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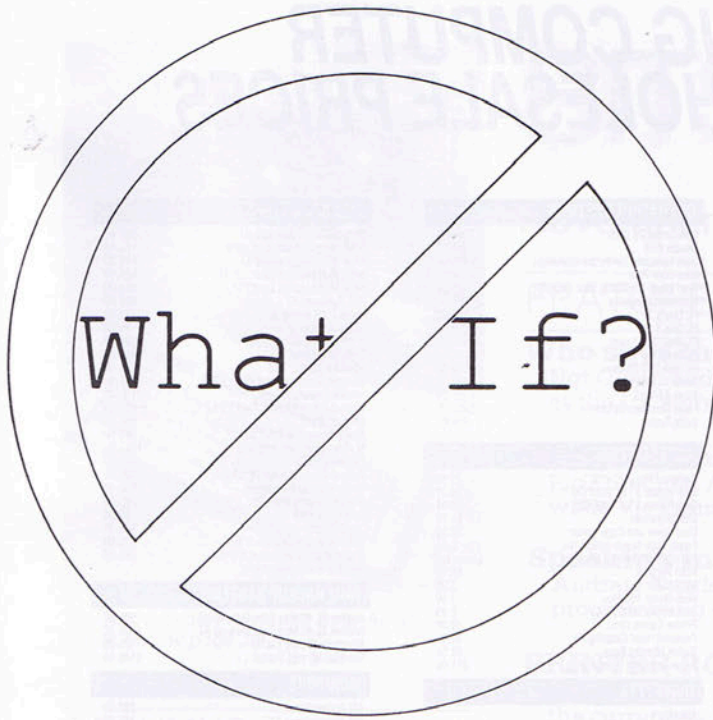
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The Archimedes, the latest from Acorn.  
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# BITS & BYTES

November 1987 Vol. 6 No. 3

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Pip Forer and Ann Frampton report on the NZCES conference while Vic Francis asks somebody for his principal observations.

- Speaking in tongues** 33  
Andrew Tearle takes a not very serious look at one programming environment.

- PRINTER ROUNDUP Part 3 – \$5,000 and over** 49  
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## Firmly in the PC market

In announcing several new products in its PC range in Auckland recently, Hewlett-Packard affirmed its commitment in the field and said that its business had grown "threefold in the PC area in the past 18 months."

International sales and support manager Robert Langerman pointed out that 12 new products — five terminals, two portables and five new desktop machines — had been introduced since August. The company was following both current and future standards, still offering 5.25-inch floppy disk drives as standard on its

PCs (apart from the Portable Vectra) but with 3.5-inch drives optional. HP had a licence agreement with Microsoft to use OS/2 — when it arrived, which was still well in the future.

"We see portables as an alternative to desktop PCs," said Langerman, "so they have full-function keyboards." A version with 20Mb hard disk is being marketed, still truly portable with battery power but only for short periods.

Top of the range is the Vectra RS/20, a 20MHz 80386 machine designed for the 25MHz chip when it becomes available. It comes with 2Mb RAM, up to 310Mb of hard disk drive, and six half-height data storage shelves.

Also new from HP are two new printers. The PaintJet colour graphics

printer, aimed at the business, technical and CAD market with a need for text, graphics and colour on the same machine, produces 180 by 180 dpi resolution and NLQ text at 167 cps. Two disposable cartridges hold the four ink colours — black, yellow, magenta and cyan which combine to make 330 different shades and hues — and nozzles and printing elements.

The company's first 24-wire dot-matrix printer, the RuggedWriter 480, works at up to 480 cps in draft mode and 240 cps for LQ and is aimed at the heavy-duty multiple-application area. Its low noise level of 56 dBA is achieved mainly through sound deadening inside the casing.

## Nobel Prize

J. Georg Bednorz and K. Alex Mueller of the IBM Zurich Research Laboratory have been awarded the Nobel Prize in physics for their breakthrough discovery of high-temperature superconductivity in a new class of materials. This is the second consecutive year that IBM Research Division scientists have won the prize.

## NEC joins the 80386 ranks

The flagship of NEC's PC range is the new Powermate 386, offering a choice of full-height 66 or 130Mb hard disk, 1Mb 32-bit RAM, eight expansion slots, one parallel and two serial ports, graphics card and high-resolution screen. Two half-height slots can take a combination of tape backup unit, floppy disk drive or, in the case of the 66Mb version, an extra 20 or 40Mb hard disk.

Also from NEC come three new printers. The low-priced 24-pin P2200 Pinwriter has 27 resident fonts, built-in paper handling functions and a memory set to eliminate dip switches, and will print 360 dpi at 60 cps in LQ mode or 168 cps in draft mode. Offering PostScript page description interpreter, 3Mb memory, 35 resident fonts and several interfaces and emulations, and aimed squarely at the desktop publishing field is the LC-890 LED printer, while the LC-860/866 adds graphics capabilities to the existing LC-815/850 text-only LED models.

## NEXT MONTH

- **Buyer's Guide** — PCs under \$3000.
- **Games People Play** — Real computer people don't play games — or do they?
- **The Right Connections** — there's a right and a wrong way to plug in. Find out how.
- **Program Special** — utilities and quests to keep you busy.
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## Trim the spikes

Sensitive chip-based electronic equipment (and the data stored in it) can be protected against mains power interference spikes with a fully-approved cord set from British company Belling Lee which comes complete with male and female IEC320 plugs and handles currents up to 6 A.

According to NZ agent Cory-Wright and Salmon Electronics, the L2145/6 spike trap at \$40 is believed to be the least expensive such device meeting the requirements of British, European, Canadian and American approval authorities. It comes complete with graphs to show its performance when typically checked to BS613:1977.

## New Lasers due soon

It's the old story – New Zealand, being at the end of the supply line, has to wait until the rest of the world is satisfied before new products appear here. One such item of hardware, the Laser XTE Compact Turbo, has been available in the US for some time, but only now are the first production examples starting to filter through here.

Coming complete with EGA and 640kb, the new Laser is portable and equipped with one 5.25-inch drive, while an external second floppy or hard disk can be connected. Two serial and one parallel ports are standard, and the base price is just under \$2,000.

## Archimedes scores twice

The Acorn BBC Archimedes, the subject of this month's cover review, has already won awards at two significant events. It topped 50 products from around the world to be

## More power for the AT box

Demonstrated recently by Systematic Solutions, the Auckland company which will be distributing the product, was the ultimate in add-on boards to make an AT or 80386-based PC rival the supercomputers in terms of raw power, usually measured in terms of MIPS (million instructions per second) or MFLOPS (millions of floating-point operations per second).

The CSA (Computer System Architects of Provo, Utah) PARTS system comprises boards containing various models of the Inmos transputer family linked to provide hitherto unheard-of speed for PCs. The English company Inmos has developed the 32-bit RISC transputer chip to operate in parallel with other transputers, apportioning part of the task to each in such a way that the speed of calculation is directly proportional to the number used.

Each runs at 10 MIPS, so

that the off-the-shelf intermediate system with five transputers on two boards to occupy two spare slots (one carries a single T414 transputer, 2Mb RAM, connections and appropriate software, while the other contains four more T414s, each with its own 256kb RAM) does 50 MIPS. By comparison, Auckland University's new IBM mainframe, about the fastest in the country, operates at 30 MIPS and costs rather more than the sample CSA's \$19,990. Or the 17-transputer model at 170 MIPS and \$54,000 rivals the Cray supercomputer costing many \$US millions.

But the new breed of multi-MIPS machine isn't suited to running your Lotus 1-2-3 or standard word processor – or even desktop publishing package – blindingly fast. Instead, it's programmed specifically for each task and used for specific commercial and scientific applications which require

the speed benefits of parallel computing, made cost-effective. The most obvious are ray-tracing (those computer-generated graphics now being seen on our television screens); CAT scanners; geophysical uses, including image-enhancement of satellite photographs and data analysis; scheduling of transport facilities and complicated personnel rosters; fault-tolerant networks; and large-scale CAD work, where engineering analysis is presently very conservative.

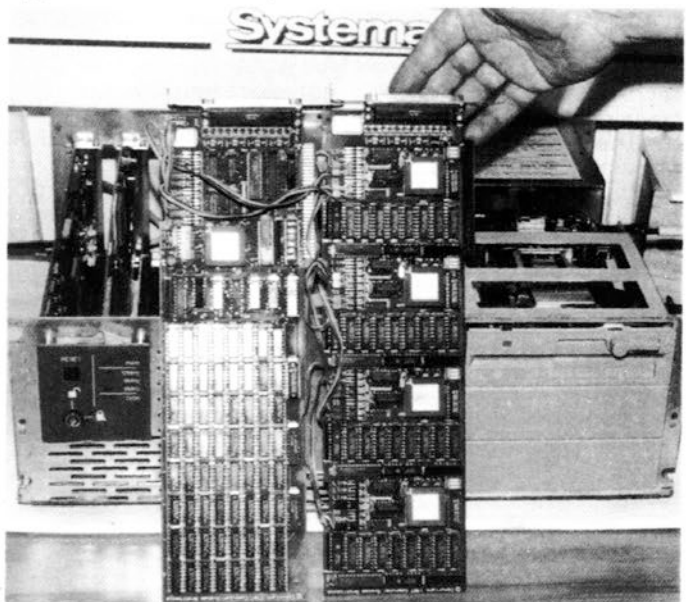
To demonstrate the speed of calculation, Grant Christie, Systematics director of systems engineering, had a standard PC/AT running the Mandelbrot Set, and at about five hours into the task it had filled perhaps half a screen with the resultant diagram. The AT with 50 MIPS worth of T414 aboard did the same thing in about 10-12 seconds.

named Best Product at Singapore Informatics '87, where the judges described it as "a major technology breakthrough" and commended it for its cost-effectiveness.

Close behind came its naming as Micro of the Year at the annual British Micro Computing Awards in London. The judges there said it was "a lovely bit of technology that has enormous potential, being able to run BBC Micro and IBM-compatible software." The Archimedes has only a limited number of 32-bit competitors in the education field, and the first shipment of production models is expected in New Zealand this month.

## Fast 24-pin from Panasonic

Due for release in New Zealand this month is Panasonic's first 24-pin dot-matrix printer, the



Supercomputer for an AT – on two add-on boards

16-inch KX-P1540 which prints in draft mode at up to 240 cps, text at 160 cps and LQ text at 80 cps. Emulation is Epson LQ1500, Diablo 630 or IBM Proprinter with font cards optional, and it features automatic cut-sheet or

envelope loading without having to remove the push-tractor fed paper.



## Appointments

Greg Magness, sales and marketing manager, has been appointed to the board of Barson Computers (NZ), joining managing director Doug Pauling as the New Zealand representatives on the board of the wholly-owned subsidiary of the publicly-listed Barson Computers (Australasia) Ltd.

Loureen Cunningham is now national sales manager for Sharp electronic typewriters in Andas Business Machines' Wellington head office. Tony Goodchild has been appointed national service manager to co-ordinate technical support and training throughout the dealer network, while David Hooper, previously with BHP in Brisbane, joins Andas as financial controller.

John Delamere (ex Concurrent Computers) is the new general manager of IGL Anitech, where he intends to increase "some aspects of Anitech which tend to have been ignored". The Zenith agency for New Zealand is continuing, despite Zenith's reported move into Australia on its own account, but the problem with the popular laptop model continues to be that of supply, with the US armed forces having ordered 90,000 units.

## Prices dropping?

In what appears to be a lone move so far, Hoskyns Group has lowered the local price of its UK-sourced management software package, Project Manager Workbench, by 18 per cent because of the strong New Zealand dollar. PMW project manager Lesley Weston says the price of the package will be reviewed constantly and the period of the reduction will depend on the performance of the kiwi dollar.

We await with bated breath similar announcements from other software distributors.

## Major Graphwriter upgrade

Lotus' package for producing and automatically updating charts created from spreadsheet or database data has had a major upgrade, and Graphwriter II is now available. A new user interface employs the familiar 1-2-3 menu and command structure, with direct links to any data source, and among other requirements are a bigger variety of and improved chart formats.

## Large-scale property management

Despite its principal's stated aversion to computers, Brierley Cromwell Property Management has chosen ICL's Property Information Management System (PIMS) to manage its portfolio of \$600 million worth of property. Initially centralised in the company's Wellington base, it will be expanded in the future to serve the Auckland and Christchurch offices.

PIMS was developed specifically for the New Zealand property management market by Coopers & Lybrand in collaboration with ICL. It runs on ICL's multi-user Clan system and can maintain separate registers of tenants, properties, assets and debtors as well as the general register, but data entered into the system will update all relevant ledgers.

## New arrival tackles the market

When a new company which specialises in the data communications field is launched, it might

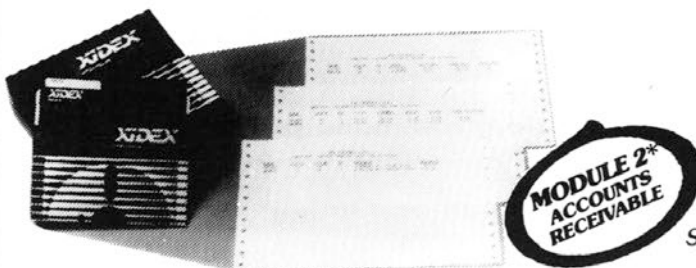
reasonably be expected to say a few things about its products. However, when Commscorp held a formation function recently at Auckland's Eden Park, guest speakers were famous rugby players Gavin Hastings and David Kirk, neither of whom made the slightest mention of either computers or communications equipment.

But while managing director Tony Hough maintained that silence, a written handout made his company's objectives clear. Commscorp has been appointed New Zealand distributor for the Australian manufacturer Scitec Communication Systems, which researches, develops, markets and maintains its own products and is said to have a 45 per cent share of the Australian market with its range of multiplexers and modems. Also, since the implementation of the digital data network in Australia, Scitec claims to have installed 80 per cent of all circuit terminations to date.

Commscorp's principal shareholders' collective experience in the data communications industry adds up to 56 years. In addition to Tony Hough, they include marketing director Dennis Millard, engineering manager Ian Harris, and Ian Gordon, Auckland sales manager.

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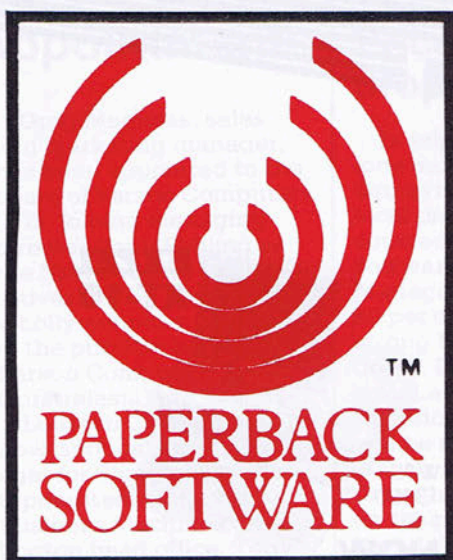
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# MENU GENERATORS: DOS Made Easier

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One nice feature of *direct access* is its ability to prompt the user to insert a blank or key disk. Batch and BASIC files must be preceded with the words BATCH and BASIC. Parameter passing is accomplished simply by entering an ampersand after the program name.

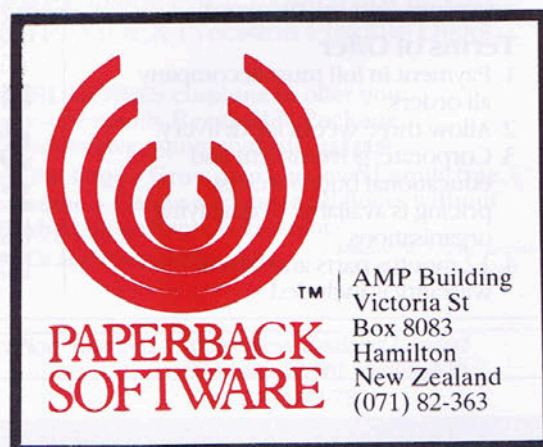
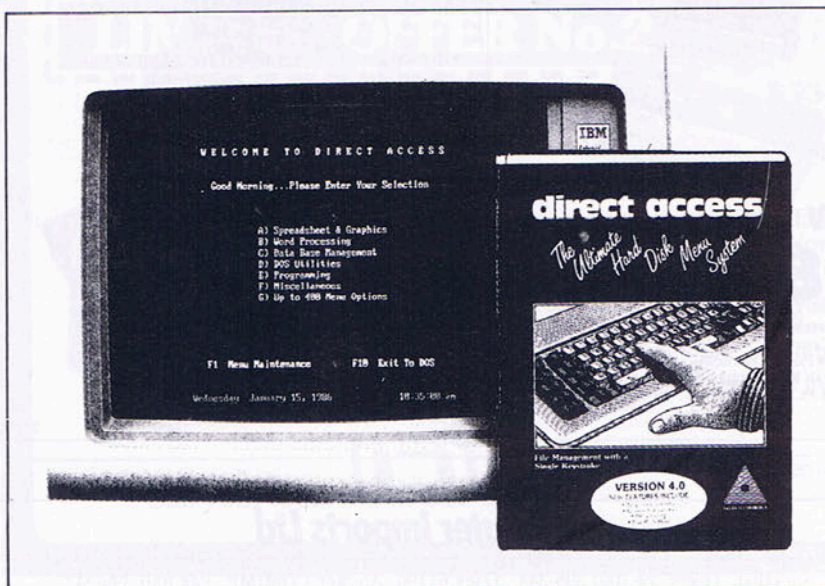
*direct access*'s greatest strength, however, is in its ability to produce usage reports for management purposes. You can generate reports with a two-level sort on such variables as user name, project number, date and time, and application name; the results of the sort can be directed to either the screen or the printer. Options are also available for deleting data with a WHERE condition on sorted fields.

Whether you need a menu system for a company-wide installation or yourself, *direct access* is the way to go.

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## Colourful DEC

A colour text terminal, the VT225, has been developed from the existing VT200 model by Digital in Australia and is now released in New Zealand, giving the opportunity to use text-only colour without paying a premium for graphics capability. According to marketing manager Roger Redfern, colour text is useful for transaction processing, complex forms or in process control in manufacturing industries.

And another introduction by DEC, available from January 1988, is a colour non-impact printer to be used with the company's range of VAX, VAXmate and MicroVAX systems and workstations, and also with PC-compatible systems under MS-DOS. Up to seven primary colours are provided at 180 by 180 dots per inch, or up to 255 colours at half that resolution, and text-only printing is at 167 characters per second.

## The plot continues

The Mutoh iP-500E A1 plotter, with ability to plot in ink, ballpoint, ceramic and pencil, has been introduced to the local market. Distributor Power-tech Engineering says the

Mutoh pencil plotting head and cartridge carousel uses standard 0.3mm and 0.5mm micro-leads, HB high polymer being recommended, with the result being indistinguishable from an ink plot.

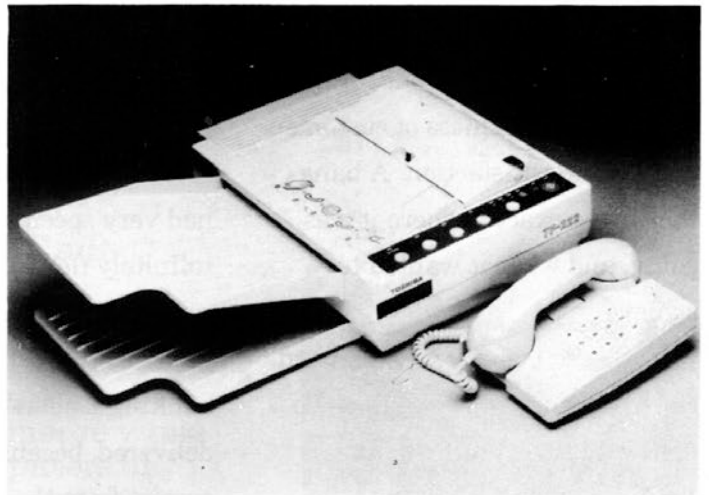
Advantages over the other forms of pen plotting are said to include speed, cost of plotting points, and the lack of ink blockages and pens drying out.

## Shades for CAD

Eagle Technology, New Zealand distributor for Autodesk products, has announced the release of Autoshade, a colour rendering program which turns 3-D AutoCAD drawings into shaded images. Among its uses is the ability to study a structure from any viewpoint under various lighting conditions, by using the colours of drawing elements in AutoCAD as the basis for colour in the finished renderings.

## First with the new

Apricot Computers has announced an OS/2 upgrade option, comprising the Microsoft Operating System/2, full documentation and a 1Mb memory module which plugs into



## Compact fax from Plessey

Described as being genuinely able to fit into an expanded briefcase with its dimensions of 297 x 375 x 105 mm and weight of 7kg is another Toshiba facsimile machine intro-

duced by Plessey Business Systems. It can transmit an A4 page in 15 seconds and has a 16-step grey scale for text and graphic transmission quality.

the motherboard of any of the five Apricot PC models. In New Zealand, the upgrade option will apply to XENi 286 and 386 PCs as long as they have sufficient memory to meet the requirements of the new operating system.

## Move over NEC?

Australian microcomputer manufacturer Peak

Pacific believes its newest model, the Osborne Turbo-Mate, will compete directly with NEC's successful Powermate range. Similar in appearance to the Powermate, the new Osborne is said to be faster, cheaper and more flexible, with standard 640kb RAM, zero wait state, seven full-length AT-style expansion slots, 101-key keyboard, and performance peaking at 13MHz.

# AST Premium/286

“What sets the Premium/286 apart from many of the AT compatibles is performance.”

**PC** EDITOR'S  
CHOICE  
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*P.C. TECH JOURNAL JUNE, 1987*

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*Richard Clouston, Financial Systems  
Support Manager, Unisys, Auckland.*

**UNISYS**  
The power of<sup>2</sup>



# A very Able product

by Christine Cade

Personal computer users today realise the benefits to be enjoyed from multi-tasking. Printing documents or reports, or performing a mass database mail-merge while continuing to communicate with remote computers or chart the quarterly sales, are all functions built into this type of software.

Able One is an integrated package combining word processing, spreadsheet management, graphics and database management, together with a communications module and multi-tasking. Written by Able One International, it is bundled by Commodore Computer (NZ) Ltd with the company's IBM-compatible range of PC-5, PC-10 and PC-20 hardware, and while licensing agreements mean that it is not sold separately in this country, in Australia the package is available for around \$A300, putting it in the lower end of the range of similar software.

As such it is an attractive proposition for the home or small business user whose applications or interests span the broad range of functions which the software offers. Via the menu-driven interface, novice users can quickly create and format documents, create charts and perform calculations on spreadsheet data and implement the database manager, while for those with a modem, there's the excitement of remote communications.

Able One runs on IBM and compatible MD-DOS machines with a minimum of 512kb RAM and MS-DOS version 2 or later. While it can be run on a floppy-based system, performance is significantly enhanced when it is run directly from a hard disk. The package consists of one reference manual and two diskettes: the data diskette with the Help, Install, Demo and Dictionary files; and the program diskette containing the Exec file.

## Full potential

The more advanced user can maximise the full potential of Able One by creating macros with their "remember" keys. The ability to customise the software in this way is one of the program's greatest strengths, resulting in not only faster processing

but also the additional benefits that accrue to products with user-defined interfaces.

Rarely does one find software that is difficult to install nowadays, and Able One is no exception. Installation is quite well documented in the reference manual. A CONFIG-SYS file must be created specifying the required FILES=20 and must reside on the DOS boot diskette if running from a floppy based system, or in the DOS directory if starting directly from a hard disk. I was unable to install the system on my hard disk as the review copy supplied did not contain an Install file. However, by copying the contents of both diskettes onto my hard disk and then invoking the Change Drive option from within the program I was able to proceed smoothly.

## The front end approach

Able One has a smart front end. When the program is loaded the user is presented with a drop-down menu which lists the main processing tasks. Function selection is achieved simply by positioning the highlighted bar on the required task and pressing the Enter key. Like comparable software currently being marketed, processing can be invoked by entering the first character of the function name and then pressing Enter.

Users can tailor the main task selection menu to suit their own working environment. Tasks can be added, modified and deleted. The tasks can consist of either user-defined function specific macros which can be invoked from the main menu, or they can be the internally resident functions.

In the case of user-defined macros, for example, a macro can be created and allocated a key combination, say ALT-X, which can in turn be called from the main task menu, significantly reducing user keyboard input.





# Here's some advice on accounting software from a motel proprietor and a freight forwarder... (...and an accountant.)

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FORWARDERS  
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The macro may for example involve invoking the Communications task, selecting the option Dial from within that task and entering the appropriate dial number. This task can be added to the main menu by entering on the command line "task Call-ALT-X". The pre-defined macro will then execute upon selection.

The ability to customise specific processing options within the program by the use of macros, or "remember" keys will appeal to the more advanced user. For the novice, however, the program is user-friendly, with the provision of drop-down menus facilitating quick application development and usage.

## A word or two

This product does not offer the word processing power to be found within dedicated word processing software such as MultiMate, Displaywrite or MS Word. Nevertheless, the formatting features that are offered will more than adequately address the word processing requirements of the average user and are similar in capacity to the equivalent functions offered from within other integrated software.

The standard features – margin and form settings, justification, text centring, search and replace, copy and move – are all there, together with the usual layout sub-functions such as line spacing, tabs, word-wrap, headers and footers.

Graphs created from material within spreadsheet files can easily be integrated into word processing documents, giving the professional edge to finished company reports and more formal business documents.

The speed of file retrieval and subsequent on-line text manipulation declines in performance as files become larger. Large documents would need to be created and edited in sections to gain the maximum performance from

the word processing functions.

A dictionary/spell checker is also included, offering the standard fare of this type of software. New words can, however, be added to the dictionary in a novel way. By creating and populating a file with the list of words to be added and then invoking the Add Words process, a quasi batch mode type operation can be performed. The procedure is the same for deleting words from the dictionary. This is helpful in getting rid of the multitude of 'isms' which generally accompany international dictionary/thesaurus proprietary software packages.

***It is an attractive proposition for the home or small business user whose applications or interests span the broad range of functions.***

While the reference manual mentions (albeit briefly) that "Able One can use most files created by other software packages, as long as they are ASCII", this is not a procedure that the novice user will find easy to perform. Importing a file from my word processing application, although in ASCII format, required considerable massaging before it could be used by Able One's internal processor. Similarly, importing Lotus files into Able One's spreadsheet environment was not as smooth a process as could be interpreted from the manual.

## Cumbersome spreadsheet editing

The features present in Able One's

spreadsheet/graphic management module are all reminiscent of those to be found in similar software presently available. The spreadsheet is presented in columnar format, with information keyed into cells directly and edited in the same manner. The '/' key in Able One's spreadsheet mode calls the drop-down menu, much in the same way that Lotus's menu appears across the top of the screen.

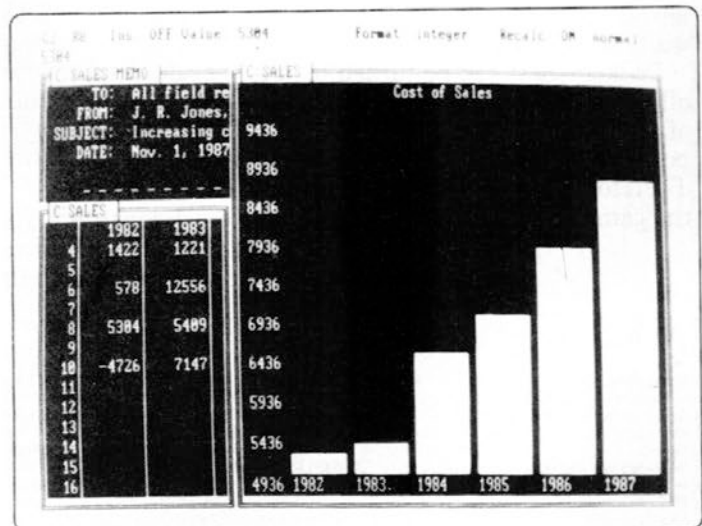
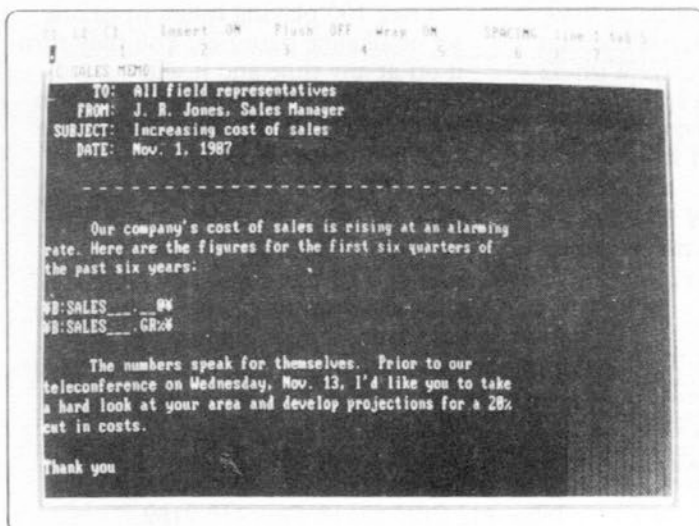
Cell editing is quite cumbersome, however. For example, to edit the content of a cell, both the Shift/Tab key combination needs to be invoked to edit the character to the right of the cursor, or the Tab key on its own to edit the character to the left of the cursor. The reason for this is that the left and right arrow keys (< >) are reserved for moving left and right between cells on the sheet.

All the features applicable to spreadsheet processing are there in Able One – formula processing, arithmetic and logical operators, statistical functions: SUM/AVG/MAX/MIN, cell formatting, spreadsheet linking, and bar and pie graph charting capability. Plot scatter graphs can also be created.

## The database manager

Via input templates, users can design data entry screens. Field names are painted onto a blank screen with their corresponding formats and lengths. Only single input screens can be created for data input, although the reference manual does not specifically state that this is the case. Fields can either alphanumeric, numeric or integer, with no provision for date formats. Date fields must be specified as alphanumeric format.

Creation of templates (and their subsequent modification) can be a fiddly affair, and editing is certainly not one of the product's strengths. Movement around the blank screen is achieved by the use of the four arrow





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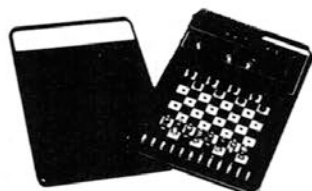
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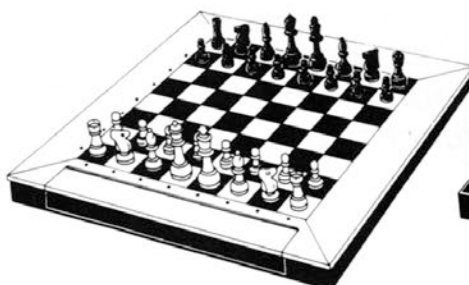
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direction keys. Repositioning fields can only be achieved by first blanking out the field entered by using the Backspace key. I could find no use for the Delete key during screen design, either in the initial input template creation mode or when returning to modify an existing template. Similarly, the Insert key has no function. Inserting lines between fields can only be achieved by firstly deleting (by backspacing over the field to be moved) and then retyping the field information in the new position.

### ***Importing Lotus files into the spreadsheet was not as smooth a process as could be interpreted from the manual.***

The supporting documentation is a little thin on the ground in explaining the editing capabilities within this process. Fields can then be edited for input validation purposes providing file integrity.

Able One's database manager supports the establishment of relationships between files. This is ac-

complished by defining 'master' and 'transaction' fields within the files to be related. Take the general ledger concept as an example, where the field 'account number' links account information with the transaction data residing in another file:

File A: Account master file:  
Account number: (i6,m)  
Account name: (a30,p)  
Account total: (n10.2)  
File B: Account transaction file:  
Account number: (i6,t)  
Transaction type: (a10,p)  
Transaction date: (a8)  
Transaction amount: (n8.2)

The field linking the two files above is the account number. The attributes of account number are identical in both files and must remain so for a link to be established between the two files. In File A the account number has been defined as 'master', whereas in File B it has been defined as 'transaction'. Files so linked can then be searched on the master or primary key field.

### **Reporting**

Creating report formats from database information is accomplished by the use of the word processor. From the options menu within the database module, the user selects Output only, to be im-

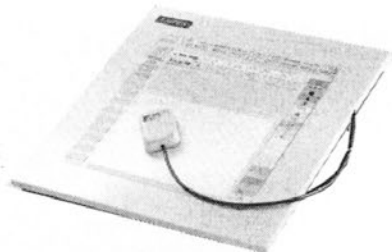
mediately placed in word processing mode. Reports can then be designed using the word processor functions and attaching the fields from the relevant file. These are then saved and printed as and when required. Where files are linked the master fields must be attached before the transaction fields in the linked files.

In conclusion, Able One certainly lives up to its name both in presentation and function. My only grumble concerns the supporting documentation which may well be out of synch with the program version I was given to review. My version did not support the Utilities option mentioned in the reference section of the manual, and where can I find out what a 'free error -96' is? More description, please, in the next manual release, especially in relation to keyboard use and macro design, especially for the novice user.

But it is not all grumble – for in the price range that this product is directed it represents good value for money. Lastly, there is a bonus. Able One has a handy pop-up calculator for those of us with tired minds. It will perform simple or lengthy mathematical calculations and can be activated from any point merely by pressing F2. A most welcome finish to a very able design. ■

*Review copy supplied by Commodore Computer (NZ) Ltd.*

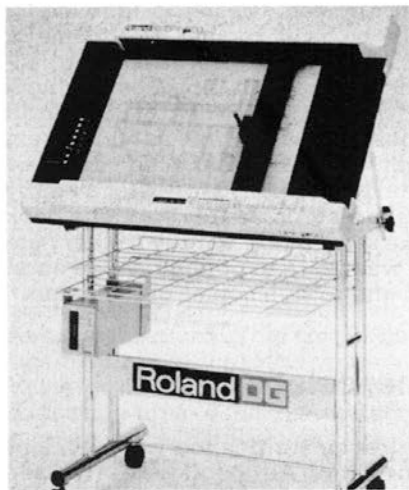
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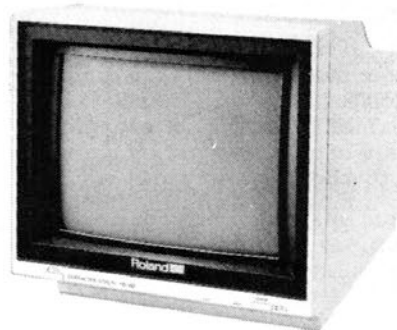
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# Who says the computer boom is over?

**W**ith PCW Show 1987 being 30 per cent bigger than last year's, it seems set to break its own 1986 record of more than 70,000 (including 47,000 business, trade and professional) visitors. We do not know the total for this year because, at the time of writing, the show is still in full swing. When we visited it on the first day it was packed from opening to closing, so obviously the attendance record is due to be broken yet again. Who says the computer boom is over?

As readers of *PCW* will know, the magazine started off in the days when 'PC' did not just mean computers of the IBM-PC type and its clones. It meant any type of micro-computer from the ZX80 (Yes! pre-ZX81) upwards. This still holds today. Although there is plenty at the show for the prospective and actual PC owner, the interests of the home computer user are more than well catered for.

The exhibition reflects the division. The noise, bustle and razzmatazz of the exhibits of the latest games software can be escaped by wandering into the distinctly quieter and cooler atmosphere of the Business Hall.

***This micro is sure to be an increasingly popular one for the Christmas stocking.***

Not that the exhibits there were any less interesting or less well attended. The 'villages' were a feature of this part of the show. In the Commodore village, the two new computers on display were the Amiga 2000 and the Commodore PC1, billed as the most compact PC compatible. With seven internal expansion slots, MS-DOS capability and genuine multi-tasking, the Amiga 2000 has full compatibility with existing Amiga software. Surrounding the central Commodore stand were the displays of firms providing hardware,

software or items supporting the Commodore machines. CAD Vision was showing its new EX CAD system specially designed for the Amiga, while Enigma Publishing launched *Enigma*, the first British independent magazine for Amiga users.

Atari World, another of the show villages, had some 30 stands carrying products backing the Atari micros. The complete Atari ST range was on display for the first time and included the ST520, retailing at only £299, complete with 512kb RAM, a 512kb built-in disk drive, a mouse and many other mouth-watering features. This micro is sure to be an increasingly popular one for the Christmas stocking.

Software houses seem to be responding by issuing more and more software in Atari format. HiSoft launched a Basic compiler and its new FTL Modula-2 compiler, both for ST. Mirrorsoft was showing the Fleet Street Editor (not only for Atari but also for most other popular micros as well). Indeed, desk-top publishing could be said to be one of the major themes of the show this year, although there were no strikingly new products in this field. The Atari games enthusiast was not forgotten, either. Domark launched its new game, *Not a Penny More, Not a Penny Less*, based on Jeffrey Archer's book of the same name. Jeffrey Archer himself was there to popularise the occasion and to sign copies of the game.

## Other celebrities

Other celebrities too were evident at the show. Although we did not see Richard Branson himself, the gondola of his Atlantic-crossing hot-air balloon was on show beside the Virgin software stand. Clive Sinclair too was seen, as active as ever, inspecting the Cambridge Computer stand on which the newly introduced Z88 laptop was making an impressive display.

This low-cost machine, which can be linked with the IBM-PC and its compatibles or with the BBC Micro, is packed with features, including Pipedream, a word processor/spreadsheet/database utility (compatible with Wordstar, Lotus and View Professional). The LCD display has only

six rows of text, but this is neatly compensated for by a mini-display which represents the document format by showing a pixel for each letter. A diary, calculator, calendar, alarm, and BBC Basic with assembler are all included as standard in this machine, while interfaces to serial and parallel printers and a modem are all available.

The name of Sinclair was evident again on the Amstrad stands. The latest Spectrum, the Spectrum+3, became available in UK shops this month, but this was the first time we had seen it. Looking more like an Amstrad CPC128 than ever with its built-in disk drive, this machine retains all the facilities of the Spectrum 128 and Spectrum+2 such as the 128kb of RAM and the programmable 4-channel sound chip.

The major new computer on display for the first time in Britain was the Amstrad PCW9512, which comes complete with a letter-quality daisy-wheel printer and the Locospell



The Amstrad PC1640 comes in a total of nine mod



The Personal Computer World show, which celebrated its 10th birthday at Olympia in September, has achieved a unique status in Britain, becoming the equivalent of the Boat Show, the Motor Show or the Chelsea Flower Show. Owen and Audrey Bishop report for *Bits & Bytes* direct from the show.

78,000-word spelling dictionary for £499. The paper-white high-resolution screen is certainly easy to read. With its spelling-checker, mail-merge facilities, 1Mb disk drive and numerous other upgrading features, this new machine looks set to repeat the enormous success of the 8256 and 8512, which have already sold over 750,000 units.

The launch of this new machine coincides with price reductions on the PCW8256 and the PC1512, the latter now to be sold with bundled software, both business and games. The Sinclair +2, +3 and the Amstrad CPC464 and 6128 are also now to be sold with software (as many as 17 games and a joystick for the CPC series!). This makes these packages extremely good value and perhaps may help to counteract the image that the CPC has been gaining in Britain of late – that it is *not* a games machine. As one software publisher said recently, "Publishing games for the Amstrad is commercial suicide."

Another new Amstrad printer appearing at the show was the LQ3500, a 24-pin dot-matrix printer, printing at up to 160 cps (54 cps in its Letter Quality mode). This is completely compatible with both Epson and IBM printer codes. Finally, Amstrad displayed for the first time its complete range of nine models of the PC1640, which features a multi-function internal graphics adapter (MIGA) which allows the computers to be used with any of three new Amstrad monitors – ECD, MD and RGB. The ECD (enhanced colour display) monitor can display 16 colours from a palette of 64, at a resolution of 640x352. The MD (monochrome display) is a 14-inch paper-white monitor, with 720x348 resolution and text in 9x14 pixels giving a clear display of letter quality on the screen.

Amstrad has been active on the software side too, launching the AccountsMaster for small to medium business for less than £150. Paymaster is another new program, at only £49, handling payroll for up to 999 employees. The third low-cost offering is Wordstar Express, based on Wordstar 1512 and having full file compatibility.

A machine receiving much attention was Acorn's new Archimedes, based on a new approach to micro-processors, the 32-bit RISC technology. The processor has a Reduced Instruction Set; in other words it is designed to perform relatively few different operations. This simplification has resulted in making it possible to design the chip to run very fast, executing up to 4 million instructions per second. Although there are some operations that a conventional processor which full instruction set could perform more rapidly, and which the Archimedes processor takes longer to perform, these are rarely required.

On balance, the gain in speed is considerable. The benchmarks show the BBC Basic V of the Archimedes consistently outperforming that of the Amiga, IBM-PC, Atari ST, and the BBC Master 128 by considerable margins. This was immediately obvious from the graphics demonstrations. With high speed, high resolution (640x512) 256 colours (all at one time, selected from 4096), the effect was dazzling.

The number of companies exhibiting hardware and software for desktop publishing made it difficult to select any product for special mention. Each daily issue of *Show News* was printed on the Agfa P400PS, an 18 page per minute printer using LED technology instead of the more usual laser beam. Pages were produced by the Agfa S200 digitising scanner, operating in conjunction with the latest release of MacScan software released by Agfa at the show.

**The number of companies exhibiting hardware and software for desktop publishing made it difficult to select any product for special mention.**

Those with an urge to get down to a good computer game could find everything they desired in the main hall – if they could survive the decibels and the serried ranks of video screens demonstrating the latest offerings. There was much more 16-bit software in evidence this year, and even the first 32-bit game, Superior Software's Zarch, for the Archimedes. Mirrorsoft had a list of 75 16-bit games, either available at the show or 'before the end of the year'.

One noticeable feature of this year's show was the sharp decrease in numbers of the smaller software houses. More and more, the smaller firms are being squeezed out or bought up by the larger ones. The industry is stabilising, which on balance is of benefit both to those within it and to the customer. There is no doubt that the quality of today's software is markedly higher than that of a few years ago.

This maturing and stabilising of the computer scene, whether in terms of software or hardware has been apparent in all aspects of the show this year. We look forward to PCW Show 1988.





# People, not technology

## Computers, education and bagpipes

by Pip Forer

The second national Computers in Education conference brought several surprises along with a wealth of shared experience. It started with a powhiri at Rehua Marae and ended three days later with the final session being terminated by the entry of a piper (pipes skirling, kilt swirling) and a rousing chorus of Auld Lang Syne.

For all the neglect in hardware provision in many sectors of education, it was still clear that given even half a chance, New Zealand educators have much to offer in educational computing. So too did the overseas speakers, ranging geographically from Scotland's Mike Tibbetts to Sandra Wills and Liddy Nevile from just across the Tasman.

This was predominantly a conference about people, not technology. The emphasis was struck right from the start at Rehua Marae, whose hospitality did so much to create the atmosphere of sharing so important for a conference such as this. As the conference progressed it became plain that since 1985 teachers had left the early experimental stage, had decided what were the correct niches for computers in education and were busy working to use the technology effectively in those areas. Effective

learning, not technology, was centre stage.

***Many schools are beginning to evaluate CAD packages which may be suitable for secondary school students.***

The emphasis of interests had also changed. At the first conference two years ago programming, gaining computer awareness and high school applications were dominant themes. At this conference interest in those areas remained but, significantly, primary teachers outnumbered secondary ones and the use of tools such as word processors overshadowed programming and computer studies. Many teachers presented papers dealing with assessments of classroom practices they had worked up over the last two years, rather than just coming along to see what might be possible. Progress towards maturity was apparent.

One indication of this was the attitude of conferees to hardware. The computer industry displayed the latest 32-bit machines just weeks after their international release (and in one case a fortnight before it). People at the conference showed interest in these advances, indeed often clustered around them. However, the talk afterwards was not of MIPS and megabytes but of measuring judgements of how such technology might extend the teaching environment. The views that emerged were based solidly on critical assessments of relevance to teaching. New developments in hardware and software were clearly seen as opening new doors, but their value was being judged in the hard light of whether it improved the learning experience.

**People + computers  
= interactions**

The importance of people and learning was stressed continually. Bill Higginson from Canada and Liddy Nevile from Australia underlined the need for first understanding how people learn before being able to use

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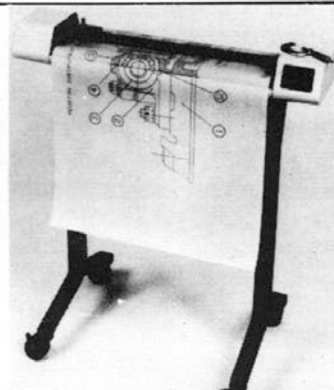
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The whole question of the role of computers in education has matured, if the feeling of the recent conference in Christchurch is any indication. Pip Forer and Ann Frampton give their views on trends in the area.

the computer to help that process. One message from two voices: computers are there to help create an environment where learners can experiment without fear, be creative and construct their own models of what the world is about.

The highlight of the conference, a keynote address from Anthony Adams of Cambridge University, reflected this as it dwelt largely on how best to encourage creative writing. Many of the key elements described here had little directly to do with computing, the major one being the importance of the interaction within groups of authors in a classroom. However, in fact the computer was essential to what was happening. Even though the computer was only prompting in the background, the classroom would not have been the same without it.

There were many new themes. Several speakers picked upon databases and information technology in the classroom. Mike Tibbetts from Marconi UK set the widest web with his keynote address on interactive video, raising the question of what implications there will be in the meeting of video and computer technologies. As deputy editor of the UK's Domesday Project, Mike also demonstrated the Domesday system to large workshops and spent some time discussing the practicalities of a related New Zealand exercise with members of the local steering committee.

With strengthening indications of a sponsor for the proposed New Zealand project, interest ran high. Complementing this large perspective Ken Ryba, Bruce MacMillan and Kwok Wing Lai dealt with telecommunications as a means of accessing databases (teacher support resources) and as a tool for inter-school communication for administration and for learning.

Special education picked up a good following, too, thanks in part to the availability of speakers from a Department of Education in-service course held just before the conference. However, perhaps most intriguing was news of the Department's own exploratory studies programme. Many of the studies funded under this scheme are close to reporting their findings and were able, in their own sessions, to indicate the progress they had made. The evaluation

of the projects is still under way, but a keen interest will be shown in the findings when they are released. At that point it is to be hoped that clearer guidelines will emerge on state support and resources for educational applications of computing.

### Of two cultures

Some people came to NZCES straight from the Computer Society conference down the road and commented on the culture shock that the transition brought. Certainly educational computing has a character all of its own. Compared with most business computing it is far more varied and involves a much more subtle relationship between the machine, the user and the working (learning) context. Its variety is apparent, stretching from computing studies and computer-assisted learning at university (Brownie points to Otago) across to applications in the youngest classes of primary schools and the integrated approach of the Freyberg High School Project. This breadth was widely appreciated.

Many attendees sampled new interests. Listening to the session on computers in music teaching (where Martin Lamb of MusicWorld fame

dropped in to join Gwynn Jones from the Coromandel) opened new appreciations for many, while the demonstrations of desktop publishing and Apple's new HyperCard filing system drew good crowds who went away full of thought. Even the group that met on Lego and Logo had more than just a good time.

***The views that emerged were based solidly on critical assessments of relevance to teaching.***

Within this variety some things also emerged that were true across the board. The professionalism and richness of ideas and innovations from New Zealand teachers was encouraging, and commented on warmly and at length by several overseas speakers (the limited support resources available were commented on by the New Zealand ones).

There were also some innovations. Apart from the piper at the end (one way to keep speakers to time) we had the foreshadowing of the launching

## Turbo Pascal Programmers

ever wished you  
could do this...?

### PP is coming

- true embedded assembler source
- conditional compilation
- microsecond-accurate execution analysis
- nested 'include' files
- formatted printed listings
- fast (typically 13000 lpm on PC-AT)
- command-line/batch interface for Turbo (no more menus!)

write for details to... **Applied Digital Research**  
**P.O. Box 6480**  
**Wellesley St West**  
**AUCKLAND NZ**

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10  |
11  |
12  | procedure send_serial (character : char ;
13  |                         serial_port : integer ;
14  |                         var result : integer) ;
15  |
16  | begin
17  |   # asm
18  |   mov     al, (bp + character) ; strip off MSB
19  |   and     al, $01111111
20  |   mov     dx, (bp + serial_port) ; 'send' function
21  |   mov     ah, 1
22  |   int     $0_232
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of two new regional Computers in Education Societies, in the Bay of Plenty and the Manawatu. We also had an award to schools for educational computing applications from Barson Computers, which went to Collingwood Area School, and the donation of a computer towards the koha at the pre-conference powhiri (an Apple IIc, courtesy CED and Apple Computers). These companies, and the others that assisted the conference to happen, including Commodore, Progeni, Amstrad, Philips and Softime, are to be thanked.

### Future issues

Naturally directions for the future were sought, and three areas drew attention. One was the future for computer studies in the sixth and seventh forms. Ken Mount of Pakuranga College, Auckland, chaired a session on this issue which reviewed progress (or lack of it) to date. The NZCES council is pursuing this further and Ken would welcome any input from teachers with con-

cerns or comments in this area.

The second area of interest was Domesday, and the suggestion for a New Zealand project. The Domesday system proved somewhat of a focus in the cafeteria and papers on the area provoked lively discussion. When a notice went up for names to go on the mailing list for Domesday: NZ newsletter it filled and overflowed in no time at all (drop a line to NZCES if you would like to go on it too). Mike Tibbetts gave very useful insights into the UK experience, and inputs from Sandra Wills and local speakers gave further support for the idea that it can happen here, and that sources of funding can be found.

Finally there was a general concern for providing appropriate support to educators. 'Ideas rich and resource poor' was a phrase that summed up the local scene. Since 1985 many of the educators present had rethought whole areas of their teaching and taken on board new, more demanding but far more effective applications of classroom computing. The progress among these pioneers, given the resources provided, has been im-

pressive indeed.

However, clearly new developments cannot be sustained indefinitely without more resources. The council of NZCES adopted an initiative in 1986 for an independent directorate to initiate, support and assess new developments in educational computing and information technology. Just as important and more fundamental will be decisions on in-service support and equipment provision. Conference goers, society members or not, will be watching developments in these areas closely.

When the next Computers in Education conference meets in New Plymouth in 1989 optical disk devices will undoubtedly be quite commonplace (Australian states already have a list of approved models for school purchase). The power of the 32-bit micro will have started to be harnessed. Friendly interfaces will have moved on yet further. One gets a feeling that this will open whole new vistas for educational computing, but at the same time if the Christchurch conference is an indicator the central issue will remain managing that

# Anybody's guess

Computers are set to revolutionise the New Zealand education system. The options they offer will take the emphasis away from the teacher and the set syllabus, and turn teaching into a process where pupils will decide for themselves what they want to learn before turning to vast reservoirs of computer-stored information to do so.

This is the assessment of John Buchanan, deputy principal of Clover Park Intermediate School in South Auckland and the president of the Auckland Computer Education Society. He has this year taken leave of absence from his school to work for an Auckland computer company to help facilitate the introduction of computers into schools.

And he says the moves towards computerisation in education over the past seven or eight years have merely been stuttering steps in the lead-up to an education revolution.

"Computers are the most important technological aid that we have seen in this country," states Buchanan. "They will change the direction of what we are teaching in our schools."

He says New Zealand's education system has "always had its power base in the establishment, which said, 'We know what you should learn, and we will impart the knowledge to you.' Teachers told their pupils, 'If you pay attention to me, and learn what I give you, you will get

good marks.'"

So the education authorities set the subjects children were to learn, and the knowledge that they had to know. That knowledge was then imparted by faithful teachers, with the decision on whether a pupil was a success or failure depending on how well he or she could regurgitate that information during examinations.

But computers, and the vast amount of knowledge available today, will make those methods of teaching obsolete, Buchanan believes.

### More than ever before

He points out that in 1983 more information was published about physics than had ever before been printed in the history of that subject. And this is just one of many examples which illustrate the impossibility of an education system attempting to teach its pupils something about everything during 10 short years of schooling.

by Vic Francis

In the light of this, Buchanan says the education system will have to decide which skills are absolutely vital for every pupil who goes to school to learn - he suggests such things as reading, writing and numeracy skills.

"Apart from that, it will be a teacher's job as a motivator to say to the pupils, 'What do you want to find out about?' Then the teacher has to look at the skills the pupil is going to need [to find out the information he or she wants to learn]."

John Buchanan foresees the next stage of computer advancement will be the provision of a large database of information, to which pupils will have ready access. They will decide if they want to learn about, for example, elephants, and then tap into the latest information on that subject.

On the computer screen they will be able to examine elephants in action - feeding, running, fighting and even mating. They will be then able to freeze the elephant's picture and print it out, examine virtually first-hand, and in slow motion if necessary, the features of an elephant charge, and print out stored volumes of information about the lives of elephants.

It will all be available, virtually at the push of a button, because of the combined effects of the vast amounts of information now available and the incredible ability of computers to store that information. And it will all



technology for effective learning.

It is becoming clear that computers are becoming more 'invisible' as they become intuitive-to-use tools. It is equally clear that, however invisible they may be, their influence on learning environments remains profound and complex. Certainly the mystique and anxiety fostered by computers has been laid to rest: a banner across

the back of the main auditorium read 'Any teacher who can be replaced by a computer deserves to be'. David Lange should approve. It certainly echoed a new confidence amongst educators. ■

### Footnote

If you couldn't be there but would

like to know what happened, the Proceedings of the Conference will be published later this year, with over 30 contributions covering all the themes of the conference. Details of the Proceedings, or of NZCES membership, can be obtained from the conference secretary, 49a Good St, Rangiora.

# Computers in secondary schools – what is the next step?

by Ann Frampton, *Computers in Education Development Unit, Department of Education.*

The most interesting comment I heard at the recent NZCES conference was from a secondary teacher in the final plenary session. He said that for him the most significant thing about the conference was what he had learnt from his primary colleagues. He was impressed with the ways that primary teachers were using computers in the classroom,

and felt that secondary teachers could learn a great deal from them.

The computer room is well established in most secondary schools now. It is in constant demand for computer studies, typing and English classes. These types of classes generally require at least half of the class to have "hands-on" at the same time, and are therefore particularly suited

to the computer room approach.

However, a number of schools are now beginning to explore other ways that computers can be used, and are finding that one computer in a classroom can be a valuable tool. This has led to many schools purchasing a computer or two for a specific application in a particular department.

For example, some computers are

be done without any teacher input, apart from the teacher's assistance in providing the skills needed to find the information.

"Pupils will still have to be taught skills," Buchanan emphasises, pointing out that it is teaching methods and not the teachers themselves who will be eliminated by computers. "But instead of teachers imposing what they want to teach, the pupils will decide for themselves."

The possibilities that computers provide are endless, and they go far beyond the subjects such as maths, accounting and physics – those which readily spring to mind as being computer-oriented.

## Design and construction

Woodwork, for example, hasn't been touched very much by new technology – yet. But Buchanan can foresee pupils deciding what they want to make, using computer technology and the teacher's direction to design it and then proceeding with the construction.

Home economics presents similar possibilities. Computers will provide recipes, ingredients and directions – and also assist in the invention of new taste sensations.

The advantage, says Buchanan, is that pupils will be able to create what they want. This will add to their commitment, attentiveness, determination and expertise in their subject.

He believes a three-tier system – all of which will eventually be linked – of school computer technology will become available.

The first stage will be where a child goes to the school library and uses a high-speed computer to search through a vast database. The second stage will be in the classroom, where a school network will use a powerful computer and education software as a teaching tool, while the third stage will be when flat-screen computer technology becomes widely available and computers become as common as calculators are today.

"Calculators are so common now that I give them away. Who would

have believed that when they first came out? In time, computers will be similar."

John Buchanan can see the stage where each pupil will have a book-sized computer with an on-board battery RAM, no disk drive and 3-4 megabytes of memory in RAM chips. "You will be able to pick it up at the beginning of the year with your text books."

Computers in schools have just begun. Just where they will end is anybody's guess. ■



John Buchanan



very easy to attach a range of gadgets to, either home-made or commercial. Science departments have found devices which enable students to investigate changes in temperature or pressure to be very helpful. Instead of the science period being taken up with a small number of measurements over a small time period, the computer can take over the repeated measuring with the intervals and time period able to be set to that which is most appropriate, rather than governed by the bell.

The students can then obtain print-outs of the measurements, or perhaps even graphical representations of the data. They have more time to devote to the "how" and "why" and "what if" questions, and are more likely to gain a better understanding of the objectives of the experiment.

Simulations and database programs have application across a wide range of subject areas. There are some excellent examples of such programs available now, such as *The Other Side*, *Into the Unknown*, *One World*, and *Hometown* which can provide a wealth of information and in-

spiration for students to develop skills in handling information, forming and testing hypotheses and making inferences. With just one computer in the classroom acting as one of the many resources available to students, much can be achieved.

### Valuable learning activity

In addition, the development of original databases by the students themselves, although time consuming, is a very valuable learning activity involving a range of skills. If the material collected is based on a survey that the students are doing in, say, social studies or economic studies, then the exercise has even more value. If the databases can be added to each year by successive groups of students, a very useful resource could be created.

Computer-assisted draughting and design packages are commonplace in the commercial world now. Many schools are beginning to evaluate packages which may be suitable for

secondary school students. In the last two or three years the costs of such packages have decreased by a factor of ten, and some are available for computers which are found in many of our secondary schools. The availability of a single CAD system to enable students to gain an understanding of both what it can and cannot do, and to occasionally free the students from the tedious parts of design and drawing to experiment with ideas, is a great asset.

The use of modems, both for students to communicate with students in other countries and to access commercial databases, is becoming popular. Unfortunately cost is a problem here, particularly with access to overseas databases, but schools are beginning to explore the possibilities. Imagine a French class who corresponded once or twice a week in French with students of similar age in France. Or bilingual classes in different parts of New Zealand corresponding in Maori. If students have access to word processors at lunchtime, after school or during study periods to speed up the process of preparing letters, the actual sending and receiving of mail can be done with one computer and a modem in the classroom.

The range of quality software for the computers which have a good educational software base continues to grow. Teachers in all subject areas are finding that there are exciting ways that the computer with a utility package can be used in the classroom. More specific packages which are appropriate to a particular subject area but still allow for investigation, collaboration and encourage a range of skills rather than simply teaching content are beginning to appear. These can usually be used very effectively with groups of students which may mean a little reorganisation of classroom management systems, but prove to be very rewarding in terms of outcomes.

If your school has a well-used computer laboratory and is considering the purchase of further computers, think about the alternatives. Is it necessary to have all students working at computers at once or are there some needs which could be met very effectively if there were a few computers on trolleys attached to different departments in the school? Should these computers all be the same brand as those in the computer room or are some computers clearly more suited for some applications than others?

Above all, remember that not all teachers need to be computer experts, but they all have the ability to be computer users. With today's equipment and software, that is all that is required for a teacher to use a computer effectively in the classroom. ■

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# Simplicity at a good price

Given the number of locally-developed accounting packages on the market, is there a place for overseas-sourced software? Howard Cole investigates an example from Migent.

Being presented with a new software package is like receiving a birthday or Christmas present wrapped in shrinkproof, successfully concealing the contents and provoking the question, "Will the contents live up to my expectations?" So it was with the package In-House Accountant.

First conceived and built in California, and marketed by Migent throughout the USA, the UK and now in the South Pacific, the package comes our way direct from Nevada. The contents of the carton include the original manual, a local supplement, the usual agreements and a sample set of forms (invoice and statement), along with the name and address of a support company. The carton is enclosed by a marketing sleeve extolling the virtues of the package which, given the suggested retail price of \$348 (plus GST), are considerable. The package runs on a PC with 384kb memory, two diskettes or hard disk.

The manual occupies some 400 A5 pages and has a glued spine, with chapter, figure, table and report indices at the front and an alphabetical index at the rear. The printing is crisp, clear, and readable as are the computer screen replicas and report printouts. Future editions of the manual would be more easily used at the computer desk with a spiral or ring binding to allow the book to lie flat and which could therefore also accept amendments. Looking at other accounting package options on the local market, though, this level of manual is unable to be matched by some of the more expensive offerings.

## Local supplement

In Australia, Deloitte Haskins & Sells wrote a small supplement to the original manual to explain unfamiliar accounting terms and to provide a local chart of accounts as a template for the Australian market. This example has been followed in New Zealand by Coopers & Lybrand. The supplement is printed in the same manner as the original manual and contains sections on legal aspects of accounting in New Zealand (GST, depreciation), a suggested chart of accounts and a balance sheet report format to match the chart.

The structure of the package is reasonably simple:

- for home use as a cash book;
- for business use as a cash book with extras – debtors, creditors, inventory.

The manual is laid out to follow this structure, from Install through Guided Tours of Home, then Business accounting, to a Tutorial based on the Home sample data. Then follow definitive chapters on Transactions, Master Files and Utilities. The appendices include pop-up window definition and use, common procedures for home and business processing, system messages and a glossary.

The Install function is quick and easy to use and allows for either a diskette-based or a hard disk system to be set up, complete with a set of sample data ready to use. Data, for a home or business entity, is kept in a sub-directory of the IHA program directory, enabling multiple sets of data to use the same programs. The diskette versions would need a separate diskette for each set of data.

Setting up a second household or a series of business entities is easily accomplished. Create a new data sub-directory and copy into it the contents of your existing data. Commence the procedure for a new system by following the menu and screen commands, during which you are asked whether you wish to keep the same master files as in your original data. There is a function key choice to remove the files completely to allow you to commence afresh, or to have just monetary balances zeroed to allow immediate transaction processing against familiar records.

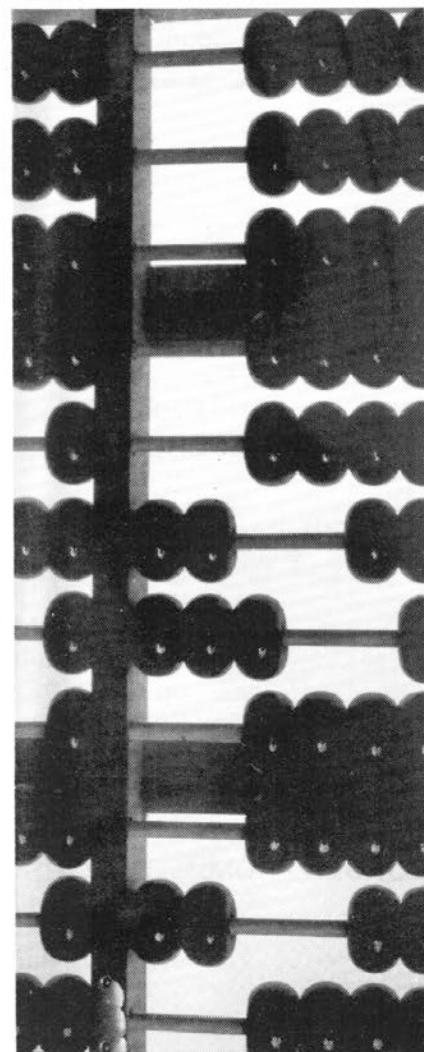
When setting up a new data directory, be careful about the way you use the report writer! If you plan to use one set of standard reports for all entities then the report writer may reside in the program directory, but if you wish to tailor reports to individual entities then transfer the report writer to each data directory affected.

## Ready for the real work

At the conclusion of Install, take the menu choice to the System Configuration screen and choose such options as date format and printers. You are then ready to commence the real work of translating your home/business shoebox full of papers into book-keeping records by loading the master files.

There are two master files in the system:

- **Names**, each record of which contains a number, name and address for company or individual, telephone, and account balance to date. Each Name record may be either a creditor, employee, customer etc, the distinct





category being decided upon by the user to aid in selection of enquiries, reports and mailing labels rather than to have any effect in the account ledger. A new Name may be added from within a transaction.

• **Accounts**, each record of which contains a number and name, account category and monthly financial balances both actual and budget. The account category needs special mention as the four-figure account code is structured into groups, ie 1000-1199, cheque/savings accounts 1200-1399, accounts receivable.

In this respect In-House Accountant joins hands with Trader and Macputer, both of which have structured ledger code groups. Inventory items are able to be allocated numbers within the current assets category of 2000 available code numbers, along with general current assets accounts. To nominate a record as an inventory item, a flag is set in the master. This also makes available in the master a unit sales price (for invoicing), and monthly quantity balances.

Both files are able to be accessed by either number or name. The name access is limited, depending on which way the name is entered, so a name entered as George Travers will sort into the "G" series rather than correctly into "T". The method of selection of a name or account that I prefer-

red, however, was to pop up the appropriate list window on the screen, arrow up or down to the correct entry and paste into the transaction, enquiry or report. The list window selection was by key combination Alt-A for Accounts and Alt-N for Names.

## ***Setting up a second household or a series of business entities is easily accomplished.***

Other pop-up windows are available from similar key combinations or function keys, and include: Help, Calculator, Financial Formulae, Recurring Transactions, and Printer selection.

### **A horse of a different colour**

On now to establish opening balances in our business environment. Each transaction may contain up to 10 line items which *must* balance financially within the transaction. That is, each transaction affects two or more accounts in the ledger, preserving the double entry which means,

theoretically, that the ledger can never be out of balance. Normal usage aside, system crashes among other happenings may corrupt data and part of the repair process should be the ability to be able to post a single leg journal to bring accounts back into balance. The absence of such a facility will force a restart of the system from the previous backup copy – and that is a horse of a different colour. Need I say more?

In each transaction header, IHA differentiates between internal adjustments and those transactions which have to do with the real world outside the business. The latter transaction demands what is known as a Source account, together with the amount total appearing on the source document. The source amount may then be subdivided into a maximum of 10 related accounts; for example a creditor's invoice may be distributed to: purchases, freight or GST. IHA, being an import, does not calculate GST automatically, but I found no problem in either the calculation of GST or its allocation to the correct ledger.

The standard chart of accounts included with the package by Coopers & Lybrand was very useful. The correct entering of information is made easy by the context sensitive help screens (single key) and the profuse illustrations in the manual. Transac-

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Written by T.H. Caradoc-Davies

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tion data entry may be checked by the use of a journal activity report which produces a complete listing of entries. Any mistakes may then be repaired using the transaction edit function.

***You do not have to be an accountant to use it, and its simplicity should appeal to sole traders, other small-business folk and home owners.***

Activity reports are the main method of extracting information from the system. Each report may be output to printer, screen or disk file, and each report has a selection screen as part of the function allowing a range of accounts, names, transactions and dates to be used to tailor the output. Print output has been very thoughtfully tailored to a 10-inch printer, any reports over 80 characters in width being automatically reduced in pitch to be accommodated within the 80-column restriction.

Reports available include: journals, financial statements, cheques, in-

voices, aged balances and inventory lists. Financial statements may be tailored to individual presentation by the allocation of account code ranges to various positions within the report, together with totalling and headings, and a good example is included in the New Zealand supplement. Pie charts and bar graphs are also available as output, but require a graphics card to be fitted. Even though the review machine had a graphics card in use, an IHA system message denied that fact, so choose your EGA/CGA carefully.

Other system messages are less than clear, with some valid choice of action not mentioned in the message alternatives. After working through the messages once, however, you should remember the action you wish to take. The financial reports file was missing from the system for a while during the review and on choosing that menu option, the package hung the machine rather than gracefully returning to the menu with an appropriate message.

The recommended retail price of IHA is \$349. The package is easy to use, has lots of features not available at twice the price, a good readable manual and a local support organisation, still being developed. You do not have to be an accountant to use IHA, and its simplicity should appeal to

sole traders, other small-business folk and home owners.

IHA is definitely value for money in spite of the minor inconvenience of some less than perfect system messages. It is not copy protected. ■

*Review package supplied by Computer Store, Milford, Auckland.*

#### CORRECT

```
Customer #      4
Customer Name   BRYANT T G
Box or Street   22 GORDON ST
City/Prov/State WELLINGTON CITY
Postal/Zip Code 2
Telephone #     345-5231
Remarks        B CREDIT
Remarks        CONTACT ACCT SMYTH 342786
Remarks        14 DAYS
Tax #           0 3
Balance        977.08
```

Correct (Y/N)Y

#### CORRECT INVENTORY

Stock/Item Number	A777777890	/	4
Description	PAINTBRUSH 6" HARDY L/B		
Quantity In Stock/ Serial#-Remarks	1854	SN 42987	
# On Order/ Turn Over %/ Margin %	2	0.16%	28.21%
Tax Rate/ Gross Margin	0	0.06%	
Unit Cost/ High Qty/ Avg Cost	2.80	20	2627.60
Price A	5.20		
Price B	4.80		
Price C/ Avg Retail/ Margin %	3.90	3654.30	162.80
Re-order Point/Order at \$ Unit	4	2.80	
Re-order Qty /Vendor#	14	14	
MTD Units/% Sold	148	705.90	
YTD Units/% Sold	148	705.90	

Correct Item # ?

# Watch This Space CHRISTMAS IS COMING!



# Archimedes: an interesting old Greek

"Eureka!" said that fellow when discovering something in his bathwater. The word means "I have found it", but does Pip Forer think along those lines with this latest from the British computer industry?

**1986** was the year of the ONYAC review... Oh No, Yet Another Clone. Things seemed so cosy then. Few chose to look beyond MS-DOS and a machine review often boiled down to a brief note about relative speeds, a profound discourse on the placing of the arrow keys (or some similar keyboard feature) and some comments on colour (the machine's casing more often than graphics capability). There were even some who could see no lasting life outside the MS-DOS world.

The second half of 1987 has a real air of excitement as the 32-bit generation starts to hit the desktop. No longer can anyone argue that non-MS-DOS systems are irrelevant. The Macintosh's growing acceptance has made that point, and IBM has further underlined it by foreshadowing OS/2. It has also been rammed home by a new range of microcomputer equipment that offers some strikingly different alternatives at relatively low prices. The Acorn Archimedes is one such machine.

The penalty for the reviewer is that meaningful reviews become more demanding. There emerges a need to evaluate broader and broader aspects of systems against competing machines with various different strengths. In many ways this makes it

a far more interesting task, but a task one approaches with some humility. For a start I am fairly certain that I will not finish this review, at least not to the extent of providing answers to all the inevitable queries.

The most fundamental of these is undoubtedly, "What is the Acorn Archimedes?" Is it the ultimate BBC micro upgrade for schools, a serious contender for the role of graphics workstation, a hacker's dream or an interesting diversion from mainstream microcomputing? Is it all or none of these?

## 32-bit at RISC

In raw terms the Archimedes is a full 32-bit microcomputer, acronymically based on the ARM (Acorn RISC Machine). Its proprietary RISC chip has been claimed as offering greater performance than 32-bit workstations, or twice the performance of a Vax 780. This places it firmly in the same league as the new range of 80386 and 68020 based systems. Many of these are so recent that comprehensive comparisons cannot be attempted yet, but as we shall see the Archimedes certainly outperforms 16-bit and 16/32-bit hybrid machines on most tasks by a considerable margin. Like the 16/32-bit Amiga, the Archimedes uses three processors in conjunction with its CPU, the others supporting I/O, memory management and graphics.

Any review is complicated by the fact that there are really several Archimedes. The machine I have had is from the lower of the range, a 310, single floppy disk, one megabyte machine. Its companion is the 305, identical but with only 512kb RAM (a configuration I am told is a little restricted for any significant tasks.) Above these 300 series machines lies the 400 range, offering up to 4Mb RAM for starters and an internal hard disk. Both series are open architecture, but the 400 series allows greater expansion options, and is also slated to support the popular scientific community non-proprietary standards of Unix and Ethernet.

Acorn reputedly is aiming the 300 series (with a BBC badge) at schools and the home user, and the 400 series at the heavier end of the market, especially as graphics workstations for CAD/CAM and design work. Given its considerable success in marketing Acorn motherboards into other products, one can expect the ARM also to appear surreptitiously in many other places.

Since my experience is with a 310 the evaluation will concentrate on the likely 310 market, but we will return to the 400 series later on.

Physically the 310 comes as four







main pieces: plinth, monitor, keyboard and 3-button mouse. The plinth is solid and not unattractive with a footprint about the same size as a small PC clone. The mouse is positive in use and otherwise unexceptional, while the monitor is the same one that serves the Domesday system so well and accepts both analog and TTL RGB.

The Archimedes supports all of the existing eight BBC screen modes as well as 14 new ones (two with 132 columns, others with 256 colours, all with a palette of 4096 hues and the largest taking 160kb RAM to store). For three of the highest resolution modes (for instance the 1280 by 976 monochrome option unique to the 400 series) a more expensive multisynch

***This places it firmly in the same league as the new range of 80386 and 68020 based systems.***

monitor would be required, with an enhanced monitor necessary too for the 132-column screens.

I find modes 13 and 15 most useful for me right now: both offer 256 colours, one at 320 by 256 and the other 640 by 256. This wide range of modes is surprisingly useful, but is a clear contrast to several rival machines and reveals quite a lot about the design philosophy of the Archimedes.

The main departure from previous Acorn machines is the keyboard, which features 103 keys including 12 function keys, numeric keypad and various dedicated keys such as Home, Print and Page Up. Working regularly on both a Mac and BBC Master I find the keyboard a little foreign and light at first (the editing and copy keys are in a different place from the Master's, for instance), but with a little use that passes. It is a very full-featured keyboard, and one might expect that, if the lower levels of the school system are targets for sales, a cut-down version might be offered in due course.

The disk drives are the now standard 3½-inch variety. The Archimedes uses an enhanced version of the Acorn ADFS as its default filing system and offers (automatically detected) 640kb or 800kb disk formatting. The disk load speed is quite acceptable, loading a 160kb colour screen image in nine seconds, for instance.

### **Super-Beeb?**

From the outside the system looks conservative. Inside it is a real Aladdin's cave. For existing BBC users the delight is the downward compatibility with existing systems.

As an example I wanted to trial some mapping programs on it that were currently resident on an Econet hard disk file server. To load them across to the Archimedes just required removing an Econet card from a Master, placing it in the Ar-

chimedes, plugging in and logging on. I was then able to upload files from the network filing system and run them immediately on the Archimedes. I could even get various data files for the same program from net and from floppy disk simultaneously.

Of course these were 'well behaved' programs, but even relatively delinquent programs and components of the BBC environment can also be accommodated through a 6502 emulation package called 65Arthur. This picks up the odd minor problem (such as embedded 6502 machine code and 16-bit indirection operators using odd crevices of memory) and generally makes the ARM behave just like a BBC. It seems you can even load sideways RAM images such as VIEW and use them to effect. The caveats given on the emulator probably mean that existing BBC programs happy on a network environment will work, but protected or DFS software may not.

There is a great deal more one could say about compatibility, but suffice for now to say that Acorn's attempts to keep faith with existing BBC users have been highly successful. This should reap rewards in terms of their existing user base.

Compatibility with past models is only a small aspect, however. Alone, it will not ensure that BBC users choose to stick with Acorn, and it will be a marginal concern for non-Acorn users. What matters more is the machine's capability in competition with others. In this there are at least





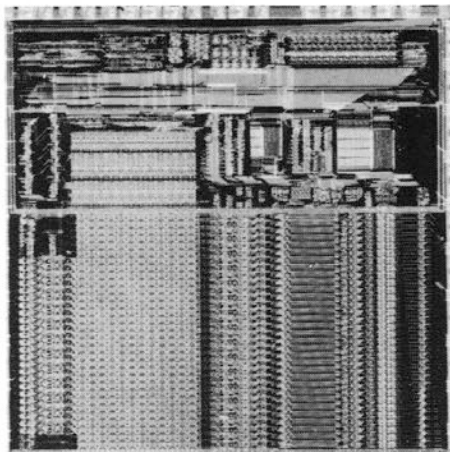
five components: cost, speed, user environment, software and expandability.

In terms of cost there is currently little comparison at the base level. A 310 appears to perform, in terms of processing power, on a par with machines that are at least twice and more likely five times its price.

This is said in part on trust, since the cost aspect assumes some knowledge of speed. A compiler for the Archimedes failed to reach me in time for benchmarking, so final affirmation of speed, particularly against recent published 80386 and 68020 benchmarks, will have to wait. I have, however, been able to compare the performance of Archimedes in interpretive Basic, which is contained in ROM and provided as a faster RAM version.

When I ran the GW-Basic benchmarks from the 1985 IBM special issue of *Byte* the Archimedes cantered home when placed alongside the 42 MS-DOS machines listed there. In disk intensive operations it was on average twice as fast as its rivals and 50 per cent faster than the quickest of them, a PC-AT. In the maths-intensive benchmarks (the Sieve of Eratosthenes and a calculation mix) it was between seven and thirty times as fast.

Compared with more recent figures it seems that the Archimedes *interpreting* Basic can rival *compiled* Basic on a Macintosh. Notwithstanding differences in Basic speeds and the (current) irrelevance of Basic for many applications, the power is there. Furthermore, Acorn claims that the pre-



Archimedes Arm chip, enlarged 8 times.

sent ARM is running at a conservative clock speed and is capable of more than four-fold increase. The current model will be benchmarked against some other machines in Pascal over the next month or so, for more conclusive results.

This brings us to environment. What is the support that the machine offers the users? What will the users find when first using the machine, and what will they be able to do if they get around to serious development? The foundation for the system is an evolution of the Acorn design philosophy which has always offered very clean, workmanlike options, integrated graphics and compatibility between languages.

The core is the operating system (Arthur) which offers many new supporting features. Among these are OS calls for sprite handling, font handling (including anti-aliased colour fonts), mouse control, eight-voice stereo sound, windowing and pop-up menu construction. These are all well documented, if you have access to the Acorn Development Notes, are clear-cut and offer attractive paths to implementation.

Most of the features offer fast and easy-to-implement solutions with a lot of room for innovation. The programmer can work with well-constructed building blocks which have a very 'clean' feel to them.

## Psychological security

The Archimedes sticks with the notion of a language in ROM, to my mind a significant plus in education, if only for the psychological security it gives. The language is Basic and the justly acclaimed BBC Basic has been yet further enhanced. New control structures include WHILE... WEND and CASE and the inclusion of some one line matrix statements.  $X()=Y()-Z()$ , for instance, does a quick matrix subtraction and checks for compatible dimensions before so doing.

This Basic also has some new features starting to be offered elsewhere. Line numbers are now optional, and a library of routines can be specified which can be dynamically called in and out of a program during use. Co-resident multiple programs are also supported and the documentation makes constant reference to a (clearly anticipated) compiler option. Basic has its own customised editor which offers a very useful complement. For general text editing there is also a module called Twin which will be available separately and allows for multiple documents and multi-tasking, editing one while compiling another.

On the other language front we are promised most major options, and the Archimedes is said to be particularly competitive running LISP. An exam-

ple of what compiled C code may be able to achieve with graphics is the demo program Lander on the Welcome disk. It is a 21st century flight simulator in every way.

My general feelings are that for a hacker this is an affordable dream machine. With it one has both the power and tools to be extremely creative. People's creativity will then be likely to spill over into a software explosion. However, people who want to author programs are only part of the market. Many more want to run software tools, and in this area they also want a consistent and simple user interface to empower them to move easily between applications. Where does the Archimedes stand with this?

## Arthurian environment

Compared with most machines it is very well placed. Arthur (the OS) seems not unlike the options offered on the 68000 based Ataris and Commodores: it has a traditional user interface (relevant to MS-DOS and baseline Unix) and the tools for building a WIMPs system. At present it simply lacks multi-tasking, a lack which is supposedly being rectified.

However, Arthur seems less radical than the Macintosh environment, where rigid conventions and parallel developments such as PostScript have had benefits in the user environment. The indication is that some of the positive lessons have been integrated into the Archimedes.

Acorn is not bundling a printer, for instance, but effectively has adopted Epson standards and offers built-in screen dumps, with specified data formats for image and text transfer between programs. The font handler, while less sophisticated in some regards, offers some exciting extensions, including implementation of anti-aliasing, the use of grey or colour shades to smooth the perceived shapes of letters.

The window handler ensures compatible window usage, and pop-up menus, while not seen on low cost machines, are well established on professional workstations as an appropriate interface. Overall it is probably less radical and comprehensive an OS, but a simpler development environment.

On the subject of software there is little that can be said. Because of its BBC compatibility there exists a significant foundation of software that has value in education. However, in terms of future growth what is likely to be on offer?

Two key issues must be the range and quality of customised software for the Archimedes, and the likelihood (and performance) of an MS-DOS emulator. In the first regard the



official Archimedes launch in the UK has promised some 200 titles will be available.

Given the timing of writing this review, I can only say that a trickle has started to arrive. Compilers (C, Pascal and Fortran) should be available by the time this appears in print, and so will the first database, art, spreadsheet and word processor offerings (not to mention Zarch, the full Lander game). At the launch Computer Concepts announced a desktop publishing package and Smalltalk Express a version of Little Smalltalk, while fully-configured videotex systems are available. Further titles are expected to be announced at the Acorn User Show.

***On the other language front we are promised most major options, and the Archimedes is said to be particularly competitive running LISP.***

Overall one can't ignore the Archimedes. It is powerful, cheap, and offers an exciting development environment. Compared with the non-32-bit brigade it lies in a different performance category. Compared with most machines on its first launch it has a significant base of potential buyers whose existing software and networks it can use. It also has a home advantage in a major marketplace: the UK and EEC.

### Psychological prop

As to MS-DOS compatibility, I have always suspected that in many cases this is a psychological prop. Many non-corporate owners of what is, inevitably, superior and more recent hardware want MS-DOS compatibility as a safety net, but when it comes to actual use will, for most applications, slide into the superior software that superior hardware and system design can run, using emulation only intermittently. Whatever the case, Archimedes offers emulation.

Two emulators are available: a solely software example which will handle the usual MS-DOS tests (GEM, Windows, Lotus, Flight Simulator) running MS-DOS 3.2; and a card with access to a 5.25-inch disk drive and a 10MHz chip.

Expandability appears to be no problem. The 300 series for a start will support a backplane offering all the

traditional BBC ports, so allowing direct use of existing peripherals. In both series 'module' standards exist for expansion modules. The baseline machine offers six ports (standard parallel and serial included) but this looks to be highly extensible. An Ethernet module, IEEE488 bus, full Midi controller and a PAL video digitiser have been released with its launch.

Without a developed software base its immediate appeal must lie with existing BBC users, especially programmers and those involved with designing systems that interface to measuring instruments or tools. In power terms it should appeal to tertiary and research users too, although here it will be the Unix/Ethernet-based 400 series that will have to front up if it is to be serious competition for MicroVax and Suns amongst many established users in science and engineering.

It will also have to see the porting-over of major established software suites and face the competition from 80386 and 68020 micros. Arguably in this area its price advantage will see it well placed in education, simply because class sets of equipment are usually under far greater cost pressure than lone research machines.

Certainly the pace of change has been breathtaking. Consider the cost of a single machine with Archimedes-style capabilities at the start of 1986. In late 1987 the Archimedes can yield a network of fifteen workstations for a similar price, some way ahead of current rivals. With growing demands for graphics facilities for teaching, this market looks set for



exploitation.

I like the Archimedes. Clearly it is a very new machine, and so lacks the software enjoyed by longer-standing systems, but the evidence is there that, in the right circumstances, good hardware breeds good software. This hardware also has the ability to link into the world of alternative operating systems such as Unix. At present it is certainly faster, cheaper and easier to program than its obvious rivals.

Many questions still need to be answered on speed, software and user interface. I sense that in the expected hot competition within the 32-bit area the Archimedes will more than hold its own, with its unique blend of power, cost and programmability to carve it a substantial niche. The nature of that niche depends largely on how other systems compare and develop, and as more information becomes available on ongoing development, some head-to-head comparisons need to be made. ■

*Review system supplied by Barson Computers, Auckland.*

### Microcomputer Summary

Name	Acorn Archimedes
Manufacturer	Acorn Computers, Cambridge, England
Processor	proprietary Acorn RISC, running at 12MHz
RAM	0.5Mb or 1Mb internally expandable to 4Mb (400 series) plus CMOS RAM for time, date and system configuration
ROM	512kb
Mouse	3-button
Disk	one 800kb 3.5-inch floppy second floppy or hard disk optional
Display	analog RGB giving 22 modes including teletext, 132-col. text, 1280x1024 monochrome; colour up to 256 colours (from 4096), maximum resolution (16 colours) 640x560
Keyboard	103 keys, full travel
Peripherals	ports for analog, serial and network cables plus audio, RGB and monochrome video; range of expansion modules giving access to other BBC ports such as 1MHz bus and thence to existing peripheral range
Bundled software	BBC Basic, Basic editor, sprite editor, 6502 emulator, sound editor, sketching program, demonstrations
Price (excl. GST)	Archimedes 305 \$2,295 Archimedes 310 \$3,560 colour monitor \$1020 multisynch \$1,809 Twin \$85 Pascal, C or Fortran \$310



# Hail the Lips 10 laser~

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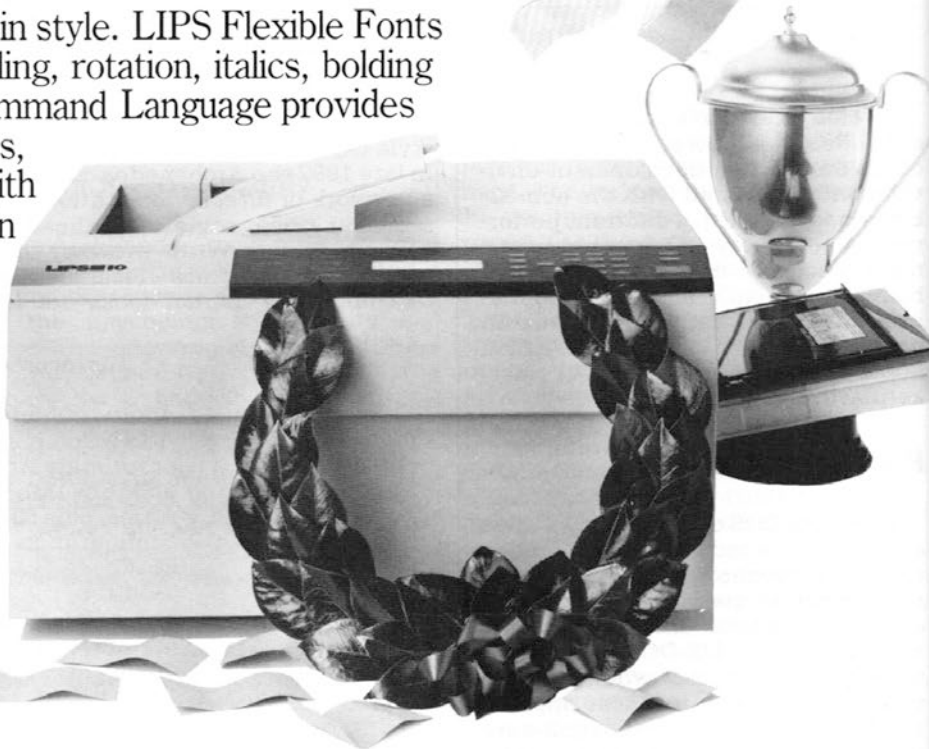
LIPS-10 is a speedster that's built for marathons. Built to last 5 years at 500 sheets per day. That's a long way ahead of 150 sheets a day for less than 3 years. There's less

servicing too. Instead of just 3,000 sheets, the LIPS-10 supplies kit lasts 15,000 sheets. So overall you reduce maintenance and achieve much lower running costs. To allow unattended operation the LIPS-10 paper cassettes and output tray both hold 250 sheets. And face down collation saves sorting time.

And it does it all quietly and in style. LIPS Flexible Fonts provide dynamic character scaling, rotation, italics, bolding and justification. The LIPS Command Language provides business graphics, forms, logos, bar codes and easy merging with text. Extra fonts are available in cartridges or by downloading.

Fitted with both centronics and RS-232-C ports, the LIPS-10 Laser printer is compatible with the IBM-PC range, compatibles and most minicomputers. It emulates the Diablo 630 daisywheel and Epson FX-80 matrix so you won't have to modify your word processing or software.

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# it sprints marathons!



# Speaking in tongues

by Andrew Tearle

I thought I could afford a car. I was wrong. So I sold the thing (eventually... we had it four weeks and it took six weeks to sell it! The kids only liked it when it was stationary anyway.), counted the money, tied it tight in a rubber band, hid it in the desk and called David-the-Computer up at Greenwoods Corner to deliver the Amstrad 1512.

At five o'clock he was at the door. Sharing a coffee I pretended to ignore the boxes David had brought while he for his part courteously neglected to count the dollars still tightly bound.

Even before I had the money to buy the Amstrad I had understood that I was going to buy it, soon. Thus I had two or three days earlier purchased Borland's Turbo Basic from MOS and devoured it each night once the troops were in bed.

Turbo Basic is a dream. If your experience of microcomputers has (almost inevitably) brought you into contact with Basic, interpreted-provided-with-the-machine-Basic, then it is likely that by now you have gone in one of two directions. Either you will have given away writing programs and use commercial software or you will have progressed to Pascal or C or somesuch: whichever, I recommend you to Turbo Basic as a new experience.

It provides a simply superb voyage into a programming environment – not just lines of thought on a screen – windows and colours and speed. Learn to laugh at anyone proud enough to disdain Basic as a tool for today's programming.

And then, like me, let your Bankcard groan once more and let your enthusiasm take you to the tool for tomorrow's programming: Turbo Prolog.

Finish the piece, put it down, RUSH to the phone and call the dealer for Borland's Turbo Prolog if...

- if you want to put your head somewhere new,
- if you want to discover the difference between procedural and declarative languages,
- if you want to rediscover everything around you and learn to redefine all that you experience.

I like Turbo Prolog. But then you may have guessed that. Perhaps you will too.

Like me, you may then come face-to-face with a sort of intellectual melancholy as you realise that learning another language like French or Spanish or Japanese is more or less difficult, but at least they are learnt in

your own natural language, whereas learning Prolog is like learning a second language to understand a third. The manual has the most elegant cover but is atrociously written and likely to appear totally unreadable. It's almost Greek to me.

Herewith the point of all this. When you do get Prolog and when you do get discouraged with your efforts to comprehend what declarative languages are and what they're all about and why they are important today but more important tomorrow; when all this happens... take heart! Rescue lies no further away than the nearest 'good' bookshop (ho!ho!). Pop in, ask them to get you a copy of *Turbo Prolog: Features for Programmers* written by Sanjiva Nath and published by the Management Information Source Inc. (represented in New Zealand by McGraw Hill). I came across it in the University Bookshop opposite the creche in High Street while Four! amused himself for an hour painting rainbows.

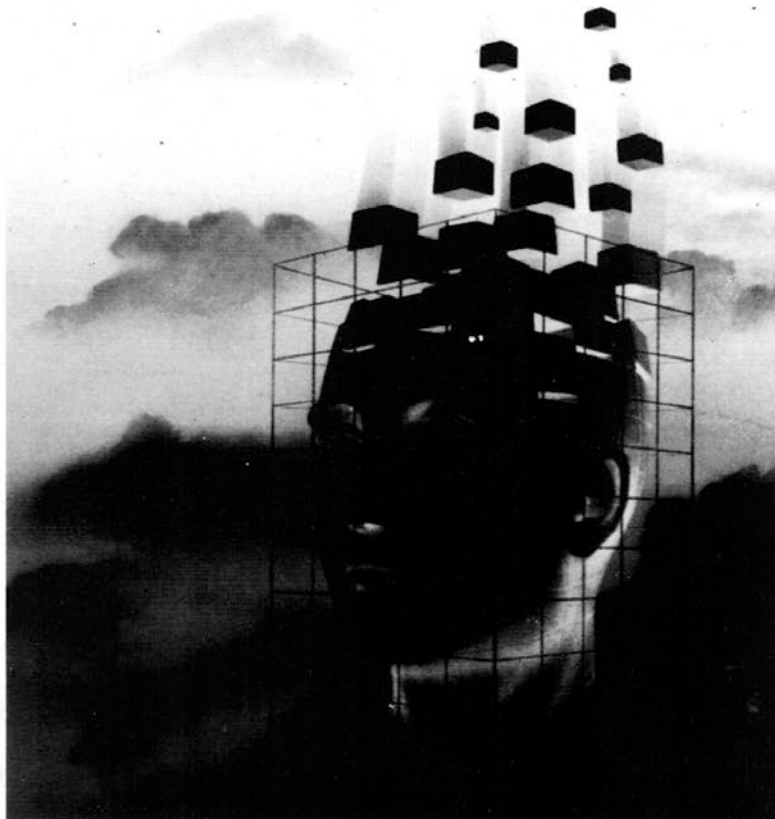
New languages for new generations of computing are important to all those who would be a part of David Lange's New Zealand new tomorrow – when the working man cannot expect a 40-hour week for 40 years. More specifically, new languages which approach the whole gamut of problem solving, knowledge manipu-

lation, expert systems, artificial intelligence, robotics and natural language processing in a new way are vitally important to those who delight in technology or would be a part of an informed future.

The first chapter of Nath's book lets you know you are not standing before a didactic teacher, but rather seated beside a friend who shares your vision (take a peek at the dedication in the front of the book). Line by line and page by page you realise how much you retained from the manual, how little you truly understood; and now it unfolds before you.

After making your commitment – acquiring the software, buying the book, spending the time and effort – here at last is a kindred spirit eager to impart his understanding to you, sharing the joy of discovery. What more could you ask of any book? Buy the software if you can. Buy a computer if you need. But failing any or all of the above, buy the book, through the *Bits & Bytes* Book Club if necessary.

Oh, and by the way, if you're really into Prolog or expert systems and you find yourself at Royal Oak roundabout with a while to spare, ask a local where to find the cowboy hat with a beard and two boys – Nearly-Seven at school and Four! on a tricycle – and Strikey the dog, come and share a coffee, talk about the future.





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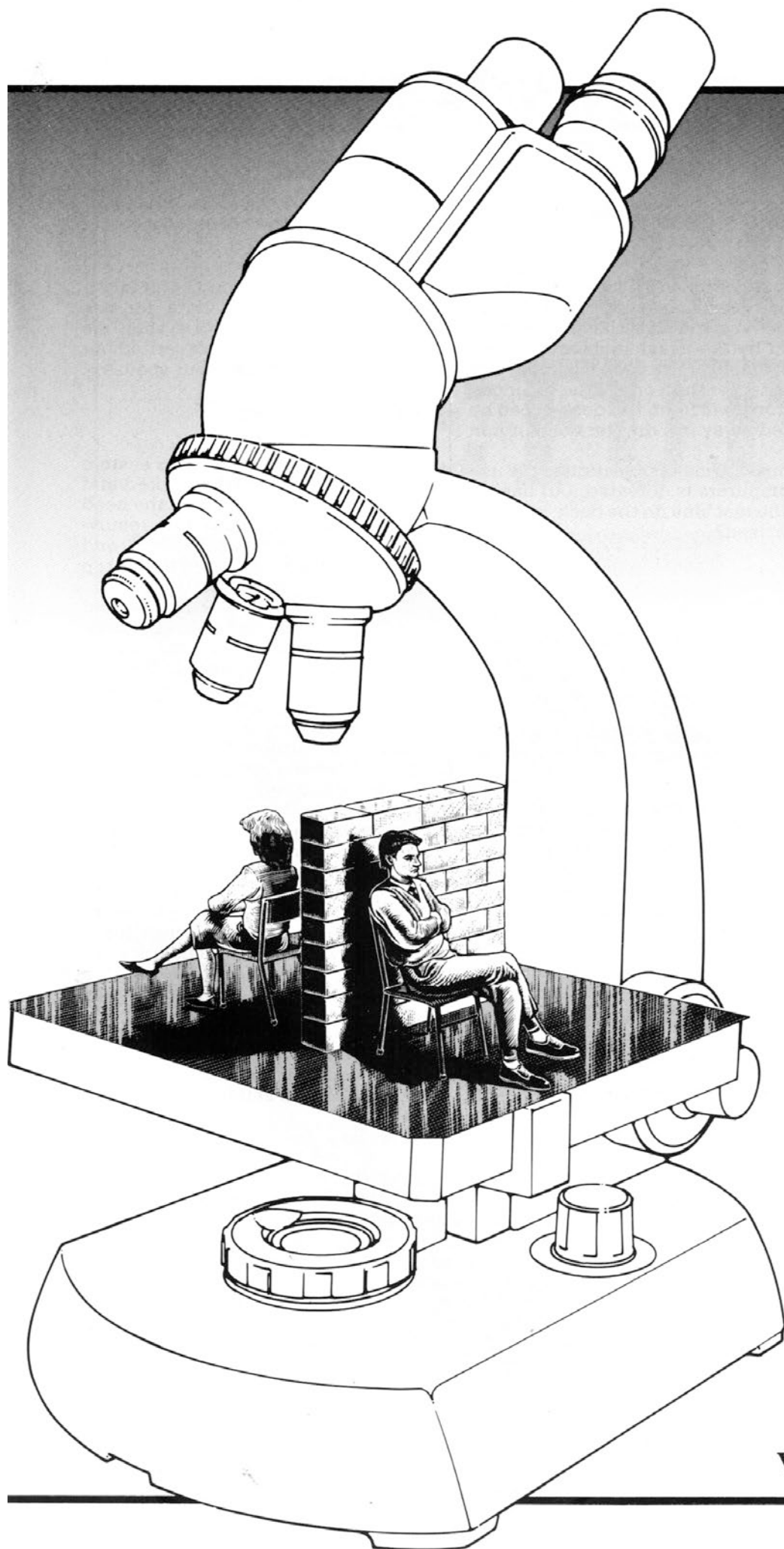
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# Part of a system

Oh where, oh where has my little DG One gone?  
Oh where, oh where can it be?

Back with Data General, that's where. This is one case where the reviewer should be allowed to keep the product being reviewed. I checked out the original DG One when it first came to New Zealand and found it nice but slow, and with the screen just about impossible to read, even in the right conditions.

Now the Data General One Model 2 is out. This machine has a backlit supertwist LCD screen, readable, not perfect, but good enough. And it's faster, with good screen refresh. Speed is relative, especially now that 386 machines are on the market, so XT speed is acceptable.

Let's backtrack now and look at what the DG One Model 2 actually is. It's the latest portable offering from Digital Computers, with a small 360 by 300 by 90mm case and the hinged screen unlatched by clips each side. When flipped up it reveals a compact keyboard, with all the keys there and looking very crowded, but surprisingly the locations of the keys are easily learnt and they seem to fall readily into place. I like the feel.

The only keys difficult to use are the cursor controls, with the up and down arrow keys being either side of the left and right, an arrangement unsatisfactory for paging up and down. Screen contrast and brightness are also controlled from the keyboard, using the CMD key and up and down arrows. The screen viewing angle is adjustable.

## Portable power

Internal batteries are included, rechargeable from the AC power unit supplied and also from a car adapter. A serial port (RS232C and RS422 compatible) and Centronics parallel printer port are included, along with a hole for the presently-vacant telephone connector. These ports are all covered, when not in use, by a flip-down stand at the back which brings the unit into a more comfortable working angle.

So we have a small computer with its built-in screen and running on batteries or mains, but where does it fit in the scheme of things?

It is advertised as a portable, take-anywhere computer, but I don't see it being used like that in New Zealand. What does appear more likely is that,

because of its small size, it can happily sit on an executive's desk. No-one enjoys having the desk dominated by the usual keyboard, screen and computer box, but this unit, not much larger than one of the older calculators, will fit on the desk or can be tucked away in a drawer when not in use.

Thus one major objection to the use of computers is defeated, but having got the machine on the desk, how is it to be used?

***It is advertised as a portable take-anywhere computer, but I do not see it being used like that in New Zealand.***

This model fits squarely into the Data General System, a situation confirmed by the software. The machine has a built-in program to allow it to act as a terminal for the DG system, which means switch on, link up and exchange the information required. A spreadsheet, word processor or database can then be used to process any information.

But more is to come. Software has been provided to form even better links with the DG system. The DG One Model 2 can be used as a straight terminal, either interactively or in

running programs on the mini or mainframe, capturing data for use later. The computer can then be taken home and the work carried out there, to the delight of your spouse.

## Barrier removed

One feature of the DG mini system is that MS-DOS can be accepted and run on the hard disk without the need for partitioning the hard disk, removing a barrier between MS-DOS and the DG system, or between the laptop and the mini system.

The DG One Model 2 is provided with MS-DOS 3.2 and has 512kb memory as standard (so why did my review machine have only 256 kb on board, as well as outdated manuals?). Apart from that factor the manuals supplied seem up to the standard required, but although the MS-DOS manual is eminently readable to me, it could be hard without some knowledge of MS-DOS.

Using the computer as a terminal or link, it is possible to run full-size MS-DOS programs or capture in memory large amounts of data, which can then permanently be stored on either of the standard twin 3½-inch high-capacity floppies. If twin floppies are not enough, an alternative model is available with one 3½-inch floppy and one 10Mb hard disk drives.

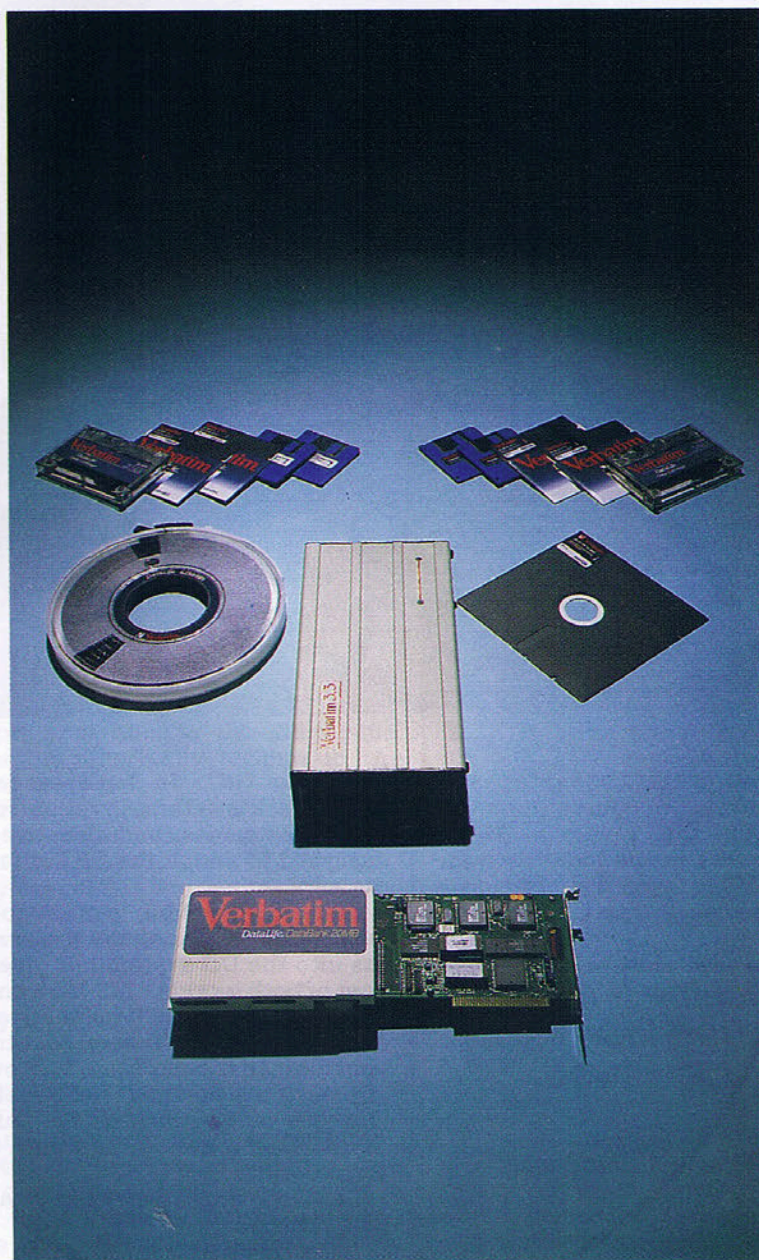
Perhaps I have been spoilt, but it would seem that to get the most out of the machine when interacting with the DG MV mini series a hard disk is

## Microcomputer Summary

Name	Data General One/Model 2T
Microprocessor	16-bit 80C88-2, 7.16/4.77 MHz switchable
RAM	512kb standard, expandable to 2.5Mb maximum with memory cards in dedicated memory slot
Display	backlit supertwist LCD, or electroluminescent, 2:1 aspect ratio, 80 columns by 25 lines
Disk drives	one or two 720kb 3.5-inch floppies or one 3.5-inch floppy and 10Mb hard disk
Keyboard	full-size with 79 keys, including 10 function keys
Communications	built-in communications compatibility (8250), parallel printer port
Power supply	internal battery pack and external charger (LCD models) for 7 hours' operation, AC adapter
Operating system	MS-DOS v3.2
Options	RAM expansion, electroluminescent screen, disk drives, carry case
Prices (excl. GST)	from \$3,831 (single 3.5-inch floppy, LCD) to \$8,803 (3.5-inch and 10Mb disks, EL screen)



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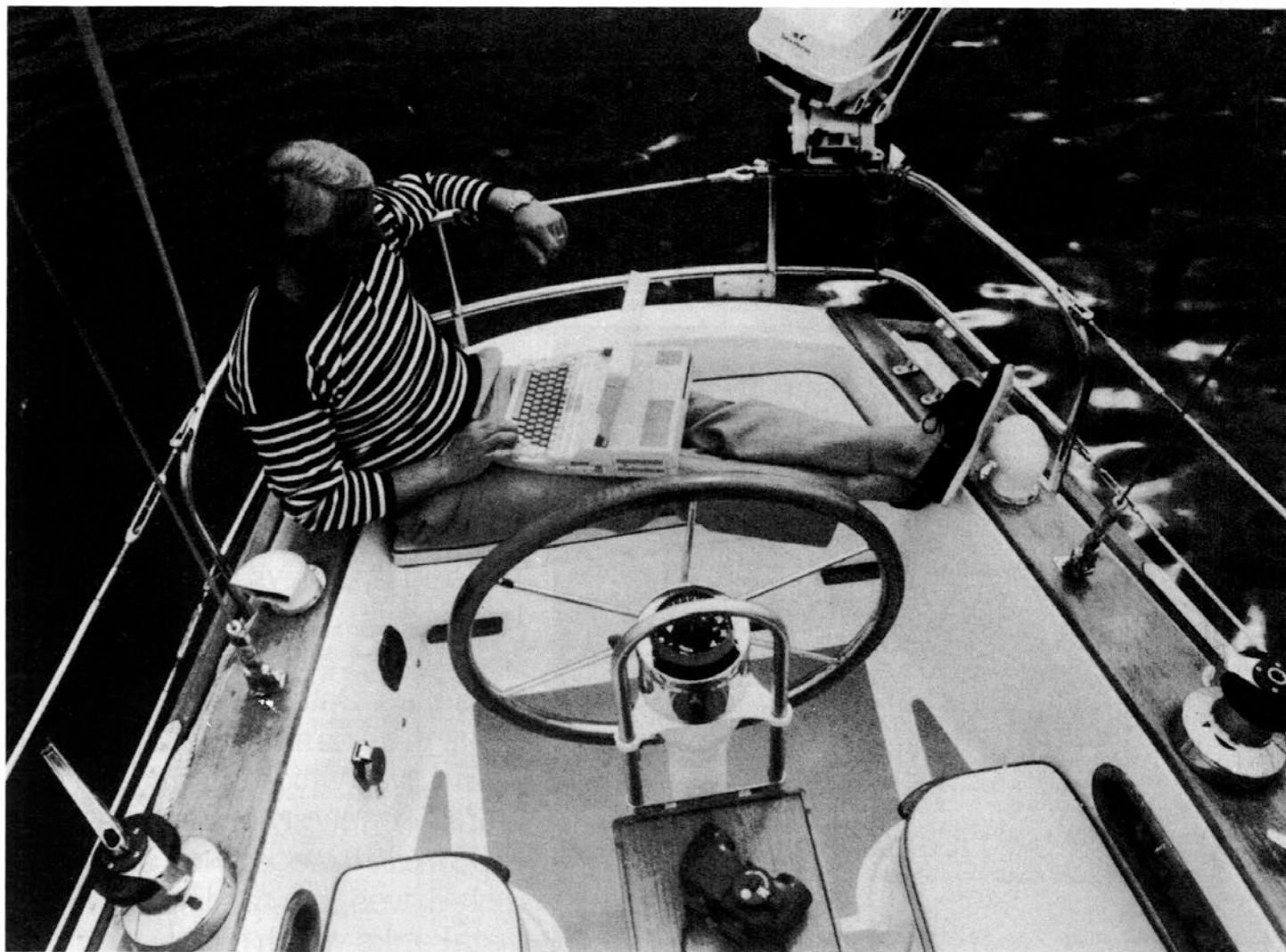
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needed. It can then be used as the ultimate personal computer running MS-DOS, then accessing any data on the MV mini, storing the data which is usually quite large in terms of file size, and then processing it. Data General has a LAN system which has PC integration and electronic mail. This Office Integration is a major feature of the DG system and the DG One Model 2 seems to fit right into it.

## System price

This is a system machine, and as explained fits right into the Data General system, which is reflected in the price. With 512kb, backlit supertwist LCD screen, twin 3½-inch floppy drives, parallel and serial ports, bat-

teries, built-in AC adapter and charger, tutorial, documentation and MS-DOS 3.2 the price is \$4,288 (excluding GST in the industry manner). The 10Mb hard disk version is \$6,543, again excluding GST.

## ***This machine is more specialised than those normally reviewed.***

As part of a system, not too bad. For those who want the ultimate screen, an amber electroluminescent model is available, at an interesting premium of \$6,543 for the twin floppy and \$8,803 for the hard drive, all

excluding GST. In both cases the power pack is external to allow for the extra electronics, and the screen is designed to match the CRT screen of the mini series.

I feel this machine is more specialised than those normally reviewed. It fits into the DG system but gives the best of both worlds – MS-DOS and the MV mini series – with no need to step outside the Data General fold to buy your personal computer. The overall impression is that of a well-developed machine without any quirks, but the more I used it the better it was. Good engineering.

But DoG-One it, why did I have to give it back? ■

*Review system supplied by Data General, Auckland.*



# Menu system for hard disks

by George Mitchell

The purpose of the software package Direct Access is to speed up and simplify access to programs that may be buried in some distant sub-directory on the hard disk and to remind the user of the contents of a file or directory in more detail than is otherwise the case. It allows the user to define his or her own menus in order to access applications from the disk without going through DOS directories.

Direct Access really does live up to its purpose.

I found it simple to set up, and the directions and options clearly laid out. It is very useful in collecting information quickly on what programs are available on the hard disk, relating them to each other by categories in such a way that the general duty of a program will lead to its description and retrieval if selected. It also avoids the tedium of writing paths each time you boot up.

***It is very useful in collecting information quickly on what programs are available on the hard disk.***

The feature of using passwords (or not) for access to submenus affords the facility of allowing access to selected files for differing levels of competence or management. It also enables the user to enter a full description of files in the submenus, something normally lacking in the usual file name.

Once the information is entered and the menu is made up with the information requested, a logical menu program guides the user through the intricacies of directories, subdirectories and paths with a single key entry.

## Too much of a good thing?

Typing the ampersand (&) and the plus (+) to add additional parameters and multiple commands is useful, and the comma (,) for calling a floppy disk is a good idea but could be too much of a good thing. While the time and date come on screen with a cheery "Good morning" or "Good afternoon" when the installation is configured to

display automatically at boot up, the alternative does not pick up time/date as DOS is not called.

Printing tracking reports is a duty more likely to be done with a database or word processor. However, the tracking menu does allow the naming of a field or a time between dates for deletion of data no longer required.

A very good adjunct is the usage tracking function which enables management, consultants and contractors to record the actual time spent in operating the computer for a specific duty, thus assisting in the billing of the customer for services.

Updating the menu by means of the Maintenance Menu accessed by the F1, F2 and F3 keys with single-entry options is quick and simple. Returning to DOS is also simple and

straightforward with F10, although one of the features is a standard DOS menu which gives the ability to work with DOS commands without knowing DOS. The variable screen blanking time can be set to a maximum of 45 minutes.

Direct Access version 4.1 has just been announced, adding such features as company logo display on the screen when logging on, a tree function to list all directories or files for easy input to the menu, and added security with a valid user name list as well as a valid project number list.

This is a worthwhile accessory to any hard disk system. ■

Distributors: Paperback Software (NZ) Ltd, Hamilton.

Price: \$225 plus GST.

## Menu

### Appetisers

What's Best demo disk	\$10.00
ProDesign II CAD demo disk	\$10.00
Timeline demo disk	\$10.00
The Remarkable Payroll demo disk	\$10.00
PC Write evaluation version	\$19.95

### Entrees

PFS First Choice	\$250.00
Ability	\$225.00
Framework II	\$745.00
Open Access	\$1095.00
Symphony v1.2	\$1125.00

### Main courses

Lotus 1-2-3 v2.01	\$645.00
Word Perfect v4.2	\$595.00
Freelance Plus	\$895.00
Microsoft Word	\$895.00
TimeLine Project Management	\$995.00
Microsoft C Compiler	\$1095.00
Excel	\$1195.00
Harvard Professional Publisher	\$1295.00
PageMaker	\$1795.00
Ventura Publisher	\$2395.00

### Side dishes

Sidekick	\$165.00
Direct Access	\$169.00
Mace Utilities	\$225.00
Microsoft Windows	\$189.00
Norton Utilities	\$215.00

### Desserts

Zork I,II,III	\$99.00 ea
Gato	\$99.00
Championship Golf	\$125.00
Hitchhiker's Guide to the Galaxy	\$125.00
Flight Simulator	\$145.00

All prices are exclusive of GST, in the manner adopted by the industry in direct contravention of advice and wishes of the government, Consumers Institute and indeed just about every other branch of commercial enterprise.

# The missing link?

by Peter Belt

**W**hen you are gluing your PC back together again after another one of those bouts of who gets to use it first (if at all), it is time you were at least thinking about getting another machine. Maybe the cost is holding you back, or the fact that two PCs cannot communicate directly. Fear not: the Office Automation Link comes to the rescue!

Office Automation Link (OA-Link for short) is an extra PC on a board. All you need is a free expansion slot in your currently overworked system, and you could be on your way to higher productivity. With the workstation adapter board comes an interface box, two 10-metre 15-pin cables, a little booklet, a printer adapter, some pamphlets and a floppy disk containing ODOS, the OA-Link Disk Operating System. In addition you will need a screen and a keyboard, which can be any one of the already available brands, allowing you to continue with your favourite equipment.

## Not an easy fit

After unpacking the various boxes and reading the manual once, I felt confident enough to start the installation of the expansion card. The soldering on the card was precise and proved once again that Taiwanese electronics can now be high-quality equipment. A little box of four dip switches allows the configuration of the card for the number of OA-Links present in the system, with a table in the booklet showing what the settings are.

A problem occurred with the actual sliding of the adapter board into my PC: it would not fit, because the little capacitors at the end of the banks of RAM were in the way of the card guide. I had to remove the expansion card guide totally to allow the OA-Link to fit.

A definite plus in the design was the fact that although the card had an 8-bit connector, it left enough room to slot it into a 16-bit connector, thereby allowing the card to sit in any slot on the AT. About 10 metres away was my interface box, which allowed the connection of the two cables coming from the PC. Apart from the two data lines, there was a standard 9-pin D-connector monitor port, a 25-pin RS232 serial port, a 25-pin parallel port and a DIN keyboard connector, all clearly labelled.

The dimensions were modest: 183 x 140 x 55mm, not allowing for the cables at the back, of course. I plugged the monitor and the keyboard cables

into the box, and that completed the hardware installation.

## Too easy?

In the back of my mind I did not expect it to work: it simply could not be that easy. After I turned on my computer (the Host), I switched on the OA-Link. It reported that 256kb of RAM was at my mercy. I booted up ODOS, the Multi-user Operating System, on the Host and after a five-to-ten-second wait, the OA-Link started to boot from the hard disk, and there it was: the C>\_ prompt! I quickly did a directory, and again it did exactly what it was supposed to do.

At this stage I returned to the Host. My computer sat there, happily waiting for my command. The mean streak in me decided to age the accounts from both the Host and the OA-Link. The result made it obvious that both the Host and the OA-Link were totally unaware of each other's existence. ODOS to the rescue!

The Office Automation Disk Operating System comes on one floppy disk and loads over the top of DOS to become totally transparent. It does, however, require a DOS version 3 or higher, because the lower DOS versions do not support networking.

At this point, consultation with the little booklet told me to look into my root directory on my hard disk, and compare it with the directory on the ODOS disk. Any files on my hard disk with the same name as any on the ODOS disk were to be renamed, but the only two I could find were AUTOEXEC.BAT and CONFIG.SYS.

Then it instructed me to copy the ODOS disk into my root directory on the hard disk. To me that went against the grain. I am a great believer in sub-directories, and to be forced to clutter up my root directory was not at all amusing. I decided, and so should everybody, to do a full backup of my hard disk before carrying on. I then copied ODOS onto the hard disk and booted up the host with a Ctrl-Alt-Del. It was interesting to see that the OA-Link carried on quite happily, completely unaware that the Host was currently unavailable.

This time my computer recognised itself as a Host, and when the slave was rebooted, it gave itself the identity of USER0.

## Claim and counterclaim

At this stage the benefits of this system and the claims made by the manufacturer and vendor as to the relative performance and economy of the OA-Link should be discussed.

The first claim is that one OA-Link multi-user system can support up to nine users, including the Host. This is of course physically possible, but given that any average computer has only eight expansion slots, and at least two or three of those are taken up by other cards such as disk controllers and display adapters, it seems that actually getting eight slaves onto one Host is a bit of a squeeze. Another no-no is for the Host actually to be used, but more about that later.

As the OA-Link has its own 6.67 MHz NEC V20, CMOS 8088-2 processor, it does not require the Host's CPU attention for most tasks, which is what the manufacturers, Our Business Machines Inc, happily claim. However, this is dependent on what the applications do, as we shall see.

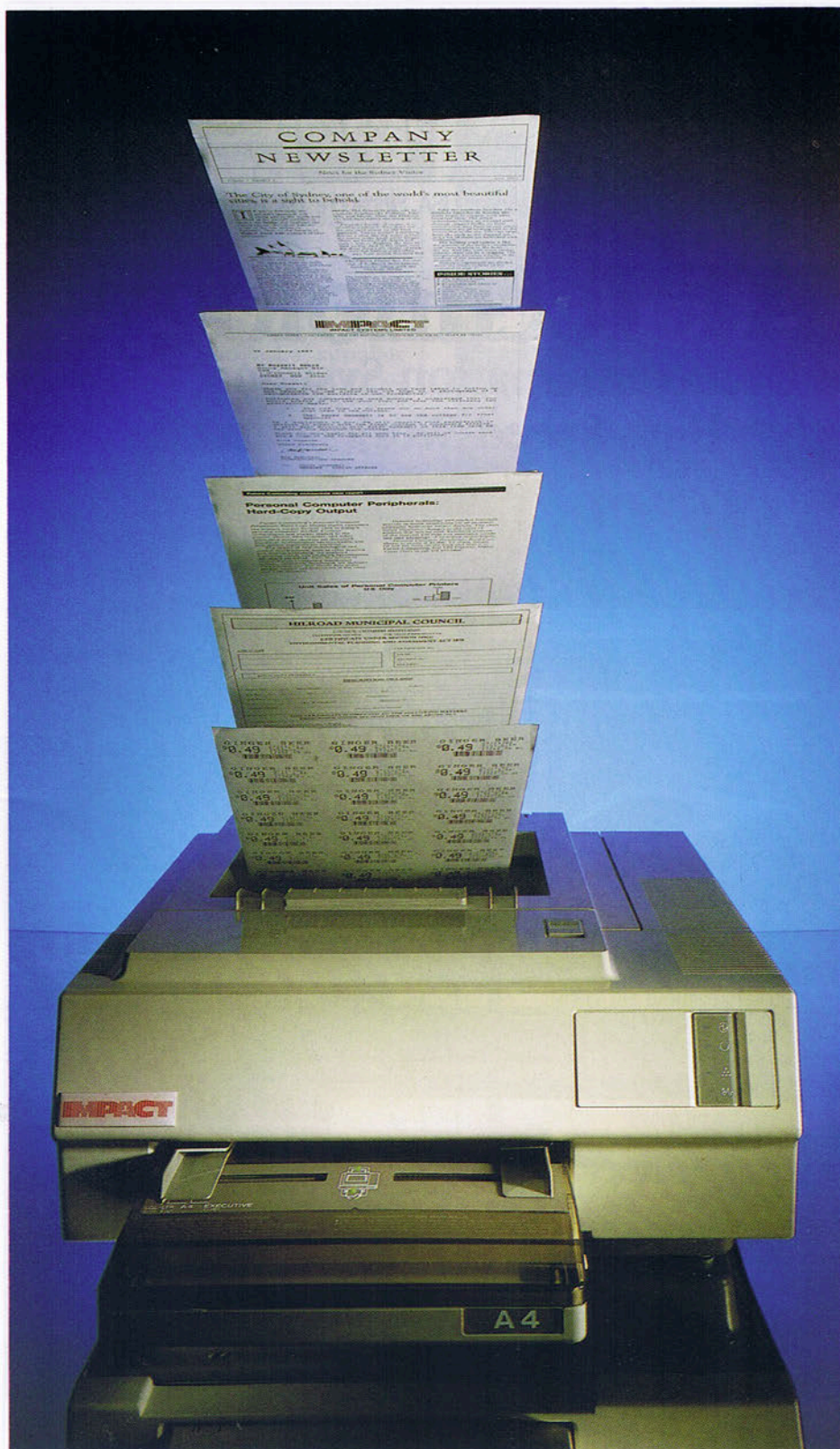
***It requires DOS version 3 or higher, because the lower DOS versions do not support networking.***

Each workstation has a local serial and parallel port, which will allow a printer next to every slave, while the serial port could support such devices as modem, plotter, digitiser, serial printer or serial mouse. A plus is that all the parallel printers on any slave, including the one on the Host, can be directly used by all. This can be done in a real-time situation, eliminating queueing and process control overheads.

ODOS is the most elementary multi-user operating system. If a network situation is needed, appropriate networking software such as IBM PC-Net or Novell, both of which OA-Link is claimed to operate under, still has to be purchased, although the manufacturer says using Novell as the main operating system loses the ad-

(Continued on page 43)





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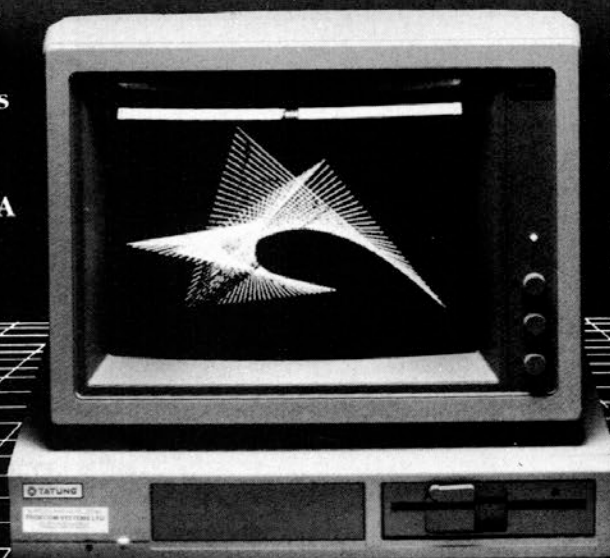
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## The missing link? (from page 40)

vantage of OA-Link's ease of use. If ODOS is used while networking software is operational, it will support file and record locking, a feature seriously lacking in a non-network setup. Therefore, all that the user will notice from ODOS is printer switching and printer status display.

A facility to bring in some protection by using passwords for users and on directories is also allowed for, although I was unable to get it working, even after consulting the supplier and the receipt of a new copy of ODOS. I am sure that it will work, but it seems that a bit more than average knowledge is required to get things up and running.

By clustering the OA-Link multi-user system with other OA-Link systems, a theoretical network of up to 2,295 users can be created. This figure should be taken with a saltmine of salt, although probably 1000 should be a feasible goal. For the more technical, the card takes over interrupt 2 and channels interrupt 19, disk services, and 21, device services, to the Host.

Any slave terminal can be up to 65m from the Host without any loss in data integrity, which should satisfy most people's space requirements.

Any slave also has the option of having a colour screen. This way the OA-Link can enhance the network for individual display adapter requirements, with the purchase of either a monochrome or colour OA-Link, with choice of monitor and keyboard.

## Comes the cruncher

I take great pleasure in trying to find the limits of any system. The manufacturer's claim that the slave runs at twice the speed of the standard IBM-PC seemed right on the surface, until I got stuck in...

To set the scene: the host is an AT running at 10MHz with one wait state. When OA-Link is not installed, Norton's System Information (SI) performance index gives it a rating of 10.3, and the lesser-known Landmark CPU speed test, which measures the raw grunt of a CPU, gives it a 10.0MHz rating (6.2 times that of the IBM-PC).

Now comes the real cruncher: by simply slotting in the OA-Link card, the AT's performance drops to Landmark 9.4 (5.7 times PC), and Norton starts to hover between 9.2 and 10.3, without even connecting the card up or turning the slave on. To me this represents an approximate average drop of 6 per cent in performance at the best of times, just adding an interface card, and I also suspect that any additional OA-Links would have the same effect on the Host's processing power.

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## The missing link?

I proceeded to connect up the OA-Link slave and boot it up, again monitoring the performance of the Host, which in this case did not change from Norton 10.3-9.2 and Landmark 9.4. The slave ran at Norton 2.4 which might confirm the claim that it runs twice as fast as a standard IBM-PC. Landmark, though, showed more realistic results at 1.7MHz, the same performance as an IBM-PC (based on the Landmark test – the normal speed is 4.77MHz). This was in agreement with a test on V20 CPUs I have previously carried out, showing the average increase in performance of the NEC V20 over Intel's 8088 to be in the range of 2.5 per cent.

## *The claim that the slave runs at twice the speed of the standard IBM-PC seemed right on the surface, until I got stuck in...*

Later I put both the Host and the slave under very heavy CPU loads by compiling, sorting, and setting a chess program to play against itself. Again the performance stayed the same. Then I finally hit the bottleneck: when the slave requests disk (or device) access from the Host, the Host just about drops dead. And when both the host and the slave are fighting for the attention of the disk drives: ditto.

To illustrate its severity: I set the slave going on a Norton File Find (FF) which scans all the directories for a particular file name. This, as may be appreciated, depends heavily on disk access. On the Host I monitored the Host's performance. The values were up and down like a yo-yo, with the worst performance being Norton 0.5 and Landmark 0.2 (0.5 times PC), which means that if a slave requests disk access, the Host just about shuts down – and not for a fraction of a second, either.

After a closer look it seems that the Host does not interfere with the slave's performance, but the slave can severely impair the performance of the ever hospitable and enduring Host, a problem not restricted to this particular system.

## ODOS and utilities

As all the printers on one OA-Link network can be shared by all, a facility is needed to manage the printers, and two programs on the ODOS disk specifically cater for this. Firstly,

ODOS itself. By typing ODOS and giving it a parameter, functions include such things as: displaying the name of the user currently operating the default printer, or who is using the local parallel printer; cancel printing on default or local printer; two methods of switching default printers; assigning default printers and default ports to workstations; and setting up buffers and a primitive form of password security.

The rest of the files on the ODOS disk are for 'internal' ODOS use, or to test the slave. I found these tests very poor. If I loaded them on to the hard disk and attempted to run them, a rather logical thing to do, they directly went to drive A:, and would not work until I put the ODOS floppy in it. At least OBM has supplied the assembler source files, so the more adventurous can change the tests to suit.

## Conclusions

The hardware of OA-Link is easily installed. The software, however, is not user-friendly enough, and is too brief to be of any thorough use. Documentation is completely inadequate, and I would suggest that the supplier might like to invest in five or ten typewritten pages in a supplementary booklet to reduce the number of enquiries. The hardware looks well thought through and of quite a high quality, although the two cables running between every host and slave can be clumsy.

Our Business Machines found using one 32-pin cable to be too bulky to install in office buildings and opted for two cables, but only one needs to be used if both the serial and parallel ports are not required.

As for the potential market, I would

say that people who already have a network with software running should have a very serious look at OA-Link, as the suggested savings do apply to them. For those who want to expand from a single-user environment to two or three screens, I would suggest a look at OA-Link while keeping in mind the lack of security. Without running network software, all applications are liable to be used at the same time, risking a crash or even corruption of data. ODOS by itself is totally insufficient when it comes to file and record locking.

The advantages of OA-Link include: slaves do their main processing themselves and have their own RAM; the network is easily expanded; on existing networks the expansion could be cheaper using a OA-Link as opposed to a PC-slave; all printers radiating from one host can be shared by all users; and workstations can be quite a distance away from the host.

As for disadvantages: some extra cost will probably be incurred expanding the RAM, as 256kb is generally insufficient; if the host is more powerful than the slave, the slave cannot enjoy that power; when the slave requests disk (or device) access from the host, the host all but stops in its tracks; expansion from a single-user system would probably not present a cost-effective solution using OA-Link; the documentation is only sufficient for hardware installation; and if no networking software is present, file security is nonexistent.

OA-Link will not be a miracle solution to all, but when applied in the right area, it is a tidy and attractive way to put an extra screen on the desk.

*Review equipment supplied by:  
Viscount Electronics, Palmerston North*

## Specification Summary

Name	Office Automation Link
Distributor	Viscount Electronics, Palmerston North
Manufacturer	Our Business Machines Inc, Taiwan
CPU	V20 CMOS 8088-2, 6.67MHz
ROM	OA-Link V1.02, dated 01/01/85
RAM	256kb, expandable to 704kb
I/O	1 serial, 1 parallel port
Display	monochrome or colour screen (see options)
Keyboard	XT compatible
Operating system	runs under MS-DOS 3.00 or higher
Bundled software	ODOS, a multi-user 'shell'
Price	\$1795 (including GST)
Options	either a colour or monochrome OA-Link screen, keyboard, printer, plotter, mouse, modem, etc
Ratings (5 highest)	Installation – hardware 5+
	Installation – software 1
	Documentation 1
	Support 5
	Ease of use 5
	Station expansion capability 1
	Network expansion capability 5
	Compatibility 5–
	Value for money 4



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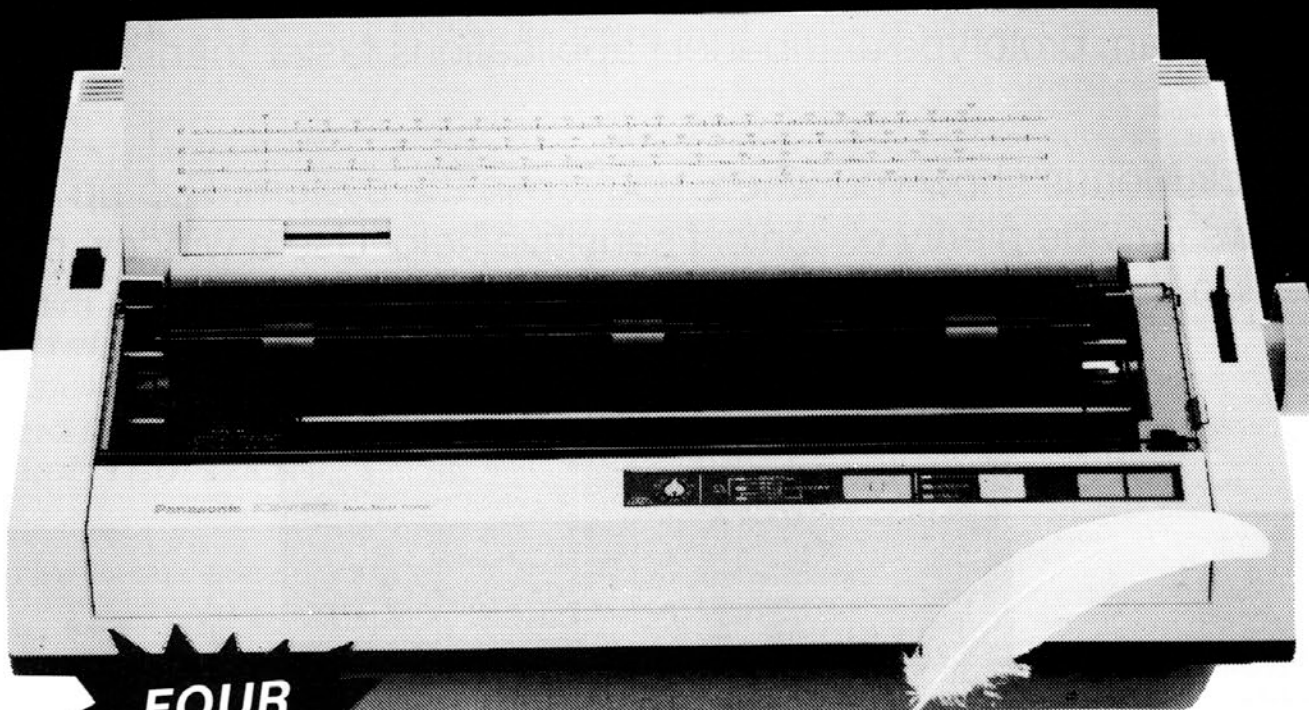
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KX-P1083 (10 inch) <b>NEW 9-Pin</b>	240 cps in Draft mode, 51 cps in NLQ mode.
KX-P1082 (10 inch) <b>NEW 9-Pin</b>	160 cps in Draft mode, 32 cps in NLQ mode.
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# Cracking pace from Compaq: new industry standard?

by Gaie Ellis

Just when we thought the technology for desktops had reached its most dizzying heights, new releases pose the question: "Will we ever have the software to fully utilise the hardware potential?"

One of the more exciting launches to happen this month was the release from Compaq of its new Deskpro 386/20 and the new 386 Portable.

Running at 20MHz the Deskpro is sported by Compaq as being the "fastest PC in the world" and watching the machine in action even non-technocrat computer users were impressed with its ease of operation and speed. The manufacturers have opted for Flex architecture, as opposed to the microchannel, because this company is not prepared to turn its back on the estimated nine million users operating 5¼ inch disks, according to Australian managing director Ian Penman. He said they would continue to provide that drive option along with the new 3½ inch drive and while he readily acknowledges the advantages of the 3½ technology they would not sacrifice compatibility.

This PC supports the new Weitek coprocessor board for numerically intensive applications and this, combined with the speed of the machine, makes it particularly suitable for the rapidly growing CAD, engineering and desktop publishing applications.

Designed to accommodate software and hardware peripherals for industry standard 286 and 386 PCs, the machine will also take full advantage of the features of the MS OS/2 operating system when it becomes available next year, Penman said. Microsoft Windows 386, jointly developed by Compaq and Microsoft, will be included free of charge with all 80386-based Compaq products shipped by December 31 this year.

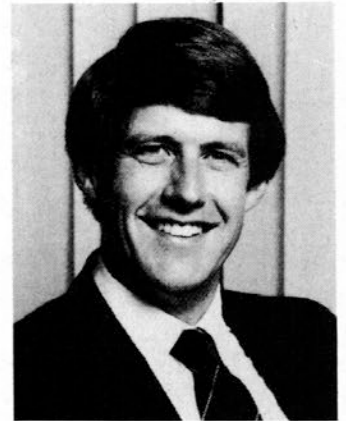
MS DOS Version 3.31, also the product of joint development by the two companies, gives users the capability to configure logical disk drives or files up to 512 Mb, and take advantage of the new hardware offerings.

The new portable, which weighs in at nine kilograms, also runs at 20MHz and utilises the 80386 processor to achieve high speed. The highlight of this machine has to be its ability to support up to 100 megabytes of fixed disk storage.

"Does anyone need that much portability?" At first level, maybe not, but this type of power offers portability for situations that are currently being catered for by mini-computers.

While people may not need to take their mini about with them, the portability makes it a very real option when it is used as a file server, particularly in intensive use situations such as banks.

I guess the one question in the mind of dealers here is whether Compaq will be



able to supply. Penman said they underestimated the market when they launched the first portable last year and that they were unlikely to let that happen again. However, product for review looks like being a while in coming to Godzone which could indicate that demand is again greater than expected... or that the market development precedes the manufacture. A clever move in the volatile computer industry, particularly for product which has been fathered by ex-IBM performers.

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# Laser printing technology – the nitty-gritty

by Don Sykes,  
*Marketing Manager, Hewlett-Packard (NZ) Ltd*

Today's laser printing is the interaction of several different technologies including electronics, optics, electrophotography and software engineering. Its roots are in the photocopier industry, where early breakthroughs such as dry toner development, electrophotography and the reproduction of an image via electronic instructions have been the building blocks of the modern laser printer.

Forerunners of the desktop laser printer included sophisticated electronic publishing machines that were large, slow, and required a specialised publishing application to justify their high cost. These machines provided high-resolution images for such applications as newspapers or magazine publishing.

Early technological advances in the photocopier business, such as Xerox Corporation's development of a dry toner process, IBM's development of a similar process, and Canon's development of its NP, or New Process, paved the way for what we know today as desktop laser printers. Some of the earliest laser printers, such as IBM's Model 3800 and Hewlett-Packard's HP 2680 laser printer were the result of these technologies. Valuable lessons were learned in the development of these products and the trend toward high-volume, low-cost laser printing began.

## Market opportunities

The imaging technology for laser printing has been around for a number of years (the IBM 3800 was introduced in 1976). The real advances toward an affordable, powerful and easily used printer were made in the early 1980s, when Hewlett-Packard, with its introduction of the HP2686A LaserJet printer in 1984, brought the cost of laser printing down to earth while setting a standard for a blossoming industry.

Recent research data, extrapolated from Data Quest North American figures, project the market size of 10 page-per-minute, non-impact, plain paper printers (the desktop laser printer) worldwide to be as follows:

	Units shipped	Dollars
1984	58,800	\$US243,600,000
1987	634,000	\$US1,680,000,000
1991	1,538,400	\$US2,166,000,000

This represents the fastest-growing printing technology in the world today, at annual compounded growth rates in terms of dollars of sales at 36.64 per cent, and annual compounded growth rates in terms of units sold at 59.41 per cent. The rapid growth rate in units sold, when contrasted with the relatively lower growth in terms of dollars of sales, reflects the competitive environment, and increasing price/performance levels as vendors become better at building affordable desktop laser printers.

As price/performance barriers are lowered, the inevitable erosion of other printing technologies will occur, so look for more laser printers and fewer daisy-wheel, dot-matrix and other impact technologies used in office or desktop printing in the future.

As mentioned, laser printing is the combination of several technologies. To explain how each type contributes to the laser printer's operation, we will trace a typical document's printing process.

The document is created with a software package, or application program, which deciphers the application instructions into printer instructions by means of a printer driver file. These files are generally written by software publishers so their applications will be compatible with a variety of peripherals. In the case of HP's LaserJet Series II, the driver file resides within the software package and serves to translate the application's commands into HP's PCL printer language which the printer can understand.

HP developed and uses the most emulated page printer language in laser printing today: PCL printer language. As application data is received, this is how it responds: first, the data is "parceled" out, that is the printable elements that make up the page are separated from those commands that decide typefaces, type sizes, or special characters. The result of this action is an "intermediate

page", which includes the location of text, graphics, and images. Essentially, the intermediate page is a roadmap of what images are to look like and where they are to be placed when printing the page.

## Laser printing process

The intermediate page is divided into horizontal strips, from top to bottom and left to right, and each of these "buffer strips" is rasterised. Rasterisation is the process of defining, dot by dot at 300 dots (or pixels) per inch of page area, whether the printer will or will not print a pixel at that precise spot on the page. When rasterised, each strip is a set of on/off instructions (binary data) that will tell the printer exactly which pixel will be printed and which won't for that area of the page.

The actual printing process for our document consists of six stages: cleaning, conditioning, writing, developing, transferring, and fusing. Cleaning involves physically and electrostatically cleaning the printer drum (an aluminium cylinder wrapped with a photosensitive material) of any prior electrical impulses and toner from previously printed pages. The clean drum now needs to be prepared, or conditioned, by applying a uniform electrostatic charge to the surface of the drum. This is accomplished with the printer's first corona assembly, which applies the charge by applying high voltage to a thin wire close to the drum which ionises the air around the wire. This causes the drum's photosensitive material to take on the electrical charge of the wire and ensures that the surface of the drum will have a clean, electrically-constant surface before the image is written on it.

As the drum continues its rotation, it passes the writing station where print information is written onto its surface. The signal used to modulate the laser beam that does the writing is the rasterized, binary data already explained. The laser beam, scanning across the horizontal axis of the drum, focuses on each concise spot on the drum and either exposes (dissipating the electrical charge) or does not ex-

# PRINTERS

pose (leaving the drum electrostatically charged) for each pixel on the page, line by line. The result is a 300 by 300 dots per inch electrostatic image of the portion of the page to be printed which now rolls toward the developing station.

At the developing station, the electrostatic image encounters a cloud of dry toner particles, a powdery black ink composed of black plastic resin mixed with iron. The toner cloud is electrostatically charged, but with the opposite charge of the drum. Since opposites attract, the toner particles attach themselves to the drum where the drum is electrostatically charged, and repel from the places where it is not.

As the drum continues its rotation, it is moved to the transfer station, where a second corona station electrically charges the paper. Again, this charge is opposite from the one on the toner-laden drum. The toner particles are attracted to the paper as it passes by the drum, and we now have our image on the paper. The diameter of the drum, roughly 3 inches, does not

allow a full 11-inch page to be printed on its surface. Typically, it takes several revolutions of the drum to complete the image of one page, so the various activities of the laser printing process are being carried out simultaneously several times for each page printed.

Next, the toner particles are fused onto the paper by actually melting the plastic particles to the paper. When the paper with the dry toner passes through the fusing unit of the printer it is exposed to a 180°C heat lamp and the toner is heat-fused to the paper. From this stage the paper is transferred to the output tray and is immediately available for the user, with print that has set a new standard for the term "letter quality".

Key benefits for laser printer users are very high print quality, speed and, since they are non-impact, less than 50 dBA operating levels of noise. Software support, in Hewlett-Packard's case from over 600 packages, has also been a key factor in their success.

## Not just for desktop publishing

by Steve Shilham,  
*Marketing Manager, Impact Technologies Ltd.*

One of the worst things that can happen to any new product is for it to be badly marketed, particularly a new technology which is still not fully understood by the prospective purchaser.

Remember when the home computer was first introduced and we saw enthusiastic vendors jumping up and down telling us about all of the marvellous things we were going to use them for?

Recipes, for instance. Whoever heard anything so daft as a PC sitting on the work bench just for sorting recipes? Where were the pictures; how do you browse through all of the mouthwatering photos of puddings and pies? How do you add all those magazine clippings you always have in the kitchen drawer, kept until they are yellow and covered in tomato sauce stains: All that flour getting in the keyboard. YUK!!

The kitchen recipe book was a classic case of an overenthusiastic industry pushing a product on a marketplace which had neither the need nor the inclination. Not that we didn't have many uses for a home computer, but not as a recipe book. Sadly, to a lesser extent, the same has been done with what must be one of the most exciting new products of the decade, the laser printer.

When we, the manufacturers and marketers, should have been out there telling our customers what marvellous benefits these new printers can offer them, how quiet they are, how fast, what marvellous print quality and all that sort of thing, what do

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**M1063: SPACE RESCUE ADVENTURE.** A comprehensive and sophisticated game to challenge you.

**M1064: ADULT JOKES.** A collection of witty, funny and often blue jokes.

**M1065: TEST YOUR ESP.** Could be used seriously or in fun. Computer shuffles and displays one of 25 cards with special symbols.

**M1066: CROSSWORD SOLVER.** Helps you find those elusive words in crosswords.

**M1067: BRIDGE.** A comprehensive and well-designed game to sharpen your play.

### UTILITIES

**M2041: BAYLEY UTILITIES.** Has mail facility for those who share the computer with others, wish to log computer time, more.

**M2042: EGA UTILITIES.** Help you to make better use of screen - changes colours, borders, lines, etc.

**M2043: SPECIAL COLLECTION UTILITIES.** With Nsweep (genuine), PC-Sweep, add line ends to ascii file, hard disk directory, adjust margins on Epson printer, etc.

**M2045+: SIDEKICK-LIKE RESIDENT UTILITIES.** Calculator, note pad, data base, appointments calendar, cut & paste, term, communications. 2 disks. Easy, powerful. \$36.

**M2046: HOT UTILITIES.** Superior directory, system stats, diskcheck, file find etc. For colour screen.

**M2047: MACINTOSH EMULATOR.** Doesn't run programs but provides a Dos shell like the Mac's. Great to watch, use.

### WORD PROCESSING/PRINTING

**M3007: SPELLING CHECKER.** Works with most word processors. We've added thousands of new words incl business/computer terms.

## TOP QUALITY PUBLIC DOMAIN & USER SUPPORTED SOFTWARE

**M3020: EXCELLENT WORD PROCESSOR.** Compatible with Wordstar, has clear, easily followed commands on screen.

**M3021: QUALITY MULTI-FONT PRINTING** on dot matrix, incl Courier, Greek, Helvetica, Palatino, Roman, Italics, etc.

**M3024: WORD PROCESSING FOR KIDS.** Special features, large lettering, easy to use. A gem.

**M3025: TOUCH TYPING - PRACTICE AND EVALUATION.** Lets you read script from screen, reports speed/accuracy.

**M3026: EGA/CGA WORDPROCESSING.** A many featured program that makes extensive use of colour screens. Delight to use.

**M3028: FANCY PRINTING FOR WORDSTAR.** Access many special characters, change line spacing, do sub/superscript, etc.

**M3029: PC-WRITE ENHANCEMENTS.** Uses macros to enhance the key command structure for easier and faster use.

**M4017: ONE-PAGE DESKTOP PUBLISHING.** Suits preparation of flyers, notices.

### GRAPHICS

**M4014+: COMPUTER-AIDED DESIGN.** Dancad3d will do complex drawing, 2 or 3 dimensions, print sharp lines for mechanical drawing, illustration, animate parts. We've squeezed 4 disks on to 2 needs CGA. \$36.

**M4025: SCREEN CAPTURE UTILITIES.** Grabs colour, b/w, graphics, etc. A professional printing aid.

**M4022: EGA GRAPHICS.** 3 dimensional, wire-frame modelling. Move, tip, scale, rotate.

**M4023: BUSINESS GRAPHICS.** For pie/bar charts, graphs, comparisons. Easy to use.

**M4024: PAINT GRAPHICS FOR MONO/HERCULES.** Good facilities - and you don't need colour. Patterned shading, backgrounds, etc.

### LANGUAGES

**M9001: BASIC/GWBASIC COMPATIBLE INTERPRETER** with tutorial. Runs programs written in industry standard Basic. Suits PC compatibles.

**M5023: Z80 CROSS ASSEMBLER.** New version that lets you write & compile CP/M programs on PC.

**M5034: MINI-ADA.** Substantial subset of major new language. Pascal & Basic source code + disassembler. Requires Turbo Pascal.

**M5035: ZBASIC COMPILER.** Fast, easy to use version, with editor & examples on disk.

**M5036: TURBO PASCAL CROSS-REFERENCER.** Lists, beautifies, cross-references source code.

**M5038: EXPERT SYSTEM SHELL.** Contains utilities to develop, test and run new expert systems. Menu driven. Turbo Prolog source provided. Book available.

### COMMUNICATIONS

**M8011: COMMUNICATION UTILITIES.** New version with compression/decompression tools. RS232 tutorial.

**M8014: SUPER NEW COMMUNICATIONS.** Telix. Powerful, yet easy to use, menu-driven. Contact bulletin boards.

**M8016: PRESTEL/VIATEL COMPATIBLE** communications program for contacting those bulletin boards. Handles split baud rate (1200/75).

### CALCULATION/BUSINESS

**M7001: GENERAL LEDGER ACCOUNTING.** Has GLedger, Cash Book, Profit/Loss, Balance Sheet. Prints cheques. Data can be read by Lotus 123. Easy to use.

**M7004: STOCK MARKET ANALYSIS.** Special aids to help you "think and grow rich".

For managing and evaluating portfolios and prospects. Needs basic.

**M7024+: PAYROLL SYSTEM.** Flexible, easy to use, adjustable rates. 2 disks. Good doc. \$36.

**M7040: 123 COMPATIBLE SPREADSHEET.** Also does graphs, pie charts. 52x200 cells.

**M7041: MEMORY-RESIDENT SPREADSHEET.** Full featured. At hand when you want it. Insert calcs into text, etc.

**M7042+: BILLINGS FOR SERVICES.** (Professions/trades, etc). Costs, mailing list, invoices, controls res, file merge. Quality program, easy to use. Powerful reporting. 2 disks. \$36.

**M7043: INTEGRATED SPREADSHEET/EDITOR.** On one disk. Effective combination.

**M7044+: CONTRACT BID ESTIMATING.** 5 disk set of powerful program for calculating costs, margins, progress and final estimates. Flexible to use. Needs hard disk. \$65.

**M7045: ACCOUNTS RECEIVABLE AND INVENTORY.** Integrated system for small business that has up to 200 debtors. Prints invoices, cost of sales reports, etc.

**M7046: GOAL SEEKING FOR SPREADSHEETS.** Works backwards with your spreadsheet from a specified target and lets you examine options.

**M7047: POINT OF SALE INVOICING.** Suits retailer with different products/depts, reads bar codes, controls inventories, etc.

**M7048: PURCHASE ORDER SYSTEM.** Keeps track of orders, goods received, quantities, prices, suppliers.

**M7049: PERSONAL FINANCIAL ANALYST.** Examines your monetary/assets situation and makes projections for planning.

### DATABASE

**M8009+: SUPER DATABASE MANAGER** New version. 120 fields, 16 million records. Fast sorting, fields anywhere on screen. Calculations. Two disks \$36.

**M8018+: DBASEIII COMPATIBLE DATABASE MANAGER.** Same functions and runs same files as DB3. Major or small tasks, good reporting, labels. Extensive docs. Highly rec. 2 disks. \$36.

**M8019: DBASEIII UTILITIES (1).** Add colour, printer control codes, compress/decompress, menu front end, show data flow, read file structure.

**M8019: DBASEIII UTILITIES (2).** Weighted Retrieval. New view of data based on your selection criteria. Attach relative importance to factors.

**M8020: DBASEIII UTILITIES (3).** Add ons and utilities. Compiled, with C source. Display header info, port addresses, date entry, count comments, encryption, view files, strip characters, more.

**M8022: HOME INVENTORY.** Keep a record of your possessions re theft, fire, insurance, etc.

### EDUCATION

**M9019: CHEMISTRY GAME** that teaches chemical valences, atomic bonding and structure.

**M9020: IQ WORKOUT.** Gives practice on synonyms, antonyms, analogies, numbers. Evaluates. Needs Basic.

**M9021: COMPUTER-AIDED TESTING.** Shows questions, checks answers, represents questions until correctly answered, evaluates.

**M9022+: MODULAR2 TUTORIAL.** 2 disks that teach you how to program in this important new language. \$36.

**M9023+: TURBO C TUTORIAL.** If already familiar with another language, this will give you a good grounding in Turbo C. Sample source included. 2 disks. \$36.

**M9024: SPANISH LANGUAGE TUTORIAL.** Includes vocabulary and conjugation of verbs. Extensive.

**M9025: JAPANESE TUTORIAL FOR BUSINESS AND TRAVEL.** The words, pronunciation, grammar most useful to the casual speaker.

**M9026: FRENCH TUTORIAL.** Emphasis is on conjugation of verbs.

**M9027: SECONDARY MATHS (2).** Compiled with Pascal source. Equations, lines, triangles, Ohms Law, Parallel Circuits.

### GENERAL

**M9504+: RECIPE MANAGEMENT.** Contains hundreds of recipes and excellent searching. Add your own. 2 disks. \$36.

**M9512: GOURMET PIE RECIPES.** Some of the most delicious you've ever tasted. Menu-driven.

**M9513: LIFESTYLE & HEALTH ANALYSIS.** Has personality assess, biorhythms, heart disease risk, alcohol screening, life expectancy. Needs Basic.

**M9514: CHURCH MANAGEMENT (1).** PROSPECTS. Keeps track of those interested in joining, personal data, etc.

**M9515: CHURCH MANAGEMENT (2).** MEMBERSHIP. Details of new members, anniversaries, birthdays, Sunday school membership, etc.

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Until today, presenting computer data to an audience was either difficult, clumsy, expensive, or all three. Now, instead of crowding around a PC (or just showing transparencies made from computer printouts) the KODAK DATASHOW Projection Pad – placed on the platen of a transmissive overhead projector – duplicates your computer readout on a liquid crystal display and projects it, as it appears on your monitor. No modifications, no fancy (and expensive) video hardware. Carry the whole system with you and set it up in minutes. Operate the system from the rostrum by infrared remote control.

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Post to: Datashow, Kodak New Zealand Limited, PO Box 2198, Auckland.



we do? We embrace desktop publishing with open arms. Everywhere you look, if you see a laser printer advertisement, chances are that it will be desktop publishing.

## Page formatting

Now there is nothing wrong with DTP. I use it all the time; it's marvellous. But as marketing manager at Impact I am one of the privileged few who has access to all of the latest products as soon as they hit the market. There is a far larger group of people who can benefit from using the laser printer by simply replacing the old devices they used to use.

There is something a little sad about the uneducated purchaser who still buys a daisywheel printer, unless he has some very good reasons for it (none of which spring to mind), when for less than \$4000 he can be silently producing eight pages per minute from his laser. The fact that the daisywheel printer market still exists at all is indication enough to me that we must have frightened all the users into thinking that if you buy a laser you must be desktop publishing.

A few examples of how diverse these marvellous new machines are:

## High throughput

You don't need to be a bureau to find yourselves turning out an awful lot of correspondence, as several wordprocessors and a network or a mini computer can keep a printer very busy.

One of our clients has a mailing list of 6,000 pages, all of which need to be letter quality. To produce these on a daisywheel was a 12½-day job, but on a 15 page per minute laser the job took seven hours; even using an eight page per minute printer the job was complete in 13 hours. How many companies still take price lists, newsletters, and order form printing to the printer when a laser can do it all for them so cheaply and quickly?

## Forms overlay

Which brings me to another marvellous application. Imagine not needing office stationery at all but just blank paper! Forms overlay means the user can send a document to the laser printer, call up any one of a number of forms overlays and have these printed as well as the document.

If that sounds complicated, consider having a paper tray full of blank paper and sending invoices to it which automatically print the forms overlay and the data. The next sheet

is a letter which automatically prints the letterhead, addresses and the document simultaneously, and then comes an accounting report with all the report lines, boxes, and titles all auto-formed by the forms overlay. It can save a lot of time and money and is built into many of the Impact printers as a standard feature to simply call up with lead-in codes in the document.

## Logos, signatures and photos

By use of the plug-in font cartridges, company logos, personal signatures and even photographs can be reproduced in superb quality. "Original" signatures on all of your 6000 mailouts!! Logos on all your letterheads, statements, and invitations without pre-printing.

It's not just the savings in printing costs, but the pure convenience of never having the paper upside down, or needing changing. You can even produce first sheets and follow-ons for your letters from the same bin. Oh, the iced water, Carruthers, it's all too much!!

## Graphics

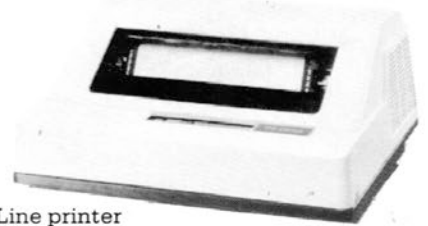
From simple business pie and bar charts through to the complexity of Autocad 3D drawings, laser printers can produce exceptional quality graphics, especially when running in plotter emulation. Impact has eight and 15 page per minute printers with HP7470 plotter emulations built in, as well as the more conventional Epson and Laserjet plus emulations. They are thus all-purpose printers when there is a requirement for a mixture of graphics and text or even for occasional CAD plots to get a quick draft of how the final drawing is going to look before plotting.

I hope this has given a brief overview of just a few of the applications for laser printers. None of the examples is what is traditionally considered desktop publishing, but all allow a great deal of flexibility and features, and all from software already in general use. With prices now below the \$4,000 mark for eight page per minute machines and speeds of 15-20 pages per minute not uncommon, there are very few applications which would not benefit greatly from the use of a laser printer as a straight replacement for a daisywheel, matrix, lineprinter or band printer.

So next time you see advertisement for a laser printer, don't "switch off" thinking that desk top publishing is not for you. Try instead to think of a few reasons *not* to get one. It becomes increasingly harder.

Oh, I nearly forgot - they're great for desktop publishing too!!! ■

## C ITOH CI-300



Line printer	
Pins in print head:	shuttle matrix
NLQ feature:	yes
Print speed in NLQ mode:	85 lpm 210 cps (10 cpi)
Print speed:	300 lpm 750 cps
Max chars/line:	220
Point sizes:	10, 11.67, 13.33, 16.67 cpi
Paper width:	3.5" to 16"
Paper feed:	front and bottom
Buffer size:	452 bytes
Ribbon type:	nylon 50m spool
Graphics mode:	bit image to 200 dpi
Interface:	RS232c serial and centronics parallel
Features:	touch selection of density; print, character and line feed speed, character magnification x2 x4 x8 vertical and horizontal,
Options:	bar code, OCR and line generation,
Retail price:	\$13,600 plus GST
Agent:	The Microcomputer Electronic Co Ltd

## C ITOH CI-600



Line printer	
Pins in print head:	shuttle matrix
NLQ feature:	yes
Print speed in NLQ mode:	170 lpm 425 cps
Print speed:	600 lpm, 1500 cps
Max chars/line:	220
Point sizes:	10, 11.67, 13.33, 16.67 cpi
Paper width:	3.5" to 16"
Paper feed:	front and bottom
Buffer size:	452 bytes
Ribbon type:	nylon 50m spool
Graphics mode:	bit image to 200 dpi
Interface:	RS232c and Centronics
Features:	touch selection of density; print, character and line feed speed, character magnification x2 x4 x8 vertical and horizontal,
Options:	bar code, OCR and line generation,
Retail price:	\$18,150 plus GST
Agent:	The Microcomputer Electronic Company Limited

## TriMatrix 850 PrintNet



Dot Matrix (three print heads)  
 Pins in print head: 9  
 NLQ feature: yes  
 Print speed in NLQ mode: 72 cps  
 Print speed: 850 cps burst speed. 544 cps or 240/pm  
 Max chars/line: 247  
 Point sizes: 0.014"  
 Paper width: up to 16"  
 Paper feed: front or bottom  
 Buffer size: 256 k standard. up to 1.5 mb optional  
 Ribbon type: multistrike  
 Graphics mode: Epsom emulation  
 Interface: five serial (bi-directional) and one parallel  
 Features: built-in networking capabilities. Can be connected to any devices capable of serial communication.  
 Retail price: \$7255  
 Agent: The Micro Source Ltd

## GENICOM GE5010



Laser  
 Print speed: 10 pages per minute  
 Max chars/line: 110 at 10cpi A4 size  
 Point sizes: 300x300  
 Paper width: 8.04 (204.2mm)  
 Paper feed: two bin feed  
 Buffer size: 436kb standard  
 Graphics mode: IBM graphics  
 Interface: std with both serial and centronics parallel  
 Features: 300,000 page engine life 200 sheets bin 1 and 50 sheets bin 2. Std  
 Options: additional fonts and emulations  
 Retail price: \$7795 plus GST  
 Agent: AWA Computer Ltd

## GENICOM GE3510/3520



Dot matrix  
 Pins in print head: 9 wire  
 NLQ feature: yes  
 Print speed in NLQ mode: 90 cps  
 Print speed: 300 cps  
 Max chars/line: 240 characters at 18 cpi  
 Point sizes: DP9Hx9V LQ 21Hx18V  
 Paper width: 13.6" (345mm)  
 Paper feed: rear and bottom  
 Buffer size: 4k  
 Ribbon type: multistrike  
 Graphics mode: IBM format  
 Interface: GE3510 Coax A. GE3520 Twinax  
 Features: Full IBM compatibility including front panel controls, both models available in quietised chassis  
 Options: auto sheet feeder,  
 Retail price: GE3510 \$7895 plus GST; GE3520 \$7618 plus GST  
 Agent: AWA Computers Ltd

## LASERPRO GOLD EXPRESS

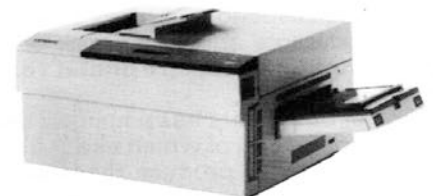
Laser  
 Print speed: 8 ppm  
 Paper width: A4, B5, legal  
 Paper feed: 250 sheet tray  
 Buffer size: 1.5mb expandable to 3mb  
 Graphics mode: full page bit map graphics at 300x300 DPI  
 Interface: std RS232 and Centronics  
 Features: duty cycle - 5000 ppm, lifetime - 300,000, emulates Diablo 360, HP Laserjet, NEC 3550, IBM Proprinter, 25 std fonts  
 Options: 2 bin feeder, post-script  
 Retail price: \$7990  
 Agent: LaserPro Distributors

## NEC Silentwriter LC860



LED Array  
 Print speed: 8 ppm  
 Max chars/line: 136  
 Paper width: 8.5"  
 Paper feed: 1,2,3,4,6,8,10,12,25, 50 lines/inch  
 Buffer size: 1.4Mb  
 Graphics mode: 300 x 300 dpi - H.P. and emulation  
 Interface: parallel and serial  
 Features: 2nd bin feeder consumables last up to 5000 copies, input and output trays hold 250 sheets, face down output.  
 Options: font cartridges, Diablo interface  
 Retail price: \$7995 plus GST  
 Agent: NEC Information Systems

## C. Itoh LIPS-10



Laser 300 DPI  
 Print speed: 10 ppm  
 Point sizes: generated fonts 2-50 point Sans Serif, Gothic, Roman and Optima  
 Paper width: A4 standard, letter and legal options  
 Paper feed: sheet  
 Buffer size: 256kb  
 Graphics mode: HP Laserjet and Epson  
 Interface: dual-Centronics and RS-232C  
 Features: heavy duty and robust - designed for 600,000 pages life, monthly usage equals 15,000  
 Options: generated fonts, LIPS command language built in  
 Retail price: \$8990 plus GST  
 Agent: Control Microcomputers



Over \$5000

PRINTERS

### IMPACT LS800-04

Laser

Print speed: 8 ppm  
Paper width: A4, B5, foolscap, cut sheet  
Paper feed: built in bin feed  
Buffer size: 2.3m RAM

Graphics mode: line and box drawing and area fill, PMPACT GCL

Interface: serial and parallel  
Features: 16 fonts with over 8000 variations and 23 bar code standards. Emulations as for 2800-03 plus GCL and HP7470A.

Options: Graphics include 2D plotting, OCRA, OCRB, bar codes, forms, HP7470A page description language, emulations, fonts, bin and envelope feeders etc

Retail price: \$10100

Agent: IMPACT Technologies Ltd

### GENICOM GE3530/GE3540

Dot matrix

Pins in print head: 18 wire parallel  
NLQ feature: yes

Print speed in NLQ mode: 100 cps

Print speed: 400 ppm

Max chars/line: 240 characters at 18cpi

Point sizes: DP9Hx9V LQ 21Hx18V

Paper width: 13.6 (345mm)

Paper feed: rear and bottom tractor feeds

Buffer size: 4kb

Ribbon type: multistrike continuous reinked, 50 million characters/ cartridge

Graphics mode: IBM format

Interface: GE3530

Features: full IBM compatibility, both models available in quietised chassis

Options: auto sheet feeder single and dual

Retail price: GE3530/GE3540 both \$10,550 plus GST

Agent: AWA Computers Ltd

### NEC Silentwriter LC890



LED Array

Print speed: 8 ppm

Max chars/line: 136

Paper width: 8.5"

Paper feed: 1,2,3,4,6,8,10,12,25, 50 lines/inch

Buffer size: 3Mb

Graphics mode: 300 x 300 dpi - postscript

Interface: serial and parallel - std

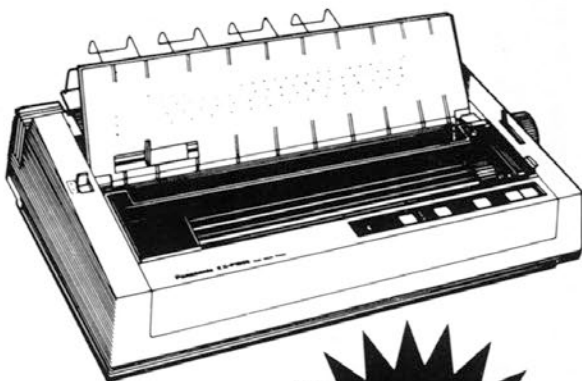
Features: postscript, H P emulation, 250 sheets input and output trays, RS422/Appletalk interface.

Options: font cartridges

Retail price: \$11895 plus GST

Agent: NEC Information Systems

## Flexibility and super-fast printing from Panasonic



**\$1990**  
+ GST

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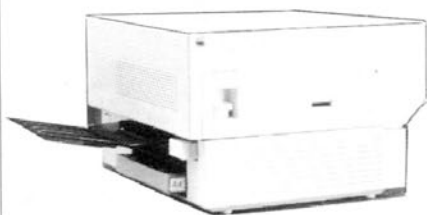
The Panasonic KX-P1595 dot matrix printer can do some amazing things. Like 240 cps in draft mode. To let you produce your letters, memos and reports in a snap. All with the quality you expect from Panasonic. For demanding users, the KX-P1595 has a lot to offer.

- Prints 240 cps in draft mode, 360 cps with white spacing
- Near letter quality printing in all pitches
- Handles paper up to 16.5" wide
- Operator accessible touch switch for font and pitch
- Nine pitches and graphics printing
- Built-in parallel and RS-232-C serial ports
- Auto paper loading for cut sheet

**Panasonic**  
Leaders in Printer Technology

Contact your nearest Panasonic printer dealer now or phone MEC Dealer Products for the name and location of your nearest dealer.

## APPLE LASERWRITER PLUS



### Laser

Print speed: 8 ppm  
Point sizes: 4 to 720  
Paper width: 8"  
Paper feed: sheet feeder,

Graphics mode: all text and graphics printers at 300 dpi

Interface: Appletalk, RS232C  
Features: Macintosh software support, compatible with wide range of PCs including IBM PC and compatibles. Diablo 630 emulation., full page high res graphics at 300dpi, large selection of fonts, postscript compatibility networking capability

Retail price: \$11995  
Agent: CED Distributors Ltd

## IMPACT L1500-01

### Laser

Print speed: 15 ppm  
Paper width: A4, foolscap, cut, sheet  
Paper feed: twin built in bin feeders  
Buffer size: 512kb RAM

Interface: serial and parallel, all major mini and mainframes possible

Features: Emulations include Diablo 630, TI855 DP/WP, HP Laserjet, twin font slots. Duty cycle: 25k. Print per month, machine life 1.5 million prints.

Options: page description language, emulations, fonts, bin and envelope feeders etc

Retail price: \$15400  
Agent: IMPACT Technologies Ltd

## GENICOM GE4510/GE4520

### Line

Pins in print head: 33  
NLQ feature: yes  
Print speed in NLQ mode: 82/100  
Print speed: 400/1000 high speed draft

Max chars/line: 220 at 16-7 cpi

Point sizes: DP9Hx70

LQ9Hx18V

Paper width: 3" to 16.54

Paper feed: two sets of tractors

Buffer size: 4kb

Ribbon type: multistrike continuous reinked, 50 million characters/cartridge

Graphics mode: IBM format

Interface: GE4510 Coax

A/GE4530 Twinax

Features: full IBM compatibility, std with

quietised cabinet

Options: font selection

Retail price: \$16485 plus GST

Agent: AWA Computer Ltd

## 10 Megabytes/8 Minutes

For IBM-PC™, XT™, AT™ and compatibles

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**Save hundreds of dollars a year.**

If you use your PC for business, making regular hard disk backups is a *must*. If you back up your system once a week, someone in your office will spend *hours* of valuable time formatting and saving diskettes. In a year's time, that could cost you hundreds of dollars in labour costs. **Fastback** will save you 95% of that time — *and money!*

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- Nothing else to buy. **Fastback** is a fully self-contained and ready-to-use hard disk backup system.
- No need to format your floppy disks in advance. **Fastback** automatically formats them for you as it saves.
- Works with PC-DOS® or MS-DOS® version 2.0 or higher.
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ComputerStore ✓

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## LASER PRO EXPRESS



### Laser

Print speed: 8 ppm  
 Paper width: A4, B5, legal  
 Paper feed: tray holds 250  
 Buffer size: 152 k expandable to 1.5 mb  
 Interface: RS232 and centronics parallel  
 Features: duty cycle – monthly 5000 ppm; lifetime: 300,000 emulates – Diablo 630, Epson RX80, HP Laserjet NEC 3550 Spinwriter. Nineteen std fonts. Express commend language, 300x300 DPI resolution  
 Options: second bin feeder, postscript support  
 Retail price: \$3990  
 Agent: LaserPro Distributors Ltd

## IMPACT LS800-01

### Laser

Print speed: 8 ppm  
 Paper width: A4, B5, foolscap cut sheet  
 Paper feed: built in bin feed  
 Buffer size: 256kb RAM  
 Graphics mode: line and box drawing and area fill, IMPACT LCL  
 Interface: serial and parallel  
 Features: Diablo 630 emulation, courier 12 with 500 variations fully upgradable, interfaces available for all major mini and mainframe computers  
 Options: page description language, emulations, fonts, bin and envelope feeders etc  
 Retail price: \$4470  
 Agent: IMPACT Technologies Ltd

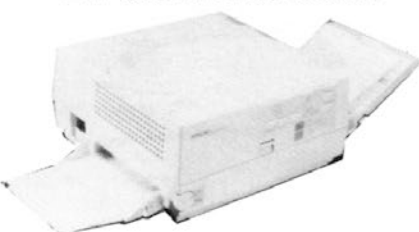
## LASERPRO EXPRESS II



### Laser

Print speed: 8 ppm  
 Paper width: A4, B5, legal  
 Paper feed: 250 sheet tray  
 Buffer size: 640k to 3mb  
 Graphics mode: 300 x 300 DPI resolution  
 Interface: Centronics and RS232 serial  
 Features: emulates diablo 630, Epson FX80, IBM Proprinter, Laserjet Plus, NEC 3550 Spinwriter 19 std fonts. Duty cycle – 500 ppm; lifetime – 300,000.  
 Options: 2 bin feeder, postscript  
 Retail price: \$4890  
 Agent: LaserPro Distributors Ltd

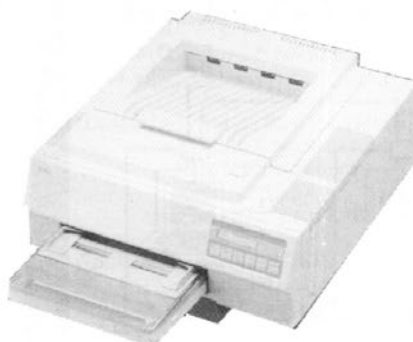
## EPSON GQ-3500



### Laser/xerographic

Print speed: 6 ppm  
 Max chars/line: font dependent  
 Paper width: A4, A5, B5, letter, legal, half letter  
 Paper feed: automatic feed  
 Buffer size: 1k input buffer. 512k memory  
 Graphics mode: 300 dpi density  
 Interface: std: centronics-type 8-bit parallel; optional: RS232C, RS422  
 Features: high resolution, high quality printing, face up or face down paper ejection, printing on envelopes and overhead projector sheets  
 Options: font cards, emulation cards, interfaces  
 Retail price: \$4995  
 Agent: Epson New Zealand

## STAR LASER



### Laser

Print speed: 8 ppm  
 Paper width: letter size, legal, A4, B5 and executive  
 Paper feed: paper cassette  
 Buffer size: 1 mb  
 Ribbon type: Centronics parallel, RS-232C, RS422  
 Interface: Centronics parallel, RS-232C, RS422  
 Features: 1mb memory standard 4 font styles resident, 4 emulations (HP Diablo 630 IBM ProPrinter, Epson), 300x300 DPI  
 Options: multi bin feeder  
 Retail price: \$5500 plus GST  
 Agent: Star Micronics Ltd

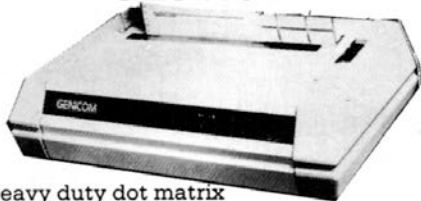
## BROTHER HL-8



### Desktop laser printer

Print speed: 8 ppm  
 Point sizes: 8.8, 10, 12, 16  
 Paper width: 100 x 190 mm to 216 x 365 mm  
 Paper feed: cassette feed or manual feed  
 Buffer size: 1 mb RAM std  
 Graphics mode: 300/150/100/75 dots/inch  
 Interface: parallel and serial std  
 Features: 16 character LCD display. Maximum compatibility with hard/software – 5 printer emulation as std. 5 resident fonts, full page 300 dpi graphics  
 Options: 1 and 2 mb memory expansion – paper trays  
 Retail price: \$5500 plus GST (target)  
 Agent: Selected dealers throughout New Zealand

## GENICOM GE3410



Heavy duty dot matrix  
Pins in print head: 18 parallel  
NLQ feature: yes  
Print speed in  
NLQ mode: 400 ppm  
Print speed: 400  
Max chars/line: 240 (in 18 cpi mode)  
Point sizes: DP9Hx70  
LQ9Hx18V  
Paper width: 13.6 (345mm)  
Paper feed: rear and bottom  
Buffer size: 512 characters  
Ribbon type: multistrike continuous reinked,  
Graphics mode: standard with both serial and centronics parallel interfaces  
Interface: standard with both serial and centronics parallel interfaces  
Features: Fast slew rate of 15 inches/sec further increase throughput.  
Options: Auto sheet feeder, single or dual. Pedestal with catch tray  
Retail price: \$5690  
Agent: AWA Computer Ltd

## LASERPRO SILVER EXPRESS



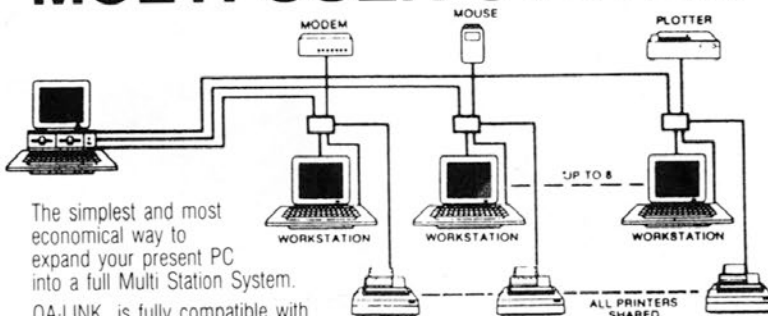
Laser  
Print speed: 8 ppm  
Paper width: A4, B5, legal  
Paper feed: 250 pg tray  
Buffer size: 768k expandable to 1.5 mb  
Graphics mode: 300 x 300 DPI  
Interface: std Centronics, RS232 Serial  
Features: 25 std fonts, duty cycle 5000 ppm; lifetime 300,000. Emulated Diablo 630, HP Laserjet+, FX80 Epson, IBM Proprinter, NEC Spinwriter. Express command language, Desktop Publishing compatible.  
Options: Postscript support, 2nd bin feeder  
Retail price: \$5990  
Agent: LaserPro Distributors Ltd

## TriMatrix 850 XL



Dot Matrix (three print heads)  
Pins in print head: 9  
NLQ feature: yes  
Print speed in  
NLQ mode: 72 cps  
Print speed: 850 cps burst speed. 544 cps or 240/pm throughput  
Max chars/line: 247  
Point sizes: 0.014"  
Paper width: up to 16"  
Paper feed: front or bottom loading  
Buffer size: up to 8k  
Ribbon type: multistrike  
Graphics mode: Epsom emulation  
Interface: parallel and serial  
Features: prints bar codes. Front panel menu programming, multi-pitch printing. Jam proof paper feed.  
Retail price: \$5995  
Agent: The Micro Source Limited

## OA-LINK MULTI-USER SYSTEM



The simplest and most economical way to expand your present PC into a full Multi Station System.

OA-LINK is fully compatible with IBM PC/XT, AT and COMPAQ 386, it also runs all the popular PC Software.

A complete system can support up to 9 users, including the HOST COMPUTER, at a radius of 200 feet. OA-LINK Workstations offer either COLOUR GRAPHICS or HERCULES Display Modes. Each Workstation has a LOCAL SERIAL and PARALLEL PORT. Users can print on their LOCAL PRINTER or switch to any other printer on the system by a one touch command. It can also hook up to MICE or MODEMS.

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The OA-LINK Multi User System has a local V-20 CPU running a 6.67 MHZ for every user, so it can be almost twice the speed of an IBM/PC; even under Multi User Mode. OA-LINK is designed for user installation and can be fitted in minutes. It is cost efficient too — from only \$1795 including GST for each work station plus a monitor and keyboard.

### OA-LINK MULTI USER SYSTEM

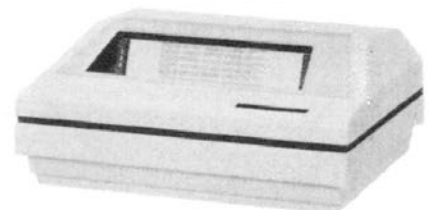
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## YD-4400



Shuttle matrix line printer  
Pins in print head: 91 hammers  
NLQ feature: yes  
Print speed in  
NLQ mode: 230 lpm 512 cps  
Print speed: 333 lpm  
Max chars/line: 136 at 10 cpi  
Point sizes: variable  
Paper width: 3.5" to 16"  
Paper feed: bottom feed tractor  
Buffer size: 2 line x 24 dot  
Ribbon type: multistrike  
Graphics mode: 24 pin bit image and plot modes  
Interface: centronics, standard, RS232c optional  
Features: heavy duty line printer, full plotting and graphics capability including bar codes,  
Options: DM661 graphics controller includes tektronics mode,  
Retail price: \$13,600 plus GST  
Agent: The Microcomputer Electronic Co Ltd



### IMPACT LS800-02



**Laser**  
 Print speed: 8 ppm  
 Paper width: A4, B5, foolscap  
 Paper feed: built in bin feed  
 Buffer size: 384kb RAM  
 Graphics mode: line and box drawing and area fill, IMPACT LCL  
 Interface: serial and parallel  
 Features: 6 fonts with over 3000 variations, Diablo 630, HPLaserjet, line printer, Epson FX-100  
 Options: page description language, emulations, fonts,  
 Retail price: \$6940  
 Agent: IMPACT Technologies Ltd

### NEC Silentwriter LC850



**LED Array**  
 Print speed: 8 ppm  
 Max chars/line: 136  
 Paper width: 8.5"  
 Paper feed: 1,2,3,4,6,8,10,12,25, 50 lines/inch  
 Buffer size: 128 k byte (1.3 m optional)  
 Graphics mode: 300 x 300 dpi  
 Interface: Centronics parallel and RS232 serial std  
 Features: Consumables last up to 5000 copies, optional second bin, input and output trays hold 250 sheets, optional plug-in fonts face down output.  
 Options:  
 Retail price: \$6690 plus GST  
 Agent: NEC Information Systems

### IMPACT LS800-03



**Laser**  
 Print speed: 8 ppm  
 Paper width: A4, B5, foolscap, cut sheet  
 Paper feed: built in bin feed  
 Buffer size: 2.3mb RAM  
 Ribbon type: carbon or multistrike  
 Graphics mode: line and box drawing and area fill, IMPACT LCL  
 Interface: serial and parallel  
 Features: HPLaserjet PLUS emulation with full bit mapped graphics  
 Options: page description language, emulations, fonts, bin and envelope feeders etc  
 Retail price: \$6970  
 Agent: IMPACT Technologies Ltd

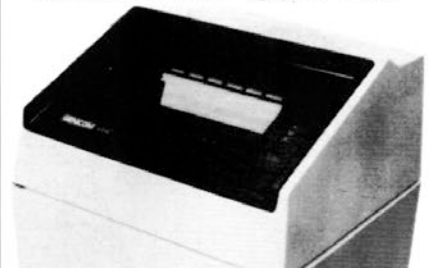
### GENICOM GE4410

**Shuttle matrix**  
 Pins in print head: 33  
 NLQ feature: yes  
 Print speed in NLQ mode: 82/pm  
 Print speed: 400/pm high speed  
 Max chars/line: 220 at 16.7 cpi  
 Point sizes: DP9Hx9V LQ 21Hx18V  
 Paper width: 3" to 16.54" (76 to 420mm)  
 Paper feed: two sets of tractors depends on interface type  
 Buffer size:  
 Ribbon type: multistrike continuous reinked, 50 million characters/cartridge  
 Graphics mode: IBM, Printronix, ANSI 3.64, Linedraw, Block, -Plot graphics  
 Interface: either serial, centronics parallel, data products parallel  
 Features: quietised cabinet  
 Options: font selection, Magum graphics  
 Retail price: \$18565 plus GST  
 Agent: AWA Computers Ltd

### IMPACT L1500-02

**Laser**  
 Print speed: 15 ppm  
 Paper width: A4, cut sheet  
 Paper feed: twin built in bin feed  
 Buffer size:  
 Interface: serial and parallel, all major mini and mainframes supported and APPLETRACK and RS422  
 Features: POSTSCRIPT, 4 fonts. Diablo 630, HP Laserjet+, TI855 DP/WP HP 7475 plotter (HP and GL language). Twin font slots, duty cycle: 25k print per month, machine life, 1.5 million prints.  
 Options: page description language, emulations, fonts, bin and envelope feeders etc  
 Retail price: \$19100  
 Agent: IMPACT Technologies Ltd

### GENICOM GE4440



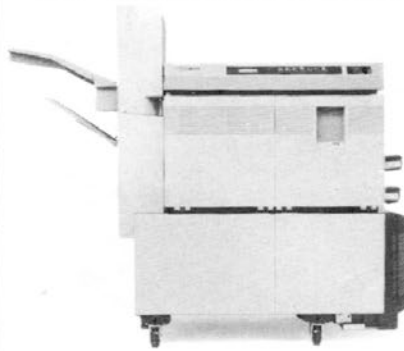
**Shuttle matrix**  
 Pins in print head: 66  
 NLQ feature: yes  
 Print speed in NLQ mode: 165/pm  
 Print speed: 800/pm high speed draft  
 Max chars/line: 220 at 16-7 cpi  
 Point sizes: DP9Hx70 LQ9Hx18V  
 Paper width: 3" to 16.54  
 Paper feed: two sets of tractors depends on interface type  
 Buffer size:  
 Ribbon type: multistrike continuous reinked,  
 Graphics mode: IBM, Printronix, ANSI 3.64, line draw, Block, Plot graphics  
 Interface: either serial, centronics parallel, data products parallel  
 Features: quietised cabinet  
 Retail price: \$19995 plus GST  
 Agent: AWA Computer Ltd

## GENICOM GE4530/GE4540



**Laser**  
 Pins in print head: 66  
 NLQ feature: yes  
 Print speed in NLQ mode: 165/pm  
 Print speed: 800/pm  
 Max chars/line: 220 at 16-7 cpi  
 Point sizes: DP 9Hx9V LQ 9H x 18V  
 Paper width: 3" to 16.54  
 Paper feed: two sets of tractors  
 Buffer size: 4kb  
 Ribbon type: multistrike continuous reinked,  
 Graphics mode: IBM format  
 Interface: GE4530 coax A/GE4540 twinax  
 Features: full IBM compatibility  
 Options: font selection  
 Retail price: \$24995 plus GST for both models  
 Agent: AWA Computers Ltd

## HP LASERJET 2000



**Laser**  
 Print speed: 20 ppm  
 Paper width: A4, A3, letter, legal, ledger, executive  
 Paper feed: dual 250 sheet trays  
 Buffer size: 1.5mb expandable to 5.5mb  
 Graphics mode: 300 DPI, full page  
 Interface: RS232/422, Centronics parallel std  
 Features: 34 fonts included, additional font cartridges  
 Options: paper deck upgrade, 1mb expansion kits  
 Retail price: \$45000  
 Agent: Computertime Ltd

## IMPACT L2000-01

**Laser**  
 Print speed: 20 ppm  
 Paper width: A4, A3, cut sheet  
 Paper feed: built in bin feed  
 Buffer size: 2.5mb RAM  
 Ribbon type: carbon or multistrike  
 Graphics mode: line and box drawing and area fill, PMPACT LCL  
 Interface: serial and parallel, most major interfaces supported  
 Features: double sided printing and page sorting under program control, A3 cassettes drum life in excess of half a million. Duty cycle: 70,000 pages per month, drum life: 500,000 pages  
 Options: page description language, emulations, fonts, postscript available, 2000 sheet input tray  
 Agent: IMPACT Technologies Ltd

## IMPACT L2000-02



**Laser**  
 Print speed: 20 ppm  
 Paper width: A4, A3, cut sheet  
 Paper feed: built in bin feed  
 Graphics mode: line and box  
 Interface: serial and parallel  
 Features: as for L2000-01 plus full graphics 300 x 300 ppi for CAD/CAM, bar charts etc, capable of bar codes forms etc, 8 different HP7470A emulations, duty cycle 170,000 pages per month drum life: 500,000 pages  
 Options: page description language  
 Agent: IMPACT Technologies Ltd

## CENTRONICS PP8

**Laser**  
 Print speed: 8 ppm  
 Max chars/line: 132  
 Paper width: 4.1" x 5.8" - 8.5" x 14"  
 Paper feed: straight paper path  
 Buffer size: 256 kb  
 Ribbon type: carbon or multistrike  
 Interface: parallel or serial  
 Features: low cost ownership, full page graphics, portrait and landscape rotation  
 Options: 1.5mb expansion board/font modules  
 Agent: Rakon Computers Ltd

## IMPACT L2000-03



**Laser**  
 Print speed: 20 ppm  
 Paper width: A4, A3, cut sheet  
 Paper feed: built in bin feed  
 Buffer size: 2.5mb RAM  
 Graphics mode: line and box  
 Interface: serial and parallel  
 Features: 8 different emulations and postscript, duty cycle for pages per month, drum life: 500,000 pages, 2000 sheet input tray.  
 Options: page description language, emulations, fonts, double sided printing  
 Agent: IMPACT Technologies Ltd



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A final thought, the ArchiveXL is based on QIC-40, the tape interchange standard for data compatibility. That's a big Archive extra.

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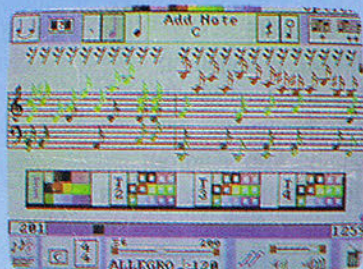
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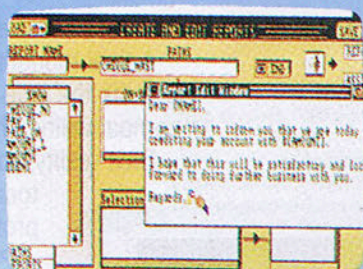


# When the work is done it's a whole lot of fun!

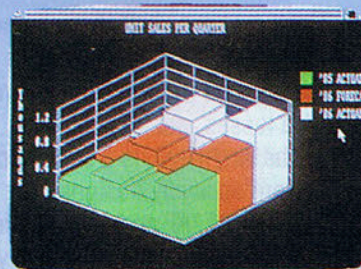
The Amiga 500 from Commodore is a new concept in home computing. It will do everything you'd expect of a 512 K computer — and a lot more — at a price that won't break your bank and in ways that make computing easy.



\* The Amiga 500 makes music brilliantly. It's built-in synthesiser will produce almost every musical instrument. You can write a melody or a symphony. The Amiga will digitally store the music on its 3½" disc drive and play it back in stereo.



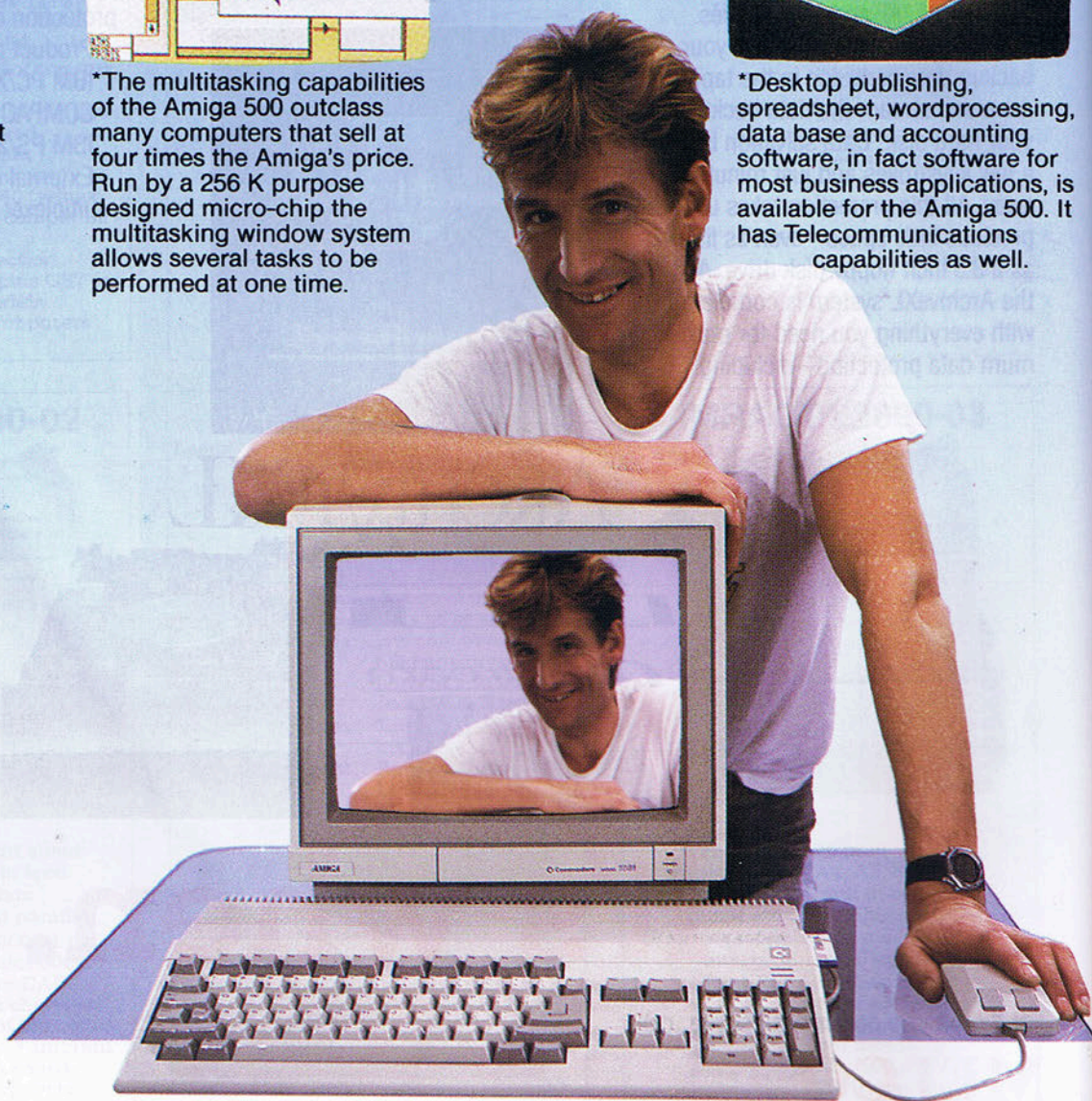
\*The multitasking capabilities of the Amiga 500 outclass many computers that sell at four times the Amiga's price. Run by a 256 K purpose designed micro-chip the multitasking window system allows several tasks to be performed at one time.



\*Desktop publishing, spreadsheet, wordprocessing, data base and accounting software, in fact software for most business applications, is available for the Amiga 500. It has Telecommunications capabilities as well.



\*Creating pictures and designing is a breeze with the Amiga 500. Using one of several software packages and the Amiga mouse you can produce spectacular images and animation in more than 4000 colours on the high resolution Amiga screen. The screen's ability to reproduce the Amiga's extraordinary colour capability is just one of the Amiga advantages.



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## AMIGA 500 DEALERS

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Mathews Electronics, Whangarei 72-348  
— Robin Hoare Computers, Rāwene  
57-761 — R & J Russell, Dargaville 8699 —  
Searle Electronics, Whangarei 82-445

### Auckland

Alpine Computing, Takapuna 493-889  
— Computability, Newton 395-660 —  
Computer Calculator Centre, Lorne Street  
790-328 — Computer Awareness, Mt  
Wellington 591-563 — Computer Village,  
Queen Street 734-022 — Farmers Trading Co.,  
Hobson Street 799-220 — Glendene  
Pharmacy, Glendene 836-9580 — Ian Morrow  
Industries, Drury 294-8696 — John Walker  
Music, Papakura 299-8827 — Kompute  
Systems, Howick 534-2120 — Loadstar  
Computers, Orewa 63-120 — Micro Utilities,  
Glenfield 444-8063 — Personal Computer  
Store, Takapuna 496-502 — Robertson TV  
Services, Te Atatu 836-9232 — Rowan Morgan  
Enterprises, Pukekohe 86-743 — Simply  
Computers, Queen Street 392-814 — The  
Computer Terminal, Birkenhead 419-0543  
— Waiheke Computers, Waiheke Island 7400  
— West City Computer Centre, Henderson  
836-1567 — Ashby Computer Centre,  
Glendowie 588-301

### Waikato/Bay of Plenty

Audio Hi Fi Services, Tokoroa 68-922  
— Channel 5, Rotorua 89-164 —  
Communication House, Tauranga 82-857  
— Computer Clerical Services, Taupo 89-910  
— Computer Rentals, Hamilton 77-129 —  
Computer Room, Hamilton 80-781 —  
Computerware, Waihi 7552 — Dollar Save  
Computer Centre, Hamilton 393-545 — Good  
Gear Electronics, Whakatane 70-063 — Meikle  
Bros, Whakatane 88-069 — Phil Booth  
Television Audio, Te Puke 37-882 —  
Whakatane Appliances, Whakatane 85-054

### Poverty Bay

Personal and Business Computers, Gisborne  
88-256

### Hawkes Bay/Wairarapa/Manawatu

Computer Village, Levin 82-070 — Computer  
Village, Palmerston North 66-392 — Data  
Stream, Napier 56-195 — Manawatu TV &  
Sound, Palmerston North 67-184 —  
Businessworld, Masterton 80-963 — Viscount  
Electronics, Palmerston North 86-696

### Taranaki

Computer Village, New Plymouth 81-738 —  
Stewart Appliances, Wangarei 52-700 — Trio  
Business Centre, New Plymouth 88-586

### Wellington

Computer Experience, Wellington  
736-777 — Computer Village, Upper Hutt  
278-595 — Computer Village, Lower Hutt  
693-313 — Computer Village, Bowen St  
737-430 — Kapiti Business Machines,  
Paraparaumu 88-277 — Logitech Solutions,  
Wellington 724-950 — Telear Electronics,  
Tawa 731-965

### Northern South Island

Computer Nelson, Nelson 89-100 — Craw  
Video, Nelson 82-949 — Haywrights, Motueka  
87-200 — Microcomputer Centre, Blenheim  
81-162 — The Electronic Shop, Blenheim  
89-274

### West Coast

Coast Business Machines, Greymouth 5264  
— Graham Electronics, Hokitika 384 — J H  
Greenwood, Westport 7349

### Southern South Island

Commodore and Computers, Christchurch  
61-399 — Computer Centre, Christchurch  
793-428 — Computer Village, Christchurch  
65-072 — Computer Village, Dunedin 741-506  
— Eclipse Radio and Computer, Dunedin  
778-102 — Ken France Electronics, Alexandra  
8021 — Midland Computers, Timaru 44-241 —  
Smith & Church Electrical, Ashburton, 89-019  
— Waitaki Electric Power Board, Oamaru  
48-000 — Southern Micrographics, Invercargill  
84-057

# Reduce operating costs

by Barry Small

**B**eware of high operating costs in the computer industry, which can in many cases be completely overlooked when purchasing and installing systems, particularly in the micro and mini range. Most sales people have honourable intentions when dealing with prospective clients, but there are times when all facts and figures are not fully represented.

One such area is that of printer consumables. As far as the standard printers (dot matrix and daisywheel) are concerned, they use vast quantities of paper and of course the inevitable ribbon or ribbon cartridge. Not much can be done about reducing paper costs, apart from shopping around for the best deal and encouraging staff to be more economical in the use of printed output, but the ribbon cartridge is another area. Certainly the cheapest on the market can be scouted out, but recycled cartridges cost considerably less than the new price and in many cases produce a higher quality than the original product.

The same cost saving can be applied to that machine which shows signs of taking over a significant portion of the office printing market — the laser printer with its advantages of output quality, low noise and use of standard photocopier paper. One major drawback is the high ongoing

cost of toner replacement in what is called the EP toner cartridge, which most manufacturers indicate will produce approximately 3,000 copies, varying to some extent with the amount of text or graphics on each page. This actually works out at about 10 cents per sheet, excluding the cost of the paper.

A recycling service is now offered, refurbishing an exhausted EP cartridge and returning it for a substantial cost saving of about \$100 under the typically near-\$300 cost of a new cartridge.

The cartridge is stripped completely, checked for damaged components and excessive wear, and rejected if a serious defect is found, such as a scored drum. The refilled cartridge is given a full guarantee for its first-time refurbish (rubber strips and things wear, precluding completely satisfactory work a second time) and should last for a further 3,000 copies. The fusing roller cleaning pad, which can also be cleaned during the refill process, should also be included when sending the parts to a recycling service.

Laser printer hardware prices are showing signs of coming down, and refilling toner cartridges is another way of reducing costs and making these machines more accepted as the useful printers they undoubtedly are.

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# Control programs for the 80386

by Mark James



In last month's column we described two types of operating systems that run on computers based on the Intel 80386 microprocessor: the "true" multi-user system, which operates the microcomputer as if it were a larger minicomputer; and the "control program", a kind of monitor that shares the computer's resources among a group of more or less independent programs running underneath it. This month, we shall look a bit closely at the control programs.

Control programs are "multi-tasking" operating systems. Whereas ordinary MD-DOS can run only one task at a time, control programs can run several, taking advantage of the faster speed and larger memory space available with 80386-based machines.

A control program runs in the 80386 chip's protected mode, which means that it is pretty much invisible to the various tasks that run underneath it. Each of those tasks thinks that it is running, alone, on an IBM PC/XT-type computer - with a maximum of 640kb of memory, 8088 processor (which the 80386 can emulate), video RAM and resident MS-DOS.

In fact, the control program orchestrates its available memory so that a different 640kb is allocated to each task; in addition, the control program must fake MS-DOS, and intercept any DOS or BIOS calls that the task makes, including keyboard input and

video output. Finally, the control program must have some way of time-sharing among the various tasks. The time-sharing is usually pre-emptive (that is, every few clock ticks, the control program abandons one task and moves on to the next one), but it can also be based less arbitrarily, on disk or terminal operations for example.

Control programs differ in the ways in which they present the screen output of the tasks underneath them. The most common approach is windowing, in which each task gets its own window on the screen. Other control programs use "hot keys", which are key combinations that cause the whole screen to switch from one task to another. Still others are multi-user systems, in which each task can run on a separate terminal, and several people can use the computer at once. Combinations of these three approaches are possible.

All control programs can handle character screen output, but not many will be able to deal with graphics (apart from simple boxes). Individual programs have two ways of presenting information on the screen: the "well-behaved" way, in which all screen output is done through DOS or BIOS calls (which the control program can intercept); and the "ill-behaved" way, in which the program writes directly to the video RAM.

In general, well-behaved programs are text-oriented such as word processors and spreadsheets while those that use graphics are ill-behaved. Most control programs have trouble with the ill-behaved tasks, sometimes to the point of dying horrible deaths when such programs are run. Furthermore, the multi-terminal control programs are limited by the lack of graphics capabilities of the extra terminals (usually "dumb" ones) that are attached to the computer.

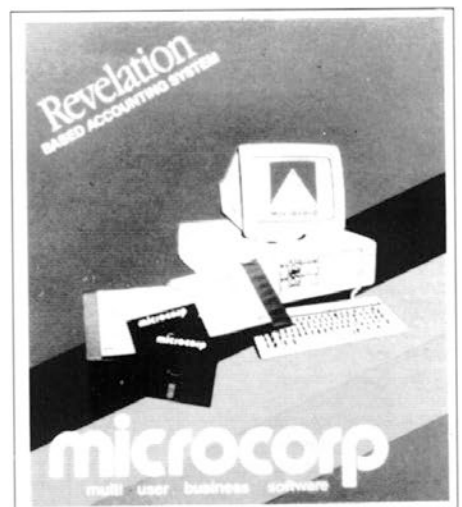
One issue that a control program (particularly a multi-user one) must address is that of data security. With MS-DOS there is no problem, since only one task could run at a time, but with multi-tasking systems, there is the danger that two or more programs will attempt to make conflicting changes to the same disk file. This is the same problem faced by networks, where several computers may share the same disk files, and control programs often try to solve the problem in the same way as networks do: with file and record locking mechanisms provided by Microsoft Networks (MS-Net), or some other network protocol. It is not certain, however, that all control program designers have even thought very much about this issue, so that prospective purchasers would be well advised to check before buying a control program.

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The following list includes a baker's dozen control programs which have been released or announced recently in the press. The comments are merely impressions gleaned from press releases and sales hype, and should not be construed as definitive reviews of each product. As *Bits & Bytes* receives review copies of these control programs, this column will publish the results.

- Concurrent DOS 386 (Digital Research, Pacific Grove, California) runs well-behaved MS-DOS programs and also CP/M, MP/M, Concurrent CP/M and older Concurrent DOS programs as well. It uses hot keys, and there is a multi-terminal version too. File security is provided by file and record locks as implemented in the company's DR-Net product.
- CTOS/VM (Convergent Technologies, San Jose, California) is essentially an 80386-based network server for Convergent's NGEN system, but it apparently also runs local DOS tasks.
- Desqview 2.00 (Quarterdeck Office Systems, Santa Monica, California) is a new version of the well-reviewed Desqview, a competitor to Microsoft's original Windows product. Desqview 2.00 is essentially built for the 80286 chip, but the 80386 version supports windows (called virtual screens) for well-behaved, text-oriented DOS programs. It is said to run considerably faster than Microsoft Windows.
- DOS Supervisor (AT&T, Cherry Hill, New Jersey) supports up to eight concurrent MS-DOS tasks.
- Merge 386 (Locus Computing Corp., Santa Monica, California) is a control program that can be added as a process under Unix Sys-

tem V/386. It is not clear how the screen (or screens) are shared between MS-DOS and Unix tasks.

- PC-MOS/386 (The Software Link, Atlanta, Georgia) is an 80386 version of the company's MultiLink software. It combines hot keys with a multi-terminal approach, so that each terminal has access to each task. (There are no windows.) File security is provided by a software emulation of networking hardware and the MS-Net locking protocol. Only well-behaved, text-oriented programs will run. (PC-MOS/386 was reviewed in the September 1987 issue of *Bits & Bytes*.)
- PCVMS (Q Technology, South Perth, Western Australia) tries to act like VMS, the operating system for Digital's VAX computers. It can run well-behaved MS-DOS applications as if they were VMS tasks.
- Simultask 386 (AT&T, Cherry Hill, New Jersey) comes from the inventors of Unix, and so it is not surprising that it uses Unix as the control program, running MS-DOS as a sub-environment under Unix. The 80286 version of Sumultask was impressive enough, although limited to well-behaved DOS tasks and encumbered, as one might expect, with the overhead of Unix. It will be interesting to see how much improved this 80386 version is.
- 386-Topjob was written at Olivetti's California research facility. When Olivetti announced its 80386-based computers in July, it surprised everyone by introducing its own control program instead of Microsoft's 386 Windows. Now, however, the European launch of the new machines seems to have abandoned 386-Topjob for 386 Windows, so the future of Topjob is in doubt. Topjob uses hot keys to

support up to eight tasks, and provides file security through an implementation of MS-Net.

- VM/386 (Softguard Systems, Santa Clara, California) is said to be modelled after IBM's VM/370 mainframe operating system. It is not clear to what extent the model follows the original; not too closely, one would hope.
- VP/ix (Interactive Systems Corp., Santa Monica, California, and Phoenix Technologies, Norwood, Massachusetts) is co-produced by the same company that cracked IBM's ROM BIOS on the PC/AT. This control program can be added to Unix System V/386.
- 386Ware (Logicraft, Nashua, New Hampshire) combines a control program capable of running eight MS-DOS tasks with a local area network whose disk storage is on a Digital VAX minicomputer.
- 386 Windows (Microsoft, Redmond, Washington) is a much-enhanced version of the original Microsoft Windows. It is said to support even ill-behaved tasks, which accounts for its slowness compared with the text-oriented Desqview 2.00. Applications written specifically for 386 Windows (there aren't any yet) will be able to take advantage of its graphics abilities, and will conform to IBM's Systems Applications Architecture. 386 Windows is said to use the same user interface as the forthcoming OS/2 Presentation Manager.

Again, these comments are mostly subjective, and will remain so until this column can do proper reviews of several of the control programs. There is little doubt, however, that 80386 control programs are the coming thing in microcomputer system software. ■

# AST Premium/286

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# For architects' eyes only?

by Lindsay Burgess

The introduction of new technology for PC-based CAD systems, such as the AT computer, 28ms hard drives, etc, has created demands on the software developers for more specialised CAD packages that are devoted to the discipline they are to be used by. Gone (going?) are the days of setting up a CAD system and setting to work.

The user – whether in the design field or the draughtsperson – now needs a more customised program to fully utilise what is required from the CAD system. It is going beyond the requirements of a draughting "tool".

One such program I have had the chance of working is a new architectural package called DataCAD, an American originated system from Microtechtecture and marketed here by Cobi Consultants. As the glossies on it say it was created by architects for architects; all the features of a CAD draughting system, with all the extras needed for the building industry.

The ultimate in visual impact gives a perspective view of the building drawn with such ease it's child's play – choose the view required, enter the position and there's the three-dimensional model for viewing. The chosen view can be saved with the plan – edited in its 3D position and plotted out. The specialised drawing facilities will enable those engaged in the building industry to make full use of symbol libraries needed when a specialised use is required of CAD.

DataCAD's advanced drafting and single key editing commands help in all development/design work, from a complex multi to a modest residential box. With such things as bill of materials for items used, auto clean-up of walls, door openings, windows, on-

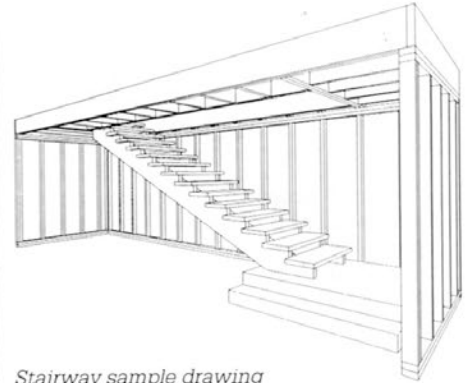
screen template libraries, user-defined scales, area/perimeter calculations, background plotting (to free up computer time), copy and move between layers, etc, it is a powerful design/draughting tool and yet one which can be easily learnt and put to work very quickly.

Its ability to draw walls to preset sizes and clean up corners makes it very simple to assemble the building. Add to that the ability to overshoot the lines and highlight walls, and it puts together a plan that can look like a plan in the traditional architectural style.

The dimensioning system with either user-selected points or automatic line selected system puts it all together very easily, and added to this is the associative dimensioning system, where a plan can be rescaled to fit another site, automatically changing all dimensions to suit.

## Perspectives

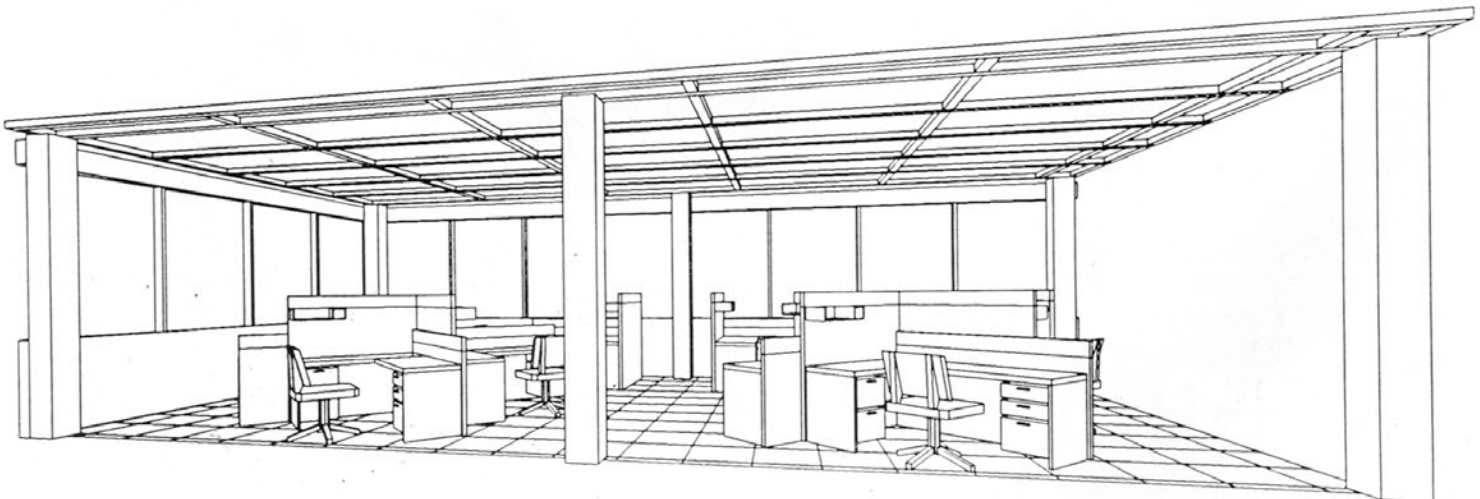
The DataCAD 3D viewer allows perspectives to be selected at any point in the drawing along with orthographic, oblique and parallel projections from the 2D plan. Basically, the operator enters in the height of the walls required; as the plan is drawn it is also created in its 3D base form to be viewed at any stage – even to the extent of being inside the building (just looking around, thanks). All images, shapes and views can be saved on separate layers to be used for future viewing or editing. For interior designers it makes visualisation of the finished project very easy to portray on-screen to a client before final plan completion.



Stairway sample drawing

DataCAD will run on all MS-DOS XTs, but of course with CAD an AT is the answer. The program requires a maths co-processor and 640kb to run. The list of input and output peripherals is extensive; although digitisers are supported, a mouse will operate DataCAD extremely well, more so with the user-definable macros for single key entries. The drivers for different macros will allow EGA resolution as well as the fancier boards such as the PGA card or Sigma Colour 400, etc (up to 1024x1024 pixels).

Although aimed mostly at architects, interior designers and the like, it can also be used by engineers for such things as pipe/duct work design. Nothing's perfect (if it was, it probably would be unaffordable), and there are a few little things that could be utilized from other PC CAD systems to give the ultimate, but only very minor details. In all, it's a software package that should see more of the people it was designed for, going over to CAD. ■



Office layout – perspective view



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# Do you use your function keys?

How often have you wondered what the function keys on your computer keyboard are for when using spreadsheets such as Supercalc and Lotus 1-2-3? Most of us never find the time or enthusiasm to go to our manuals to look up and digest the information pertaining to spreadsheets in general, let alone the use of the function keys!

This column will attempt to explore and explain some of the many features of the under-utilised function keys and hopefully reduce some of the mystery surrounding them and their uses. We hope that these tips will constitute the kind of information many beginners wish someone had told them about when they first started using spreadsheets. While this material will refer specifically to the use of function keys within the context of Lotus 1-2-3, the comments will be valid for most other types of spreadsheets in common use. If your computer is not IBM PC-compatible, please check your 1-2-3 function key template for correct key names and combinations.

## F1 – the Help key

For both the beginner and more advanced spreadsheet user, the Help key presents a wealth of information which most of us tend to overlook

and, more often than not, probably only press it in error instead of the Escape or F2 (Edit) keys.

Do yourself a favour and spend some time exploring the information contained in the help facility, and you will undoubtedly learn something and improve your knowledge. For example, did you know that Release 2 or 1-2-3 allows the user to password protect files?

Another useful feature of Release 2 provides for typing international currency signs, such as British pound and Japanese yen. When used in conjunction with the Alt key, the F1 key is called Compose. It works like this: hold down the Alt key and press F1. Then press the letter L, followed by = (equal) and the British pound symbol will appear.

By using this Compose feature and entering a number between 128 and 253, one can produce a range of symbols. Be warned, however, that your printer will not print many of these symbols, and some that it will attempt to print will look different from the way they appear on your monitor.

The Help key offers context-sensitive help information from within most menus, or immediately after pressing a function key, or even in the middle of typing a formula or @ function. Using this key in an interactive manner is usually much faster than

referring to the manual (once you have located it!).

## F2 – the Edit key

The edit key is probably the most useful of all the function keys although some of its most important uses are often overlooked. For example, suppose recalculation is set for manual and you want to recalculate a single cell. Rather than pressing F9 (Calc) to recalculate the entire worksheet, you can simply place the pointer on the cell you want to recalculate, press Edit and Return. Note, however, that this method returns the correct result only when the cell is not dependent on serial calculations.

In addition to using Home and End keys while in Edit mode, the use of the Left and Right Tab keys moves the cursor in five-character jumps through the entry being edited.

1-2-3 Release 2 and later versions allow the use of the Insert key which activates the overstrike feature. Now anything typed will overwrite existing characters, and pressing Return will place the revised entry in the cell in which the pointer resides.

F2, used in conjunction with the Alt key, invokes a Step mode which allows the user to 'step' through a macro one instruction at a time, checking for errors. (The Step mode in Release 1A is activated by Alt and F1.)

## F3 – the Name key

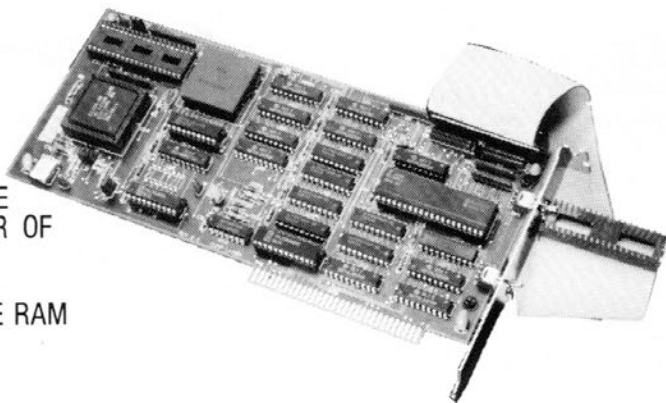
The Name key allows the user to view a complete list of range names or file names at a glance (the latter feature only with Release 2 or above), by following the File Retrieve command with the F3 key. All the file names will appear on the screen and selection is achieved by moving the pointer to the appropriate name and pressing Return. Access to range names is easily achieved by pressing F5 (GOTO), followed by the F3 key. Pressing the Name key again tests all range names on the screen and selection is as before.

## F4 – the Absolute key

Using the point mode of entry (arrow keys) followed by F4 and Return results in an absolute formula. Having entered an absolute formula, toggle the F4 key, hence obtaining mixed and relative formulae.

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## F5 – the Goto key

By pressing F5, the user can enter a specific cell or range destination. A lesser-known feature of the GOTO key is its ability to move into set titles in worksheets, thereby ignoring the locked out feature. Exit from the titles area by pressing End Home.

## F6 – the Window key

Create a window by choosing Worksheet Windows Vertical followed by the F6 key and notice how the cursor jumps to the other side of the window and vice versa. Entering Worksheet Windows Unsync returns the pointer to its original position.

## F7 – the Query key

After having performed a Data Query Find Quit sequence, the F7 key accomplishes subsequent Find operations automatically. This means that you can do a query that doesn't require a Quit command to complete and so doesn't expose you to the Reset command in the process. The same applies to other Data Query commands such as Extract, Unique and Delete.

## F8 – the Table key

This key is similar in nature to the

Query key in that it repeats the previous Data Table sequence of commands that have previously been manually specified. Where data tables are concerned, this key saves many keystrokes. It is important to remember that recalculating the entire spreadsheet will not result in the recalculation of data tables. To do that, the user must press the F8 key for each table and only the most recently accessed table will be recalculated.

Note that Lotus 1-2-3 does not automatically store a record or file of data tables. Thus, once one creates or operates on a second data table, the settings of the first will be erased. You may consider creating a macro that recalculates the spreadsheet using the Calc key, then updates data tables by activating table ranges using range names such as table-a, input-a, table-b, input-b. Document data tables by keeping a log of table settings and locations in some out-of-the-way part of the spreadsheet.

## F9 – the Calc key

Did you know that you can use the F9 key for something other than global recalculation? When used in conjunction with the Edit key, Calc can change a formula to a value. Use this technique to change the results of @ TODAY or @ NOW date functions into values.

## F10 – the Graph key

Get into the habit of selecting the View choice often when creating graphs in the Graph mode. In a similar vein, if you are making a change in a value plotted on a graph, use the F10 key from within the spreadsheet to see how the changes affect the graph.

Function keys make worksheet tasks easier, so use them frequently and your work with 1-2-3 will be enhanced. It is difficult to destroy worksheet contents with any function key, and if you become confused, press Escape. As you become more proficient with the function keys you'll wonder how you ever got along without their useful and time-saving features. Finally, don't forget the invaluable Help key!

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*Through this column MicroLab offers a commentary on developments in the computer industry as they affect the business person.*

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# Loading GET arrays in Basic

by Bryce Utting

Anyone using graphics animation with GET arrays has possibly been looking for a way of avoiding drawing a graphic on the screen during the program initialisation routines so that GET can load it into an array. The way around this isn't too hard, and this month I've listed a program called Datacode, which works by reading a disk file containing the graphic data and creating a Basic file containing DATA statements with this data in it. This can be merged with your Basic program so that the arrays are filled by reading from DATA statements rather than from the screen.

The first stage of this process is to get the data into a disk file. This is done by patching into your program at the point where the array has been filled. Add this line:

```
xxxx OPEN "O" #1, "<filename>":
FOR N=0 TO <size>:PRINT
#1,<array>(N):NEXT N:CLOSE #1
where <filename> is the file the data
will be written to, <size> is the size
that your array has been initialised to,
and <array> is the name of the array
itself. For example, to write the array
SCR which was defined with DIM
SCR%(100), to the file SCR.DAT use:
xxxx OPEN "O", #1, "SCR.DAT":
FOR N=0 TO 100:PRINT
#1,SCR%(N):NEXT N:CLOSE #1
```

Please note that the array *must* be defined as an integer array. You should be doing this anyway as integer arrays can be PUT onto the screen more quickly than other types.

The next step is to create the DATA lines. This is done by running Datacode - give it the filename (SCR.DAT in the example), the name of the Basic file to create (this will overwrite anything else with the same name, so be careful! I normally use the same name as the graphic file, ie. SCR.BAS) and tell Datacode that it is a Data file (the Picasso option is used for stamps created with Picasso, and possibly Graffiti). The screen will display the data lines created while Datacode is running, so you can keep an eye on its progress.

The Basic file should now be on your disk, with line numbers starting at 1000 and going up in tens. Renumber it so that it will fit in your original program, MERGE it, and change the program so that instead of drawing the graphic it reads it from the DATA lines with something like:

```
xxxx FOR N=0 TO <size>:READ
<array>(N):NEXT N
or, from the example:
xxxx FOR N=0 TO 100:READ SCR
(N):NEXT N
```

I have also listed a program that

uses a helicopter image from a game I have been working on for many long months now. The picture was created with Picasso, and moves across the screen. The data statement in line 110 is different from the normal output (the version of Datacode listed outputs in hexadecimal), but the program should show how to use Datacode.

The Charset story continues... Bruce Stevenson of the Wellington Sanyo Users Group wrote to me a while ago with probable addresses for DOS printers in DOS 1.25. These depend on which version of IO.SYS you are using (watch the screen closely during the boot process). The addresses are:

&H7A4 for IO.SYS 2.10

&H764 for IO.SYS 2.01

&H7A5 for an unnamed IO.SYS

Unfortunately I'm using IO.SYS version 1.00, and so can't use any of these, but I hope someone finds them useful.

```
10 ON ERROR GOTO 180
20 CLS:PRINT "A:":FILES:PRINT :PRINT "B:
":FILES "B:":PRINT
30 INPUT "Source " :FILE1$:INPUT "
Destination " :FILE2$:PRINT
40 PRINT "Picasso or Data?":A$=INPUT$(1
):PRINT A$:IF A$="P" OR A$="p" THEN P=1
ELSE P=0
50 OPEN "I",#1,FILE1$:OPEN "O",#2,FILE2$
60 COUNT=0:LINENO=1000:BFR$=STR$(LINENO)
+" DATA "
70 WHILE NOT(EOF(1))
80 GOSUB 140
90 IF LEN(BFR$)>200 THEN PRINT #2,B
FR$:PRINT BFR$:LINENO=LINENO+10:BFR$=STR
$(LINENO)+" DATA ":ELSE BFR$=BFR$+","
100 WEND
110 BFR$=LEFT$(BFR$,LEN(BFR$)-1):PRINT #
2,BFR$:PRINT BFR$
120 CLOSE
130 RUN
140 IF P THEN X$=INPUT$(2,#1):GOSUB 170
ELSE INPUT #1,X$
150 X$=STR$(VAL(X$)):IF ASC(X$)=32 THEN
X$=RIGHT$(X$,LEN(X$)-1)
160 BFR$=BFR$+X$:RETURN
170 X$="&H"+HEX$(ASC(LEFT$(X$,1))+256*AS
C(RIGHT$(X$,1))):RETURN
180 RESUME 110
10 DEFINT A-Z
20 GOSUB 80
30 COLOR ,1:CLS
40 FOR X=600 TO 32 STEP -4
50 PUT (X,80),CO,XOR:FOR N=1 TO 50:NEXT
N:PUT (X,80),CO,XOR
60 NEXT X
70 END
80 DIM CO(62)
90 FOR RD=0 TO 62:READ CO(RD):NEXT RD
100 RETURN
110 DATA 39,10,0,0,0,0,-20981,0,-8427,64
,-20693,-32582,-8361,112,-4433,0,-3971,0
,24600,0,-1990,0,-1,254,4096,0,-10481,61
44,-214,14560,-171,-769,-85,6384,-1,0,-3
969,0,24600,0,-897,0,-21846,170,4096,0,0
,0,0,4096,0,10240,0,4096,0,0,0,0,0,0,0
,0
```

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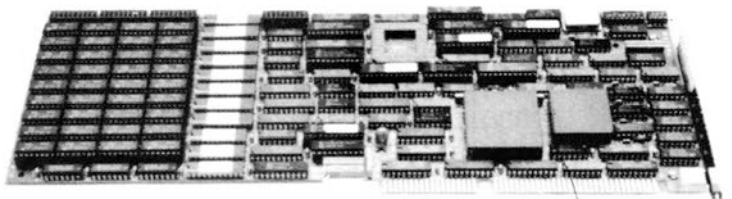
According to *PC Week*, "The Inboard 386 proved perfectly compatible with a standard IBM PC AT and every software product we tested." It's compatible with advanced software, too, including 386 control software for multitasking. And lots of developers are already using Inboard to create OS/2<sup>®</sup> applications.

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# Cooking with DOS

by Selwyn Arrow

This month we will take a look at a couple of ways of preparing menus. No, this isn't the cooking page; these are screen menus!

Let's say that we have a disk with an assortment of programs on it. What is quite often needed is an easy way to select any of these programs by pressing just one key. We may have a collection of games or utility programs on a floppy disk, or it could just as well be a hard disk with lots of programs we would like to access easily in several different directories.

I will give two examples. One I use at work on a floppy disk that contains a set of printer demonstration samples, the other is a user supported program that I use at home with my hard disk so that the family can easily select the program they want without bothering too much about using DOS to get to it.

## Floppy menus

This method is best suited to a floppy disk, but it could be extended to hard disk use by calling up second

dary menus etc. We will again use the good old standby, batch files for this job. For more information on this subject, look at my DOS column in the March and April issues.

First make a list of the programs you want to choose from. I have nine printers from which to choose so my menu has 10 choices. The last one is so that we can get back to DOS. I numbered each choice 0-9, but you can use one, two or three letters just as easily if you wish. I used a text editor to produce a 23-line screen like this: Heading

- 1 Printer 1
- 2 Printer 2
- 3 Printer 3
- ... etc
- 9 Printer 9
- 0 Exit to DOS

Of course the final product was double-spaced and had each printer's name in full. I called this file MENU.SCR.

Next we write a batch file called MENU.BAT which will TYPE this file on to the screen and then wait for us to enter the number of our choice. An extra refinement at this point is to



change the usual DOS prompt to a question mark. This makes the finished menu look very professional! My MENU.BAT looks like this:

```
ECHO OFF
PROMPT $?
CLS
TYPE MENU.SCR
```

Now all we have to do is write one batch file for each choice and give it the filename of that choice number, for example 1.BAT. Each of my printer samples is a program written in Basic to put that printer through its paces, so my batch file just needs to call BASICA xxxxxxxx where the x's represent the Basic filename, so 1.BAT would look something like:

```
ECHO OFF
CLS
BASICA PRNTR1
MENU
```

Each Basic program must return to DOS using the SYSTEM command of course; otherwise you will not see the menu for another choice.

The final choice, 0.BAT, is a little different as all it has to do is restore the prompt back to its usual form, ie: ECHO OFF

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Members of our N.Z. Computer Games Club have always enjoyed special pricing on hardware purchases. However, we are now offering special mail order packages to non members. There are several packages available, in fact there are over 100, covering not only the Amiga, but also the C64C, C128, C128D, and Commodore PC Computers. Some examples:—

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47	A500		✓				\$210*	7*	28*	✓	\$2825	\$2395
47A	A500		✓		✓		\$300*	10*	40*	✓	\$3630	\$3090
48	A500		✓	✓			\$240*	8*	32*	✓	\$3450	\$2990
50	A1000		✓				\$240*	8*	32*	✓	\$3360	\$2995
55A	A1000		✓	✓	✓		\$240*	14*	56*	✓	\$4930	\$4285
51	A2000		✓				\$360*	12*	48*	✓	\$4475	\$3995
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CLS  
PROMPT \$p\$g

And there we have it, a simple way to write your own menus using the facilities provided by your DOS.

There are a few things to watch out for. One is that you cannot (easily) return from a second batch file to the one it was called from, as the second overwrites the memory area where each batch file is stored. Another is that some programs seem to wipe out this same batch file area when they are called, so that the batch file no longer works after that point. In our example above it would then mean that the last line of a 1.BAT would never happen.

Luckily there are not too many programs that do this as it would mess up our menu system.

## Automenu

For a more comprehensive menuing system on my hard disk I use a program that I obtained for a copying fee of only \$5 from the NZ Microcomputer Club, which has approximately 1,000 disks available to its members in its Public Domain libraries. Many of these programs are very worthwhile using, and I will probably introduce some that I find most useful in a future article. My copy of AUTOMENU (version 2.0) came from the club's MS-

DOS Users Group some time ago, but I see that they now have version 3.01 available.

You do need to have some understanding of DOS to make use of it, but the six-page (print-it-yourself) manual provides plenty of information for you to experiment with. It comes as a set of three files, the program AUTOMENU.COM, a batch file AUTOBAT which is best placed in your root directory so that you can call the program up from anywhere (especially AUTOEXEC.BAT), and a file which you modify to your own requirements with any text editor, called AUTOMENU.DAT. This last is a master set of batch files with an extra character at the beginning of each line so that the Automenu program can tell what to do with that line. When called for, each set of lines is made into a file called AUTOTEMP.BAT and this in turn is executed as an ordinary batch file.

For instance, the very first line in AUTOMENU.DAT is the main menu title that will appear centred at the top of the screen, while next is the first menu option line followed by one or more lines of DOS commands, just as we discussed above in our simple menu. The last command in each set is usually AUTO so that we are returned to the menu again.

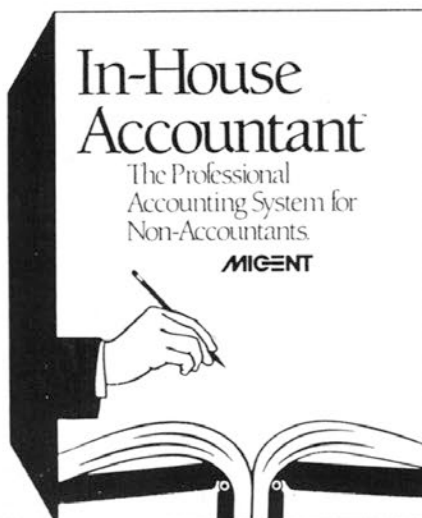
Next would come the first line of the second menu option etc. Up to

eight menu options are available per screen. Your choice of these can be called by pressing the required number key or function key, or by using the directional keys to move the pointer to your selection following by Return to make that choice. F10 is used to go forward one menu, while F9 goes back one menu.

Up to eight individual menus can be defined, so this gives a total of 64 choices which should be enough for most applications. Perhaps the later version improves on this number of choices, and I know it does allow the program to be memory resident. The menu screen is nicely laid out with fancy borders, and a nice touch is the time at the bottom left of the screen and the available memory in the bottom right corner. One function that does not work on all monitors is the screen blanking after three minutes as it is supposed to. Overall this is a useful program, but for a higher sum there are bigger and better ones available. I understand such a commercial program will be reviewed in these pages soon.

That's it for this month. Remember if you have any DOS commands or functions you want to know more about, then please drop me a line via this magazine. Better still, if you have access to a modem leave me a message on the NZ Micro Club's FIDO bulletin board system (09) 498-315.

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# Software prices

Dear Sir

I read with great interest the recent correspondence concerning the pricing of software in New Zealand. I would like to share my outrage and amusement at being offered a program upgrade by 'the sole of New Zealand distributor' at a cost higher than the original program cost!

Yes, that's correct. The Microsoft QuickBASIC Compiler v3.0 upgrade, from v2.0, costs \$NZ209 when purchased from Brimaur Computer Services NZ. My legal V2.0 copy was sent to me air-mail by a friend from the USA at a total cost of \$NZ160! The compiler cost was \$US55, its recommended USA price \$US99.

What is more, even

though the program was purchased in the USA and registered with Microsoft in the USA, the upgrade has to be purchased in NZ from Brimaur. This restriction is typical of a monopolist's ability to control supply to a market, to segment that market, and to fix prices.

*Computer Language*, May 1987 on page 65 advertises QuickBASIC for \$US69 (RRP \$US99). On page 64 Borland Turbo BASIC Compiler is priced at \$US64 (RRP \$US100). The August issue of *New Zealand Interface* contains an insert from MoS, computer suppliers. The price there for Borland Turbo BASIC is \$149 and for QuickBASIC v.30 it is \$299! Examination of recent is-

ssues of various computer publications reveals no Brimaur-distributed software prices.

Recently ads in the *Christchurch Press* have offered for sale Microsoft Word v3.1 at \$695 plus tax. The Brimaur wholesale price is about \$900. This is by no means unusual. Many wholesale software prices, from 'sole NZ distributors', are either above or very close to other distributors' retail prices.

Microsoft program upgrades seem to appear every year. Who wants to pay hundreds (thousands?) of dollars every year for upgrades to a set of Microsoft products when the equivalent brand-new original can be purchased from Borland or elsewhere

at less than the cost of the proposed Microsoft upgrade?

What is the New Zealand cost of a Borland program upgrade? What is the USA cost of a QuickBASIC upgrade? What do Brimaur charge for a Word v3.1 upgrade?

I purchased QuickBASIC v2.0 because it is part of a family of products sharing common features, for example the programs' Editor. Borland products, at NZ prices, offer me a minimum of 100 percent better value, not only now but probably long into the future.

**L.Z. Jankowski BSc(Econ), Dip.Ed,**  
Otaio

# Problem disks

Dear Sir,

I do not appear to be having much luck with my local enquiries so... why not contact the experts?

I have been the owner of an SX-64 Commodore computer for over three years. The reason why I bought the machine was because of its portability both at home and at work.

My problem...

Programs which include EasyScript word processor, B/Graph, 64 Stock Control and occasionally Print Shop are reluctant to load, more so in cold weather. I have taken my computer to the Commodore folks over on the Shore but they advise me that the disk drive is okay and there should be no reason why the programs fail to load.

There is no brand name on the program disks and I can only assume they are, perhaps, a cheap quality disk. I am presently using 3M double sided, double density disks which work every time I power up. Inci-

dentally, the 3M disks are used for back-ups (where original programs can be backed-up) and files for the word processor.

The word processor is a program I would probably use more than any other (apart from the Commodore Spread Sheet), but it is frustrating having to power up and leave the computer on with the program disk sitting in the disk drive until a workable temperature has been attained.

Is there any method around that can allow me to back up these program protected problem disks, onto a disk that I have some degree of faith in?

Finally, my wishing to backup my odd protected programs is not for the purpose of piracy (your article page 39 August *Bits & Bytes*) or to make a quick quid. I simply wish to enjoy my computing without having to reply on temperamental disks when I can have many hours' en-

joyment using proven disks that work.

**J.E. Anderson,**  
Papakura

*Mr Anderson's letter was referred to Graham Truman, a business system specialist with Shoreline Computers, Northcote, Auckland, who replied:*

It appears Mr Anderson has two semi-related problems.

When particularly cold, the SX64 (and in fact almost any disk drive) will have a tendency to misbehave itself. Normal room temperature is the best operating level. The SX64, being a portable unit, is often exposed to lower temperatures especially overnight, and if this is the case it should be allowed to warm up by leaving it switched on for a few minutes.

An insulated, padded cover (which also offered protection against bumps etc) was being marketed at one stage, but I suspect Mr Anderson's only answer now would be to make one himself to suit.

The other problem relates to his diskettes. Being mass-produced programs, there may be

a chance that they have been recorded slightly out of alignment, but in my experience the chances of this happening are not great. The more likely situation is that the diskettes have become worn with use (Mr Anderson says that he uses the word-processor more than any other program) or slightly corrupted. There is a tendency with the SX64 to store diskettes in the space above the drive. This is not recommended as the magnetic field from the drive itself and the colour monitor right next to it may affect the diskettes themselves.

However, all is not lost. Commodore Computer (NZ) Ltd will provide, through his local dealer and to legitimate owners, backup copies of most of the software packages they market. In addition, there are utility programs such as Disector, Omniclone and others which will back up these programs. If Mr Anderson is unsuccessful with his local dealer, I will put him on the right track, should he care to contact me.

Incidentally, this is the application for which these utility programs were designed, although it would appear that they tend to be used more for piracy these days.



# Excessive power

Dear Sir,

While I have no reason to doubt the sincerity and integrity of your excellent magazine or its contributing authors, I wonder if a comment by Nigel Burrell (Sept 87 page 69) is correct. His opening paragraph includes the comment, "Most people require much more powerful machines nowadays to suit their application."

I for one question this. Where are the facts to justify this statement? Apart from some of the more computer intensive applications – examples are CAD, complex analysis (both scientific and financial), the majority of applications which I have been associated with can readily be achieved by a 640kb IBM-PC type system with a hard disk.

Where this is not the

case, it is generally because of the need for concurrent access to the same data files: this requires a PC network with a file server or an alternative (depending on size) multi-access system solution (and also the services of a professional to get the system working).

Let me offer an alternative and possibly truer suggestion as to the situation. "Most people are persuaded by the system manufacturers, the trade press and the equipment and software suppliers that they require much more powerful machines nowadays to suit their application."

I am not suggesting that these groups are necessarily being unethical or deceptive. After all, the aim of most of the engineering community is to produce a

better product and that of the sales force is to sell it. What I am suggesting is that the objectiveness in procurement is being lost to the (unjustified) fear of getting out-of-date and therefore unsuitable tools for the job. Hardware is cheap, software is not! But can we be sure that we are buying the most cost-effective solution to our processing problems with all of this pressure to use larger systems?

A good example of this perhaps misguided approach to system development is the striving for multi-user operating systems for the PC. Technically this is a notable achievement which has produced a new product line in the same box, but which has defeated the basic aims of the PC design – to provide an individual

with a stand-alone processing capability which can be unique to the individual and therefore secure.

When the PC becomes so complex that it requires a technically aware professional to select it for the user and to train him in its use, it is no longer a true PC.

How about a reader survey to find out how many of the PCs in use out there really need to be bigger than the standard product?

A secondary comment on accuracy. Now that IBM has ceased production of its original PC and has introduced a new range of small systems, are Nigel Burrell and the many others still correct in discussing that range of systems as being IBM compatible?

**David E. Hilling,**  
*Wellington.*

# Sharp practice

Dear Sir,

I wish to raise through your columns a question as to the practices of the computer consultant firms associated with various chartered accountants which reflect on the integrity of the chartered accountants who are associated with them.

To support this question I give you three examples.

1. A prospect in one of the larger country towns was all set to buy a system for his office. He had done a very thorough investigation and found an office whose practices were similar to his own. The system we had installed there met his requirements, apparently in all respects, and strongly recommended our service. He was enthusiastic to move ahead quickly and all he had to do was to "discuss it with his accountant."

Suddenly the sale was off. Now a very obviously embarrassed prospect with no adequate reason for the change had "put it

on hold". It wasn't long afterwards that we found out that he had bought the opposition product and it wasn't long after that that we also heard he was having problems with it.

2. A client we had supported for quite some time, when the support from his previous supplier of an inadequate system became non-existent, was all set to upgrade his system and all requirements had been determined and were in hand to be met. As a result of over-extending itself in the export market the firm went through some deep water and the upgrade had to be postponed. We carried them through this period and in fact extended to them some considerable credit as they had indicated to us the intention of relying on us for the upgrade.

No doubt as a result of the stress they had been through, the management felt that the assessment of the new system was too much responsibility and

put it in the hands of their accountant. Relying on the integrity of their accountant, they assumed that the consultant would contact us, and fully expected us to be the suppliers. However, the consultant recommended other equipment (for which they are the agents for the software if not the hardware). The management of the firm concerned expressed some surprise and embarrassment when they found that their consultant on whom they were relying had not even bothered to contact us.

3. A large charitable organisation, not in Christchurch, requiring equipment for a variety of administrative accounting, personnel, and word processing facilities, approached a well-known firm of accountant consultants for assistance. The consultants replied with a quote offering 10 days' work at \$450 a day and gave the curriculum vitae of the consultant who

would be carrying out the work. Now admittedly the consultants were quite open about the fact that the person they offered had experience limited to a narrow range of very expensive mini computer and IBM PCs, but how is the unsuspecting charitable organisation to realise the implications of the consultant having no experience of multi-tasking or multi-user software or of operating systems apart from the IBM 3X series?

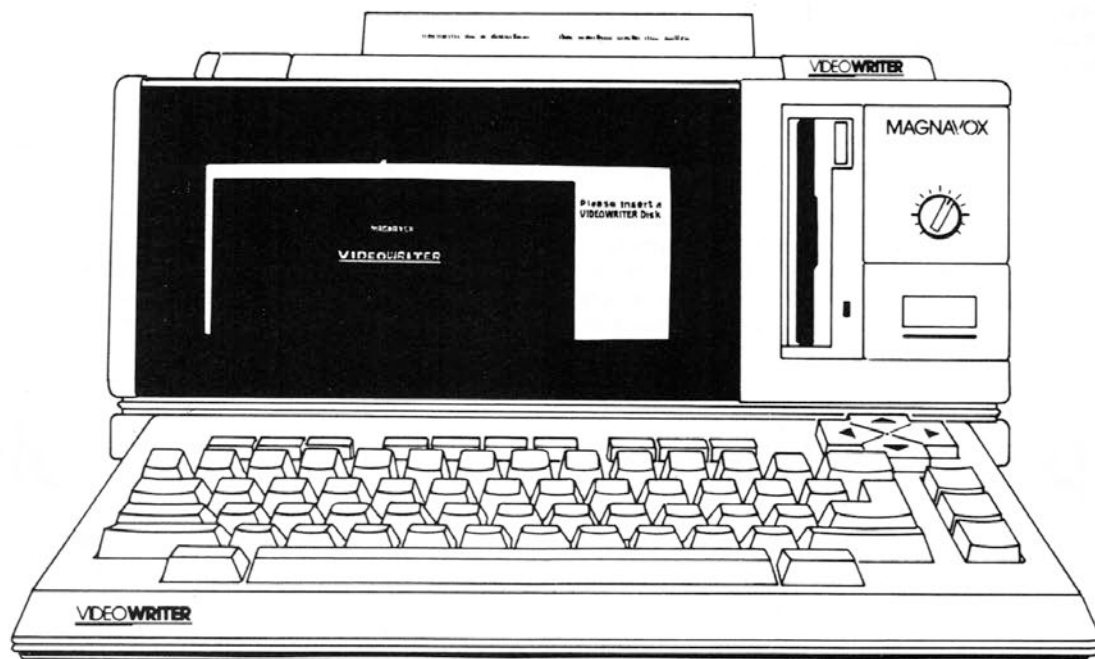
Is there a Code of Practice established for people claiming to be computer consultants? Does that Code of Practice include the condition that such consultants for systems requiring more than one terminal must have experience on a relatively wide range of multi-tasking and multi-user operating systems?

**C.V. Currie, ME, MIPENZ**  
*Director,  
Systems Software and  
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# Keeping things in perspective

by Roger G. Hicks



Living and working in a small society like New Zealand, it's easy to get a very introverted and parochial view. I'm always interested to hear of Unix happenings in other parts of the world as this helps to keep things in perspective.

I've recently heard of two major sales successes for Unix in the UK. DHL, the worldwide courier company, has a network of 100 IBM System 36 machines. Last July it announced it had bought two large Unix machines (Pyramid 98x) as a first step towards the replacement of its S36 network. Confirming the decision to move towards a Unix-based development strategy, DHL's management information services chief, Mike Hurt, said, "This is a new corporate position adopted by the company worldwide."

Charles Taylor is a 100-year-old marine insurance association that underwrites approximately 90 per cent of the world's shipping tonnage. For the last 12 years it has used Digital Equipment PDP11 computers for the data processing. Now due for replacement, it naturally looked at upgrading to the newer VAX computers, but according to the Charles Taylor's DP manager, "There were no real tools to make an easy transition."

With the added incentive that the DEC solution would cost twice as much, this leading marine insurance company has ordered a 100-terminal Unix machine from TIS. A director of the company that is providing the software to assist with the transition is quoted as remarking dryly, "DEC just thinks it can walk on water and the rest of us have got to do things their way."

## Evolution of C

The use of a language or set of symbols to describe conceptual or philosophical issues is necessary if the ideas are to be shared, acted upon and enlarged. However, contained in the communication method chosen are implicit constraints that both channel and restrict the minds of people attempting to extend the knowledge.

One of my favourite examples occurs in the history of number rep-

resentation. For centuries after the Roman conquests of Europe, numbers were represented using the Roman method, using symbols such as I, V, X, L, C and grouping them together to represent specific numbers. For example; III is 3, VI is 6 and CCVI is 206. The real quirk in the system is that a lower-valued symbol occurring before a higher-valued one is subtracted rather than added; thus IV is 4 and XC is 90. Much common-or-garden arithmetic is very difficult with this system, long division for example being difficult to comprehend as well as to perform.

With the adoption of the Arabic representation of numbers (as are in use today) that included zero, our understanding of numbers took a great leap forward. It might be said that the effects brought about by changing the language and symbols used has resulted in the science and technology we see today.

In the computer software field some languages have a very practical, as well as conceptual, impact on the direction of the industry. C is a language that has had a significant impact, through its relationship with Unix and from that into a wider arena.

The operating system written in assembler for the PDP7 was a test bed for concepts being developed by one of the researchers at Bell Laboratories. Without the C language these ideas would have become part of the conceptual base from which other operating systems developed, but Unix and its impact upon decades of the information technology industry would not have happened.

## B first

When Unix was moved from the original PDP7 to the new PDP11 in 1970, Ken Thompson developed a language called B. B owes many of its main characteristics to BCPL, a language developed a few years earlier by Martin Richards. The B compiler was very much smaller than BCPL, requiring only 4kb of 18-bit words on the PDP7, and in spite of many syntactic changes, B remained very close to BCPL semantically.

Both BCPL and B are typeless languages, but by 1972 the advances

being made in language and compiler theory were favouring enforced typing of variables. This research work, coupled with some problems that the newer processor architectures had highlighted in the B language, resulted in Dennis Ritchie developing a new version of B. Originally called NB, the language quickly became known as C, and in the summer of 1972 Unix was rewritten in C.

The decision to write Unix in a higher level language, and the nature of the language chosen, enabled Unix to become adapted for wider research and encouraged its spread onto other machines. The growth of Unix had started, something that would have been almost impossible without the solid foundation of C beneath it.

In 1977 AT&T sponsored a committee to monitor and develop internal C standards, and this move greatly assisted the spread of the language. And now, in the late 1980s, the American National Standards Institute through its X3J11 committee has taken C under its wing.

C and Unix, from a common origin, evolved separately but concurrently. Without the strong interaction and initial cross-fertilisation it is probable that neither would have grown beyond the research stage. And the result of that would be a computer industry missing much of its conceptual driving force.

The use of C now extends far beyond the Unix arena; much of the systems software development being done today is based upon the language and the ideas and concepts inherent in it. Although written a decade ago, the closing paragraph in the paper written by Dennis Ritchie et al, and published in the AT&T Technical Journal in 1977, is still pertinent:

"Realistically, the very acceptance of C has compelled changes to be made only most cautiously and compatibly. Should the pressure for improvements become too strong for the language to accommodate, C would probably have to be left as is, and a totally new language developed. We leave it to the reader to speculate on whether it should be called D or P."



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#### REVIEWED THIS ISSUE

##### Turbo Prolog: Features for Programmers Sanjiva Nath

This book explores the limits of Turbo Prolog's possibilities and provides the programmer with numerous ready-to-use routines. It is designed for both the novice and the more familiar programmer. The programs are easy to follow and allow for a great deal of exploration. It covers lists and recursion, arithmetic functions and predicates, building databases, DOS disk file management, video display programming, accessing ROM-BIOS interrupts also interfacing with "C" and assembly language.

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##### The Amiga Michael Boom

Shows users how they can build on a beginner's knowledge of BASIC and the Amiga's built-in graphics and sound features to create an array of sophisticated applications. It explores how the Amiga system can be expanded to use laser discs, synthesizers, colour printers, touch tablets, digitizers and more.

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##### Armchair Basic A & D Fox

An absolute beginner's guide to programming in BASIC. After reading this, you'll have a firm understanding of what programming is all about. Filled with illustrations and examples, it's an unintimidating introduction to the most popular micro-computer language – BASIC.

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##### Advanced MS-DOS Ray Duncan

Shows programmers how to fully access the hidden power of MS-DOS. This book covers: screen, keyboard, file, and record access. The internal structure of MS-DOS disks. The Intel/Lotus/Microsoft Expanded Memory Specifications. Creating installable device drivers and filters to extend MS-DOS. Useful comparisons with UNIX and CP/M.

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Heinemann Our price \$11.11. Save \$0.84.

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##### Advanced Macintosh Basic Programming Phillip Calippe

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Compute Our Price \$47.00. Save \$3.55.



## Using Microsoft Works Sharon Zardetto Aker

This is a comprehensive reference guide and tutorial showing some of the tasks which can be done efficiently and easily with Works, including a word processor, database, spreadsheet, telecommunications, and graphics. It describes how to create form letters with the word processor, to home and business budgets and tax forms with the spreadsheet.

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## Operator's and Programmer's Guide for the Amstrad CPC6128 and PCW 8256 Digital Research Inc. Amstrad Consumer Electronics p/c

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# How's your Fog Index?

by James Lawry

This month I'm taking a look at a light-hearted novelty program with an unusual use. The program is based on one written by R. B. Nottingham.

How readable is your writing? There has been campaigning recently to make pieces of writing more readable, particularly legal documents,

guarantees, etc. The immediate problem of the campaign was how to quantify readability, until an American organisation called the Gunning-Mueller Clear Writing Institute developed a test known as the Fog Index.

This is calculated by means of a for-

mula: the average sentence length (measured in words) plus the percentage of long words, all multiplied by 0.4. (A long word is defined as a word having three or more syllables.) The index is said to be roughly equal to the number of years of schooling required to read the document and understand it fully. Obviously, a lower fog index means a more readable piece of writing.

This formula is the ideal candidate for computerisation. Not only that, but it is also fun to calculate your own writing's fog index, and that of your favourite author, newspaper articles, legal documents, or whatever. And the program is good for demonstrating string handling techniques. Of course, results should not be taken too seriously – it is easy to fool the computer into giving wide-ranging results with bogus extracts.

How to go about it: counting words is no problem, just count spaces. Counting sentences is the same, just count full stops. The main problem is counting words of three or more syllables. How to count the number of syllables in a word?

You could count the vowels. Each syllable must have a vowel in it. What about double vowels, as in the word "screen"? All right, ignore a vowel if it follows another vowel. And ignore final e's, as in the word "byte". What about the words "double" and "dye"? All right, make words ending in "le" or vowel "e" an exception to that last one. What about the word "jumped"? Ignore final "ed", but again with exceptions: "ded" and "ted".

This is about as many rules as you can make. They're not perfect (for example "useful" is counted as three syllables), but they're adequate. Any suggestions you have for improvement are welcomed, and I would also be interested if anyone finds a vaguely practical use for this program, since I haven't yet.

Here then is my attempt to code these rules into Locomotive Basic. There are plenty of REMarks throughout, explaining what each of the text-processing lines is doing, and these may be left out when you type it in.

Line 150 tells you most of the variables that are used. Variable names are long so you can see what each is doing, but you can shorten them if you like to save some typing.

OPENIN file\$ opens a file from disk or tape, so that it can be accessed through stream #9. This program is

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set up to read the text from an ASCII file on tape or disk, so that you can enter the text on a word processor, save it and then run this program. (Some word processors need to be in a special mode to make ASCII files, such as Program or Non-document mode. Check your instruction book.)

Two variables are used to hold true/false values, using -1 and 0 for true and false respectively: in.word and in.sentence. The statement

IF in.sentence THEN...

is equivalent to

IF in.sentence<>0 THEN...

and

IF NOT in.sentence THEN...

is equivalent to

IF in.sentence<>-1 THEN...

These variable are used to allow for double spaces, double exclamation marks, and ellipsis (dot-dot-dot).

Line 320 shows a nifty way of checking for a letter: letters are the only characters for which UPPER\$ and LOWER\$ return different values!

An error trapping routine at 700 comes into action if you try to work out the fog index of less than one sentence and generate division by 0 or overflow error.

To use the program, first type in the text on your word processor and save in the right mode, then run this program. A window at the top of the screen will update with statistics so far as text is read in, and you can stop it at any time by pressing ESC twice. If you do this or it comes to the end of the file, a table will tell you the results of the test.

If you don't have a word processor, leave out lines 160,170 and 220 and change the message in 180 to "Press any key:". Replace 230 with WHILE 1, so you must press ESC twice to get out, and leave out the "#9," in 240. Then you can simply type in your text, a line or two at a time, when the question mark appears.

How does the program rate a few samples? Two articles I tested from the August *Bits & Bytes* issue rate well: Selwyn Arrow's DOS Corner rates 11.78, while Peter Ensor's scanning feature is a little higher at 13.14. (A sample of the first hundred words or so was taken for each of these.) Thirteen is supposedly about right for a seventh form student, so this seems pretty good.

How does this compare to other publications? Quite well! A newspaper editorial rates 17.44. The CP/M End User Program Licence agreement, a complicated bit of legalese which disk users will find in their manual, 18.81. But the 1951 New Zealand Official Secrets Act takes the prize, clocking in at 40.36 years of education required to read it! How does your writing compare?

One of these days somebody may come up with a similar test for software user-friendliness. ■

#### Listing 1.

```

10 ON BREAK GOSUB 560
20 ON ERROR GOTO 700
30 MODE 1
40 'all variables default to integer
50 DEFINT a-z
60 'lower top of window 0 three lines
70 WINDOW 1,40,4,25
80 PAPER 0:PEN 1:CLS
90 'create window in space
100 WINDOW #1,1,40,1,3
110 PAPER#1,1:PEN#1,0:CLS#1
120 'title in this window
130 LOCATE #1,9,1:PRINT#1,"FOG INDEX CALCULATOR"
140 LOCATE #1,9,2:PRINT#1,"=====
150 words=0:long.words=0:sentences=0:syllables=0:vowels=0
160 PRINT"Enter the name of your text file"
170 INPUT" ",file$
180 PRINT:PRINT"Insert the disc or cassette and press":PRINT
    "any key:"
190 'cursor on,wait for key,cursor off
200 CALL &BB81:CALL &BB18:CALL &BB84
210 CLS:CLS#1
220 OPENIN file$
230 WHILE NOT EOF
240   LINE INPUT#9,text$
250   FOR char=1 TO LEN(text$)
260     ch$=MID$(text$,char,1)
270     ' end of word
280     IF ch$=" " AND in.word THEN in.word=0:words=words+1
290     ' end of sentence
300     IF INSTR("!.?,:;ch$) AND in.sentence
        THEN in.sentence=0:sentences=sentences+1:
        IF in.word
        THEN in.word=0:words=words+1
310     ' letter
320     IF (UPPER$(ch$)<>LOWER$(ch$) OR ch$="")
        AND NOT in.word
        THEN in.word=-1:syllables=0:vowels=0:in.sentence=-1
330     ' vowel
340     IF INSTR("AEIOUY",UPPER$(ch$)) THEN vowels=vowels+1:
        IF vowels=1 THEN syllables=syllables+1
        ELSE vowels=0
350     ' ignore ED except TED and DED
360     IF char>3
        THEN IF UPPER$(MID$(text$,char-2,3))="ED "
            AND INSTR("DT",UPPER$(MID$(text$,char-3,1)))=0
            THEN syllables=syllables-1
370     ' ignore final E except LE,vowel E
380     IF char>2 THEN IF NOT in.word
        THEN IF UPPER$(MID$(text$,char-1,1))="E"
            AND INSTR("AEIOULY",UPPER$(MID$(text$,char-2,1)))=0
            THEN syllables=syllables-1
390     ' check for long word
400     IF NOT in.word AND syllables>2
        THEN long.words=long.words+1
410   NEXT char
420   IF in.sentence THEN in.word=0:words=words+1
430   GOSUB 490
440   PRINT text$;
450 WEND
460 'finished
470 GOSUB 560
480 CLOSEIN:END
490 WINDOW SWAP 1,0:LOCATE 1,1:PRINT"Words:";USING "####";
    words;
500 LOCATE 12,1:PRINT"Long wds:";USING "#### ";long.words;
510 LOCATE 26,1:PRINT"Sentence:";USING "####";sentences
520 IF sentences>0 THEN LOCATE 1,2:PRINT"Words/sentence:";
    USING "####";words/sentences;
530 IF words>0 THEN LOCATE 22,2:PRINT"% Long words:";
    USING "###.##";long.words*100/words;
540 IF sentences>0 THEN LOCATE 1,3:PRINT"Fog Index:";
    USING "###.##";(words/sentences+100*long.words/words)
    *0.4
550 WINDOW SWAP 1,0:RETURN
560 PEN 1:PAPER 0:MODE 1
570 PRINT"Fog index results:"
580 PRINT"*****"
590 PRINT"Words: ";USING"####";words
600 PRINT"Long words:";USING"####";long.words
610 PRINT"Sentence:";USING"####";sentences
620 PRINT"Wds/Sen: ";USING"###.##";words/sentences
630 PRINT"% Long wds:";USING"###.##";long.words*100/words
640 fog.index:=(words/sentences+long.words*100/words)*0.4
650 PRINT"Fog index:";USING"###.##";fog.index!
660 PRINT:PRINT"Another file? (Y or N)"
670 'clear buffer,get Y or N
680 WHILE INKEY$<>"":WEND:is="":WHILE INSTR("YN",is)<2:
    is=UPPER$(INKEY$):WEND
690 IF is="Y" THEN CLOSEIN:RUN ELSE RETURN
700 IF ERR=11 OR ERR=6 THEN PRINT:PRINT"Results impossible
    to calculate.":PRINT"No complete sentence or word.":
    RESUME 560
710 PRINT:PRINT"Error"ERR"in"ERL:STOP

```

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# Who wants to be a Mac developer?

by Grant Cowie, PhD

Have you ever wondered why there are almost no locally developed accounting systems for the Macintosh? Or why there are dozens of local software houses churning out systems for the MS-DOS world, but very few for the Macintosh? Perhaps you're even thinking of filling this void. Let's have a look at what you'll need, and then see if we can't answer these questions.

It's generally acknowledged that developing for the Macintosh is much harder than for other computers. The much-praised Macintosh interface which makes the Mac so easy to use also imposes enormous overheads on the programmer. You ought to be aware that although Mac programming can be tremendously rewarding (in the intellectual if not the financial sense) it is also hard work and often extremely frustrating.

The complexity of developing for the Mac means that one thing that you will require as a developer is good information. Unfortunately it is very difficult to plug into good information sources from New Zealand and your most likely source of information and help on Macintosh problems is friends and colleagues. One of your first steps as a budding developer should probably be to join your local Macintosh user group or club where you can exchange information and solutions with other Mac enthusiasts.

Unfortunately at the present time you will be hard pressed to find any other sort of local development support, and should therefore consider joining AAPDA, the Australasian Apple Programmers and Developers Association. This will (potentially) give you access to lots of technical information including *Inside Macintosh*. You can also subscribe to regular Macintosh Technical Notes, which are well worth having if you're thinking of dabbling into the toolbox. AAPDA is also the only way to get hold of MPW, the Macintosh Programmers Workshop, and the address is: AAPDA, P.O. Box 1156, Wollongong, NSW 2005, Australia.

One thing that AAPDA has organised over the past few months in Australia is a series of training courses and seminars for developers. The good news is that these courses are going to be run in New Zealand, either in November or February. The details aren't available at the time of writing, but if you're interested contact David Blair at CED Distributors (the New Zealand Apple distributors) in Auckland.

Apple has a special Registered Developer status. In practice this is almost impossible to get, as it seems that to qualify for it you need to already have had a history of successful development on the Macintosh – a sort of chicken and egg situation.

Being a registered Apple developer means that you may be eligible for discounts on development computers, and that (at least in theory) you have access to a wide range of technical literature.

So having joined your local Mac club, become a member of AAPDA and perhaps even a Registered Apple Developer, you'll still need to sort out what development tools you are going to use. If you are starting a substantial development from scratch you would probably be well advised to use MacApp and MPW. MacApp is a sort of generic application which looks after all those tricky things such as windowing, menus and event handling. If you are not familiar with the Mac toolbox this will save you at least three months of frustration.

One of the problems with MPW is that compilations are not fast, and unless you have a Mac II you can spend a lot of time waiting. However there are alternatives, although these are not at present MacApp compatible. I use Borland's Turbo Pascal because it gives full access to the toolbox and compiles at a breathtaking 12,000 lines per minute. Some of my colleagues swear by Lightspeed Pascal which is an incremental compiler with a fantastic debugging environment. And of course there are other languages available such as Forth, C, Fortran and (believe it or not) Cobol.

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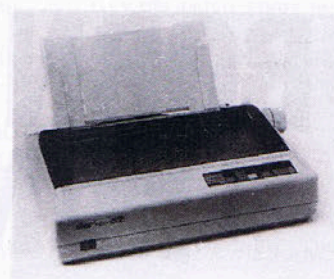
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# More adventures

by Timothy Howell

Some adventure games involve using the keyboard to type in commands to move around and do other things. To move, the directions of the compass are used to direct you; that is NORTH, EAST, or N and E for example. Other commands such as EXAMINE, PUSH, DROP, and JUMP, though self-explanatory, are also very useful and often-used commands. Some of the more advanced adventures need less obvious commands

for you to progress.

The commands are not the only elements that are necessary for a good adventure. It is up to a thing called a parser to recognise your commands and to act them out. A parser is a very complicated program, and for a large number of commands to be recognised a great deal of memory is needed.

To counteract the lack of memory, a disk drive is often used and so many

of the larger and more descriptive games are on disk. If you are really into adventuring, a disk drive is an almost essential purchase. Nevertheless, many good adventures have been written to suit tape users, and are still being written, so all you tape users out there take heart!

There are adventures both with and without graphics. Understandably, those adventures with graphics take up more memory with their pictures and this often reduces the quality of the parser. The advantage of having graphics, however, is that the game often looks much more interesting and that is often an incentive to keep on going and to see new pictures. Alternatively, those games without graphics often can understand you better than those with. With more advanced programming techniques, many software companies can cram both a good parser and graphics into the C.64 without the use of a disk drive or a multi-load system.

Of the many adventures on tape for the C.64, those from the British company Level 9 are generally regarded as being some of the best that are available. Their games are often of a science fiction genre and most of them feature both graphics and text. Recently Level 9 has combined with Rainbird and has produced updated and more technically advanced versions of their earlier games, packaging them in trilogies.

Jewels of Darkness is one of these packages. It features the three games from the Middle Earth Trilogy: Colossal Adventure, Adventure Quest and Dungeon Adventure. The games involve exploring and solving puzzles in a medieval-like atmosphere. Another similar trilogy, Silicon Dreams, has also been released and consists of more recent Level 9 offerings. In this trilogy you are in a more modern surroundings such as a massive spaceship and a technologically advanced society in which you have to take over the government.

Adventurers don't have to be content with only serious sci-fi adventures. There are also quite a few humorous examples available, some, such as The Boggit and Bored of the Rings, satirising well-known books.

Other adventures on tape also feature characters from popular books, movies or television series. A number of companies have licensed characters from those media and have featured them in their adventure games and let you be your favourite hero. Characters such as Spiderman, the Hulk, Dracula and the Fantastic Four

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have all had their own adventure games, as well as such books as *The Hobbit*, *Lord of the Rings*, *Rebel Planet* and *Seas of Blood*.

A number of 'budget' adventure games are also worthy of attention. *Kentilla* (Mastertronic) is another science fiction based game which has small pictures and is fun to play. *Sea-base Delta* is also another good game, in which you have to penetrate an underwater enemy base and then escape again. The graphics are also really good – especially for a game of this price.

As far as disk-based adventure games go, one publisher that immediately springs to mind is Infocom. Infocom has long been regarded as the premiere adventure game producer as, though all its games are only on disk, they feature excellent descriptions of the locations you go to and the parser is extraordinarily good – you can type in almost anything and get an intelligent response.

A wide variety of games are available from Infocom, ranging from science fiction such as the *Zork* series and *Starcross*; to solving detective problems in *Deadline*; and to humorous games such as *Hitchhiker's Guide to the Galaxy* (based on the well-known Douglas Adams book) and *Leather Goddesses of Phobos*. All of the Infocom games come with detailed documentation and sometimes little gimmicks as well.

Activision has also produced a number of disk-based adventures that are also worth looking at. Two related games that were released over a year ago are *Mindshadow* and *Tracer Sanction*. Both of these have good quality graphics and are also good fun to play. More recently, Activision has released *Borrowed Time* and *Tass Times in Tone Town*. These games are unusual because you have the option of either typing the commands in normally, or moving a pointer around and point to the command that you want to make. Both of these games are worth looking at as well.

One British adventure which is receiving a lot of worldwide acclaim is *The Pawn* from Magnetic Scrolls and Rainbird. Not only does this game feature a parser that is as good as Infocom's, but it also features graphics that are second to none on the C.64. This game was converted to the Commodore from the Amiga/ST version and features a number of cryptic puzzles. *The Pawn* also comes with a novel and a couple of other items to help you in the game. Cur-

rently, *The Pawn* is the apex of the many adventure games that are available for the C.64. Magnetic Scroll's second game, *Guild of Thieves*, should be available very soon and it could possibly surpass *The Pawn* in the quality of its features.

This is meant to be a general introduction to adventuring on the C.64. I

have tried to describe a basic cross-section of the types of adventure games that are available as well as trying to explain the basic necessities of a good adventure. Many of those I have mentioned are of good quality, but again, if you are thinking of buying a game, try it out first. ■

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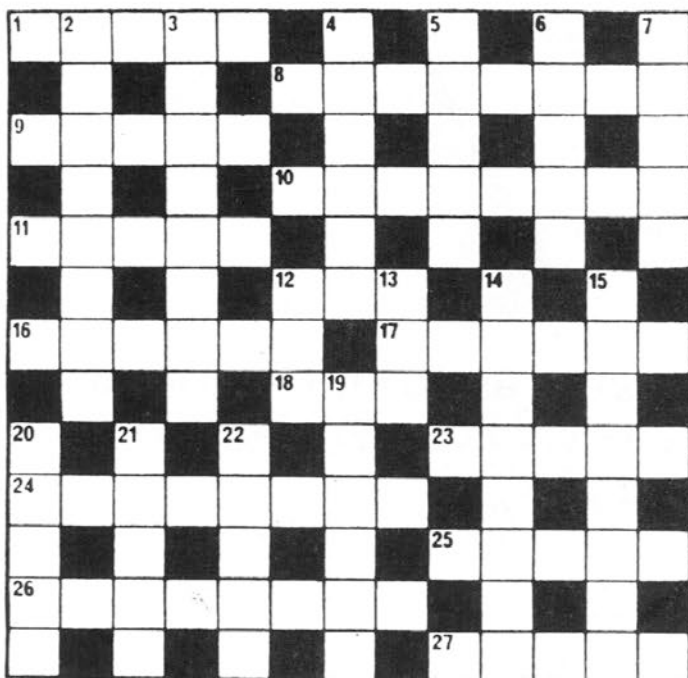
### Across

1. Symbolic representations on screen of procedures or commands, much used in mouse/window systems. (5)
8. Sir Clive's third big-selling computer, which came out in 1982. (8)
9. Colloquial description of the sockets for expansion boards found in open architecture micros. (5)
10. The generic name for computer programs. (8)
11. Microsoft's operating system for the 16 bit 8086/8088 processors and work-alikes. (2/3)
12. High level programming language named after Lady Lovelace, pioneer woman in computing history. (3)
16. A security copy of a computer file, on disk, tape or other recording medium. (4-2)
17. A short routine or program to cause a main program to be read into memory. (6)

18. Acronym for the microprocessor comprising the "brains" of a computer. (3)
23. The name given to John Von Neumann's enhancement of the ENIAC computer. (5)
24. As in ----- time, the speed of operation of a computer. (8)
25. Japanese electronic giant, that makes the MBC series of PCs, e.g. the MBC 550/555, or MBC 885. (5)
26. Peripheral device with visual display and keyboard. (8)
27. The key or keys used to return a computer to "go" or the ready state. (5)

### Down

2. The spreadsheet from Micropro, usually sold bundled with Wordstar, Reportstar etc. (8)
3. Systems of linked computers or communication stations. (8)
4. To transfer data from your computer to a remote computer or bulletin board system. (6)
5. Worldwide co-ordinating body for Telecommunications (abbrev.) (5)
6. To interrupt a program, or the key used to do this. (5)
7. This colour is the common alternative to green for a monochrome monitor. (5)
12. Code letters for NEC's range of PCs, now in their 4th series. (3)
13. Acronym for the part of the microprocessor that does maths calculations and logical operations. (3)
14. Speed of transmission of information through a serial input/output port. (8)
15. Mb for short, or 1024 kilobytes. (8)
19. High-level programming language, named after a great French mathematician and scientist. (6)
20. The expansion of W from the acronym WORM, a new concept in mass storage. (5)
21. The generic term for those who work or play with computers. (5)
22. The science dealing formally with the principles of thought and reasoning. (3)



### Last month's solution



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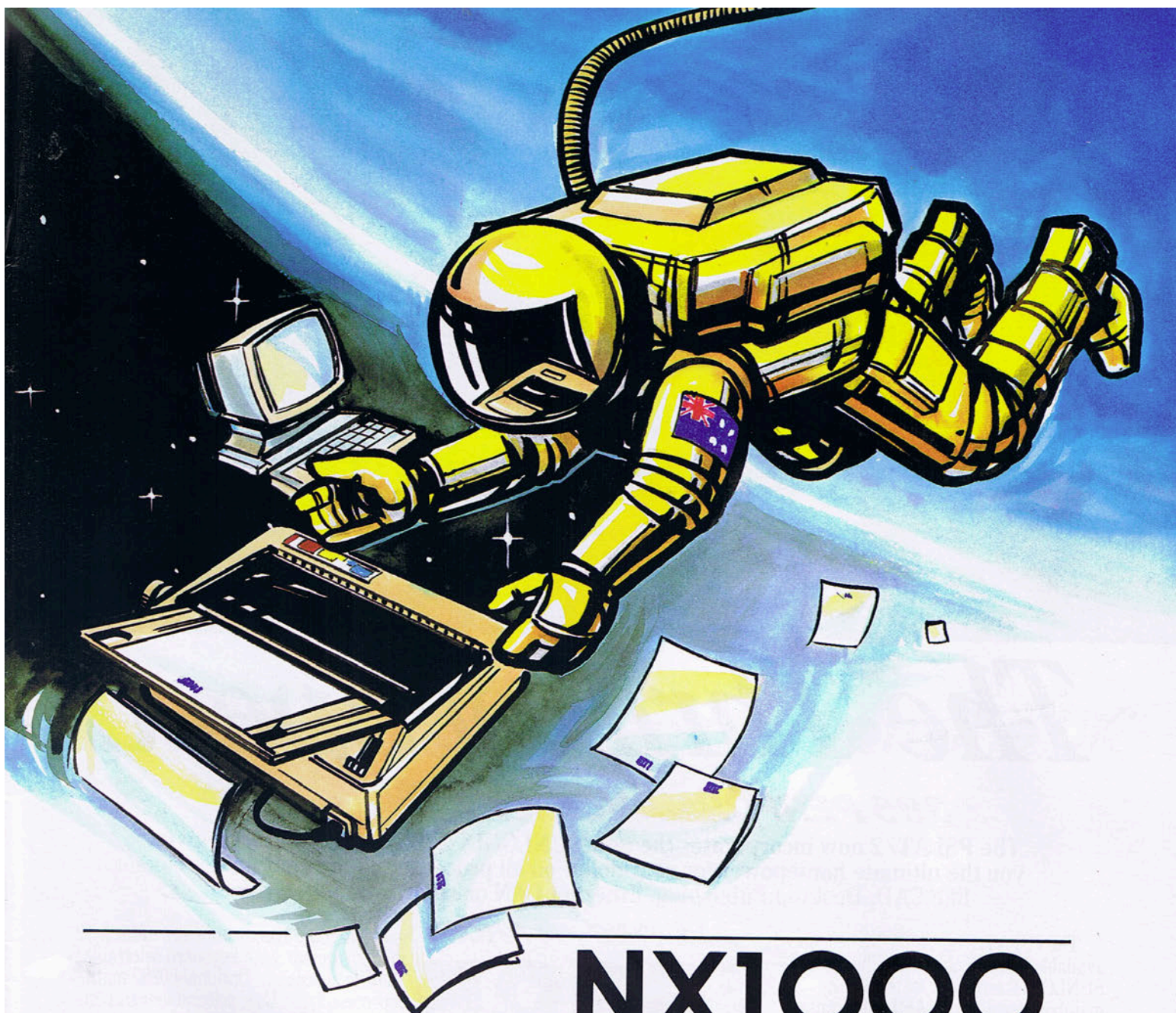
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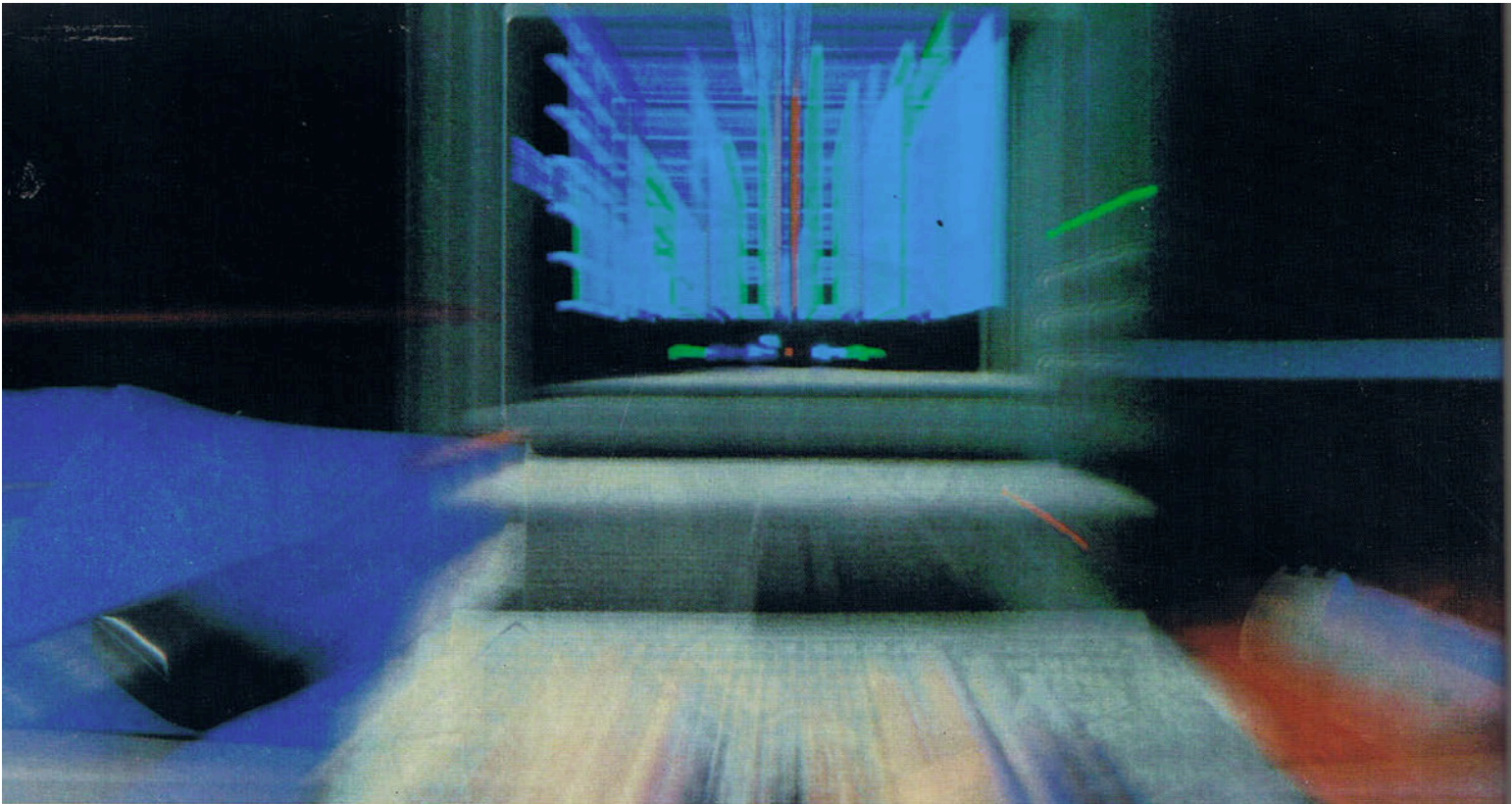
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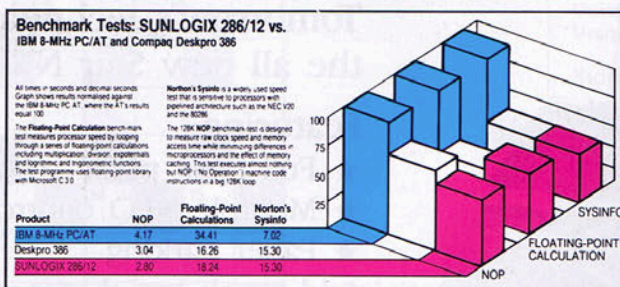
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