NEW ZEALAND'S PERSONAL COMPUTER MAGAZINE

BITS & BYTES

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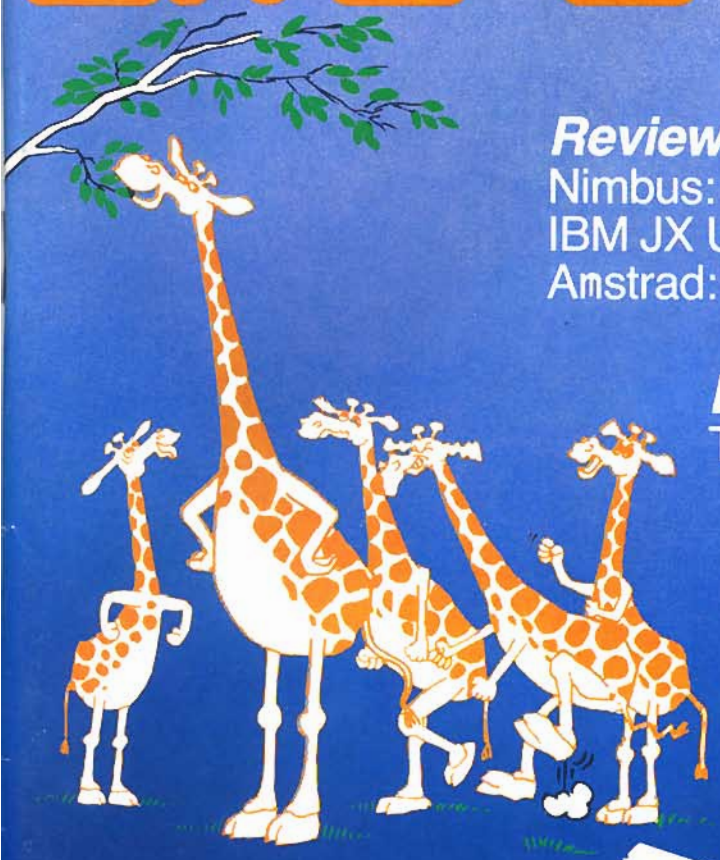

Reviews

Nimbus: UK crafted... and the Best of British?
IBM JX Unveiled
Amstrad: Why 128K?

London Report

The Personal Computer World Show

New X'perience:
Driving the X'press

Starting this issue

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The Entertaining CPC6128

With over 300 colourful games already available covering everything from advanced flight and combat simulation to slick examples of all the arcade classics, the CPC6128 has an unfair advantage over its competitors.

There's shoot-outs, adventures, brain teasers, card games, 'simulations' – enough to keep the most agile and inquisitive minds busy indefinitely. As part of the CPC6128 package you will also receive CPM plus, GSX and Dr Logo, the world famous teaching and graphics language that introduces the concepts and ideas behind writing computer programs.

High Performance-Low Cost

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.

Compatibility

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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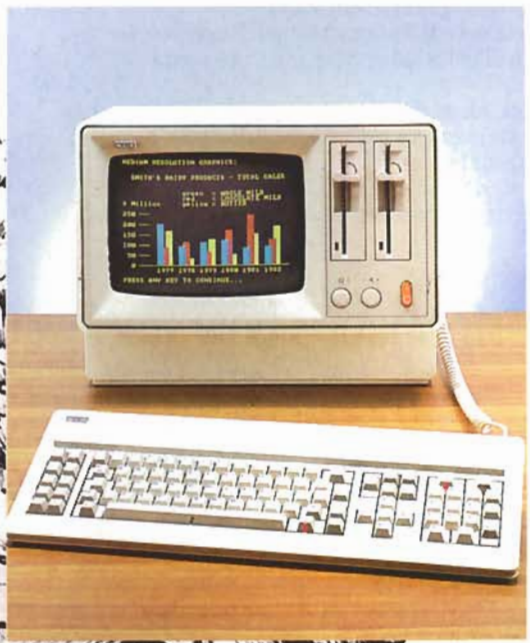

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NEWS

Personal Computer World Show: You're there with roving reporter Paul Crooks. 7
Price War opening shots from Commodore.

HARDWARE

Spectravideo's X'press almost meets Mark James' home-business idealism. 13
Nimbus arrives and Peter Parsonage flies into it. 17
Opus drives discs for the Spectrum. 25
IBM's JX has Richard Gorham looking beyond name plates. 40
Amstrad's 6128 could be an 8-bit finale, says Peter Biggs. 41

SOFTWARE

An adventure game for Colin Marshall's computer classes. 34

THE QUIZ

Qn: Would you like to win a C64, disc drive and Star printer? 38

FEATURES

Toolbox, by Gordon Findlay. 27
Assembly Language, by Neil Williamson. 29
Machine Language, by Joe Colquitt. 31
Survey of Bits and Bytes readers. All 96,000 of us. 36

COLUMNS

Letters 21
Amstrad 46
Apple 47
BBC 48
Sega 50
Sanyo 52
Spectravideo 53
Commodore 57
Spectrum 66
Atari 69
Book reviews 70
Book club 71
Advertisers index 76

Amstrad 6128

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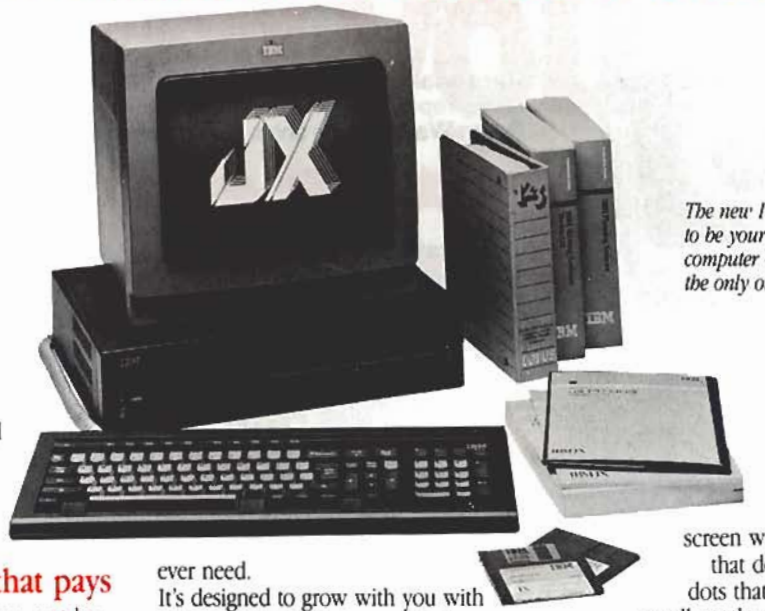

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It's designed to grow with you with standard interfaces that enable it to accept a wide variety of add-ons — including future technology yet to be realised.
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The JX is the first IBM computer to use the advanced new 3.5 inch diskettes — hailed as the storage medium of the future.
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PC World show: We Were There

A show of successes, promise...and despair

PAUL CROOKS joined the 70,000 people that crammed into the Olympia Stadium in London during the five days of the Personal Computer World Show in September. He reports...

The smell of success and, if not failure, at least decay, lingered around different stands in the stuffy atmosphere of the Olympia Stadium.

In the first category three A's dominated — Atari, Apricot and Amstrad.

The latter category included Acorn, Sinclair and MSX.

Commodore fitted uneasily into a neutral category.

Atari dominated as far as floor space and the show's hardware highlight was concerned.

That highlight was the Atari 520 ST — and Atari was making every effort to ensure nobody could doubt it was going to be a success.

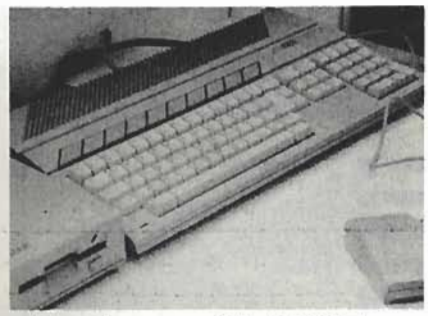
On hand were all the Atari top brass from Jack Tramiel down, and by my count, at least 24 software companies demonstrating software for the ST.

The fact that most of that software, which included word processors, spreadsheets, utilities, languages, games and even some vertical packages, would fall over if you pressed a couple of keys seemed almost irrelevant.

Conviction

Tramiel has succeeded, at least in England, in convincing many of the major software houses (Atari claims a total of 80 are working on software for the ST) that the ST is going to sell in large enough numbers to justify them racing to write software for it.

A representative of a mail order house told me they had sold 60 STs in the first three weeks of its launch — with next to no software available and with only monchrome monitors, as colour monitors were in short supply.



One of scores of Atari 520 ST computers at the PCW Show.

Nevertheless it is too soon yet to say the ST will be a success. (Readers can expect the ST to be available in NZ with a price tag of around $2500 early next year).

Atari also displayed a 260 ST (256K of RAM) with a built in disk drive, and a Winchester hard disk for the 520 ST. But these were kept in a large glass case — indicating they were only prototypes.

Not far behind the ST in terms of crowd attention was a much more down to earth hardware product — a word processing system.

Irresistable

Boring you might say, but a price tag of £399 (NZ$1000) for a 256K CP/M computer, one disk drive, monitor, word processing software and a printer is sure to prove irresistable to many people.

At that price level the PCW 8256 could only come from Amstrad — a company that has turned the low end computer market in Britain upside down in the last year.

While the PCW is configured to suit word processing (the bundled software, Loco Script, was written especially for the computer and uses to full advantage dedicated keys, printer features, the 90 x 32 screen and other hardware features), it runs the CP/M Plus disk operating system — which means any CP/M programs converted to Amstrad's unusual 3 inch disk drive can be used.

The number of these programs is sure to increase as Amstrad also had on display a 128K CP/M Plus version of its home computer range. The CPC 6128 also costs £399 with a built-in 3 inch disk drive and colour monitor.

However the CPC 6128 (which should now be available in New Zealand) has raised controversy here as originally Amstrad stated it would only be sold in America and the existing 664 (which has only 64K of RAM and an inferior version of CP/M) would be sold elsewhere.

Rubbing salt

Then Amstrad announced it was dropping the C64 and replacing it with the C128 which, to rub salt into the wounds of C64 owners and dealers carrying C64 stocks, would also be cheaper.

Nevertheless, as a result of its aggressive pricing, which started with its original micro the CPC 464, and technique of bundling peripherals in the one price, Amstrad is now number three behind Sinclair and Commodore after only 15 months in the marketplace — and appears to be going higher.

To try and compete, Sinclair has slashed the price of the QL fromn £399 to £199 (NZ$500) and has announced bundled deals for the Spectrum Plus (computer, data recorder, speech synthesiser, joystick, for £149).

Sinclair also finally reached agreement with its creditors over its £15m debt (the newspaper baron Robert Maxwell withdrew his offer) and reportedly sold 160,000 computers to a large retail chain (although this is only part of the stockpile of unsold Sinclair computers).

The Sinclair stand at the show, even with half price QLs, was hardly a hum of activity and rumours of a 128K Spectrum and a portable micro (the Pandorra) aren't going to save the company from even tougher times after the Christmas selling season.

Acorn out

One company that is already finished as a mass computer manufacturer is Acorn — now owned 80% by Olivetti, which recently rescued it for the second time this year.

This Christmas should see the last of its stocks of Electron and BBC computers sold off and after that it seems Acorn will concentrate on educational and scientific markets for its BBC Plus compu-

(Continued on page 8)

(Continued from page 7)

ter, which has 64K of RAM (a 128K version is also on the way).

To this end Acorn launched at the show a 32 bit co-processor for the BBC.

Called the Cambridge co-processor and based on the National Semi-Conductor 32016 chip, Acorn claims in benchmark tests it performs as fast as popular supermini class computers.

A one megabyte RAM version of the co-processor costs £1700 (NZ$4300) while Acorn has also launched a stand alone version called the Cambridge Workstation (which is faster again). A one megabyte of RAM model with monitor and twin 640K floppies sells for £4395 (NZ$11,000).

Amiga

Commodore decided to launch the C128 in Europe at the PCW Show — and its staff were deluged with questions...not about the C128, but about the Amiga (see separate story), which wasn't displayed.

One question that did come to mind about the C128 though is, at £450 with a disk drive, how is it going to compete with the Amstrad 6128 at £399 with a disk drive and a colour monitor?

Also, software houses don't seem to be rushing to write software for the 128 mode — which means the only immediate advantage in buying a C128 over a C64 is access to CP/M Plus software. This advantage isn't going to strongly appeal to home users, so the computer is aimed at serious or business users.

At least Commodore recognise this fact and state they are aiming it at a business market.

Hotel giveaway

Amstrad has also forced Commodore into price cuts and bundling. One recent C64 package included three nights hotel accommodation...as well as the C64, data cassette and programs, for £200 (NZ$500).

More drastically, the Plus 4 has been halved in price to £99, inclusive of data cassette — Commodore recently admitted the Plus 4 and C16 would be dropped after Christmas here.

There are rumours of Commodore launching a Unix-running computer but none were on display.

The prize for the most boring stand at the show must go to MSX. Sony, Toshiba, JVC and Mitsubishi all displayed MSX models on the stand, but left it poorly staffed.

Apricot's brightly lit stand dominated the business computer section.

With the release at the show of two more models in the "F" range, Apricot (formerly ACT) now has a range of eight PCs costing from £700 (NZ$1800) to £3200 (NZ$8000).

Apricot down

Apricot PCs are clearly second behind IBM PCs in U.K. sales but soon after the show Apricot announced it was expecting a considerable drop in earnings for the past six months — indicating that not just the home micro makers face problems here.

Philips arrived in force from Austria to display its new ":Yes" personal computer range.

The low end model with 128K of RAM and one 720K 3.5 inch disk drive is expected to retail for £1000 (NZ$2500). The :Yes was launched in NZ this month, the base price being just above $3000, without a monitor.

Digital Research's Dos-Plus operating system is supplied with the :Yes, which uses the 80186 processor. The :Yes can also run MS-DOS but Philips emphasise that its not "another clone" of the IBM PC.

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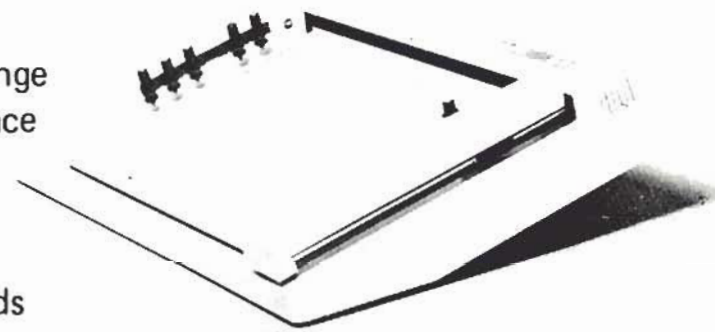

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PC World show:
Look out for WIMPS!

WIMPs have arrived in force — if the personal computer world show was anything to go by.

But for once computer users and potential users should welcome this new technology.

WIMPs are Window, Icon, Mouse, and Pull down menus — also variously known, in typical computer industry jargon, as system user interfaces, user environment managers and front-ends.

System user interface is probably the best description as, with the use of windows, icons, pull down menus and a mouse, the programs provide a friendlier interface between the user and the computer's disk operating system.

The concept is not new (the first implementation was on a computer developed by Xerox in the seventies) and in the Macintosh it has sold well, despite other limitations.

Now the rest of the computer industry seems to have finally concurred that users should have a friendlier operating system and the ease of use of a mouse — rather than the sometimes complicated and hard-to-remember commands of traditional disk operating systems like CP/M, MS-DOS.

The WIMP leader is GEM (Graphics Environment Manager) from Digital Research, which can be implemented on any 16 and 32 bit computer running CP/M, MS-DOS, PC-DOS or Concurrent DOS operating systems.

Thus at the show GEM Desktop was being demonstrated on a wide range of micros, including Apricots, the Philips :Yes, the IBM PC and compatibles (more than 20 manufacturers have now been licensed to use GEM with their computers).

Apricot's new F2 model — 512 K of RAM, twin 720 K 3.5 inch disk drives, a mouse and GEM for £1495 (NZ$3750)

But to get the full benefit of WIMP, applications software has to be written to take advantage of it.

Digital Research say more than 50 software houses have stated their intention to publish GEM-based application packages by the end of the year.

To set the ball rolling Digital Research itself has written and released a number of GEM application programs, including GEM Write, GEM Graph, GEM Draw and GEM Paint, while its DR Logo also uses GEM.

The popular integrated package Open Access has also been released in a GEM version.

GEM Desktop comes as standard on the Atari 520 ST and virtually all the applications written for that computer will take advantage of its windows and icons, and the mouse also comes as standard.

World Show Software

Competitors for GEM include Microsoft's Windows, IBM's Top View, Epson's Taxi and Commodore Amiga's WIMP called intuition.

The first two have had development problems although Windows has finally been released. However, it reportedly makes heavy demands on the computer.

Intuition incorporates windows, icons and pull down menus but also allows those who wish to (such as software developers) to revert to the more conventional command line.

Among the other software on display at the show was a new development in training software for the IBM PC.

Called PC Automator, the program allows the insertion of special teaching instructions into popular application programs.

For example Wordstar is a popular word processing program, but it can be difficult to learn.

Using PC Automator, extra or enlarged explanations and instructions can be implemented on to Wordstar to help new users.

These instructions are activated either by the touch of a certain key (or combination of keys), or if a certain Wordstar screen message appears.

A simple example is if an "i" is typed before an "e" after a "c". A message is activated to tell the user of his/her mistake.

GEM Paint running on the Philips :Yes computer — one of the new range of applications packages using WIMPs (windows, icons, mouse and pull-down menus).

A number of large companies in the U.K. are already using the package to help train staff in applications software.

It is expected to be available in NZ soon.

Regretfully I didn't have time to try out a lot of the new games software on show but I was disappointed visually with much of the offerings.

The exceptions were the few games programs running on the Atari 520ST — the graphics were a level above anything else on show. The only problem is how many people are going to be able to afford an ST to play games?

Award for OPD

The One Per Desk (OPD) from ICL (reviewed as Computer Phone in last month's issue of Bits & Bytes) was the winner of the Micro Business Hardware Award announced at the PCW Show.

Other hardware finalists were: Omnireader, a low-cost text reader that allows typed pages to be entered into a computer without re-keying: ComNET 900, a local area network; and the Seiko Wrist Terminal, a watch-size device which can display information downloaded from a personal computer.

The winner of the software award was the Priority Decision System, a program that helps managers make decisions based on consistent priorities and policies.

We Were There

Amiga kept behind closed doors

While the PCW Show attracted a lot of visitors, only a select few were invited to Commodore's demonstrations of the Amiga at a nearby hotel.

Reluctant to steal the limelight from its own C128 computer, Commodore showed the Amiga to only a few software writers, dealers and journalists.

I was not among them, but I have seen an Amiga briefly since.

All I can say is that the graphics and sound capabilities of this computer live up to the word everyone has been using — stunning.

Last month I asked whether the Amiga is worth twice the price of the Atari 520ST?

For those who require such sophisticated sound and graphics and/or those who can afford the likely NZ price tag of $5-6,000 for a 512K system with colour monitor, I would say yes.

For those wanting straight business applications, the choice is less clear-cut. The Amiga does support multi-tasking, that is, you can run several programs at once, but it is questionable how useful this is to most users.

The Amiga is due to be released in Britain early next year — and if anything it has created more interest here than in the US (one Amiga review was headed bluntly "Get Lost Macintosh").

This is partly because the Brits have claimed the credit for Amiga DOS. It is an adaptation of an operating system called Tripos, developed by a British company called Metacomco.

Metacomco is entitled to produce similar software for other computer manufacturers — leading some writers to predict it will become the standard operating system for 68000-based computers.

But the real strength behind the Amiga is the three custom designed chips cutely named Agnus, Daphne and Portia.

These chips handle functions such as memory control, input/output, graphics and sound, freeing the 68000 central processor to operate much faster.

Interestingly, among the peripherals that Commodore intends to offer is a 5¼ inch disk drive and PC-DOS emulator software that will allow the Amiga to run IBM PC software, including Lotus 1,2,3, Flight Simulator, etc, without modification. Talk about trying to cover all bases!

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First shots of price war

The first shots of a predicted price war in the home computer market were fired in early October when Commodore Computer NZ Ltd announced heavy discounts and consequent retail price cuts of up to 45%.

The C64 was reduced to $549, and the 1541 disc drive came down to $485 (from $749).

It seems the momentum for a showdown had been building since March when Commodore gave notice to Fountain Information Services that its sub-distributorship (to mass merchandisers like Farmers) would end this December.

An orderly withdrawal however, didn't happen.

Commodore Computer NZ managing director Dick Anderson says an essential element to the decision to cut prices was the retail market "going dead" and the increasing price competition from Atari since July.

"We had been hoping to launch the C128 about July to enable a repositioning (repricing) of other products but the C128 had still to arrive so we were eventually compelled to go ahead with repricing anyway," says Anderson.

The initial result was October's unit sales increasing 100% on September sales.

At Fountain IS, general manager Paul Williams refers to the price cuts being reflective of the market reality, and of Fountain's desire to exit from the home micro market.

In step with impending name changes to the organisation, Fountain is planning to concentrate on Altos processors and various modems and peripherals for multi-user computer systems.

Meanwhile Fountain was continuing to buy Commodore gear from Australia to supply its retail chain customers until the year's end.

Other micro brands also came down in price, but not as drastically.

P.O. justifies monopoly

The Post Office's monopoly of the availability of Computer Phone is justified by product manager Norm Nicholls on the basis of the department's investment in "tailoring" the device to the local telephone system.

"Because there is no accepted standard for telephone devices worldwide, we have to put this kind of effort in and that is why we must retain control," he said. When international standards arrived, as they have in the computer world, the post office might have a different attitude to a range of competing devices.

This investment was required to be recouped from a relatively small market, and this further encouraged the PO to retain all distribution rights of ComputerPhone.

Some users however could be expected to be unimpresed with the PO's structures on the device's availability.

Customers cannot, for instance, purchase the device as they can in Britain and Australia.

The Australian purchase price for ComputerPhone is about A$3000 (NZ$4000).

Mr Nicholls however asserts that the rental-lease plan reflects the "continuing commitment" of the PO to support ComputerPhone.

He added that ComputerPhone would not be a static entity (meaning it would likely be enhanced) and there was the possiblility of similar but more advanced devices being introduced within the next few years.

For the monochrome ComputerPhone the cost will be:

Rental only - $350 a month

Two year term - $230 a month or $2000 plus $120 a month

Three year term - $190 a month or $2000 plus $100 a month.

The colour monitor rates are about 40 percent more.

5.3 Gb disc drive

Data General has announced a 5.3 gigabyte (Gb) disc package for large mainframe and mini configurations. The disk package consists of nine 592MB discs and three intelligent disk controllers mounted in three meter-high cabinets.

New AT & T deal

Microprocessor Developments Ltd (MDL) has renegotiated with Olivetti Australia its contract of supply of AT&T micros and miniprocessors.

(American Telephone and Telegraph owns 25% of Olivetti worldwide.)

MDL marketing manager Ken Eagle says the new deal enables his company, as the NZ distributor of AT&T computers, to offer retail dealers the usual 30% margin.

Previously, says Eagle, no dealer was interested in the slim margin offered under the initial arrangement, and MDL was having to sell direct — selling only two AT&T systems up to last August.

Olivetti Australia agreed also to a lower pricing schedule to enable retail price cuts for AT&T equipment.

Since the revised pricing, eight AT&T systems (each costing upwards of $50,000) have been sold and retail dealerships signed with Skellerup Microsystems and Business Computers Ltd (Chch), says Eagle.

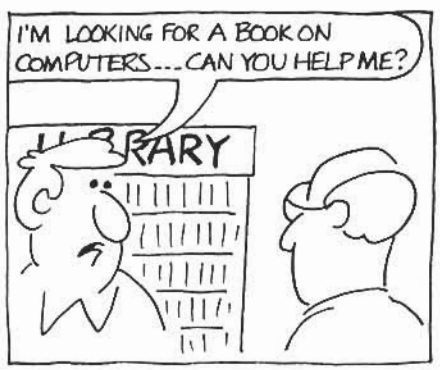
Regarding rumours of financial troubles at MDL, Eagle says the company's biggest problem was in arranging adequate finance for the manufacture of EFT (electronic funds transfer) terminals next year — that contract, he says, being worth $3 million.

Plans stalled

Microbee NZ's new Auckland centre will be temporarily unmanned and its operations centred in Wellington until January.

Manager Shane McKeown is meanwhile returning to Australia to help prepare the opening of a few more Australian branch offices.

McKeown says customers, mainly schools, would not be affected as all but one of Microbee's school users were in Wellington, and that was where support had to be concentrated during the next two months.



Printer premiere

The NZ distributor of Star printers, Genisis Systems, was conferred with a world first in launching Star's latest high-density dot matrix printer.

The only other outing for the 24- pin-head printer (the usual density has been nine pins) was at this month's Comdex Show in Los Angeles.

The launch here was acknowledging Genisis' claimed 70% share of the local printer market.

Officiating at the launch last month were Star sales managers Masanobu Takano and Masao Yamakazi, who told Bits and Bytes that dot matrix printers would retain the lion's share of printer business.

They say the "page printers", including daisywheel and laser-jet types, had less than 4% of the total market because of high price and slow form feed disadvantages. Although predicting this share would increase, to 17% by 1990, the number of dot matrix units would then total 12.5 million.

In step with slowed computer sales, printer sales growth subsided to 10% on last year's totals but they predict sales being spurred by more advanced products such as the higher density "multi-pin-head", faster printing dot matrix to be launched by Star in the latter half of next year.

Amstrad cuts

Amstrad's tape-driven 464 micro was reduced 30% in price in mid-October following the Commodore discounts.

Included were $300 bundles of 464 software and joysticks cut to $195.

Meanwhile the disc-driven 664 Amstrad sold out last month, according to distributor Grandstand Leisure.

Its successor, the disc-driven 6128 (with 128 K ram) was recently launched with a $500 discount offer being made to schools.

In the US, the giant Sears-Roebuck chain recently launched the 6128 on to that fiercely price-driven market.

Amstrad's newest machine, the 8256 , was expected to arrive here in bulk from Germany in mid-November, and will be priced at $2400 (including printer).

Atom images

In Zurich IBM scientists have made a new scanning-tunnelling microscope which can "zoom in" on atomic surface structures and make images of them.

NEC multi-uses

Low cost multi-user and integrated accounting software from M L Systems, of Auckland, enables three-user configuration, complete with computer, printer, terminals and software, to cost $16,500.

A single user NEC APC 111 could be expanded to multi-user capabilities, with each level of software able to be returned for a full credit when purchasing a more comprehensive level.

Another NEC development is the availability of Attache business software, previously running only on IBM computers.

Computex 'live'

Computex went "live" on October 21.

Initial services include a 300-frame notice board, and a teleconferencing ability for subscribers wanting to "talk" to each other.

Computex has mailed, to more than 3000 respondents, information on modem and software options enabling linkage to this videotex service.

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The Spectravideo 738 "X' press"

The X'press is almost there

By Mark James

I had originally intended to write this review on the Spectravideo 738 using the machine itself, and therein lies both the excitement and the disappointment of this seductive computer. That I should consider using this machine to edit a serious document shows that the 738 aspires to be more than an MSX "games computer"; but the fact that I am now back to Wordstar on an MS-DOS computer indicates how far Spectravideo still have to go in order to achieve their objective.

The Spectravideo 738, nicknamed X'press (or Express), is the first home computer on the New Zealand market to provide both MSX and CP/M.

As an MSX machine, it has very few faults. It adheres to the full MSX hardware configuration; its MSX Basic in ROM is complete; its graphics and sound capabilities are both satisfying and flexible; there is a full 64K of user RAM.

Its single cartridge port can run any of the growing range of MSX-format game cartridges. In addition, a 3½ inch disk drive (360K of formatted storage) is a standard feature of the machine, and it is this that sets the X'press apart from other MSX computers.

Like the Amstrad 664 and the Commodore Amiga, the X'press is attempting to bridge the gap between home and business uses.

Intelligent design

The X'press comes in its own carrying bag, intelligently designed with both hand and shoulder straps on the outside and pockets on the inside to hold cartridges, diskettes and documents. There are also compartments for cables and the rather hefty external power supply.

The computer itself looks somewhat like a white plastic version of the Hewlett-Packard 110 – you almost expect to see an LCD screen flip up.

The keyboard has 73 full-travel keys arranged in professional typewriter style except for the fact that the F and J keys are not dished. There are five programmable function keys, shifted to give ten.

The cursor control keys are large and have been arranged in an unusual I-shape. The caps-lock key has an LED indicator.

There are also keys marked "Graph" and "Code", each of them shiftable but not lockable; with these, 152 extra graphic, mathematical and foreign symbols can be produced on the screen from the keyboard. These, however, follow only the MSX standard; which means that you need to buy an MSX-compatible printer in order to print them.

The single floppy disk drive is located on the right side of the computer, along with parts for dual joysticks and a cassette tape.

Most of the interfaces, however, are found on the back, protected by a long handle that pops out for carrying, or down for tilting the keyboard to a comfortable angle. Here are the on/off switch, the DC power input, a channel switch, and ports for sound, video and VHF output, as well as both a serial (RS-232C) and a parallel interface, and a port for an external disk drive. The only fault in this arrangement lies with the serial port, a nine-pin "D" connector, which sits right next to the disk port, a 25-pin "D" connector. Since the 25-pin "D" connector is also the most commonly-used RS-232 interface, people will likely confuse the two.

Strange Dos

Apart from MSX Basic, which resides in ROM, the X'press supplies two other operating systems on diskette: CP/M and MSX-DOS.

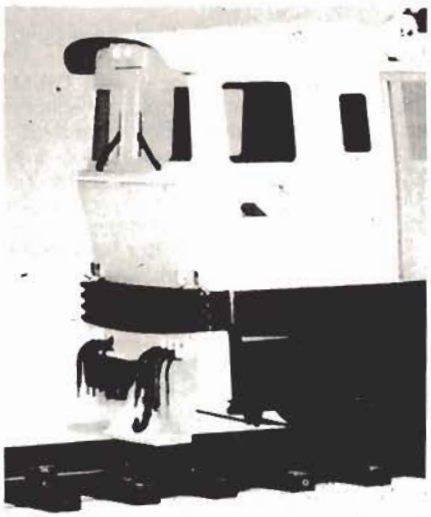
The latter is a rather strange animal. If its name recalls that of MS-DOS, it is because both DOSes (as well as MSX Basic) were designed by American software giant Microsoft.

MSX-DOS has had a low profile in MSX literature, perhaps because Microsoft had assumed that there is no market for DOS-level hacking among those who might buy MSX computers.

The amount of effort that has gone into the design of MSX-DOS certainly does not reflect an immense respect for the "low end" of the computer scene.

MSX-DOS has been likened to an MS-DOS for the Z-80, and there are the familiar file-handling commands and programs (DIR, COPY, DELREN, FORMAT), and MSX-DOS file format is identical to that of MS-DOS; but sub-directories are not supported, and there is no CHKDSK program — essential to any serious use of the disk.

On the MSX-DOS diskette are two programs worth mentioning: WIDTH80 changes the monitor screen from 40 to 80 columns, without the necessity of extra hardware. The 80-column text is of poor quality when a television screen is



used as a monitor, but that is the fault of the television, not of the X'press.

On a low-resolution computer monitor, the X'press produces crisp, well-defined characters in either 40 or 80-column mode.

The other program is called 4-in-1; it's a combined memo writer, spreadsheet and filing program which, ironically, works only in 40-column mode.

The functions are simple but are not integrated.

Documentation is sketchy, but the program is easy enough to learn by trial and error.

The CP/M diskette contains the full CP/M 2.28, including Z-80 assembler and DDT. Experienced CP/M users, however will miss the usual "extras" such as NEWSWEEP.

With the STAT CON:=UC1: command, screen output can be made 80-column; one of the function keys is even pre-programmed with this command.

The CP/M diskette also contains a program called Scheduler, which performs five functions: a personal information file, a date-based diary, a name and address index, unit conversions (mostly metric to and from imperial), and a "world time" converter.

The sparse documentation warns the user not to run the Scheduler on the CP/M system disk, as "a fatal error may occur and damage the system disk."

Disk performance

How does the X'press perform as a disk-based computer?

As a test of this, I decided to try to write this review using the memo writer func-

(Continued on page 14

(Continued from page 13)

tion of 4-in-1. I quickly gave up.

The memo writer contains some useful features, such as insert mode and paragraph reform, but lacks such essentials as cut-and-paste.

In any event, serious text processing in 40 columns is pretty hopeless.

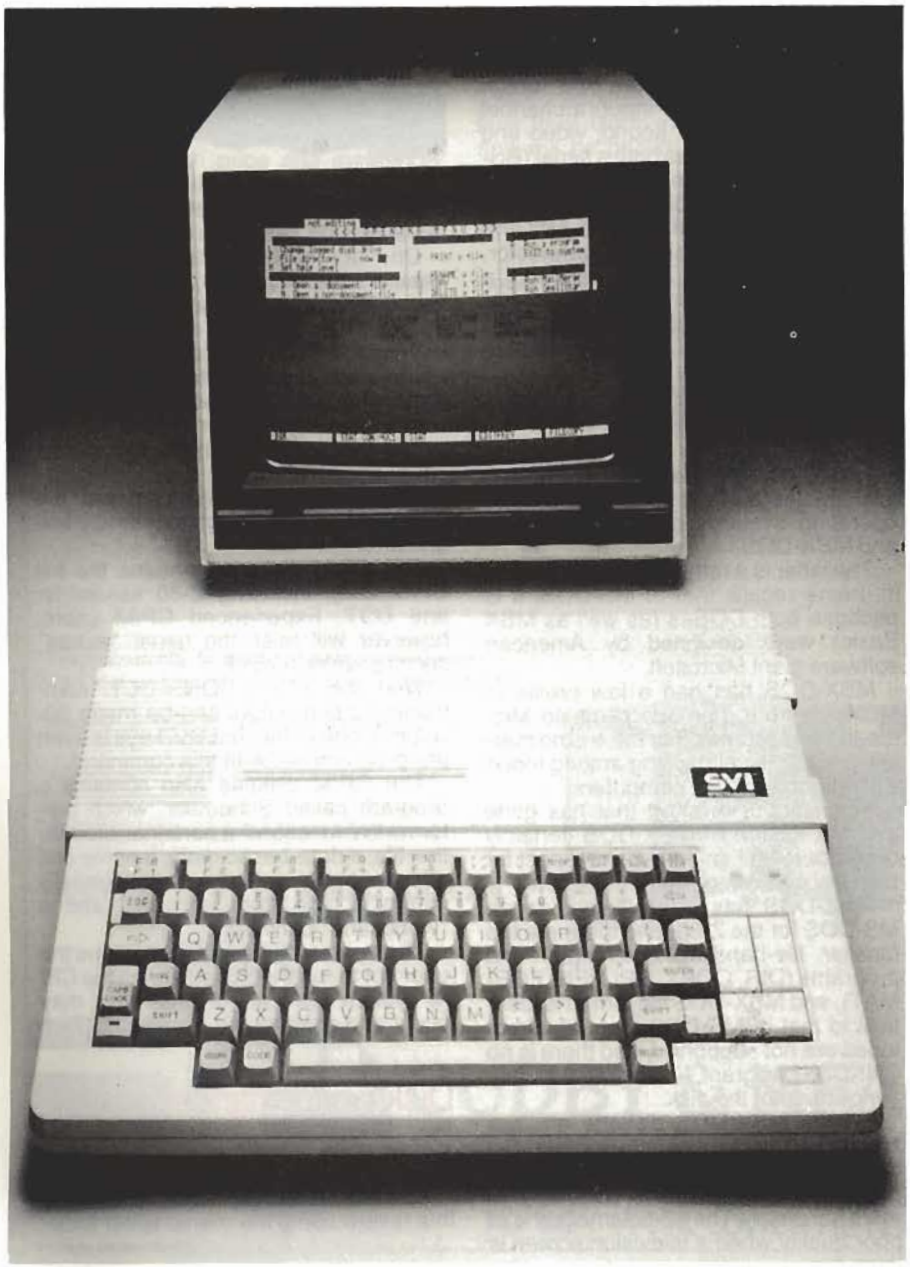
Not to worry, thought I, with CP/M there are plenty of 80-column editors around. Unfortunately, none were available on 3½-inch diskettes for the X'press – and if I dared copy the likes of Wordstar on to one, the copyright club might strike my RAM chips dead.

The only 80-column editor that I succeeded in getting to work was CP/M's pathetic line editor ED.

Still, I figured I had one trick left: both CP/M and MSX Basic have RS-232 communications programs. If I couldn't write the article on the X'press itself, I could at least use the X'press as a terminal on the AMPS system at the office and this way I would be sure of a decent full-screen editor.

The X'press software, however, let me down again. The CP/M program called RS232 supports every form of serial communication except terminal emulation. And the Basic CALL COMTERM function, like all of MSX Basic, operates only in 40-column mode.

Thus, while AMPS would happily converse with a 40-column terminal, I was still stuck with a 40-column editor. I had to concede defeat; out came the Sanyo and in went Wordstar.



More software

In fairness to the Spectravideo people, it should be said that no new computer has ever hit the market with enough software.

Computer Distributors do promise that plenty of CP/M and other software is on the way, including such popular programs as Multiplan and the MicroPro range. These, one would hope, will take advantage of the inbuilt 80-column feature of the X'press.

There is also a small but growing selection of non-game software available in cartridge form. I had a look at one, a Dutch database manager called MT-Base (NZ$169).

It is flexible and powerful, containing a rudimentary report writer, and the documentation is thorough. However, this is generic MSX stuff, and therefore strictly 40-column; the 80-column feature is again wasted.

> In fairness ... no new computer has hit the market with enough software.

A word on documentation: that supplied by Spectravideo is of mixed quality.

The CP/M manual is good, with examples presented at appropriate points.

The MSX Basic reference manuals — there are two of them, one for standard commands and one for disk commands — are fairly complete, but the Basic programmer will find it annoying to have to switch back and forth between them.

The MSX-DOS guide is long on hype and short on readable English, but it does cover plenty of technical detail, for those interested.

Finally, the SV1-738 User's manual, although essential for first-time users, should quickly find its way to the back of the shelf and stay there. (The English is a Chinese version.)

There are two non-Spectravideo manuals that are well worth recommending to anyone wishing to program on an X'press. They are:

The Complete MSX Programmer's Guide, by T. Sato, P. Mapstone, and I. Muriel (Melbourne House, NZ $79.95). The word "Complete" should be read "Complete Basic". This is well-presented and full of examples and explanations.

Starting Machine Code on the MSX,

by G. P. Ridley (Kuma, NZ $19.95). This is a fine beginner's guide to Z-80 assembler.

The world has not been kind to those who have tried to cross the divide that separates home and business computers. Even IBM failed with its overpriced, underpowered PCjr, and Apple's attempts to work both markets have only lost them the coveted praise of Wall Street.

On the other hand, the outlook for pure MSX might not be bright, either. The world market for cheap game computers is at best uncertain, except perhaps in Japan, and there are too many manufacturers trying to supply a demand that has stagnated since 1983.

The Spectravideo 738 X'press is solid on the game front, and it has taken an important step in augmenting MSX with a floppy disk, 80-column display and CP/M as standard equipment.

Its abilities as a more serious computer are hampered, however, by the present lack of 80-column software available.

But given better software, the X'press deserves to succeed.

Mark James, the reviewer, is support manager with Advanced Management Systems in Auckland.

Microcomputer Summary

Name:	Spectravideo 738 "X'press"
Manufacturer:	Spectravideo, Hongkong.
Microprocessor:	Z-80A
Clock speed:	3.579 MHz
Memory:	32K ROM (MSX Basic) 64K RAM (24456 bytes available under Basic) plus 16K video RAM.
Input/Output:	MSX cartridge slot Inbuilt 3½-inch floppy disk drive Port for second (external) floppy drive Centronics printer port RS-232C serial port Dual joystick ports Cassette tape port Video, audio and VHF output.
Keyboard:	73 full-travel keys (including 5 shiftable programmable function keys and 8 editing keys).
Display:	Text up to 80 x 24 characters; graphics 256 x 192 pixels; 16 colours, 32 sprites.
Languages:	MSX Basic, Z-80 assembler.
Sound:	8 octaves, 3 voices plus 1 noise channel.
Cost:	$1195.00.
Supplied accessories:	VHF monitor cable, 2 diskettes, 5 manuals, power supply and cable, carrying case.
Options:	Second disk drive $795, printers from $699.
Reviewer's ratings: (5 highest)	ease of use 4, expansion 5, support 4, documentation 3, language 5; value for money 4.

(Review unit supplied by Computer Distributors, 46B Taharoto Road, Takapuna.)

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DMM 9175A

An innovation named Nimbus

By Peter Parsonage

This is another IBM compatible but it is, in many ways, a more advanced computer. It uses a true 16-bit microprocessor, operates at a higher clock speed and stores twice as much data on smaller disks. With so many advantages it could be expected to command a higher price, but this is not the case. To achieve the specification to be described you may assume that it is manufactured in Asia. Again, this is not so. It is manufactured in England by Research Machines Ltd.

As supplied for evaluation the computer included: the Nimbus computer unit, an IBM style keyboard (Nimbus), a Nimbus mouse, and a Roland (Japan) RGB colour monitor.

Software was very limited and I was only given an operating system (MS-DOS 3.1) and RM BASIC. The MS-DOS disk did include a "Welcome" program that demonstrated many of the features available.

Hardware details

The computer is attractively packaged in a moulded case coloured in two shades of grey. It occupies only 75% of the desk space required for an IBM.

Two 3.5" disk drives are fitted as standard and below them are three slots, neatly concealed behind flaps to accomodate two ROM packs and a software "key", required for protected software.

A speaker is mounted behind the front panel for use with the inbuilt sound generator.

On the rear panel a selection of sockets are provided for the display (colour or mono), networking, a printer (serial with a non-standard connector), keyboard, mouse or joystick, and power outlets(230v AC, 12v and 5v DC).

The keyboard conforms to the UK standard IBM configuration but uses capacitance switching with resultant quiet operation, though a rather spongy feel. I have certainly used better keyboards.

A disturbing feature is the absence of indicator lights for the CAPS LOCK and NUM LOCK keys. This was a major deficiency on the IBM keyboard and has been rectified by most compatible manufacturers.

The tilt angle may be set to 5 or 10 degrees. This is a rather limited choice and again conforms to the IBM style with no improvement.

The monitor is a standard Roland unit available for use with a wide variety of computers. It is an attractive unit that performs well. The superb graphics features of the Nimbus give it a thorough testing.

The mouse is a neat unit that fits snugly in the palm of the hand. It has two buttons and worked well with a demonstration program.

The case opens easily to show a main circuit-board concealed beneath the disk drives and the power supply making access difficult. Three expansion slots are available with the fourth occupied by the disk drive controller.

Connection to the main board is by ribbon cable and pin connectors.

The volume control for the internal speaker is mounted on the main board accessible through a ventilation hole.

Specifications

The important feature of the design for the Nimbus is the use of a true 16-bit microprocessor, the 80186.

The IBM and its compatibles use the 8088, a microprocessor which uses an 8-bit data bus but supports 16-bit operations. This, coupled with an 8MHz clock (the IBM clock is only 4.77MHz), should make the Nimbus much faster in executing programs.

With the limited software available I could only test the computational speed of BASIC using a simple benchmark program for which I have results for nearly 200 computers.

The Nimbus executed the program in 24 seconds, the same as the IBM PC.

(Continued on page 18

The RM Nimbus, a 16-bit micro from Oxford-based Research Machines Ltd, is based on an 80186 8MHz processor, VLSI gate array technology, dual-bus architecture and a separate graphics processor. Among new ideas is an input/output system called Piconet, which allows Nimbus to drive up to thirty peripherals or instruments from a single 1/0 port.

(Continued from page 17)

This is 8 seconds slower than the ACT Apricot, and 66 faster than the Sanyo MBC-550.

The graphics display is handled by a separate VLSI processor and graphics demonstration programs operated with impressive speed.

I am sure that the theoretically superior 80186 would demonstrate its true capabilites in a networked application but I was unable to test this.

As supplied the Nimbus had 512K of RAM with a further 64K allocated to the screen. This can be expanded to 1 Megabyte and can be partially configured as a ramdisk (silicon disk) if required.

The two disk drives were 3.5" drives and could each store 720K. A Winchester (up to 40Mb) can be built in or an external Winchester may be used. A 5.25" disk drive can be added externally for program exchange with the IBM PC.

I can only speculate on the usefulness of these options as no catalogue or detailed data is available yet.

In a teaching situation where a networked system is used, a Winchester would be very useful.

Work related

In my teaching experience (technical institutes) networking or any multiuser system is simply a nuisance foisted on to teachers by administrators and salespeople.

The students are keen to learn on a system similar to that which they are likely to encounter in a working environment. From that viewpoint I liked the Nimbus very much indeed.

I felt instantly at home with the MS-DOS 3.1 operating system because it was so similar to the PC-DOS 2.1 that I normally use.

The graphics resolution may be selected as high or low. High resolution gives a display of 640 X 250 with 4 colours (IBM PC is 320 X 200 with 4 colours or 640 X 200 in black and white). Low resolution gives a 320 X 250 display with 16 colours (160 X 100 for the IBM).

The demonstration programs clearly showed the graphic capability to be an outstanding feature.

The character set includes all 256 IBM characters and a further 256 that are user definable.

Lines can be plotted at a rate of 130,000 pixels (dots on the screen) per second and that is very fast. With the appropriate software the powerful graphics could provide useful displays for teaching within schools.

The alphanumeric font used is clear and easily read. I normally prefer the clarity of a green screen monitor but found no difficulty at all with the Nimbus colour display for text.

Software

The disk format used prevents operation of IBM PC software directly and the importer had only RM BASIC available with documentation, although I understand that other languages are available.

I was offered some packages without documentation but declined as that makes fair evaluation difficult.

The availability of good software largely determines the future of a computer and I am sure that this will apply with the Nimbus.

It is priced towards the high end of the market and potential users will be concerned about the support likely from software suppliers. Educational programs for schools, require hundreds of man-hours to write. With limited resources within NZ, teachers will certainly be looking to see what is available from overseas sources.

Within Technical Institutes BASIC is still accorded high priority and the acceptability of RM BASIC remains to be seen. PASCAL and LOGO would further enhance the range.

For business applications it will be necessary to source database, spreadsheet, word-procesing and accounting packages.

Documentation

The Owner's Handbook is well presented in the familiar small ringbinder commonly used. It is clear, well written and would be readily understood by a complete novice.

Technical details are limited and a more detailed treatment would be esential for the experienced user.

The handbook for MS-DOS 3.1 supplied is bound, making it very awkward to use (especially when trying not to damage it). The pages are already punched and if it was mine I would take it apart and put the pages into a ring-binder.

It contains all the required information but the overall quality of presentation and typesetting is not suited to the fine computer with which it is supplied.

The RM BASIC book is A4 size and marked "preliminary edition". This is fortunate because it too is poorly presented. It does contain a good descrip-

tion of the BASIC commands available and sufficient details to allow a beginner to advance quickly with little additional assistance.

Summary

The Nimbus is a very well engineered computer utilising advanced design concepts.

The overall standard of construction is high and the problems I have mentioned could all be corrected with little difficulty.

This is a very new computer and these problems are inevitable.

The importer, Barson Computers Ltd, has a proven record through their association with other products, in particular the popular BBC microcomputer, and if they support the Nimbus as well it should achieve a significant share of the market.

My main reservation concerns the availability of software. It is sufficiently different to the IBM PC and PC JX to make compatibility look doubtful.

With a price of $6500 complete, it competes with a very wide range of personal computers.

MICROCOMPUTER SUMMARY

Name:	RM Nimbus
Manufacturer:	Research Machines Ltd., England
Microprocessor:	80186 16-bit 8051 (11 MHz) for peripheral control VLSI processor for fast graphics 8087 (optional) coprocessor
Clock speed:	8 MHz
RAM:	512K plus 64K for screen
ROM:	System
Input/Output:	RS422 (Bell socket) serial for printer — Works with limited subset of RS232 RGB video DIN connector (IBM monitor) Mono video Power supplies: 230v AC, 5v and 12v DC Mouse socket (Nimbus mouse supplied) Piconet Network Three expansion board positions
Keyboard:	Detached with coiled lead (IBM style)
Display:	25 lines X 80 characters
Graphics:	640 X 250 X 4 Colours or 320 X 250 X 16 Colours
Languages:	RM BASIC, RM PASCAL, RM LOGO (Only RM BASIC seen and tested)
Sound:	Inbuilt speaker
Cost:	$6500
Software:	Yet to be seen
Distributor:	Barson Computers Ltd.
Reviewer's Ratings:	(1-5, with 5 the highest) Ease of use 5; documention 3; languages 4; expansion 3; value for money 4 (if features can be used).

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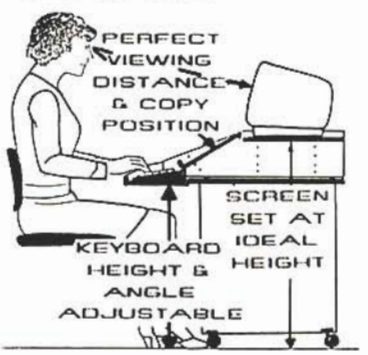

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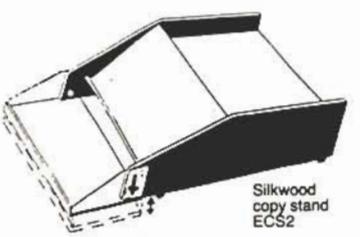
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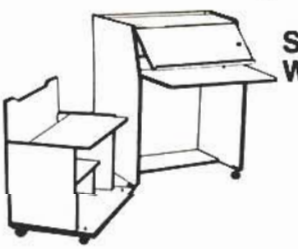

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Juki 2200 typewriter/ printer review.

I read with interest John Slanes' review of the Juki 2200 typewriter/printer in the Sept. 1985 issue of Bits & Bytes, but a very important short coming with the parallel interface version was not mentioned.

The parallel interface conforms to the Centronic format except that the P.E. (paper end) signal is not generated, so unless your word processor program "dumps" to the printers 2K buffer in "one page lots", and then waits until commanded to continue, the printer will cheerfully print away, irrespective of it having paper or not?

This problem can be got around if you "hover about" while your document is being printed, and quickly disable the print mode (Control Z) when near the end of the page, load a fresh sheet of paper, and then enable print mode, (Control P), again.

But this is a little "hit and miss" and leads to some pages having more lines than others, which can look messy on an important document.

Apart from a few shortcomings I am very happy with my Juki 2200 typewriter, which satisfied my requirement for a "letter quality" printer and portable typewriter at a reasonable price.

I must congratulate you and your staff for an excellent magazine. I have been a subscriber from the "word go", and with every issue you go from strength to strength. Keep up the good work.

Andrew Court
Wellington

Dear sir,

I read with interest the review by John J Slane and surprisingly I find much I can agree with. The question of capacity or large volume work load will never be challenged by this office. I am very honest in, where possible, qualifying the likely work load prior to making the sale. It should be remembered that all Juki 2200 users have a 14-day trial period to assess their useage against the performance of the Juki 2200.

There are one or two review statements that do require a response.

The Juki correctable carbon ribbon is rated at 400,000 characters and can be purchased from Action Line in dozen lots at $11.70 each, or 58 cents per 2000 character page.

A better alternative, of course, is the new Juki Fabric Ribbon. This is rated at 400,000 characters and sells for $13.50 each. Using this ribbon the page cost reduces to 7 cents per page.

The question of speed was not fully presented by Mr Slane. We agree that 10cps is not earth shattering, but when compared to a "dedicated" low cost

daisywheel printer operating at 14cps the difference is minimal.

To print a 2000 character document on the Juki 2200 takes 3.33 minutes. This stated in "tea-drinking" time may suggest that "instant coffee" may be a better choice than "Brooke Bond". Indeed using a 14cps printer only saves 55 seconds — or one less "slurp" of your beverage.

With reference to the 2K printer buffer on the Juki 2200, we were surprised at Mr Slane's disappointment. In fact when we analyse your own "daisywheel printer" round-up published in July 1985, we find that the Juki 2200 is the only machine under $1000 to boast a 2K buffer.

Indeed you need to spend closer to $1500.00 for this feature.

In conclusion we do agree with the reviewer that the Juki 2200 fills a need in the market which demands both an electronic typewriter and daisywheel printer.

The Juki 2200 has been placed with many small companies and small departments in large organisations which demand a genuine dual purpose capability.

George J Bright.
General Manager
Andas Actionline

Dear sir,

We have been invited to voice our opinions on the contents of Bits & Bytes. By and large I would say it is fairly satisfactory as it is.

Now, speaking for myself, I would like to see more programs published; particularly of the more serious kind, including subroutines that could be incorporated in one's own programs. Utility programs are always welcome.

Information and circuits on how to add ports of various types, how to make simple A/D convertors and any ideas at all along these lines are much appreciated.

I like what Gordon Findlay has to say and Joe Colquitt's type of article.

I own an Amstrad with Disc-drive, though I built my SC/MP with Nibbyl Basic way back in '79. Later I made an S-100 Computer.

I am not the least interested in Bill Smith leaving Wig-wams and going to Whata-it & Co. I also feel that reviews may be a bit overdone.

Thank-you for giving us the opportunity to express ourselves in this way.

E.J. Brown
Cambridge

Dear sir,

I have been a subscriber to "Bits & Bytes" since January 1984 and I enjoy reading it virtually cover-to-cover each month. It's superior to any other computer magazine offered in NZ, Australia, USA or UK at present.

I am now ready to invest in a PC, but I would love you to review the Spectravideo 328, and Apple 2e, to make any decision easier. I know the 328 has been out for 18 months now and that you reviewed the 318 in December 1983. However, the 328 is different, has been enhanced since its first release in NZ, the peripherals are how available (and hence reviewable) plus prices have dropped significantly (from $1495 to $895).

The 2e has been around a long time but in view of recent "enhancements" and much reduced costs I should love to know how it stands amongst the competition today. I refer to the $3995 Busi-

(Continued on page 23)

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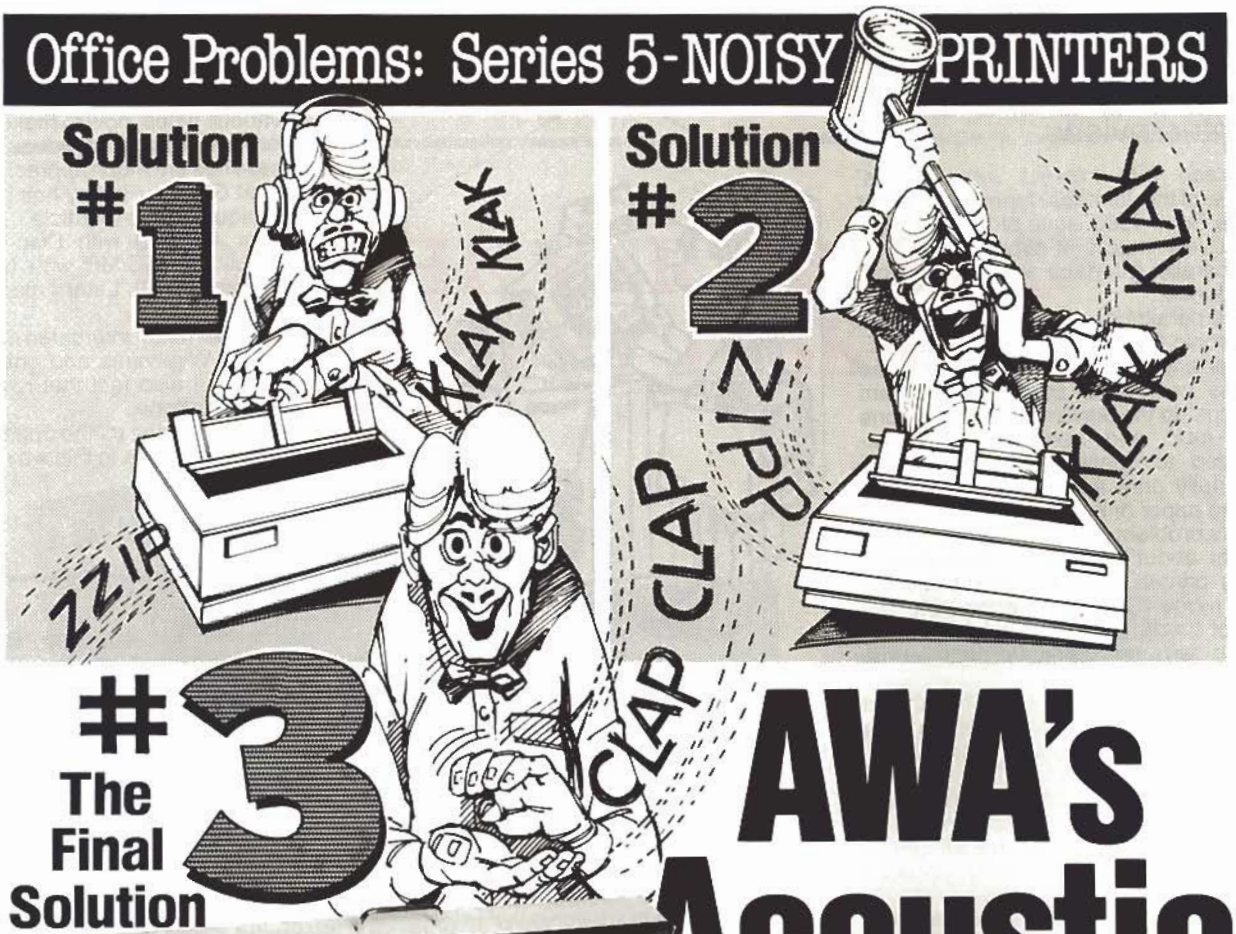

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AWD 2602

(Continued from page 21)

ness Pack (128K RAM 2e, monitor with built-in 163K duodrives, 80-column card, Appleworks,. . .).

I appreciate that you really have your work cut out reviewing brand-new models. But, as the 328 and 2e appear excellent buys in the "advanced-home-computer-potential-business-computer" category, a fresh look would be most welcome indeed.

Chris Marshall
Auckland.

The choice, ultimately, is the buyer's. — Ed.

Dear sir,

I think Bits & Bytes is very good for a NZ mag. It's the best in fact, but it would be better if:

1) it had a buy, sell and swap input free of charge.

2) a mailbag section so people can write in.

3) a bug hunter section where people can write in and inform others about bugs in commercial software.

4) paid people for their programs (listings) so more people would send them in.

5) got people to review there own software.

6) you had an 'adventure' on tips, help, etc.

R.M. Adair
Gore

Editor's response:

1) space precludes free advertising.

2) this is a mail section.

3) I am keen to receive readers' tips and insights.

4) we do pay for published programmes.

5) software reviews have to be objective.

6) tips on game play are of very limited application.

Dear sir,

My son is a subscriber to Bits & Bytes, which I like to look at as well.

Our Company has been issued an IBM,PC,AT computer.

As our staff are "computer laymen," we note your publication of programs on business applications e.g. the "sort program" in July.

Programs on sequential and random files, and recipe costings would be enlightening, as would be data base, Lotus Symphony spreadsheet examples similar to the "House Buying Program" (May '85 issue).

There is an increasing supply of books on programs, but where does one draw the line on the correct choice?

Keep up the good work with your publication.

L.A. Hibbard.
Christchurch

Farm software

Barson Computers (NZ) Ltd, distributor of the BBC microcomputer, has announced the release of a Farm Management package for the BBC.

Developed by Rural Planning Services, a UK agricultural consultancy, the initial package consists of four modules:

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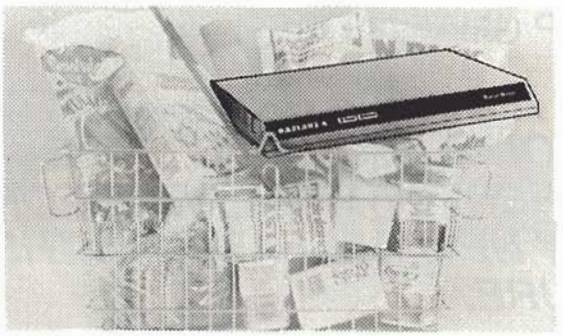

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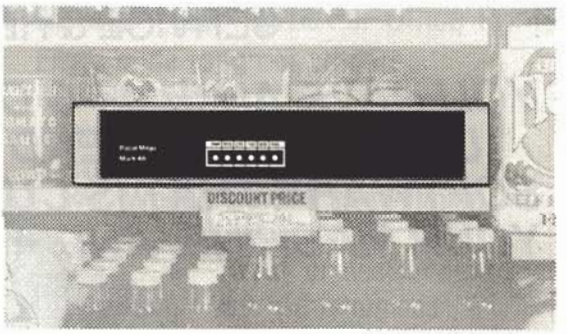

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RACAL

Disc drive for Spectrum

By Lindsay Hunter and Roger De Salis,

of the Wellington Spectrum Users Group.

The Opus Discovery is a disc storage unit offering a conventional alternative to Sinclair's own microdrives.

Discovery 1 is a black box, with a flat base plate extending out the front on to which is mounted the Spectrum, containing a single 3½" 180K disc drive, a board containing all the required electronics, and a power supply internally which powers both the Opus and the Spectrum.

In addition is a through-connector, Centronics printer interface doubling as an 8-bit bi-directional parallel I/O port, "Kempston Standard" joystick socket and composite video-output-phono socket.

The unit is not compatible with Sinclair Interface 1.

Manual

The manual supplied with the unit was excellent, in places surpassing Sinclair's IF1 manual in the way that channels and streams are explained, how each command is used, and short demonstration programs to illustrate each point.

The extended BASIC commands such as OPEN#, CLOSE# and MOVE etc are supported, but information seems to come to a complete stop if data is required for hardware device addresses, access methods via machine code to the various peripherals. This is a shame as the unit is so good in all other respects, and one hopes this information is forthcoming in some form.

The unit has a full complement of error messages, but examining the ROM revealed one undocumented error message. I should love to know which incorrect command sequences produces "Don't be a wally!".

There is full support of channels and streams, but a dual syntax for some commands: the standard command ERASE "m";1;myfile" which can be replaced by ERASE 1;"myfile" has the effect of erasing "myfile" from the disc, and reporting if the file was not found. But ERASE "m";1;"myfile" also kills "myfile" if it was there, but does not produce a report, even if it wasn't? Similarly with the SAVE command.

"Breaking" during a drive operation leaves the drive motor running and the computer back in Basic. Any subsequent operation that is allowed to complete, will turn it off.

Printer support

The ZX Spectrum access to peripherals through Interface 1 requires the use of OPEN commands.

Due to the use of tokens and keywords, output is either sent directly, or edited into ASCII, i.e. character by character. The latter is necessary for printer formatting and graphics.

Similarly, the shadow Rom in the Opus supports the printer using OPEN# 3;"t" for text, and OPEN# 3;"b" for binary.

The manual makes several references to the ability to input data using the parallel port, but is vague in the way this may be achieved.

Opus emulates microdrive Basic, and we encountered no problems running Basic programs.

Changes may be required concerning the printer, namely OPEN#3;"t" in a basic line somewhere in the program prior to any LPRINT or LLIST statements — very similar to opening the serial printer interface on Interface One. A neat aspect of the printer software is it being all in the shadow 8K Rom, overcoming the problem of where to put the parallel printer driver software.

Space problem

One problem in running was the channel and map area required to access the disc being slightly larger than the 600-700 bytes required for a microdrive operation, so any programs that are short on space may require the removal of a few lines so the "Out of Memory" message is not displayed. My extensively modified version of Tasword 2 had to have about 6-8 lines removed to make it run.

In operation, request for a directory is pleasantly fast, but the actual time taken to load/save programs/code was surprisingly lengthy. We converted a well known flight simulation program that loads from Microdrive in 7 seconds; but from the Opus disc 22 seconds was required. This time factor was consistent throughout the use of the drive for any disc operation.

Another difference is that microdrive is effective in space utilisation on the cartridge, but the Opus appears to need a sequential space larger than the file size to actually write the file to disc.

I was attempting to save a 10K file with 29K free space on disc, and was rewarded with "No Room on disc".

Erasing files, or performing a disc tidy operation (included as a special Opus command) allowed the file to be successfully saved.

Disc backup

As the unit uses a paged Rom in the bottom 8K of memory, and a channel and map area in the same way as Microdrive Basic, it should be possible to load most applications.

Transexpress 85.2 is available as a conversion utility to convert existing cassette software to disc, but it is by no means foolproof. Most other methods used to backup cassette sofware to microdrive should apply to the Opus.

One glaring omission of Transexpress is the utility to go from disc to tape. Cassette tape remains a cost effective way of archiving material and I cannot believe this is an intended oversight.

Transexpress supplied with Opus Discovery 1 works well in transferring cassette-based programmes to disc with the limitation that the renaming of files by Transexpress is not useful when new file names do not match those in the Basic loader.

Most Spectrum software is constructed of a series of files loaded in sequence by a short Basic program at the beginning that loads and runs the rest. Transexpress renames in the subsequent files as modifications of the First. "First" is followed by "First 1" and then by "First 2" and so on. If the programmer had already named them "First", "Second" and "Third", then Opus will fail to load.

Some conclusions

At $995 it compares favourably with drives for other systems particularly as it includes a joystick port and a printer port. And 180Kb storage is "respectable".

SAVEing and LOADing 32Kb of CODE takes about 23 seconds each way. Microdrive is faster by the order of 3! But conversely, a CAT command takes less than two seconds on the OPUS, but can be up to 10 seconds on a Microdrive.

The review unit was loaned by the importers, Microware Ltd, Wellington, who added the following comments:

The time taken to load and save programs on the Discovery unit may well be slower than the microdrive in some cases. The microdrive does have a slightly faster transfer rate. Where the Discovery wins is in the loading of a program that consists of several blocks of code. This is very quick, whereas the microdrive may have to loop completely prior to picking up each block.

Other points to note are the unit fits the SAGA keyboard; the 28 Pin socket inside the unit is for a 2K RAM chip, as part of the 2nd drive upgrade.

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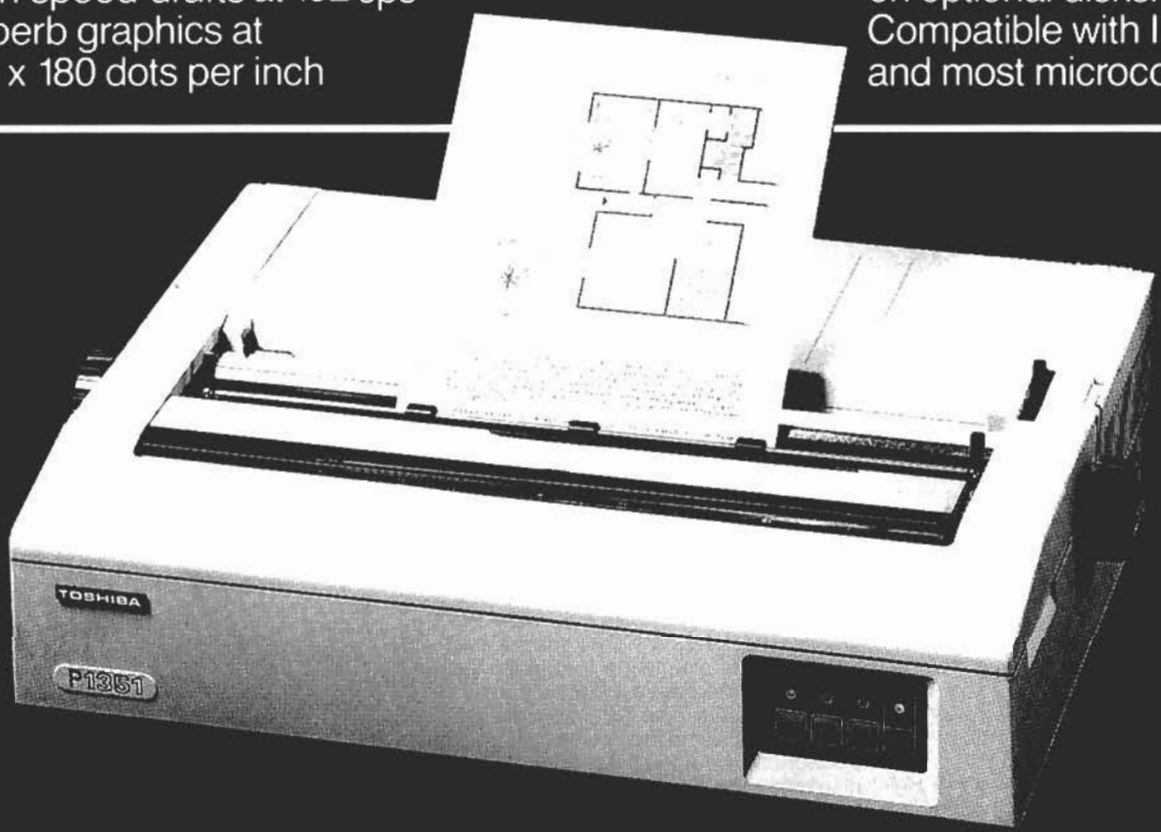

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Filling the gaps

By Gordon Findlay

Last time we started work on a program which kept lists of names, addresses and telephone numbers. As the story ended we had a complete program, which presented a menu, of which only the clear and exit options actually did anything! Now its time to fill in some of the gaps.

As we left the program, we knew it worked. As we write the missing subroutines we should try to keep things that way!

The routines to load and save from tape (or disk), enter data from the keyboard, delete records, change record, search for a record, and alter a record all need to be written. What order should we do them in?

I think it is obvious that the first one should be the routine (at line 4000) which accepts data from the keyboard. This would then allow us to enter test data to debug the other modules as they are written.

After that I would have liked to write the routines at lines 2000 and 3000 which load and save from tape, so I could enter a file, save it and use it as the other routines are written. This way I would have a file of data to use without having to type names in every time I tested some modification (but the requirements of producing a magazine article preclude this).

Every machine has different commands for loading and saving, so I need to leave them for last.

This is quite important — don't write a program in the order it occurs to you — write it in the way which makes it easiest to develop. Too often I've seen programmers start by investing great amounts of energy into a title page, and getting a magnificent display, but never getting the program finished. Findlay's 56th law: "make it work before you make it pretty".

The entry routine is straight forward enough. In lines 4000 we clear the screen (change the command if you have to), and indicate how many records there are in the file already. This is helpful — it allows the user to keep track as data is typed. We read a name, address and telephone number, using the input statement in line 32.

This little subroutine (lines 30-34) first clears X$, then inputs X$!

Why? Some versions of BASIC won't change the value of a variable if the operator just presses RETURN as the reply to an input. Try this test:

```
10 X$ = "BITS AND BYTES"
20 INPUT X$
30 PRINT X$
```

At the input statement just press the RETURN key without anything else. Does "BITS AND BYTES" get printed? If so, your version of BASIC has the quirk I'm describing.

So the subroutine at line 30 is sure to return with an empty string if nothing is given.

Why empty?

Why do we want an empty string?

At line 4040 we ask for a name. If the "name" typed in is null, we give up, and return to the main menu (line 4050), otherwise we increase the number of records (N) and store the reply as the next entry in the array of names (N$(N))

We then get an address and telephone number in the same way (line 4080-4105), but this time accepting a null entry as valid — after all, the member might not be on the phone, or we might not know the address.

Before accepting an entry as final we ask for confirmation that it is correct (line 4120) and use the subroutine for yes/no answers at line 20.

If the entry is not correct it is only necessary to back up the number of records, N, as in line 4140.

The incorrect name and address etc. will still be in the array, but we will never look past the value of N to see them.

The entry subroutine repeats until an empty name is given as a signal to quit. This subroutine could be worked on —

at present it won't allow "CHRISTCHURCH, 4" as an address because of the comma.

A single key entry routine at line 20 would speed up the handling of yes/no answers.

The next routine should logically be the listing of data, so we can check that the data is recorded properly. I decided to allow the user to specify the first and last record to be listed.

Line 8005 will toss us out if there is no data to list, otherwise we give a first and last record number. These are captured as strings so that a null response can be taken as a "default value".

If the starting value is null, or less than 1, it becomes 1; if the finishing value is greater than N, or null, it becomes N. This means that the user can just press RETURN if the data is at one end or the other of the file. Pressing RETURN twice lists the whole lot.

A subroutine to display a record looks to have several application — lines 40 to 46 will do the trick. They print whichever record is chosen, as given by the value of the variable 1.

The rest of the listing subroutine is a simple loop, pausing between records to let the user have a look at the screen.

Deleting a record can be dangerous. Lets check that the right record is deleted. This can be done by deleting only one at a time, returning to the main menu each time; and by displaying the record to be deleted before doing anything.

Line 5032 checks that the record number that is given is a valid one — always check inputs!

The subroutine to display a record is used (that's why the record number was stored as 1) and the subroutine to get a yes/no answer used to confirm. As you can see, once we get some way into the program we will find bits of program ready for us to catch up and use.

(Continued on page 28)

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(Continued from page 27)

'Decremention'

Deleting a record means doing two things — changing the record number, N, and moving all records after the deleted one back one space. To explain: if the seventh record out of ten is deleted, the 8th moves into 7th place; the ninth into 8th place, and the tenth into ninth place. No more seventh, but two copies of the tenth!

By decreasing N by 1 ("decrementing" N) though, we will ensure that we never look past 9th place, and therefore never see the duplicate.

One minor complication — if the last record is deleted we have no moving back to take care of, so in line 5075 we skip around.

Changing a record could be as complex, or as simple, as you like. This is the place where most expansion and refinement is possible. I'm working on a largeish program just now in which changing of records is done by using cursor motion keys, with a screen-based editor, rather like a word processor.

However, there is no room here for such large codes so a rudimentary version will have to do.

We change a record by displaying it, (line 6030), and asking for new name, address and phone. If nothing is given (X$ is empty) then the field concerned is left alone, and no substitution made (for example, in line 6070, where the address is only changed if a new one is given).

Users make mistakes, so the amended record is shown and they are asked to say whether it is now correct — if not, they can try again.

The routines are relatively simple, but all rely on the user knowing the number of the record to delete or change. This can be found by listing the data and looking for the one wanted, or by using the search option, so the computer does the work.

That, and some information about loading and saving, will have to wait for next episode. In the meantime, add these routines to last month's shell, and *test them thoroughly. Then knock the* rough edges off — I've left plenty for you!

```
  Additions to last month's program.

Input a string, possibly null
30 X$="" :REM see text
32 INPUT X$
34 RETURN

Display record number I
40 PRINT "Name: "; N$(I)
42 PRINT "Address: ";A$(I)
44 PRINT "Phone: "; PH$(I)
46 RETURN

Capture data from keyboard
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

Delete a record
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":RETURN
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

Change (edit) a record
6000 CLS
6010 PRINT"Change which record";
6015 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

List record(s) on screen
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
```


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Part Two: AL programming with CP/M

Running Assembly Language

By Neil Williamson,

of NZ Osborne Users Group

This program prints all the printable characters between 20 hex (a space) and 7f hex (rubout) continuously on the screen until a key is pressed.

The program processes one Byte at a time, and prints one character at a time. However, since it works at machine speed, it appears as though everything happens virtually instantaneously.

The program is entered using DDT.COM. Load DDT.COM and when the — prompt shows type A100 [RETURN]. You should now see the hex address 01000.

The A command allows you to enter Assembly Language instructions at the address shown.

Type in the following instructions opposite the addresses shown, with a [RETURN] after each line. If you make a mistake on a line and want to go back and correct it, simply press [RETURN] opposite an 'empty' address to get back to the — prompt, then type A followed by the address where you wish to make alterations.

Address	Instruction
0100	MVI E,20
0102	MVI C,2
0104	PUSH D
0105	CALL 5
0108	POP D
0109	INR E
010A	MOV A,E
010B	CPI 7F
019D	JNZ 102
0110	MVI C,B
0112	CALL 5
0115	ORA A
0116	JZ 100
0119	RST 7

After inputting the above program, hit [RETURN] on the line following 0119. This will get you back to the DDT — prompt.

Then type either CTRL C or GO [ie Gzero] [RETURN] to perform a warm boot and get you back to the A] prompt.

Then type SAVE 1 BARBER.DDT[RETURN].

This instruction saves 1 CP/M page (100 hex or 256 decimal Bytes) of memory starting at 100 hex, into a file called "BARBER.DDT".

To run the saved program, type DDT BARBER.DDT[RETURN]. This will load DDT then your program. You should see the following:

```
DDT VERS 2.2
NEXT PC
0200 0100
```

Finally, type G100[RETURN]. The program should then run outputting characters to the screen continuously until you hit a key.

The way the program works is that the first character, a space (20 hex), is put into the E register, and the console output call is put into the C register. The content of the E register is saved in the stack by the PUSH instruction, and then printed on the screen by the call to 0005 hex (BDOS).

The content of the E register is restored by the POP instruction, increased by one, duplicated into the A register, and then tested to see if it is 7F hex. If not, it is saved and printed, and the program loops to print the next character.

If it is 7F hex, the program tests to see if a key has been pressed to end the program. If not, the program repeats starting at memory location 0100; otherwise, it ends.

The Assembly Language instructions used in the above program are as follows:

MVI (for Move Immediate) means "Move immediately the Byte shown after the stated register into that register". This instruction moves (or puts) the hex value of 20 into the E register, preparatory to printing the ASCII character with that value.

The equivalent of this instruction in Basic is the LET instruction - eg LET E=&H20

On the next line, the hex value 2 is moved into the C register. The hex value 2 is the CP/M call for Console Output, that is, print on the screen.

PUSH means "Save the contents of the stated register pair in the stack". The register pairs are B (for B-C), D (for D-E), H (forH-L), and PSW (for A- PSW).

The D-E pair is saved in this program as the value in the E register is used by later instructions, and use of BDOS trashes the contents of the registers.

CALL means "Call the subroutine stated". Its equivalent in BASIC is the GOSUB instruction. In this case, BDOS is called to print the character in the E register on the screen.

POP means "Restore the stated register pair from the stack". This gets back the value in the E register.

INR (for Increase Register) means "Increase the contents of the stated register by 1". In the program, the value n the E register is increased.

MOV (for MOVE) in this case means "Move the Byte in the second register stated into the first register stated". So MOV A,E will move the contents of the E register into the A register.

The contents of the second register remain unchanged. The equivalent of this instruction in BASIC is LET AE.

CPI (for Compare Immediate) means "Compare the Byte in the accumulator with the hex number immediately following the instruction". The CPI instruction acts as if the hex number is subtracted from the number in the accumulator and sets the zero flag to bit 1 if the result of the subtraction is zero — that is, the two numbers are the same — or bit O if a non- zero result.

The CPI instruction is used to test to see if one number equals another or not, and CPI 7F sets the zero flag if the Byte in the accumulator equals 7F hex. The program is designed to print only the characters up to 7F hex.

JNZ (for Jump if Not Zero) means "Jump to the address shown if the zero flag has not been set". The CPI instruction may have set the zero flag depending on the value in the accumulator.

The two instructions act as a branch in the program similar to the IF instruction in BASIC. The BASIC equivalent is IF A<>&H7F THEN 102

MVI C,B moves the Check Console Status call (OB hex) into the C register. This CP/M call, when BDOS is called, puts into the Accumulator 00 hex if no key is pressed, or FF hex if one has been pressed.

ORA (for OR Accumulator) means "Logically OR the accumulator with the stated register". ORA A will OR the accumulator with itself. The instruction will set the zero flag if there is 00h in the accumulator, thus indicating no key has been pressed.

JZ (for Jump on Zero) means "Jump to the address shown if the zero flag has been set". This sequence of instructions allows the user to stop the program by pressing a key.

RST 7 (for Restart) means "Restart DDT".

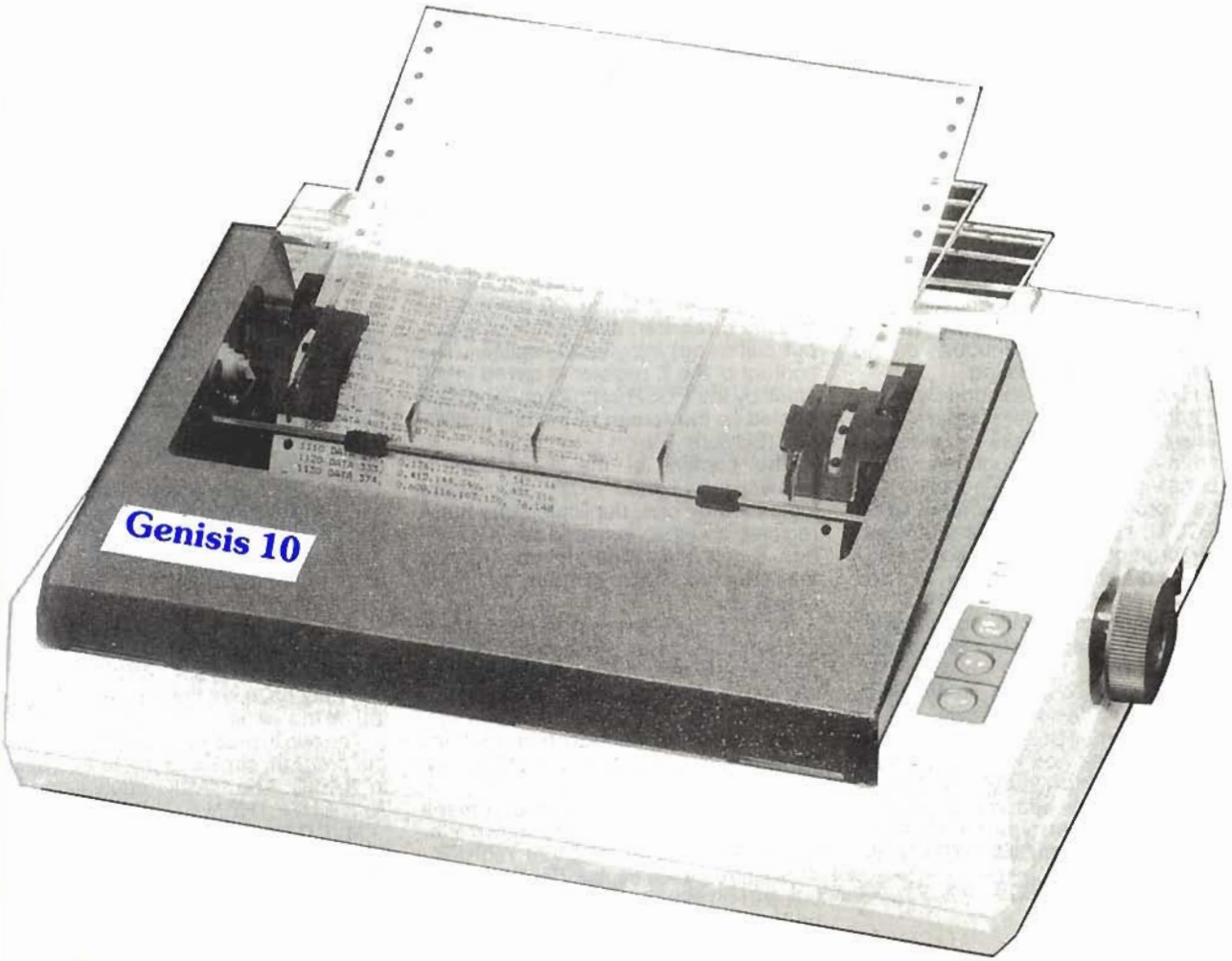
An article of this size can only be an brief introduction to working with Assembly Language. Only a few of the 8080 instructions have been explained.

To find out more, I recommend a book called "SOUL OF CP/M" by Mitchell Waite and Robert Lafore (Howard W. Sams & Co Inc.).

This book is an excellent "hands on" introduction to Assembly Language programming and the CP/M operating system.

The Assembly Language program above is one of the many sample programs in the book to help you learn Assembly Language programming, and the CP/M system calls.

Part 1 was in the October issue.



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8-bit and beyond...

By Joe Colquitt

Most 6502 machines will run these routines as long as absolute addresses are taken into account.

Last time some simple arithmetic was explained, and to carry on, here are routines to use in multiple byte calculations. The first example is to total eight numbers stored in consecutive bytes, and store the product in two other bytes.

The 8 numbers are stored in $C080-$C087, the low byte of the product ends up in $C100, and the high in $C101.

Note that by using different parameters for the X register, up to 256 consecutive bytes can be added together. **See program 1.**

By using 'sec' and 'dec (high)', the routine can be used for multiple subtractions.

Multiplication over several bytes needs a different approach.

Here is the code for a routine to multiply two numbers, each up to 255, giving a maximum product of 65025, enough for most applications. The process used is the 'shift/add' algorithm.

Each time a 1 is shifted out of the multiplier, the multiplicand is added to the product.

Before using the routine, get the multiplier in $C101 and multipland in $C100.

The result is in $C102 and $C103. Execution time is between 170 and 250 clock cycles, (170-250 microsecs). **See program 2.**

To see this more graphically, the bytes can be examined as the routine progresses. Take 200*150 (=30000) as an example:

Shift no.	Mult/R	Mult/D	ProdHi	ProdLo	
	200	150			
	11001000	10010110	00000000	00000000	
1	10010000		00000000	10010110	add 150 to ProdLo
2	00100000		00000001	00101100	add 150
			00000001	11000010	
3	01000000		00000011	10000100	
4	10000000		00000111	00001000	
5	00000000		00001110	10100110	add 150
			00001110	01100110	
6	00000000		00011101	01001100	
7	00000000		00111010	10011000	
8	00000000		01110101	00110000	

The transfer of Bit7 of prodlo to bit0 of prodhi is accomplished by the fact that 'rol' rotates bits through the carry flag. So if bit7 of prodlo is asl 'd out of the byte, the carry is set, and the rol picks this up and puts a 1 into bit0 of prodhi.

In the above calculation, 117 (01110101) is in prodhi, and 48 (00110000) is in prodlo. (117*256)+48=30000.

The process for division is similar. Successive subtractions are made until only a remainder is left. **See program 3.**

The parameters for this routine are: $C100/$C101 dividend lo/hi, $C102 divisor, $C103 quotient, $C104 remainder. Eg divided 10134 by 47. **See program 5.**

Readers may like to tabulate a binary flow for a division.

32-bit multiplication is simply shifting 4 bytes instead of 2. **See programs 4/6.**

Anyone who would like a copy of the public domain monitor 'Supermon' for the C-64 should send me a cassette or disk and a stamped return envelope as I have an adjustable datasette. If you include a save on your tape, I can make sure my saves will load on your machine.

Joe Colquitt, 6 Martin Ave, Mt Albert, Auckland.

```
PROGRAM 1

C000 LDA#$00    ;CLEAR PRODUCT AREA
C002 STA$C100
C005 STA$C101
C008 TAX        ;SET INDEX
C009 LDA$C100   ;LOAD LOW BYTE OF PRODUCT
C00C JSR$C014   ;PERFORM ADDITION
C00F CPX#$08    ;TEST FOR < 9 ADDITIONS
C011 BNE$C009   ;LOOP IF LESS
C013 RTS        ;RETURN TO INITIAL CALL

SUBROUTINE

C014 CLC        ;
C015 ADC$C080,X ;ADD THE NEXT BYTE TO THE ACCUMULATOR
C018 STA$C100   ;STORE THE LOW BYTE OF RESULT
C01B BCC$C020   ;IF CARRY IS NOT SET DON'T INCREASE THE HIGH BYTE
C01D INC$C101
C020 INX        ;INCREMENT THE COUNTER
C021 RTS        ;RETURN (TO $C009)

PROGRAM 2

C000 LDA#$00    ;CLEAR THE PRODUCT AREA (A AND $C103
C002 STA$C103
C005 LDX#$08    ;SET THE COUNTER
C007 ASL        ;SHIFT PRODUCT LEFT  (LOW)
C008 ROL$C103   ;                    (HIGH)
C00B ASL$C101   ;SHIFT MULTIPLIER
C00E BCC$C019   ;NO ADDITION IF NEXT BIT IS 0
C010 CLC        ;ADD MULTIPLICAND TO PRODUCT
C011 ADC$C100
C014 BCC$C019
C016 INC$C103   ;INCREMENT THE PRODUCT HIGH BYTE IF NECESSARY
C019 DEX        ;DECREASE THE COUNTER AND LOOP IF NOT
C01A BNE$C007
C01C STA$C102   ;STORE THE PRODUCT LOW BYTE
C01F RTS

PROGRAM 3

C000 LDX#$00
C002 LDA$C100
C005 STA$C103
C008 LDA$C101
C00B ASL$C103
C00E ROL
C00F CMP$C102
C012 BCC$C01A
C014 SBC$C102
C017 INC$C103
C01A DEX
C01B BNE$C008
C01D STA$C104
C020 RTS

PROGRAM 4

C000 LDA$00
C002 STA$C105
C005 STA$C107
C008 LDX#$11
C00A CLC
C00B ROR$C107
C00E ROR$C106
C011 ROR$C105
C014 ROR$C104
C017 ROR$C02C
C01A CLC
C01B LDA$C107
C01D ADC$C104
C020 STA$C106
C023 LDA$C103
C026 ADC$C107
C029 STA$C107
C02C DEX
C02D BNE$C020
C02F RTS

PROGRAM 5

10 POKE49408,150:POKE49409,3:REM 150+256*3=150+10128
20 POKE49410,47
30 S=49152
40 PRINTPEEK(49411);",";PEEK(49412);:REM ANSWER IS: 215 REMAINDER 25
PROGRAM 6

10 INPUT"HIDX=";HI:POKE49413,HI*256:INPUT"LODX=";LO:POKE49412,LO
20 INPUT"HIDY=";HI:POKE49411,HI*256:INPUT"LODY=";LO:POKE49410,LO
30 S=49152
40 FOR I=0TO13:A=A+PEEK(S+I):NEXT:IF A<>1421 THEN PRINT"ERROR":END
50 NEXT:PRINT"OK"
```


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Adventure for students

From Colin Marshall

A teacher at Kohimarama Primary School, Auckland.

Is there a place in the classroom for computer adventures?

There is no denying the appeal of adventure games to computer users, but can this pastime be channelled into positive learning experiences.

For many years teachers have recognised the effectiveness of simulation-type lessons for their students — as in acting out plays.

And similarly games manufacturers have realised the same appeal in involving game players in "realistic" situations. Monopoly is an example.

But can the simulation game loaded into a computer be of any educational value?

We can evaluate such games by analysing why simulations are so effective.

The answer appears to be that individuals enjoy making decisions about how their game will proceed, and good computer games are those which offer players this freedom of choice about the next move.

Generally they offer options involving exploration, and achieving tasks (like retrievals and rescues) with limited resources and time — and being "in charge" opens doors to imaginative thinking, and a logical process of inquiry.

Even the mundane encounters, such as with a piece of paper, take on real significance within the minds of players grasping for clues.

And in this regard we have a bridge to the educational use of adventure games.

Who said learning couldn't be fun? An educational computer simulation game would involve mapping skills, planning and executing logical (well...sometimes) sequences, and using basic skills like spelling and maths calculations.

This does not mean all adventure games are suited to positive classroom use and role playing: the dark and negative values of some games should be avoided.

But one that I recently ran for my classes is a good example of the potential in adventure games for encouraging worthy student responses.

Called Excalibur, it is published by the Fitzroy Community College in Australia and seems well suited to launching computer classes on this path.

This programme runs on a Commodore 64, costs $40, and is one I would rate with four marks out of five.

Excalibur is for the person that wants to learn how to play an exciting adventure game without getting stuck in the first two minutes. Excalibur is not a programme that you take away to spend your entire vacation playing, but is a clear, concise and enjoyable introduction to adventure games.

It was produced in Australia by educationalists knowing how to make things simple without taking away the challenge. In my experience such programmes written for children have been the programmes that parents also pick up to learn with their children.

Excalibur is written in a way that focuses the player on the task rather than the language or the skills of playing. The results of this are important, and can be somewhat amusing.

Half an hour after starting play, a player realises a skilfulness without thinking about a skill-learning proceedure.

Once past the simple instruction set, the screen is divided into two portions. The upper one shows a castle and four key features of the landscape in several colours. A bat flies across the screen and away you go.

The lower half of the screen is for text prompts and instructions. Full sen-

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tences are accepted as well as one or two word prompts. Some commands, such as directions, can be entered as single letter commands.

One good feature is that commonly used words such as names can be accepted and understood if they contain slight spelling errors (though, of course, nobody ever makes these).

The objective is to obtain the sword Excalibur and return with it to your ship waiting in the harbour — or is it?

This sounds relatively easy until you discover your resource limitations: how much you can carry, your ability to overcome thieves, the health potion, and...why am I changing colour?

The hero (you) is a sprite for whom variations of play are explained as you go for a help function during in times of "stress".

Everything looks simple — except the job of completing your mission.

Errors are not easy to make. Neither I nor my pupils could make the programme bomb out — and that's saying something. The programme prompts you all the way along and checks what you are saying. If your answer is consistantly wrong the computer gives you a prompt of options to choose from and one of these must be selected to progress.

Criticisms of this software are the slow loading time and the inability of graphics to totally show what the sprite character is doing. At stages the sprite has half a body behind the castle and half on the path — most unusual.

The price ($40) is reasonable, though I believe this type of software should be in the $20-$30 range.

In conclusion, this is one piece of software that has not tried to bite off too big a chunk.

As an introduction to adventure games it is clear, concise and well written.

The graphics are not the world's best but the text is straight forward and useful.

The instructions and prompts are readily available and helpful.

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We knew it was good...but we were elated: Bits & Bytes has the top readership of any New Zealand computer publication. We have **—96,000 readers** — that's one in 28 New Zealanders over the age of 10.

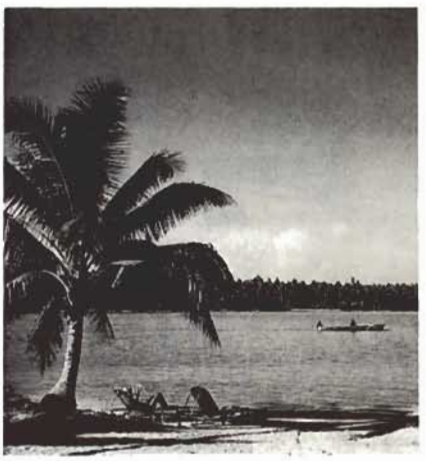
We ran a contest for marketing managers and media buyers throughout the computer industry and advertising agencies in New Zealand to guess our readership and only four people were in the running for our trip for two to Club Rarotongan.

The winner, pictured here getting into the spirit of things, was Tony Butler, manager of Fountain Marketing Ltd's Computer and Games Division.

Other facts that came to light in the AGB McNair readership survey just released include:

- **— 60,000 readers are over the age of 20**
- **— 20,000 professional/government/management/executive**
- **— 7,000 self employed**
- **— 9,000 Teacher/nurse/police**
- **— 12,000 technical and skilled**
- **— 30,000 students**
- **— 80,000 readers in the top three socio economic groups**
- **— 17,000 readers with purchasing power over $10,000.**

What does it all mean? It means Bits & Bytes is New Zealand's top selling and most read computer publication and that it is a magazine which relates to New Zealanders across the board.



An important reminder

BITS & BYTES

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Have you filled in and returned your questionnnaire yet?
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Christchurch Computer Show

South Island Showcase

The stage is set for the third annual Christchurch Computer Show which looks like being the largest yet held in the South Island with more than 40 exhibitors, representing the country's major hardware and software distributors.

The seminars, which have become a feature of these shows, have already attracted heavy bookings and the organisers believe these will be booked to capacity by the time the three day ev ent opens on November 22nd.

The Christchurch Computer Show was the first in the Bits and Bytes series of shows and it has become something of an annual event for dealers and consumers throughout the South Island, many making a point to travel from the deep South, the West coast or the Nelson area to familiarise themselves with new product available in this rapidly changing field.

The high interest in videotex is likely to attract many potential subscribers: it will be the first time that Computex is displayed publicly at such an event.

The drop in prices at the low end range of the market has also revived interest amongst would-be purchasers, especially those who earlier felt themselves priced out of the market.

All visiors to the show will go in the draw for an Apple 11 e Professional System from Andas Computer Centres.

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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.

There are 30 questions in the quiz — 15 this month and 15 in the next issue.

WAIT UNTIL YOU HAVE THE 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 1

1. Whereabouts in the United States was the language BASIC first developed?
2. Name a programming language with a one character name.
3. Computers often communicate through a MODEM. Where does the word MODEM come from?
4. The Bits and Bytes box number is 9870. What is that in hex?
5. It's sometimes called a "five inch floppy", and sometimes a "five and a quarter inch floppy". What is the actual diameter of a mini-floppy disk (in inches)?
6. Gary Kildall has no doubt written many pieces of software. Which one has become most important?
7. No quiz is complete without a question about the Commodore. What is the name of Commodore's latest computer, due to be released here early next year.
8. And now dear reader, tell me true
   Who is it that they call "Big Blue"?
9. Farmers have taken quite a lot of interest in micros recently. What is the name of the unit at Lincoln College which has been researching the use of computers in farming?
10. What is the maximum number of bytes a Z80 (or 6502) processor can address without bank switching or extended addressing hardware?
11. One of the early computers was called ENIAC. What did ENIAC stand for?
12. A small computer — much like the ZX 81 — it didn't have BASIC built in. What it did have was originally designed for controlling telescopes. Name the computer, and the language.
13. In which issue of Bits and Bytes did the first advertisement for the Bookclub appear?
14. Of course you know that EPROMs are just erasable programmable read-only memories, but how are they erased?
15. He writes adventure games, and in ASCII his initials are 83 and 65. Who is he?

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The IBM PC JX
Reaching for a new IBM market

By Richard Gorham

The arrival of a new Japanese-sourced: 16 bit micro-computer on the NZ market, with IBM PC "compatibility" and a price tag of under $5000, would not be cause for more than a politely stifled yawn amongst even the most avid of NZ computer buffs.

The reason is that this type of event is no longer "news" — many micro-computers now have those IBM-like credentials.

Why then should I consider the possibility of more than passing interest in "just another clone".

Could it be that the computer under scrutiny here incorporates such features as 3.5 inch hard-cased floppy disk drives, or perhaps the infra-red keyboard, or even the potential availability of all your IBM PC software favourites on cartridge ROM?

I doubt it.

The one truly innovative feature of this newly announced microcomputer must be the fact that it is IBM itself that has joined the IBMulator brigade in unleashing yet another PC-clone on an (almost..) unsuspecting market.

And this is the key issue, because when IBM decides to release any new machine people sit up and take notice, be they consumers or competitors. The new JX model has been no exception, with most IBM dealers reporting plenty of consumer interest.

IBM NZ's stated rationale for releasing the JX (which has been available only in Japan and Australia) was ".....to address an area of the market not previously reached: namely those small businesses that are too small for a PC-G (the base model IBM PC senior) together with the farming sector, and the educational institutions".

These markets have certainly not been reached in NZ by the PC-G, and for one very good reason.

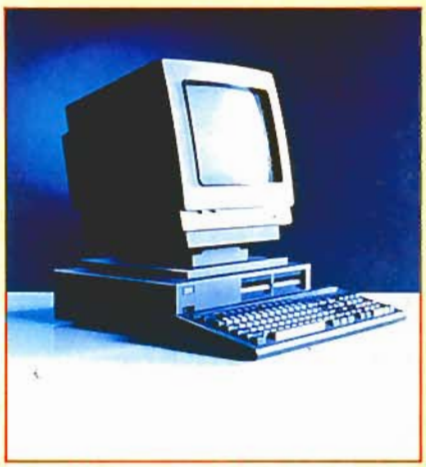
The price of PC-G in even it's most basic configuration (1 disc drive, mono screen, and 128K memory) is around *the $7,000 mark; to be truly capable of* reasonable business applications and exploiting the newer memory-hungry-and-graphics-supported software packages on the market you're spending around $9,500 (2 discs, 384K, colour screen).

Contrast that with the prices of PC-JX.

In its basic "starter system" configuration (1x3.5 inch disk drive, colour screen, 128K) the JX will set you back $3,846 — a little over half the price of a PC-G — and with a good colour screen to boot (sic).

For a more comprehensive business system (2x3.5 inch disk drives, 1 5.25 inch disk drive, colour monitor, 384K) you'll be paying $6,617.

There is also a "disc-less" JX available for $2,805 for networks of up to 64 machines, linked to hard-disk based XT or AT model.



So what do you get for your money, and exactly how does the JX measure up?

The Hardware

The system reviewed was a business *configuration JX with 384K, twin 3.5 inch* disk drives, colour screen, one 5.25 inch PC-G compatible disk drive in expansion chassis, and colour screen (standard with all models in NZ).

My first impression of the system was the veritable mountain of cardboard box it was delivered in, complete with carrying handles; a change from the usual drab IBM packaging.

Once assembled, the computer manages to convey the appearance of a solid and well constructed machine while still being pleasant on the eye. In fact, the system looks more like a Japanese Hi-Fi model than a business computer, being a conservative charcoal grey with considerable attention to design details.

The CPU box itself is small enough to sit on a desk without making a nuisance of itself...unlike the standard PC-G

In the "starter" configuration this box will contain the ubiquitous Intel 8088 microprocessor, 128K of RAM, one 3.5 inch Sony-type floppy disc-drive with controller, colour graphics screen adaptor, two ROM program cartridge slots, 8 octave triple-chord sound generator, Centronics-type parallel printer adaptor, cassette interface, 2 joystick interfaces, infra-red receiver for the keyboard and power supply (phew!).

A RS232C serial interface is an option.

A significant point about the JX is the use of new high-density custom designed chips to reduce size, power requirements, and price.

Five advanced technology gate arrays replace more than 180 conventional chips, and a one megabit ROM module is included (IBM claims this the first ever in a personal computer).

It would be hard to imagine all of the above fitting into such a compact box without this technology!

The JX's 8088 microprocessor runs at 4.77 Mhz, to preserve compatibility with the PC-G. This will no doubt disappoint those fortunate enough to have experienced the thrills of the later 8088-2 running at 8 Mhz — but is certainly adequate for most small-business applications.

Less security

Up to 384K of RAM can be added to the standard 128K (within the CPU box) taking it up to a highly respectable 512K. This is achieved by plugging in one of *several extra memory cards which are* available. One of the cards holds 384K, and is approximately the same size as two packets of cigarettes placed ends-together — very impressive.

The RAM used is 25% faster than PC-G memory (access time of 150ns against 200ns), but rather surprisingly sacrifices the additional security of parity checking (data auditing).

IBM PC-BASIC (i.e. written by Microsoft for IBM) is provided in part of the 96K of permanent onboard ROM, as well as being supplied in a more comprehensive version with the PC-DOS version 2.1 operating system on disc.

The 3.5 inch drives are similar to the type developed by Sony, but provide only 360K of formatted space on each $17 disk (against 720K in most other implementations of these drives).

This approach has been taken to ensure that all data held on the PC-G's 5.25 inch drives can be transferred to 3.5 inch discs using the same DOS 2.1 commands — DISKCOPY, COPY etc.

A total of two 3.5 inch floppy disk drives can be fitted in the CPU box and a further 3.5 inch or single PC-G compatible 5.25 inch drive can be added if an expansion box is attached.

The expansion box has almost the same dimensions as the CPU box. It is attached to the system by removing the CPU box's top cover, stacking the expansion box on top of the CPU, and placing the removed cover on top of the expansion box. Wiring is connected internally by plugging a flat cable into a socket on the CPU box mother board — neat and tidy.

The expansion box has its own internal power supply, slots for 4 extra cards, and room for one floppy disk drive. Extra memory can be plugged into the slots if required, but 512K is the maximum system memory usable.

A 5.25 inch disk drive, if fitted, is half the height but functionally identical to the PC-G drives.

Non-glare

The colour monitor that is provided with all configurations is a non-glare high resolution RGB1 version, and in conjunction with the supplied graphics system is capable of displaying 16 colours simultaneously in low-resolution (160 x 200 dots), 4 in medium (320 x 200), and 2 in high resolution (640 x 200).

A swivel stand is supplied with the monitor, and the monitor on stand sits nicely on top of the CPU box at around eye-level.

Interestingly, two versions of the screen are available depending on "the location of your country in the earth's magnetic field" — one for Hong Kong and one for the rest of Oceania.

A "full" 98-key keyboard was supplied, in contrast to a 79-key "compact" version (without a separate numeric keypad) which is optional.

The full keyboard layout is a considerable improvement on the PC-G's, with separate cursor control and numeric keys, and with the function keys (now labelled PF1-PF10) laid out horizontally left to right above the main keys.

An auxillary "enter" key is also provided on the numeric keypad. Numerous other minor changes have also been made, including the movement of the "/" key away from the shift key — which is almost universally hated on the PC-G's keyboard.

Connection between the keyboard and CPU box can be made via either infra-red (cordless) transmission, or by plugging the 0.65 metre coiled cable into keyboard and CPU.

Use of the cable rather than infra-red is definitely recommended when more than one JX is in use in the same room at the same time, for obvious reasons.

Using the machine

After checking the basics (i.e. 240V, 3-pin plugs etc) the machine was humming (whatever computers hum to themselves) within a scant 10 minutes of unpacking.

Rather than going into a detailed description of IBM PC-DOS 2.1 and other items relevant to the PC-G, I will try to highlight those areas of difference between the JX and PC-G (otherwise this would turn into a book rather than a review!).

The first thing to note on switching the machine on is the almost uncanny speed with which the machine completed its POST (power on self-test). I assume that this is partially because of the faster memory chips used, but mainly due to a disconcerting lack of parity checking. As is usually the case, you don't get anything for nothing.

Unlike the PC-G, there are no internal DIP switches to indicate to the system how much additional memory has been installed.

Thus if the machine has more than 128K of memory, then a special device-driver must be included in the CONFIG.SYS file on the boot-up disc.

Judging by the device driver's name (PCJRMEM.COM) this must also be the case for the JX's American cousin, the rather ill-fated PC Junior (being relaunched in the US for the Christmas market).

As a user without a disc-drive would not have the facility to load this device-driver, application programs could only take advantage of any additional memory by directly addressing it and using it for work-space. However I would not see this being a realistic configuration of this machine anyway, so it shouldn't cause too many problems.

If PC DOS is not loaded (i.e. a DOS boot-up diskette is not present in drive a:) the ROM based version of PC BASIC automatically loads and is ready for use.

If a DOS boot-up disk is in drive a: then DOS 2.1 is loaded, and the user is presented with the usual bland DOS prompt "a:>".

In either case it is worth noting that the screen boots up in 40 column mode (another PC Jnr influence?). To use 80 column mode (and make best use of the high quality screen) one must either issue a BASIC instruction, or run a MODE.COM file from the DOS diskette.

A few 3.5 inch demonstration disks were supplied with the review machine, but unfortunately none of the new "Assistant" series was available at time of review. These seem to be the main thrust products for the JX, and include word processing, spreadsheet, business graphics and other essentials.

Most of my impressions were gained from running standard PC-G software by means of the 5.25 inch drive. This review was written using that old workhorse Wordstar, copied from 5.25 to 3.5 diskette (which is more convenient and durable).

In this implementation, I did not detect any significant difference between the 3.5 and 5.25 drives, in the time taken to access data. However I did find the graunching noise of the 5.25 drive, when being accessed, to be irritating.

Performance

Another dislike was the keyboard's lack of any tactile feedback — it's hard to tell whether a key-depression has been registered without looking at the screen.

(Continued on page 42)

(Continued from page 41)

More disappointingly, there doesn't seem to be the same type-ahead buffer on the JX keyboard as there is on the PC-G. It took me a while to become accustomed to the fact that you had to wait for commands to be processed before you could key in others.

But despite these annoyances, the keyboard is suitable for business use.

I found the infra-red option on the keyboard to be surprisingly useful (I must admit initial scepticism), and ended up discarding the interconnect cable. The range seems to be about 3 metres, but obviously the screen is getting rather difficult to read at that distance.

I ran some BASIC benchmark programs on the PC-G and JX and found that the JX is approximately 5% slower than the PC-G when running in-memory functions (i.e. looping whilst adding 1 to a counter) that do not access 1/0.

But more of a surprise was the JX being approximately 5-10% faster than the PC-G (with colour adaptor) when accessing the screen. This is also evident in the JX's better scrolling and lack of the irritating flicker which is a hallmark of the PC-G.

I feel that overall the performance of the JX is adequate for most small-business applications that might otherwise

be looking to use a PC-G, but would question disk capacity limitations.

Compatibility

Most PC-G software seems to be compatible with the JX, but obviously particular packages should be tried (the more thoroughly the better) with the machine before suitability of either software or hardware for a given application can be determined.

However, it is very unlikely that PC-G software that must be "booted" (i.e. does not run under DOS directly) will run on the JX.

I tried running the Microsoft Flight Simulator, after having copied it down to 3.5 inch diskette with a COPY11JR duplicator program, but couldn't get it to boot. This might be seen to be an embarrasment to retailers of the machine as it seems to be a de rigeur test for PC-clone compatibility.

Summary:

I was impressed with the IBM JX.

It has a comprehensive list of standard features, is well constructed, and can call on a large repertoire of available software, whilst being reasonably priced given its three lettered name-plate.

Providing that one does not require 100% software compatibility with its bigger brother, the PC-G, compatibility for plug-in accessories, or a larger disk capacity, then it is tempting to question the choice of a PC-G in preference to a JX.

I feel that overall the performance of the JX is adequate for most small-business applications that might otherwise be looking to use a PC-G, but would question the limited disk capacity while no hard disk is yet available as an

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option.

It should be noted that the Japanese version of the JX has a number of options: 10 Mb hard-disk (referred to in the JX PC DOS manual supplied with the machine under review), and a choice of one monochrome and two colour screens are available to the Japanese consumer in a marketplace that is considerably more competitive than NZ.

A 720-Kb (double-sided) floppy for the JX is also available in Japan.

In conclusion the JX is a very solid machine at a reasonable price, from the company that is the indisputable number one in the business computer market in NZ and overseas; a factor which should influence the adequacy of back-up service and support from independent dealers.

Given that the average NZ buyer is extremely cost-conscious and naturally suspicious of products without an established pedigree, then it could be that this machine has just the right combination of price and reputation to make it a big success for IBM in NZ

Microcomputer summary

Name:	IBM Personal Computer JX
Manufacturer:	International Business Machines.
Microprocessor:	8088
Clock speed	4.77 Mhz.
RAM:	64-512 Kb
ROM:	Twi cartridge slots (not PC Jnr compatible
Input/Output:	Ports for keyboard, display, rs-232C,Joysticks, audio,centronics, parallel printer, cassette taper, light pen.
Keyboard:	98 and 76 key options, infared and remote card, non-tactile.
Display:	12-inch colour, non-glare four to 16-colour modes. Up to 80 characters in 25 rows.
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Options:	ROM cards, expansion unit with 5¼ inch drive, cluster adaptor
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Languages:	Advanced BASIC and BIOS on integrated ROM nodule
Costs:	$3,846 for 128 Kram single drive, $6,617 for 384 Kram dual drive with expansion 5¼ inch drive unit. Further upgrades.
Ratings:	(1 low - 5 high) Documentation 4, support 4, language 5, expansion 3, value 4.

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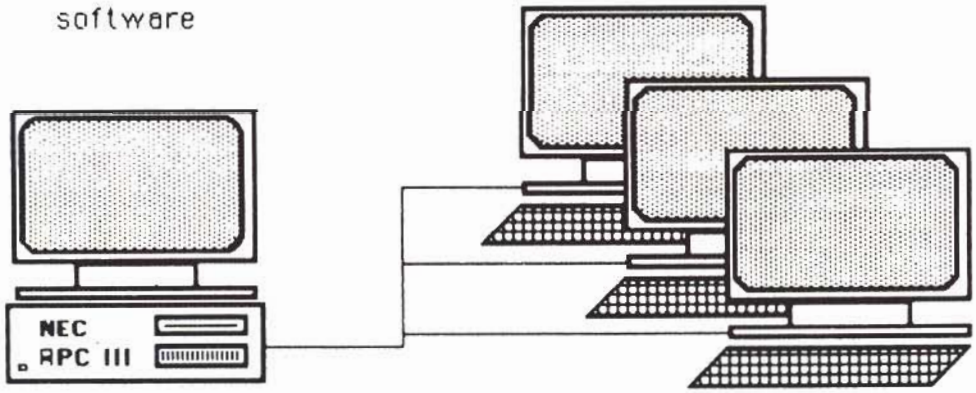

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(COLUMN WIDTH)							
40 CHARACTERS PER LINE	YES	40 CPL	YES	YES	YES	YES	YES
80 CHARACTERS PER LINE	YES	80 CPL	YES	YES	YES	YES	YES
66 CHARACTERS PER LINE	YES	66 CPL					
132 CHARACTERS PER LINE	YES	132 CPL					
(PAPER HANDLING)							
FRONT LOADING FOR EASY PAPER SETTINGS	YES						
BUILT-IN PRINTER STAND	YES						
PRINT ON POST CARDS	YES						
(WARRANTY)							
ONE-YEAR WARRANTY	YES						
(SOFTWARE COMMANDS)							
DOUBLE STRIKE	YES	DOUBLE STRIKE					
EMPHASIZED	YES	EMPHASIZED					
COMPRESSED	YES	COMPRESSED					
UNDERLINE	YES	UNDERLINE					
SUPER/SUBSCRIPTS	YES	SUPER SUB SCRIPTS					
ITALICS	YES	*ITALICS*					
DOUBLE DENSITY BIT IMAGE	YES						
(CHARACTERS)							
9X9 FONT	YES						
TRUE DISCENDERS	YES	abcgjpqyabc					
ITALICS	YES	*ITALICS*					
COMMODORE GRAPHICS	YES		YES	YES	YES	YES	YES
(OTHER FEATURES)							
SINGLE DENSITY BIT IMAGE	YES		YES	NO	YES	YES	NO
EXPANDED	YES	EXPANDED	YES	YES	YES	YES	YES
REVERSE	YES		YES	YES	YES	YES	YES

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Uncommonly friendly approach

By Craig Beaumont

Locomotive Basic has a number of uncommon features that you can utilise to make your Amstrad more friendly. One in particular is the "soft" keyboard.

Each key can be programmed to give any character or even a string when hit.

A built-in example is the ENTER key on the keypad of the 464 which gives RUN" with a carriage return- (enter character) when hit while pressing CTRL.

Each key has three modes — normal, shifted and control. In this case the control mode of the keypad ENTER has been predefined.

If you have a diskdrive it would be better if the carriage return wasn't there as you would then avoid the Bad command error. To do this and more try out the program listed.

Now if you type CTRL-T you get the number of minutes the computer has been on. CTRL-H is the HELP key suggested in the user guide for when you get lost on the screen. Key 3 on the keypad gives the amount of unused memory and CTRL-ENTER has been fixed for use with diskdrive.

This version has a diskdrive orientation, you could adapt it for other purposes by changing the keys and strings. There is a limit to the amount of key redefinition you can do, up to 100 characters may be used before getting an Improper argument error.

I hope this example plus reference to the user guide will help you make effective use of this feature of the Amstrad.

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Combat game

Last month I mentioned a few games that impressed me. Now I'm taking a closer look at the one Rowan would recommend you to put your goggles on for — it's Combat Lynx by Durrell.

This battle-ground helicopter simulation demands a lot in both dexterity and tactics.

Your role is the pilot of the only air support for your force. You must support a number of ground bases by ferrying personnel and wounded to and from base 1 — which happens to have an endless supply of weapons.

The enemy force comprises fighters, helicopters, tanks, trucks and the most fearsome — the gun emplacement. They constantly attack you, your ground forces and attempt to destroy your bases. You can take an aggressive role using the formidable battery of weapons at your disposal.

But the display is what makes the game. The 90 degree field of vision shows the contoured ground rolling beneath or perhaps rushing up to pluck you out of the sky.Other vehicles are clearly identifiable and they move intelligently.

The sound is O.K, it changes when you accelerate/deccelerate — in fact you can go backwards!

Control of the Lynx is best with dual joysticks, or you can use solely keyboard or a mixture, but the acceleration keys are poorly placed.

Your main advantage over the enemy is an over-view map option. A nice touch is the score table which can be saved/loaded. Altogether this is one of the most challenging games around.

Assembler

The most interesting thing I've heard of in the hardware field is about the first expansion ROM for the Amstrad.

It's an assembler that's supposed to be very fast and has the advantage of not taking up any of the memory used for program space. It is aimed at the more professional programmer - so it has a more professional price-tag.

At the moment only a small amount of software is available on disk - these are generally Amsoft games or Business packages.

It is expected that the percentage of programs available on disk will grow rapidly.

This will be helpful to users of diskdrives, because although the built-in software protection feature helps keep the price of software down, It is no help when you want to transfer what you won to disk ... that is, unless you have Transmat by Pride Utilities.

It allows easy transfer of programs between media, plus other facilities like disk header reading.

Another secondary storage utility by the same company is Syclone which allows you save on tape at higher baud rates and break the protection on software.

These are legal as long as you hackers out there keep the results of using these programs to yourselves - remember the copyright laws are being beefed up.

If you want to take advantage of the strong Kiwi dollar you may find it better to import these and other programs yourself, rather than wait for them to arrive here.

Programmes

One way you can contribute to this column is by sending in the interesting CALLS, POKES and program modifications you discover.

To start the ball rolling: if you put CALL & BB18 in a program, the program will pause until you press a key - pretty useful huh!

If you can do better, then please tell everyone by writing to us. We'd also like to hear tips on playing games.

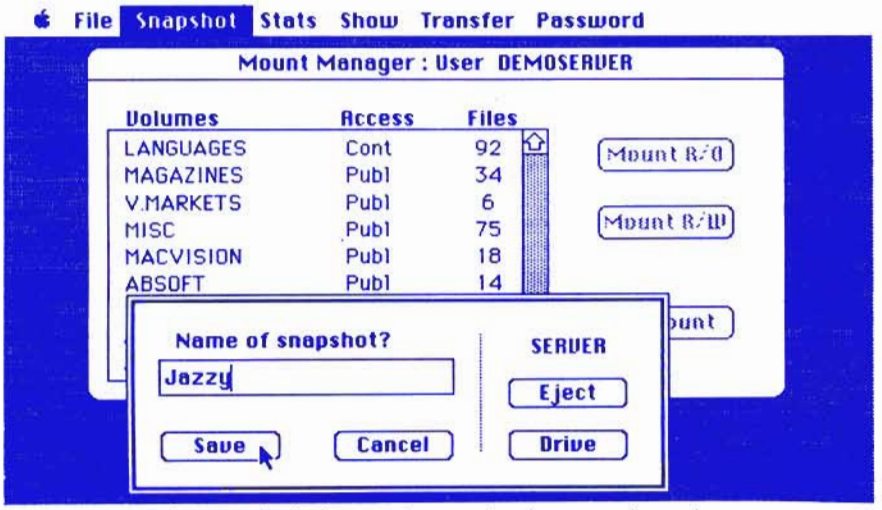
```
10 REM Key Redefiniton
20 KEY 0,"CAT"+CHR$(13)
30 KEY 1,"|DISC"
40 KEY 2,"|TAPE"
50 KEY 3,"?FRE(0)"+CHR$(13)
60 KEY 10,"CLS:LIST "
70 KEY 12,"RUN"+CHR$(34)
80 KEY 140,CHR$(13)+"MODE 2
   INK 0,1:INK 1,24"+CHR$(13)
90 KEY DEF 44,1,104,72,140
100 KEY 141,"?time/18E3"+CHR$(13)
110 KEY DEF 51,1,116,84,140
120 SPEED WRITE 1:MODE 2
130 PRINT"KEYS NOW DEFINED"
140 NEW:REM save before running.
```

The Omnidrive

Giving Mac more space

By Alex and Fred Wong

The Macintosh computer, an excellent stand alone machine, also excells as part of a network like AppleTalk, recently introduced by Apple to form the Macintosh Office. The OmniDrive hard disk storage system range, from Corvus, is designed with both these functions in mind.



A 'snapshot' of an auto-mount volume configuration

Hardware

The OmniDrive is packaged in a handsome, unassuming plastic case the same colour and width (although a bit deeper), as the Macintosh.

On the front are three lights to indicate its status and on the back is a small connector for a serial cable to link to the Mac's modem port. Next to the connector is a set of DIP switches which configure the OmniDrive for single Mac operation or multi-Mac use.

Installation consists merely of plugging in the cable and the power cord and configuring the switches.

Operation

Fred rocks (no rolling for him!) the switch on and the gentle fan begins to hum. He powers up the Macintosh and inserts the startup disk, and it places the hard disk icon (in this case specified as the Server volume, which includes all the programs needed to run the drive) on the desktop, and ejects itself.

The OmniDrive uses an application called the Volume Manager to create and maintain volumes on the drive and another called the Mount Manager to mount and un-mount them. A backup utility lets information from the hard disk to be saved onto floppies and it announces how many disks it will take.

The OmniDrive managers provide basically the same services as the volume managers on the Quark and Tecmar hard disks, with some added features.

The OmniDrive allows several different configurations of auto-mount volumes and each configuration is 'snapshot-ted' as a document on the drive. By double clicking that particular snapshot, the volumes specified on that document is mounted. This is a handy feature, which almost eliminates any need to access the mount manager.

Other features are primarily for networking, to maintain private and public files and to ensure the integrity of data on the drive.

The OmniDrive is compatible with the Apple Talk Personal Network. Using OmniTalk software, the drive may be shared among many computers using Apple Talk to provide hard disk storage for many Macintosh computers at once. Corvus also offers its own Constellation 3 networking software and cables.

This is an important feature, as networking, with its ability to share information and peripherals (such as the OmniDrive and Apple's LaserWriter printer) between computers, becomes more important for cost and efficiency conscious businesses and educators.

The OmniDrive uses Apple's standard Finder and operates approximately three times faster than a floppy.

It works professionally and although the Corvus software is somewhat more complicated to use, it also performs more complicated tasks. With the 45 megabyte version, our review model, the space on disk just does not run out!

Documentation

The OmniDrive comes with three books. A small installation booklet that describes, with large, clear diagrams, how to plug in the drive, configure the DIP switches and how to set up a network. In Fred's famous words: "It had me up and running in a few minutes!"

Then there is a user's guide and a network manager's guide, both of which are very well presented. They give out huge amounts of information in a rambling, round-about way that leaves nothing out, if you can find it!

Summary

The OmniDrive is a very sophisticated storage system for the Macintosh that has extensive networking capability built in. Although such power may be unnecessary for some potential hard disk users, an open upgrade path is often desirable.

The large range of Corvus OmniDrives leaves several price options to *consider too, from the 5.5 meg to the* 126 megabyte drive.

For dealers specifically, there is also the Demo-A-Mac, which is a 45meg drive.

System summary

Name:	OmniDrive
Manufacturer:	Corvus systems, Inc., California.
Type:	45 megabyte Winchester hard disk (also available in 5,11,21, and 126 megabyte models).
Features:	Sophisticated networking capabilites.
Reviewers' ratings:	Documentation: 3; ease of use: 4; value for money: 5; support: 4.

(Review unit supplied by Computer Broking Services Ltd., Wellington.)

Of Maturity, Novelty and Networks.

By Pip Forer

This month a pot pourri : the recent expansions of the BBC design, a note on some new products and a utility to let you monitor BBC network use.

Maturity

First off there is the news of the enhancement of the BBC range...the BBC B.

The B is a 64k machine with expanded and reorganised RAM which incorporates an area of 32k of 'shadow' memory that can be used for screen support plus (the balance) for additional sideways RAM.

After two years of use I am still fundamentally impressed by a lot of the early design features of the Beeb and the redesign circumvents its main problem : when you use its excellent graphics you run out of RAM. The B also offers two extra ROM slots on a redesigned mother board.

The shadow RAM in the B can be switched in and out by software and when not in use the B works like a B. This offers software compatiblity for existing applications.

If the RAM is utilised then some new OS calls allow direct access to shadow screen memory, extra RAM and better control of paging. The B is also set up (as the Apple 11e presaged the 11c) with facilities for 128k memory.

The upgrade allows for enormously enhanced software and in particular the second 64k can reconfigure as sideways RAM to hold language or utilities.

This expands software options enormously and cuts another bottleneck for the demanding Beeb owner...the shortage of ROM slots.

It would also allow yet further expansion on BBC BASIC program size...this time to a full 64k.

Where does this leave the Beeb? Overseas reviewers have seen the B as an interim upgrade. Perhaps a good assessment is that at present many users can opt for 8-bit or MS-DOS machines. The latter offer power but less simple use, and at a cost.

The B retains the excellent features of the Beeb and stretches its power to keep it as a preferable option to MS-DOS in many circumstances.

Challenging both options, of course, are the new generation machines based on the user-oriented philosophy pioneered by Zerox and the Macintosh, and now being emulated by other companies.

In the long term these will sweep the current 16 bit machines away after a much briefer and lower level presence in the home and school than the 16 bitters, but they will take a while to get software.

The enhanced BBC is a good vehicle to bridge the gap and may also be a step along the road to an Acorn WIMPs machine.

Novelty

One of the reasons for my optimism is the range of new items coming for review, including some good educational programs (the Barsons stand at the NZCES conference was quite an Aladin's cave). The other is the network (see next section).

Firstly ViewStore, the Acorn database, is out and completes the VIEW trio. Its specifications look good and it is marked for review.

Also out is the mythical Graphics Extension ROM which will allow access to a far wider range of graphics commands FROM ANY LANGUAGE. These include patterned or quilted fills, movement of blocks of the screen, sprite management, primitive drawing (circles, elipses etcetera) and a user specified range of dotted/pecked lines.

This offers in ROM many of the facilities only available in software screen- creation programs on other machines and augurs well for some great software if the ROM becomes standard issue.

PROLOG too has finally arrived and we will have an extended review of the BBC implementation as soon as a review copy comes to hand.

All in all the new developments dovetail well with the expanded Beeb and could be combined to produce a flexible and easy-to-handle system to meet a wide range of needs.

Another new product is a network bridge from Acorn. This allows several local nets to join while retaining their own autonomy. The benefit of this is that often degredation on a large network could be reduced by splitting it into smaller units (or wiring and administration may be simplified).

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A useful feature of the bridge is that all the nets involved can share the same file server if desired.

It is a useful additon to the network and leads nicely into another addition network users may find helpful: a network log.

Network use

Having recently reviewed networks for micros (predominantly 16-bit ones) Econet retains my deep respect.

It is unusual it seems in being a network with an integrated design, i.e. designed by the machine designer's as integral to the concept of the whole system, and it offers better features than many networks several times its price, albeit more slowly than some business networks.

What it shares with many however is a lack of any accounting system. Most LANs are not designed to monitor who uses them or for how long because they are used within an organisation where such administration is unnecessary.

However, it is often desirable to know what proportion of the time machines are in use, or which form of pupils, class or discipline are most frequent users.

This can be particularly important where (as say in a school lunch period) access is informal.

What is presented below is a program to let you monitor such use, by machine or by user on a network.

Time on the machine is monitored in time units using the network interrogation routines described in Bits and Bytes' September issue.

You run this program from any Econet machine. The catch is that at present this machine is then dedicated to that task. The user specifies the date and the time he wishes logging collected on. The program procedes to check the network (say every minute) and builds a running list of a)users and b)machines in use.

It compiles an ongoing record of use, adding new users as they appear, until ESCAPE is hit when the program drops the log on to the printer and terminates. You can then see if Jones Minor has been hogging the system for too long or not.

What is impressive is the time taken to produce such an accounting procedure and the ease of production (even if currently it demands a whole machine to itself): a couple of hours at most. And it requires no more than a fundamental grasp of BASIC and the routines documented in the Acorn network managers' guide.

I offer very little in the way of explanation except to note the purpose of the following procedures:

```
    1MODE 4
    2CLS:PRINTTAB(3);">>> DO NOT TOUCH T
HIS MACHINE <<<"
    3PRINTTAB(3,30);">>> DO NOT TOUCH TH
IS MACHINE <<<":VDU28,0,27,39,3
    4ON ERROR PROCwind_up
    5 HIMEM=&57F0
    6PROCsettimes
    7topuser%=0:topmach%=0
   10 REM

   20 REM
   30 REM


   31DIMrdy% 10
   32nmac%=10:nuser%=10
   33DIMplayer%(10),name$(10)
   34DIM key% 3,cbkey% 16,whqbk% 28
   35DIMallmen$(nuser%),allmac%(nmac%,2)
,allmen(nuser%)

   53password=&FFF1:osbyte=&FFF4
   60 ?&57FF=&FA
   65?&57FD=rdy%
   66?&57FE=rdy% DIV 256
   70 REM
   71REM BYTES 2FFD-E ARE POINTERS TO TH
E rdy% control block and thence to all o
ther common data values.

   75REPEAT
   76 REPEAT
   77 UNTIL TIME>lapse
   91PROCplayer_scan
  100PROCassignstat
  200PROCassignuser
  300CLS:PROCstatus
  490TIME=0
  499 UNTIL FALSE
  500 END
10000DEFPROCsettimes:CLS:PRINTTAB(5,12);
"SCAN EVERY HOW MANY MINUTES ";:INPUT ti
me
10005INPUT TAB(5); "What date for log";d
ate$
10010 lapse=time*6000:TIME=lapse:ENDPROC

11000DEFPROCassignstat:FOR I=0 TO cnt%-1
:USER=FALSE:FOR J=1 TO nmac%:IF player%(
I)=allmac%(J,1) THEN allmac%(J,2)=allmac
%(J,2)+1:USER =TRUE
11010NEXT J
11020IF USER = FALSE THEN PROCnewmachine
:topmach%=topmach%+1
11030NEXT I:ENDPROC
11040DEFPROCnewmachine:FOR IK=1 TO nmac%
:IF allmac%(IK,1)=0 THEN allmac%(IK,1)=p
layer%(I):allmac%(IK,2)=1:IK=nmac%
11045NEXT IK
11050ENDPROC
12000DEFPROCassignuser:FOR I=0 TO cnt%-1
:USER=FALSE:FOR J=1 TO nuser%:IF name$(I
)=allmen$(J) THEN allmen(J)=allmen(J)+1:
USER =TRUE
12010NEXT J
12020IF USER = FALSE THEN PROCnewmen:top
user%=topuser%+1
12030NEXT I:ENDPROC
12050DEFPROCnewmen:FOR IK=1 TO nuser%:IF
 allmen$(IK)="" THEN allmen$(IK)=name$(I
):allmen(IK)=1:IK=nuser%
12055NEXT IK
12060ENDPROC
15000DEFPROCstatus
15006PRINT"USER ID";TAB(18);"USE":PRINT


15010FOR I = 1 TO topuser%:PRINTallmen$(
I),allmen(I):NEXT I
15015PRINT:PRINT:PRINT
15016PRINT"Machine No.";TAB(25);"TIME US
E":PRINT
15020FOR J=1 TO topmach%
15030PRINTallmac%(J,1)," ",allmac%(J,2)


15040NEXT J:ENDPROC
16000DEFPROCwind_up
16004*FX21,0
16005:CLS:PRINTTAB(5,12);"PLEASE ENSURE
NET PRINTER IS ON":PRINTTAB(8);"STRIKE A
 KEY WHEN READY":A$=INKEY$(10000)
16010*FX5,4
16015VDU2:PRINT"LOG TAKEN ON ";date$
16020PROCstatus:PRINT:PRINT:PRINT"TIME U
NITS ARE ";time;" minutes."
16030PRINT"Total scan time is given by t
he":PRINT"entry for the station number o
n the":PRINT"print header. If omitted it
 is":PRINT"the longest used station."
16040VDU3
16050VDU26:CLS:PRINTTAB(12,12);"LOGGING
TERMINATED":END
```


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MAKING SPRITES: Part 1

The Sprite environment

By Dick Williams

We will look at Sega sprites and details regarding single and multiple sprites plus examples of various sprite patterns, including a fast no frills pattern editor program.

The drawings show how patterns are made up, plus mag modes and a sprite pattern for a kiwi.

Details regarding sprites are in the Sega blue book on pages 113-122 and this information is also in the disc manual.

A sprite can be thought of as a small blank postage stamp which can be drawn on and moved about on the graph screen without rubbing out anything which may already be drawn on the screen.

There can be quite a few sprites on view at any given time and each one can pass in front of or behind other sprites.

This is achieved by clever design of the screen controller built into the Sega to create the impression that there are 32 very thin additional screens in front of the normal graph screen.

These additional screens are reserved for sprites and can be imagined as very thin sheets of glass.

If a sprite is placed on one of these sprite screens it can be moved anywhere on it but does not interfere with other sprites on different sprite screens nor with anything on the graph screen.

This is shown in the Sega book on page 122. Note the numbering from 0-31 with the graph screen shown as behind the last sprite screen. You can only have one sprite on any sprite screen at once.

The sprite screen closest to you when viewing the TV is sprite screen 0 and because it is in front of all other screens, a sprite on sprite screen 0 will block viewing anything which may be directly behind it.

By placing moving sprites on different sprite screens, small images can move behind or in front of other images making for very realistic games. So the first thing to remember is that there are 32 sprite screens.

Sprites are 8 pixels square. They can be doubled in size to 16 pixels square and they can be combined, either normal size or double size, into groups of two, three or four sprites to create a larger size sprite.

Each sprite has to have a number to identify it. There can be a total of 256 sprites numbered 0- 255 and any sprite, say sprite number 4, can be placed anywhere on either one sprite screen, or several sprite screens, or if you're really keen, can be placed anywhere on all 32 sprite screens at once.

There is a limitation in that only four sprites can be displayed on any horizontal line at one time.

You can place five sprites on a horizontal line (using five sprite screens) but only four will show and if you then move one of these four off the line then the fifth sprite will show.

A group of sprites is treated as one sprite so you can have four sprite groups on a horizontal line at once.

So the next items for your memory are: that each sprite you create must have a number, and you can only have four individual sprites or four sprite groups displayed on a horizontal line, at one time.

Each sprite can be any colour. All sprites in a sprite group will all be the same colour, however you can place different coloured individual sprites next to each other to get different colouring in an image.

The code for placing sprite number 1 on sprite screen number 4 and giving it colour number 9 is:-

30sprite 4,(X,Y),1,9

First the sprite screen number, then the X Y coordinates, then the sprite number and the last item is the colour.

When you read the code it looks as though the first part should be referring to sprite 4 but no, the first part is the sprite screen number.

Before getting into more detail it might be a good idea to type in the sprite demo programs listed.

The first one (sprite 1) is very simple, it puts a black sprite in the centre of the screen.

Sprite 2 first draws a black bar across the screen and then places four coloured double size grouped sprites over the bar. Note that the sprites are on top of the bar and also that the colours remain true. The sprites can be easily moved on the screen by altering the X and Y numbers.

Sprite 3 shows a lot of sprites moving all over the screen behind of and in front of each other. Sprite screens used are numbers 1 to 24.

Sprite 4 is a more interesting pattern and can be substituted into sprite 3.

Sprite 5 uses the same pattern as sprite 4 with a random movement.

Now there are a couple of points to watch out for if you want to alter these demo programs.

The first is that I have used some strange combinations for the X,Y coordinates and if you alter them its quite likely you will get a statement parameter error which only means you are off the edge of the screen.

The other point is that in some cases I have used four patterns to set up a sprite.

If you delete some of these to see the affect, it won't do what you think because the computer still has the pattern in it's memory.

You can set a pattern to no pixels set by using this "0000000000000000"

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Now you have some experience with sprites and should be ready for the next part — next issue — of setting the sizes of sprites using "mag" statements.

```
5 REM --sprite 1--simple sprite---
10 SCREEN 2,2:COLOR1,15,,1:CLS
12 REM ----------0123456789ABCDEF-
20 PATTERN S#0, "FFFFFFFFFFFFFFFF"
30 REM ---erase sprite-------------
40 SPRITE 4, (125,80), 0, 1
50 REM ----------------------------
70 GOTO 70
10 REM -sprite 2-----4 sprites-----
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 LINE (0,72)-(255,80),,BF
16 PRINT CHR$(12);"GRAPH SCREEN
18 MAG 3
20 PATTERN S#0, "FF818181818181FF"
22 PATTERN S#1, "FF818181818181FF"
24 PATTERN S#2, "FF818181818181FF"
26 PATTERN S#3, "FF818181818181FF"
28 REM ----------------------------
30 SPRITE 0, ( 20,60),0,1 :REM BLACK
32 SPRITE 1, ( 60,60),0,2 :REM GREEN
34 SPRITE 2, (160,60),0,4 :REM BLUE
36 SPRITE 3, (200,60),0,9 :REM RED
38 REM ----------------------------
40 GOTO 40
```

```
10 REM sprite 3---moving sprites--
12 SCREEN 2,2:COLOR1,15,,1:CLS:C=1
16 LINE (0,70)-(255,80),1,BF
18 PRINT CHR$(12);"GRAPH SCREEN
20 MAG 3
24 PATTERN S#0, "FF818181818181FF"
26 PATTERN S#1, "FF818181818181FF"
28 PATTERN S#2, "FF818181818181FF"
30 PATTERN S#3, "FF818181818181FF"
32 REM ----------------------------
34 FOR P= 1 TO 24
36 SPRITE P, (P * 10 * C,Y), 0, C
38 Y=Y+8: C=C+1: IFC>14 THEN C=1
40 NEXT P:Y=0:C=C+1:GOTO 34

5 REM sprite 4-beat-use in sprite 3
24 PATTERN S#0, "00193F3C1C0D0F2B"
26 PATTERN S#1, "0C0F0F0F02031B07"
28 PATTERN S#2, "00CCFE9E9C1B78EC"
30 PATTERN S#3, "1AFAF8F0EC2C3800"
10 REM sprite 5---random movement--
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 MAG 3
16 PATTERN S#0, "071F3F415DCDC5C1"
18 PATTERN S#1, "FFFE7E67301F0703"
20 PATTERN S#2, "E0F8FC82BAB3A383"
22 PATTERN S#3, "FF7F7EE60CF8E0C0"
24 REM ----------------------------
2E X=RND(1)*220:Y=RND(1)*30
```

```
26 SPRITE 0, (X  ,  Y), 0, 9
30 SPRITE 1, (Y*Y,  X), 0, 1
32 SPRITE 2, (X+Y,Y+X), 0, 2
34 SPRITE 3, (X+X,Y+Y), 0, 13
36 FOR P=1 TO  50:NEXT:GOTO 26
5 REM -sprite 6--expanding sprites
10 SCREEN2,2:COLOR1,15,,1:CLS
12 PATTERNS#0,"0103070F1C3F70FF"
14 PATTERNS#1,"FF703F1C0F070301"
16 PATTERNS#2,"80C0E0F038FC0EFF"
18 PATTERNS#3,"FF0EFC38F0E0C080"
20 MAG 3
22 X=110:Y=78:X2=110:Y2=78:E=10
24 FOR S=0 TO 6
26 X=X-E:Y2=Y2+E:Y=Y-E:X2=X2+E:IFC>14
THEN C=1
28 SPRITE0,(110,78),0,1
30 SPRITE1,(X,Y),0,2
32 SPRITE2,(X ,Y2),0,4
34 SPRITE3,(X2,Y),0,5
36 SPRITE4 ,(X2,Y2),0,6
38 SPRITE5 ,(X2,78),0,7
40 SPRITE6 ,(110,Y2),0,9
42 SPRITE7 ,(110, Y),0,10
44 SPRITE8 ,(X ,78),0,13
46 NEXTS:FOR P=1 TO  10:NEXT
48 IFE= 10THEN E=-10:GOTO 24
50 IFE=-10THEN E= 10:GOTO 24
```

More for starters

By Dick Williams

Here are a few more programmes for beginners, that were referred to in October's Bits and Bytes.

```
700 REM-----PROGRAM FOUR------------
710 FOR X=56 TO 57
720 SCREEN 2,2:COLOR1,15,,4:CLS
730 CIRCLE(165,95),70,1
740 CIRCLE(132,80),10,1
750 CIRCLE(190,80),10,1
760 CIRCLE( 88,95), 8,1,3,0,1
770 CIRCLE(242,95), 8,1,3,0,1
780 CIRCLE(134,83), 5,1,,,,BF
790 CIRCLE(188,83), 5,1,,,,BF
800 CIRCLE(165,105),8,1,3,0.5,0,8
810 CIRCLE(165,54),85,1,1,.160,.340
820 CIRCLE(165, X),85,1,1,.160,.340
830 PAINT (165,140),9
840 CIRCLE (48,45),50,15,.5,0,1
850 IF X=57 THEN GOTO 900
860 COLOR1: CURSOR5,160:PRINT CHR$(16)
;" THIS IS MY
870 PRINT :PRINT " BROTHER
880 COLOR1,11,(0,155)-(110,191),4:LINE
 (0,154)-(111,154),1:LINE(111,154)-(11
1,191),1
890 IF X=56 THEN GOTO 930
900 COLOR1,11,(0,155)-(90,191),4:LINE
(0,154)-(91,154),1:LINE (91,154)-(91,1
91),1
910 COLOR1,15 : CURSOR5,160:PRINT CHR$
(16);" THIS IS MY
920 PRINT :PRINT " OTHER ONE"
930 PAINT(255,0),1
```

```
940 FOR P=1 TO 200:NEXT P
950 IF X=57 THEN GOTO 980
960 CURSOR15,40:COLOR4:PRINT CHR$(12);
"HELLO "
970 IF X=56 THEN GOTO 990
980 CURSOR12,40:COLOR1:PRINT CHR$(12);
'GIDDAY"
990 CIRCLE(165,0),130,1,1,.190,.31
1000 CIRCLE(165,90),60,1.1,.120,.360
1010 LINE (165,130)-(165,130),,
1020 LINE (155,129)-(155,148),1
1030 LINE (145,129)-(145,148),1
1040 LINE (135,129)-(135,142),1
1050 LINE (125,129)-(125,135),1
1060 LINE (165,130)-(165,150),1
1070 LINE (155,129)-(155,148),1
1080 LINE (145,129)-(145,148),1
1090 LINE (135,129)-(135,142),1
1100 LINE (125,129)-(125,135),1
1110 LINE (175,129)-(175,148),1
1120 LINE (185,129)-(185,142),1
1130 LINE (195,129)-(195,142),1
1140 LINE (205,129)-(205,150),1
1150 FOR P=1 TO2000:NEXT P
1170 NEXT X
1180 GOTO 700
5 REM-----PROGRAM SIX---------------
10 SCREEN 2,2:CLS
20 CIRCLE(35,140),5,1
30 CIRCLE(60,140),5,1
40 CIRCLE(85,140),5,1
50 CIRCLE(115,140),5,1
60 CIRCLE(145,140),5,1
70 CIRCLE(130,165),5,1
80 CIRCLE(100,165),5,1
90 CIRCLE(75,165),5,1
100 CIRCLE(50,165),5,1
```

```
110 LINE(35,135)-(145,135),1
120 LINE(150,140)-(135,165),1
130 LINE(130,170)-(50,170),1
140 LINE(45,165)-(30,140),1
150 LINE(30,130)-(150,130),1
160 LINE(150,130)-(155,135),1
170 LINE(155,135)-(150,145),1
180 PAINT(35,140),1
190 PAINT(60,140),1
200 PAINT(85,140),1
210 PAINT(115,140),1
220 PAINT(115,140),1
230 PAINT(145,140),1
240 PAINT(130,165),1
250 PAINT(100,165),1
260 PAINT(75,165),1
270 PAINT(50,165),1
280 LINE(30,130)-(25,135),1
290 LINE(25,135)-(25,140),1
300 LINE(130,120)-(140,130),1
310 LINE(130,120)-(45,120),1
320 LINE(45,120)-(40,130),1
330 LINE(55,120)-(60,95),1
340 LINE(60,95)-(95,95),1
350 LINE(95,95)-(100,120),1
360 LINE(100,120)-(95,95),1
370 LINE(95,100)-(175,95),1
380 LINE(100,105)-(175,100),1
390 LINE(175,100)-(175,95),1
400 LINE(175,95)-(185,90),1
410 LINE(185,90)-(190,90),1
420 LINE(190,90)-(210,95),1
430 LINE(210,95)-(230,95),1
440 LINE(175,100)-(185,105),1
450 LINE(185,105)-(195,105),1
460 LINE(195,105)-(210,100),1
470 LINE(210,100)-(240,100),1
480 LINE(240,100)-(230,95),1
490 LINE(40,140)-(140,140),1
500 LINE(135,155)-(45,150),1,BF
510 LINE(90,95)-(85,70),1
520 PAINT(185,95),9
530 PAINT(100,175),2
540 PAINT(85,110),10
550 LINE(100,100)-(100,105),1
560 LINE(100,110)-(100,100),1
570 LINE(100,110)-(110,105),1
580 LINE(110,105)-(120,100),1
590 PAINT(105,134),1
600 GOTO 600
```


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Bounding robouncers!

By Stefan Schmidt

And yet again you are called out to defend planet Earth from a new alien threat — Robouncers.

If, by chance, enemy destruction has propelled you out of the first three levels, with casualties at a minimum, then the next number of levels will prove to be harder.

As the game progresses, your playing screen decreases, and the aliens' combine forces to pelt down en masse.

After that nerve-racking experience, the series of levels become even more exacting: the sequences of difficulty become more concentrated, your playing screen becoming smaller, the invaders more numerous, and to top it all off, they now fire missiles too.

When I first encountered Robounce I was playing via keyboard, and it was difficult because the movement of my craft was too slow to respond and its force-field was active too long.

The use of the joystick proved more challenging. The Robouncers bounced faster, the force-field was only up for a short period of time, and the movement of my craft improved dramatically.

Within this Michtron package is a silent mode, a pause mode, and an abort mode (for bad starts).

There are a few let downs such as the quality of graphics and the sound, which to me was an "insult" to the Sanyo MBC 550/555 capabilities.

Compatible upgrade

Sanyo has introduced another IBM PC "compatible" series, consisting of the Executive PC with dual 360K disk drives, the Executive XT with an internal 10 megabyte hard disk, and the Executive XT20 which has a 20 megabyte capacity.

It is Sanyo's first PC with internal hard disk.

Sanyo Business Systems' Ken Davis says the new computers offer additional features, while costing just over half the price of the IBM PC.

Colour graphics is standard, as is switchable clock speeds of 8MHz and IBM's 4.77MHz.

It has seven available expansion slots, five full-sized and two half-sized. An eighth is utilised for the colour graphics card and the parallel printer interface.

With a 140 watt voltage regulated power supply, the series has sufficient power to handle a number of peripherals and to even-out voltage fluctuations.

Bundled software includes word processing, GW Basic and MS-DOS 2.11 operating system.

A detachable sculpture-type keyboard has 84 keys and numeric keypad, LED indicators, and special function keys.

The Executive series ranges in price from $3695 for the PC to $7595 for the XT20, with the mid-range Executive XT, with its 10 megabyte internal hard disk, selling for less than $7000 (with monitor).

Since PC-DOS is almost identical to MS-DOS, you will find that a lot of IBM Public Domain will run on the Sanyo.

Occasionally, though, you will find a certain difficulty in getting the program to run on the Sanyo. Sometimes this can be attributed to the difference between the IBM keyboard and the Sanyo's

IBM KEYBOARD	SANYO KEYBOARD
ALT	CTRL + =
CTL+PF1	CTRL + SHIFT
CTL+PF2	CTRL + SHIFT + {
CTL+PF3	CTRL + SHIFT + }
CTL+PF4	CTRL + SHIFT + :
CTL+PF5	CTRL + SHIFT + "
CTL+PF6	CTRL + ;
CTL+PF7	CTRL + '
CTL+PF8	CTRL + ,
CTL+PF9	CTRL + .
CTL+PF10	CTRL + /
ALT+PF1	CTRL+PF1
ALT+PF2	CTRL+PF2
ALT+PF3	CTRL+PF3
ALT+PF4	CTRL+PF4
ALT+PF5	CTRL+PF5
ALT+PF6	CTRL+SHIFT+PF1
ALT+PF7	CTRL+SHIFT+PF2
ALT+PF8	CTRL+SHIFT+PF3
ALT+PF9	CTRL+SHIFT+PF4
ALT+PF10	CTRL+SHIFT+PF5
SHIFT+PF1	CTRL + 1
SHIFT+PF2	CTRL + 2
SHIFT+PF3	CTRL + 3
SHIFT+PF4	CTRL + 4
SHIFT+PF5	CTRL + 5
SHIFT+PF6	CTRL + 6
SHIFT+PF7	CTRL + 7
SHIFT+PF8	CTRL + 8
SHIFT+PF9	CTRL + 9
SHIFT+PF10	CTRL + 0
CTL + 2	CTRL + '
CTL + 6	CTRL + SHIFT + *

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How to get more RAM

By Don Stanley

Last month I mentioned that SV328 owners could get an extra 32K of ram under machine code, and 318/328 owners could access the video ram as temporary storage. Here's how its done for the spare ram bank, the video ram use will come later.

Note that all port addresses throughout are in hex.

There is no reason why the machine code routines in this article could not be adapted for 64k MSX machines; in most cases only the port addresses need changing.

Starting with the spare 32k ram in the 328, you need to know a little about machine code and also how to switch the roms out.

The Listing 1 routine will switch out the roms, and the Z80 CPU can then access the other 32K ram which exists at locations 0 to &H7FFF.

The Listing 2 program will re-enable the roms when your machine code routine is through and you need to go back to BASIC.

When you have called ROMOUT from a machine code routine you can not access the roms any more until ROMIN is called. Thus you can not use any BASIC routines like printing to the screen and so on.

However you can switch the roms in and out at will, so by using a series of ROMIN and ROMOUT commands you can use the rom and switch back again.

When the rom is switched in, nothing which you stored in the spare ram is lost. You can also locate machine code programs in the spare bank, but ensure that you don't try to access the roms.

By the way, CPM does exactly this. There are a number of routines such as read character, scan the keyboard, print a character which CPM swaps the roms in to carry out.

An example

To use the above, as an example say you wanted to store a large text file in the spare bank and have a BASIC program using all the 29K in the usual user bank. Your machine code program would be along the following lines. . . (this routine starts at &H9100 in the BASIC programs in this article).

```
CALL  ROMOUT          ;disable roms
LD    DE, (address1)  ;first adr to move
                        to
LD    HL, (address2)  ;first adr to move
                        from
LD    BC, (length)    ;# bytes to move
LDIR                  ;move
CALL  ROMIN           ;re-enable roms
RET                   ;to BASIC
```

The locations address1,address2 and length would be defined in BASIC, and would be filled with the address to write to in the spare bank, the address to read from in the usual bank and the number of bytes to move from the usual bank to the spare. Your BASIC segment would look something like Listing 3.

The above machine code routine would have address1,address2, length replaced by &HD150,&HD152,&HD154 respectively. The outcome of the Listing 3 segment would be that the string which is at location &HD200 and is 225 bytes long is copied to the spare bank starting at location 0 and then transferred back to the usual ram from location &HA000 onwards.

The sort of things that I find this useful for is when I would normally have a large string array eating up the usual ram.

I can force each string to be 255 bytes long by adding nulls to the end, fill up the 32K spare bank with the strings and then just reaccess the one I need later. Then I only ever have one array element in the usual ram.

The space saving in the user ram can be enormous, as the array would require 3 bytes for every element plus the string itself.

Making each string 255 bytes long helps avoid having to keep track of the number of bytes to read and write to and from the spare bank.

Experiment

For anybody who wishes to experiment further with this you will find the following locations very useful. They are used by DEF USR to manipulate the argument in the USR(argument) call.

It is often easier to pass VARPTR (strings$) to the routine than doing the POKES but your machine code routine needs to be able to sort out what is what.

If the argument is an INTEGER, then the integer is store din locations &HF925/26.

If the argument is a string, &HF925/26 hold the address in memory at which the string descriptor is located.

If the argument is a single precision number then the number will be in &HF923--&HF926, and a double precision number will be in &HF923-&HF92A.

The type of argument (string/integer/single/double) will be stored in F793. (2=Integer 3=string 4=single 8=double).

A string descriptor contains 3 bytes, the first is the length of the string and the second is the location in memory where the actual string is stored.

To pass a value back to BASIC, just fill the above locations with the value and ensure that you fill F793 with the type. Then, for instance, a call like A=USR(0) will see A contain the value that the routine placed in &HF925/26, if it is an integer.

Strings

To use this with strings, a call like A=USR(VARPTR(a$)) would see the lcoation of the string descriptor placed in &HF925/26. You would need to modify the routine above to match Listing 4: (this routine starts at &H9000 in the BASIC program Listing 5).

The BASIC program would be modified to that in Listing 5 which shows how to move a string variables value into the spare bank, and how to move from the spare bank into an area of ram and then to another string variable.

That really covers how to move bytes between the spare and normal RAM banks. It is up to your ingenuity with machine code and BASIC as to how you use this extra space. Go to it.

(Continued on page 55)

FAREWELL. . . AND HELLO

After a year long run, Alex and Barbara Bridger have retired from writing our Spectravideo columns.

But being the reliable types that they are, they had arranged for the chairman of the NZ Spectravideo Users Association, Don Stanley, to continue offering the high standard of information long evident in this column.

Don introduces himself as:

"A computer fanatic with particular interest in the micro field.

"I have degrees in mathematics and statistics and these reflect my major interest in the micro field. I have been a programmer/analyst for five years, in both the medical research and banking fields. I have recently started up a software/ consulting/ training company in Wellington along with several others.

My connections with user groups include being the founder and first secretary of the Wellington Spectravideo Group, being the first chairman of the NZ Spectravideo Users Association and being a member of the New Zealand SAS Users Group Committee. I am also the editor of the WGTN SV Clubs newsletter at this stage, and have been since June 1984."

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(Continued from page 53)

If you don't feel up to using machine code but still want to use the spare bank, the program "Memory Expansion" will let you store programs in the spare bank and switch it back and forth with the main bank. Your local SVI dealer should have a copy of "Memory Expansion".

LISTING 1

```
ROMOUT:   DI
          LD   A,0F
          OUT  (88),A
          IN   A,(90)
          AND  FD
          OUT  (8C),A
          RET
```

LISTING 2

```
ROMIN:    LD   A,0F
          OUT  (88),A
          IN   A,(90)
          OR   02
          OUT  (8C),A
          EI
          RET
```

LISTING 3

```
100 CLEAR 500,&HD200
110 L1=&HD150 : L2=&HD152 : L3=&HD154
120 FOR I=&HD200 TO &HD200 +224                 ' STRING GOES HERE
130   POKE I,212                                ' LOTS OF ARROWS
140 NEXT
150 A1=0                                        ' TO ADDRESS
160 A2=&HD200                                   ' FROM ADDRESS
170 L=225                                       ' LENGTH OF STRING
180 GOSUB 300                                   ' MOVE THE STRING
190 :
200 ' ABOVE PUT STRING IN SPARE BANK -- NOW PUT IT BACK AT A000
210 :
220 A1=&HA000                                   ' TO ADDRESS
230 A2=0                                        ' FROM ADDRESS
240 L=225                                       ' LENGTH
250 GOSUB 300                                   ' MOVE IT
260 FOR I=&HA000 TO &HA000 +224                 ' AND CHECK THAT THE
270   PRINT HEX$(I),CHR$(PEEK(I))              ' STRING IS NOW AT
280 NEXT                                        ' A000 '
290 END
300 POKE L1,A1 AND 255                          ' LOWER BYTE OF A1
310 POKE L1+1,255 AND (A1-(A1 AND 255))/255     ' UPPER BYTE OF A1
320 POKE L2,A2 AND 255                          ' LOWER BYTE OF A2
330 POKE L2+1,255 AND (A2-(A2 AND 255))/255     ' UPPER BYTE OF A2
340 POKE L3,L AND 255                           ' LOWER BYTE OF L
350 POKE L3+1,255 AND (L-(L AND 255))/255       ' UPPER BYTE OF L
360 DEF USR=&H7100 : A=USR(0)                   ' MOVE THE STRING
370 RETURN
```

LISTING 4

```
          CALL   ROMOUT          ; disable roms
          LD     HL,(F925)       ; string des address in HL
          LD     C,(HL)          ; length of A$ in C
          INC    HL              ; point at string start
          LD     E,(HL)
          INC    HL
          LD     D,(HL)          ; string start in DE
          EX     DE,HL           ; string start in HL
          LD     DE,(address1)   ; start address to move to
          LD     B,0             ; ensure 0 bytes to move ok
          LDIR                   ; move them
          CALL   ROMIN           ; re-enable roms
          RET
```

LISTING 5

```
100 CLEAR 800 : DEF USR=&H7000 : DEF USR1=&H7100
110 L1=&HD150 : L2=&HD152 : L3= &HD154
120 A$=STRING$(225,191)                         ' STRING GOES HERE
130 A1=0                                        ' TO ADDRESS
140 POKE L1,A1 AND 255                          ' LOWER BYTE OF A1
150 POKE L1+1,255 AND (A1-(A1 AND 255))/255     ' UPPER BYTE OF A1
160 A=USR1(VARPTR(A$))
170 :
180 ' ABOVE MOVED STRING TO SPARE BANK -- NOW PUT IT BACK AT C500
190 ' AND BUILD B$ FROM THERE
200 :
210 A1=&HC500
220 A2=0                                        ' FROM ADDRESS
230 L=225                                       ' LENGTH OF STRING
240 POKE L1,A1 AND 255                          ' LOWER BYTE OF A1
250 POKE L1+1,255 AND (A1-(A1 AND 255))/255     ' UPPER BYTE OF A1
260 POKE L2,A2 AND 255                          ' LOWER BYTE OF A2
270 POKE L2+1,255 AND (A2-(A2 AND 255))/255     ' UPPER BYTE OF A2
280 POKE L3,L AND 255                           ' LOWER BYTE OF L
290 POKE L3+1,255 AND (L-(L AND 255))/255       ' UPPER BYTE OF L
300 B=USR1(0)                                   ' MOVE STRING
310 :
320 :
330 FOR I=A1 TO A1+L                           ' INTO B$
340   B$=B$+CHR$(PEEK(I))
350 NEXT
360 PRINT B$                                    ' CHECK B$ OK
```

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Character editing: part two

By Joe Colquitt

If you have done any experimenting, you should be quite comfortable with the concept of redrawing characters. Let's take a look at colour and different video banks.

Character multicolour can be a bit of a handful at times. If you read my articles on sprites (and digested them), you should be familiar with "bit pairs". A character is made up of an 8 x 8 grid, like this:

```
■■■■■■■■   BYTE 0
■■■■■■■■
■■■■■■■■
■■■■■■■■
■■■■■■■■
■■■■■■■■
■■■■■■■■
■■■■■■■■   BYTE 7
```

The top eight dots are the bits in byte 0, and can be split into four pairs:

```
■■ ■■ ■■ ■■
```

In any pair, if the left dot only is on (•.), the colour for the pair will be value in 53283. If the right dot only is on, the value in 53282. If both dots are off, the value in 53281 (background). If both dots are on, the colour is in the range black-yellow, and is a value between 8-15 in colour RAM — add eight to the normal POKE value for that colour. Note that multicolour mode is not enabled for that screen location if its colour RAM value is less than eight.

To turn multicolour mode on, POKE53270,PEEK(53270)OR16. This small program will illustrate these points.

```
10 FORI=0TO7:POKE12288+32*8+I,0:NEXT:REM CLEAR THE SPACE CHARACTER
20 FORI=0TO7:POKE12288+I,204:NEXT:REM MAKE '@' EIGHT ROWS OF ●●..●●..
30 FORI=0TO7:POKE12296+I,170:NEXT:REM MAKE 'A' EIGHT ROWS OF ●.●.●.●.
40 FORI=0TO7:POKE12304+I,85:NEXT:REM MAKE 'B' EIGHT ROWS OF  .●.●.●.●
50 FORI=0TO117STEP3
60 POKE1024+I,0:POKE1025+I,1:POKE1026+I,2:NEXT
70 POKE53272,28:POKE53270,PEEK(53270)OR16
80 A=1
90 POKE53281,0:POKE53282,7:POKE53283,6
100 FORI=0TO119:POKE55296+I,A:NEXT
110 POKE198,0:WAIT198,1:POKE198,0:A=(A+1)AND15:GOTO100:P_3,
```

Run the program, and after the three lines are POKEd at the top of the screen, press any key to increment the value in colour RAM. Notice that the first eight key presses change the colours of the characters, but do not enable multicolour. However, the instant colour RAM value goes past seven (yellow), the characters are seen in their multicolour format. To exit the program, either STOP/RESTORE or POKE 53272, 20:POKE 53270,PEEK(53270)AND239. Also try different POKE values in lines 20-40 and 90.

These principles apply to "PRINTS" as well. If you substitute this line for lines 40-50, then by putting a colour command where the * is, multicolour can be turned on/off by commands > (yellow) or < (orange). Print" @@@ AAA BBB".

Extended background

Extended background is the process of having multicolour hi-res characters without going in to multicolour mode. This small routine to demonstrate:

```
10 PRINT"■":FORI=55296TO55605:POKEI,1:NEXT
15 PRINT"■53281"
16 PRINT"■53282"
17 PRINT"■53283"
18 PRINT"■53284"
20 FORI=0TO63
30 POKE1030+I,I
40 POKE1110+I,I+64
50 POKE1190+I,I+128
60 POKE1270+I,I+192
70 NEXT
80 GETA$:IFA$=""THEN80
90 POKE53265,PEEK(53265)OR64
100 GETA$:IFA$=""THEN100
110 IFA$=" "THENA=A+1AND15:FORI=0TO309:POKE55296+I,A:NEXT
120 IFA$="■"THENPOKE53281,PEEK(53281)+1AND15:REM F1
130 IFA$="■"THENPOKE53282,PEEK(53282)+1AND15:REM F3
140 IFA$="■"THENPOKE53283,PEEK(53283)+1AND15:REM F5
150 IFA$="■"THENPOKE53284,PEEK(53284)+1AND15:REM F7
160 GOTO100
```

When using extended background, you are limited to the first 64 characters. These can be re-defined to personal choices. Extended background allows you to PRINT/POKE a character that has a different colour background to the general background colour, with a selectable foreground colour. Run the program and you'll see this in effect.

First, the colour RAM is set so that the POKEs can be seen. Next, the first 256 characters are POKEd to the screen in groups of 64. When you press a key, extended background mode is enabled, and the four blocks become the same (to look at). They may be different colours. Looking at lines 30-60, you should be able to see a pattern. The quarter of the character set the character is in determines its background colour. Lines 110-160 wait for the space bar of F1-F7 and change a colour accordingly. By using the screen and the listing, the operation of extended background will soon become apparent.

Video bank switching

The video interface chip (VIC) can work only with 16K at a time, and knowing how to select which 16K it looks at is necessary when using, for example, very long BASIC programs, or several character sets. All the examples so far have used bank 0 (0-16383) as the viewed bank. But what if your program extends to location 17000 in memory? You can't use bank 0 because any characters would be made up of numbers that make up the program (you could insert a character set in a program by changing line pointers, but that is only a "flash" way of doing it and is not really practical).

The answer is to put your character set in any region above 17000. The second bank the video ROM looks at starts at 16384 (256*64), and you treat this bank exactly the same as the first — character sets start at multiples of 2048, and sprites start at multiples of 64. The addresses available for character sets are therefore 16384,18432,20480,

(Continued on page 59)

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(Continued from page 57)

22528,24576,26624,28672, and 30720, and those for sprites 16384+(page*64).

To access a video bank other than the default bank, use the tables on pp 101-105 of the user manual. As an example, say you want to use a character set starting at 22528. The bank controlling locations are: 648,53272,56576 and 56578.

648 needs to be POKEd with the location of the screen/256. Assume that in this example, the screen is put at the start of bank 1, in the same relative position it occupies in bank 0. When you switch your machine on, the screen occupies 1024 to 2023. Now we will shift the screen so that it occupies (16384+1024) to (16384+2023), 17408 to 18407. 648 is therefore POKEd with 17408/256=68. If you don't do this POKE, you can't do any editing. The next POKE concerns the actual bank change, using locations 56576 and 56578.

First, make sure bits 0 and 1 of 56578 are set to 1, then POKE 56576 with the new bank code, like this:
POKE56578,PEEK(56578)or 3
POKE56576,(PEEK(56576)and252) or A
where A = (3-bank)

Next the location of the character set must be put into 53272. POKE the low nybble with ((address-(bank*16384))/1024). In our example, it works out this way: ((22528-(1*16384))/1024)=6. The 6 is what goes into the low nybble of 53272. POKE53272, (PEEK(53272) AND240) OR6. The "AND240" is to maintain the value of the high nybble.

The screen position must now be set, in a similar fashion to the character set position. The high nybble of 53272 is the target for this operation. The formula is POKE53272,(PEEK(53272)AND15)ORA where A = (screen location-(bank * 16384)) /64
In this example, it works out as (17408-(1*16384))/64 = 16

The total package for putting the screen at 17408, and using a character set at 22528 is:

```
POKE56578,PEEK(56578)OR3
POKE56576,(PEEK(56576)
 AND252)OR2
POKE648,68
POKE53272,(PEEK(53272)
 AND240)OR16
POKE53272,(PEEK(53272)
 AND15)OR6
```

If you type all of these in, STOP /RESTORE,POKE648,4 will get you out of it. Note that when you move the screen, the sprite pointers go with it. In this example, they now reside at (16384+2040) to (16384+2047) = 18424 to 18431. Run this small program and it should make things clearer. It will also give you a reference on which to experiment.

```
10 POKE56334,PEEK(56334)AND254:POKE1,PEEK(1)AND251
20 FORI=0TO1023:POKE22528+I,PEEK(53248+I):NEXT
30 POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
40 POKE648,68
50 POKE53272,(PEEK(53272)AND240)OR6
60 POKE53272,(PEEK(53272)AND15)OR16
70 POKE56578,PEEK(56578)OR3
80 POKE56576,(PEEK(56576)AND252)OR2
90 V=53248:POKE18424,192
100 POKEV,160:POKEV+1,160:POKEV+21,1:POKEV+39,1
110 SS=16384+192*64
120 FORI=SSTOSS+63:POKEI,255:NEXT
130 PRINTCHR$(147):LIST
```

Entrepreneur game

A management simulation game called Entrepreneur (from Microsoft), which tracks the business statistics of a software company, is being aimed by Paxus at people with experience in business as well as management hopefuls who aspire to run their own companies. It is particularly useful for those interested in software development and marketing.

Extensive software

Skellerup Microsystems Ltd, the Christchurch-based software house, offers a range of software it claims constitutes the largest repertoire of interactive multi-user business software available — supplying more than 80 models of computers, from IBM PCs to ATIT's BB5 mini.

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Masterfile	4424
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The Amstrad 6128

The Z-80's Finale?

by Peter Biggs

Amstrad has just released its answer to the US move to 128K home and business computers – the Amstrad 6128 – and it was here in NZ only 10 days after its launch in the UK!

My own experience has been through the Sinclair range to the BBC Micro and now to MSDOS with some passing usage of CP/M on the way. I remember the days when 16K was 'real big', playing StarTrek (the best version I've seen to date) on a TRS80 and a very adequate game of chess on my old ZX81. 128K wasn't even a dream then.

Now ... big memory is in for 1985/86.

Why all this extra memory? After all, the 8-bit chip only addresses 64K and BASIC can usually only be written in this space minus the operating system.

The answer is simple. It's aimed at the small business and more sophisticated home user to give them access to the vast library of software, both commercial and public domain, through the CP/M operating system.

Educationally, it could also be useful as it would give students experience of the kind of small computer operating systems found in businesses around the country.

Sleek machine

Now to the machine itself. Sleek and subdued, the 6128 looks a very professional computer with a 'business-like' finish. The entire system is manufactured in South Korea by a Japanese company and its looks 'quality'.

It comes with a green screen or colour option, with the green screen definitely preferred for WP (Word Processing) and business applications.

The keyboard is shorter and thinner with the disc drive lower than on the 664. It has light grey keys contained in a dark grey plastic casing (I liked the brightly coloured keys of the 664), a master key chart and a screen colour chart on the disc drive.

It has a 10 function keypad/numeric combined keypad with the Return and Enter keys smaller than on the 664. The Cursor keys are arranged in an upside-down 'T' shape. It has a good keyboard feel, although not ideal for WP but more than adequate.

The 6128, like the 664, uses a 3-inch single-sided disc drive using discs manufactured by Hitachi. They hold a respectable 180 K/side on 40 tracks. "Why not 3.5 inch, the industry standard?" I hear you say. No answer.

The 6128 plugs together the same as the 664, the three wires being only just long enough to place the monitor above the computer.

There are plenty of I/O ports – a second drive, stereo, cassette, parallel printer, joystick, expansion but no RS232.

A number of peripherals are available – a dot matrix printer, a joystick, a light pen, a voice synthesiser and a TV modulator if you retreat to using it on a TV. No Graphics Table, Plotter or Mouse yet.

An RS232C interface, complete with Prestel software in ROM, is available and is needed for the Modem. The Modem, built here by Fountain Industries, is P.O. approved.

I found of great interest a ROM holder box fitting 7 ROMS. Undoubtedly software will become available for these ... after using a BBC, I found ROM software the way to go for software used frequently.

Bank-switched

The 6128 is based around the Z-80A processor running at 4 MHz, with 128K RAM of which 64K is bank-switched and the entire operating system held in a 48K ROM. this contains the BASIC interpreter and the Operating System which are held in 32K and the remaining 16K contains AMSDOS and a small part of CP/M. 27K of this is held in the second bank.

Amstrad BASIC switches ROM and RAM out of the same memory space giving users 43K (out of 64K) of BASIC space to play with. The extra 21K of ROM use up the screen memory and operating system.

The BASIC is Locomotive BASIC, supporting interrupts directly from BASIC – Every and After – and facilities for defining up to 8 text windows. It's a full BASIC with the extra 64K operating as a RAMDISK, storing screen images and data using a program called Bank Manager (supplied).

You cannot write bigger programs but you can access string data (using Bankwrite, Bankread, Bankfind) or screen maps (using Screenswap and Screencopy) from the extra memory. These commands simply copy 16k blocks of screen data in and out of the video RAM area. Up to four additional screens can be sorted but displaying them can take about half a second.

The graphics and sound are excellent. Sound is via the MSX standard AY-3-8192 chip, using an interrupt and queueing technique which is very easy to control and the Envelopes are peculiar but versatile, and they work.

The graphics can display up to 16 colours from a pallette of 27 in the lowest resolution mode 160 x 200. The highest resolution is 640 x 200 or 80 col x 40 rows of text.

No abbrev.s

I found it annoying that there is no abbreviation for commands or keywords but maybe I've been spoilt with the BBC Micro. Upper and lower case variables are the same so be careful of reserved words. The manual supplied with the computer is excellent but contains little of CP/M.

There are two Disc Operating Systems (DOS) with the 6128, AMSDOS and CP/M. In all cases, I found disc access times satisfactory.

AMSDOS is Amstrad's own DOS, which services BASIC, but disc servicing such as formatting, backing up and copying files is all run from CP/M.

AMSDOS itself was born from the cassette OS on the 464 and is barely suitable for discs. It does not support random-access files for instance and the other disc commands are enough but limited.

64K can only support CP/M 2.2 but with 128K, the more sophisticated version CP/M Plus (CP/M 3.1) is possible ... and the 6128 comes with both. Also, to make CP/M software modification easy, Amstrad have configured the 6128 as a VT-52 terminal, an industry standard. With CP/M Plus, 61k is available as TPA.

Why CP/M?

Why CP/M? Because it's been around longest (since 1968) and there is a vast amount of commercial software (eg. Wordstar, dBase II) as well as free software from CP/M User Groups around the world.

About 10% of it would be very useful but the average home user will probably not be interested.

CP/M Plus comes with all the usual CP/M utilities as well as GSX, the Graphics Extension that allows dumping screens to a printer. The CP/M is in 8080 code rather than Z80 but this should not affect most software.

The CP/M Library contains a large number of useful utilities and assorted software, usually not useful to the beginner but definitely useful further on.

Vitually all computer languages (such as Pascal, Turbo Pascal, C, Pilot, LISP) are available through CP/M.

As CP/M is used for business software it could give schools and others a chance to get their feet wet on a com-

(Continued on page 62)

(Continued from page 61)

mercial OS that provides a good introduction to MSDOS.

Again, with the extra memory, the full implementation of Digital Research LOGO is possible and it comes supplied as the reduced 64K version. The commands are well documented in the manual.

The only two niggles I have are that the extra 64K should have been able to have been used for BASIC program space and that the drive is only single sided with 180K. This is unsatisfactory for CP/M.

The major fault is that AmsDOS does not allow random access filing, a sin unworthy of this otherwise superb machine.

Comparisons

Comparing the 6128 to other computers around, the Commodore 128, due to be released here around the beginning of November, allows the extra memory to be used to store programs and variables as well.

As the Commodore 128 has access to the vast store of games and utilities written for the Commodore 64, it would still be the computer if you wanted to just play games.

However, look at the cost of adding a colour monitor and a disc drive and you'll see the difference – about $1000.

The BBC Micro has always suffered from memory constraints although the recently released version now has 32K for programs in any mode. The 6128 has a lot more memory but the BBC Basic with Procedures is easier to use and leads to better structured programming. As a 6502 processor-based computer, it cannot run CP/M.

There is a wealth of educational software for the Beeb, and its DOS is better than AmsDos.

But again, the price difference is over $1000.

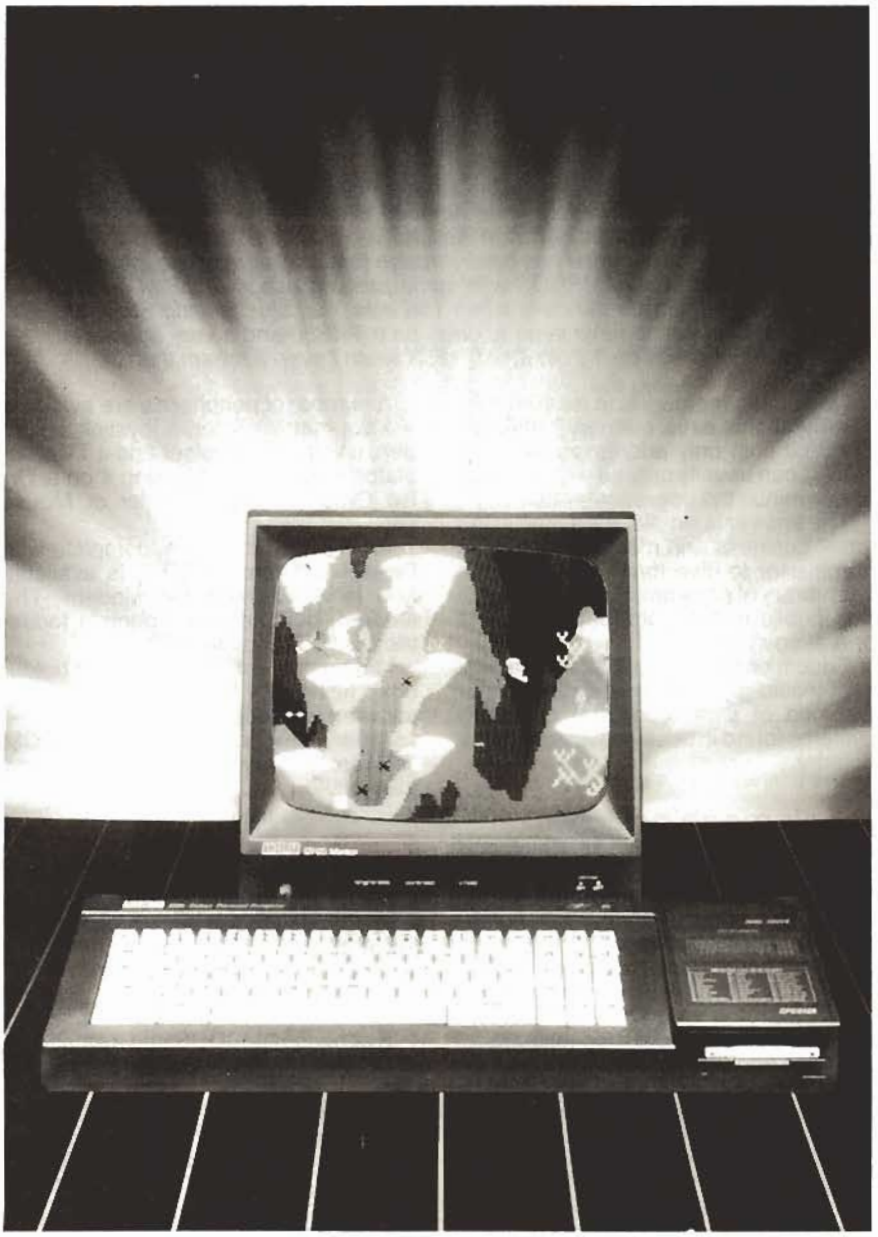
(PS they say 'Elite' will be available for the Amstrad Real Soon Now!)

Other contenders for the small business market running CP/M are the Bondwell 14, Osborne Vixen and others. For myself, I would keep an Amstrad green screen at work and a colour screen at home and simply move the computer!

Needs database

Now to software. I have seen some exceptional games, all well priced, such as Sorcery, Beachhead and Ghostbusters – as well as a Wordstar-like (improved to my way of thinking) word processor called Amsword and a satisfactory spreadsheet called Mastercalc.

It needs a good database, an art and design package such as CadPic and an integrated 'Appleworks-like' program including icons to complete the full circle.



Is this the end of the track for 8-bit micros?

As Amstrad is one of the three top selling micros in the UK we should see plenty of software pouring out for it soon.

I confess to being impressed. What this machine has got is price, function and compactness. It's all there in two neat packages.

Overall, it is good value for money, well supported, and software and peripherals are reasonably priced.

The 6128 brings a colour monitor and disc system to the home and small-business user for under $2000.

A small-businessperson could buy the machine and get started right away in WP or a spreadsheet, then pick it up (its light and easy to carry) and take it home at night for the kids.

A final thought: This seems to be the end of the track as far as 8-bit computers go. I am sure we will soon see 16-bit

MSDOS home computers on the market but the problems will remain the same – lack of software and broken promises.

As far as I can see, the 6128 would place any home user in a good position – in fact, most users would never reach the end of their machine. Besides there is now a lost of expertise and software around for 8-bit 6502 and Z80 chips and you could learn a lot on this one.

I'm still waiting for gigabyte bubble RAM chips addressed by two 32 bit co-processors, wafer disc drives and a flat hi-res colour screen. Dream on ...

Dick Smith goes U.S.

One company familar to NZ readers that has just become established in Silicon Valley is Dick Smith Electronics.

It opened its first store here three months ago and now has three, although it is not selling computers yet - only peripherals and electronics products.

Marketing vice president is David Milson, who had headed Dick Smith's NZ operations before being transferred to the US.

MICROCOMPUTER SUMMARY

Name:	CPC 6128
Manufacturer:	Amstrad Consumer Electronics Plc
Processor:	8 bit Z80A
Clock speed:	4 MHz
RAM:	128K arranged in two 64K banks. 41K available for user BASIC, 61K TPA to CP/M Plus. No expansions available yet.
Input/Output:	Keyboard, cassette, stereo, joystick, centronics parallel, a second disc drive, and expansion ports. Volume control on internal speaker.
Keyboard:	74 keys, qwerty style, keypad/function keys cluster, T style cursor keys. All keys may be user-defined using up to 120 characters.
Display:	Green or colour monitor option. 224 character set, 3 graphics/text modes. Max. 80 x 25 line display. Full international character set under CP/M Plus.
Graphics:	640 x 200 max. pixel density. Display max. 16 out of 27 colours.
Operating systems:	AmsDOS (native support for Locomotive BASIC), CP/M 2.2 and Plus.
Languages:	Locomotive BASIC (in ROM), DR LOGO (supplied), others available through CP/M.
Sound:	3 channels over 8 octaves, each independently variable.
Cost:	Computer with green screen $1595. With colour display $1995. Note: display contains power supply for computer and drive
Options:	Second disk drive, joystick, printer, voice synthesiser (with stereo speakers), RS232C serial interface (with Prestel ROM software), modem, TV Modulator, ROM Box.
Software:	BASIC in ROM. Two Discs supplied with CP/M 2.2 and CP/M Plus (with all utilities), DR LOGO (for 2.2 and Plus), other disc routines for copying, formatting etc.
NZ Disributor:	Grandstand Electronics Ltd, Auckland.

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POWER

Nimbus is probably the most advanced computer in its price range. It evolves from a completely original design concept incorporating VLSI technology, dual bus architecture and a separate RM-designed graphics processor.

Together with the use of the 80186 8MHz processor, this makes Nimbus two to three times faster than most competing systems.

The 8051 11MHz peripheral control processor enables the most ambitious interfacing needs to be met.

Direct memory access allows your disk access to run in parallel with other kinds of I/O and support high speed network operation.

Dual bus architecture ensures that graphics and internal memory needs do not slow each other down.

The 8087 8MHz hardware floating point option will satisfy any needs for very demanding numerical processing.

GRAPHICS

User-friendly is an over-used word, but given the choice, most users, whether beginners or experts, prefer to drive their computer with graphics-oriented facilities.

The trend towards easier to use, quicker to learn, more attractive application software (with mixed graphics and text, colour, multiple fonts, mouse and cursor control, windowing and sprites) requires bit-mapped display and high resolution. All these features are provided by the RM-designed graphics processor together with an order of magnitude increase in speed.

MODULARITY

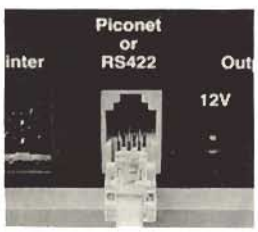
You can adapt your nimbus computer to almost any purpose today or tomorrow. The Nimbus comes with a standard 576K of internal memory (including a separate 64K for graphics) which is expandable up to a megabyte.

There are also system ROMS, a configuration EEROM, and — optionally — one or two ROM cartridges.

The flexible, easily upgradeable design allows users the choice between the following Nimbus internal disk configurations:

- single 3.5" drive
- twin 3.5" drives
- single 3.5" drive + 10 or 20 Mb Winchester.
- without drives (as a station on the network).

And for even higher storage capacity external high-speed 40 and 80 Mb. Winchester disk drives will be available together with optional cartridge tape backup.



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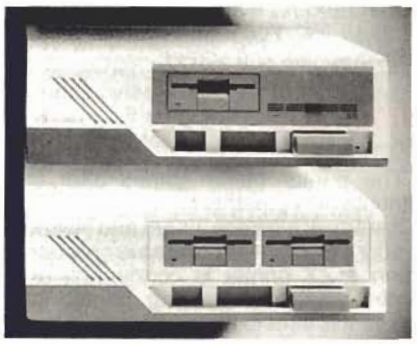
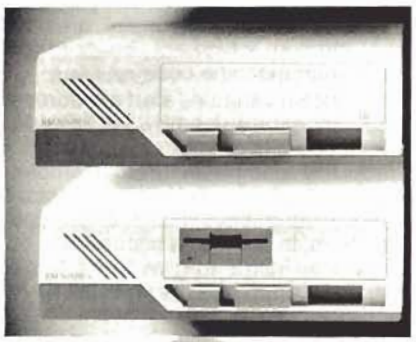
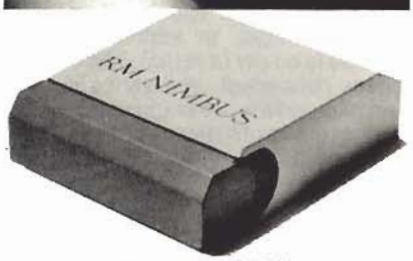






INTERFACING

A computer's abilities are virtually unlimited if they are supplemented with the right professional tools.

Control modules, data logging *instruments, sound, music and* graphics devices — every kind of technical or scientific application — can in theory be linked to a microcomputer. But few micros are designed to be able to cope with more than a small number of these interfaces.

Among the many totally new ideas incorporated in Nimbus is Piconet, a unique input-output system which allows the computer to drive up to thirty peripherals, instruments or devices from a single I/O port.

As well as Piconet, Nimbus provides a complete array of standard I/O facilities and four general purpose internal expansion slots. In fact there are more interface options with Nimbus than you are ever likely to need.

SOFTWARE

The MS-DOS* and MS-NET* operating system, together with other key design benefits ensure the user has access to a very large range of existing software, including the following:

- word processing
- spreadsheet
- administration
- accounts
- database
- communication
- office productivity
- languages
- graphics
- paintbrush
- CAD
- CAL
- entertainment

A 5¼" external disk drive is available for reading and writing files from IBM PC and other MS-DOS* systems.

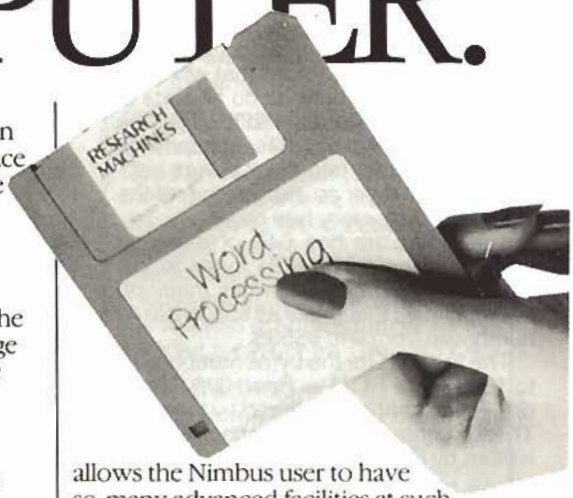
NETWORKING

Networking is increasingly in demand in those computer installations where economy, efficient organisation and improved communications are essential.

RM's extensive experience in networking is now translated to 16-bit using MS-NET* with our high-speed 0.8 Mbits/sec chain interconnection. This will allow up to 64 stations spread over up to 1200 metres to share network facilities, printers and software.

DESIGN

Design is the key element which allows the Nimbus user to have so many advanced facilities at such really low cost.



The Nimbus series is elegant functional and modular. User requirements have been taken into account from the most simple (very quiet fan, hand-grip slots for easy carrying) to the most far-reaching (1 megabyte memory expansion, Piconet multiple interface system, new graphics processor). Built-in expansion capacity is provided to handle most conceivable future developments.

Nimbus, with its custom-designed keyboard, has a small footprint which gives a total front-to-back system depth of about 56cms. Monitors can fit easily on the Nimbus units, which are themselves stackable.

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A survey of memory

A few days ago a Spectrum Plus owner commented to me that while he could get his computer to do all sorts of interesting things by following the instructions given in this column, he didn't really understand what was happening. So I think an explanation of the Spectrum's memory is in order.

The Spectrum has 64K of memory, and since there are 1024 bytes in 1K, there are 65536 bytes in this memory. These can be thought of as 65536 boxes numbered from 0 to 65535.

The first 16K (or the bytes numbered 0 to 16383) are ROM — Read Only Memory — and cannot be altered by the user. These contain the operating system written by Sinclair to control the computer.

The next 48K (the bytes numbered 16384 to 65535) are RAM — Random Access Memory — and can be altered by the user. Most of this memory is used to hold program, but some of it is taken up by information used by the ROM.

These areas can be manipulated by the user to provide various effects.

Screen memory

The first 7K or so of RAM (the bytes numbered 16384 to 23295) are taken up by screen memory. This area holds a representation of the screen picture in memory. Whenever you print something on the screen, a ROM routine puts it in to this area of memory.

Every 50th of a second, this area of memory is transferred onto the screen, and in this way the picture is formed.

The first part of the screen memory is called the display file. This holds a representation of the dot pattern of the screen. Since the screen has 192 dots down and 256 dots across, this area contains 192 x 256 49152 bits. Each bit is set to 1 or 0, depending on whether the dot is black or white.

Since there are 8 bits per byte, 6144 bytes are necessary to hold information about every dot on the screen.

These bytes occupy addresses 16384 to 22527. Clear the screen, and POKE any address between 16384 and 22527 with 1. You'll see a dot on the screen.

Colours

The last part of the screen memory is taken up by the attribute file, which controls the screen colours. Since the Spectrum can have two colours per character square, and there are 24 x 32 768 squares on the screen, there are only 768 bytes in the attribute file. Each byte holds information about one square.

The bytes are in one long list, but the screen is a grid of squares. How do the bytes represent these squares?

The order is pretty much as you would expect. Each 32 bytes represent one line on the screen, and the next 32 bytes represent the next line down. So if you POKE an address in the attribute file (say 22550) with a random number (say 16) and then POKE another address 32 bytes along (22582) with another number (say 125) you'll get two coloured squares, one below the other.

Try writing a little program which will POKE random numbers into the whole attribute file. You'll end up with a multicoloured flashing screen.

Other addresses

The printer buffer comes after the attribute file in memory.

It starts at address 23296 and finishes at address 23551. This area is only used when a ZX printer is connected, and stores whatever is being printed out before it is sent to the printer.

Since few people have ZX printers, the printer buffer is a useful area of empty memory which can be used for storing short machine code routines.

The system variables start at address 23552. These are used by the ROM to hold various bits of information used to control the computer. For example, address 23609 is called PIP, and controls how long keys beep when you press them, in 50ths of a second.

Try using POKE to give PIP a large number (say 200) and see what the keys sound like.

After the system variable come the microdrive maps, at address 23734. This area is empty unless you have microdrives connected, and varies in size when microdrives are being used. So all the other areas of memory after the microdrive maps move up and down in memory as well.

Basic

The microdrive maps are followed by a short area of channel information, and then the Basic program.

The Basic program is any program written in Basic that you have typed in or loaded, and can be any length betwen a few bytes and about 41K in length, since you have about 41K of memory available once 7K is used by the screen memory and suchlike.

After the Basic program comes the variables. These are the variables used by the Basic program.

For example if you have a variable named C and you LET C 5, then just above your Basic program the variable C will be stored with its present value, 5. Every time you change the value of C, the computer begins at the start of the variables, and searches through memory until it finds a variable called C, and then alters the value stored with it.

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Following the variables are various bits and pieces of information used by the computer, for example a GOSUB stack which keeps track of where to return to when you go into a subroutine in a Basic program.

At the very top of memory the user defined graphics are stored. Normally this area of memory will contain bytes representing the letters A to U, because this is what the user defined graphics look like when you turn the computer on, but these bytes will be altered whenever you change the graphics.

So there it is, a survey of the 65536 bytes forming the Sinclair Spectrum computer.

You can alter these bytes as much as you like (using POKE) without harming the computer in any way, so feel free to try things out.

If you try to POKE ROM (that is, addresses below 16384) the computer will simply ignore you.

You might confuse the computer if you alter some of the system variables, so that it "locks up". If this happens, simply switch it off and on again to regain control.

If you're a Spectrum Plus owner, try to borrow an old Spectrum manual if you can get hold of one, since the old manual contains a lot more information about the internal workings of the Spectrum. It just hasn't got such pretty pictures.

If you want to know about a particular area of memory in more detail, check out past issues of Bits & Bytes.

If there's anything else about the Spectrum you'd like to read about, drop me a line at P.O. Box 4063 Christchurch.

'City Smasher'

Here's 'City Smasher' for the ZX Spectrum.

The program itself is original but the idea is not.

Instructions are included in the program and the graphics included in lines 9000-9070; these lines may be entered first so that the graphics may be entered as such in the main programme.

```
  10 GO SUB 9000
  20 GO SUB 7000
 500 LET q=0: LET p=1: LET h=17:
 LET b=15: LET x=1: LET y=0: LET
 s=0
 550 LET mis=0
1000 FOR g=8 TO 25
1010 FOR f=21 TO INT (RND*12)+6
STEP -1
1020 PRINT AT f,g; INK 1;"■"
1030 NEXT f
1040 NEXT g
1050 PRINT AT x,y; INK 0;" "
1070 LET y=y+1: IF y=28 THEN PRI
NT AT x,y;" ": LET y=0: LET x=
x+1: IF x=22 THEN GO TO 2000
1071 IF ATTR (x,y+2)=57 THEN GO
TO 5000
1075 IF INKEY$="5" AND mis=1 THE
N GO TO 1081
1080 IF INKEY$="8" THEN LET x1=x
: LET y1=y: PRINT AT x1,y1; INK
2;"►": LET mis=1: BEEP .008,x1+1
5
1081 IF mis=1 THEN PRINT AT x1,y
1;" "
1085 IF mis=1 THEN LET x1=x1+1:
IF x1=21 THEN LET mis=0: PRINT A
T x1,y1;" "
1086 IF mis=1 THEN PRINT AT x1,y
1; INK 2;"►": IF ATTR (x1+1,y1)=
57 THEN LET s=s+1
1090 IF INKEY$="8" AND b>0 THEN
FOR o=1 TO 29-y: PRINT AT x,y+o+
1; INK 3;" -": BEEP .01,o-30: NE
XT o: LET b=b-1: PRINT AT x,31;"
"
1100 PRINT AT 0,0;"SCORE ";s;AT
0,16;"AMMO ";b;" ";AT 0,25;"L ";
p
1200 GO TO 1060
2000 FOR g=8 TO 25
2100 FOR f=21 TO INT (RND*12)+6
STEP -1
2110 PRINT AT f,g; INK 1;"■"
2120 NEXT f
2130 NEXT g
2200 LET x=1: LET p=p+1: LET y=0
: LET s=s+p: LET b=b+2: GO TO 10
60
5000 CLS
5010 FOR f=1 TO 100
5020 BORDER INT (RND*8)
5030 BEEP .01,f-50
5040 NEXT f
5050 FOR k=1 TO 5
5051 PRINT AT k+2,6;h$(k);" ";h(
k)
5052 NEXT k
5055 FOR k=1 TO 5
5060 IF s>h(k) THEN LET h(k)=s:
GO TO 6000
5061 NEXT k
5070 PRINT AT 15,0;"BAD LUCK, BE
TTER LUCK NEXT TIME"
5080 PRINT AT 21,5; FLASH 1; PAP
ER 6; INK 0;"Press any key to st
art": PAUSE 0: PAUSE 0: LET p=1:
 LET b=15: LET s=0: LET x=1: LET
 y=0: CLS : GO TO 1000
6000 PRINT AT 15,0;"YOU HAVE BEA
TEN ";h$(k)
6010 INPUT "Your name please ";h
$(k)
6020 LET s=0: CLS : GO TO 5050
7000 CLS
7010 PRINT "CITY SMASHER"
7020 PRINT '"USE KEYS 6 & 8 TO B
OMB AND FIRE"
7030 PRINT '"RESPECTIVLY, ONCE T
HE CITY IS "
7040 PRINT '"DESTROYED YOU WILL
RECIEVE 2 "
7050 PRINT '"MORE SHELLS , AND R
ECEIVE THE "
7060 PRINT '"PATTTERN YOU ARE ON
 AS A BONUS"
7070 PRINT AT 21,9;"PRESS ANY KE
Y": PAUSE 0: CLS : RETURN
9000 FOR f=USR "a" TO USR "e"+7
9010 READ a: POKE f,a
9020 NEXT f
9030 DATA 0,a,32,60,a,32,0,a
9040 DATA 0,a,a,15,a,0,a,a
9050 DATA 255,153,a,255,a,153,a,
255
9060 DATA 48,112,120,127,a,a,63,
0
9070 DATA 0,a,240,252,254,a,252,
0
9075 DIM h$(5,16): DIM h(5)
9080 FOR g=1 TO 5
9090 READ h$(g): READ h(g)
9100 NEXT g
9110 RETURN
9120 DATA "UNCLE BULGARIEA",1000
0,"NAUGHTY TED",2000,"FROSTY BOY
",1200,"TARCOON",800,"MINER WILL
Y",400
9998 ERASE "m";1;"city": CAT 1:
SAVE *"m";1;"city" LINE 1: VERIF
Y *"m";1;"city": CAT 1: STOP
9999 SAVE "city" LINE 1: VERIFY
""
```

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Tramiel on:
Where's Atari heading?

Atari boss Jack Tramiel claims his bosses are "the people for whom I work to produce products for"...meaning you and me.

That was why, he says, he took time out from the Summer Consumer Electronics Show at Chicago to "report" to a local user group on product development plans.

Excerpts of the report, reprinted in the October newsletter of Auckland's Tariland Computer Club, are presented below as direct quotes from Tramiel.

On why Atari produced the 260STD (as well as the 520ST):

"We feel that there are different buyers in this marketplace...people who like to buy from K-Mart and people who like to buy from specialty stores, so we went ahead and designed two different kind of machines.

"There is the total system like the 520 which will be sold to specialty stores and a system like the 260 where the mass merchandiser, if he wants to, can buy it. It was strictly to be able to produce the volume and to satisfy our customers.

On future products:

"We will definitely have new machines constantly. Our aim is to continuously improve the product line. We intend to show at Comdex this year an even higher graphic machine.

"We intend to keep the ST as the basic machine. What we will do is we intend to have an expansion box. In that expansion box we intend to put quite a few boards. One of those boards will be a 32-bit board. Not a machine, but just a board. It will turn the ST, which you own today, into a 32-bit machine if you want to.

On stored memory capacity:

"We will be expanding our drive capacity. We will have a 3.5" disk drive with a half-megabyte and one megabyte in the future. We have a number of different printers, including a daisy wheel printer.

On 3½-inch discs:

"No (5¼-inch discs, Atari's with) 3½-inch discs. We want to keep all those products alive and build on the software.

On 8-bit machinery:

"The whole idea as far as the eight-bit line is concerned is to keep that product alive and expand it. As far as beginners, as far as education, as far as people who don't have much money, the eight-bit line is a fantastic produce. We will continue producing it and expanding it.

I'm hoping in 1986 or even the end of this year to have a 256K eight-bit machine with a built-in drive.

On the ideal Atari computer:

"It would not be on the table. My ideal Atari computer of the future is to have a television with a remote keyboard to be your computer.

On US Market availability of STs:

"The 520ST system (512K RAM, half-megabyte 3.5" disk drive, & high resolution monochrome monitor) will be sold in July retails for $799.

"The 260ST will be available in October or end of September and we'll have 2 machines...one will be $395 without the drive and $495 with the drive.

And a message for Atari users:

"The message I have for them is a very simple one. I appreciate all the patience they have had over the years. Now we are here, we are producing the best products and I hope they will be as proud of us as we are of them."

Monkey business

By Michael Fletcher

After conquering the original Donkey Kong we now turn to meet Donkey Kong Jnr.

It's a role reversal from Donkey Kong, because in this game our 'hero', Mario, has to hold Donkey Kong captive at the top of the screen while Jnr tries to set his dad free.

Mario unleashes snap-dragons and birds that drop lethal eggs but perhaps his best aids are the difficult scenarios that you have to climb through to reach father.

There are four scenes: the first scene is a mess of vines and platforms, the second is of chains to unlock, the third a moving tangle of platforms and vines and birds, and the fourth. . . I haven't got through to this final level (yet).

If you are successful in climbing the vines, while avoiding the snap dragons, you will reach the top of the screen where Mario is holding Donkey Kong — but before you can pull the chain that will release Papa Kong, Mario pushes the cage to the next level.

The graphics for Donkey Kong Jnr are very close to the arcade version.

After repetitive plays this game remains interesting, but I can see it becoming tedious, as Donkey Kong did.

That's a fault of all multi level games: after you have mastered them they are stuck at the back of your software collection and are never played again.

Donkey Kong Jnr is a 16K cartridge, manufactured by Atari, and costing $69.95.

Jack for NZ?

I talked to Jack Tramiel briefly at the PCW Show, to invite him to be keynote speaker at the Microcomputer Industry Dinner to be held again in conjuction with the PC 86 exhibition in Auckland in May next year (Adam Osborne was keynote speaker at this year's inaugural dinner and exhibition).

He seemed genuinely delighted at the invitation and promised to make every effort to attend.

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Getting the Most from your Sinclair Spectrum

By Anne Sparrowhawke.

This appeals to older (say parents) rather than younger people.

At first glance its style may be off-putting because it's wordy.

But here lies its strength. The text gives a blow by blow account, as if you had a personal tutor beside you.

The first five chapters are about BASIC programming for the novice, then follows a chapter on machine level workings, and the use of colour, graphics and sound is explained.

Hardware add-ons are covered as are the types of software available.

A chapter on troubleshooting is more useful than the ZX manual's cryptic comments.

Similarly newcomers find little help from the ZX manual in getting to grips with BASIC. Hence the need for a really helpful book, and after reading this the subtleties of the manuals will be more apparent and appreciated.

J.F. Lamb

Apple Basic for Business

Alan J. Parker/ John F. Stewart
Reston $39.90

Although it contains a rather strange mixture of topics which range from the impact of computers on society to the use of Visicalc, this book succeeds well in introducing elementary data-processing skills to the Applesoft programmer.

Sequential and random access file-handling is clearly explained as a suite of simple business programs is developed and refined.

It is quite possible to write powerful business programs in Applesoft and this book provides an excellent launching pad for more sophisticated programming ventures.

– Mike Wall

Better programming for your Commodore 64

By Henry Mullish and Dov Kruger. Fontana $17.95 269 pages. Reviewed by W.F. Engel

The authors are computer scientists, which explains the tutorial style.

They give exercises to explain arithmetic operations, then go over to mathmatical expressions of algebra in computerese. The chapters each conclude with numbered questions and projects and a little program to write

There are clear explanations of string manipulation, variables, how left, middle and right functions work, and at last I can understand structured programming.

For handling large masses of data is instruction on dimensioning arrays - working with loops and nesting loops, and the conversion of ASCii characters and numbers.

The book deals with sound in an elementary way.

The final chapter gives pointers on debugging and hidden basic commands.

W.F. Engel

A Dictionary of Computer Terms

By Laura Darcy and Louise Boston. Fontana, $12.95, 282 pages.

With some trepidation I selected this book to review. Being a novice user, I imagined the book would help elucidate the complex labyrinth of computer manual jargon, and I wasn't surprised to discover one could browse easily through this, and not assimilate anything.

The challenge is to manipulate the dry logic of its contents. To this end it does offer a pleasant page layout, easy to read with each reference word in bold type and the explanations slightly indented, in non-squint type.

K.T. Jeltsen

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SAMS

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This introductory book shows you how to use Ashton-Tate's *Framework* software to its fullest potential. Covers word processing, spreadsheets, data base management, programming, and graphics. Advanced users can learn how to create automatic or custom operations that might otherwise require significant time at the keyboard. For anyone who writes, works with numbers, or needs rapid access to store information. Allan Simpson.

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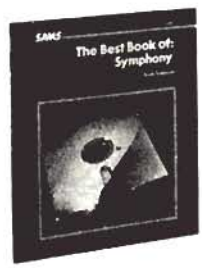

Symphony is a complete set of integrated application programs and therefore can be overwhelming to the first-time user. This book takes a feature-by-feature approach to explaining and demonstrating the full capabilities of the package. Alan Simpson. 256 pages

$59.95

■ THE BEST BOOK OF: dBASE II/III

dBase II® and dBase III® have long been recognized as comprehensive data base management packages. But, they have also gained a reputation for being difficult to use. This book simplifies a very complicated product and allows you to get greater utility from this software. Ken Knecht. $49.95

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Beginners' BASIC — **Clive Prigmore**
Teach-yourself step-by-step guide to programming which can be used with the ZX81, Spectrum, QL, VIC-20, Commodore 64, Oric 1, Dragon 32 and 64, Apple IIe, TRS-80, BBC, Electron, Lynx, TI 99/4A, and Atari 400, 600XL and 800. Contains many worked examples and exercises, and can be used without a computer.
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The Second Book of Machine Language — **Richard Mansfield**
Written for programming with Commodore 74, 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.
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Commodore 64 Logo Primer — **Gary G. Bitter & Nancy Ralph Watson**
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Sinclair

The Sinclair QL Companion — **Boris Allan**
Covers Sinclair SuperBASIC, principles of structured programming, use of sound and graphics, and hardware facilities. For machine code programmes, there are sections on programming the QL's Motorola 68008 microprocessor and an overview of the Intel 8049 support chip used to handle peripheral devices such as the keyboard. Intended for comparison between techniques for programming the QL and other popular models.
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Making the Most of the Sinclair QL: SuperBASIC & its Applications — **Dick Meadows**
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Atari

Assembly Language Programming for the Atari Computers — Mark Chasin

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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.

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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.

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Stewart Brand

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On-Line Computing for Small Businesses - Silver's Wall
Maurice A. Silver, John Jeacocke & Ray Welland

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Chris Gilbert & Laurie Williams

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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.

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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.

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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.

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Adventure Games for the Electron
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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.

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Getting Started With ProDos
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Applesoft BASIC: A Teach-Yourself Introduction
B.M. Peake

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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.

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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.

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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.

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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.

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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.

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Commodore 64: Basic Programs in Minutes
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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.

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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.

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Language/programming

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Penguin — **Our price $11.95. Save $1.00**

The Companion to the Electron

By Jeremiah Jones and Geof Wheelwright, Pan Books, Collins. $21.95, 285 pages.

This book is thicker than the usual computer texts, with no pretty pictures, relatively few diagrams, but a comprehensive index of about 500 entries.

It is punctuated with 105 demonstration programs, each with an introduction and following comentary, and in some cases line-by-line explanation.

To quote the authors: "We have assessed the strengths and weaknesses of the 'Acorn Electron User Guide' and concentrate on those areas in which the manual fails to provide users with adequate support".

In view of the above, it may be surprising to find 110 pages devoted to BBC Basic Key Words, but this also includes 50 full programs.

For example OPENUP and the subsequent discussion on "file handling on tape" covers 11-pages with an 8-page program showing how it's done.

Each Basic key word entry concludes with the appropriate token number and the final chapter contains a disassembler program making use of the token numbers.

A disappointing omission is a numeric list of token numbers; so having found the token number the reader will have to hunt through the Basic key words to find the related key word.

A chapter on character generation deals with the binary-hex relationship, simple character creation, characters in motion, mirror characters, inverse characters, and double characters – each supported by a program to demonstrate the effect.

Finally four chapters deal with machine code and assembly language, the assembler, operating system, and a disassembler program.

All the programs appear to be photocopies from a very average computer printer – and they are not nice to read.

Otherwise the programs run without trouble and were instructive.

Unlike the programs, the text is easy to read.

This is a fine instruction manual covering that area of programming between Basic and the "heavy stuff" written for professional programmers.

– Ken Meredith

Ladybird Computer Series

These four booklets are written by members of the Loughborough Primary Microproject and cover BBC and Spectrum computers.

The publisher, Ladybird, has co-opted educators and the result is a set of clearly-written books unusually free from the apparently obligatory detail often a part of computer writing.

They are also free of jargon, and do appeal to the younger reader.

They introduce the novice to the computer and several small programs demonstrate sound and graphics functions.

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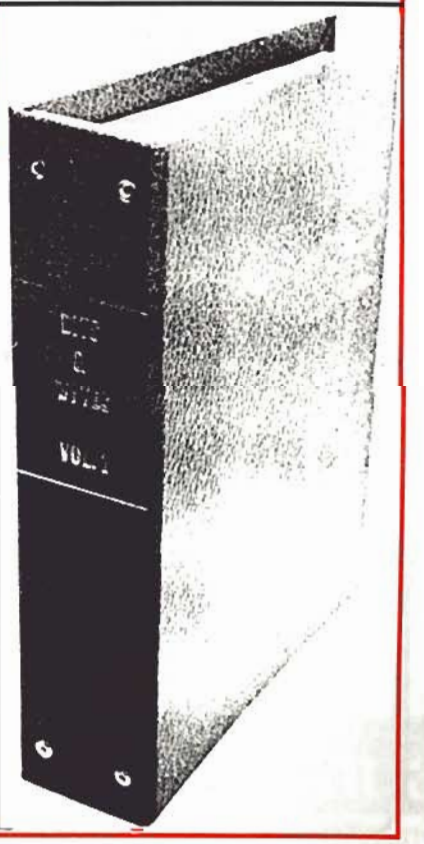

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Chaston Trading	76
Commodore Computer	56
Commodore Computer	58
Compumedia (Maxell)	77
Computer Game Rentals	46
Computer for people	35
Control	18
Cudby & Mead	12
Data Stream	28
Dick Smith	68
EC Gough	8
FBN Software	49
Fountain	32,33
Genisis Systems	30
Hi Tech Micro	80
Home Mail	76
IBM	6
Innovative Computers	10,42
James Electronics	48
J R Moon	76
Kane Agencies	27
Kapiti Business Systems	51
MCP Applications	79
Melco Sales	15
Micro Software Hire Club	59
Micro Style	50
Micro Ware	31
Mitsui	16
ML Systems	43
Monaco/Atari	39
Nashua	78
NCR	4
NZ Computer Games	54
NZ Post Office	37
Office Electronics	66
Otakou Software	67
Progeni	63
P C Power	23
Pitmans	70
Racal Milgo	24
Reed Methuen	76
Sanyo	52
Silkwood Furniture	19
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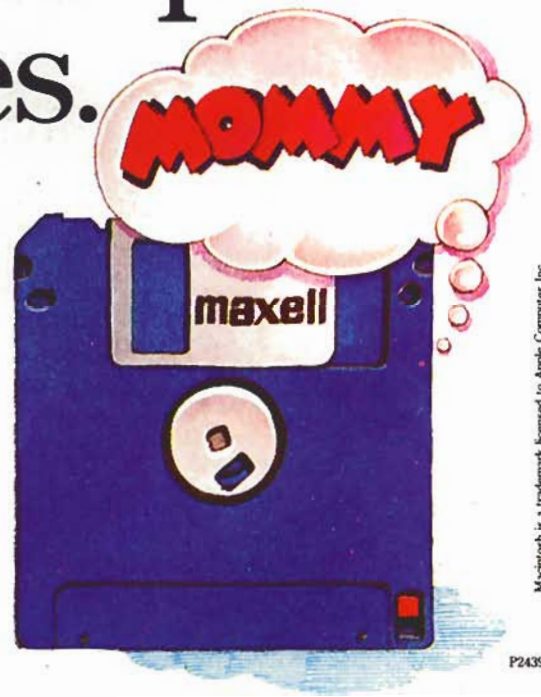

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