your Computer — L.Rade & R.D. Nelson

Easily followed activities include 16 chapters of adventure followed by 16 commentaries, providing solutions and guidance on how to program these solutions in BASIC. Avoids getting machine-specific or getting involved in dialects of BASIC. Programs usually given in a flow-diagram form, using minimal BASIC.

Penguin — **Our price $9.20. Save 75 cents**

Games

Arcade Games for Your VIC-20 — Brett Hale

A 15-year-old whiz kid from Victoria, Australia has put together a collection of 20 arcade games for the unexpanded VIC-20. All programs listed twice — once for a straightforward keyboard play, and once for use with a joystick. All games extensively play tested. Selection includes Galaxy Robbers, Yackman, Sub Attack, Fantasy, Pinball, Indi 2000, Leaper and Bullet Heads.

Corgi — **Our price $10.10. Save 95 cents**

More Arcade Games for Your Commodore 64 — Brett Hale

Collection of Arcade games by Australian whizz kid, 15-year-old Brett Hale. Games are in BASIC and can be modified to your wants. And they are listed twice — for keyboard and joystick use. Includes Speedy Boulders, Encircle, Yackman, and Barrell Jumper.

Corgi — **Our price $10.15. Save 80 cents**

Arcade Games for Your Commodore — Brett Hale

Fifteen-year-old Victorian whizz kid, Brett Hale has put together a collection of 12 extensively play-tested arcade games which are in BASIC and can be modified. Each is listed twice — for keyboard and joystick. Includes Tick, City Terror, Bricklayer and Surface Lander.

Corgi — **Our price $10.15. Save 80 cents**

Virgin Computer Games Series — Edited by Tim Hartnell

Each book contains a selection of more than 20 games which allow you to hine programming skills as well as have plenty of fun. Contains brief dictionary of computer terms, bibliography and hints on how to improve and extend some of the programs.

Commodore 64 edition $11.05. save 90 cents Spectrum, ZX 81, TRS-80, VIC 20, Oric Dragon, Atari, BBC editions $8.30. Save 75 cents Atari 600XL edition $14.75. Save $1.20

Tim Hartnell's Giant Book of Computer Games

More than 40 games compatible with Microsoft BASIC able to run on most micros, including BBC, VIC 20, Oric, Apple II and IIe, Commodore 64, Dragon 32, Tandy Color, IBM PC, Laser, TRS-80, PET, MZ80K and Spectrum. Range covers board, dice, space, brain and adventure games, simulations, artificial intelligence, and some just for fun.

Collins — **Our price $13.80. Save $1.15**

40 Educational Games for the VIC-20 — Vince Apps

Programs designed to help younger family members handle the VIC-20 and increase their general knowledge. Uses variety of games aids such as the beat clock, stop the hangman, race the buzzer. Subjects include geography, languages, mathmatics and science. Hints included to show how programs can be changed as skills improve.

Granada — **Our price $20.30. Save $1.65**

Fantastic Games (Commodore 64 & VIC-20 editions)

Introduction provides instructions on running the games and the book ends with a section on how games are made. In between are Speedboat, Logger, Haze Maze, Getaway, Sub Attack and Snail's Trails.

Wingard-Hayes — **Our price $7.95. Save 70 cents**

Space Adventures (Commodore 64 & VIC-20 editions)

Introduction provides instructions on running the games and the book ends with a section on how games are made. In between are Moonshuttle, Metor Shower, Protector, Alien Attack, Red Alert and Invasion — with a couple of sections explaining data and read statements.

Wingard-Hayes — **Our price $7.95. Save 70 cents**

Compute's Second Book of Commodore 64 Games

Sixteen new worlds to explore... from photographing the Loch Ness monster to running a presidential campaign...to test your strategy, skill and knowledge. All ready to type in and play. Also articles on writing text adventure games and designing video games, and special-purpose programs to guarantee error-free program entry.

Compute — **Our price $35.60. Save $2.90**

Tim Hartnell's Giant Book of Spectrum Games

More than 80 programs covering just about every sort of game imaginable — arcade action, mind benders, chance and skill, adventure, space, board and card, fun, simulations. And there are utility and demonstration programs, games to convert notes on error trapping and a glossary.

Collins — **Our price $13.85. Save $1.10**

Spectrum

Cracking the Code on the Sinclair ZX Spectrum — John Wilson

Practical machine code programming guide allowing the user to harness the full power of the Spectrum's hardware and escape the confines of BASIC. You are introduced to Z80 instruction set and learn to combine the various elements of machine code in commercial-like programs. Annotated example programs allow you to enter and use fast screen handling routines and sorts in your own programs, debug them with the trace facility, and run them with the on-screen clock. Covers ROM routines, interrupt handling and programming principals.

Pan — **Our price $24.95. Save $2.00**

Adventures for Your ZX Spectrum — Clive Gifford

Six ready-to-run adventure games — Crash! Pearl Diver, The Ring of Power, The Seven Keys of Tarkus, School's Out and Everyday Adventure — plus advice on writing your own adventures on a glossary and bibliography.

Virgin — **Our price $13.85. Save $1.10**

An Expert Guide to Spectrum — Mike James

Practical introduction to the Spectrum's advanced hardware and software features. Aimed at the user seeking a deeper understanding of the machine and its capabilities. Starts with an inside view of the micro, then moves to a connoisseur's guide to ZX BASIC and an introduction to the machine operating system. Covers ZX video tape system, RS232 interface, microdrive and advanced programming techniques. Complete program listings and projects for further exploration.

Granada — **Our price $23.10. Save 1.85**

The Sinclair User Book of Games and Programs for the Spectrum

Sixty games and programs from the Spectrum magazine, Sinclair User; protect your castle from invading soldiers in Siege; test your three dimensional sense Labyrinth; improve your geography in Mapwork, face Mr Spec Trum on Wimbledon's centre court, run your own cricket test at Lords, jump a clear round in Olympia, play noughts and crosses against the computer, sink a submarine in Depth Charge, tackle a crash typing course in Touch Type.

Penguin — **Our price $12.90. save $1.05**

Practical Spectrum Machine Code Programming — Steve Webb

Designed for programmers who want to write faster and better programs than they can in BASIC. Assumes you have no knowledge of machine code and works through the details to the point where you are linking routines and using routines with BASIC programs. Questions throughout to test progress.

Virgin — **Our price $18.05. Save $1.45**

The Spectrum Add-On Guide — Allan Scott

Non-technical language used to explain what various peripherals do, how they ork and how you can use them in programs ... games, programming, business word processing or whatever. Detailed program listings for "best buy" in each section, and a complete adventure game that can use up to seven add-ons, including two network Spectrums.

Granada — **Our price $20.35. Save $1.60**

Spectravideo

Games For Your Spectavideo — Damon Pillinger & Danny Olesh

More than 25 programs including Minefield, Road Race, Star Strike, Towers of Doom and High Fighter. Plus a series of graphic demonstrations and a chapter on making effective use of the Spectravideo's sound.

Virgin — **Our price $12.90. Save $1.05**

Keyboarding

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 separate 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 $14.75. Save $1.20**

Quick Keyboarding — Vonnie Alexander

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

Methuen — ***Our price $7.35. Save 60 cents***

General

Graphics Compendiums — editions for Spectrum & Commodore 64 — David Durang

Useful graphics designs and programs, including large library of pre-defined graphics characters, easy-to-use programs for designing and loading of your own graphics, special sections on graphic effects and animation techniques. Plus a selection of graphics games.

Pitman — **Our price $18.45. Save $1.50**

Computer Bits and Pieces — Geoff Simons

This compendium of curiosities is an informative, amusing and entertaining — and somewhat disturbing — account of the wide-ranging activities of computers...their uses in science and research, creativity, transport, industry, offices and administration, medicine and health, monitoring the environment, education and training, games and entertainment, the home, and the future.

Penguin — **Our price $11.95. Save $1.00**

User Groups

AUCKLAND

ACES (Auckland Computer Education Society): C/- Director, Computer Centre; Secondary Teachers' College, Private Bag, Symonds Street, Auckland. Meetings, third Thursday of month, at the College.
APPLE USER GROUP: Ross Bryon, ph 761-670 (h). Meetings: 3rd Tuesday.
APPLE JUICE TABLOID: Philip McKenzie, 4/464 Parnell Rd, Auckland 1. Ph 798-179.
ATARI MICROCOMPUTER USER GROUP: Ian Mason, 25 Manutara Ave, Forrest Hill, ph 467-347 (h). Meets 2nd Tuesday, Western Suburbs Radio Club, Gt North Rd, New Lynn.
THE AUCKLAND VZ-200 USERS GROUP: President, Julian Bish, 22 Ussher Place, Pakuranga. Phone, Auckland 562-166.
BBC USER GROUP: Dave Fielder, ph 770-630, Ext 518 (w). Meetings: 2nd Wednesday*.
COLOUR GENIE USER GROUP, (Auckland): Secretary: Mrs Nola Huggins, ph 655-718, P.O. Box 27-387, Auckland 4. Meets every fourth Monday, All Saints Church Hall, Ponsonby Rd, Auckland.
EPSON HX20 USERS' GROUP. Contact: C.W. Nighy, 231 Khyber Pass Road, Auckland, (Ansaphone, 774-268).
HP41C USERS' GROUP (Auckland): C/- Calculator Centre, P.O. Box 6044, Auckland: Grant Buchanan, 790-328 (w). Meets third Wednesday, 7pm, at Centre Computers, Great South Rd, Epsom.
LXIV N.Z.: Aligned towards those using Commodore 64's, mainly in education. Contact Brother Bosco Camden, 215 Richmond Rd, Auckland 2.
MS-DOS USERS' GROUP: Meets first Monday each month at 112 Mountain Rd, Epsom, Auckland. Contact Peter Biggs, ph 603-274.
MSX/SPECTRAVIDEO COMPUTER CLUB: Contact: P.O. Box 22-620, Otahuhu, Auckland, 6. Meetings, 3rd Wednesday of month at IHC Hall, 56 Ranfurly Road, Epsom. Contact Bill Ferguson (Secretary). Ph 276-1966, ext 803 (w).
NZ COMMODORE USER GROUP (AK) INC: Kay Coddington. Ph 588-931 (h). Box 5223, Auckland. Meetings: 3rd Wednesday, Remuera Primary School Hall, Dromorne Rd, Remuera.
NZ COMPUTER COMMUNICATION USERS' GROUP: P.O. Box 6662, Wellesley Street, Auckland 1. Stephen Williams.
NZ OSBORNE USERS GROUP (NZOG): C/- P.O. Box 43-182 Auckland. Meetings 2nd Tuesday. Auckland University, Human Sciences Building, 7.30 pm. Neil Williamson, ph 275-4310 Auckland.
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.
SANYO USER GROUP: Noel Weeks, P.O. Box 28-335, Auckland 5. Ph 540-118 (h).
SYMPOOL (N.Z. SYM user group): John Robertson, P.O. Box 580, Manurewa, ph 2675-188 (h).
TARILAND COMPUTER CLUB INC: A club for Atari enthusiasts living in Auckland. Meeting 2nd Wednesday each month at Remuera Primary School Hall. Contact Allan Clark 8368-922 (h) 505-409 (b).
ZX81 USER GROUP: C/- 28 Haig Ave, Auckland 4.
NZ MICROCOMPUTER CLUB INC, P.O. 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 10am — 5pm, at the same hall on the Saturday following the above meeting.

The following user groups are part of the N.Z. Micro Club. Meetings start at 7.30 pm at the OSNZ Hall.
BUSINESS USER GROUP: Sam Chan, phone 678-518 (h). Meetings: 3rd Thursday.
CP/M USER GROUP: Peter Ensor, ph 653-011 (h). Meeting: 4th Monday.
IBM PC USER GROUP: Terry Bowden, ph 452-639 (h). 778-910 (w). Meetings: 3rd Thursday.
GENEALOGICAL USERS GROUP: Maartin de Vries, ph 2674-886 (h). Meetings, 1st Wednesday, 9.15 pm.
KAYPRO USERS GROUP: Russell Clement, ph 817-8525. Meetings, 4th Monday.
POCKET COMPUTER USER GROUP: Peter Taylor, ph 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.
1802 USER GROUP: Brian Conquer, ph 695-669 (h).
2650 USER GROUP: Trevor Sheffield, ph 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.

NORTHLAND

BAY OF ISLANDS COMMODORE 64 USER GROUP: Contacts — Mrs B. McLeish, P.O. Box 119, Okaihau (secretary), or Mr H. Perry, 143 Church Street, Onerahi.
KERIKERI COMMODORE 64 USER GROUP: Contact: Brett Snow, Skudders Beach, KeriKeri. Ph 78-888.
WHANGAREI COMPUTER GROUP: 15 James Street, Whangarei. Phone 84-416. Meets every second Wednesday of the month at Northland Community College.
WHANGAREI SINCLAIR USERS CLUB: Meets 1st Sunday, 1pm — 5 pm, Whangarei Community College. Contacts: B.M. van Gelder 83-886 or president, 81-733.

BAY OF PLENTY

A.Z.T.E.C.: Brian Mayo, Church Strreet, Katikati. Phone 490-326. Members all use micros.
BAY MICROCOMPUTER CLUB (Tauranga): G.L. McKenzie, Secretary, Snodgrass Road, Tauranga. Phone: 25-569.
BAY OF PLENTY TAURANGA COMMODORE USERS GROUP: Contacts — phone 62-083, 65-311, and 83-610. Meets first and third Monday of month, 7 pm.
BAY SHARP USERS GROUP: Contact — phone 86132. Meeting 2nd and 4th Monday. 417 Cameron Road, Tauranga.
BEACH COMPUTING CLUB (Waihi): Jamie Clarke, Box 132, Waihi (Ph: 45-364 Waihi Beach).
TAURANGA MAC GROUP: Contact, Clive Bolton, 81-779 (w), 62-811 (h).
WAIHI COMPUTER ENTHUSIASTS: Contact G.C. Jenkins, 10 Smith St, Waihi (h) WAH 8478. Workshops every Tuesday. Meetings last Tuesday of month.

WAIKATO

THE ATARI CONNECTION. Contact Paul Cormack, 29 McDiarmid Cres, Huntly. Ph (h) 88-695.
HAMILTON SUPER 80 USERS': P.O. Box 16113, Glenview, Hamilton.
WAIKATO ATARI USERS' CLUB: P.O. Box 6087, Heaphy Terrace, Hamilton. Ph Bob (071) 78-434, Albert 73-360.
WAIKATO COMMODORE USERS' GROUP: Secretary, Mrs Eileen Woodhouse, 32 Kenny Crescent, Hamilton.
WAIKATO COMPUTERS IN EDUCATION SOCIETY. Secretary, Geoff Franks, Fraser High School, 72 Elliott Road, Hamilton. Phone (h) 81-050.
WAIKATO SPECTRUM USERS' GROUP: Secretary: Roger Loveless, 18 Heath St. Hamilton. Phone 492-080. Meetings: First Tuesday of the month.
WAIKATO SPECTRAVIDEO USERS' GROUP: P.O. Box 16113, Glenview, Hamilton.
MORRINSVILLE COMPUTER SOCIETY: Contact: Alison Stonyer, 49 Coronation Road, Morrinsville. Phone 6695 (h). Meets 1st and 3rd Wednesdays.

CENTRAL N.I.

ROTORUA COMPUTER CLUB: Contact: Ken Blackman, 6 Urquhart Place, Rotorua. Third Tuesday of each month at 7 pm, Waiariki Community College, Rotorua.
GLOWWORM COMPUTER ENTHUSIASTS: Meets every second Sunday of the month in the Otorohanga District Council's board room. Contacts: president, Colin Wilkins, Oto 8331; vice-president, Hugh Button, Oto 7228; secretary, Laurence Bevan, Oto 7066.
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.
SOUTH TARANAKI MICROCOMPOUTER SOCIETY: Contacts: Apple, Jim Callaghan, 86-667 Hawera; S80, TRS80, John Roberts-Thompson, 84-495 Hawera; Sega, Dave Beale, 85-108 Hawera; Spectrum, Guy Oakly, 8060 Manaia. Sub groups meet on the third Wednesday of the month. The whole society meets periodically in the Hawera High School computer room. Written inquiries to Allen Goodhue, 21 Princes Street, Hawera.
WANGANUI COMMODORE 64 USER GROUP: Contact — P. Northway, Phone (h) 42-916. 7 Broadhead Avenue. Wanganui. Meets first and third Thursdays of month at Wanganui Community College.
MOTOROLA USER GROUP: Harry Wiggins, (ZL2BFR), P.O. Box 1718, Palmerston North. Phone (063) 82-527 (h).
MANAWATU MICROCOMPUTER CLUB: Contact: Richard Anger, 64- 108 (w) or 63-808 (h). Meets twice a month at PDC Social Club rooms.

HAWKES BAY

SHARP PC1500 USER GROUP — Contact: Allan Thomas, P.O. Box 155, Napier. Newsletter.
NAPIER VZ-200 USERS GROUP — Contact: Peter Cox, Ph 435-126 after 4 pm or write to Peter Cox, 9 Cranby St, Orekawa, Napier.
HAWKE'S BAY APPLE COMPUTER CLUB: Meets 1st and 3rd Mondays, 7 pm Napier Boys' High School. Contacts: Bert Tripp 700- 412; Charlie Lum 438-005.
HAWKE'S BAY MICROCOMPUTER USERS' GROUP: Bob Brady, Pirimai Pharmacy, Pirimai Plaza, Napier. Phone 439-016.
HAWKE'S BAY COMMODORE USER GROUP: Contacts: Mike Phillips, 401 Lascelles Street, Hastings (president); Mark Hodgson, 1108 Oliphant Road, Hastings (secretary). Meetings: first Tuesday of month at H.B. Community College.
HAWKE'S BAY SPECTRAVIDEO USER GROUP: Meets first Tuesday of month at Hawke's Bay Community College. Contact P. Lawrence, P.O. Box 799, Napier.
INTERACT USERS GROUP: For more information write to Denis Clark, 43 Charles Street, Westshore, Napier.
HBCES (Hawke's Bay Computers in Education Society): Contact — Grant Barnett, 89 King Street, Taradale, Napier. Ph: 446-992.
GISBORNE MICROPROCESSOR USERS' GROUP: Stuart Mullett- Merrick, P.O. Box 486, Gisborne. Phone 88-828.

WELLINGTON

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.
ATARI USERS' GROUP, Wellington: Eddie Nickless. Phone 731- 024 (w), P.O. Box 16011. Meetings: first Wednesday of month.
CROG (Central Region Osborne Group): For Osborne, Amust, Kaypro & other CP/M computer users. Contact: Bruce Stevenson, 5 Dundee Pl, Chartwell, Wellington 4; ph 791-172. Meetings: 1st Wednesday, 7.30 pm.
KAPITI COMMODORE USERS GROUP INCORPORATED: President — Derek Millett, 115 Matai Road, Raumati South; secretary — Mrs Faye Deakin, 9 Buckley Grove, Paraparaumu, phone 87-869 (or 859- 799 Wellington bus.). Meets 1st Friday in month Paraparaumu Primary School Library, Ruapehu Street, 7.30 pm.
MICROBEE USERS' CLUB: P.O. Box 871, Wellington, 2nd Sunday of month.
NEC COMPUTER USERS' GROUP: C/- P.O. Box 3820, Wellington.
NZ SUPER 80 USERS' GROUP: C/- Peanut Computers, 5 Dundee Pl., Chartwell, Wellington 4. Phone 791-172.
OHIO USERS' GROUP: Wellington. Secretary/Treasurer: R.N. Hislop, 65B Awatea Street, Porirua.
POLY USERS GROUP, Wellington: Contact — Christine Greenbank, Computer Studies, Wellington Teachers' College, Private Bag, Karori, Wellington.
WELLINGTON APPLE USERS GROUP: Inquiries to secretary, Grant Collison, P.O. Box 6642, Wellington. Ph 872-537, evenings. Meets last Saturday of month.
WELLINGTON COMMODORE USERS' GROUP: P.O. Box 2828, Wellington. Contacts: Peter March (h) 86-701, Robert Keegan (h) 789-157, or phone 886-701.
WELLINGTON MICROCOMPUTING SOCIETY INC.: P.O. Box 1581, Wellington, or Bill Parkin (h) 725-086. Meetings are held in the Fellowship Room, St Johns Church, 176 Willis Street, on the 2nd Tuesday each month at 7.30 pm.
WELLINGTON SEGA USER GROUP: Meets first Thursday of month at Paparangi School Hall. Contact Shaun Parsons, P.O. Box 1871, Wellington. Phone: 897-095 after 6pm.
SEGA OWNERS CLUB: Lower Hutt. Meets 1st Monday each month. Contact: Murray Trickett. (w) 724-356, (h) 662-747.
WELLINGTON SPECTRAVIDEO CLUB: Contact — Don Stanley, C/- Box 7057 Wellington South. Ph 746-906 (w). Meets on one Monday a month at Staff Common Room (Level D), Wellington Clinical School, Mein Street, Newtown.
WELLINGTON SYSTEM 80 USERS' GROUP: Contact: W.G. (Bill) Lapsley, day 286-175; evenings, 268-939; or Andrew Vincent 780- 371 (evenings).
HUTT VALLEY COMMODORE USER GROUP: Contact — P.O. Box 46047. Phone 671-992 or 646-254 evenings. Meetings, first and third Mondays of month at St Bernard's College, from 7.30 pm.

SOUTH ISLAND

ASHBURTON COMPUTER SOCIETY: Meets first Monday of month, 7.30 pm. Enquiries to Pete Boyce, 4 Willow St, Ashburton. Ph 83-664.
SOUTH CANTERBURY COMPUTER GROUP: Caters for all machines from ZX81 to IBM34, Geoff McCaughan. Phone Timaru 60-756 or P.O. Box 73.
NORTH OTAGO COMPUTER CLUB: Contact: Peter George, P.O. Box 281, Oamaru. Phone 29-106 (b) 70-646 (h).
LEADING EDGE HOME COMPUTER CLUB: Elaine Orr, Leading Edge Computers, P.O. Box 2260, Dunedin. Phone 55-268 (w).
NELSON COMMODORE USERS' GROUP: Peter Archer, P.O. Box 860, Nelson. Phone (054) 79-362 (h).
NELSON HOME COMPUTER CLUB: Contact — Mike Jenkins, Box 571. Ph 87-930. Meets, 7 pm, first and third Tuesdays of the month at Nelson Intermediate.
BLENHEIM COMPUTER CLUB: Club night second Wednesday of month. Ivan Meynell, Secretary, P.O. Box 668. Phone (h) 85-207 or (w) 87-834.
MARLBOROUGH COMMODORE USERS GROUP: Secretary, Robin Vercoe, 42 Rogers Street, Blenheim. Meetings: second Thursday of month, 7.30 pm, IHC rooms.

BULLER COMPUTER USERS GROUP: P.O. Box 310, Westport, Phone: 7956 Wpt. R.J. Moroney (secretary).
HOKITIKA COMPUTER USERS GROUP: Contact — Adrian Mehrtens, 185 Sewell Street. Ph: 943.
OTAGO COMMODORE 64 CLUB: Meets first Tuesday of month, 7.30 pm. Contact: Geoff Gray, 41 Eglinton Road. Ph 53-986.
DUNEDIN SORD USERS' GROUP: Terry Shand. Phone (024) 771- 295 (w), 881-432 (h).
CENTRAL CITY COMPUTER INTEREST GROUP: Contact: Terry Stevens, Box 5260, Dunedin. Phone 882-603. Meetings every second Tuesday.
OTAGO COMPUTER EDUCATION SOCIETY: Jim Ferguson, Arthur Street School, 26 Arthur Street, Dunedin. Ph 776-524.
ATARI USER GROUP, Dunedin: Meets fortnightly on Thursday. Phone Graeme Wheeler 737-907 for the date, time and place of next meeting, or write to 38 Calder Avenue, North East Valley, Dunedin.
SPECTRUM AND QL COMPUTER CLUB — Contact: James Palmer, 37 Sunbury St, Dunedin. Phone 44-787, Monday to Friday after 4 pm.
SOUTHLAND MICRO USERS GROUP — Contact: Secretary B.J. Brown, 40 Elm Cres, Invercargill. Ph 88-920. Meets every second Monday at St Paul's Church Hall, 7.15 pm.
SOUTHLAND COMMODORE USER GROUP: (VIC 20 and 64s). Address: C/- Office Equipment Southland, Box 1079, Invercargill.
SOUTHLAND COMPUTER EDUCATION SOCIETY: Secretary, Bob Evans, Southland Boys' High School, Herbert Street, Invercargill. Ph (h), 73-050 or ZL4LX.
GORE COMPUTER CLUB: Meets first and third Tuesdays of month, 7 pm. Contacts: Allan Rodgers, ph 7488, Dave Clarke, ph 5836.
NZ SOFTWARE EXCHANGE ASSOCIATION: Non-profit group for exchange of software written by programmer members. Contact. Ian Thain, Box 333, Tokoroa.

CHRISTCHURCH

CANTERBURY COMPUTER EDUCATION SOCIETY: Contact — Graeme Sauer (secretary), P.O. Box 31-065, Ilam, Christchurch 4.
CHRISTCHURCH APPLE USERS GROUP — Contact: Peter Fitchett, ph 328-189. Meets first Wednesday of month, third floor, Tower Building, Christchurch Teachers' College.
CHRISTCHURCH ATARI USERS GROUP: Contact Ron van Lindt, 10 Silverdale Place, Christchurch 6. Ph 891-374.
CHRISTCHURCH SPECTRAVIDEO USERS GROUP — Contact: Lester Reilly, ph (h) 428-686. Meets third Tuesday of month.
CHRISTCHURCH TRS-80 COLOUR USER GROUP: Meetings: last Wednesday of month. Contact: Dennis Rogers, 21 Frankleigh Street, Christchurch 2. Phone 34-731.
CHRISTCHURCH '80 USERS' GROUP: Brendan Thompson. Phone (h) 370-381. P.O. 4118, Christchurch.
OSI USERS' GROUP (CH): Tony Martin, 9 Innes Rd. Phone 555- 048.
SINCLAIR USERS' GROUP CANTERBURY, INC: Contact: Gary Parker (president). Phone 894-820, P.O. Box 4063. Meets 7.30 pm last Monday of month. Phone for latest meeting place.
CHRISTCHURCH COMMODORE USERS GROUP: John Kramer, 885-533 and John Sparrow. Phone 896-099.
CHRISTCHURCH BBC and ELECTRON USERS GROUP. Meets alternate Monday nights at 6.30 except Saturday or Secondary-School holidays, at Hagley High School. Secretary, Mrs R.D. Nolan, 87 Palmers Road, Christchurch, 9.
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, 7.00 pm, Abacus Shop, Shades Arcade. Secretary, Robert Wilson, 17 Warblington Street, Christchurch, 7. Ph: 881- 456.
CHRISTCHURCH SORD MS USERS GROUP: Meets first Thursday of month, 7 pm.
CHRISTCHURCH SEGA USER CLUB: George Cox, ph 33-007. 17 Hillsborough Tce Christchurch 2.
DICK SMITH WIZZARD COMPUTER CLUB, Christchurch: Contact — Tony Dodd, 34 Mayfield Ave. Ph: 557-327.
CHRISTCHURCH VZ-200 USERS GROUP: Meets second Tuesday of month. Contact Ian Birse, ph 523-915, Graham Dillon, ph 324-117, or P.O. Box 22-094, Christchurch 1.

NATIONAL

BBC/ACORN COMPUTER USER GROUP OF NZ,P.O. Box 9592, Wellington. Local meetings — Auckland: 2nd Wednesday of month at Conference Room, Auckland Teachers' Training College, 60 Epsom Ave. 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 pm. 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.
SANYO USER GROUPS have been set up in Auckland, Wellington and Christchurch. Contact P.O. Box 6810, Auckland for further information.
NZ UNIX USERS GROUP, P.O. Box 7087, Auckland 1. Membership P.O. Box 13-056, Hamilton.

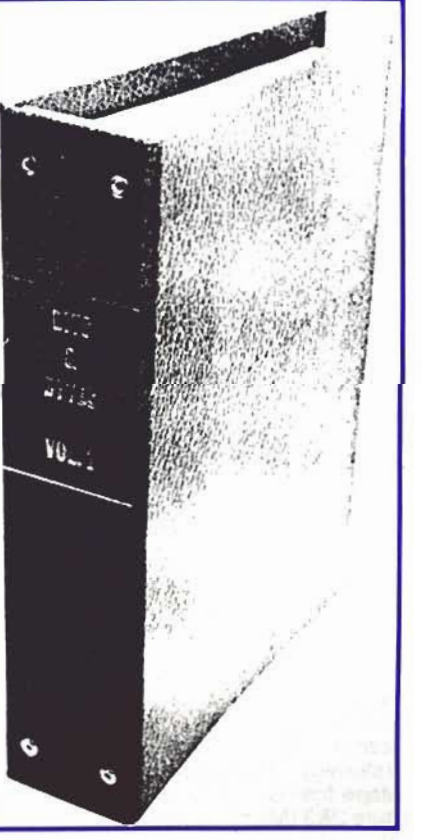
NOTE: Clubs would appreciate a stamped self- addressed envelope with any written inquiry to them.

If your club or group is not listed, drop a line with the details to: Club Contacts, BITS & BYTES, Box 9870, Auckland 1.

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FOR SALE: 4 floppy disks for Apple II$^+$ or IIe containing LODERUNNER, KARATAKA, CONAN, APPLE, PASCAL, TALON, STELLAR 7 and other assorted games for $40, write to S. FREEBORN, LEES ROAD, R.D.1 KAIAPOI.

Large list of foreign computer magazines. Many titles from about 20 countries throughout the world. Send US$3.00 to: F. Engelberts, Box 1422, 2970 Emden/W. Germany

For Sale: 160 Kb 5 ¼" Disk drive for IBM Pc. as new. $400 or exchange for Atari 1050. W.G. Barker 30 Kowhai Ave, Invercargill. Telephone 76293

OSBORNE ONE portable with screen, 2 drives, interface & software. $1800. Contact Dave 23 Vanbrugh Pl, Bucklands Bch, Auck. Ph 534-4590.

16/32K Sega owners "Burglar Bill" — Top quality "Manic Miner" type game. 100% machine code. Send $24.95 for your copy to: Michael Boyd, 'Carnbuoy', Mt Fyffe Rd, Kaikoui.

Spectrum (Continued from page 53)

faces advertised. These allow the computer to control mechanical devices such as robot arms. With such an interface your computer could control many things in your home, such as heaters, lights, and suchlike. The difficulty lies in building your own robots and connecting devices to the interface. Perhaps these applications will become more common in the next few years.

It will inevitably occur that you want to connect more than one interface to your computer at once. Even if you only want to use one interface at a time, juggling interfaces by pulling them in and out all the time will wear out the Spectrum's connector.

So it is quite important to have at least one interface with a rear connector, so that another interface can be connected into the back.

Since most interfaces are not self-powered, and draw current from the Spectrum, there is a limit to how many interfaces you can connect at once. I have often had two interfaces connected without any problems, but one person I knew had difficulties with three interfaces connected.

Sanyo (Continued from page 71)

but only once has a firm accepted our offer. Not only did their accounting package work, but it had an excellent manual — their's is the one with a sea-scape on the box.

A point to remember — if the dealer doesn't know whether software runs on Sanyo or not, ask to test it.

The following list is of some programs Sanyo User Group members recommend:

Games: Cashman, Time Bandit (arcade), Maz (maze), King Arthur (strategy), Hangman (educational), Solitaire (cards), DC10 (flight sim.), Adventure 2&3 (Michtron vrsn).

Utilities: Micro-spell (Trigram speller), Softspool (Michtron print buffer), Super-Zap (disc editor), M-Disk (Ram disc), Cornerman (Desk tidy), DS.DOS 2.11+ (0S), Personal Money Manager (Michtron budgeter).

Graphics: Mastergraph, Picasso, Graffiti.

Languages: Turbo Pascal (Borland), GW-Basic for 55Xs and Macro- Assembler (Microsoft).

Machine Language

Example 5 (Continued from page 76)

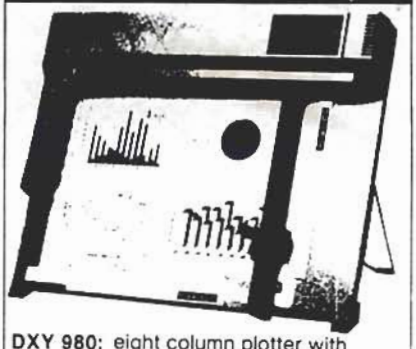
```
C0F0 LDY#$01    ;set Y to match value
C0F2 LDX#$00    ;set LEN counter
C0F4 LDA$0200,X;get String(1) char
C0F7 BEQ$C011   ;exit if limiter found
C0F9 CMP$C100,X;compare to String(2) char
C0FC BNE$C013   ;if <> set 'no match'
C0FE INX        ;
C0FF BNE$C0F4   ;
C101 RTS        ;exit (Y=1)
C012 LDY#$00    ;
C014 RTS        ;exit (Y=0)

10 'NPUTA$
20 SYS49152
30 PRINTPEEK(781),PEEK(782)
35 REM 781=X store, 782=Y store
40 GOTO10
```

Example 6

```
C000 LDA#$93    ;print CLS
C002 JSR$FFD2   ;
C005 LDX#$08    ;8 cursor down
C007 LDY#$12    ;18 cursor right
C009 CLC        ;'set position' mode
C00A JSR$FFF0   ;PLOT
C00D LDA#$5A    ;print 'Z'
C00F JSR$FFD2
C012 RTS
```


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