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BITS & BYTES

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NEW ZEALAND EXCLUSIVE! Accel 900, the AT from DSE Multitech



Commodore's entry
into the AT field

Apple IIGS, the
extension
of the II series

Software:
A128 Accounting
Farsight

**Computer
hardware –**
Part 2 of our
annual roundup

Index to Volume 4



Sorry, but your data base is now a victim of Evolution.

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In the past, data bases have been sluggishly slow, difficult to fathom, and not very helpful.

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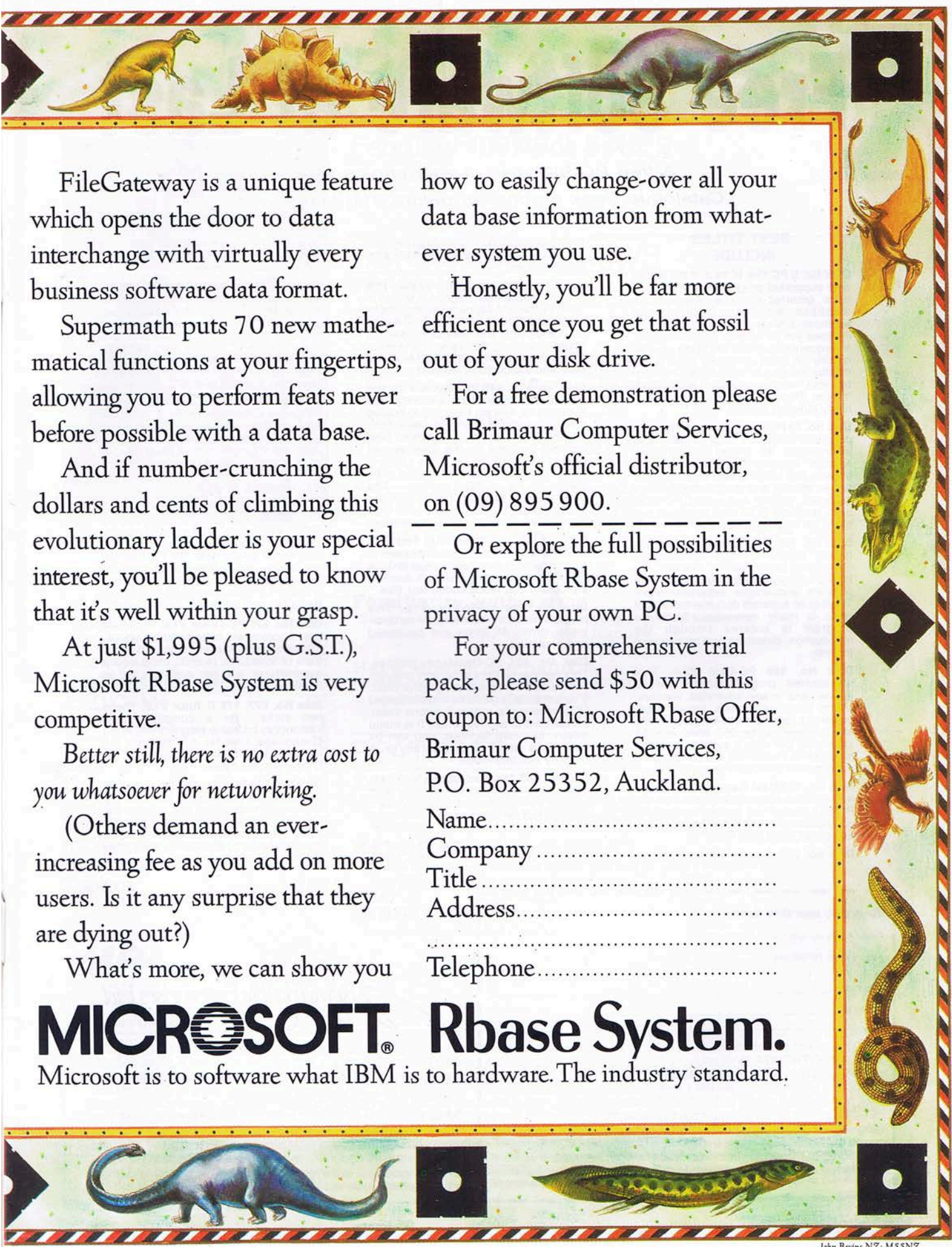
specialised applications *without any programming.*

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Disk No. 78 PC-Write. This powerful word processor supports most printers and incorporates 46 printer control files. Notable features include nine help screens, fast edit and save functions, split screen editing, and user configuration of keyboard, display and printer. PC-Write uses standard DOS files, and supports paths on hard disk systems.

Disk No. 105 PC-Professor V1.0. This tutorial program, which increases in complexity incrementally, teaches the BASIC programming language. The program encourages experimentation. There is no separate documentation, but none is really necessary. Once the program is entered through the introduction, directions and menus lead the way.

Disk No. 199 PC-Calc V3.0. This spreadsheet program comes with a tutorial and many advanced features. Maths functions include natural logs, power of x, averages and tangents. There are 26 columns by 255 lines with 64 characters per cell. It supplies numeric precision to 14 decimal and flexible print options with on-screen prompts.

Disk No. 274 Best Games V1.0. This is a compilation of the better games from the PC-SIG library. All games run on PC compatibles although it may be necessary to type MODE CO80 first.

Disk No. 293 Arcade Games V1.0. An

assortment of colourful arcade games that will catch and hold the attention of game fans for hours.

Disk No. 310 Qmodem V2.0e. This telecommunications program is written in Turbo Pascal and supports, among others, Hayes and Racal Vadic modems. It runs up to 9600 baud and features windowing, screen colour definition, XModem protocol, autodial/redial, DOS command shell and subdirectory support.

Disk No. 344, 345 PC-Keydraw #1 and #2 V1.0. These two disks are composed of programs offering keyboard to screen drawing, graphics printing, and slide show capability. The drawing program on Disk No. 344 provides for the creating and editing of graphics screens. Built-in technical functions allow the disks to be used as a CAD system. The demonstration files on Disk No. 345 are to be used in conjunction with PC-Keydraw #1. (Requires colour graphics.)

Disk No. 403 PC-Tutor V4.2. This disk contains tutorials that cover the basics of a first course in computer usage and the IBM PC disk operating system. It also has a program that reads coded text files.

Disk No. 404 EZ-Forms. V1.0. This program allows the user to generate tailor-made forms. All forms can be stored and/or printed.

Disk No. 405 PC-Deskteam Utilities. This memory resident accessory program can be called from any program or DOS. It includes alarm clock, calendar, selected DOS commands, notepad, phone dialer, printer control and typewriter. It is menu driven, has help facilities, and can be used as a stand alone program or in memory resident mode.

Disk No. 457 Assorted Games V1.0. This disk offers a collection of lively and popular games. The disk also provides a program that permits a computers internal speaker to act as a speech synthesiser.

Disk No. 480 PC-Outline V1.04. PC-Outline is comparable to ThinkTank. Users

can outline and organise items by arranging and rearranging them using different classifications.

Disk No. 517 Imageprint V1.20. allows the production of high quality characters on a dot matrix printer. With Imageprint, users with IBM/Epson printers can extend the character set of their printers and enjoy a variety of features: italic, half high, true superscript and subscript, 12 characters per inch, proportional character spacing and much more.

Disk No. 522 Instant Recall V1.5X Instant Recall is a memory resident database program that allows users to record and access any information without leaving their main program. The program can work in conjunction with other programs and offers up to 80K of database information at anytime.

Disk No. 558 PC-Prompt (DOS Help) V1.0. PC-Prompt is a memory resident DOS extension that automatically provides syntax prompting for DOS commands as you type. The F10 function key can be used to display additional help when needed. Help screens can also be invoked for other languages, such as BASIC(A) and Borland's Turbo Pascal.

Disk No. 576 PC-Tickle V1.0. PC-Tickle is an appointment calendar/chequebook, manager/record keeper program. It keeps track of schedules, records, chequebook expenditures, and can even be used as a calorie counter.

Disk No. 577, 578 C Tutor V1.0. These two disks offer a comprehensive introductory tutorial to programming in the C language. Disk No. 577 contains the tutorial text and Disk No. 578 provides the C program examples.

Disk No. 598 Disk Tool V1.0A. Disk Tool is a powerful and easy to use disk file manipulation utility. With this package, the user can edit any part of any disk file using a handy windowed Hex and ASCII dump of the file on the screen. Many other utilities are included on the disk.

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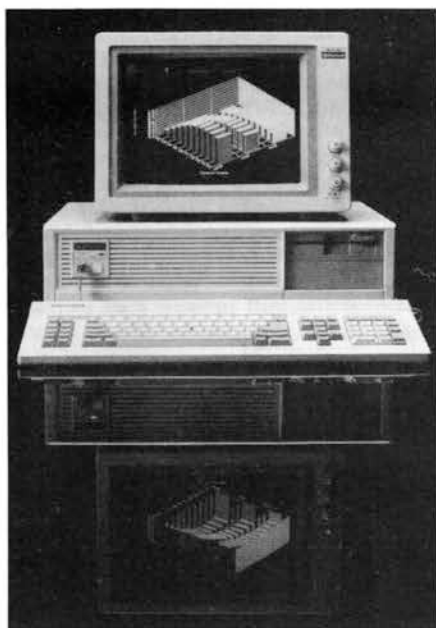
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BITS & BYTES

February 1987 Vol. 5 No. 5

ISSN 0111-9826



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BITS AND BYTES magazine is published monthly (excepting January) by Bits and Bytes Ltd, Denby House, third floor, 156 Parnell Road, PO Box 9870, Auckland 1. Phone 796-776, 796-775. **EDITORIAL:** managing editor, Gaie Ellis; editor, John King. **ADVERTISING:** Auckland — David Meyer, PO Box 9870, 796-775; Wellington — Vicki Eckford, 753-207. **SUBSCRIPTIONS:** third floor, Denby House, 156 Parnell Road, PO Box 9870, Auckland, phone 796-775. **SUBSCRIPTION RATE:** \$19.80 (incl GST) for 11 issues, school pupils rate \$17.60 (incl GST). Overseas subs are \$35/year surface mail, and airmail rates of \$68 (Australia, South Pacific), \$100 (North America and Asia) and \$125 (Europe, South America, Middle East). **BOOK CLUB:** manager, Sharon Fairlie, at above Auckland address, phone 796-775. **DISTRIBUTION INQUIRIES:** bookshops to Gordon and Gotch Ltd, computer stores to publisher. **PRODUCTION:** graphic designer, Michelle Tack; typesetter, Monoset; printer, Rodney and Waitemata Times. **DISCLAIMERS:** The published views of contributors are not necessarily shared by the publisher. Although all material in Bits and Bytes is checked for accuracy, no liability is assumed by the publisher for any losses due to use of material in this magazine. **COPYRIGHT:** All articles and programs published herein are copyright and are not to be sold or distributed in any format to non-subscribers of Bits and Bytes.

Local software features at PC 87

New Zealand's largest computer exhibition, PC87, will be staged in Auckland on May 29, 30 and 31.

Based on the success of previous exhibitions, *Bits & Bytes*, the organiser, is confident this year's event will be the biggest yet, especially as a number of off-shore companies have expressed keen interest in participating.

The exhibition will be held in the Overseas Terminal at Princes Wharf, again providing ample opportunity for the business community to participate in the range of seminars and exhibition activities.

Entries are currently being invited for the annual New Zealand software awards and which will be presented at the computer industry dinner (see page 8).

A feature of this year's exhibition will be the New Zealand Software Showcase, a further move by Bits & Bytes Ltd to promote New Zealand software. As publishers of New Zealand's most widely read computer publication, Bits & Bytes has committed to continue its drive to promote and encourage the local development of software.

Recognising the high cost in becoming established in this field New Zealand software companies will be offered a substantial discount on stand space at PC87.

It is intended that this discount will encourage many smaller, entrepreneurial companies to display their products, particularly as the exhibition is being promoted overseas and is likely to attract foreign buyers.

Buzzing around

A few pre-release models of Microbe's new Gamma are being seen in Australia, where the company has given in to requests from companies who are willing to put up with the inevitable teething troubles in order to develop software. As yet even the Gamma's place in the market is uncertain, but on its New Zealand release in early 1987 it is expected to sell for around \$8,000.

With 1Mb standard memory expandable to 4Mb on the motherboard or 8Mb maximum, and 68000 processor running at 8MHz, the Gamma promises plenty of power, and an optional 16-bit 80186 co-processor card will give the ability to run MS-DOS software as well. Standard disk drive is the 3.5 inch 800Kb microfloppy.


Local accounting

The number of locally-written accounting software packages on the market is steadily growing (see A128 review this issue), and another was released at the end of last year. Steve Peacocke's Trader Series, originally written for CP/M machines, particularly the Amstrad with around 400 users to date, has now been developed for MS-DOS hardware.


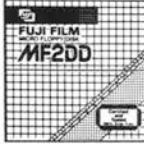



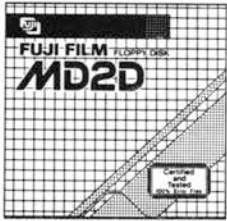
While the basic accounting structure is still the same, the new version features pop-up help and calculator functions along with pull-down options and full colour, and will run on a 256Kb micro.

North Shore dealership

The only Apple dealer between the Auckland Harbour Bridge and Whangarei, and the first to operate in the area for some time, opened for business shortly before Christmas. North City Computer is selling only the Apple range and is acting as a level one service centre, one of the principals, Tony Unkovich, having previously been service manager for Apple for five years. The other two partners are Paul Smith and Peter Vincent.



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New portables

An enhanced IBM PC Convertible is soon to be released by Southmark Computers. A built-in 10Mb hard disk will be matched by RAM increase to 640Kb, and a new 6:1 contrast LCD screen (dark blue on silver) is to provide better visibility. Battery life when driving all this is expected to be around three hours, with a likely price of about \$7,900.

From Toshiba comes the T1100 Plus, internally similar to the T2100 with 8086 processor but battery-powered and with LCD screen. Improvements over the T1100 model include two floppy drives, faster processor and a better screen, and the price is said to be just under \$5,000.

Convertible expansion

Travelling business people with IBM PC Convertibles who want to run a sizeable spreadsheet program such as the Lotus 1-2-3, which takes 640Kb, can find the machine's standard 256Kb memory is inadequate. Now available from STB of Texas is the C-RAM 384, an add-on board which uses 12 CMOS chips to boost the PC Convertible to 640Kb.

Name dropping

The only Data General DG2 dealer in New Zealand is dropping the line. Peter Uffindell, Southmark Computers director, says there's no dissatisfaction with either the product or company, but continuing supply problems have caused the decision.

"The products are good, but it's Data General's decision not to hold local micro stocks. The product is well made but not well sorted out, and it's been outgunned by other people in the market," he says.

Moving over

Epson, probably number one in the Australian microcomputer market, is looking across the Tasman with a view to setting up in New Zealand, where it's unhappy with current representation.

The company's range of eight dot-matrix printers is familiar enough, from 80-column 9-pin to 136-column 24-pin NLQ. The seven PCs all have two disk drives, starting with the twin floppy model and progressing upwards through colour versions and hard disks to the PCAX, the 640Kb micro with 40Mb hard disk and 1.2Mb floppy and 80286 processor.

Spreading

Datamatic Holdings of Sydney, shortly to merge with Northrop Instruments and Systems, Wellington, has acquired Data Peripherals Pty Ltd, a Sydney-based company specialising in LANs and microcomputer systems.

The acquisition is said to widen Datamatic's activities into areas not previously covered, in addition to giving Data Peripherals access to an Australia-wide market as well as the Sydney, Canberra and Melbourne offices presently operated.

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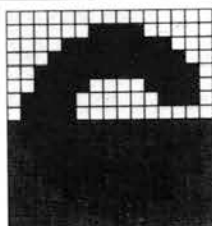
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Entries are invited for Bits & Bytes' third annual New Zealand Software Awards. The awards are open to any company or individual to enter and there is no limit on the number of entries submitted. A suite of programs may be submitted as one entry or as separate entries. A \$25 entry fee applies per entry. Programs entered may already be established commercial product, or, as yet, commercially unavailable.

The awards will be made in each of the following categories:

Business: Any software program aimed at general commercial use.

Farming: Any program designed specifically for farm management or planning.

Education: Programs which have been specifically developed for use in an educational role.

Recreation: Any program which has been designed for leisure.

Conditions of entry and criteria along with entry forms are available from

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Managing your share portfolio

In this regular column we keep the business person in touch with developments in the microcomputer industry.

The research reports are prepared by Brent Hill, Jenny Peacocke and Phil Ashton at KMG MicroLab, an independent consultancy established by KMG Kendons in Auckland.

In the last six months, investing in the sharemarket has become a national pastime. Investment syndicates have emerged in numbers and the Stock Exchange is now more popular than Aotea Square for a lunch-time rendezvous.

For those with a sizeable portfolio, calculating the current market value of your total investment, determining the element of profit (or loss), or calculating percentage return on funds can prove to be a major hurdle. The share portfolio application lends itself to computerisation.

Life would be a breeze if we could merely enter the current market price of our shareholdings, whereupon the system would immediately list the current worth and profit element within our portfolio.

There are two approaches to implementing a level of control:

1. Purchase software designed specifically for investment management which will maintain all data relating to the sharemarket and highlight personal portfolio detail. Products are available that have graphics capability to emphasise trends and illustrate best moments to buy and sell, based on accumulated historical data.

One supplier is planning to provide an on-line service to automatically update sharemarket details and prices by way of a dial-up process into its system. This is not expensive. Alternatively, a weekly update service by diskette is available.

You could expect to pay \$770 for the software and \$300 per annum for the update service, both excluding GST.

2. As an alternative for those with less cultural requirements, there is the common or garden spreadsheet which is ideally suited to portfolio management.

MicroLab has provided the expertise in the past, setting up the spreadsheet models for clients who simply want a listing of their investments in alphabetical sequence highlighting number of

shares, costs, market prices, profit, per cent return etc.

The data entry of current share prices is simple and rapid. Calculations are instantaneous. Listings can be designed to suit the user.

The option would cost in the vicinity of \$500, while also providing the spreadsheet tool for other user-defined applications, for example cash and profit forecasting.

In terms of hardware, all you would need is a dual drive IBM or compatible personal computer with a minimum RAM configuration of 384Kb. Naturally a graphics board will be essential if you wish to produce illustrations on the screen. Colour is an alternative too.

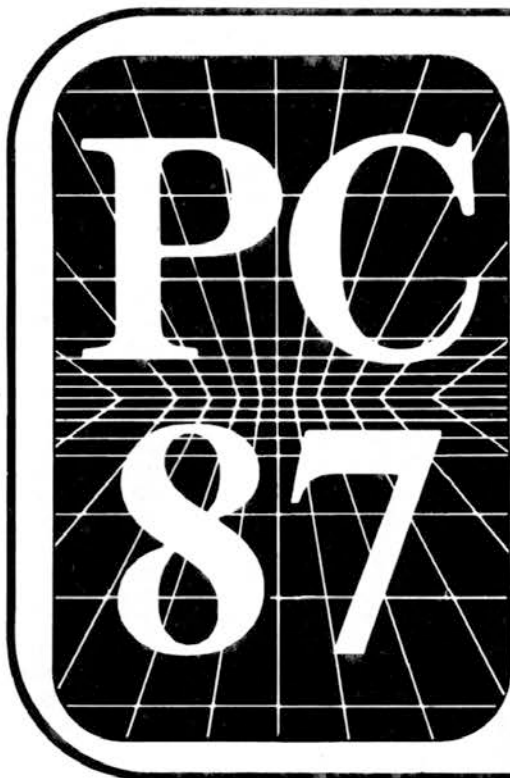
Now for something a little different

It is so often the case in our experience that businesses will happily invest in computer hardware and perhaps a general accounting software package without really fully utilising the equipment at their disposal. Taking into account a full understanding of the features available in the accounting software, there are a number of relatively cheap software products (less than \$300.00) which have been designed to take some of the hassle out of operating a PC and in fact improve your productivity.

There are a large number of useful and not so useful products out there for IBM compatibles which can improve your lot. These range from third-party hardware add-ons, such as turbo boards and multi-function cards, to ingenious software products. These products often operate in conjunction with your bread and butter packages to effectively make available an extra pair of hands or speed up your present procedures. Other products appear under the "fix-it" category, and once used become an indispensable aid in the battle for supremacy over your computer system.

Let's have a brief look at a few of these products.

Sidekick - comes in protected (\$147.00 + GST) and unprotected (225.00 + GST) versions. If you've ever wanted to make brief notes, do a calculation or check a date while you're in the middle of a program, Sidekick will do it for you.



The New Zealand Personal Computer Exhibition

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All you need to do is call it up with two keystrokes and it appears as a window overlaid on your screen. Sidekick is memory resident which means once you've loaded it up (when you switch your machine on) it stays in memory (RAM) and can be accessed as fast as you can push two keys. It is very straightforward to use and dispenses with the need for note pad and pencil, diary and calculator. It also has an ASCII-table (useful for programmers and screen designers) and Dialer (for use with modems).

Smart Key - Retail \$119.00 + GST. If you've ever wanted to overcome those tedious and repetitive typing tasks then this is the product for you. Another RAM (internal memory) resident program, Smart Key will allow you to set up keyboard macros; that is, using a single keystroke will result in a whole string of keystrokes being performed. These macros may also be formatted to include "fill-in the blank" pauses for variable and fixed length information and provide one key access to complicated program control sequences, or even just helping you enter long words in a word processor.

XTree - Retail \$139.00 + GST. For those user, with hard disk machines and so many directories and files you simply cannot keep a track of them, this product will turn your illegible map into an organised and easily accessed file system. XTree combines the characteristics of a file manager, a DOS shell and a path utility into a single menu-driven package designed to give fast access to those previously buried files. Not only does it allow you to access files within sub-directories quickly, it also provides

on-screen vital statistics, facilities to create and delete directories etc, and tag files, for example to delete a number of files.

Microsoft Windows - Retail \$295.00 + GST. This product allows the user to make greater use of DOS utilities without having to learn the hard to remember DOS commands. Microsoft Windows incorporates screen icons (symbols) and pull down menus to help you use DOS without tears. It also includes multitasking capabilities which means you can switch, say, from a spreadsheet to word processing without delay. You also get desk top functions such as calculator, note pad and clock plus a paint program (similar to Mac Paint) for creating free hand graphics.

Norton Utilities 3.1 - Retail \$260.00 + GST. This package is particularly notable for its UnErase command, a facility to bring back deleted files, an essential tool for any computer user. If a file is inadvertently deleted it may in fact be recovered if it has not since been written over by another file. However, the Norton Utilities can do a lot more than that. They in fact give the user an insight into the workings of DOS so that he or she may become brave enough to give DOS program editing and debugging tools a go. Other facilities available in Norton Utilities are Text Search, a search of a particular word or name on your disc, Directory sorting, Disk Testing and many other hard disk helpers which really work.

You now have some insight into the extras that are available for your PC. They are fun to use and do provide time-saving benefits.

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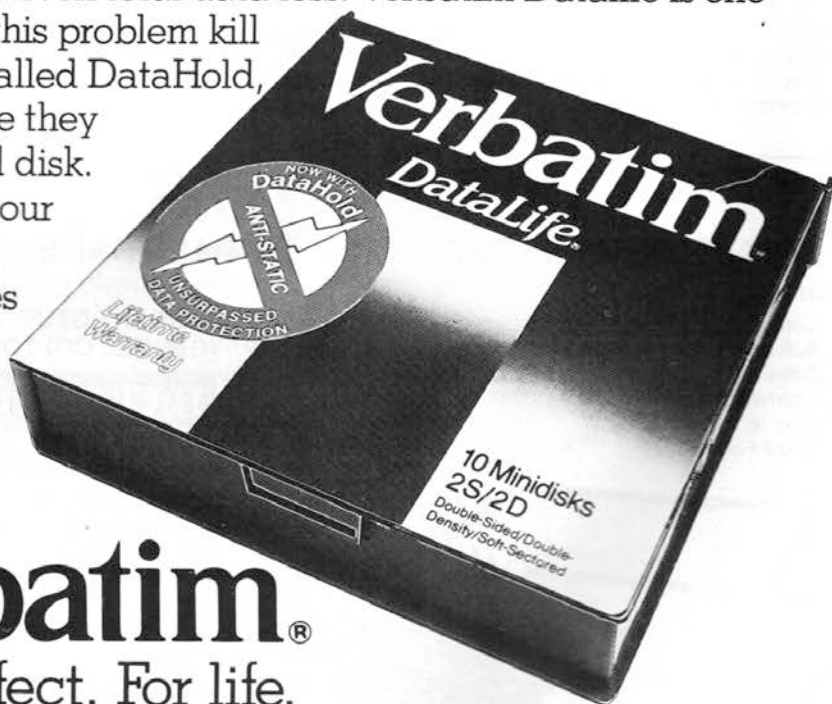
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The AT clones are here

by Mark James

Recent months have seen a rash of introductions of computers compatible with the IBM PC/AT, based on the Intel 80286 chip. Prices are becoming competitive, as they did a year or two ago with the original IBM PC and PC/XT-type machines. Commodore, late entrant in the PC-clone business with its PC10 and PC20 computers, is in with the pack this time with the Commodore PC/AT.

In outer appearance, the Commodore PC/AT is much like the PC20: a solidly-built, very plain-looking metal box. The switches and connectors are all located in the back: nine-pin RGB monitor port, nine-pin serial and 25-pin parallel connectors, along with power and keyboard cable connectors and slots for eight expansion cards.

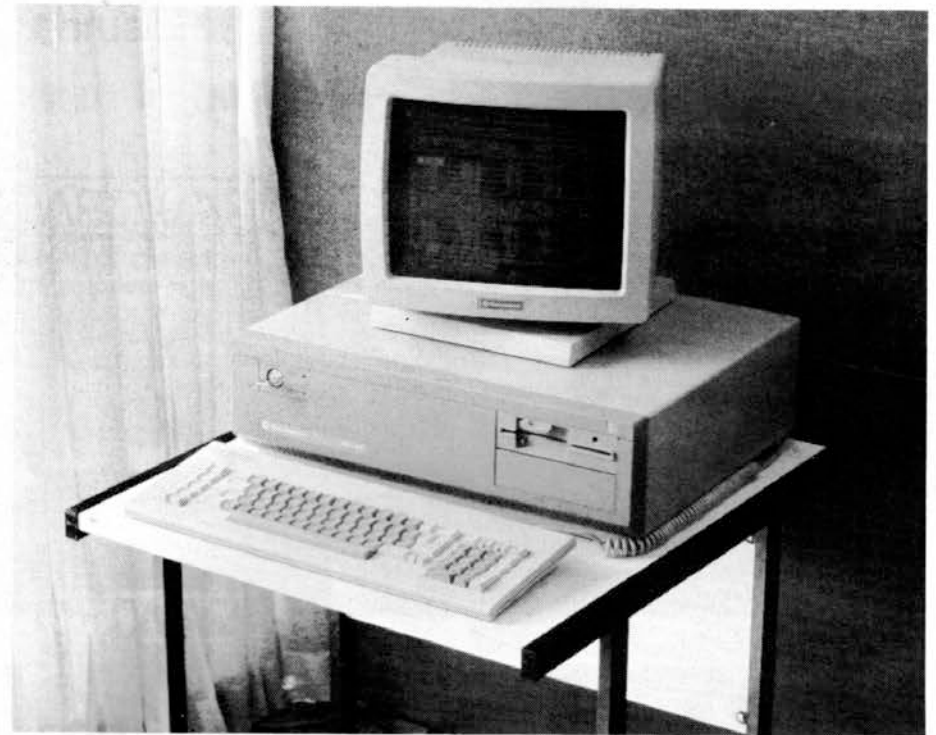
Inside, however, the machine is considerably less plain. It comes with a full megabyte of RAM on the motherboard; its 80286 processor has two software-switchable speeds; it has a 20-megabyte hard disk, a 1.2-megabyte floppy, and room for four more half-height storage devices; and its standard video controller, called the Advanced Graphics Adaptor, can emulate both the IBM Colour Graphics Adaptor and the Hercules high-resolution monochrome card. The eight expansion slots can hold up to six full-sized AT cards and two short XT cards.

All of this is standard equipment on the Commodore PC/AT, and is supported by a 240-watt power supply. The price for this package (without monitor, but with GST) is \$9350.

Performance

MS-DOS version 3.2 comes with the machine, along with a few extra utilities to manipulate Commodore's graphics controllers and switchable processor speed. At slow speed (6 MHz), the Commodore runs all copy-protected PC/AT software without trouble; at high speed (which Commodore claims is 10 MHz) it will calculate prime numbers up to 1000 in a blazing 0.22 seconds. (This compares with 1.84 seconds for the Commodore PC20.)

A word needs to be said here about processor speeds. Although Commodore claims 10 MHz for its machine, this is a bit misleading. In order to run at a true 10 MHz, the RAM would also have to respond at that speed (in other words, in 100 nanoseconds or less). Memory of this quality is still too expensive for most personal com-



puters; the Commodore's RAM runs at 120 nanoseconds. Therefore, the effective speed of the processor is only about 8 MHz.

However, since the Commodore's memory is all on the motherboard (i.e. close to the processor), the processor does not have to wait for it. This gives the Commodore an advantage over machines which keep their RAM on different boards from the processor, and which therefore waste time in "wait states" while the memory signals cross from one board to the other. A truer description of the Commodore AT's processor speed is thus 8 MHz with no wait states. Any way you look at it, though, it's fast, earning an 8.3 performance index from Norton Utilities.

Processor speed, however, is only part of the story. In most real-world programs, it is the disk and not the processor that is the bottleneck. The Commodore's 20-megabyte Tandon drive benchmarks slightly faster than IBM's, although its floppy drive, like that of the PC20, is a bit thunky. People with disk-heavy applications might consider some of the optional Seagate hard disk drives (available up to a whopping 320 Mb).

Keyboard and monitor

The Commodore's keyboard has a standard IBM PC/AT-style

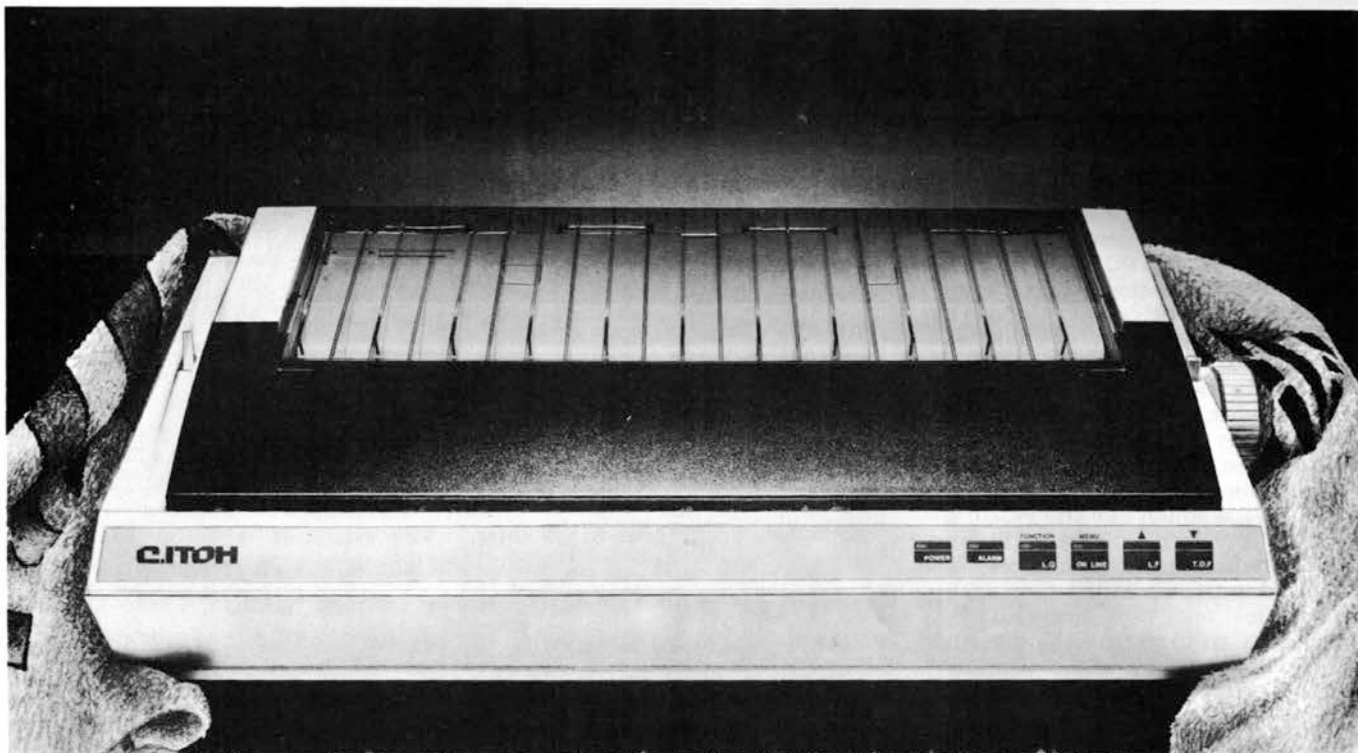
sculptured layout. Its 87 keys include ten shiftable function keys along the left edge and a combined numeric and cursor-control keypad on the right. The Caps Lock, Num Lock and Scroll Lock keys all have LED indicators. The keys are full-travel but lack a good springy feel. The F and J keys are slightly dished.

No monitor comes as standard equipment, but there are four to choose from, ranging from a 12-inch monochrome screen (\$395) to a 14-inch "Enhanced Colour Monitor" (\$1595). This latter beauty was on my review machine. Coupled with the EGA-compatible video controller (\$995), it is capable of 720 by 350 pixels in 64 colours. It has its own cooling fan, and is almost as noisy as the computer itself. Both text and graphics are clean and bright, although I did have some minor compatibility problems.

A truer description of the AT's processor speed is thus 8 MHz with no wait states.

Compatibility

In terms of both hardware and BIOS, the Commodore PC/AT is very



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much compatible with the IBM PC/AT. Some copy-protected diskettes have trouble at the high processor speed, but I encountered no problems at all at 6 MHz. Flight Simulator does not like Megagraph, the EGA video controller supplied by Commodore, unless it is switched into a low-resolution mode (this is accomplished through DIP switches in the back plus the installation of a software emulation module). Also, in none of the video card's modes could I convince the screen to colour its borders; IBM's EGA card will permit this.

Another minor incompatibility arose with the keyboard. The LED indicators on the Caps Lock, Num Lock and Scroll Lock keys are not triggered in exactly the same way as on the IBM keyboard. It is possible for programs that directly address the keyboard interrupts to get these indicators wrong; this occurred under both AMPS and Microsoft Windows. The lock keys are still fully functional and only their LEDs are wrong. (Curiously, Sidekick, which also directly addresses the LEDs, did not have this problem.)

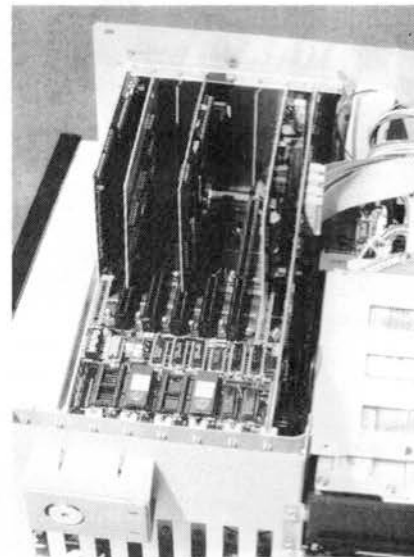
Apart from these minor inconveniences, the Commodore PC/AT performed just like an IBM, except noticeably faster. A week's thrashing with both single- and multi-user systems produced no glitches or hardware errors.

Conclusion

Commodore no longer has a problem being perceived as a maker of serious business computers.

Although the PC10 and PC20 came too late to have much of an impact on the PC-clone market, they did broaden the company's reputation outside the home computer jungle. Now, coming out with a reasonably-priced 80286 machine just when the AT-clone battles are heating up, Commodore is in a position to invade a new market.

Particularly with its fast processor and optional large and fast disks, the Commodore PC/AT would be good value as a multi-user system or a network file server.



Inside the Commodore PC/AT, in the usual place at left rear, is the motherboard. Occupying the expansion slots are, from left, AGA card, V-LAN key card, two blanks, V-LAN net card, two more blanks, parallel and serial cards, and hard disk controller. In the front are the key switch and 20Mb hard disk unit.

Microcomputer Summary

Name:	Commodore PC/AT
Manufacturer:	Commodore Computer, Pennsylvania
Microprocessor:	Intel 80286
Clock speed:	10 MHz with wait states (equiv 8 MHz without)
Power supply:	240W
RAM:	1 Mb on motherboard
ROM:	Phoenix BIOS (IBM PC/AT-compatible)
Monitor:	None standard; options range from low-resolution monochrome (320x200 pixels) to high-resolution colour (720 x 350 pixels, 64 colours)
Graphics:	AGA card standard (emulates Hercules or IBM's CGA)
Keyboard:	87 full-travel keys; detachable; 10 function keys; 13-key numeric/cursor-control pad
Disk Drives:	One 20-megabyte hard disk, one 1.2-megabyte floppy
Communications:	One RS-232C serial port; one parallel port
Expansion slots:	6 AT-size, 2 XT-size
Operating System:	MS-DOS 3.2
Price:	\$9350 (including GST)
Options:	Monitors (\$395-\$1595) EGA-compatible video controller (\$995) Disk drives up to 320 megabytes KB5151 keyboard available "early 1987" MS-Windows
Ratings (5 highest):	Performance 5; IBM compatibility 4; documentation 4; expandability 5; value for money 4.

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Clouds and sunshine

A review by Bill Heritage

An hour after I started looking at A128 Accounting, the man from the office next door dropped by.

"There's a cloud over your brow," he observed. "What's making you look so glum?"

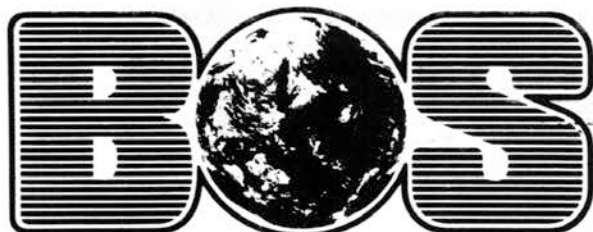
"I'm wondering how I'll find anything good to say about his software," I replied, scowling at the screen that meekly awaited my next instruction.

Fortunately I persevered and did indeed find admirable qualities in this software.

A128 Accounting is written by Kingsley Light and Colin Marshall and distributed by Ashby Computer Centre Limited. It describes itself as "fully integrated Debtors, Invoicing and Stock Control for the Commodore 128." It retails for \$599 and you also



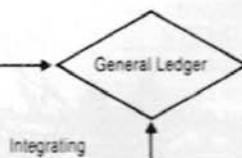
Ashby's A-team: Graham Truman points to the screen, watched by (from left) Kingsley and Julie Light and Colin Marshall.



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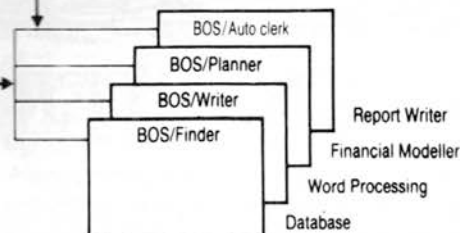


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need a copy of Superbase 128 to run it. It is accompanied by a comprehensive loose leaf manual.

This was fairly new territory for me. My experience to date had mostly been in medium-sized to large businesses where accounting software, even for micros, starts at around \$1000 for Debtors on its own, never mind Invoicing and Stock too.

A128 is well on the way to being all that a small business will want, and at a very reasonable price.

Having unpacked, connected and plugged in all the strange hardware (I had never used a C-128D before) I was, like any first-time user, eager for action. Most manuals these days have a "Getting Started" section somewhere. The index to this manual was innocent of any such reference. Frustration one. Eventually I found the necessary instructions within the section headed "Registration".

It was an unfortunate introduction to a manual that is really very good. When I referred to it later I always found a thorough, easy-to-follow description, straight from the index. I

accepted the dot matrix typeface as an economically necessary evil.

Loading

Before you can do any accounting you must load Superbase 128, which takes two to three minutes, replace the Superbase disk with A128 and press Return. The startup screen is there in a few seconds, asking you for the date, time and printer type.

The main menu has 17 options without making the screen look crowded. All you have to do is press the letter of the desired function. Frustration two. I HATE systems that accept data without waiting for the user to press Return, especially systems that omit the Return in some places but require it in others. Like this package.

Before entering data into a demonstration system I like to list the master files. Anyone who has spent three quarters of an hour trying to guess a valid customer number or salesman code will appreciate why.

Frustration three. The Debtor reports are fairly horrible. The Debtors list gives only the key (Debtor code), Debtor's name, contact name and phone number. I expect such a list to include the full postal address. Hopefully, future ver-

sions will print a proper heading and the system date too. The Debtors Aged Trial Balance is tiresomely cluttered with telephone numbers and current balances on alternate lines down the page. (In fairness, with the limit of 80 columns imposed by some Commodore printers, to get the information on at all guarantees a cluttered report.)

I assume the sales tax is left over from an earlier version.

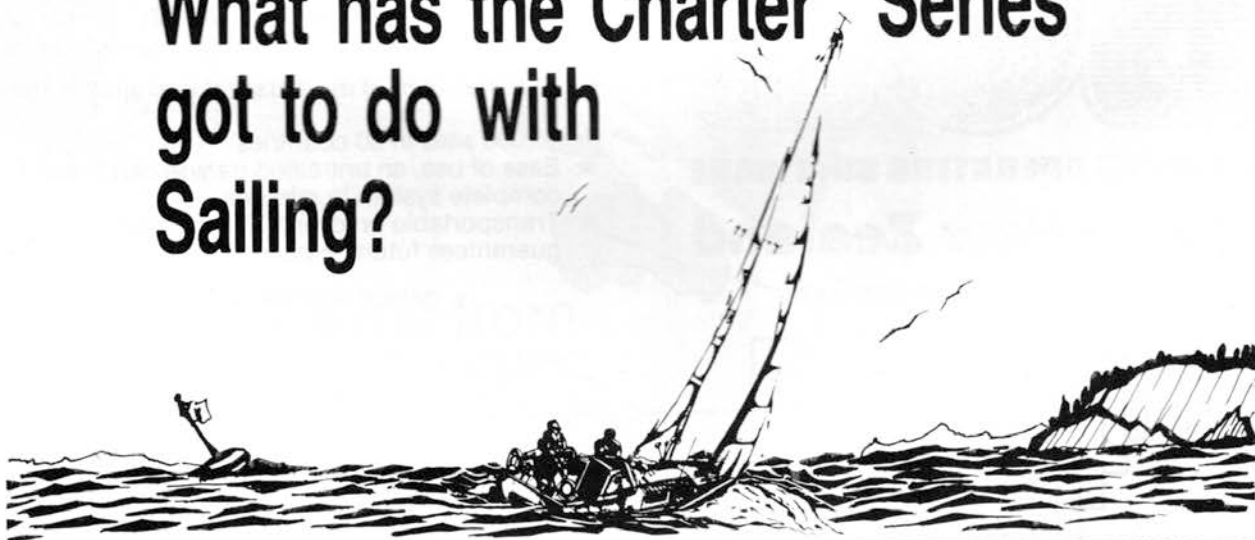
Another irritation with the reports is having to key in the date every time. Certainly, it allows for flexibility - 25/12/86 or 25th December 1986 may be entered to taste - but what is the point of entering the date when starting up the system if it cannot even be offered as a default?

So my brow was clouded and my face creased in a scowl.

Demonstration system supplied by Ashby Computer Centre Limited, Auckland.

Bill Heritage is a computer systems consultant with Bowden, Impey & Sage, Auckland.

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Simple

I added a new Debtor then changed it. It was easy. The system didn't seem to want to accept a blank fourth address line (yes - four!). I looked in the manual. It was simple.

I added a new stock line. A trap here for the unwary. The "Tax %" requested is Sales Tax %. The system handles GST perfectly well, so I assume the sales tax is left over from an earlier version of the software.

Time to sell some of my imaginary stock to my fictitious customer. And this is where the scowl went clean away. Happinesses one to eight:

1. Facility to add a Debtor in the middle of invoicing. Pure magic, this.
2. Full account details displayed before the sale is entered to allow an assessment of creditworthiness.
3. Heaps of room for delivery instructions.
4. Unlimited comments, but only before the first line item.
5. Facility to sell something not in the stock file, e.g. "2nd hand lathe."

6. Facility to add a stock line in the middle of invoicing. More magic.

7. Warning if the quantity invoiced exceeds the stock file's quantity on hand.

8. Message line at the end of the invoice.

There are minor annoyances, for example no reminder to load the printer with invoice stationery before you begin (not even in the manual), but for a small business system the functions available are excellent.

Invaluable

Happiness nine. Debtors and stock items can be accessed on partial matches of the key. Invaluable when you can't remember the exact key or are too lazy to type all eight characters.

Credit notes have all the same features as invoices. I wanted to age one back to the month of the original invoice (OK, I'm a pedant). It's not possible.

Cash receipts are automatically allocated to the oldest outstanding balance. A lot of the benefit of ageing Debtor balances is lost if cash cannot

be allocated against the actual invoices paid. I don't think I scowled again, but I certainly refurrowed the brow.

As an integrated accounts receivable package, A128 is well on the way to being all that a small business, such as a tradesman, will want, and at a very reasonable price.

Stock recording is only a little more than the minimum required for invoicing. Stock receipts have to be entered as amendments to the stock master file, as do changes to the cost price. There is a simple re-order report available (but no backorders, average cost calculation, usage history etc). If stock control is important to your business, then this package doesn't go far enough.

Reports are clear and simple except for the Debtors reports mentioned earlier. The audit trail didn't find the top of the next page on my printer, but maybe the switch settings weren't right. If you are game you can create your own reports using Superbase.

Links are available to a Creditors/General Ledger module and to Superscript word processing. These weren't supplied with the demo system so I couldn't try them out.

Marks out of ten: functionality (Invoicing/Debtors) 7, reports 5, ease of use 9, manual 9, value for money 8.

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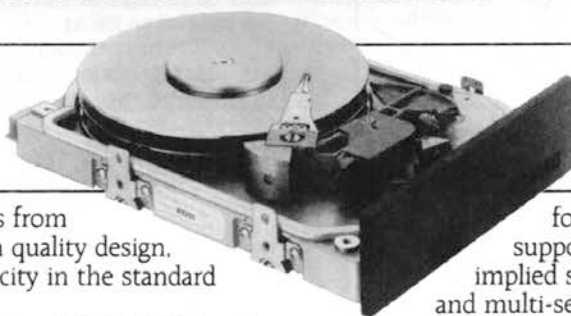
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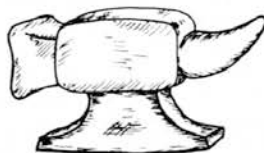
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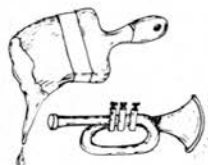
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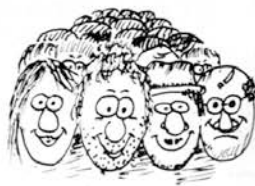
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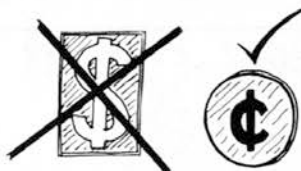


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Business/Finance

Valuing equity securities

by Martin J. Webb

The problem:

In our previous discussion we examined some of the more basic methods available for valuing shares, particularly shares in private or unlisted public companies.

For many decades investment analysts, investment bankers and stockbrokers have been searching for a valuation technique or model that encompasses, as much as possible, a quantitative approach to security valuation. As we discovered in our analysis of the earnings capitalisation and dividend capitalisation methods, there is a large amount of subjective or non-quantitative judgement inputted in the various components that make up these models. This is a major criticism of these models.

Some possible answers:

In recent decades several valuation models have been developed which endeavour to establish the true intrinsic value of a security in a number of ways with a dominant quantitative emphasis. Examples of these models include:

1. Dividend discount and growth models: these work on the premise that a security's intrinsic value is a function of the probable future income streams flowing to the investor, and the implicit required rate of return of the 'average' investor. The latter is adjusted against the forecast growth rate of dividends and used as the discount factor. This basic model can take many forms depending upon the investment horizon of the investor and the stage of maturity the company being valued is perceived to be at.

2. Dividend discount model pragmatic multiplier approach: this is an extension of the earnings capitalisation model discussed in the earlier article, but it uses a form of the dividend discount model to determine the appropriate price earnings multiple of a given security.

The appropriate price earnings multiple is determined by using the following formula:

earnings retention rate divided by
(required rate of return minus
expected growth rate of dividends
for the stock).

e.g.: ABC Company Limited retains 70 per cent of its earnings.

Investors require a 20 per cent pa return from the stock, and expect a growth rate for dividends of 8 per cent pa.

Using the pragmatic multiplier approach the appropriate price earnings ratio would be assessed to be:

$$PE = \frac{D/E}{i-g} = \frac{70}{20-8} = \frac{70}{12} = 5.8 \text{ times.}$$

A sample substitution of various values for the required rate of return (i) and expected growth rate in dividends (g) will show that a small change in either i or g will have a large impact on the multiplier.

3. Capital asset pricing model: This model was developed in the late 1950s by Harry Markowitz, and attempts to quantify or measure the returns that a so-called risky asset should produce, relative to the risk assumed to attach to that asset as opposed to the risk and rewards attaching to 'the market'. Markowitz

defined the formula for pricing such a risky asset as:

$E(R_i)$	=	$RFR +$
Expected return	equals	Risk Free Rate of Return
B_i	$(R_m - RFR)$	
Beta Coefficient of R	Return from market	Risk Free Rate

The components of the equation are such that computation of the B_i and R_m factors lend themselves to microcomputer or advanced financial calculator applications.

In a later article we will examine in depth the full workings of the CAPM. For the meantime it is sufficient to understand that through the CAPM we can determine the expected rate of return for a risky asset as being a composite of:

(a) the risk free rate (eg 2-year government stock rate).
plus (b) a risk premium that is a function of the unique risk of the asset (B_i) and the prevailing risk premium ($R_m - RFR$).

4. Arbitrage pricing theory (APT): This contends that there are a number of factors that influence stock returns, in contrast to the CAPM where the only variable of importance (B_i) is the covariance of the asset with the market portfolio.

APT was developed by Stephen Ross in the early to mid 1970s and employs a stochastic process to generate asset returns.

The common K factor model of the form is as follows: $R_i = E_i + b_{i1}\delta_1 + \dots + b_{iK}\delta_K + E_i$
where:
 R_i = return on asset i during a

specified time period.

E_i = expected return for asset i.

B_{ik} = a common factor with a zero mean that influences the returns on all assets.

E_i = a unique effect on asset i's return which, by assumption, is completely diversifiable in large portfolios and has a mean of zero.

The δK terms are multiple factors that are expected to have an impact on the returns of all assets (eg: inflation, GNP growth, interest rates etc.), while the b_{ik} s determine how each asset reacts to this common factor.

Given the above model, it is not difficult to see how this method with its multivariate regression approach lends itself to computer based sensitivity analysis. In fact, the use of a soundly constructed computer based financial model (similar to say the Reserve Bank of New Zealand's econometric model of the New Zealand economy), could produce potentially superior investment analysis of individual companies, given changes in internal and external operation conditions.

Summary:

In the above discussion we have taken a cursory look at some of the more sophisticated valuation models, two of which, the CAPM and APT, lend themselves to computer based applications.

Although we will look closer at these models in later discussions, we must bear in mind that they still go only some way to answering the question of "What is this stock of share worth?"

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Now the Challenger has a big brother —

The DSE Multitech AT, Accel 900

reviewed by John Slane

About two and a half years ago, when IBM clones were starting to appear, Dick Smith Electronics introduced its own version — the CHALLENGER — which was a 16-bit (8086) PC in models from a stripped-down cassette version to a top end hard disk configuration. The models bore the Dick Smith label and were sourced from Ferranti Computer Systems Ltd.

Although the review model worked as described, the quality reflected the attempt to build a unit down to price. Certainly the price was reasonable for that time (\$5000 for a twin disk unit plus some average bundled software).

Now the Dick Smith group is offering a work-alike PC-AT (80286 processor), but his time under the Multitech label. This is an experienced Taiwanese computer firm that has been in the New Zealand market for some time, with products targeted at the low cost end of the computer range.

The ACCEL 900 at around \$8000 comes with a monitor (tilt and swivel), one high capacity floppy drive (1.2 Mb) and 20 Mb hard disk. Eight expansion card slots are provided, and already installed is a Hercules graphics card, a monoscreen driver, and two serial and one parallel cards with sockets.

I was also provided (at short notice, directly from Australia) a copy of Open Access II which I will comment on later. This will be supplied at a much reduced price with the package, while Microsoft Windows and Mouse are to be bundled.

One notable feature of this computer is that it has a processor speed of 10 MHz, so a reasonable claim can be made for fast operation. This high speed, or the usual 6MHz, is selectable by either hardware or software. The only time one would need to drop to the slower speed is when particular software is configured with interrupts that presume the 6 MHz speed is being used.

I had no problems in running PC software at 10 MHz.

Another interesting and rather smart feature is that the 1.2 Mb drives can read a variety of less dense formats — 180Kb single sided, and 360Kb double sided. Again I experienced no problems in working with these vari-



ous formats, but the user should note that if the Accel 900 **writes** to these 180/360 disks, the disks can no longer be used in another machine's 180 or 360Kb drives.

Keyboard

The keyboard I was supplied with was thoroughly satisfactory. It was similar in layout to an IBM type with the addition of separate cursor keys as well as those overlaid on the numeric keypad. Built-in indicator lights tell the status of everything anybody would want to know. There are 97 keys. For preference, I would like the keyboard to tip up a little more, but that is only a minor point.

I was surprised to hear that in Australia a different keyboard is being substituted. Apparently it is "more IBM-like". I wouldn't have thought that was an advantage! This review had to be written before I had a chance to compare the latest keyboard which is to be provided with the NZ version also.

The main unit is in a **very** large box (22 x 16 x 7 inches, the manual says) and takes up substantial room on a desktop. It is also noisy in operation

having both a fan and a hard disk drive.

The designers don't want you to be put off by this, though. They make the perfectly appropriate suggestion that the whole thing be stuck in a drawer, behind a partition, or (I suppose) in another room altogether! If all your systems and programs are on hard disk the idea isn't so ridiculous after all. Already many computer suppliers have designed brackets for stowing processor units off the desktop, and extension cables for keyboards and monitors are readily available.

Access to the system is key lockable — a worthwhile feature especially with the hard disk installed. The power switches for the main unit and the monitor are inconveniently tucked away at the back of the respective units, but the reset button (which you may need to use often if you have unfriendly software) is right up front. The keyboard cable also plugs into the back, so you may need that extension cable after all!

Up and running

The basic system is reasonably intelligent. It looks for DOS in the

floppy drive first and then goes to the hard disk if nothing is found. The start-up diagnostics are so quick the wait is barely noticed.

Sensibly the unit includes battery backup so the date and time will always be reasonably current. The screen font is the familiar Asian-English version that I dislike intensely, but it has the slightly redeeming feature that it is presented with good definition.

MS-DOS often includes a system configuration file so that selected default parameters can be specified. The new Zealand/European form of the date is one example. Such a file was not supplied on the present two-disk DOS, and perhaps the distributors should consider this. I've been entering dates in the USA format for nearly ten years, but I still don't like it!

The monitor reviewed is a slow-decay green phosphor. This provides very good stability (no flicker) but is hopeless for realtime graphics such as in games, or if much scrolling is to be done. After-image is a real problem. It's quite a while since I used a monitor with this sort of characteristic and I'd just about forgotten how disconcerting it was. The white phosphor screen to be supplied as standard was unavailable for review at the time.

System Disks

Two disks combining MS-DOS 3.2 are provided, along with one disk containing monochrome graphics utility

programs. These provide a comprehensive range of operating commands and utilities, as would be expected. The files contain a mixture of programs both common and specific to either 8088 or 80286 computers. The type-specific ones are clearly identified in the manual's listings, and the screen error messages are described if the wrong files are selected.

Open Access

This is a very comprehensive suite of programs beautifully packaged. It consists of programs for communications, utilities, word processing, spreadsheet and 3D graphics, data base, and programming language environment.

As well as full tutorial manuals on each, the programs and sample data are provided on eight disks. The first contains a utility to back-up everything and/or to transfer all the files to hard disk. This utility worked exactly as described and enabled a quick and efficient transfer to the hard disk on the review unit. As would be expected, subsequent access of files from the hard disk was impressively fast. Screens full of directory listings appeared almost instantaneously.

The Open Access suite of programs is not impressive. They are really "Clayton's" programs - what you use when you don't have the real thing! I couldn't work up any enthusiasm for them at all. They are in the style of programs typical of the late 70s and early 80s - unfriendly.

Perhaps I'm being overly uncharitable. At least they are provided cheap.

Conclusions and comments

It is quite clear that compared with early Multitech computers, the Accel 900 shows a vast improvement in design and technical sophistication. The package offered by Dick Smith Electronics, unlike the earlier Challenger, comes well set up with all that most users will want, except for what one may want as specialised software. There is little in the way of hardware requirements that will need to be purchased and added on.

I was interested in finding out what retailing and backup support will be available. The firm claims that the Dick Smith outlets in Auckland, Wellington and Christchurch will not only have the Accel 900 available, but will also be able to offer servicing (board replacement) and installation to the average user's requirements. Service contracts are presently under negotiation.

A toll-free enquiry hotline is also to be offered.

...compared with early Multitech computers, the Accel 900 shows a vast improvement in design and technical sophistication

Microcomputer Summary

Name	Accel 900
Manufacturer	Multitech Industrial Corp, Taiwan
Microprocessor	80286
Clock Speed	10 MHz/6MHz (switchable)
ROM	64Kb
RAM	512Kb (expandable to 1 Mb)
Input/output	2 serial, 2 parallel. Other expansions available.
Keyboard	97 keys. Separate cursor keys. Indicators.
Display	14in white phosphor monitor standard. Green monitor available
Graphics	Hercules Card installed
Sound	Speaker. No volume control. Usual frequency range
Disk	1.2 Mb floppy, 20 Mb hard disk Floppy drive reads 180/360 Kb formats
Options	8 expansion slots. Up to 5 drives can be installed. Modem can be internally mounted.
Operating System	MS-DOS 3.2
Languages	All usual range
Bundled Software	Microsoft Windows, Microsoft Mouse. Open Access II available at reduced price with package
Cost	\$7,995 (\$7,895 with green screen)
Ratings	(1 low, 5 high) Documentation 4, support 3 (still to be demonstrated), language 5, expansion 5, value 4

Since the Accel is designed to run IBM type software, the firm is not intending to carry much in the way of software - this is readily available elsewhere. However, they already stock computer peripherals such as modems and printers which can be matched to the Accel.

The handbook describes a wide range of system configurations, and for the local market Dick Smith is likely to carry the single floppy version or hard drive (20Mb or 40Mb) plus floppy, with Hercules card as standard and CGA and EGA optional, with appropriate monitor.

The package being offered is reasonable value for money and there can be little doubt that DSE will now have a product that could make some penetration into the serious business market. Since I, and probably others, have been reading the Dick Smith catalogues for years, the firm's greatest obstacle at this stage will be to break away from the hobbyists and gadgeteers image and present both itself and the Accel 900 as credible to the upmarket business community. The Accel 900 is well outside the league of the hobbyist.

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PC126

Familiarity, with extras

by Shayne Doyle

FARSIGHT is an integrated spreadsheet and word processor operating in a windowing environment. The publishing software house is Interface Technologies Corporation, Houston, Texas.

The product comprises three components: WINDOWS allows work with multiple documents in separate windows at the same time, and also lets the user perform DOS style file handling tasks from within Farsight; CALC is the spreadsheet component used to create worksheets and simple databases; and WORD is the word processing component used to write memos, letters, reports, or longer documents.

CALC is a fully featured spreadsheet, functionally equivalent to Lotus 123, and having a maximum worksheet size of 256 columns by 2048 rows. It uses the same worksheet files and macros, so files can be exchanged between the two without conversion hassles. Of course, being a component part of a windows product, more than one worksheet can be in memory at one time.

Command options are selected from top line pull-down menus, activated by the F3 key. All the familiar functions are there, plus a few new ones. In practical use, there is very little difference between Calc and Lotus 123, and a user familiar with the latter should have no trouble at all using Calc straight away.

Briefly, some of the operational differences I found while using Calc are as follows... scrolling through the spreadsheet or selecting ranges is quite slow, as there is an appreciable delay in rewriting the display. On the other hand, recalculation is fairly fast, although I was disconcerted to find that when I set recalculation to automatic, even entering a text string caused it to enter recalc mode.

The GOTO function took me a while to find, and is more complex than the Lotus equivalent. In Calc, it is called Search (F5 key), and this pops down a sub-menu with three further options - goto, label, or value, much more flexible than Lotus and very useful when working in a large worksheet. The function key and cell movement keys are completely different from Lotus, and this is one area that an ex-Lotus user would need to concentrate on learning.

Values or formulas

The print function has a useful extra option - it allows you to print



either the worksheet cell values as seen on screen, or the formulas that create the values. This latter feature normally requires an additional software product if you are using 123. Printing is performed by a "spooler" - not a true multi-tasking background spooler, as it suspends whenever other I/O tasks are carried out from the current window. However, it does allow you to carry on working while your print files are being processed.

A number of print documents may be queued to the spooler, and printing initiated at a later time if required. On the whole, it's a vast improvement over Lotus's print handling.

WORD is a very useful word processor, offering a surprising number of features for this price bracket. It is based around the concept of "chapters", much as a book is structured. A Chapter menu sets up page formatting of each chapter, which may encompass one or many pages. When printing the document, each chapter may be numbered in addition to page numbering.

In addition to chapter formatting, the "ruler" covers paragraph formatting options, and may apply to any amount of text, from a single line to the entire document. There may be any number of rulers and chapter formats throughout the document, so very flexible formatting is provided. One format feature I have not run into before is the concept of "hanging paragraphs" where the first line occupies the entire text width, and the remainder of the paragraph hangs considerably indented below this.

Full text cutting and pasting facilities are available, and these work very fast. Search and replace is excellent, popping up a sub-menu giving choice over search direction, specific or any case, full or part word matching, and single or all occurrence replacement.

Only 10cpi

Headers and footers may be specified, with automatic page numbering. Full control is available over

Desk	File	Layout	Chapter	Type	Style
B:\WORD\TST1.WRD	Pg 1 Ln 4	Insert Ruler		FRED	ruler1 -
		Change Ruler			
r*	This her	Tab	number 1. In this document I will type		
	a load of old r	Decimal Tab	ginning to admit to myself that perhaps		
	this stuff is't	New Page	ll.		
B:\WORD\TST2.WRD	Pg 1 Ln 4	Paginate		chapter1	ruler1 -
r*	This here is document number 2.				
B:\CALC\TST3.WKS					
F9 (F2):	'It will only get worse !!				
	A	B	C	D	E F G H
1	ANALYSIS OF FOOD PRICES RECENTLY				
2	=====				
3	Pre GST		Should	But now	Why the
4	price	GST	cost	costs	difference Answer:
5	-----		-----	-----	-----
6	4.46	0.45	4.91	5.74	0.83 Sneaky postponed price rises
7	7.89	0.79	8.68	9.34	0.66 by greedy monopolistic food
8	3.78	0.38	4.16	6.11	1.95 wholesaling/retailing coys.
9	1.54	0.15	1.69	2.10	0.41 It will only get worse !!

print type style, covering all the usual options such as bold, italic, underline, subscript, etc. The only choice of pitch is normal 10 cpi or compressed – no 12 cpi. I could not find any mention of embedded printer control codes and when I tried to enter these by use of the Alt/nnn method, I had mixed success. IBM graphics characters may be entered, so the usual line drawing components can be included in a document.

However, when I tried to input Alt/027 (Esc), the program hived off and did a bit of disk activity, and nothing appeared on screen. This prevents printer control codes being directly entered, a bit of a shame really, as you can do some quite creative printing with this sort of direct printer control from a word processor.

One other feature I particularly noticed as missing is the ability to convert documents to Ascii text files

and vice versa – importing/exporting other programs' data files. On the other hand, Word offers a full mail/merge facility. This is where a mailing list document or file is set up containing a number of variables such as names and addresses. A standard form or letter document is set up, and when this document is printed, the fields from each line in the mailing list file are slotted into the standard document, this procedure being repeated for every entry in the mailing list. Mailmerge can also be used for such mundane tasks as printing envelope address labels.

As Farsight is a windows product, a mixture of spreadsheet and word processing documents may be open concurrently, each in its own window which can be moved around or resized as you wish. Parts of either type of document may be "cut" out, this action placing the cut portion into a "clipboard". It is then very simple to swap windows and "paste" the contents of the clipboard into that window's open document. This works equally well between spreadsheet and word processing documents, and has to be one of Farsight's major advantages.

Both Word and Calc have macro facilities, the former calling them "scripts" for use on word processing documents, while the spreadsheet macro capabilities appear to parallel those of Lotus 123. The manual in fact recommends the user purchase one of the many books devoted to models and macros for Lotus 123.

I ran the package on both a dual diskette and a hard disk machine, and found that on the former, frequent swapping of program overlays was a

bit of a nuisance. This occurs when changing between different major functions such as print spooling, window swapping, and some spreadsheet functions.

Manual

A well organised manual is provided, with tutorial as well as reference sections. I have installed a lot of software packages, but I found the installation section a bit confused and not entirely easy to follow.

In summary, I have to admit that as I have a preference for Lotus 123 and a separate word processor, I approached this review with a bit of an "anti" feeling towards Farsight. However, as I used it more and experimented with the various features, that attitude changed and I now feel it is an excellent product that could attract a lot of people requiring its special features – most notably the quick and easy method of including spreadsheets in word processing documents.

This area has been attacked many times by various integrated packages, usually requiring some sort of time-consuming conversion between modules to achieve it. Farsight efficiently addresses this problem and succeeds particularly well.

If you are looking around for a word processor and/or spreadsheet, you will be foolish not to ask for a demo of Farsight – don't let the low price fool you! At a very reasonable \$396.00 including GST, as they say on TV, "It's got to be good for you!"

Review software kindly loaned by Orchid Trading, Auckland.

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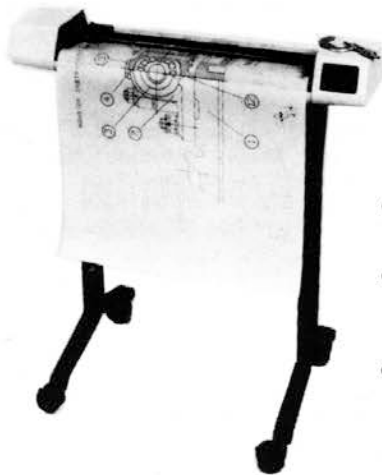
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Lots of potential

by Paul Left

The latest machine in the Apple II family is the 16-bit IIGS. The title represents Graphics and Sound, and reflects Apple's moves to upgrade the capabilities of the II series, having been left behind in these two areas with the advent of the Amiga and Atari ST. The GS has achieved a compromise between compatibility with existing Apple II software and making significant improvements in performance.

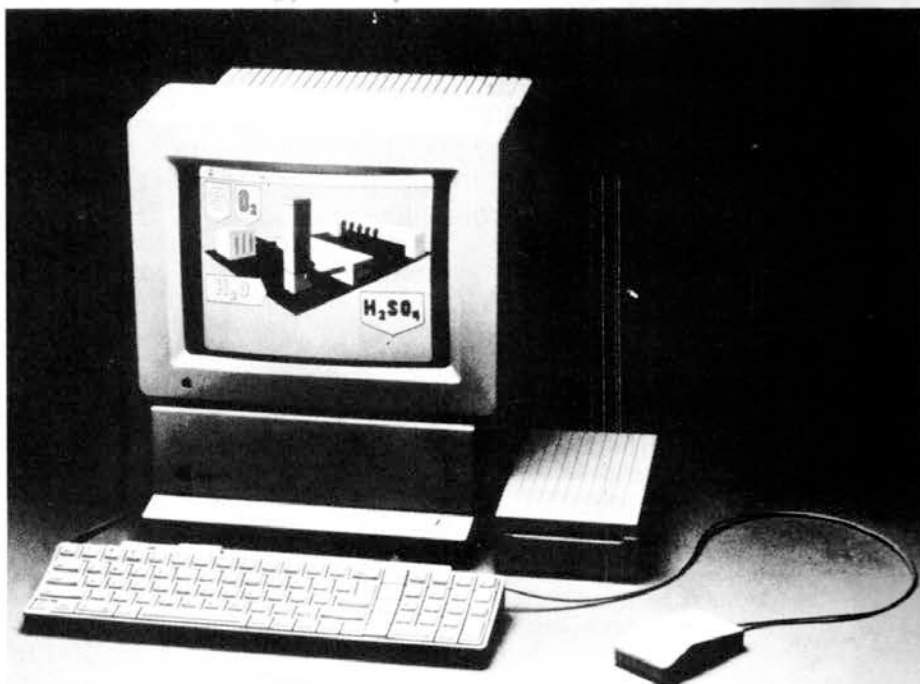
At the time of writing (early December 1986) much of the software and documentation for the GS was unavailable or in pre-release versions. The 100-page booklet provided, *A Touch of Applesoft BASIC*, might prove to use to BASIC newcomers, and makes use of the Apple II low-resolution graphics to introduce programming techniques.

Also accompanying the GS was the *Apple IIGS Owner's Guide*, but despite its 190 pages, I did not find it helpful. Under "Starting up", for example, it suggests that any combination of 5.25 and 3.5 inch disk drives can be used, but in fact the 3.5 inch drive must be directly attached to the computer and any 5.25 inch driver daisy-chained from it. The Control Panel should also be set up to scan the slots on boot-up. *Setting Up Your Apple IIGS*, however, describes disk-drive installation more fully than the owner's guide, which I suggest should be treated with caution. CED says that a system disk, training disk, and a system disk user's guide are to be included with the retail packages, but these were not available at review time.

There is still no comprehensive technical manual, however, and I think the huge number of Apple II enthusiasts, all potential buyers of the IIGS, deserve more recognition from Apple Computer, Inc. The company is internationally encouraging software development, so technical material must be available, but sophisticated users who really want to get into the IIGS ROM will otherwise need lots of time to browse.

Keyboard

The keyboard has a few changes from the Apple IIe. The numeric keypad is fairly standard, except for the CLEAR key at top left which produces a Control-X character. It is used to cancel the current line without backspacing over it when entering text at command level, but could easily be set up by programmers as a function key. The Closed-Apple key is now simply labelled OPTION and is placed just to the left of the Open-Apple key. One



difficulty I had, as a regular user of PC-compatible machines, was with the very short space bar, constantly hitting the tilde-single left-quote key with my left thumb while typing. I found this layout too cramped and non-standard for convenience, although this is obviously a matter of personal preference.

The arrow-keys remain in a row to the right of the space-bar. Diamond-shaped cursor pads have become almost an industry standard, but Apple has remained faithful to the Apple IIe layout. I found myself frequently hunting for the cursor keys, tucked away as they are at the bottom of the cramped GS keyboard. The designers could perhaps have labelled these keys with big, bold arrows to help overcome this.

Inside the case, the main board is extremely neat and compact, the custom chips allowing significant miniaturisation with room to enclose the familiar Apple II cards. Sitting next to the 65C816 CPU is a 128Kb ROM chip, bearing copyright messages from Apple and Microsoft and containing Applesoft BASIC and the Control Panel firmware.

Speed and power

Where the GS really shines is in the processor design and the built-in ROM routines. The 65C816 chip is fast, and the Memory and Window Management firmware is undeniably

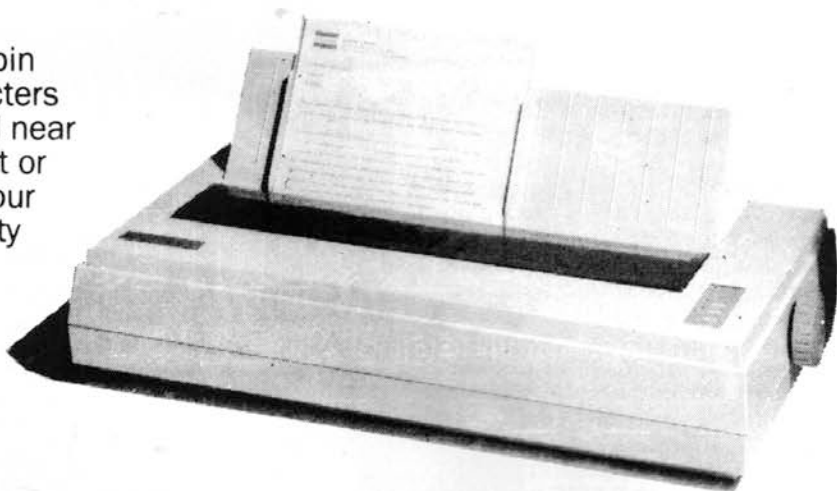
powerful. The 65C816 runs at 2.8 MHz, compared with the standard 1MHz of the 6502. The Control Panel firmware is accessible from most software, even in the middle of disk access, and allows the user to set the system speed.

The slow option allows full emulation of a 6502, so that software will run at normal speed, while the fast option causes most Apple II software to really gallop, and familiar games take on a new challenge. Most sound effects are rather bizarre in this mode!

To get some idea of the speed improvement in fast mode, I ran some simple BASIC programs that used FOR...NEXT loops to display text and graphics on the screen and perform simple calculations. For example, the program in Listing One executed in 18 seconds in fast mode compared with 48 seconds in slow mode. That is, the IIGS in fast mode consistently executed short BASIC programs about 2.6 times faster than in slow mode. This means that BASIC programs using vector shape tables give a much smoother display, and any type of sort or calculation is much faster. The greater speed of the 65C816 should prove a great boon to BASIC programmers.

It's a pity, though, that the powerful routines in ROM are not supported by BASIC or any other high-level language as yet, although a C compiler is on its way, and if the IIGS proves popular others should follow. At pre-

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sent the only way for the Apple enthusiast to use these routines is to use the monitor in ROM to provide disassembled listings of the routines. That's time-consuming, of course, and leads to a piecemeal understanding of the code. I believe the true potential of this machine will be unrealised until the ROM is properly documented or made available to a higher-level language.

Compatibility

I found some compatibility problems with the IIGS and existing Apple II software. For example, I could not get my Apple Logo disk to boot, which I found disappointing, and I was not able to try Apple Logo II, but I found other copy-protected disks (Apple Logo is fairly heavily protected) would not boot either.

However, CED assures me that both versions of Apple Logo will run on the GS, so mine may have been an isolated case. Over 90 per cent of existing Apple II software is said to be compatible. Standard DOS 3.3 or ProDOS programs seem to run with no problem, but as many users (including schools) are forced to use copy-protected software, they may find that some of their software will not run. While packages such as AppleWorks are enormously popular

and are fully supported by the IIGS, the huge range of programs for the Apple II series provides a richness of applications that should not be left behind.

There is a small amount of new software available specifically for the IIGS, and although I was able to see this in pre-release versions only, some of it shows the capabilities of the machine most impressively. The sound capabilities are provided by a dedicated Ensoniq chip, which handles 15 independent audio channels.

The Cortland Tape Deck makes use of the audio channels to play back digitally sampled sound, allowing the user to alter parameters during playback. My copy would not run properly, but what I have heard provides realistic reproduction. At present there seems to be no documentation on this software and Tape Deck is limited to playing existing samples. It would not be difficult to write a routine to sample sound using the cassette port, but Tape Deck may provide this in its finished version.

Colourful

According to pre-release publicity, the GS can display any 256 of a possible set of 4096 colours. The owner's guide, however, claims only 16 col-

ours on any one screen, and the software to date seems to bear this out, although the exact colour capabilities are still unclear. GS Paint is a graphics package which allows you to compose text and colour graphics onscreen, rather like MousePaint or MacPaint. I was very impressed with this program. The menu options bear an uncanny resemblance to Microsoft Windows in many places, but everything is noticeably faster than on a PC running Windows.

The screen resolution is good and the colour capabilities are superb, providing 16 colours and 16 patterns for each picture. The colours can be mixed using an editor which is very easy to use. The palette can be saved to disk for later use, and when a picture is saved the palette is saved with it. There is even a version of GS Paint which provides for some animation of parts of your screen, and are there data disks available with digitised photographic images. When this package is finished, it should provide one of the strong selling points of the IIGS.

Mouse Desk is a package which provides a calculator, puzzle, and a set of desk utilities. Again, this was pre-release software, but I was not impressed, as it seemed cumbersome to use with less utility than a program

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such as Sidekick, although perhaps this is an indication more of the limitations of Apple's ProDOS. Mouse Desk now forms the basis of the GS System Disk.

The main board is extremely neat and compact, the custom chips allowing significant miniaturisation

At the moment there is little finished software available in New Zealand which has been designed specifically for the IIGS. That means that a buyer is limited mainly to using existing Apple II software. Much is promised, including a GS version of MultiScribe, and if the GS sells well there should be plenty of exciting software released in the next year or so.

The Control Panel allows you to change the display from colour to monochrome, set the number of columns, and set text, border, and background colours to any combina-



The Apple II family from left, IIC, IIE and IIGS.

tion of the 16 colours available. You can also set the system speed (as mentioned earlier); adjust pitch and volume of the firmware 'beep'; set time and date; set keyboard options including layout (Dvorak, international keys, etc) and a keyboard buffer (one of the features I missed most on the older Apple IIs); configure RAM, printer and modem ports; and examine the seven user slots. As mentioned above, the Control Panel can be accessed at any time with most software, so that you can experiment with altering system speed and screen colours even while a program is running.

Memory

The IIGS I reviewed was supplied with a 1 Mb expansion card in addition to the standard 256K of RAM, and AppleWorks loaded itself into memory and told me I had 1131Kb available workspace. With this type of memory available for files on the desktop, AppleWorks users should have few problems with lack of space. While Applesoft (in common with most other forms of BASIC) is unable to address more than 64Kb of memory, applications software can make use of large amounts of memory.

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In the United States, the standard GS has 256Kb of RAM; in New Zealand and Australia the machine has been released with 512Kb, of which 256Kb will be on an expansion card which can be replaced with 1Mb. That is, the maximum RAM (until larger RAM chips become available) will be 1.256 Mb. In theory, the 65C816 can address 8Mb of memory.

Who'll buy the IIGS? Apple II enthusiasts will overcome the current lack of technical documentation by thoroughly investigating the on-board routines. Schools could pursue the graphics capability and use it for

could also upgrade, particularly if the hardware/software configurations now making the Macintosh a publishing tool become available for the GS.

Summary

In summary, the Apple IIGS offers significant improvements over existing Apple II machines in terms of processor speed, graphics, and sound. The keyboard is less than full-size and could cause inconvenience to some users. At present there is little software available, apart from that

running on earlier Apple II models, but exciting graphics software must be close to release.

Look for the release of software providing animation and 15-voice synthesiser capabilities in the near future. Look for lots of enhancements through the use of cards to fit in the seven slots inside the GS, and look for replacement of existing software (such as AppleWorks) using mouse-driven pull-down menus and icons, integrating pictorial graphics with word-processing, database, and spreadsheet functions.

LISTING ONE:

```
10 FOR G = 1 TO 5
20 HGR: HCOLOR=3
30 FOR F = 0 TO 279
40 HPlot 0,0 TO F,150
50 NEXT F
60 NEXT G
70 PRINT CHR$(7)
```

teaching programming and for running software written specifically for the IIGS, providing the compatibility with existing Apple II packages is satisfactory. Apple II business users

AppleIIGS Technical Data

Processor:	65C816 (with 6502 emulation) clock speed 2.8 HMz
ROM:	128Kb standard
RAM:	256Kb, expandable up to 4Mb (not all available in 6502 emulation)
Display:	text: 40/80 columns low-res: 40 x 48, 16 colours hi-res: 280 x 192, 6 colours double-high: 140 x 192, 16 colours super-high: 640 x 200, 4 colours 320 x 200, 16 colours
Ports:	serial printer, modem, mono and RGB, disk drive, joystick, keyboard/mouse (Desktop Bus), stereo headphones
Slots:	1 memory expansion 7 general purpose
Keyboard:	Dvorak or Qwerty separate numeric keypad

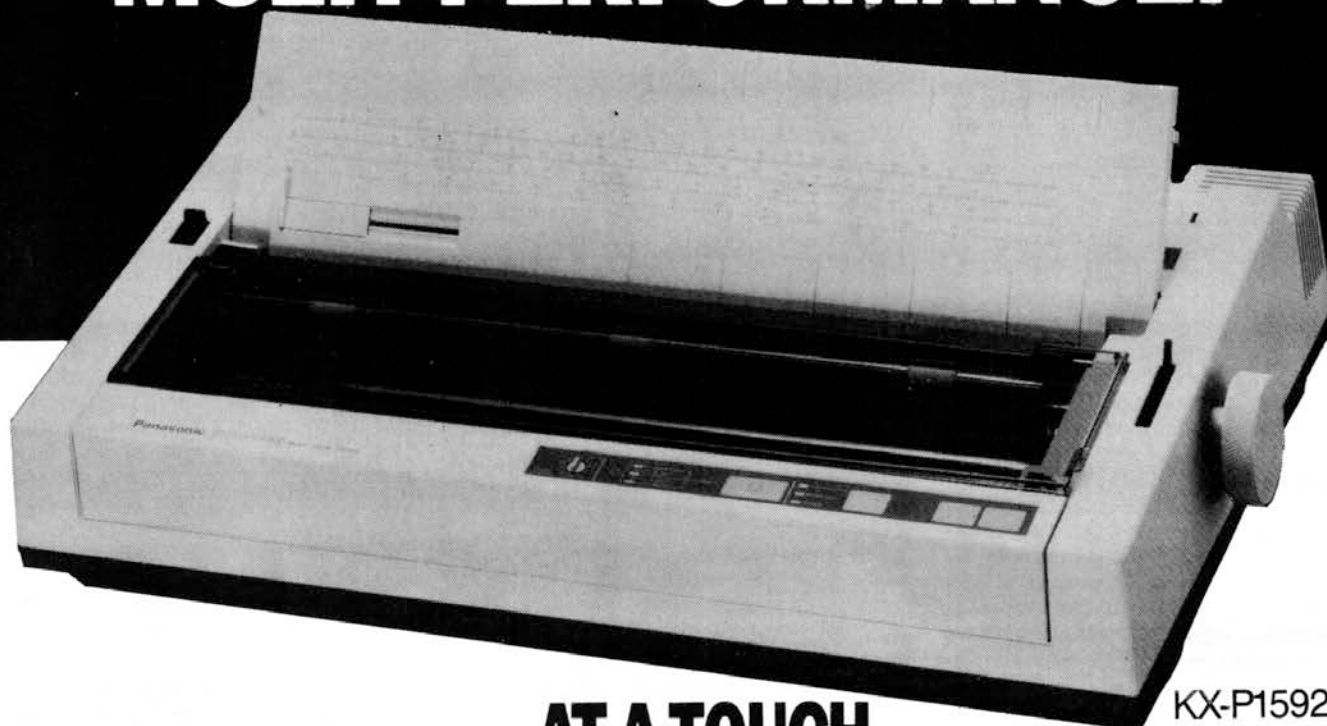
weighs less than fifteen pounds and runs on batteries. With so much going for it, we have reason to think the Wang LapTop computer will be carried away more than all the other portables put together.

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KX-P1091 (80 COL)	120 cps in Draft mode, 24 cps in NLQ mode.
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Have Mouse, can paint

by Colin Marshall

Everyone who has a computer loves to see good high and medium resolution graphics. People looking at an Amiga expect to see good graphics – and fair enough too.

AEGIS IMAGES is a paint program for the Amiga, and has a partner that goes by the name of AEGIS ANIMATOR. In this article we will look at the AEGIS IMAGES paint program, while later we will look at ANIMATOR and how the two can work hand-in-hand to create superb cartoons and graphics.

AEGIS IMAGES does one thing, and it does it well. It encourages you to become creative and enjoy your computer, and encourages you to draw and experiment.

A good paint program imitates the real-life artist. If you want to be bold, then be bold. If you require that extra fine detail and mix of paints, then do so. At any one time you can select any 32 colours from a palette of 4,096 – when in low resolution mode. If in high resolution mode your choice is limited to 16 colours.

Both modes also have a mosaic selection as well as the colours. This is where you can create a pattern using several colours, and use it as if it were a colour. The application and use of both the high resolution and low resolution modes is identical in virtually all aspects even although two totally separate programs do the work. In this article I treat the two as identical. Just remember that the high resolution screen has a lot more detail, not bad for a small computer.

Every artist has some basic tools, and the computer is no different. All information can be entered from the keyboard or the mouse, but everyone will use the mouse as it is so easy. First of all, select your brush from one of the drop-down menus, but with only 16 brushes to choose from this doesn't take much time.

Next, select the type of thing the brush is to do – erase or draw – oh dear, we just confused a few artists. IMAGES brushes can either draw in any selected colour (without cleaning your brush even), or erase. An air-brush option is available whereby holding down a selection button on the mouse while drawing will give more and more of the paint or pattern until an area is completely filled. You can of course create your own brush to do things the way you like. The really great thing of course is that no matter how much you use them, the brushes are unconditionally guaranteed not to wear out!

Creating your own brush is easy. From the brush menu, select a brush and then the GET option. An enlarged picture of the brush appears on the screen, to be modified to your liking, saved and used. These tools alone could keep many people happy for quite some time drawing to their heart's desire. However, AEGIS IMAGES makes life even easier, as computer graphics artists would expect.

A good paint program imitates the real-life artist.

Drawing

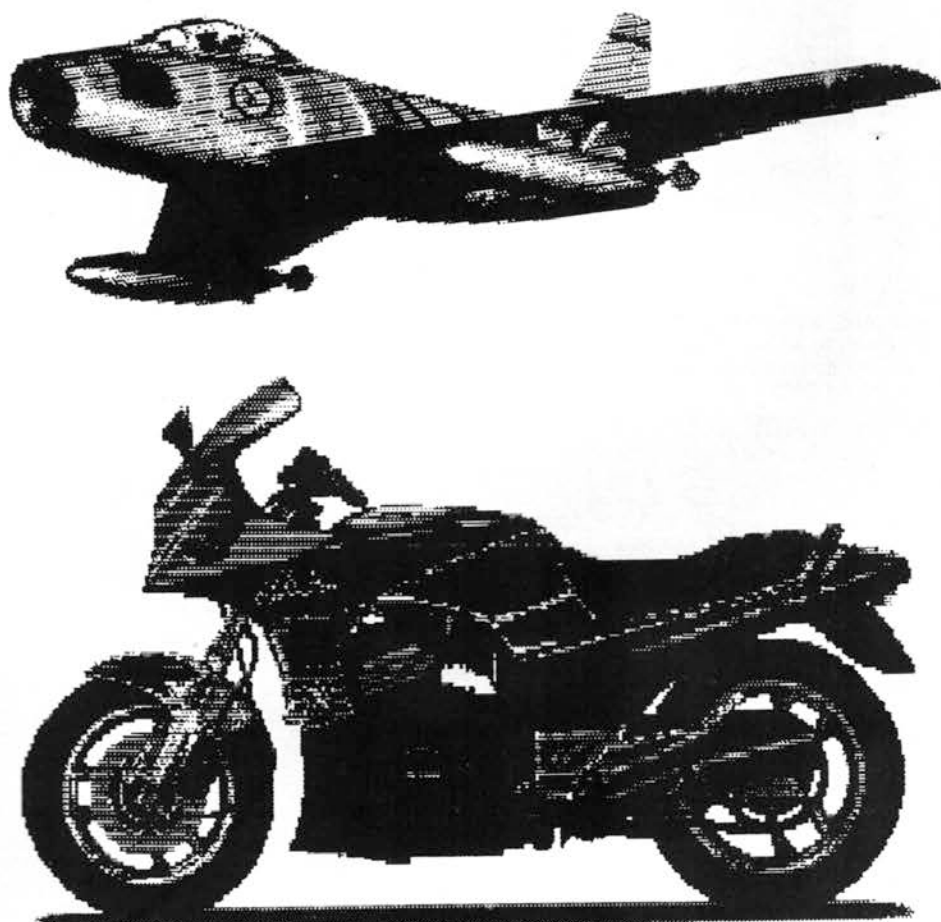
The next of many tools is the Shape menu. In this menu are options that

include freehand drawing, line drawing (for straight lines), fill, rectangle, circle, point, polygon, parallelogram, triangle, ellipse, curve, arc, erase, text, fonts.

Geometry was never so much fun. All these options allow you to create and modify shapes easily, while the text and font options give access to all the fonts on the Workbench. The fill command fills anything within a closed curve in the currently selected colour or mosaic. Drawing arcs and curves is unusual, in that all you have to do is select three points, and the computer works out the rest.

The Colours menu allows you to select and modify your current colour. These are standard options one expects on the Amiga, except for two. A Transparency option paints over

The motorcycle was printed out on a Panasonic KX-P1091 printer having been created in low resolution mode. The plane was created in high resolution. These samples come on the disk.



other colours to give a smoky or view through coloured glass image, while the other option is Glow. This is like the Transparency option, except that if a colour is not within the range of the smoky imaging then the colour is changed to one that is. I know this seems a bit strange, but in practice it works really well.

The Edit menu has a couple of nice features. The Frame option allows the user to define an area of the painting and move it to another location. Frames with data in them can be flipped, pasted, resized and painted – all rather fun. Undo deletes the last change that was made – very useful, believe me!

Two screens can be used at the same time on the standard 512 Kb Amiga and are totally independent of each other. There is one option in this menu that I really like – the Magnify option. The smallest area can be magnified several times and worked on. Any changes made are immediately visible on the larger picture as well, a very, very useful feature.

The Special Effects menu contains another menu named Effects, which has some classy features. Pantograph lets you select a given area and duplicate it anywhere else. Under lets you paint under some colours and over others as you select the colour preferences, while Grid turns on a grid that

makes detailed work a lot easier. Antialias is weird but it works, smoothing out the edges between colours that sometimes make computer graphics look bad. Antialias blends the two colours together into something that is not noticeable.

No matter how much you use them, the brushes are unconditionally guaranteed not to wear out!

Effects

The last menu is Special Effects, and some of the effects certainly are special. The first of these, the Wash command, blends all the colours together to look as if the painting was a water colour. This can be amazingly effective.

The next option is Smear, which seems to work like a rough wash (excuse the imagery). The changes are less subtle than a Wash, and depend more on the fineness of detail and the type of brush being used.

Cycle Colours is a very clever option. The colours on given parts of

the screen are cycled through a range of colours, giving the impression the object is actually moving. The waterfall demonstration is a good example of this. Cycle Draw, the next option, changes the colours that are coming from your brush as you draw... stranger and stranger, but some really amazing results. The next option is a mirroring facility that allows you to break up the screen in numerous ways and duplicate your painting and then subsequently modify it.

As mentioned above, AEGIS IMAGES can be used with other programs. This means that the screens, which take up about 30 blocks on disk, can be used as backgrounds to games, graphs, charts and so on.

Printing out the paintings is not hard and does not take long. I have tried producing pictures on both colour and black/white printers and in both cases the pictures are of a good quality.

In conclusion, AEGIS IMAGES is a program that is worth having if you want to use your computer for any form of graphical work. The program is easy to use. The manual is straightforward and very easy to follow. The pictures that can be created can be extraordinarily detailed and used with other programs. As a paint program this is top-notch. Rating 5/5.

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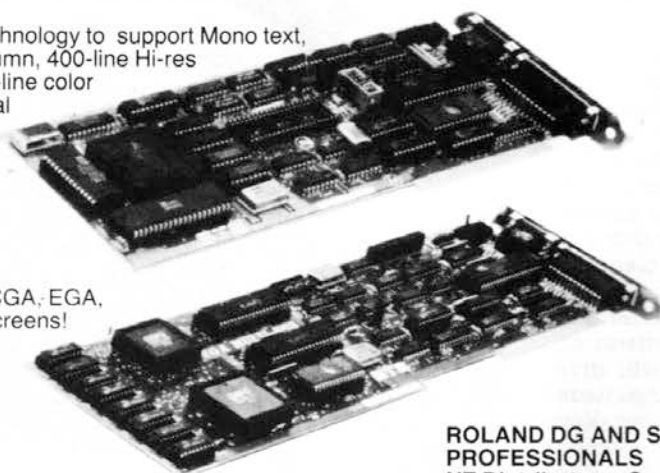
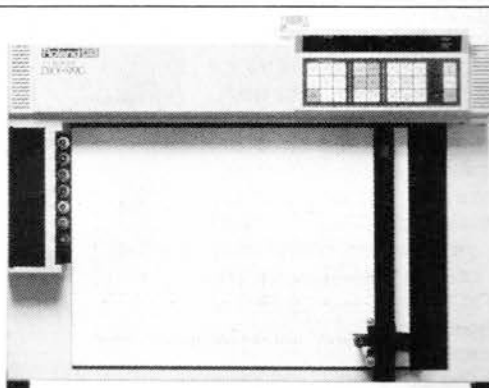
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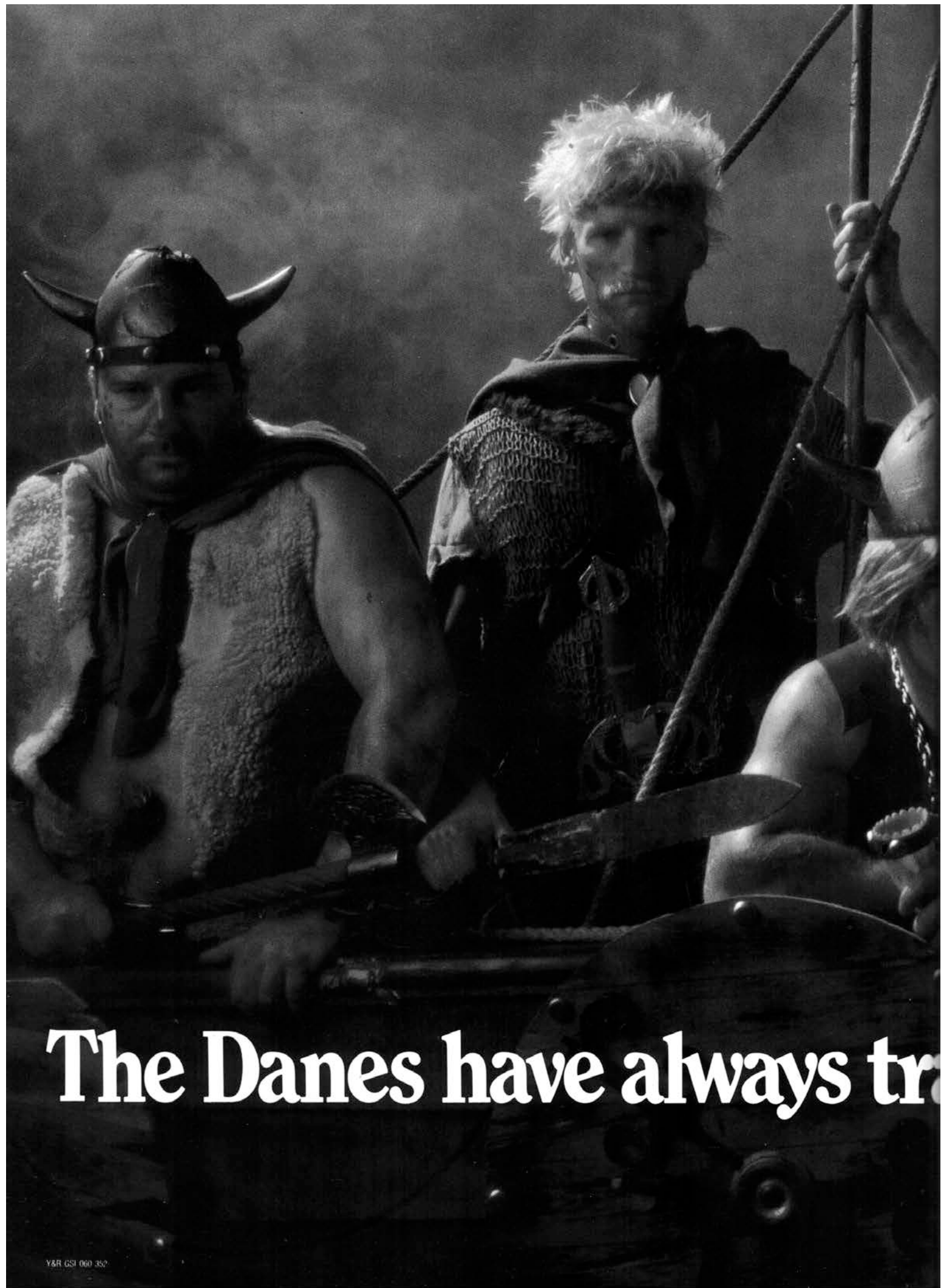
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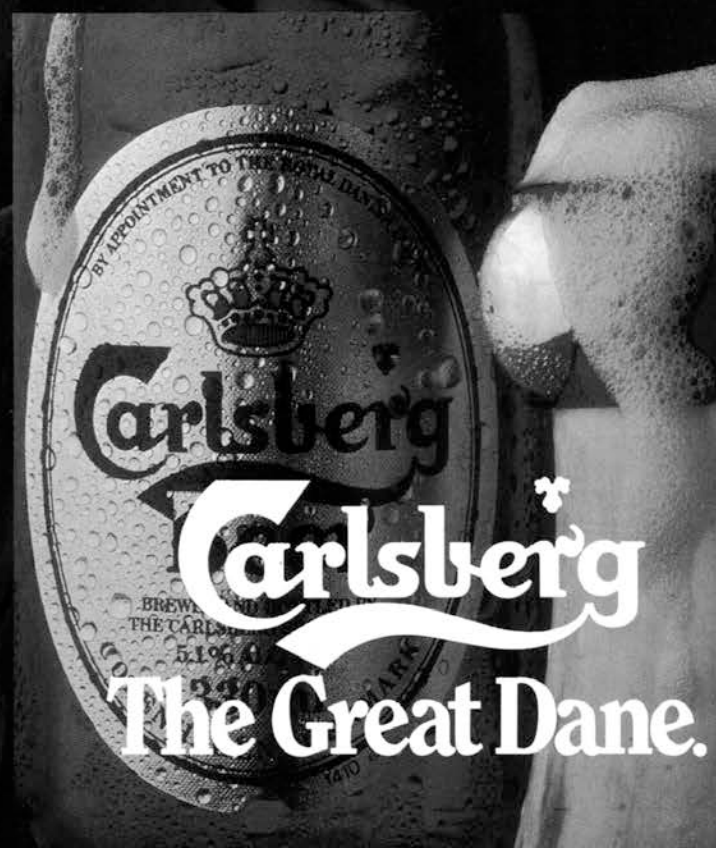
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Keeping up

by John King

Anybody would think that a company involved in such high-tech machinery as the most modern general aviation aircraft would be well to the fore when it comes to using similarly up-to-date methods of management. After all, the aviation industry thrives on paperwork (it's an old saying that an aircraft is not cleared to fly until the weight of its paperwork exceeds its empty weight), and what better way to keep track of all that stuff than on the office microcomputer which is used for administration anyway?

But it doesn't always work like that. The aviation industry also has a long history of bureaucracy, and it takes some lateral thinking for somebody to see beyond the piles of logbooks, manuals and pieces of assorted paper. There's also the question of the natural suspicion cast on newfangled ideas by those civil servants whose very existence is based on the movement of paperwork.

New Zealand's major airlines, however, have been using mainframe computers for nearly 20 years, and their engineering and record systems are well established. It was only a matter of time before the general aviation industry caught up with the practice, and while it's taken longer than some observers would have expected, one of the country's leading aircraft distributors recently installed a microcomputer to handle the complete maintenance management for its own aircraft as well as those of an associated flying school and any private owners who want to use the system.

Motor Holdings (Aviation) is the New Zealand distributor of, among many other things, Cessna aircraft and Hughes helicopters, with its main base at Auckland's Ardmore Aerodrome. While new aircraft are a bit thin on the ground (Cessna piston-engined production in the USA has halted in response to a combination of sales downturn and final rebellion against the crippling litigation industry), Cessnas are the most prolific light aircraft in this country, and MHA is busy importing used aircraft and helicopters as well as maintaining a fair proportion of the nation's aviation fleet.

Each individual aircraft has to be maintained at regular intervals, and different components in each need to be inspected, overhauled or replaced at different intervals that may be based on flying hours, cycles (usually flights or engine starts) or calendar time. Governing all that is a plethora of service bulletins, airworthiness



Motor Holdings (Aviation)'s Ardmore hangar usually contains a variety of general aviation aircraft, from the executive twin-engined Cessna to aero club trainers and even (foreground) a privately-owned ex-RNZAF Harvard which dates from World War Two.

directives, defect reports, concessions, modifications and dozens of other types of paperwork flowing to and from the Ministry of Transport's Civil Aviation Division, all of which has to be carefully recorded and retained.

In fact, so difficult is it to keep track of all the airworthiness requirements that it's an open secret in the industry that almost any aircraft could be grounded if the CAD inspectors delved into every scrap of paper involved. "It's impossible to keep a manual system foolproof," says Chris Wolff, Motor Holdings (Aviation) Ardmore branch manager.

Against that background, when the company made the decision to computerise the maintenance records, things had to be taken carefully. Originally intending to have the software written locally by consultants but later abandoning that tack, MHA sought advice from authorities overseas, particularly the Canadian Air Transport Authority which had established a working party to look at systems. Three packages were recommended, and an influence on the final choice of the Dash product from Reading, Pennsylvania, was the fact that the mini version was already in use by Newmans Air of Christchurch.

Even so, MHA's package, installed at the end of November, is only the

sixth PC version of Dash in operation anywhere in the world, which makes it something of a novelty. And while it's all still new to the engineers, there's an air of general enthusiasm at the way this new machine is going to help, first at Ardmore and perhaps later at other branches around the country.

"It's easy to customise so that it prints out such things as New Zealand requirements," says Peter Rishworth, management consultant brought in for the project. "When an aircraft comes in we print out what work is needed, the worksheets and any deferred maintenance decisions." Having it all in printed form also simplifies discussing future requirements with an aircraft owner, for example highlighting when a component is due for work before the next scheduled maintenance interval.

Motor Holdings' Dash Rotable/Inventory package is running on a 640Kb Exzel with 20Mb hard disk and floppy drives, at a total package price which the company finds most satisfactory.

But what actually made them take the plunge? "I first mentioned it as a joke," explains chief engineer Laurie Tribe. "I had trouble keeping up with the logbooks, and said it was time they got me a computer. Not long afterwards the board approved it and we were away."

Words upon words

by Craig Beaumont

Amstrad call themselves the Amstrad experts, to prove that they first wrote what has become the favoured tool of many Amstrad machine code programmers - Maxam. With Maxam they wrote Protext, Prospell and Promerge, together forming a complete word processing package. They wrote their manuals with Protext, checked the spelling with Prospell

and merged the files to be printed together with Promerge. They offered all these on EPROMs as well as disc and tape. They were then in business.

Maxam is a fairly conventional editor/monitor/assembler package. One of the most interesting features is its ability to assemble from BASIC. By just writing assembly language

program lines in BASIC lines and using the command :ASSEMBLE BASIC and machine code can be mixed easily. Maxam has been superseded in terms of debugging by Ocean's Laser Genius with its Analyser function, but it still has a lot going for it.

To get used to Protext I'm writing this column with it. There are the usual adaptation problems when one changes from one system to another - for example in Tasword CTRL-DEL deletes a line while under Protext this deletes a marked block of text. Protext has similar storage capacity to the Tasword 464D's 23K (40K on the EPROM version), while Tasword 6128 uses the extra memory of the 6128 as a 64K RAM disc.

Protext and Tasword 6128 have many similar features, although their implementation is different. Tasword tends towards menus, whereas Protext uses commands including bar commands. One subtle difference between them is in how they make text line up with a straight right hand edge. Tasword calls this justification and inserts 'soft' spaces starting from the right and working leftwards. Protext calls it formatting - the same operation, but it starts from the middle and works outwards in both directions. Which one you prefer is a matter of personal taste.

Tasword's approach to printer control codes has room for improvement and Protext makes that improvement. If for example you want a word to be in *italics*, then you will need to switch the italics mode on before the word and off after the word. Both programs use inverse characters to show these controls, but in Tasword they muck up the justification while Protext handles them nicely.

The deciding advantage of Protext is its overall speed. I timed them performing common operations on a 22K (2500 word) long essay.

Time (min:sec)	Protext	Tasword 6128
Load text	0:10	0:31
Save text	0:11	0:27
Move from start to finish	<0:01	0:05
Replace "the" with "THE"	0:06	2:50

The loading time on Tasword includes the time it takes to access the RAM disc, and even without this it would be slower. The main reason the replace operation takes so long on Tasword is that it shows all the replacements being made on screen, then justifies each paragraph. Protext changes the words in memory and leaves you to reformat the parag-

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raphs. There is a Protext command to reformat the entire document which takes only a few seconds, so this is no problem. If you are serious about word processing you would find the speed of Prospell a great advantage.

Prospell is clearly superior to Tas-Spell, though it appears to be slightly weaker than Oasis Systems's CP/M based Word Plus. They have similar features, and it is likely that Prospell is a derivative of Word Plus. Tas-Spell can be used only with Tasword 6128 or 464D, while Prospell will operate independently of Protext, accepting ASCII or Wordstar type files from other word processors. Protext and Prospell can be loaded together, and while moving between them is just a matter of using bar commands, available text space falls to 10K.

The main function of Prospell is the proof reading of documents, for spelling but not contextual errors. It does this by finding words in documents not in its dictionary - which initially contains 33,000 words. You may then view the context of the unrecognised word, and ignore it, store it in the dictionary, change the word or look up possible correct spellings. Tas-Spell has all except the useful last option.

Prospell has a two-pass mode where it finds all the unrecognised words at once, then asks what you want to do with each one. With Tas-Spell you have to wait while it finds the next unrecognised word (unless you direct output to printer), which can be time consuming with a long document.

The January 1986 Amstrad Computer User demonstrates some of the features of Word Plus that Prospell incorporates - Find and Anagram. Find is the saviour of crossword buffs not quite able to finish off the puzzle. Asking Prospell to find all words with six letters, with B in first and N third places produced 25 words on Prospell while Word Plus found 37.

Anagram would be useful to anyone playing Starion. When asked for anagrams of STAR it produced ARTS, RATS, STAR and TARS. Word Plus gave the same answer, except it replaced TARS with TSAR. Tas-Spell lacks these features, and is slower in normal operation than Prospell.

Promerge is a mail merging utility specifically for use with Protext. It is a very powerful language for producing personalised standard letters and much more. I call it a language because it has sufficient looping, mathematical and conditional ability to write a prime generator - even if it is a little slower at this task.

Thanks to J. Procter of Christchurch for supplying the above Amstrad software for review. She was so impressed with it that she has arranged to bring in and sell this software, both tape and disc versions - at a price which competes directly

with Tasword. She does not anticipate bringing in the EPROMs, as these require a ROM board and would be quite expensive in their own right. A PCW version of Protext should be available early in 1987, having many more features and a decisive speed advantage over Locoscript and Newword.

Some of you may remember Mooncrest, one of the first arcade games in colour. Incentive Software has been licensed to produce a replica of this game, doing a good job with the graphics and sound, but some ex-arcade playing friends say the Amstrad version is harder than the

original. The game is based on blasting through a number of screens then docking with other parts of your spaceship, increasing your firepower for the next screens. As you get through each stage the speed of the following screens increases rapidly. If you score over 30,000 points you get a bonus game - I'm not sure if this happens every 30,000 points as my high score so far is 57,350.

Finally a hint on running programs for non-typists. If you type the file name of the program to be run first, then press CTRL-Left Arrow followed by CTRL-ENTER you will save a few key strokes.

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The MS/PC-DOSsier

by Selwyn Arrow

The process where DOS uses AUTOEXEC.BAT is illustrated in figure 1. If this file is not found on the disk, the DOS issues prompts for you to input the date and time when you do not have an on-board clock. You can of course include DATE and TIME commands in your AUTOEXEC.BAT.

How to go about his procedure, writing and using .BATch files, will be a topic to be covered soon. For further information on this and some other startup functions, consult your DOS manual if you cannot wait until then. Later in this series we will be exploring this area in much more detail as AUTOEXEC.BAT is a very useful feature to have under your control.

Did you try last issue's technical tip? If so, did you work out why the line we advised you to include in your AUTOEXEC.BAT (PROMPT \$p\$g) presents you with a prompt showing which subdirectory you are in?

I hope you did look in your DOS manual for information and I am not surprised if you couldn't make much sense of it, as making sense of manuals is what this series is all about!

The purpose of the PROMPT command is to be able to change the DOS system prompt. For instance, you can have it appear in the colour of your choice (if you have a colour monitor!) or even as multi lines, and if you don't like you can change it.

The \$ character is used as an identifier and must precede any character that specifies a particular prompt. The default is the current drive designation, ie A>, which is obtained by issuing the command PROMPT \$n\$g. By replacing \$n with \$p we obtained the current directory in our example. The \$g is the specifier for > and of course other characters can be used in its place. The usual ones are listed in your manual. To use any other character you can place it between double quotes, ie "?".

Automatic execution

Our main technical topic this month is a most useful file called AUTOEXEC.BAT. The most popular use for AUTOEXEC.BAT is to automatically execute a specific application program residing on the same disk. This saves loading two separate disks, for both DOS and the

required program, each time you want to run the program.

When you turn on your PC and insert your DOS disk (if you do not have a hard disk in your system), COMMAND.COM is loaded as was explained last time. DOS then looks for a file on the current drive called AUTOEXEC.BAT. If present, it will execute the statements in this file, one line at a time.

In the case above, our line caused the prompt to show our whereabouts. We could also include the line of characters you normally have to type in to call up BASIC and then load and run your favourite game etc. Then again on another disk, for your spreadsheet program you just need a line with say LOTUS or 123 on it for that program to start up automatically.

Origins of PC- & MS-DOS

As promised last time, we will now have a look at the history of MS/PC-DOS and find out why we are not using what almost everybody at that time thought would be the 16-bit ver-

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sion of CP/M, now known as CP/M-86. When the 8086 chip came out in 1979/1980, along with the 8088 which uses the same set of computer instructions and is the one used in standard PCs, Digital Research Inc announced that the CP/M-86 operating system would soon be ready. This was an obvious step as its CP/M for the 8080 and Z80 based chips was (and still is) very popular, but CP/M-86 had a low priority and so was delayed.

In the meantime Seattle Computer Products had brought out a CPU board based on the 8086 in mid-1979. It lacked an important ingredient – software to make it run. After waiting almost a year for the promised DRI operating system they produced their own, based on CP/M-80. Called QDOS, it was written by Tim Paterson in four months and appeared in August 1980. Shortly afterwards, another Seattle firm called Microsoft, already well known for its version of BASIC, bought QDOS and marketed it under the name MS-DOS.

It was not until several months later in mid-1981 that DRI released CP/M-86, but by then IBM had chosen Microsoft to produce PC-DOS for the soon-to-be-announced IBM PC.

The background to this unexpected turn of events went like this. In 1980 IBM approached DRI to license CP/M-80, but was not very well received. The opposite was the case when on approaching Microsoft for MBASIC; Microsoft saw an opportunity and convinced IBM to use the 8088 processor for which it would supply 16-bit versions of MBASIC and DOS.

But IBM was in a hurry, so with no time to write its own 16-bit DOS, Microsoft bought QDOS for \$50,000 and Tim Paterson went to work for them. IBM's PC-DOS 1.0 had one major advantage over QDOS (and CP/M), with IBM's producing what was then considered a "user friendly" manual for non-technical users. With PC-DOS already easier to use than CP/M, this was an industry first.

PC-DOS 1.0 also included some enhancements, but there was still plenty of room for improvement. Version 1.1 and then 1.2 swiftly followed, but they did not include any extra functions. With IBM's prompting, PC-DOS 2.0 was released in 1982, adding hard disk support and many UNIX-like functions plus "friendlier" features. Version 2.1 was released in 1983, fixing some bugs in its predecessor.

Incidentally, the integer increase usually includes major additional functions, whereas the decimal numbers indicate fixes or updated features.

So where does MS-DOS fit into all this? Microsoft produces both MS-DOS and PC-DOS, so they are usually compatible. From now on we will use

the prefix only when we need to differentiate between them. For instance, IBM has included some extra functions of its own in PC-DOS which may not be found in MS-DOS. One of these is COMP which compares files.

In many cases MS-DOS commands may have the same or a similar name, but the code is different to get around copyright problems, which means that you may get subtly different effects from some DOS commands if you are looking at a different manual. Please let us know if you do!

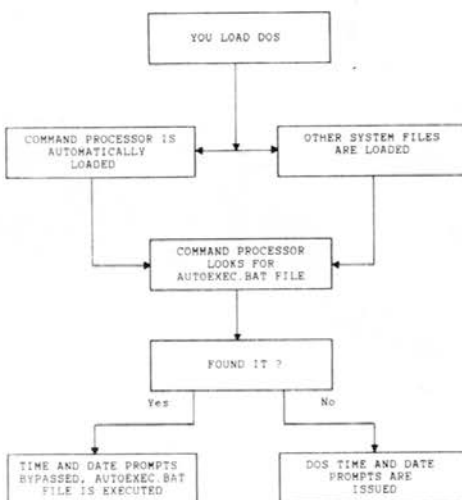


Fig. 1: How DOS uses the AUTOEXEC.BAT file.

Sometimes the company producing a particular brand of MS-DOS computer may include its own utilities to make life easier. For example, the Eagle computer has DISKUTIL which handles formatting, testing and copying floppy disks from a menu, while Panasonic has EXTPRT to switch to an external printer and FAST to switch the CPU clock. The list goes on and on.

Recent DOS releases

1985 saw the release of DOS 3.0, closely followed by 3.1, which among other things fixed a problem with RESTORE. These were aimed at the 80286 based AT machines, and among the many enhancements are some rudimentary multi-user functions, but more on this later (promises! promises!).

DOS 3.2 was released mid 1986, its main claim to fame being that it can (at last!) handle 80-track 720Kb drives which have been around in the CP/M-80 world for years. MS-DOS 4.0 has been released recently in the UK and Australia on Apricot and NCR computers, but my sources suggest that Microsoft will not be doing further work on this version as it is working towards DOS-386 etc, for the 80386 and later processors.

That's it for this month. Do keep those questions and suggestions flowing in as we need your input.

Pests can be fun!

by T.M. Stewart
and P.G. Fenemore

Dept. of Horticulture and Plant Health, Massey University

The modelling of biological systems using computers has been common for many years. Such models are used to simulate the growth of a plant, behaviour of an animal, or dynamics of an ecosystem. Often they are applied to cropping systems to predict the onset and extent of economic damage from insect pests or plant diseases, given a number of factors such as the growth stage of a plant, initial density of the pest, temperature, humidity etc.

They also allow scientists to simulate the likely effects of various pest control measures, such as insecticide application, on the system. This can be likened to financial models using spreadsheet software, in that the ramifications of changing one factor can be readily seen. When used for such purposes, the computer is a very powerful tool.

An example of such a use can be found in Australia where a computer model called SIRATAC has been developed for cotton production systems. On the basis of field monitoring, this model can provide information to growers on the population dynamics of *Heliothis*, a caterpillar which eats the bolls (pods containing the cotton fibre). Insecticides are only applied when required rather than on a systematic time scale, thus saving money by preventing unnecessary applications.

Biological crop-pest models such as the above are based on mathematical equations which are in turn based on the results of experiments on the biological system being modelled. As well as predicting the outcome of management decisions, these models also have considerable value as teaching tools, allowing students to make management decisions on various aspects of growing a crop. The decisions, correct or otherwise, are reflected in the final yields and profit.

Giving university students hands-on experience of pest management in cropping has always been difficult for several reasons. First, in most universities undergraduate students do not attend over the summer months when the bulk of cropping is carried out. Second, costs in resources and

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manpower, not to mention land, and the fact that students are likely to make at least some disastrous decisions, make such real-life exercises very expensive. Crop/pest models provide a method by which students can "grow" their own crops several times, receive a profit or loss at the end of each cropping cycle and so learn by their mistakes.

Because of the complexity of biological simulation models, they have in the past been restricted to large mainframe computers. Often only one pest is considered and a very large amount of data is needed to supply the algorithm before a calculation is made. This may be necessary for accurate prediction, but it does mean that the student can get bogged down with data, which in the real world, at a grower or farmer level, is often unavailable.

Also, it is desirable for the student to consider all the pests which occur in the crop under study, from planting to harvest, not just one or two as it is the combined effect of these pests which eventually determines profit/loss. Unfortunately, biological algorithms for most pests are simply not yet available.

It follows then that for teaching purposes, simpler microcomputer based models may suffice. At Massey University we have produced Pestgame, an educational simulation, written in Microsoft BASIC, which takes a student step by step through the process of growing maize, allowing him or her to make pest management decisions at the appropriate times with the objective of optimising profit (but not necessarily yield).

Owing to the non-availability of biological equations for the pests which occur in this crop, pest damage in the program is based on the proba-

bility of certain population levels developing, given a number of variables. For example, if a crop of maize was sown into land that had maize previously, there is a higher probabil-

- Slugs – a pest which eats young seedlings.
- Argentine stem weevil – a pest which in the grub stage bores into the stems of the seedlings and feeds there.
- Cutworm – a caterpillar which eats through the stem of seedlings causing them to topple over.

These pests all affect the initial stand of plants resulting from sowing. Slugs and stem weevils are invisible to the grower (all he/she notices are missing or 'sick' plants), but black beetle populations can be determined by sampling the soil. Cutworm injury is clearly visible and actual cutworms may be found by disturbing the soil surface.

Other pests are:

- Armyworm – a caterpillar which eats foliage primarily but sometimes attacks cobs.
- Corn earworm – a caterpillar which feeds on the cobs near harvest.

Both of these pests reduce overall yield.

Rainfall, which can markedly affect yield and over which the student has no control, is randomly determined (within realistic limits) by the computer. In a year with abundant rainfall, yields are higher than in drier years. The player is informed of the seasonal weather part way through the growing season. Cumulative production costs are displayed through the game allowing the player to monitor spending. At crop maturity the player is given the opportunity to harvest or not. Very low yields may be uneconomic to harvest.

The final costs and any profit/loss made are shown on the final screen. The student is then given the option to replay or not.

A booklet accompanies the game, informing the student of the probability of pest attack and the implications (and cost) of each management decision. Ideally, the student should run through the game several times and keep a note of the profit achieved. On single runs, chance may occasionally be loaded against the student (as it is against the grower) who will make only a small profit despite his or her best efforts. Several runs are required to give a true reflection of the player's skill.

The lack of mathematical models for the various pests means the program cannot (as yet) be used for prediction. It does, however, give experience to students in pest management, allowing them to see the implications of different decisions. In this respect particularly, we have found it a useful learning tool.

The game, developed for MS-DOS machines, was used last year in plant protection courses at Massey University. It illustrates one of the many uses to which microcomputers can be put in tertiary education.

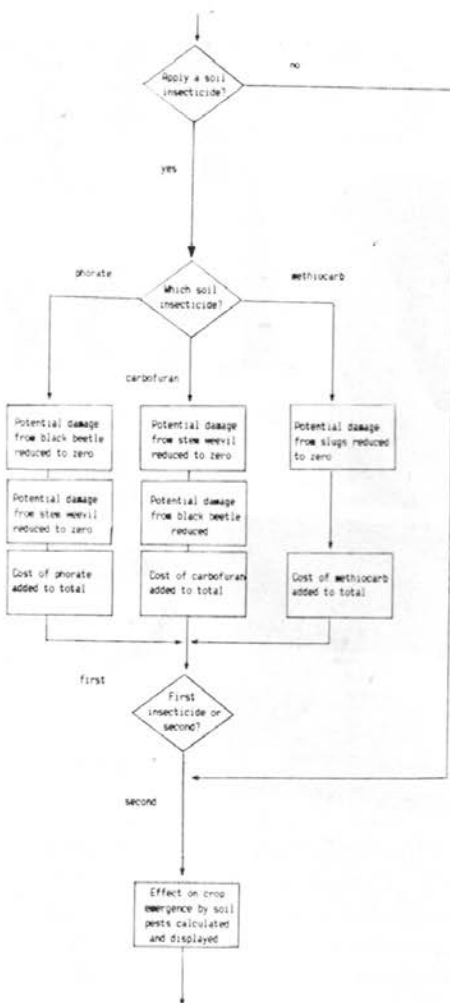


Fig 1: a portion of the flow diagram showing logic pathways in Pestgame

ity of slugs damaging the seedlings compared to a crop sown into land which was previously in pasture, where slug damage is likely to be low.

Stem weevil damage, on the other hand, is likely to be higher in land which was previously in pasture. Once the potential population (and therefore damage) value is set for a particular pest, any subsequent control decisions taken by the student have an effect on that value.

The flow diagram (Fig. 1) shows the sequential decisions and logic flow. The pests the program covers are as follows...

Establishment pests:

- Black beetle – a pest which eats the roots and other below ground parts of young seedlings.

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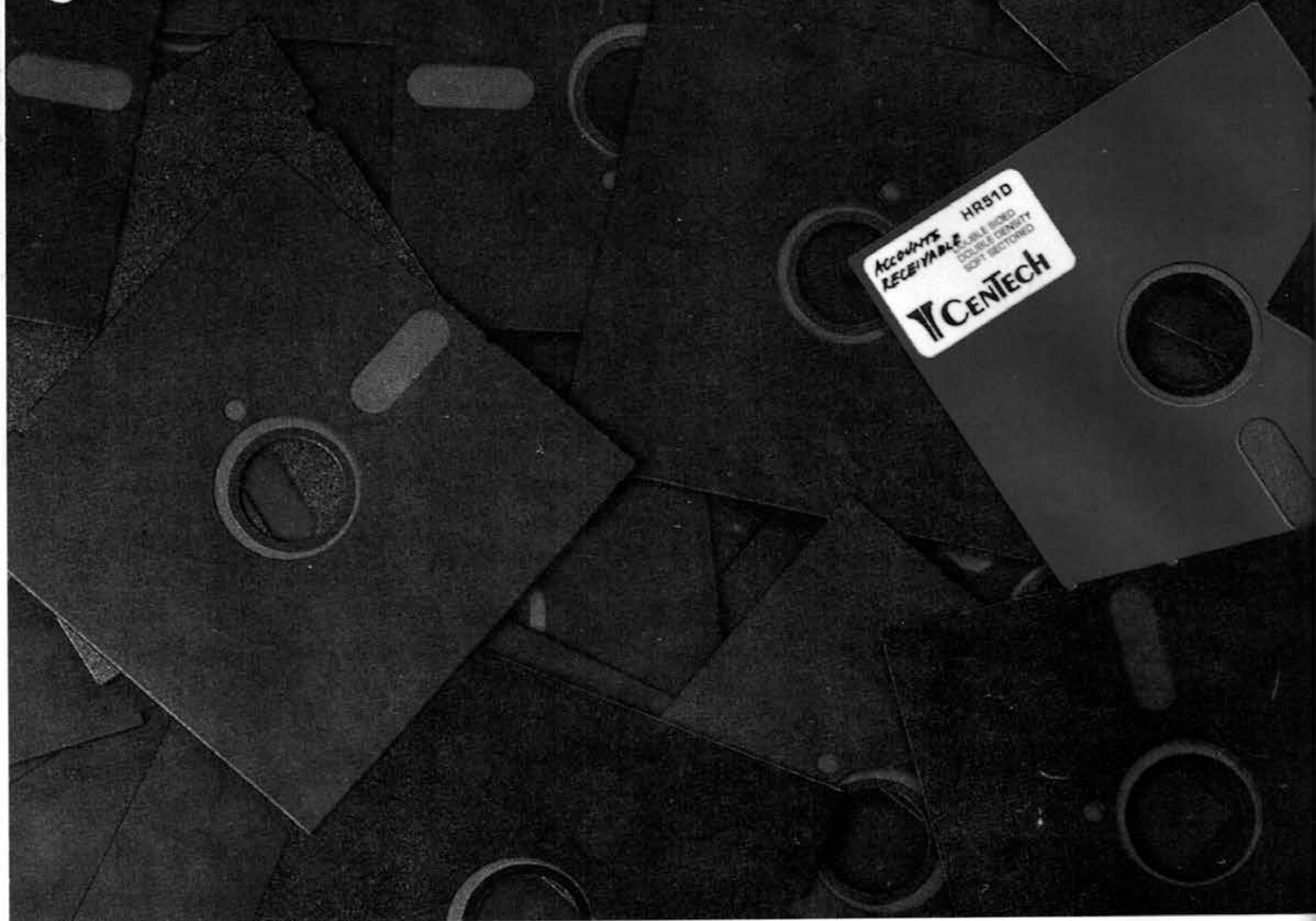
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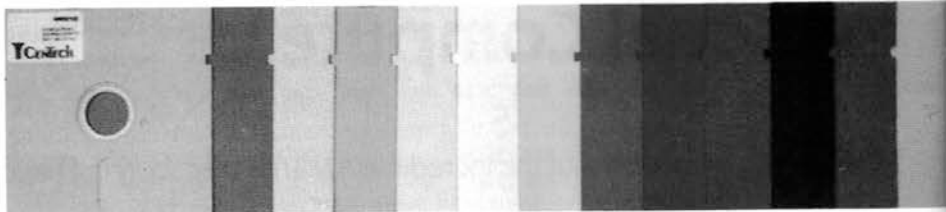
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Playing Mactunes

By John King

"It's like MacPaint with sound," is how Sound Designer has been described locally. Officially, it's known as the Computer Music System for the E-mu Systems Emulator II and Apple Macintosh, by Digidesign, for doing interesting things with music and other sounds for recording.

Not that it's for the average enthusiast who just wants a better sound coming out of the speaker on his home computer, for Sound Designer is serious stuff indeed, intended for the professional musician. It comes as a multiple set of disks and a large manual, taking some time to learn to use properly, and only four examples are currently in use around the country.

One of these is set up in the basement studio of Bruce Lynch, an Auckland musician with a high reputation in the field of commercial jingles. That may not sound serious to the average armchair critic, but it's an exacting field, and one which takes considerable experience before the person concerned can be said to be near the top.

Bruce Lynch left university in his second year to play bass guitar in a night club. "I wouldn't say I was a professional musician - just full-time," he recalls. He married singer Suzanne in 1971, and two years later they went to England, where he worked in studios and soon bought his first synthesiser.

"People were buying synthesisers to play bass, so I thought I'd better get one."

After he worked with the Cat Stevens ensemble for five years, the Lynches returned to New Zealand in 1980 to work at Auckland's Mandrill Studio, later to become partners there. In addition, the basement of their home in suburban Auckland is filled with an impressive array of sound equipment, much of which is unintelligible to the layman, but easily identifiable are a few keyboard units and a Macintosh computer.

Lynch has had his Emulator II a couple of years, the Macintosh - which replaced an Apple IIe in a nor-



Bruce Lynch working with Emulator II and Macintosh.

mal progression - for rather less time, and Sound Designer just a few months. "I bought the Mac from Lim Electronics," he says. "They are very helpful people, and look after me very well. We had a few problems installing Sound Designer, with not enough room on the startup disk when using external disk, but I've had good support."

The Emulator II is essentially a microcomputer with keyboard attached, and can control other keyboards as well. It has its own floppy disk drive for digitally recording sounds and tones, which can then be assigned to any key for changing pitch.

Sound Designer allows things to be taken further. Using the Macintosh's mouse and windows, not to mention clever bits of programming by Peter Gotcher in the first place, the actual wave form of the sound's vibrations can be presented on screen, to be modified at will. Extraneous noise such as a handclap or a scratch on a record surface can be eliminated, and one pure note played into the microphone on a flute, or directly into the Emulator as a harmonic on a bass guitar, for example, can be transformed into an entire tune by using the rest of the keys. Communication

between computer and keyboard takes place at half a million bits/second, and sound itself is sampled at the rate of 27,777 times/second.

Those tv and radio commercial jingles don't happen just by accident. They result from expertise, a lot of hard work, and an increasing use of modern technology. People are finding new uses for microcomputers all the time.

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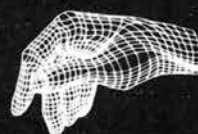
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Modular Programming

with particular
reference
to BASIC

by Evan Lewis, Ph.D.

In essence, modular programming means that a complex programming task is broken down into a number of well defined and self-contained components, or modules, each of which can be considered to be an independent programming problem in its own right.

These smaller components are more manageable than the original task. Furthermore, they too can often be broken down into a number of even smaller self-contained modules. The problem is thus broken down into small manageable units forming a tree structure.

Many modern programming languages are designed around this simple concept. In Pascal the modules are called procedures, and they are used so extensively that GO TO statements are rarely used and sometimes are not even provided in the language.

In older languages like BASIC and FORTRAN, the GO TO statement is often used extensively and if sufficient care is not taken the program can become excessively entangled in branches jumping back and forth through the program. This is known as spaghetti programming because if you draw lines on the program listing linking up all the GO TO statements with their target addresses, you end up with something that looks very reminiscent of a plate full of spaghetti — very messy.

The alternative to spaghetti programming is the careful and deliberate

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use of the modular programming which is forced upon Pascal users. Another obvious feature of well-written Pascal programs is that indenting of statements away from the margin introduces a two-dimensional structure to the program listing. This helps to separate procedures at different levels in the tree structure and to separate loops and the contents of IF statements etc from the surrounding code. The idea can also be applied to other languages such as BASIC.

In Pascal a module corresponds to a programming entity called the procedure. In BASIC and FORTRAN the corresponding entity is the subprogram or subroutine.

Subprograms in BASIC can conveniently be treated as independent programs within a larger program. They can be tested by using immediate mode to set up the input variables required by the subprogram; executing the subprogram by typing the appropriate GOSUB command, and then printing out and checking the values of the variables you expect the subprogram to have produced. In complex cases it may be more convenient to write a special temporary piece of code to carry out this testing process.

Eventually, when all of the subprograms have been written and thoroughly tested, they can be linked together to make up the completed program. The main section of the program which is executed first and calls up the subprograms in the appropriate order is called the main-line program.

Although the original problem was broken down by a "top-down" approach, looking at the highest level of modules first and then breaking those down into smaller ones, the actual programming or coding of the solution is often carried out from the bottom up - starting at the leaves of the tree (tree structures are often drawn upside down, with the root at the top and the leaves at the bottom!).

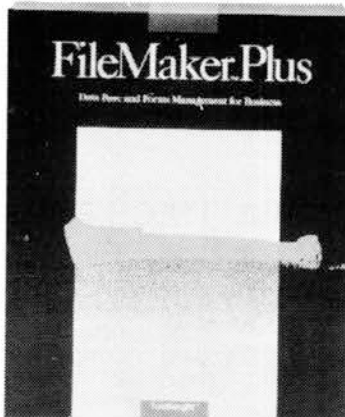
This situation arises because the higher level modules (or subprograms) rely on calling the lower level subprograms to carry out vital tasks and they cannot be written and tested without the lower level subprograms supporting them.

The separation of the planning phase, involving problem solution, choice of algorithm (or method to be employed) and the overall program design from the actual coding phase, becomes distinct. The planning phase uses a top-down approach and programming takes place from the bottom up.

It is very valuable to separate these two tasks. The program should always be well-planned before program coding begins.

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HARDWARE ROUNDUP PART 2

Microcomputers under \$8,000

In this Part 2 of our roundup of the latest available personal computers in New Zealand we look at machines retailing at up to \$8,000. Next month, the final roundup will list the increasing number of AT-compatible and multi-user microcomputers.

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Video	monochrome graphics adaptor
Resolution	740 x 348
Interfaces	1 parallel; 1 serial
Disk drives	1 360Kb floppy plus 20Mb hard drive or 2 x 360Kb floppies
Operating system	MS-DOS 3.1
Languages	any supported by MS-DOS
Optional	CGA, EGA display adaptor
Price	POA
Agents	Dick Smith Electronics

MULTITECH PC-500

Processor	8088
RAM	256Kb exp to 512Kb
ROM	64Kb
Keyboard	PC type
Video	IBM standard CGA card
Resolution	320 x 200 4 colour, 640 x 200 2 colour
Interfaces	1 parallel; 1 serial
Disk drives	1 or 2 360Kb floppy
Operating system	MS-DOS 3.1
Languages	any MS-DOS compatible
Optional	10Mb or 20Mb hard drive
Price	from \$1595.00
Agents	Dick Smith Electronics

BBC MASTER COMPACT

Processor	6512
RAM	128Kb
Video RAM	20Kb
Keyboard	qwerty, separate function keys and numeric pad
Video	RGB, composite video
Resolution	640 x 256, up to 8 colours
Interfaces	printer, optional serial
Disk drives	3.5" 640Kb built in, optional second drive
Operating system	BBC MOS
Languages	BBC Basic, Logo
Bundled software	Wordprocessor, Utilities, Tutorial
Price	\$2195.00 incl. GST
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Agents	Barson Computers



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BBC MASTER 128

Processor	6512
RAM	128Kb
Video RAM	20Kb
Keyboard	qwerty, separate function keys and numeric pad
Video	RGB, composite video, VHF
Resolution	640 x 256, up to 8 colours
Interfaces	parallel, serial, analog, user port, system expansion bus
Disk drives	optional 640Kb 5 1/4" or 3 1/2", optional hard disk
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Processor	80186
RAM	512Kb
ROM	128Kb
Video RAM	40Kb
Keyboard	qwerty with separate numeric pad, function keys
Video	RGB, video, VHF
Resolution	640 x 200 (IBM colour graphics)
Interfaces	serial, parallel, analog, user, system expansion bus
Disk drives	5 1/4" multifformat incl. IBM, BBC
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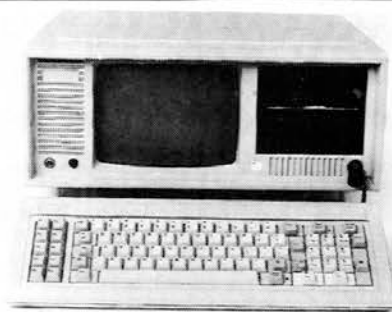


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Video	hi-res green or amber
Resolution	Hercules compatible card 720 x 348, colour graphics card 640 x 200
Interfaces	Centronics, 8 expansion slots, 8087 co-processor socket
Disk drives	Dual 360Kb Japanese
Operating system	MS-DOS 2.11
Bundled software	first choice
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Expansions	20Mb hard drive, I/O plus card, 256Kb to 640K RAM, hi-res colour
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Resolution	Hercules compatible card 720 x 348, colour graphics card 640 x 200
Interfaces	Centronics (2), RS-232, joystick port
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ROM	32Kb
Keyboard	switchable audible/silent
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Resolution	640 x 200
Interfaces	RS 232, Centronics, 6 IBM slots
Disk drives	5.25" 360Kb (optional Winchester's up to 117Mb)
Operating system	MS-DOS version 3.1
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Expansions	6 vacant IBM slots
Agents	Warburton Franki

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Processor	8088 4.77MHz
RAM	128Kb standard
Keyboard	PC/XT layout
Video	LCD, monochrome or colour
Resolution	640 x 200
Interfaces	colour/graphics, parallel printer
Disk drives	2 x 360Kb floppy or 1 floppy, 1 10Mb hard disk
Operating system	MS-DOS
Optional	8087 co-processor
Bundled software	MS-DOS 2.1 Basic
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Expansions	to 640Kb RAM, 3 expansion slots
Agents	Hanimex-Toshiba

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RAM	256Kb exp. to 640Kb
ROM	32Kb
Keyboard	optional 84 key qwerty, or enhanced 101 key layout
Video	external 12" amber or green
Resolution	720 x 350 text, 640 x 200 graphics
Interfaces	RF modulator, composite video, light pen, RGB, parallel, serial
Disk drives	1/2 height 5 1/4": 360Kb floppy, 30Mb hard disk
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Optional	EGA, colour monitor, 10Mb internal tape backup
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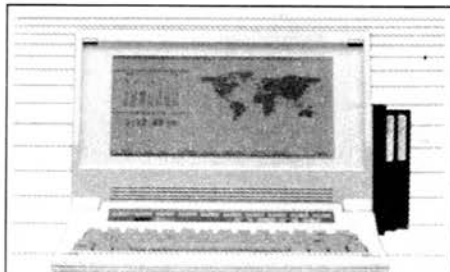
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RAM	256Kb exp to 512Kb
ROM	64Kb CMOS
Keyboard	78 keys inclined
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Operating system	MS-DOS
Price	\$4509.00 (\$4057.00 with single disk)
Expansions	10Mb hard disk — 384Kb RAM — 8087 co-processor — modem — printer — EL screen
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ZENITH Z-180 SERIES

Processor	80C88, socket for 8087
RAM	640Kb
ROM	32Kb
Video RAM	16Kb
Keyboard	qwerty, 10 programmable function keys
Video	supertwisted birefringent LCD 10.5 inches
Resolution	640 x 200
Interfaces	RS 232, Centronics, RGB & external 5.25" drive
Disk drives	shock mounted dual 3.5" 720Kb each
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Video	backlit LCD; 7 external monitors supported with optional internal video card
Resolution	640 x 200
Interfaces	RS 232, Centronics, modem port, IBM bus slot
Disk drives	5.25" 360Kb (optional internal 10 & 20Mb Winchester)
Operating system	MS-DOS version 3.1
Price	\$4578.00 (excl. GST)
Expansions	basic unit optional external expansion chassis with IBM bus.
Agents	Warburton Franki

OLIVETTI M24

Processor	8086, 8MHz
RAM	640Kb base, exp to 8Mb
ROM	16Kb
Keyboard	industry standard, or Olivetti with detached keypad and cursor control
Video	green, amber colour
Resolution	640 x 400
Interfaces	serial, parallel, mouse
Disk drives	360Kb FDD & all sizes of HDU
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Agents	Olivetti

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RAM	640Kb
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Keyboard	detachable 85 keys incl. 10 function keys and numeric keypad
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Interfaces	parallel, RS 232C ports, RGBI/monochrome port
Disk drives	single 5.25" drive
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Operating system	MS-DOS
Bundled software	MS-DOS 2.11 Basic and Tutorial
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Expansions	five I/O slots
Agents	Commodore Computer N.Z. Ltd.

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Processor	8086-2 7.16/4.77MHz
RAM	256Kb
ROM	32Kb
Keyboard	81 keys
Video	gas plasma 192 x 144mm
Resolution	640 x 400, 80 col x 25 lines
Interfaces	parallel and serial ports, RGB port
Disk drives	1 or 2 3.5in floppy
Other components	calendar clock
Operating system	MS-DOS
Optional	300/1200 modem card, portable printer
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Expansions	to 640Kb RAM
Agents	Hanimex-Toshiba

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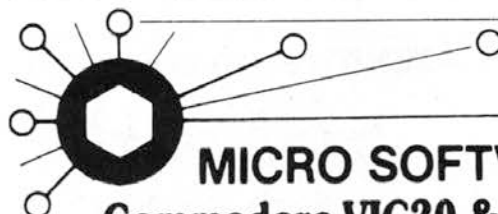
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Disk drives	1 360Kb floppy, optional 10/20/40/80Mb Winchester
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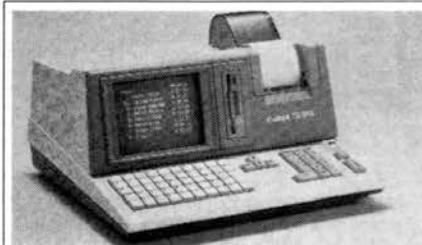
Processor	80286, 6 or 8MHz
RAM	640Kb
ROM	64Kb
Keyboard	separate, IBM AT compatible, separate numeric, cursor pads, 95 keys incl. 20 function keys
Video	13" colour or 12" monochrome
Resolution	640 x 200 pixels, 80 col x 25 rows
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COMPAQ DESKPRO 286

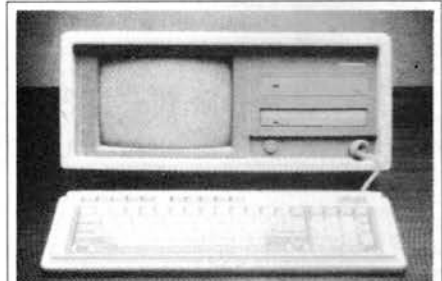
Processor	Intel 80286 6/8MHz
RAM	256Kb exp. to 640Kb
ROM	32Kb
Keyboard	optional 84 key qwerty, enhanced 101 key layout
Video	external 12" amber or green
Resolution	720 x 350 text, 640 x 200 graphics
Interfaces	RF modulator, composite video, light pen, RGB, parallel, serial
Disk drives	1/2 height 5 1/4": 360Kb floppy, 1.2Mb floppy/20/30/40/70Mb hard disk
Operating system	MS-DOS 3.1 Xenix
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Interfaces	RS 232, parallel
Disk drives	Centronics 360Kb floppy, 1.2Mb floppy, 20 & 40Mb Winchester up to 256Mb
Operating system	MS-DOS 3.1
Prices	\$6677.00 (excl. GST) basic unit; \$5501.00 (excl. GST) Kitset
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ROM	8Kb
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Video	7" monochrome
Resolution	480 x 200
Interfaces	Centronics, up to 4 RS-232, video display
Disk drives	single 3 1/2" micro-disk 720Kb built-in
Other components	customer receipt printer, cash-drawer interface
Operating system	MS-DOS V1.25
Bundled software	CDP retail manager V1.3.0.
Price	\$6858.50
Agents	Canon Data Products

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Processor	80286, 6/8MHz
RAM	256Kb exp. to 640Kb
ROM	32Kb
Keyboard	84 key qwerty, 10 function keys
Video	internal 9" amber
Resolution	720 x 350 text, 640 x 200 graphics
Interfaces	RF modulator, composite video, light pen, RGB, parallel, serial
Disk drives	1/3 height 5 1/4": 360 floppy, 1.2Mb floppy/10/20Mb hard disk
Other components	triple shock mounting of drives
Operating system	MS-DOS 3.1
Price	from \$7000.00
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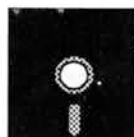
Processor	Intel 8088, 4.77MHz
RAM	512Kb
ROM	64Kb
Keyboard	New 101-Key Design; 12 function keys
Video	mono, colour or ECD
Resolution	mono: 640 x 350; colour: 640 x 200; enhanced colour: 640 x 350
Interfaces	serial and parallel 360Kb 720Kb
Disk drives	20Mb fixed disk; 1 x 5¼"; optional 3½"
Other components	8 expansion slots
Operating system	DOS 3.10 or higher
Price	\$7235.00 (with mono display)
Expansions	extra 5.25" or 3.5" diskette, extra 128Kb to 640Kb
Agents	Powercorp Group Ltd.

**OLIVETTI M24 SP**

Processor	8086, 10MHz
RAM	640Kb
ROM	16Kb
Keyboard	industry standard, or Olivetti with detached numeric keypad
Video	green, amber or colour
Resolution	640 x 400
Interfaces	serial, parallel, mouse
Disk drives	360Kb FDD, all sizes of HDU
Operating system	MS-DOS
Price	\$7623.00, with 20Mb HDU, 640Kb standard
Agents	Olivetti

**CANON A200II**

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ROM	16Kb
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Video	green on black mono, or colour with tilt/swivel
Resolution	640 x 400 mono
Interfaces	serial, parallel
Disk drives	2 x 360Kb, or 20Mb hard disk
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EGA: the new video standard?

by Bennie Gunn

There are veterans in the industry who can dimly remember a format battle which arose over British TV when their trusty but aged poor-performing 405-line transmission system was assailed by a brash newcomer – the 625-line PAL system. Just as when the horse was confronted with the motor car two generations earlier, the outcome was a foregone conclusion: technology always wins.

And so when IBM created its 200-line color standard when introducing the IBM PC, its Color Graphics Adaptor (CGA) was gradually included in all industry colour software because there was no other – despite the grainy poor definition, diagonal lines which looked like staircases and screen characters which appeared as if dissected with a paint scraper.

The only refuge for graphics and CAD was in 348-line monographics, dominated by Hercules and then its many clones. The recent demand for colour, to identify separate layers in CAD programs like AutoCad without sacrificing definition, has led to a nightmare for dealers trying to configure conflicting drivers, graphics boards and screens.

IBM itself announced an upgraded color system, the Enhanced Graphics Adaptor (EGA) in September 1984, not as a new standard, but as a higher-priced alternative to the 200-line CGA in the PC, XT and AT. Two factors triggered what is becoming widely accepted as the new standard – the emergence of ten US manufacturers and many more in Asia with their own IBM-compatible EGA boards; and the development by American company Chip & Technologies of an outstanding CHIPSet for EGA boards, which

offered manufacturers a price/performance ratio unbeatable even by IBM itself.

The sudden flood of EGA boards prompted what is now almost universal support by software houses, whose offerings so often include drivers for EGA, that a further wave of manufacturers now offer EGA cards from USA, Taiwan, Hong Kong and elsewhere.

How good is EGA?

Technically, the EGA standard is neither especially innovative nor the last word in colour graphics. Its 350-line output can be bettered by 400-line systems, or by the 1000-line and above combination card-monitors whose price is far beyond the reach even of most commercial users. One exception is the EGA Multi-Res board from STB Systems, Texas USA, which displays 350-line information on a 400-line screen (such as the Roland CD-240), thus providing the best of both worlds – very high resolution, and wide software compatibility within both EGA and CGA.

For most PC users, EGA is the best choice for colour, despite its higher cost over CGA for both card and monitor. The ability of new-generation EGA cards to emulate CGA and monographics standards as well as EGA will tend to make them a popular choice.

Comparing EGA with CGA

There are 12 video modes supported by IBM's EGA, and how they look on the screen depends on how much video memory is installed on the board (the STB EGA board has 256K RAM) and how good is the monitor attached. Connecting a monochrome monitor will give two video modes: mode 7 which is the same as the text mode on an IBM text

board; and mode 15 which is similar to a Hercules graphics mode. If you connect a CGA-type monitor (jumpers on the board may need to be changed) then you get 9 modes on tap, most giving similar results to a CGA board but without the flicker during scrolling. Also, modes 15 and 16 become available with the same resolution as modes 5 and 6 but with 16 colors.

But using the EGA with a 350- or better still, a suitable 400-line monitor will show it at its best. Text display shows the obvious improvement: the grainy 8 x 8-character box is replaced by a 14 x 8-character box in which the characters are completely filled and sharp-edged.

The new generation of EGA boards offers a much wider number of display options than EGA alone. STB's EGA Multi-Res, for example, will display incoming 350-line information on 400-line (with 25kHz horizontal scan rate) monitors. It can switch instead to a normal 200-line RGB monitor (with 15.75 kHz horizontal scan) or a TTL monochrome screen (IBM standard), or a multi-sync colour screen. Likewise, the input mode can be switched between EGA, mono, CGA, and changed between 40 and 80-column in any setting. Such a board is ideal where a first-time user wants to defer higher outlay on a very-hi-res screen.

BIOS: the heart of the EGA

Though most EGA cards use the EGA CHIPSet, they are by no means all the same. Apart from hardware compatibility, the board maker must provide software interface through a BIOS (Basic Input Output System), which is encased in a ROM chip on the EGA board. The BIOS has three

(Continued on page 78)

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INDEX TO BITS & BYTES

Volume Four: September 1985 – August 1986

This index to the fourth volume of Bits & Bytes alphabetically lists topics and cross-references with their issue number followed by the page number. Analog ports, for example, are in issue number 11, starting on page 50.

The key to Volume Four issue numbers is as follows:

1985: September's issue is no. 1, October no. 2,

November no. 3, December no. 4.

1986: January/February no. 5, March no. 6, April

no. 7, May no. 8, June no. 9, July no. 10, August no. 11.

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Our thanks to Gerald Fowler, a long-time subscriber to Bits & Bytes and professional indexer, who prepared this index.

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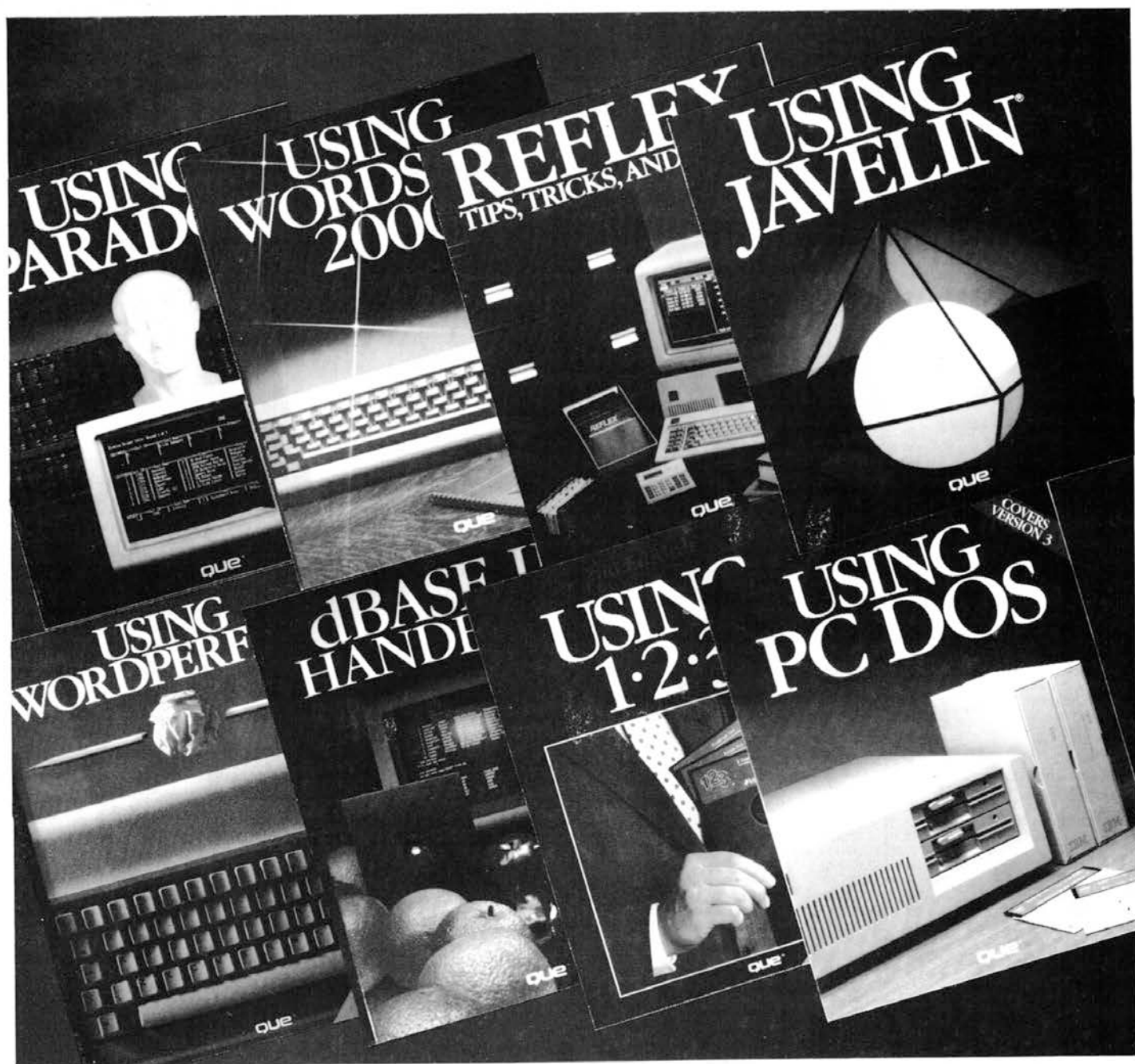
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Assorted notes

by Joe Colquitt

This month I'm taking the opportunity to tie up a few loose ends that have appeared recently.

The first concerns the GEOS continuum. Latest word from Commodore is that a Riteman driver is available through local Commodore dealers, to whom further enquiries should be directed. Price for the driver disk is \$15. Those inclined to try may like to have a go at changing the secondary address sent by the Commodore driver, which is where the problem lies. Experiment on a copy though, eh?

Next is the subject of interfacing musical keyboards and computers. This is an area that is taking off, offering musicians (and would-be musicians) the sort of control previously unattainable with such ease.

When talking about instrument-computer interfaces, you're really talking MIDI, Musical Instrument Digital Interface. As the name implies, an instrument goes in one end, and a computer in the other. The instrument does not necessarily have to be a keyboard. By using an ADC (analog-digital converter), any instrument at all can be used with MIDI, such as guitar, pick-up, microphone etc.

MIDI also allows communication between keyboards, with no computer involved. This allows one person to play several keyboards simultaneously. Now I come to think of it, I've seen concerts where a keyboardist has a bank of keyboards but doesn't physically play all of them. I can only assume that in at least some cases MIDI is being used to link them back to a master keyboard.

MIDI is not an interface in the usual

sense. It is instead a set of minimum technical specifications required for compatibility. This allows individuals to create hardware/software that falls within a range, but still permits a degree of inventiveness. Thus various manufacturers of computers and instruments have included MIDI in their products, primarily resulting in dedicated musical devices compatible with other manufacturers' devices. These are unable to be used for general computing, and are intended for professional/performing musicians.

Most people reading this would be in a position of either having a computer, or a computer and keyboard (or other instrument). If you're in the first category, there are several pieces of equipment required to create a MIDI set-up. You'll need a keyboard, of course. Many late-model keyboards have a MIDI converter built-in. It takes the organ's signal and outputs it in a form that can be read by the actual MIDI interface. The MIDI interface itself connects to the computer.

Then you'll need a software package for your computer. On the C64, MIDI (containing MIDI out/in ports) plugs into the cartridge port, and connecting cables run to synthesizers, drum machines or whatever. Signals can be sent to control notes, attack/decay (per note or per passage), sustain, pitch bend etc etc etc.

Those with a computer and keyboard are a step closer. As mentioned above, recent keyboards generally have MIDI conversion installed. If yours doesn't, it is possible to have it fitted. Again you'll need the MIDI interface and software.

I've done a little research into the

local market. Dealer enquiries reveal that MIDI is available for common computers, and the complexity and sophistication of musical arrangements depend largely on the memory capacity of the host computer. For example, a BBC can't store the number of sequences and combinations that an IBM could, although the quality of music production is the same, if used with the same keyboard.

Paul Clayton, a local performing musician, uses an IBM PC, MPU401, MIFPC card and Personal Composer, for which he is the agent. This allows 32 tracks, 16 channels, thousands of notes storage and the combinations thereof. The choice of software is dependent on your machine, your needs, and the depth of your pocket. The lower end of the software market is around \$200.

On the hardware front, I came across several units that are regarded with some enthusiasm: the Roland MPU401 intelligent interface, the Yamaha MSX package, and units by Korg, Moog and Sequential Circuits (makers of the superlative Prophet 5). The MPU401 will interface to all common computers with appropriate software (with card if needed), and has excellent performance and multiplexing capabilities.

The Yamaha system is slightly different. It's a 32k MSX computer (which can be used for usual computer functions) packaged with a keyboard and full MIDI. A 128k version is due for release. Also built-in is a comprehensive digital synthesiser, similar to a DX9 organ. The Atari ST has MIDI installed, as well as the new Apple GS.

To sum up, the best advice I can give is to have a think about what you need and contact your local computer/music dealers. Many thanks to the Roland Corporation (Auckland), John Walker Music (Papakura), Paul Clayton (Auckland), and the sales staff of various computer companies.

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For tidy directories

Dear Sir,

I have a tip for most computer owners who like to have listings of all their disk directories. I have about 30 disks and, as many of you will know, it takes about 15 pages to print them all out. However, it is worthwhile to keep an updated record of what program is on which disks, and how much room is left on each. But this can take up a lot of time – and paper.

A clear, compact way of keeping all these directories together is to use a word processor. The following instructions should be a big help for people who like everything neat and tidy. The specific commands refer to Easy Script with the Commodore 64, but they can easily be adapted to most programs and computers:

1. Boot up your word processor.

2. If your printer has compressed mode, then send the relevant commands eg F3/1=15 and F1/↑/F1/1 (this outputs CHR\$(15)). F1< also turns condensed mode on, while F3 LS 8, 10 or 12 sets 8, 10 or 12 lines/inch, thus condensing print vertically.
3. Load the first directory as a file, eg F4/+\$.
4. Change to uppercase if desired, eg F1/U.
5. Print this out (F1/O/P). The directory should appear compressed on the left side of the page.
6. Erase the directory from memory, load the next directory, and change case.
7. Set the left margin to 34, eg F3/LM34.
8. Wind the paper back to the top of the page (where the first directory was printed).
9. Print this out. This time the directory should appear just next to the first with a few spaces between.

10. Repeat steps 6-9 but change the left margin setting to 67 and then 100 (and further if your printer has more columns). There should now be four directories side by side across the page. That's a saving in paper of 75 percent!
11. To print out more directories, wind the paper to the bottom of the longest listing and repeat the process, or you can "fill in" any gaps with more listings. Now you have all your directories on just a few pages, and it is much easier to find the program you want.

This technique is also useful if you have some disks which contain lots of files which appear in the directory but cannot be loaded – with a wordprocessor you can easily delete the files you don't want printed. You can also add notes to the header or program names like ",8,1" or "error!". Have fun.

Marcus McLaren
Wellington

Peripherals and software

Dear Sir,

If your correspondent R.K. Larsen of Otorohanga cares to write to me, I can help him with his questions about Atari peripherals and software programs. However, I expect he will find a user group closer to home.

Like many others, I used to think that the Atari was only a games machine and not a real computer, but how wrong we were. It certainly is an excellent games machine, but it is also one of the best 8-bit computers currently available.

I am surprised that Atari has not taken off in NZ to the same extent as

Commodore and Amstrad. The machines seem to be similar in capability and I can only assume that the marketing strategy was different. A comparison of the three would be interesting, and I believe that perhaps the Atari with its RAMdisc capability and the additional GTIA (graphics), ANTIC (sprites) and POKEY (sound) chips may just have the edge on the others. Certainly it has the edge price-wise and seems the best buy.

I started off with a Dick Smith VZ200 which wasn't a bad idea in that it was cheap and gave me a good grounding in what to look for when I upgraded. The most important lesson was that before buying any computer you must check the extent of both software and hardware available. Differences between machines are less important than backup.

There is literally a mountain of software available for Atari, although it is not easily found in NZ. Most of it is in the USA with some very good programs now coming from England, but one must go to an overseas publication to find it. Fortunately it is easy enough to import.

I have had my 130 XE only since last February, but have accumulated a fair selection of software already. My main interests are in databases, graphics and printing and I get a lot of use out of the Print Shop programme which prints personalised greeting cards, letterheads, posters and banners etc. Like Mr Larsen I also have a Star Genesis printer.

There are plenty of other graphic

printing and artwork programs available, and many word processors. I use the Atariwriter cartridge but find the 40-col display a nuisance so I have sent away for another W/P program with an 80-column display. I have also sent for an Atari mouse called a "Super Rat" which promises programs with pull-down menus like the Macintosh, and outstanding graphics control down to individual pixels.

Another interesting and useful programme is the Music Constructor Set which among other things allows you to write music by placing notes and other musical notation onto blank staves where it can be played using combinations of the four Atari "voices". The music can be easily transposed into any other key which shifts all the notes and places the sharps or flats automatically. The finished music can be saved to disk and printed out if you wish. There is another music programme available which will do all that and also print the words of songs in the right places as well.

I read that Atari has just released a 10Mb hard disc for the 8-bit machine which really moves it up a class. That would certainly run a small business and at a very competitive cost.

We now have enough people to start a small user group in this area and I would like to hear from any other groups who may read your columns.

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A slightly different perspective

Pip Forer, in the December issue of *Bits & Bytes*, has made many very pertinent points about educational computing, and the reasons for the current "slump".

As one of the pioneers of educational computing who have left the school system, I should like to add one or two thoughts, particularly from the software point of view. This reflects my personal experiences – forgive the first person nature of this letter.

A computer system has three components – hardware, software and user. Each of these has suffered from the stop-gap, *ad-hoc* nature of developments of computer education.

The difficulties in provision of hardware are well outlined in Pip's article. I would only add that pressure groups played a very large part in many unwise purchase decisions. The pressure from manufacturers was, and is, intense and unhelpful. When I was responsible for purchase decisions I was frequently approached by salespeople. In the end, to save time I would listen until the salesperson made his first mistake or told his first lie.

Unfortunately not all teachers, and not all school committees, were as well informed as I was lucky enough to be. There is also too often a desire to maximise the number of keyboards possible, regardless of their quality and the software available to run on them.

The training of teachers is a major exercise which has not been properly addressed. But in this we find a chicken and egg situation. Which comes first – the provision of the software or the training of the teachers? The teachers don't want to know, and who can blame them, until the software is available. The software won't be produced until teachers are there who will use and buy it.

The major problem in educational computing is the provision of software. There are five reasons for the dearth of software currently used in schools:

- the variety of hardware.
- the variety of approaches adopted by teachers.
- the appallingly low standard of a lot of the educational software initially (still?) offered.
- the piracy of software, which rapidly destroyed much of a market for developers.
- the difficulty in producing good software.

For my sins I have written a large amount of educational software. Not all is very good, but some is in regular use in many schools. But this writing takes time and skill. Much educa-

tional software developed in schools will fail as soon as a pupil makes a typing error. Some of the programs I have seen will not even accept lower and upper case letters. Poor software has been counter-productive, in that it has put off many teachers.

It is well known what makes a good program for use in schools. However, few teachers have the expertise to develop them. Those with the expertise have often volunteered the time, but the education system could not exist forever on the goodwill and hard work of a few.

Of course many teachers do not appreciate the effort required. In the last major program I wrote while a schoolteacher, I included several hundred lines of code to ensure that typing errors and invalid choices were handled in a user-friendly manner. The teachers who used the program didn't even notice them! They assumed it was natural that if a user were asked for a Yes/No answer, pressing the "P"-key didn't crash the program; and the "YES" and "yes" were equally acceptable. This level of programming isn't common in schools; but is a *sine qua non* outside of them.

Few schools were prepared to pay meaningful amounts for software; and if you can't afford the software you can't really justify the hardware, can you? There are two ways of paying teachers – with money and with time. I remember being offered three days to develop a particular package for the Education Department. It took the equivalent of 10 days' full time work. The other seven came from my family. Another project, for which I

was paid in money, returned something like 50¢ per hour. How many professionals in other fields would work for that?

Teacher-programmers need to be rewarded and given time to write programs. No training has ever been addressed to programmer-teachers that I am aware of. The approach of the department has been always to avoid programming by teachers. A good idea, if what is needed can be found elsewhere; but short-sighted if it cannot.

The Computer Courseware Department Unit was given an impossible task, accompanied by totally unrealistic expectations by teachers. I admire the CCDU people immensely. They have persevered and done an incredible amount of good work in the amount of time available. They have put up with amazing pressures and coped with the flack. Many things which they have started they have not been able to follow up, for reasons of personnel or finance or time restrictions. The Department of Education has paid only lip service to the field of computing.

I have a list of about 50 programs which should have been available to schools by now. Few are. Until the software problems are overcome, computing in schools will remain in the Slough of Despond Pip Forer described. Computers can be an important, useful, effective educational medium. What a pity that at present they are under-utilised and playthings.

Gordon Findlay Christchurch

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A primary perspective

by John Buchanan

Pip Forer in the December issue of *Bits & Bytes* refers to Educational Computing in New Zealand as being in the "Slough of Despond". Mr Forer followed this up with the question, "Is this a fair reflection on computers in education in New Zealand and if so, why?"

While agreeing with Mr Forer's comments throughout the article, I feel that the perspective he gives is rather more secondary based than primary. In this article I would like to share some of my observations and experience of educational computing from the latter perspective, and to look at the very exciting aspects that I have observed around the Auckland region in the past two years.

To answer his question one needs to look at what has happened to educational computing since the "heady progress in the secondary sector from 1982 onwards."

One important factor seems to have been overlooked by Mr Forer. Primary school teachers have become involved in the use of computers in their classrooms. Notice I did not say that primary school teachers have begun to teach about computers. Hopefully that short phase we all went through is rapidly disappearing from the primary scene. In its place we have teachers using the machine to enhance the normal class programme and to enrich the classroom experiences and learning of the children.

The emphasis in primary schools is moving very quickly away from the idea of the computer being something special, to be treated with awe and reverence and used only by those who are "experts". Instead in many schools it has become another very powerful tool to be used by all the staff where appropriate, to motivate and stimulate whole class language, social studies, maths, music and many other curriculum areas.

Some examples of this are to be seen all around New Zealand. In a small country school on the Hauraki Plains one of the staff uses the computer to provide an accompaniment for the school recorder group. The teacher simply inputs into the programme the note values and pitch and duration straight from the written music and then the children have the added attraction of full accompaniment during their classes. In the next classroom the children are typing their stories into a very child-friendly word processor. Child-friendly, because the word processor has a built in dictionary as well as the capacity for the teacher and children

to construct their own user dictionary. The children have the ability and desire to turn out interesting stories neatly presented for all to read.

At a West Auckland primary school the children from the special unit are using simple games to develop hand-eye co-ordination. The children are asked to press a key when the number of letter comes up on the screen. A simple enough task for the ordinary child, but a skill that needs to be learnt by children who find it difficult to relate the brain's message to the action of the hand.

At several Cerebral Palsy schools around New Zealand, computers are being used in conjunction with wands and touch pads to enable children to communicate with their teachers and with each other in a more meaningful way.

One of the latest uses of computers in education is just starting here, being the use of computers in communication with other schools around New Zealand and in some cases around the world. Children seem to be really motivated to write about themselves and their school and district in a way not seen since the days of pen-pals. The idea of being able to quickly send a letter or magazine electronically to anywhere in the world and receive a reply very quickly seems to have motivated both staff and children.

So I could go on. The examples I have given are really just a small sample of what is really happening out in our primary schools all over New Zealand. I asked several distributors about their sales for the past year, and all have said that primary schools are buying more computers than ever before.

Let me now whole-heartedly endorse Mr Forer's comments where he talks about the "tremendous lack of in-depth, in-service training".

At the Auckland College of Education, teachers in training get a basic 12-hour introduction to the use of computers in education. An option in the third year allows some a 50-hour course. Although the latter is to be applauded, it should be the basic course for all rather than an option. However, there is a more serious problem to confront.

At a Teachers' Refresher Course held in January 1985 at the Auckland Secondary Teachers' College (now the Auckland College of Education), Tony Hunt, lecturer in educational computing, Stuart Hale, then a primary teacher at Mt Eden Normal and now at the Auckland College of Education, and I discussed the possibility

of running after-school classes for primary teachers as an introduction to the use of computers in the primary classroom. We thought we might get about 20 or so interested teachers.

The response was unexpected. The course had to be closed at 30 after a week and we opened up another night of the week as well. Since then we have been running courses every term, sometimes twice a term. During the two years they have been available, we have introduced well over 100 primary teachers to the use of computers in the classroom.

The effect of this has been a dramatic rise in the number of teachers who have at least had some hands-on training. The course of eight hours spread over four weeks is a minimal amount of time to train teachers in the use of computers in education, but it has been enough to inspire a large number to go and try out things themselves.

These courses were done in our own time and at our instigation. I feel the time has come for the Department of Education to start to make in-service time available to every school for the training of resource teachers, and to the appointment of an advisor in each local Education Board area, whose job it would be to set up teacher release courses, to advise school committees and principals, and to do the numerous other activities at present being done by Mr Forer's "pioneers".

Where does the use of computers in the primary area of our education system go from here? Not, I hope, into the Slough of Despond, for as it is described by Bunyan in *The Pilgrim's Progress* it is "such a place as cannot be mended: it is the descent whither the scum and filth that attend conviction for sin doth continually run". Not, I hope, the future for all teachers using computers in their classrooms to look forward to.

I think we should take heed of the issues raised in Mr Forer's article. They are real and they are issues that must be dealt with. Perhaps in some areas of this new technology we are going through a consolidation period where the initial tide of enthusiasm has waned slightly. In the primary area I feel we are still in the exciting stage of a tide that is yet to peak.

Let's hope that we can learn from the experiences that have taken place in other areas of computer education in New Zealand and avoid the problems mentioned by Mr Forer. Perhaps then we shall all reach the "Enchanted Ground" spoken of by Bunyan.

The WAN, WAN world

by Pip Forer

Telecommunications have made only a limited impact so far in schools in New Zealand. The UK has fostered a scheme to put a modem in every school, so as to let schools communicate with each other and with remote databases. In Australia various schemes have been proposed to ensure all schools have access to telecommunications. One proposal suggests that the data collection aspect of any Australian 'Domesday' project would use modems connected nationally to a single integrating mainframe.

However, in New Zealand the use of modems in education has been very limited, and has generally occurred through individual modems attached to single machines. Although the BBC was planned with its own modem add-on, and the Master has an internally fittable one, the vanguard of BBC users with telecommunications capabilities is still pretty small.

There are many benefits claimed for using computer-based communications, the main ones being access to data bases and bulletin boards (on remote computers) and access to electronic mail. The former increases the resources directly available at a site and the latter gives fast and cheap contact with other schools or users. Costs for a single 'letter' can be a fraction of those of a traditional letter, and the time between dispatch and response can be only a few minutes, even if you are writing to a primary school in Truro or Washington, or a colleague in Oslo or Murmansk. In New Zealand university researchers, for instance, send working notes to each other that arrive within seconds and cost, all up, perhaps a third of a postage stamp.

The key to the explosion of services in this area has been the introduction of 'packet switching' by various post office and telecommunications agencies around the world. Packet switching lets individuals shoot small parcels of information from their 'address' to another 'address'. It allows digital information to be automatically packaged and transmitted with little demands on the users themselves, without any dedicated lines and at low cost. All users have the opportunity to communicate with other users, and the result is a very diffuse and powerful network, a Wide Area Network or WAN.

In New Zealand, and in about 50 other countries, the protocol used for these operations is called X25. Furthermore, on X25 networks a group of

standards known as the 'Coloured Books' form a significant software base for electronic mail, so making it relatively easy for groups to work on a common basis. In addition all consenting X25 networks can communicate with each other if tied in to the public telecomms system in their country. The national nets are linked, so that what one ends up with is a near global network (a GAN perhaps?).

The world is now your oyster, which is where the X25 Gateway comes in. The Gateway is a newly released Acorn product for hanging Econet systems onto the great web of X25 networks. At present the normal way to use package switching from your stand-alone micro requires a dedicated data link, a dedicated modem and, usually, access to a mainframe or mini computer that is running an electronic mail service or a data base. All rather messy and inflexible.

The X25 Gateway is a device that can be hung on to any Econet network and allows access to the wide world of the packet switching network. It supports the widely used Coloured Book protocols for mail (at blue book and yellow book levels). Any Econet station (Model B, Master, Cambridge Workstation) can use it so long as fitted with an X25 Terminal ROM. Best of all, up to 16 users can simultaneously access the outside world. No need for multiple modems or multiple data lines.

From the closed world of the school micro lab and subject machines the X25 Gateway unfolds a global perspective, just like a lotus bud opening. The Gateway has the links, the basic mail software, the terminal emulation capacity for linking to mainframes and even software for transferring files between users.

Here, surely, is another string to the bow of educational networking: the capability for flexible and easy wide area networking. True, at present the Gateway poses various questions: cost of the unit (not yet available in \$NZ), local approval, worst of all how a school budgets the 35 cents for Tui's letter from Whangapoua to Sean in Belfast.

The technological solution is the easy part. But soon progress has to be made on these issues as NZ education catches up and begins to appreciate the importance of Information Technology and Telecommunications links in school computing. When it does, products like the

X25 Gateway will become commonplace.

A couple of bloopers

Two problems to publicise. The first is a small error in the Econet hard disk archiving software. If you try and save files that have been created between two dates the logic does not always work perfectly, i.e. not all the expected files may be saved. It is the sort of slip that you only notice the one time in a hundred when you really need the archived copies. Barsons have circulated the fix, so be sure you've got it.

The other bug concerns the operation of closing files on the Master series. As you probably know you must always CLOSE any disk file to which you have been writing. This operation deallocates the channel number and saves any recent changes from the buffer in the file system workspace memory back to the disk. If you don't CLOSE then these last changes get lost; very annoying when you are editing and updating a file for instance.

Now files must be individually opened, but there are various options for multiple closing of all OPEN files. In BASIC this is done with CLOSE#0. On the Master there are also two operating system calls that are useful: *CLOSE and *SHUT. These work from any language environment. *CLOSE is the same as CLOSE#0, but *SHUT closes open files on all filing systems.

The bug is that on the Master 128 these universal closing commands do not work under DFS (they are fine under ADFS and NFS). The commands deallocate the channel associated with the file, so all appears to be well, but the update from memory fails to occur. The cure is simple: CLOSE all files individually under DFS (for instance CLOSE#F). However, if your favourite piece of software acts oddly on a 128, it may be that it uses a universal CLOSE and is suffering from this complaint.

No more secrets

A few discrete words just within my earshot indicate that spilling the beans on network calls has stirred up a hornet's nest in one or two networks. Point taken, and silence will be maintained.

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Using dBASE II Carl Townsend

Organizes the material in a format that is easy to follow for those new to database programs. Using dBASE II does pay careful attention to the order of learning this system. There's plenty of information to get one started, and the book should provide a solid foundation for later reading on the subject.

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major functions:

- It initialises the EGA board by programming the registers on power-up or when rebooting, or when a program changes video modes.
- It establishes a high-level interface to let other programs use EGA. Many of the interrupt 10 function calls are compatible with system-board BIOS on the IBM monochrome adaptor and CGA.
- It includes the fonts used for character display. Both the monochrome card and the CGA have text fonts stored in ROM on their board, but the EGA has no on-board font, and must load from memory onto the board.

The EGA BIOS is 16Kb long, which is twice the size of the whole BIOS for a PC or XT. The good reasons for this are too long to explore here.

Because the EGA standard was provided by IBM, and has been embraced almost industry-wide, it might be assumed that it will run on any near-IBM machine.

Not so. Immediately on start-up, the BIOS of the machine and the BIOS of the EGA card approach each other, rather like two dogs, to check each other out. The machine BIOS is looking for the magic letters 'IBM' and will find them thoughtfully provided even in non-IBM boards. It should then give way to the EGA BIOS to continue.

If this does not happen, then the computer will either produce garbage on the screen, or refuse to boot at all. Dip-switching on the card (not the system board) may overcome this, but a major problem could require a BIOS change. Distributors of clones will be aware of any such problems arising with their particular machines.

If there is any doubt, it is better to try it out first, especially with slightly older machines.

A superb IBM-format program from McConnell Scientific is typical of those which show the dynamic colours and clean scrolling and needle-sharp definition possible with the EGA/400-line monitor combination, ensuring that any viewer will never again be happy with any lesser standard! The same board/monitor combination performs superbly under WINDOWS, whose friendly environment wins new converts every day.

The new gate-array technology is at last making some sense out of the confusion over video/graphics standards. Two cards from STB using this technology will between them display any of the standards commonly in use in this country, on any monitor. Of all the standards, with market share of 30 per cent projected for 1987, EGA is undoubtedly the fastest growing.

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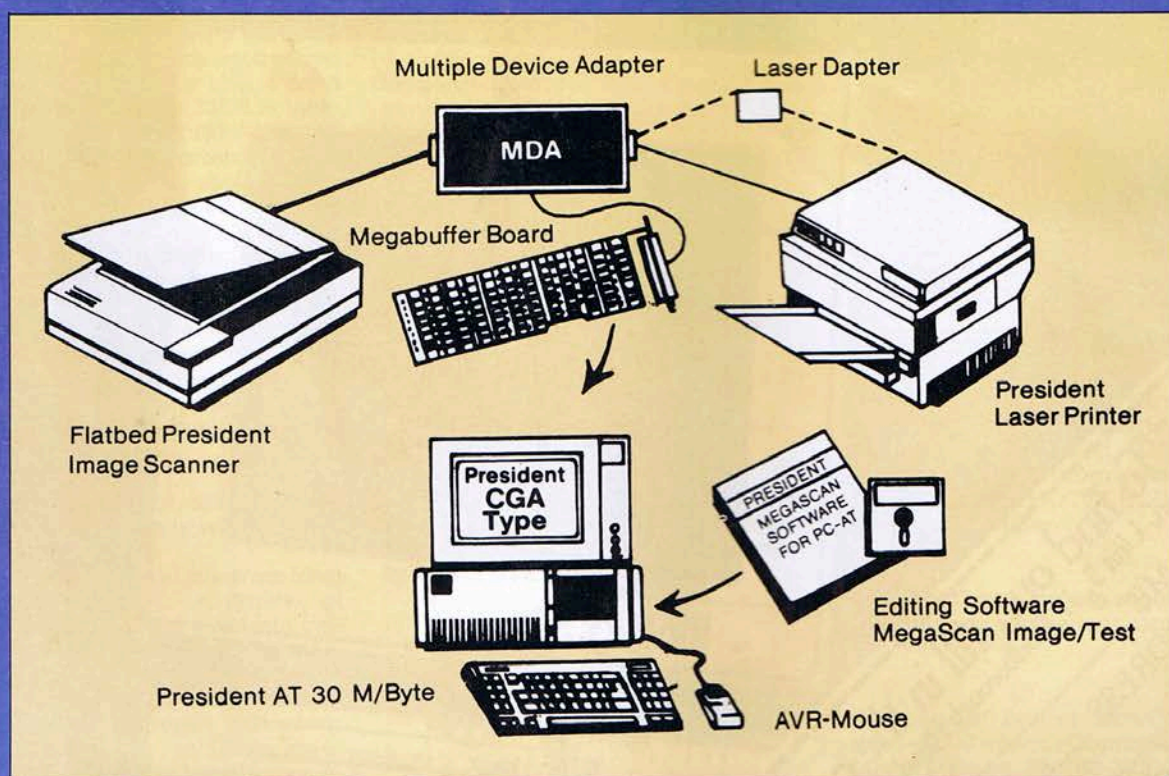
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