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"Dac-Easy Accounting is a genuinely amazing deal."

PC Magazine, October 15, 1985

"I've never before in a review come right out and told readers to buy a product, but I'm doing it now. Dac-Easy is an incredible value."
PC Week, August 27, 1985

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PC MAGAZINE

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PC Magazine, October 15, 1985

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- Password protection
- File capacity limited only by disk space
- Support contract available

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- Unlimited multi-level accounts
- Three year account history for CRT inquiry
- Pencil and pen feature to correct mistakes
- Unique budgeting routine
- CRT transaction inquiry
- Activity report, trial balance, financial statements, unlimited departments and journals

Accounts Receivable
- Open invoice or balance forward
- Customized aging report
- Unlimited number of customers
- Flexible mailing labels and directories
- Supports partial payments & finance charges
- Three-year customer history for number of invoices, sales, costs, and profits
- Customized statements
- Cash flow analysis sales analysis
- Automatic sales forecasting

Accounts Payable
- Check printing with multiple invoices and cash available routines
- Aging reports with seven customized columns
- Unlimited number of vendors
- Flexible mailing labels and directories
- Three-year vendor history
- Unlimited allocations per invoice

Inventory
- Supports average, last purchase and standard costing methods
- Powerful physical inventory routines
- Accepts any unit of measure
- Three-year product history in units, dollars, cost and profit
- Automatic forecast of product sales
- Automatic pricing assignments
- Alert and activity reports with 11 sorts
- CRT shows on-hand on-order committed sales cost profit turns GROI

Purchase Order
- Inventory and non-inventory items
- Allows up to 99 lines per P.O.
- Per line discount in %
- P.O. accepts generic discounts freight taxes insurance
- P.O. accepts back orders and returns
- Purchase journal

Billing
- Service or inventory invoicing on plain or preprinted forms with remarks
- Prints sales journal
- Allows return credit memo

Forecasting
- Unique program that automatically forecasts using your three-year history
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost, and profit
- Inventory item usage
- Forecast by same as last year, or % base from last year, or trend, or least square trend line analysis method.

Dac redefines word processing.

Free Spelling Checker if you act soon!

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"Dac's success is likely to leave an impression on other publishers who, even if they won't admit it, are likely to be feeling the heat to sell packages of similar quality at a similar price."
InfoWorld, August 12, 1985

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Partial List of Features

General
- Extensive help screens
- Supports sub-directories
- Sorts directories alphabetically
- Auto-save eliminates data loss
- Easy to connect, save, retrieve, erase and rename documents
- Not copy-protected
- Service contract available

Printer Features
- Printer paper control from keyboard
- Supports underlining, bold lettering, italics and all other printer features
- Prints up to 999 copies
- Allows you to select pages to be printed
- Supports over 50 popular printers

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EDITORIAL

Software — The Driver

Judging the annual Software Product of the Year Award made it clear to us that in recent times the rate of software development has slowed down. Where were the breakthrough programs, the new Visicalcs, dBases and Lotus 1-2-3s, which would continue to revolutionise the personal computer marketplace?

Right now, the industry is in the doldrums. A number of dealers and distributors have recently laid off staff, so serious is the decline in sales (or the lack of anticipated continued growth). Whatever the reason, there is no doubt that the boom times are over, at least for some time.

Perhaps the two phenomena are related. In deference to the IBM PC hardware standard, personal computers have become increasingly alike, and purchasers' interest has flagged. It's difficult to excite enthusiasm in products which remain basically unchanged, and this problem has been compounded by the emergence of software 'standards', which are becoming increasingly difficult to abandon.

In looking over the past year's new releases, we were a little disappointed by the lack of innovation we saw. There were some neat ideas, some cute tricks, but very little to help a flagging industry. Many products were simply variations on older themes — *plus ca change, plus c'est la meme chose.*

Fortunately, we were able to find some gems among the mass of otherwise uninspiring software, and produce a short list.

Just when we were ruminating on the future of our failing software industry the hoped-for software — and lots of it — arrived. Unfortunately it was too late for inclusion in the Awards.

Among the candidates for next year's Award you can expect to see new packages such as Javelin, a financial modelling system; Paradox, Ben Rosen's new database; VP-Planner, a new spreadsheet which offers both 1-2-3 compatibility and new features of its own; and Turbo Lightning, a new spelling checker and thesaurus from Borland International which works with virtually any other software. Reviews will appear shortly.

Interestingly, the new software doesn't offer many new features; instead it concentrates on new approaches and techniques. Perhaps the time of adding features to create complex juggernauts, such as Symphony, is finally past. Could this be the renaissance of the software industry? □

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The MACINTOSH Plus

Apple Computer's annual stockholder's meeting in January has become a regular spot for announcements of new products and directions for the company each year. Preceded by rumours of colour Macs, Laserwriters with 1000-by-1000-dot resolution and assorted other wonders, the actual event is sometimes a bit of a let down. This year, Apple introduced upgrades to its existing Mac line, rather than anything spectacularly new. Darren Challis was one of the first people in Australia (including Apple Australia) to get his hands on a Mac Plus, and he found it has a lot to offer.

IN MID January, I had the good fortune to be in San Francisco in time to attend the 'Macworld and Apple II Expo'. This was the biggest and most important exposition of Apple II and Macintosh-oriented products yet to be staged in America, with nearly 470 booths, including the 'Australian Pavilion'. It constituted the first serious entry of Australian software publishers and distributors into the American Apple scene.

Since their inception in the late '70s, computer expositions have become the favoured venue for releasing new products, and this expo was no exception. There were literally dozens of new software packages for the Macintosh, and a somewhat smaller number for the Apple II. There was also a surprisingly large number of peripherals available, including new hard disks, floppy disk drives, modems, networking systems and printer buffers. All this was displayed to at least 30,000 paying attendees (at $US15 a head).

Apple Computer took full advantage of this opportunity to release two important new products: the Macintosh Plus and the Laserwriter Plus printer.

The Mac Plus computer is not a completely new design, but an enhanced version of the existing Macintosh. It's still the same size, and has the same basic appearance, apart from the words 'Macintosh Plus' next to the Apple logo on the front panel. The main processor is the same 'pseudo' 32-bit Motorola MC68000, working at the same 7.8336 MHz clock frequency. The differences start with the size of the RAM, which is now 1 Mbyte (1024 Kbytes), compared with 128 or 512 Kbytes on the original Mac and 'Fat Mac'. Apple also announced that the Mac Plus will be upgradable to 4 Mbytes, as soon as the 1 megabit chips become commercially viable, which will probably be before the end of the year.

Compatibility Maintained

The Macintosh Plus has been carefully designed to be compatible with the majority of existing Macintosh software. But more importantly, the performance of the ROM has been improved, and the seven known bugs which previously existed in its routines have now been rectified. The ROM has been doubled to 128 Kbytes in order to incorporate more resources in ROM and reduce the number that must be loaded into memory from the System file on the disk. A few new routines and resources were also added to the ROM. (Resources are items of information accessed by application programs, such as fonts.) The Quickdraw routines (the routines which do all the drawing, including drawing of text on the screen) have been substantially upgraded, so routines such as 'Vertical Line' are almost five times faster.

The disk capacity has also been doubled: the new internal drive is the Sony 9 cm, double-sided 800 Kbyte drive, where the original Macs only had the single-sided 400 Kbyte version. Of course, you can still use a single-sided disk in a double-sided drive, but not vice versa. The new drives are also considerably faster and quieter. A matching external 800 Kbyte drive is now available; it's double the capacity and about half the size of the old ones. You can still plug a single-sided external drive to the Mac Plus.

The 800 Kbyte disks are automatically formatted with true hierarchical directories. The hierarchical file system (or HFS) is defined as "A way of using folders to organise documents, applications, and other folders on a disk to keep together and view related information." The old Macintosh File System (MFS) also had folders, but only for appearance. On other systems an HFS folder is known as a subdirectory. The HFS system differs from MFS, especially when you use a Minifinder; for example, when opening or saving a document in most applications. A 400 Kbyte disk is not normally created hierarchically, but can be when formatting the disk with the Option key.

There are also new versions of the system files — Finder 5.1, System 3.0 and Imagewriter Driver 2.1 being the most important. There is a new printer driver for an Imagewriter on Appletalk.

The SCSI Connection

The new built-in SCSI (Small Computer Standard Interface) connector is at the rear of the machine. It's an extremely high-speed, industry-standard interface, designed for connection to hard disks, tape backup systems, and other peripherals. At start-up, the Mac Plus checks for the presence of a disk in the internal drive, then in the external drive. It then checks if it can start up from a hard disk or other mass storage device connected through the SCSI port. The SCSI allows daisy-chaining of up to seven devices. SCSI hard drives have been announced by various companies, including Iomega, Supermac Technologies and Sunol. The HFS is most suitable for use with these large-capacity hard disk drives. The two serial ports are now circular 8-pin DIN connectors, instead of the old Macintosh DB-9s.

The keyboard is similar to the old one, and has the same feel, but it now incorporates 20 more keys. The new total of 78 keys includes a built-in numeric keypad and four cursor keys. There are also other slight differences, such as only one Option key instead of two, and a more standard backward-L-shaped Return key.

Another new feature is the RAM cache. With a RAM cache set-up (from 32 Kbytes to 768 Kbytes in size), you can store information used repeatedly by an application in fast internal memory, rather than loading it from disk every time it's required. The cache is similar in operation to the Turbo control caching program, but it's set from the new version of the Control Panel desk accessory. The Control Panel is also where you now select whether Appletalk is connected or disconnected. The 'Choose Printer Desk Accessory' has been replaced by the 'Chooser'.

One further difference between the Mac Plus and the Mac is that the new machine does an automatic RAM check at start-up. This can be avoided by holding down the mouse button immediately after start-up and before the start-up beep. Holding down the mouse button after the start-up beep ejects any disk in the external drive, as well as the internal drive.

At $4495 the Macintosh Plus is perhaps not a bargain, but it provides an awful lot of power and convenience for that money. The ordinary Macintosh was $4395 retail, until recently, when it was reduced in price to $3495 due to the release of the Macintosh Plus. Upgrades are available for 128 and 512 Kbyte Macs. The Macintosh Plus does not come with Macwrite or Macpaint, as the Fat Mac does; you can buy each for an additional $175.

The Macintosh Plus is an excellent computer, suitable for a wide range of uses. Its increased speed, greater capacity and other new features are intended to make it more attractive to commercial users. I have confirmed that it really does work faster due to the RAM caching, enhanced ROM and faster disk drives, while still being almost completely Macintosh compatible. This compatibility gives the user the choice of 1000-plus existing software packages. □

JUMBO FACSIMILES

Matsushita Graphic Communication System, the facsimile and office equipment subsidiary of Matsushita Electric Industrial Corporation, has delivered the world's largest colour enlarging printer system to the Computer Image Systems company of the USA.

And when they say 'large', they really mean it: the Full-Colour Jumbo Facsimile can draw an image as large as 16 by 7 metres. It will be used to produce advertising billboards more efficiently and less expensively than is possible by traditional methods.

Input data can include colour photographs, drawings and other graphic information smaller than letter size. This is then digitally processed, enlarged and printed on a material rolled over 2.5 m rotating drums.

The Jumbo Facsimile employs advanced computer-applied image processing technology, such as editing of images, and linear control of the enlargement ratio and colour painting function. The system uses a scanner to process the input image data. A variety of image processing techniques, such as the synthesis of different pictures, the superimposition of patterns and characters, and the painting of different colours over an original image, can be performed on a colour CRT (cathode ray tube).

The final image data is stored on a cartridge tape. A microcomputer-controlled spray-gun printing mechanism, which consists of four colour nozzles (cyan, magenta, yellow and black), then forms an enlarged full-colour image on materials rolled over the drums. A 16 by 7 metre copy takes from one-and-a-half to 11 hours to complete, depending on the pitch of the image.

The system is capable of printing on a variety of materials, such as paper, cloth and metal sheets, making its use feasible in the designing of wall hangings and coverings, as well as billboards.□

ASHTON-TATE BOOSTS EARNINGS

Ashton-Tate, manufacturer of dBase, Framework and Multimate, has reported a record net income of $US4.8 million for the third quarter of fiscal 1986. This represents an increase of 92 per cent over earnings of $US2.5 million for the same quarter last year.

Sales in this period were at an all-time high of $US28.6 million. International sales continued to increase, with the company signing an agreement with Datalogica, a leading Brazilian software distributor based in Sao Paulo. Datalogica now distributes the full line of Ashton-Tate products in Brazil.

Continuing its strong corporate policy, Ashton-Tate announced the formation of a Corporate Advisory Board, which will advise the company on developing products to meet the needs of corporate users. The board consists of executives from 14 major American corporations, including a third of the firms ranked in the top ten of the Fortune 500. According to Edward Esber Jr, the president of Ashton-Tate, the Corporate Advisory Board represents an unprecedented commitment to business for a microcomputer software company. □

AED GETS GOVERNMENT BACKING

Australian company AED Systems Development has received a $240,000 project grant from the Federal Government to fund development of a new technology. The company is working on a new kind of hardware architecture which it hopes will produce a supermicro with mini performance, at a substantially lower cost than current technology.

According to Wayne Wilson, a company director and one of the developing engineers on the project, the supermicros will be one-and-a-half times faster than currently available superminis. He expects them to sell for under $50,000 — compared to more than $200,000 for a VAX 11/780.

Wilson predicts AED's current research will put it at the forefront of the world micro industry, and expects a viable minicomputer manufacturing and sales operation to evolve from its developments within two years.

The research work is already producing spin-offs for upgrades to existing machines, due to the modular type of construction employed by AED in its hardware.□

TALKBACK CREDIT RATINGS

The Voice has a decidedly American twang, and it frequently mispronounces callers' names. But it provides 17,000 Qantas Staff Credit Union members with what could be the best customer service, in terms of cost and coverage, of any financial institution in Australia.

The Voice is generated by Digital's DECtalk text-to-speech voice synthesiser, and it provides Qantas Credit Union members with information seven days a week, day or night. Members can get the up-to-the-minute balance of any savings account in their name, order a cheque in their own name or in favour of one of more than 300 commonly used organisations throughout Australia, determine their borrowing ability and what it would cost to pay out a current loan, check the status of their Mastercard account, or order an interim statement.

The information system is known as CUTIE (Credit Union Telephone Information Exchange). Apart from members' individual information, CUTIE can also advise on the Credit Union's current savings and loan interest rates, current office hours, and current loan repayment scales. All the information is voiced by the DECtalk system, which is linked through a Digital MicroPDP-11/23 to a PDP-11/24. The 11/24 handles all the Credit Union's financial applications, as well as an online system connecting all four Qantas Credit Union offices. ▶

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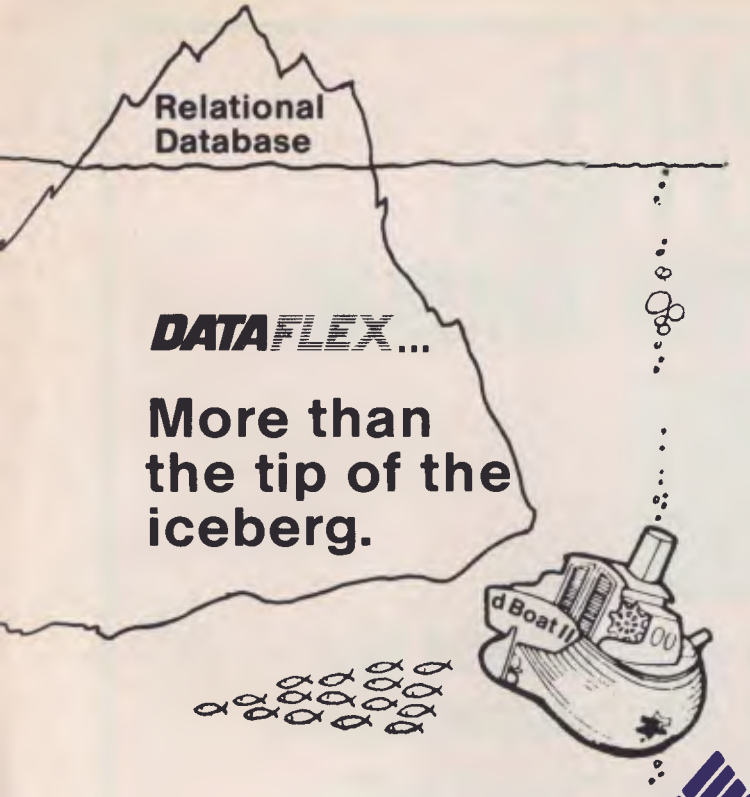

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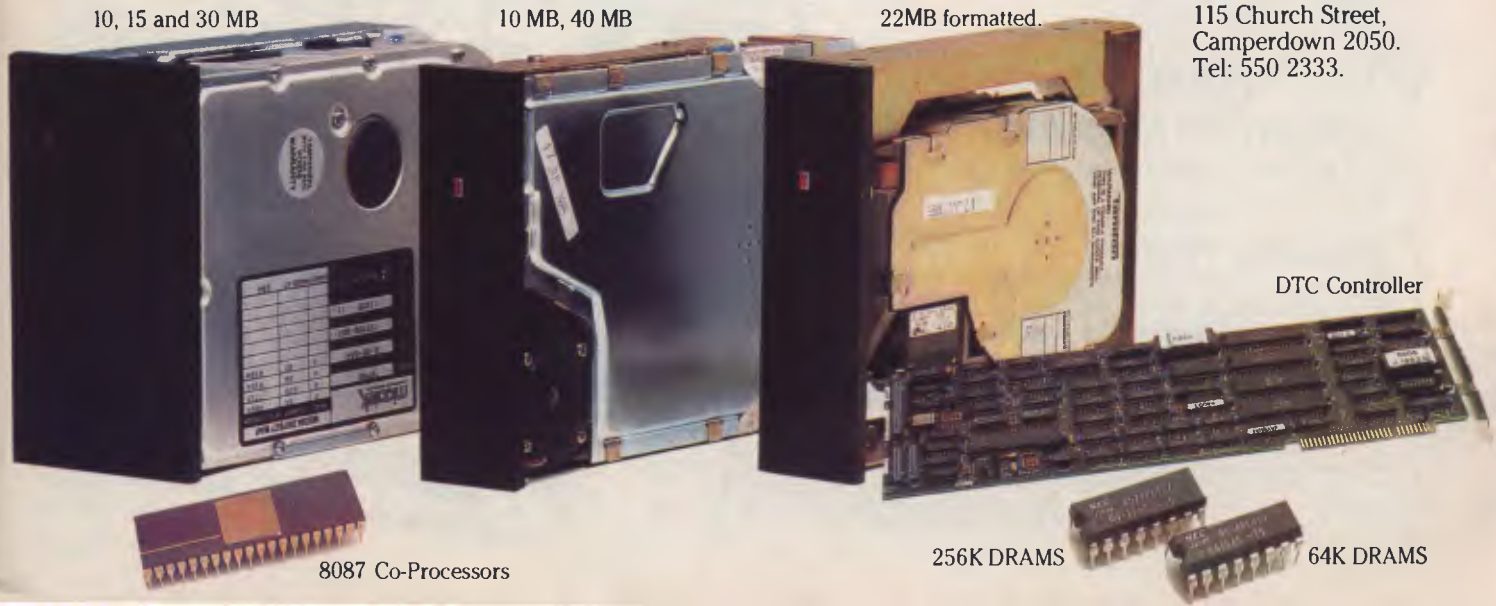

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Qantas Staff Credit Union manager, Bert Gould, says the concept began with the Credit Union's adopted policy never to give members their account balances over the telephone. "You never can be entirely sure who's calling," he said. "It all started from there. I heard about DECtalk and discovered that a group called Interact Technology in Melbourne had a demonstration system. They ended up writing the software which answers the telephone, hangs it up and interfaces the DECtalks to the mainframe. Then I wrote the software to run on the PDP-11/24, which actually handles all the enquiries, except stock enquiries about interest rates and office hours."

The system has achieved a high degree of acceptance among members. "It's been staggering to watch the name CUTIE take off," says Gould. "Mention CUTIE and everyone knows what you are talking about." About 2000 of the Credit Union's 17,000-odd members have since applied for the Personal Identification Number (PIN), which allows them to access the system while giving them security protection, and the service receives 200 to 300 calls a day. The only requirement is for members to have access to a touch-tone telephone, or a Miniature Enquiry Terminal which converts any telephone to touch-tone.

To initiate an enquiry, a caller keys in a staff or member number and then his or her PIN. CUTIE then attempts to pronounce the caller's name. Since the pronunciations are executed phonetically, the attempts can be "dreadful". Gould says this can be overcome with additional software, but in the meantime it seems to be regarded with amusement, rather than causing offence. □

POWER HOUSE COMPUTERS

The Power House Museum in Sydney is planning a major exhibition on computers for 1988. Titled 'The Information Machine Exhibition' (TIME), it will address three main questions: what is a computer, what do we use it for, and what is it made of?

The entire exhibition will be an integrated combination of graphic panels, audio-visuals and interactives. Visitors will enter the exhibition area through an over-sized computer terminal; it is planned to create the entrance ramp out of a giant keyboard, with actual key designations activated by visitor body weight, which in turn will trigger a series of interactive displays within the computer terminal and entrance tunnel.

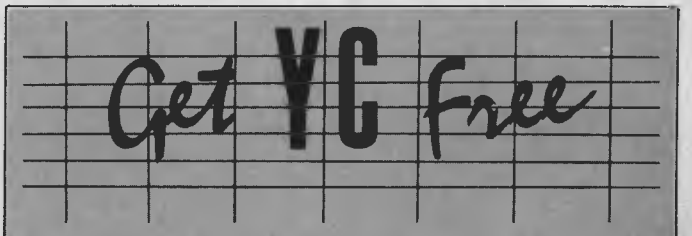
The central section of the exhibition will be the Games Console containing eight personal computers, each of which will offer a menu of short games relating to the themes of the exhibition. Repeater monitors around the central column will allow other visitors to watch and familiarise themselves with the games.

Behind the console will be the History Wall, with exhibits housed in glass cases. The history of calculation and computing since about 2000 BC will be outlined, and many of the museum's collection of relevant objects will be on display, including the abacus, circular slide rule, Arithmometer, Brunsviga Calculating Machine, a 604-Valve Calculator and the first IBM Personal Computer produced at the Wangaratta plant in Australia.

The exhibition will also incorporate an auditorium with seating for 30 people, where 20-minute presentations will be screened.

Technology to be addressed by the exhibition will include storage technology, computer circuit technology, robotics, artificial intelligence, and an area for current and future developments. The available interactive programs will include computer control, flight simulation, computer art, word processing, and a typewriter for the blind.

The exhibition is being designed by Wako Design, and will aim to be entertaining, accessible, visually stimulating and, above all, demystifying. The museum expects it to be one of the most comprehensive computer exhibitions in the world. □



If you get mumps this month, you'll also get Your Computer free — that's the promise of software distributor Mglobal in its ad on page 137.

The company's introductory offer on its CCSM Mumps package includes a free subscription to the magazine. The company has launched a version of the minicomputer database language which allows for single- or multi-user operation on the IBM PC.

It says the language, which it is releasing at $290, is extremely portable, powerful and easy to use. It claims productivity improvements of up to 70 per cent over traditional languages. □

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BY HOWARD KARTEN

SECURITY BLUES

"Some people rob you with a six gun, others use a fountain pen," wrote the legendary American songwriter, Woody Guthrie. Today, would-be malefactors have traded their fountain pens for computer terminals — or so a collection of consultants, hardware and software vendors, and journalists would have us believe.

In recent years, this motley crew has done a reasonably brisk trade in scaring the hell out of computer owners and users, with sometimes lurid tales of data vulnerability. (Indeed, concern about alleged computer crime dates back to the early '60s, although it's only lately, with the proliferation of micros, that the din has grown so loud.) But there's some reason to doubt many — perhaps even most — of the stories proffered by vendors.

The potential for data abuse — eavesdropping, data destruction, theft of computer time, and so on — is very real; in our experience, it arises more often from stupidity or sloppiness than from true technological genius at penetrating networks or computers. In one case, for example, a vendor doing a product demonstration at a press conference accessed a popular telecomputing service — and, on large-screen video monitors, shared its password and ID with the entire assembly of journalists! (Even more incredible, not one rose to point out this security breach.) And on numerous occasions we've been offered the use of the legitimate account number and password of a correspondent, for sending electronic mail on a service. In one case, the person cheerfully offering us the use of her account and password was employed by a network services firm, which presumably had its own secrets to protect, and which warned its own customers about account and password misuse!

Moreover, although we expect a capitalist system to encourage competing vendors to dispute each others' messages and products, that seems not to have transpired in the security products arena. It's hard to conceive of a business which stands to make a dollar by saying: "The alleged computer and communications threat has really been overstated; buy security hardware and software only after you've made sure you've enforced the common-sense precautions."

However, an *individual* might make a buck or two with that message, and indeed, that's just what Donn Parker had to say at the First Annual Communications Security Association meeting, held recently in Washington. Parker, widely acknowledged as an expert on computer and communications crime, made the following points:

- In the past 16 years, there have been only three *verified* instances of actual penetration of computer networks by outsiders (excluding cases where the electronic intruders illegitimately acquired valid passwords).
- The vulnerabilities are at the *end* of the pipeline (where the people are), and not in the middle.
- Virtually everything travelling over electronic networks is also available on paper, as well as in spoken form; if the paper isn't in someone's locked desk, perhaps it's sitting in the rubbish bin.
- People love to talk; technologists (programmers, analysts, and so on) particularly love to talk, and with the right approach, can be made to blab almost anything.

A brief analysis of the reasons for security hysteria reveals some interesting goings-on. First, the competition for business among security vendors is curious: all vendors have a vested interest in telling scare stories, while few companies stand to make any money by saying "There really is no security threat." (In fact, when there is no money to be made, some companies will withdraw products. In the United States, for example, IBM recently withdrew a communications security product because of low demand.)

We inky wretches also participate in the game. For most journalists the attraction to crime stories — particularly technocrime stories — is as strong as the attraction of adolescents to their first sexual experience. And we're also about as experienced as they are: journalists are frequently technophobic and just *love* to indict technology for human ills.

A typical phone interview could go something like this:

Journalist: Hello, Mr Computer Crime Victim. As the manager of this installation, do you have any idea how these eight-year-old computer geniuses could have broken into your multi-million dollar system?"

Manager-Victim: "Damned if I know. Our multi-million dollar system is highly secure and difficult to access."

And that's where the victim's somewhat skew taie comes in. After all, what's the victim going to say — "I kept telling old Harry this would happen if he left that slip of paper with his password on the side of his terminal"? Or, "Well, I just never got around to removing the master password the software vendor puts on all the limited-access software it ships"? Most folks in this unfortunate situation might be lazy, but they ain't stupid: of course they'll latch on to whatever mystique they can — and how many other people are there, either in the victim's own management or in the press, with sufficient expertise to dispute them?

Moreover, selling security products is different from peddling, say, a spreadsheet package: everyone is understanding when the vendor says he can't release the name of a satisfied user, and few users are willing to acknowledge to outsiders they have been victimised already, or even that they have security precautions in place! No sense encouraging would-be penetrators who might decide to rise to the challenge!

Another bit of American folklore which has recently achieved a kind of legendary status of its own is promoted by a well-respected American actor, sternly delivering the following message on behalf of his client, an American brokerage firm: "We make money the old-fashioned way — we *earn* it." Until we see some good, concrete evidence to the contrary, we'll continue to suspect (to paraphrase the actor) that most data thieves also come by their data the old-fashioned way: via cash payment, for hard copy.

AN IBM LAPTOP

As we've observed before in these pages, the only ones who know for sure what IBM will do are a handful of top executives. Nevertheless, evidence that IBM will shortly introduce a laptop micro with 9 cm drives, and possibly an LCD screen, is mounting.

The United States Internal Revenue Service (IRS) (the taxman) is seeking to equip thousands of its field agents with laptops containing built-in modems. Such a large order would represent a sizable amount of change — one which, naturally enough, has many vendors here tantalised.

The contract between the taxman and the winning vendor was scheduled to be signed at the end of January, and virtually all descriptions of the contract have IBM as the front runner. If Big Blue does in fact win the contract, nothing would prevent it from marketing the machine to the general public as well. As usual, IBM isn't commenting.

COMPUTER-ASSISTED RUNNING SHOES

A manufacturer of running shoes is about to introduce just the thing the world has been waiting for: computer-assisted running shoes (CARS?). No kidding!

In April, Puma, a manufacturer of running shoes, will introduce the PS Computer Shoe. For $US200 buyers will receive the following: a pair of running shoes with a microprocessor and some sensors embedded in the right shoe; software to run on the Commodore 64, Apple IIe, or IBM PC and compatibles; a manual; and a cable to connect the chip to the computer.

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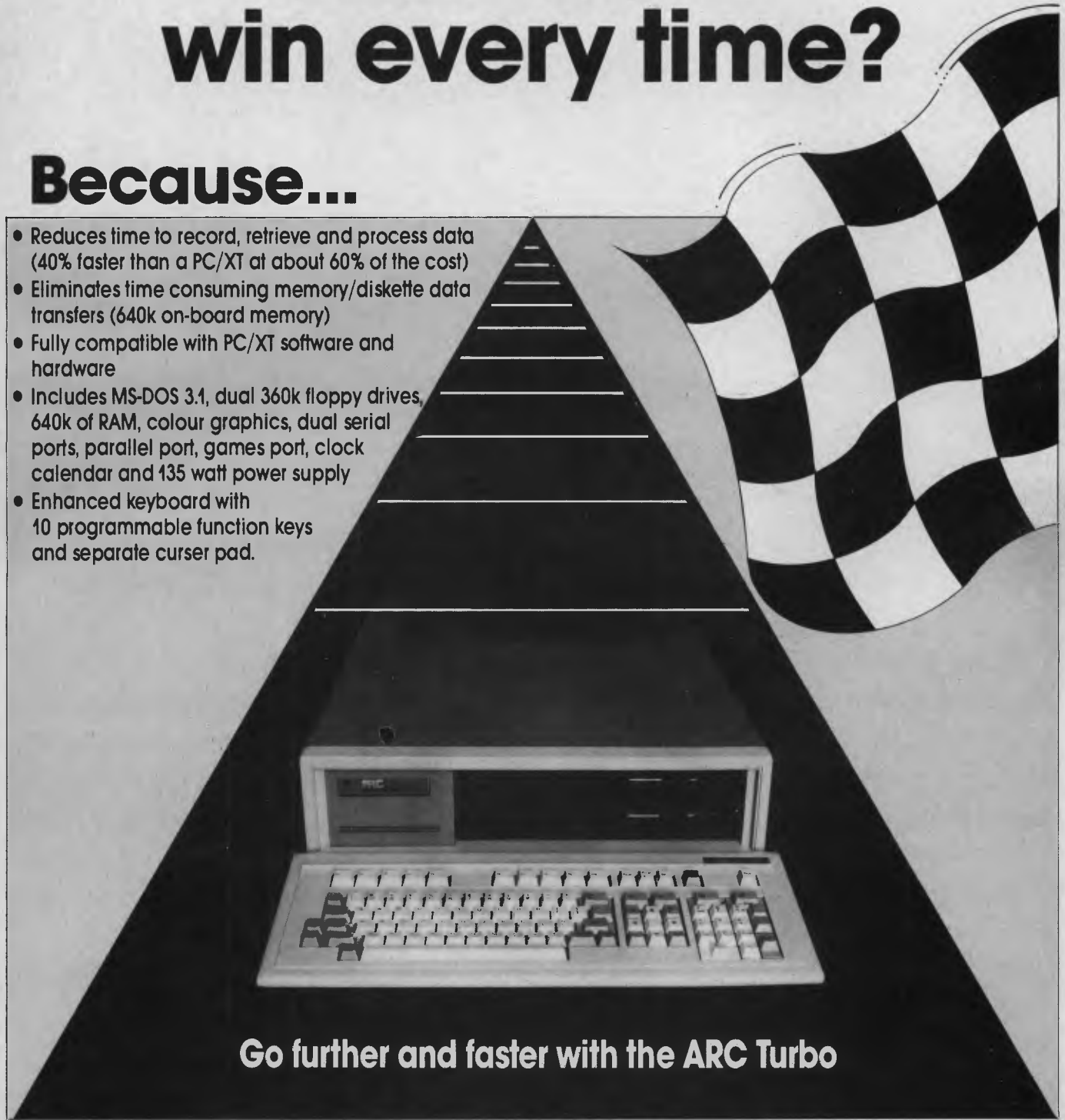

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mile laps at varying speeds and strides, you can create your own running profile. Second, the chip and software will record and keep records of the distance run, elapsed time, and calories consumed. Presumably, this will be of particular interest, not only to the health-conscious, but also to compulsive record-keepers.

The whole thing has been set up in a scientific manner, with an American professor of biomechanics, Peter Cavanagh, acting as a consultant to the company. Notwithstanding the participation of the professor, we have some questions about this whole project.

For example, does it mean that in addition to choices about a shoe's model, colour, and size, you'll have to make a choice about your computer as well? And what happens when or if you decide to change computers — will it be necessary to change shoes, recalibrate, and start from scratch? And will the user's manual include warnings about the dangers of perspiring on the keyboard? And what if you're a health-conscious computer hacker? How will you make the time to hack and run?

Actually, there's probably a simple answer to that last query: strap a big automobile battery to your back (the added weight will be good resistance training), hang the IRS laptop from your neck, cable up and go running. Good luck. □

KEY TO ANTI-PIRACY

A recent ruling by the United States Justice Department may herald a new anti-piracy effort by software vendors.

Almost since the first days of the industry, software vendors have been casting about for a foolproof, less cumbersome method of protecting software from piracy. One idea that's been floating around for years has been a lock-and-key system. Under this proposal, a device of some sort would be attached to a user's RS232 (serial or communications) port; the 'key' would be a chip provided with the software, which would have to be plugged into the device before the software would operate. The chip might contain part of the software, and would, in any case, be difficult to duplicate, reverse-engineer, or otherwise defeat.

Although the concept has obvious built-in limitations, the American group ADAPSO (the Association of Data Processing Services Organisations) has been working closely with vendors to develop suitable standards which would be acceptable to all. Last week, the Justice Department said it found no potential violations of United States anti-trust law in ADAPSO's proposal, and ADAPSO said it would release a draft standard soon.

Ironically, many American software vendors are said to have begun rethinking their positions on software protection, and some may in fact dispense with protection altogether! □

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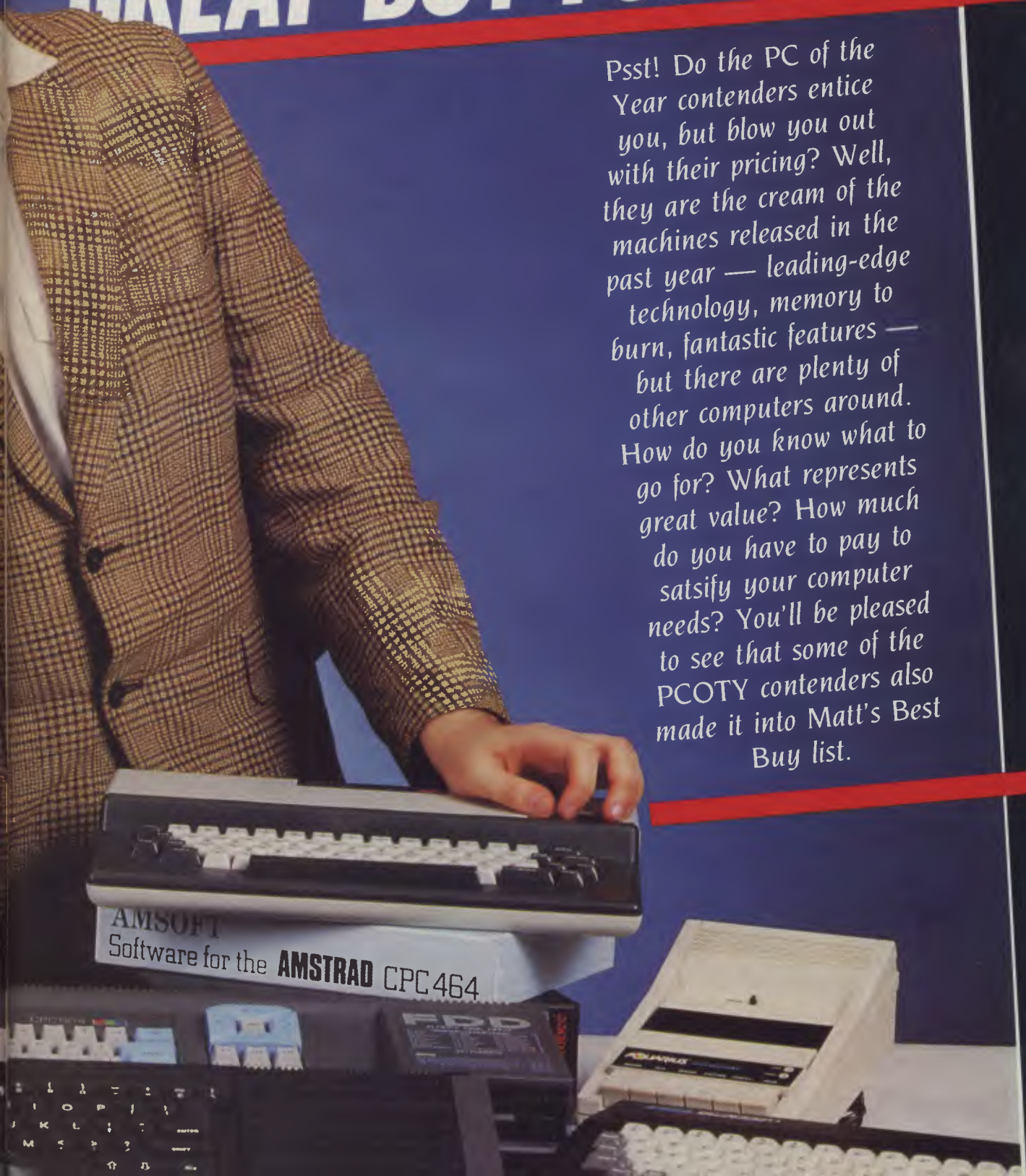

Psst! Do the PC of the Year contenders entice you, but blow you out with their pricing? Well, they are the cream of the machines released in the past year — leading-edge technology, memory to burn, fantastic features — but there are plenty of other computers around. How do you know what to go for? What represents great value? How much do you have to pay to satsify your computer needs? You'll be pleased to see that some of the PCOTY contenders also made it into Matt's Best Buy list.

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BEST BUYS

The Apple IIc has mountains of software, the QL comes with its own — both good value in the low-cost systems area.

After a careful analysis of the computer industry's sales figures for the past year, we've discovered that not everybody rushed out and bought a Hewlett-Packard 110 after we awarded it Personal Computer Of The Year for 1985.

In fact, they continued to purchase Commodore 64s, Microbees, Apples, IBMs and just about everything else on the market. Nobody was surprised, of course — the award was never intended to suggest a particular machine is the best for anyone considering buying a computer. Yet we've noticed one of the dangers of the PCOTY award is that it creates the impression among some readers there is only a handful of machines on the market worth buying.

The publicity surrounding the award — and its coverage in the magazine — is sometimes interpreted as suggesting the five to 10 finalists are the only computers worth thinking about when you're shopping around for a machine.

The PCOTY finalists are, undoubtedly, the cream of the previous year's releases — but the award is for new releases only, and takes no account of other machines already on the market. Further, the award is designed to reward advances in design and technology, as much as practicality and value for money — so, quite often, capable, value-packed machines don't reach the short-list of finalists.

We decided to introduce our *Best Buys* for two reasons: to acknowledge the top machines regardless of whether they match the award criteria; and to help answer the questions potential new buyers keep asking us, their friends, the local butcher, or anyone else who they think might help them overcome the bewilderment at having to choose ...

This isn't a high-powered judging exercise based on a long list of qualifications — it's our opinion of the machines we'd look at in each category, and which one we'd buy. We'll mention several machines in each category because they're the ones that strike us as interesting; maybe we'll leave your favourite out, but don't take that as a criticism.

If you're looking for a machine, all the computers mentioned are worth considering. Your requirements or expectations may vary from ours, in which case your best buy may be different — we provide our selection for those who are looking for a guide.

Home Computers

There's nothing we find harder in the advice field than recommending a home computer. We're asked quite often about a "machine for the kids, but maybe I'll use it to do some correspondence and so on."

The biggest problem is judging how much 'serious' use the machine will get. The problem with many small machines is the cost (and often impracticality) of expansion. For example, the Commodore 64 is one of the most popular home machines and is great value as a beginner's package, but expanding it for business-style use is a waste of time and money.

Do we recommend the Commodore to these people, or do we allow for "correspondence and so on" turning into regular serious use and recommend a more easily expanded (and initially more expensive) machine, such as the Microbee?

The main hindrance to making recommendations in this area is that most people don't really know what they want a computer for, and usually won't know until they've owned one for a while. In this situation our advice is simple — buy something cheap so it won't hurt too much to throw it away when 1) you're not interested in it any more, or 2) you love computing but want more power/capabilities.

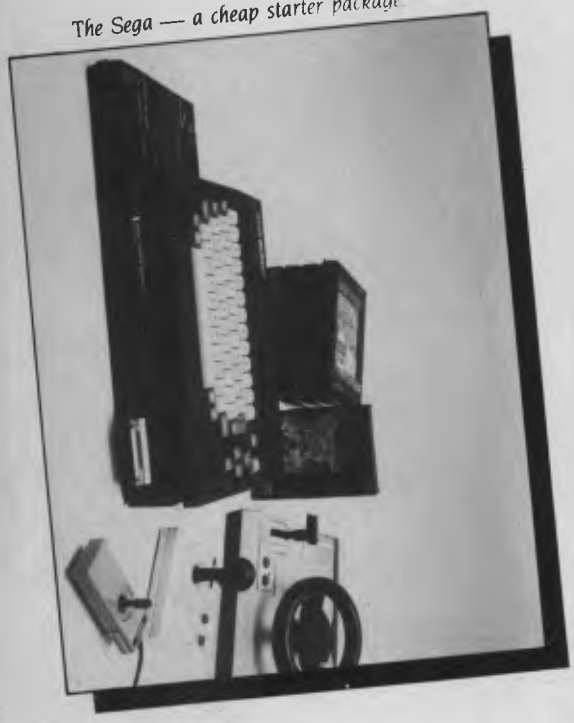
There are a few machines we like in this class; which one we'd buy would depend on our requirements at the time.

Microbee: We like the local product, and not just because it's local — it's an excellent little machine. The new Alpha-plus series has a number of refinements, like inbuilt colour, more advanced graphics, and communications capabilities. Many children are used to the Bee already because of its widespread acceptance in schools, and it is one of the rare machines that is expandable to full business capabilities at a reasonable cost (and with reasonable performance).

Amstrad: AWA is providing some excellent value with the Amstrad, which comes with a number of usually optional items as standard (for example, the cassette recorder or disk drive is built into the machine). Package prices starting at around $580 and including a monitor are top value given these extras. Judging by the number of Pocket Programs we're being sent by users, the Amstrad is becoming very popular.

Commodore C64: Good pricing, extensive capabilities, widespread software support and availability through hundreds of dealers and department stores make the C64 an ideal first machine. The C64 tends to see more use as a family games machine only than the others, and is far from ideal when it comes to expansion, but it's hard to go past for the first-time user.

A C64 'family pack', including joysticks, games, instructional programs and a ▶



The Sega — a cheap starter package

music maker sells for $499.

Sega: John Sands' Sega gets similar mass-marketing to the C64 but, as a late starter, is less popular. It is a better machine in some respects, and not as good in others (like software support). Like the Commodore, it uses a standard television set as its display, so the starting package is cheaper than machines like the Microbee, which need a monitor.

Spectravideo: The Spectravideo has excellent features at a reasonable price, but is something of an orphan on the Australian market. You can get a 64 Kbyte machine with printer, cassette and word processing software for $599 — value packaging, but be sure the other software you'll want is catered for before moving into the uncertain world of non-mass-market machines.

Best Buy: Microbee Alpha-plus if you're sure enough about computers to invest $700 or so; otherwise, the Commodore C64.

Low-cost Systems

We don't know whether to call these expensive home computers or super-cheap business machines — they can serve as either, depending on what you're looking for.

Microbee: Microbee's Computer-In-A-Book package offer through American Express in December sold $400,000 worth of machines, and we can understand why — it's great value.

The basic price for this machine is $995, which includes a disk drive and monitor, and packaged with a 1200/75 Beemodem, a printer, the standard word processor, disk manager and BASIC software, all for $1495, it's an excellent buy.

Sinclair QL: You won't collect as big a package for the price with the Sinclair AL, but you will get a technically advanced (and, in many ways, technically unusual) machine, complete with a specially written suite of software.

The QL uses a processor similar to that found in several supermicros, and special tape-loop storage known as microdrives; they're faster than tape but slower than disks. The Sinclair hasn't been sold or supported here until recently, so it's starting from behind in the marketplace.

Apple IIc: Although we feel Apple's pricing has always been a little high in Australia, the IIc is a good way to get into the wide world of Apple software.

It's a machine that has an enormously broad coverage, with software support from simple games through to full-featured business packages. And Apple is the favourite of many children, who see it as the more advanced of the machines used in their schools. Retail price is $2295, with a single drive and monitor.

Amstrad PCW8256: This new release from Amstrad, covered in our CP/M feature in February, is another excellent-value package, with the machine, monitor, disk drive and printer included in its $1495 price.

It comes with CP/M, BASIC, a word processor and Logo. Our reviewer was impressed with its value as a complete, ready-to-use word processor, but worried a little that the non-standard microfloppy drive would limit the speed at which software became available.

Best Buy: Microbee.

The Amstrad PCW8256.

Entry-level Business Machines

There are a couple of difficult decisions to make in this field, the first of which is a choice between 8- and 16-bit processors.

Until recently, the basis for such a choice was clearly defined — if you had a straightforward job like word processing, database management or accounting, you took the 8-bit machine because it was cheaper and did the job just as well.

These days it's not so easy. The flood of 16-bit software that lets you do everything better (or think you're doing it better because of the bells and whistles) and the rash of cheaper 16-bit machines being released are combining to kill off the 'old faithful' CP/M machine.

But while the business market is dominated by IBM PC-style hardware, there are still some useful bargains to be had if standard packages like Wordstar, dBase II and so on are good enough for your job.

The CP/M hardware has been matched in price by some of the 16-bit releases, but retains a major cost advantage — it usually comes bundled with enough software to handle your basic business and recreational requirements. Often this software would cost you $2000 as an add-on for your PC purchase.

Bondwell 14: The Bondwell is one such machine. Sold by Dick Smith Electronics, it has dropped from an initial $2300 to $1699. For that you get what is probably the ultimate expression of the Osborne-style luggable, with a large, readable screen, two 400 Kbyte drives, a voice synthesiser, printer and communications ports, and a software bundle that includes CP/M 3.0, Wordstar, Calcstar, Datastar and Reportstar.

Microbee APC: Yet another Microbee? Don't blame us — we can't help it if the company is good at packaging its products. Until very recently this machine was a steal at around $2000, but falling prices on other machines have relegated it to plain 'good value' status.

Improvements in the latest model remove some of our criticisms of this machine, and add a whole lot of new features.

Multitech: Only $1395 for an IBM look-alike? That's what Dick Smith charges for the base model Multitech. It has only one

drive, and 128 Kbytes of memory, but it's still the cheapest 'high-profile' clone in town. Add a monitor and some software and you soon outstrip the price of machines like the Bondwell and the Bee, but that seems to be the way of the 16-bit world ...

The second model of the Multitech sells for $1995, and comes with two drives, 256 Kbytes, and Micropro's new *Easy* word processing software. Reassuring for first-time users is the six-month on-site service provided in the package.

Hypec Mini PC: Hypec Electronics in Sydney is selling a machine of similar size to the Multitech — that is, about two-thirds the size of an IBM — but without the expansion limitations. The Hypec box has room for a full complement of eight expansion cards, where the Multitech is limited to three, and comes with two drives, 640 Kbytes of RAM and parallel and serial ports — all for $1899 tax paid.

Before you rush off and buy what looks like some of the best value in clones, be warned — we haven't reviewed it yet, so we can only judge it superficially. What we've seen looks good, however, so at least take a look at it.

Multi Clones: There are a dozen 'straight' IBM clones worth investigating because of their ridiculously low price, and we can't name them all. We do warn, however, that any lookalike is just that — it isn't the real thing. If a particular program doesn't work on your machine, you have two problems: first you have to decide whether the program is faulty, the machine is broken, or there is some incompatibility; then you have to convince the software vendor to give you your money back.

Generally we don't care for clones that don't have big-name support, but we can't deny the value in some of these products. If there's no way you can afford the real thing, but want its capabilities, this may be the only choice.

Toshiba T1100: If you're into laptop portables and want full IBM compatibility (except for the disk size) the Toshiba is one of the best answers we've seen, especially at under $3000. We still see the portable as a second machine you carry around to work on when you're away from the office desktop — and will continue to do so until their display technology improves — but if you need a laptop this is a good place to start.

***Best Buy*:** Bondwell 14.

The Beasts Of Business

Now we get to the boring bit — the market area where nothing changes but the nameplate. It may not be quite that bad, but it certainly seems that way at times.

It seems having IBM compatibility is the only way for a manufacturer to get anywhere in the business market, so your choice in this field is mostly restricted to an IBM or someone else's copy of an IBM. Who said variety was the spice of life?

Yet it's still an area of tough decisions, mainly because some of the deals available on the lookalikes are so attractive. Just hunting down the best deal may provide you with all the excitement you need.

IBM PC: Value? No. Best Buy? Maybe ... at least you can be guaranteed it's 100 per cent IBM compatible. We grudgingly admit that there are some reasons for buying IBM that the others just can't match. It's up to you to weigh those against inferior performance and/or a higher price.

Olivetti M24: One of the most impressive of the lookalikes, with all the right features for those who don't need to toe the IBM line: good pricing (we can't believe some of the deals going around on these), superior performance, compatibility and a big-name company behind it.

A quick flick through YC's January issue uncovered a 256 Kbyte M24 complete with 10 Mbyte hard disk for $4584, and a 33 Mbyte unit with accounting software, an integrated package, and a wide-carriage near-letter-quality printer for $6995.

Lasernet PC: On the subject of cheap, we picked this one out of the same issue as an example of the price advantage available with some clones — this one was selling for $1995, including software, two floppy drives, 640 Kbytes, a monitor, and an Epson printer.

Olivetti's M24.

NEC APC III — *now with IBM PC compatibility.*

NEC APC III: NEC's fortunes are looking brighter since it released its SLE (Software Library Expander) card, which finally gives it IBM compatibility. Initially, NEC chose to go it alone, accepting the MS-DOS standard but opting for advantages like 720 Kbyte drives and high-resolution graphics.

Now you can have those features plus compatibility, which makes a big difference. At its release the NEC was particularly cheap for a 16-bitter of its power, but falling prices have caught up with it a little. Still, the January issue carried an ad for a a 20 Mbyte hard disk machine at $5195, good value considering its capabilities.

***Best Buy*:** The Olivetti M24.

The Big Guns

This one will be short and sweet, or perhaps just short. It won't even have a conclusion, because we're talking about too many dollars and too wide a range of possible requirements to impose our opinions on you in this class.

We'll just tell you which machines we'd look at, and let you take it from there.

It's pretty much a new segment, carved out of the top of the business market by the IBM AT and its followers. These are the power machines, the supermicro-engined personal computers which set new performance standards for the desktop.

IBM PC AT: While some of its competitors are already outperforming it, there's a ▶

IBM's PC AT — a standard-setter.

lot more to be said for the AT than for the PC. It's a new standard-setter, showing the market which way to go — and at this early stage, you have to be sure the others aren't going to get lost along the way. Remember that of the ATalikes tested in our January issue, the real thing was the only one which successfully ran Concurrent DOS 4.1. You may not need or care about Concurrent, but the result does indicate there is a degree of incompatibility.

More Clones: There are at least a dozen by now, and more on the way. We'd look at the claims for all of them, and make a closer inspection of probably half that many. Compaq is a solid competitor, if a little pricey, while Kaypro, President and Osborne come in at around two-thirds the AT's price.

TI Businesspro: As you may have guessed from our AT comparison, we've fallen in love with the TI Businesspro, even though it failed the Concurrent test.

It's a pricey machine, coming in marginally higher than the IBM, but has a lot more to offer. Its turbo mode and its high-resolution graphics are only a part of it — the integrity of its design and clever engineering are most impressive. It fits 14 slots and six disk drive spaces into the space IBM uses for eight and three respectively, and can take three megabytes of memory without using any of the slots. It's designed for high-powered multi-user situations, as well as advanced personal use.

HP Vectra: With a starting price from $6033 the Hewlett-Packard Vectra is another AT-compatible well worth looking at. HP's engineering and quality set a standard in the industry, and this is its first 'industry standard' machine.

We haven't had one in the YC office yet, but we're looking forward to its arrival ...

Compupro System 286: Could we let such an event go by without a kind word for our beloved Compupros? Of course not, especially as the 286 box has been scaled down to 'almost a desktop' and has been given a dose of IBM compatibility.

The 80286-powered machine comes with 768 Kbytes of memory, a 40 Mbyte hard disk, minifloppy drive and tape back-up, plus ports for seven users and two printers, for around $15000 before tax. The operating system is multi-user, multi-tasking Concurrent DOS 4.1 and it supports an IBM PC video board for the system console; just plug in a keyboard and monitor, and you can run many (but not all) PC programs — copy protection is the major stumbling block.

It's far from being everyone's cup of tea, but the Compupro's multi-user performance combined with PC compatibility makes it stand out from the crowd. □

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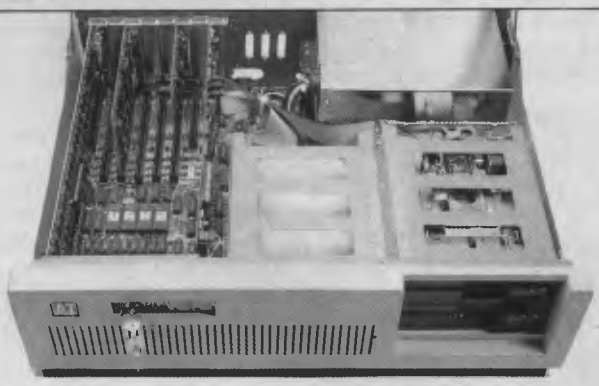

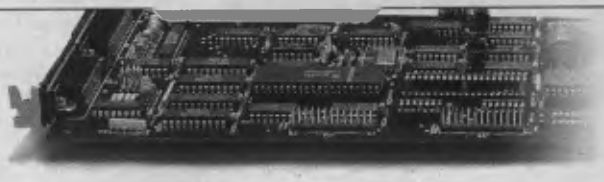

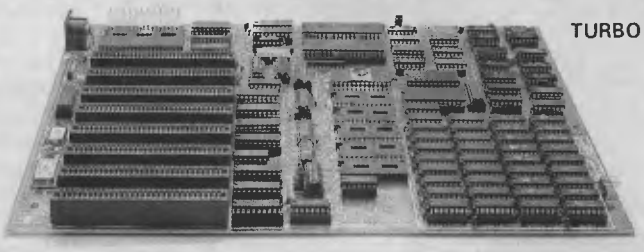

- **Turbo PC/AT:** 80286 CPU, 640K/1024K RAM, 8 MHz, 80287 Co-processor (option), 8 slots, one 1.2M Floppy Drive, one 20M Hard Disk, and controller, 200W Power Supply, Lift-up Case w/lock....
- **Turbo PC/XT:** 8 Slots, 256K/640K RAM, 8088-2 CPU, 8 MHz, 8087 Co-processor (option).
- **GM-2 PC Mouse:** photo-electronic control, high quality and easy to use.
- **GM-3 Mouse:** new model, interface build-in, 3 big buttons.
- **GM-4 Mouse:** GM-3 with RS-232 interface.

All of computers passed 120 hours lift-test.

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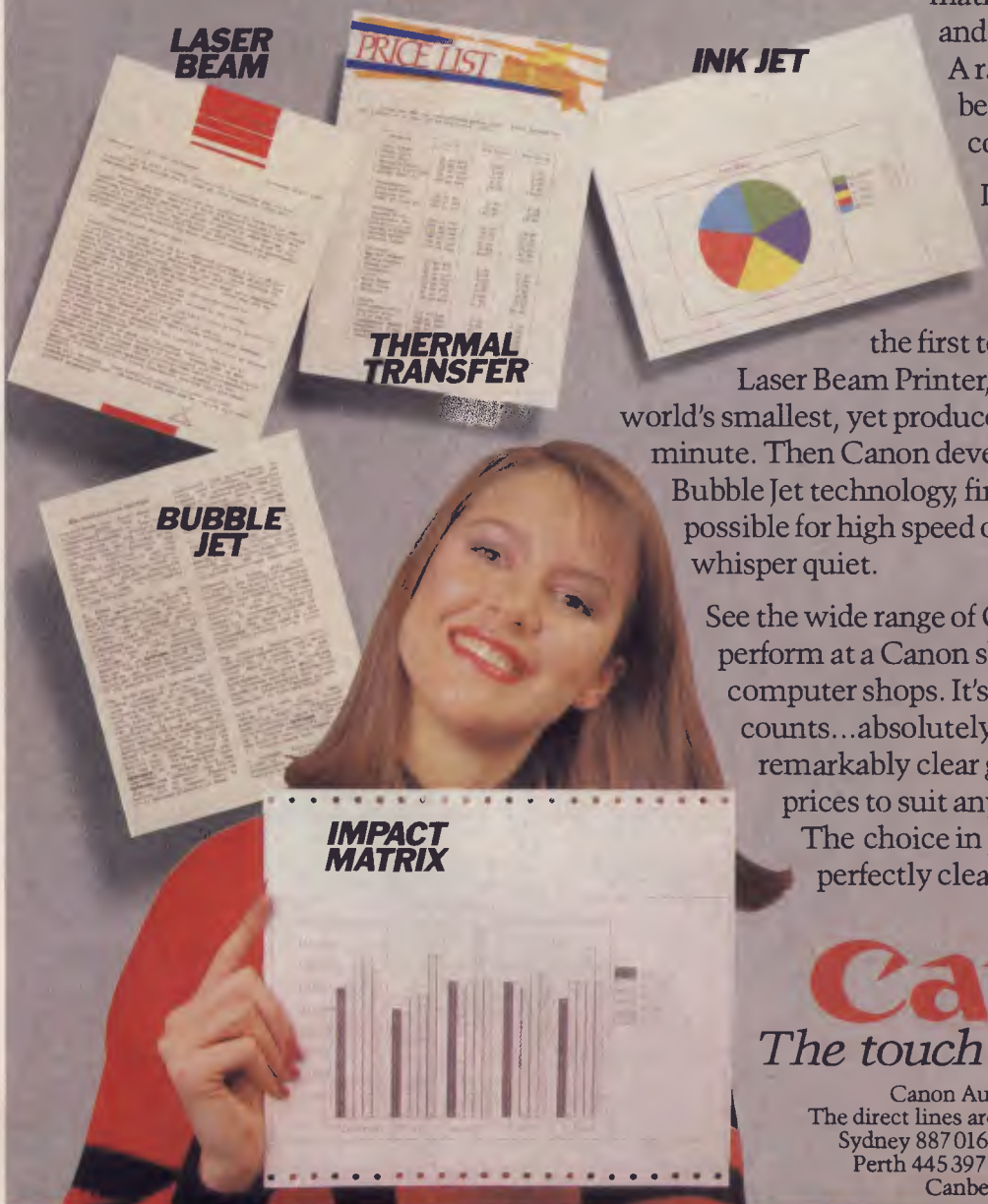
SPOTLIGHT on PCOTY FINALISTS

Who will win Personal Computer of the Year for 1986? What will be Software Product of the Year? And how well will the locals perform against each other and the imported high-tech releases? You won't know until April 2, the day of the big announcement, but to give you a chance to decide for yourself — and to 'vote' for your selection — we're announcing the finalists now. These are the short-listed products, the cream of the past year's releases ... but which do you think will be the winner among winners?

The Quality of Canon Printers is Perfectly Clear

The real test in choosing a printer is print quality. At a glance, the quality of every printout from every Canon printer is perfectly clear, from graphs and charts in up to seven shades, to the near letter quality of dot matrix.

World-famous Canon technology has created a range of printers incorporating ink-jet, dot matrix, thermal transfer and the legendary laser. A range that gets the best out of every computer.



It is also perfectly clear why Canon leads in printer technology. Among the first to make a desktop Laser Beam Printer, Canon's is still the world's smallest, yet produces eight pages a minute. Then Canon developed the ingenious Bubble Jet technology, finally making it possible for high speed operation to be whisper quiet.

See the wide range of Canon printers perform at a Canon showroom or leading computer shops. It's the end result that counts...absolutely crisp print quality, remarkably clear graphics and prices to suit any office.

The choice in printers is perfectly clear...Canon.

Canon

The touch of perfection.

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The direct lines are: Melbourne 200 6200, Sydney 887 0166, Adelaide 354 8100, Perth 445 3977, Brisbane 44 7436, Canberra 80 5798.

C481YC

Eight computers, seven software packages, and seven local products have survived preliminary judging to emerge as finalists for the 1986 Personal Computer of the Year awards.

And while these shortlisted major releases of the past year go under the judging microscope in preparation for our big April 2 announcement, we've decided to nominate the contenders early — both to allow each of these leading products its share of the limelight, and to give you a sporting chance to match your evaluation to ours.

We're going to give away a subscription (or a renewal, for current subscribers) to *every* reader who selects the same winners as our judging panel. And whether you agree with the selections or not, your 'vote' will count — we'll tally your opinions and announce the *Readers' Choice* winners in our May issue.

You don't have a lot of time — naturally, the 'contest' closes at the end of March, before the April awards issue hits the streets — so get your nominations in *now*. Send them to *Your Computer*, 140 Joynton Avenue, Waterloo 2017.

The early announcement is only a slight break in tradition for the four-year-old awards — while the award itself is usually covered in the April issue, the nomination of finalists is always made around two weeks earlier. This year we thought it best to bring it back a little further, and give it coverage in the magazine itself.

And, rather than deluge you with full descriptions of 22 finalist products in the April issue, it lets us provide much of that material early. This issue, then, contains individual analyses of the contenders for the major award, Personal Computer of the Year. In April we'll do the same for Software Product of the Year finalists and for the Australian commendations.

Stars of The Short List

A staggering six of the eight Personal Computer of the Year finalists for 1986 are portables — the laptop Hewlett-Packard won in 1985, and this year it seems innovation still comes in small packages.

Here are the finalists (in alphabetic order!):

- **Data General One:** The first fully featured laptop IBM compatible.
- **Hewlett-Packard Integral:** A powerful, but expensive, portable personal Unix machine.
- **IBM AT:** The creator of a new class of Super-PCs.
- **Kaypro 2000:** A neatly packaged laptop IBM compatible.
- **Morrow Pivot II:** A battery-powered fully portable with two 13 cm drives built-in.
- **Sharp PC-7000:** Two 13 cm drives, a backlit screen, and full IBM compatibility in another variation on the portable theme.
- **TI Businesspro:** A design masterpiece with TI's excellent graphics and IBM AT compatibility.
- **Toshiba T1100:** The first of the 'affordable' fully compatible laptops.

Software Products of The Year

It wasn't a big year for software, our judges concluded after their first look through a wide range of releases, but they did discover seven products which stood out from the crowd.

Interestingly, the selections represent a wider variety of markets than has been the case in the past. Last year, for example, integrated packages made up almost half of the short list.

This time around, no two packages are quite the same:

- **Clipper:** A compiler that brings dBase III power to non-clone MS-DOS machines, and offers dramatic speed improvements over the standard, interpreted package.
- **Concurrent DOS:** Last year Concurrent CP/M made it to the finals; this time Concurrent DOS 4.1, with its near-complete DOS compatibility and provision of multi-user, multi-tasking operation is a top runner.
- **Execuvision:** A superb package designed to assist in the development of professional graphics-based presentation material, such as slide shows, overhead projections and so on.
- **Gem:** The software environment that made the IBM look so much like a Macintosh — with it's user-friendly mouse/icon interface — Apple threatened to sue. Digital Research agreed to change the product.
- **Newsroom:** An ideal package for the school, small club or group which needs to produce a newsletter or similar publications. It allows the merging of graphics, type, banners and so on into a newspaper format on screen, before sending it to a graphics printer for a ready-to-distribute result.
- **Q & A:** Not a great database package, but a great step forward in bringing artificial intelligence research to the mass market. Ask a question in plain English, get the answer from your database ...
- **Spreadsheet Auditor:** Not a particularly exciting subject, but an invaluable and important package for the enormous Lotus user base. It 'audits' spreadsheets, producing a listing of formulae, labels and so on, and assisting the verification of the accuracy of the calculations being performed.

Australian Excellence

As well as presenting the two major awards on April 2, we will make special commendations for Australian hardware and software. Introduced two years ago, the commendations recognise the impressive development which regularly takes place locally, despite our under-financed market.

While we can't yet compete head-on with the wealth of heavily backed overseas developments, we acknowledge a high (and rapidly improving) standard of releases from local companies.

In the hardware area the finalists are:

- **Impact Systems:** Designer of a controller/interface for the Canon laser printer 'engine', Impact hit the market early with a particularly well designed machine. When it later offered the board as a $995 upgrade for Hewlett-Packard's Laserjet, it was knocked over in the rush.
- **Labtam:** Do you have a lot of money? The newest 32-bit Labtam is the stuff dreams are made of. Australia's high-technology specialist, a finalist last year, has done it again.
- **Microbee:** The first Australian winner is back for another try — the Bee has come a long way since its early box-of-bits kit introduction, and has been sold around the world.
- **Netcomm:** Last year's winner lines up again with the modem everyone's been waiting for — the Smartmodem 1234. It handles all the major Bell and CCITT standards, from 300 baud to 1200/75, 1200/1200 and 2400.

The Australian software finalists are:

- **dToolkit:** A collection of utilities and program-development assistants for dBase users.
- **Jam:** A diary/appointment scheduler for the Apple Macintosh.
- **PC Tutorial:** A clever co-resident tutorial which you can call on for assistance during your normal work.

Criteria For Judging

You'll have to consider these closely if you want to win a subscription! The major criteria — not in any particular order — which the panel used in judging the machines were:

- Ergonomic design, in terms of both software and hardware.
- Technical excellence in design and engineering, and provision of advanced or new features.
- User support, documentation and training.
- Value for money.
- Performance.

Our judges are using these points in their final determination, although they have always reserved the right to alter the criteria to keep up with the rapid rate of technological development. How does your judgement rate against theirs? □

4 STARS FOR DATA GENERAL'S ONE

DATA GENERAL'S strength is traditionally in the minicomputer market: the company was founded by Edson de Castro (an ex-DEC designer), and is best known for its MV series of minis. The earlier Desktop Generation PCs were well designed, but lacked compatibility — I was ready to write DG off as a force in the PC market.

Then came the Data General One, which shows that design flair, advanced technology and financial soundness can give a company a second bite of the cherry. This machine has really shown other manufacturers what building a portable is all about — the One crams a full system into a very compact case.

Mechanically, the DG One is superb. The dark-cream and brown plastic moulded case has a flip-top, which reveals an 80-character by 25-line liquid-crystal display and a keyboard underneath. The keyboard is compact, easy to use and has an excellent feel, but the layout is non-standard.

A cover at the back of the case props up the rear of the machine and reveals the back panel. The back panel has connectors for the battery charger and mains adaptor (two separate boxes), as well as serial and parallel ports and an optional expansion chassis. There is a cover for the battery compartment on top of the machine.

The basic configuration has only one 9 cm disk drive at the side, but users will probably want two, particularly since this is one of only a few machines on the market which will support two built-in drives (most have an external optional drive).

Mechanically, the DG One is superb. The dark-cream and brown plastic moulded case has a flip-top which reveals an 80-character by 25-line liquid-crystal display and a keyboard underneath. The keyboard is compact, easy to use and has an excellent feel, but the layout is non-standard.

Internally, the processor is an 80C88 (the low-power version of the 8088), and the circuitry is designed to be IBM compatible.

On power-up, the One will either boot from the front disk drive or, if no disk is inserted, it will enter a menu for its built-in applications. These include a notebook, word processor, set-up of hardware options, communications/terminal emulation utility and diagnostic routines.

The idea of putting something useful into ROM, rather than BASIC (*a la* the IBM PC) appeals to me, but the problem with the DG One's built-in software is it doesn't know about the disk drives. So if you use the Notebook program to edit a document, you can't save it to disk, though you can transmit it through the communications program. Presumably, the logic is that working without disk drives will save battery power. On the other hand, the inability to save work is frustrating — with a little more work these programs could have been a useful Sidekick-like accessory.

Once booted, the system loads MS-DOS 2.11 (we didn't have time to put PC-DOS 3.1 onto 9 cm disks). The system is pretty much a standard MS-DOS system, with no surprises. The drives seem a bit slower in operation than 13 cm types — perhaps because of the power-saving design.

Our evaluation machine was supplied with a selection of software, including Wordstar 2000 and Microsoft Flight Simulator (special DG One version). Everything worked fine.

A wide range of options, extensions and enhancements is available for the DG One. These include the second disk drive and battery pack, a thermal printer, an attractive carrying case (with room for the machine, printer, charger and power adaptor), and an external 13 cm disk drive. The last option is particularly important for those who want access to the vast world of IBM PC software. Many programs can simply be copied from 13 cm to 9 cm disks, but copy-protected software can be a bit of a problem.

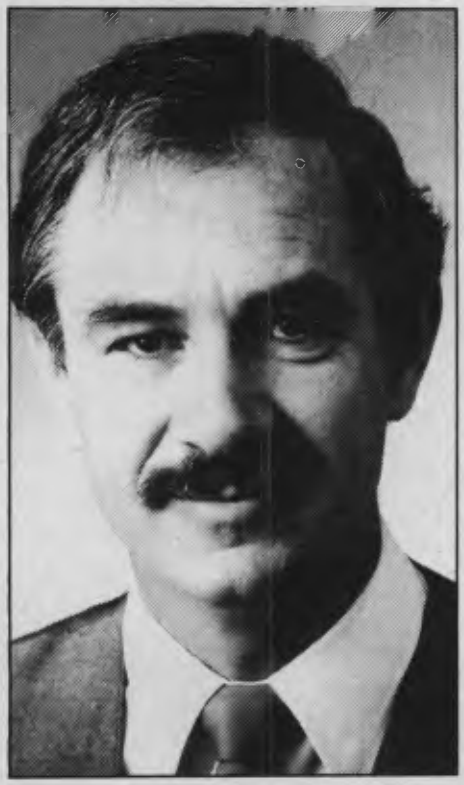
Fortunately, the DG One's 9 cm disks can be formatted for either 360 Kbyte or 720 Kbyte capacity, and the 360 Kbyte format is identical to the one used on the PC. The DOS diskcopy command, for example, will copy between disk sizes, and it would be interesting to investigate whether Copy II PC, Copywrite or other disk copiers (programs we never admit exist) would work on the DG One. It would certainly open a trove of software for the machine.

There is already a considerable amount of software available for the machine, so overcoming copy protection isn't a major problem. Bearing in mind the potential applications of the DG One, many users are probably not terribly concerned about having access to a wide range of programs.

In summary, the DG One is a civilised machine. Being the first laptop with a full 80 by 25 LCD screen and two disk drives inside the body (external drives are a nuisance — they slide off your knees), the DG One has broken new ground. The hardware design is excellent, and the electronics feature a high degree of IBM compatibility. There are one or two flaws, but the machine does what it does so well, you can forgive and forget. □

Supplier:
Data General, 1st Floor, 40 Yeo Street, Neutral Bay 2089; (02) 908 9111.
Price:
$3574 for a 256 Kbyte machine and one 9 cm disk drive, $4388 for a two-drive system, $5202 for 512 Kbytes and two disk drives.

What the experts think about Labtam Computers



KARL REED, Lecturer in Computer Science at Royal Melbourne Institute of Technology.

"There are a number of reasons why a multi-user 8086 is a good product. The most important is that small business can have several people who need access to the same database and application, and this cannot be achieved in a practical fashion by a collection of PCs or other micro-computers."

"Have a look at the Labtam 3003, it's running multiple users."
"An IBM class machine running several users."
"It was clearly a multi-user desktop machine and that was something for Australia and Labtam to be proud of."

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HP's ALL-IN-ONE

HEWLETT-PACKARD'S Integral PC is an example of outstanding hardware design. A 68000 16/32-bit processor, 512 Kbytes of memory (minimum), electro-luminescent display, 9 cm disk drive and built-in printer set the Integral apart from any other transportable on the market.

And that's not all: even though the Integral PC is a single-user machine and could run a CP/M or MS-DOS-like operating system (or even UCSD p-system), Hewlett-Packard opted to provide the power of real Unix. The result gives some clues as to the way Unix can be used as a real user-friendly operating system.

At 175 by 325 by 400 mm, the Integral is only a little smaller than the average luggable. However, that includes the keyboard, display and, most importantly, the printer. The 90-key keyboard folds down to reveal an amber electro-luminescent display, to the right of which is a 710 Kbyte 9 cm disk drive. There is a Thinkjet printer at the top of the machine, which can run at 150 characters per second and is virtually silent (thanks to the inkjet mechanism).

The electronics belie the compact design of this machine. The processor is an 8 MHz 68000, with a minimum of 512 Kbytes of memory. A 1 Mbyte memory expansion card can be added to the Integral, and an expansion box can hold an additional four Mbytes of memory, for a grand total of 5 1/2 Mbytes. Up to half the total memory may be allocated as a RAM disk drive to speed operation and augment the single built-in disk drive.

Electro-luminescent

The display is 22 cm diagonally, but has a rather different aspect ratio from the conventional television tube. The bright amber electro-luminescent display implements 512 by 255 pixel bit-mapped graphics, under the control of a dedicated 16-bit graphics processor to speed operation.

The kernel of the Integral's operating system (the root of the file system is in RAM) is built into the 512 Kbytes of system ROM, together with an implementation of PAM (personal applications manager), a user-friendly front end for Unix and MS-DOS, and Hewlett-Packard Windows (a windowing package for HP-UX). HP-UX is Hewlett-Packard's implementation of Unix System III — the latest machines have been upgraded to Unix System V.

PAM is a menu-driven system based on soft-key labels for the function keys at the top of the keyboard. In the case of the Integral, these can be driven from the keyboard or from an optional mouse. In practice, the keyboard seems to be almost as fast as the mouse, and has a much more positive feel.

Inside PAM, the user is insulated from the (to some) chill blasts of the Unix file system. The window display splits directories into three sections: folders (or subdirectories), programs and data files. Pressing 'Return' with the cursor on top of a folder opens it and displays its contents, while pressing Return on top of a program will run it, and the same action on a data file will try to display it on the screen.

Land-ho!

The soft keys at the top of the keyboard have labels across the bottom of the screen, which can be toggled between user mode and system mode. The latter series of key functions allows closing of windows, termination of programs and other functions. Using this system, the user can easily navigate between menus. The system will generally do what the user intends, whereas Unix does what he or she asks for — not always the same thing!

Of course, if a user wants to start exploring the Unix system, he or she can do so gradually, rather than having to master everything at once. For example, users can create a window containing a copy of either the Bourne shell or the C shell, but can easily switch windows back to PAM if necessary.

The Unix on the system we examined was a fairly full implementation of System III, although the features appropriate to multi-user operation, such as security and user accounting, haven't been implemented. (After all, this is only a small portable!) However, our evaluation machine, which was set up in a fairly representative way, had all the various Unix commands, such as admin, awk, mail, uucp, bc yacc, and lex, we could find a use for on a small Unix system.

Of course, many users will want applications rather than systems software. Hewlett-Packard has been busy lining up versions of a number of popular packages, particularly in the scientific/technical area where the company has traditionally been strong. Examples include Multiplan, Microtrak (project management), TK!Solver (equation solving) and a host of other third-party software (including the Informix and Unify database management systems).

The performance of the Integral is not as spectacular as might be expected. The overhead of the Unix system performs a lot more background processing than, say, MS-DOS; there are limitations of disk access through the HP-IB interface (which is not really designed for high-speed transfer from hard disks); and the 68000 is not really a 'VAX-cruncher' (it's more powerful than some earlier 16-bit chips, but not as powerful as the Lisa, for example).

However, the Integral is still quite responsive, and capable of tasks which larger machines could not tackle. Its software is very sophisticated indeed, which you should take into account when assessing performance.

Like all Hewlett-Packard equipment, the Integral feels solid and well built. The keyboard is a little awkward: the lower edge is too high in relation to the space bar and other keys, so sometimes keys aren't depressed fully. The rest of the machine, however, is well designed and elegant. □

Supplier:
Hewlett-Packard Australia, 17-23 Talavera Road North Ryde, 2113; (02) 888 4444.

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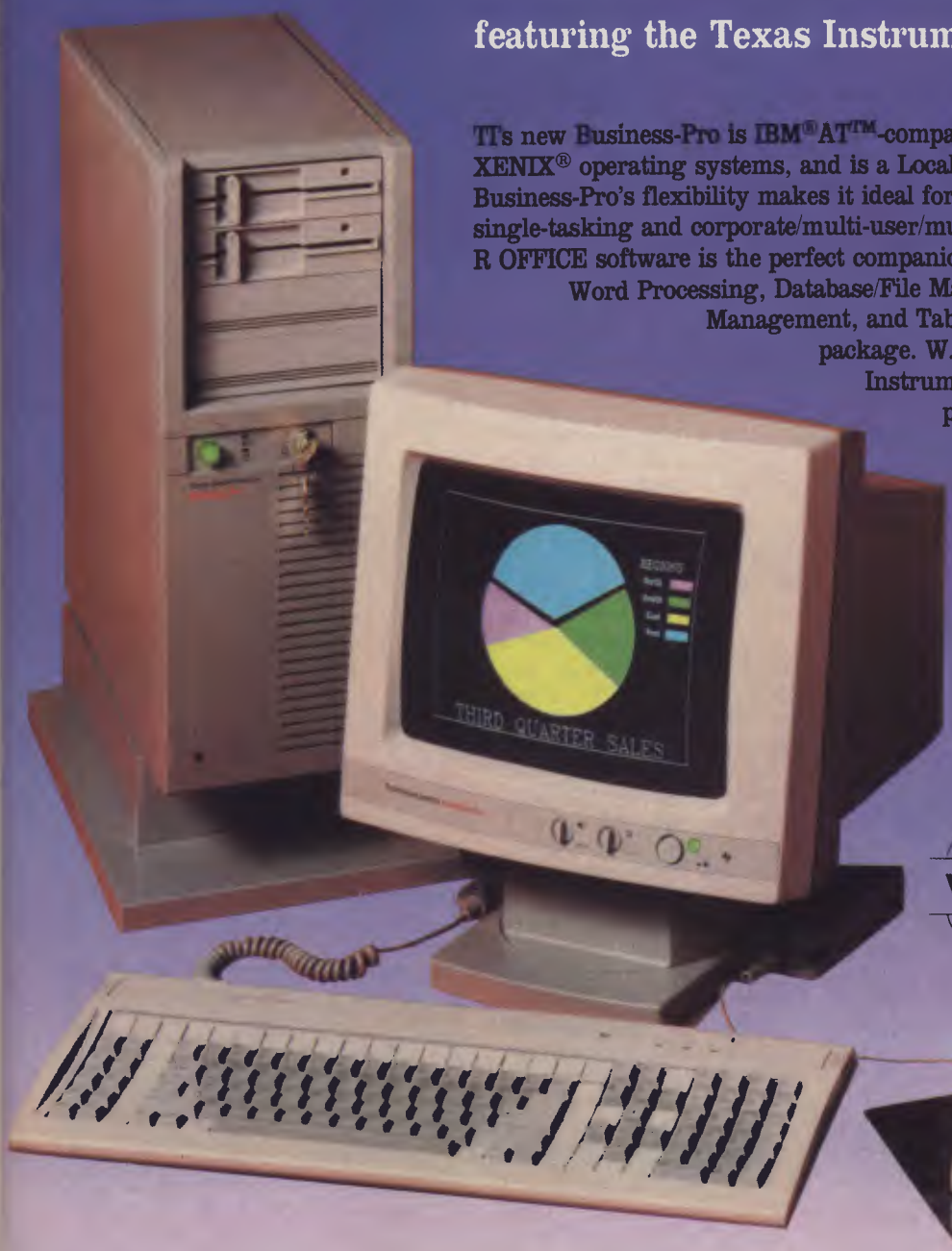

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THE TAP-DANCING ELEPHANT

BY NOW, most watchers of the personal computer market are quite prepared to believe that an elephant can tap-dance. The elephant really picked up its feet to adopt the Intel 80268 processor shortly after its announcement, and surprised many observers with the announcement of the PC AT.

IBM now has quite a spread in its product line. From the PC JX at the bottom end, through the PC and XT (now near the end of their lives) to the AT, there's quite a range of processor power.

For some time PC users, particularly those with large spreadsheets, compilers and other processor-bound applications, have felt a little more horsepower would be a good thing. Others, running out of memory space, have sought a new architecture which would allow bigger spreadsheets, multiple co-resident applications and perhaps even multi-tasking.

IBM has moved to satisfy these needs with the AT, while at the same time tidying up a number of loose ends in the design of the PC and XT, such as that much maligned keyboard layout. The AT is not the complete solution, but it paves the way for future development.

The AT follows the same basic design format as its predecessors: when you have a formula as successful as IBM's you don't tamper with it. The basic difference in design is the use of the 80286 processor, which is software-compatible with, but much more powerful, than the 8086 (and by implication, the 8088 used in the PC/XT). While the 8088 in the PC ran at 4.77 MHz, the AT's 286 runs at 6MHz; and where the 8088 performed data transfers eight bits at a time, the 286 works with 16-bit words.

The AT uses the same basic bus structure as the PC and can accept many of its peripheral cards; however, an extra connector in front of the old-style PC connector provides the additional eight bits required for true 16-bit operation. The system board can carry up to 512 Kbytes of memory. With standard IBM memory cards this can be expanded to 3 Mbytes, while third party suppliers can place that much on one board.

The AT has one controller card for both floppy and hard disks, and up to three devices are supported, selected from conventional 360 Kbyte drives, the new 1.2 Mbyte high density drives and a 20 Mbyte hard disk. Again, third-party suppliers are providing alternatives.

The front panel also boasts a new feature: a key which locks the system cover in place, which has led to this year's status symbol for PC users — an AT key on your keyring. Evidently misappropriation of expansion cards has been a problem for some companies with PCs.

The hard disk in the AT is much faster than the one in the XT. This is necessary to support both multi-user and network file server operation, where rapid access to files is particularly crucial.

The front panel also boasts a new feature: a key which locks the system cover in place, which has led to this year's status symbol for PC users — an AT key on your keyring.

The keyboard is much improved, with a full-sized return/enter key. The prodigal keys around the shift keys have returned to their proper homes. There are also indicator lights for caps, num and scroll lock.

The standard operating system for single-user operation is PC-DOS 3.1, which supports the enhanced capabilities of the AT (higher-capacity disk drives, real-time clock, and so on). However, for multi-user operation, Xenix 3.0 is available, with Xenix V due later this year.

To date, however, most software treats the AT simply as a faster version of the XT. Such software can access only the lowest 640 Kbytes of the At's memory. Exceptions include the VDISK.SYS memory disk device driver supplied with DOS 3.1 (which treats the extended memory as a disk drive), and the latest versions of packages such as Symphony, Framework II and Lotus 1-2-3 (which are able to build spreadsheets using the extended memory).

It looks as though DOS 4 will provide the ability to use extended memory for rapid switching between programs, while DOS 5 may provide a true multi-tasking operating system running the 80286 processor in its protected mode (this of course won't run on the PC/XT). Under these operating systems many of the advanced facilities of the AT will begin to come into play. To date the only operating system which drives the 80286 in protected mode (giving access to up to 16 Mbytes of real memory and 1 Gbyte of virtual memory, for example) is Xenix 3.0.

The AT is ideally set up to act as a file server on the IBM PC Network and other network systems. High speed disk access is essential here to cater for those situations when two users try to access files on the server at the same time. Major delays can be experienced with a slow disk system as the server shifts from one file to the other.

The additional horsepower of the AT is also necessary for the support of large and complex multi-layered windowing operating systems such as Topview, Microsoft Windows and Concurrent DOS. The more complex the software, the slower the machine, unless authors are willing to spend massive amounts of time and money polishing the code (possibly introducing bugs as they do so).

So the AT emerges as the hardware design on which IBM will base future operating systems and network strategies. While no-one can afford to ignore the large installed base of PCs and XTs out there (not to mention the clones), there seems little doubt tha tusers seeking high-performance software, which is instantly intractive and capable of managing large amounts of data, will find it running on the AT rather than the XT.

While there are certainly AT clones on the market here, both from the United States and South East Asia, they are simply following IBM's lead. IBM is making the running with the AT, and this, coupled with the fact that it's technically a much more innovative machine than the XT, puts the new IBM in the running for the PC of the Year Award. □

Supplier:
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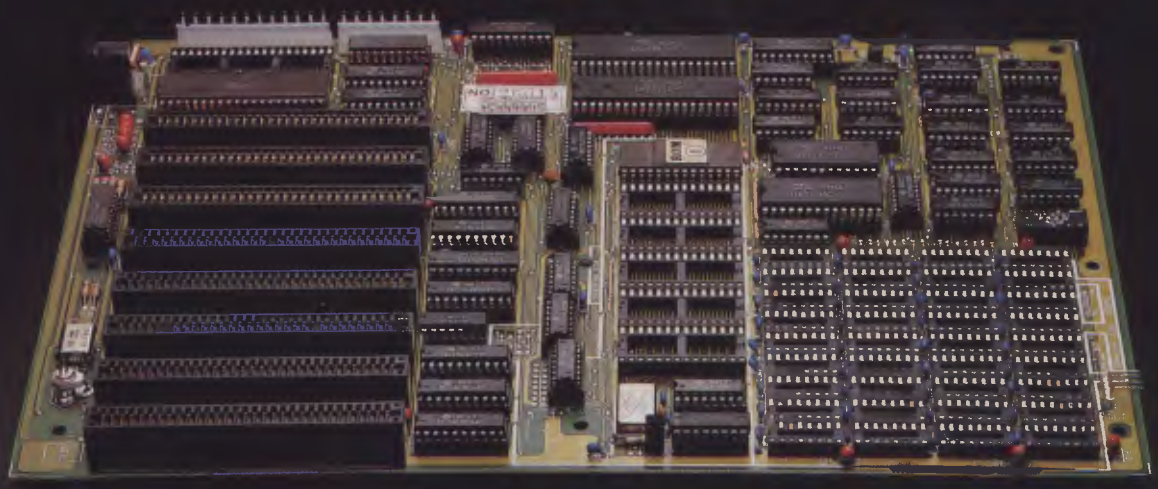

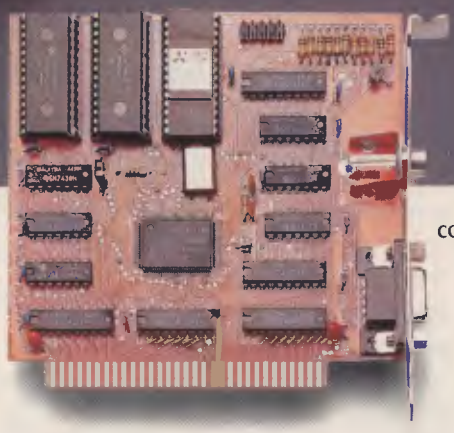

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KAYPRO PRACTICALITY

WHILE CONTINUING to supply an admittedly declining number of CP/M machines, Kaypro has branched out into the 16-bit MS-DOS field with a number of machines, the most innovative of which is undoubtedly the 2000 — a portable laden with features and bundled software.

The 2000's dark-grey case is very compact (292 by 333 by 66 mm) and cleverly designed, with a rubber strip around the edge to absorb impact. Two catches at the side release the lid/display, and raising the lid turns the machine on. Under the display you will find the keyboard, and behind that a compartment for storing a couple of disks. To the right is the 9 cm disk drive, which is unusually mounted: a catch on top releases the drive, which springs up out of the case; a disk can then be inserted and the drive lowered into the operating position.

At the opposite side of the case is an RS232C connector, and an expansion port which connects the machine to an expansion chassis is hidden behind a panel on the underside.

The keyboard is removable, so the liquid-crystal display can be made more legible by moving the screen around, without affecting typing comfort.

The display is the weak point of the machine. The contrast can be neatly raised and lowered under keyboard/software control, but there is little point, since the contrast is always too low. Text is certainly legible, but could be a lot better.

After performing a power-on memory test (which took quite some time on our evaluation machine because it was fitted with 768 Kbytes of RAM), the machine will go ahead and boot. The 768 Kbytes of memory is useful, since 300 Kbytes can be dedicated to a memory disk drive, making a single-drive machine quite tolerable.

The boot process was also quite slow on the evaluation machine; after DOS loads, the Kaypro goes into a large AUTOEXEC.BAT file in order to establish the correct modes for the serial port and to redirect printer output, as well as to load the Polywindows software. The disk drive is not very fast on head seeks, so it takes quite some time to start a process such as typing a file, but once under way it seems comparable to 13 cm disks. As with other portables, the slowness could be due to a design decision to reduce battery drain. (As an indication, the boot process takes two minutes and eight seconds.)

The only standard way of talking to the outside world is with the RS232C port, which is covered by a rubber flap at the left side of the machine (hence the redirection of LPT: to COM1:). This is not a major drawback, since most portable users are likely to leave their printers behind and take a modem when they travel.

However, at the home base, most users are likely to want more power, which the Kaypro supplies through a gizmo called the Multi-Adaptor. This is a black metal enclosure with a connector on top, which mates with the computer. On the side of the Multi-Adaptor are some connectors for a parallel port, an optional 9 cm disk drive and an optional 13 cm disk drive. It also has an IBM-compatible slot, which Kaypro recommends be used for a Persyst colour graphics card, although it could probably be used for other IBM-compatible boards. Alternatively, users can adapt to the disk drives of IBM PCs or Kaypro 16s with a card.

Oodles Of Software

The 2000, as mentioned above, is supplied with a swag of bundled software. Foremost amongst this is the combination of Wordstar and Mailmerge, the erstwhile *de facto* standard for word processing. The documentation is a bit thin for what is often claimed to be an extremely difficult word processor, but Kaypro devotees (of whom there are many) seem to thrive on this diet.

Mycroft Laboratories' modem program, MITE, is supplied for modem and PC-to-PC communications, and there is a program called the 'Travelling Expense Manager', a nice touch for the travelling sales reps, who must be a large part of Kaypro's target market. This program keeps track of travel and entertainment expenses, car mileage and other details, though it allows nowhere near the creative scope of a diary.

Also bundled with the Kaypro 2000 is Polywindows Desk Plus, a kit of memory-resident software add-ons, which provides a text editor, a small cardfile-type database, a calendar, keyboard enhancer, autodialler and DOS function access, as well as some other goodies, such as a puzzle.

The Kaypro documentation is comprehensive, and includes not only the standard users' manuals for DOS, BASIC and the other software, but also the DOS Programmer's Reference manual. However, the hardware documentation is very non-technical, so would-be programmers will find some information missing.

Despite a few rough edges, the Kaypro has a number of advantages over some of its opposition. Chief among these is the amount of memory in the machine, which provides fast operation and enables you to get by without a second disk drive.

All in all, the Kaypro 2000 impressed the panel as a well-designed and constructed machine, with emphasis on practicality. □

Supplier:
Vizden, Unit 2, 9-11 Ethel Road, Kirrawee 2232; (02) 542 3866.
Price: $2995

ABSOLUTELY PIVOTING

MORROW DESIGNS has been around for a long time. George Morrow got his start in the personal computer business in 1975, designing memory boards for Bill Godbout. Though strongly associated with S-100 and small CP/M systems, Morrow recently made a break for 'industry standard' compatibility, and coupled it with innovative design in a machine called the Pivot II.

The Pivot is the first of a new breed of machines which fits roughly between the traditional 'luggable' portables and the laptops. Luggables have one obvious disadvantage — weight. On the other hand, laptops generally sacrifice disk capacity or compatibility with the use of 9 cm disk drives, and compromise on screen quality with the use of liquid-crystal displays, which can be illegible.

At 6 kg, the Pivot is much lighter than the luggables, and it's smaller, too (about the size of a small camera case or wine cooler). However, the Pivot doesn't compromise on disk utility: the package includes two IBM-compatible 13 cm disk drives, so software is readily available.

The keyboard has 63 keys in a non-IBM standard layout, together with 10 function keys arranged horizontally below the display. These keys, and four 'icon' keys, are membrane-type rather than using keyswitches.

For travelling, the keyboard folds up in front of the display and clips into place. When unfolded, it reveals an 80 by 25 liquid-crystal display. However, in order to assist readability, the display is back-lit by a fluorescent panel. When the machine first powers up, the screen shows a world map, together with a continuously updating clock and calendar. The function keys are labelled on the status line at the bottom of the display, and allow changing of the time zone displayed on the world map.

Other key functions include entering the appointment scheduler and the setup screen.

The four 'icon' keys access the Pivot's extra built-in functions. The keys are labelled with a clock face, telephone handset, floppy disk and calculator keypad, and give access to the world time/appointment scheduler, modem communications program, normal DOS mode and calculator programs.

Although strongly associated with S-100 and small CP/M systems, Morrow recently made a break for 'industry standard' compatibility, and coupled it with innovative design in a machine called the Pivot II.

These utilities are all in the Pivot's ROM and use some specially dedicated RAM, so they don't interfere with the standard MS-DOS memory layout. The effect is similar to running Sidekick, without loss of memory space.

With MS-DOS booted, the machine behaves very much like an IBM PC. In fact, it's sufficiently compatible to be able to run PC-DOS 3.1 quite happily, rather than its native MS-DOS 2.11. However, Morrow supplies some additional utilities to make the machine a bit neater, such as SEARCH.EXE, a command which will search subdirectories to locate a file.

Commands are documented in a volume entitled 'Pivot MS-DOS Enhancements', which, like the MS-DOS documentation, is finished in Microsoft green. Since its beginnings with S-100 memory boards, Morrow has recognised the virtue of supplying complete technical information with its machines, even if users rarely need it. Accordingly, the Pivot documentation includes an MS-DOS Programmers's Reference manual, which documents the internal operation of MS-DOS and the operating system calls used by programs.

The LCD screen on the Pivot II is clear and legible in a variety of lighting conditions. The disk drives at the side of the machine are a little awkward to use on occasions — it can be quite tricky to get the disk lined up with the slot without sticking your head around the side to see what you're doing.

The keyboard arrangement is also nothing like IBM's, so users of both machines may be confused.

Overall, the Pivot II is a well-designed and packaged machine, with many interesting features. Its back-lit screen is considerably easier to read than those on the laptop machines, and its use of 13 cm disk drives ensures availability of software combined with IBM compatibility. A well-thought-out computer. □

Supplier:
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Review unit from:
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IT LOOKS SHARP

THE SHARP Corporation has had a long association with portable computers, ranging from its programmable calculators, through pocket-sized BASIC language computers, to earlier laptops like the PC-5000 (which also made the short-list for the PCOTY Award).

Sharp's technical and engineering skills are combined with IBM compatibility in the PC 7000, a small portable, similar to the Morrow Pivot in design.

Like the Pivot, the Sharp uses a vertical display format with drop-down keyboard, though it doesn't incorporate a battery pack and can only be used on mains power.

Sharp has tackled the problem of screen legibility in two ways: the screen is back-lit in either a very pale blue/electric-grey or bright green, using an electro-luminescent panel; and the display can be tilted slightly to give the correct angle of viewing. These two measures provide a degree of legibility which puts this machine (with the Morrow Pivot II) into a special class.
class of its own.

The on-off switch is on the left side of the machine, while the right side carries two 13 cm disk drives. Again, the use of full-size disk drives assists immeasurably in maintaining IBM compatibility. The drive activity lights are actually on the front panel — a nice little touch which reflects the attention to detail shown in the design of this machine.

The keyboard folds down in front of the machine and attaches through a coiled cable. It has a good, light feel, and is well laid out, with very few concessions to portability. It's definitely not cramped, and in fact follows the same layout as the PC AT.

Sharp has tackled the problem of screen legibility in two ways: the screen is back-lit in either a very pale blue/electric-grey or bright green, using an electro-luminescent panel; and the display can be tilted slightly to give the correct angle of viewing.

Standard input/output on the machine comprises a serial RS232C interface and a Centronics parallel port, which will be used mainly to connect to the matching printer. An optional colour CRT adaptor may be added, which provides an IRGB output compatible with most colour displays.

A box which accommodates various expansion cards, including a 9 cm 10 Mbyte hard disk drive, sits under the computer.

A matching printer which clips onto the back of the PC-7000 is also available. This thermal-transfer ribbon printer can print at up to 80 cps in draft mode, and is also capable of VNLQ (very near letter-quality) print. When the printer is attached to the computer, it naturally alters the centre of gravity of the machine, so the handle on top of the computer shifts — more attention to detail.

The electronics are also well put together. The processor is a 7.37 MHz 8086, which gives the PC-7000 a significant performance improvement (the clock rate is software-switchable through the set-up menu). An 8087 (also 7.37 MHz) can also be added as an option.

Other features include a real-time clock and memory expansion to 768 Kbytes.

The Sharp PC-7000 impresses for several reasons: IBM compatibility is coupled with sophisticated performance for a portable machine; the mechanical design is detailed and the styling of the unit is clean. Sharp's got a real winner here. □

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- Automatic forecasting of purchases
- Unlimited allocations per invoice

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- Powerful physical inventory routines
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- Automatic changing of costing methods
- Time and product inventory
- 3 year product history in units, dollars, cost, and profits
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- Automatic pricing assignments
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Minimum Hardware Requirements: IBM (PCjr, PC, XT or AT)[1] or other compatibles. 128K memory, one 5¼ DSDD floppy disk, 132 column printer in compressed mode, 80X24 CRT, MS-DOS[2], PC DOS[1] 2.0 or later.

[1] Trademarks of International Business Machines, [2] Trademark of Microsoft Corporation.

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TI

IMPROVING ON IBM

TEXAS INSTRUMENTS has had a chequered history in the PC market. A technologically sophisticated company, it seems to have had some marketing problems. For example, a drawn-out attempt to dominate the home computer market with the TI-99/4 failed; while the TI Professional, a non-IBM-compatible MS-DOS machine, hit the market just as the importance of IBM compatibility was becoming evident.

However, TI's machines have been successful in their own way. TI users have enjoyed superior graphics capabilities, a reasonable selection of software, and some interesting interface capabilities, such as speech-recognition hardware, which are not available elsewhere.

Texas Instruments' latest machine represents an attempt to come to terms with industry standards, while still offering some unique advantages.

The Business-Pro is an IBM AT clone, which, while offering architectural compatibility, has superior physical construction and design, and some electronic enhancements. The machine is housed in a tower enclosure which sits on a small pedestal beside the user's desk. A single cable from the back of the machine links the display, which in turn hooks to the keyboard. (Thoughtful elimination of cabling there.) In fact, the display's tilt-and-swivel stand has two connectors, one on either side. If you're right-handed, you plug the optional mouse into the right connector and the keyboard into the left one, while left-handed users reverse the cables — the hardware sorts out what's connected where.

Yes, We Have No Keys

The keyboard of the Business-Pro is particularly interesting. It's laid out in a very similar way to the IBM AT keyboard, but is larger, with areas where there are no keys. These areas are covered with square tiles, which can be removed (with a special tool clipped to the underside of the keyboard) to reveal keyswitches. The keytops can be placed anywhere on the keyboard surface, and the entire board re-defined under software control, to provide almost perfect keyboard layouts.

The first feature to strike the user is the number of expansion slots. Someone must have told TI that the five slots in the standard PC are not enough, so this machine has 14!

The system unit is built 'like a brick dunny', as they say in the classics. The metal cover is protected with plastic mouldings, which gives it an attractive finish and provides rigidity and electrical screening.

The same excellence in design is evident internally. The first feature to strike the user is the number of expansion slots. Someone must have told TI that the five slots in the standard PC are not enough, so this machine has 14! The processor is, of course, an 80286, with an empty socket for an 80287 numeric co-processor.

The system board carries 512 Kbytes of RAM as standard, with a maximum of 640 Kbytes on-board. However, a dedicated memory expansion bus will carry another 3 Mbytes of RAM, and by using slots you can have up to 15 Mbytes of memory in the machine. The memory is faster than that supplied with the AT, enabling the 80286 processor to run without wait states. As a result, the Business-Pro with its 6 MHz clock rate is very nearly as fast as other AT clones running at 8 MHz.

Six half-height disk drive mounts are provided, which can accommodate a mixture of 360 Kbyte and 1.2 Mbyte floppy drives, or 21 Mbyte, 40 Mbyte or 72 Mbyte hard disks (the last two are full-height, occupying two mounting positions). A 60 Mbyte half-height tape cartridge drive is also available.

Two video boards are available. The first is called the AT emulator card, and carries both IBM monochrome and colour graphics adaptors. The circuitry is condensed through the use of four custom integrated circuits (you can do that kind of thing with your TI). The other board provides graphics and is compatible with the earlier TI Professional.

The Business-Pro provides the best of both worlds. You can access the array of standard IBM PC and AT software, which is of course just about the major benefit of that kind of machine. Alternatively, you can use proprietary TI software, or other programs which drive the TI graphics screen, for even better performance.

Of course, having both video boards installed in the machine is more expensive than having just one, but this is no cheap machine anyway, and using up another slot makes very little difference. The two boards are cabled together, and users can switch from one mode to the other with a single command.

Operating system software for the machine is MS-DOS 3.1, which supports both TI and AT modes of operation. The TI Business-Pro also supports Xenix V, the latest version of Xenix, which is compatible with AT&T's Unix System V. This operating system will support up to eight users on the Business-Pro.

For those who want to build larger networks, TI also supports the Novell Netware operating system with ARCNet controllers (up to 50 users per LAN), or Etherseries 2.4 which supports up to eight users per server. IBM PCs can be supported on both these networks.

The TI Business-Pro has not just copied the IBM PC AT, but enhanced it in many ways. □

Supplier:
Texas Instruments, 6-10 Talavera Road, North Ryde 2113; (02) 887 1122.
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FULLY COMPATIBLE
A high level of IBM PC™ software compatibility ensures a large, established software library making the PC-7000 ideal for the office environment. The PC-7000 runs Lotus 1-2-3™, Open Access™, Flight Simulator™, Symphony™ and most popular IBM compatible software.

ILLUMINATED CRYSTAL DISPLAY SCREEN
Taking advantage of the very latest in Sharp LCD technology, the PC-7000 features the first generation of back-lit Illuminated Crystal Displays. The bit-mapped screen uses an electroluminescent panel for back-lighting to provide enhanced screen visibility under any lighting conditions. A 25 line by 80 characters, 640 x 200 pixels display provides clear, detailed graphic images and text display.

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(See review in August, Your Computer)

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LIGHTWEIGHT POWER FROM TOSHIBA

THE TOSHIBA 1100 is a battery-operated lap-sized IBM PC-compatible machine with a full 25-line LCD screen and bit-mapped graphics (640 by 200 pixels). It's stylishly finished in a light-grey moulded-plastic case.

Like most other laptops, the 1100 has a flip-up lid which contains the LCD screen and conceals the keyboard when closed. A switch on the left of the machine turns power on and off. Next to this is a contrast control, and there is a single disk drive at the rear of the of the case.

The internal memory of 256 Kbytes is optionally expandable to 512 Kbytes, and the single built-in 9 cm disk drive has a capacity of 720 Kbytes. The storage can be expanded further through an optional 9 cm disk drive, which also runs on a battery pack; or an optional 13 cm drive, which may be necessary to access standard IBM PC software. Alternatively, an RS232C port can be used to download software from another computer.

Compact

The 1100 runs MS-DOS 2.11, and sports a compact, well-laid-out 83-key keyboard, which is sufficiently different from the IBM PC's to be annoying. At just over 4 kg the 1100 is lighter than the other laptops examined, and is certainly easy to carry in the optional black carry bag.

The built-in liquid-crystal display is very legible — one of the best I've seen on a laptop. The machine feels well built, and gives an impression of quality and reliability.

The comparatively light weight of the 1100 is due to the extensive use of CMOS components, which have very low power consumption and are able to run for eight hours on NiCad batteries, rather than the much heavier sealed lead acid type. A red 'low power' LED warns of impending doom.

The 1100 has a built-in RGB display controller, with a standard 9-pin socket on the rear of the machine. This makes it a popular choice with users who have several colour displays at remote locations or who occasionally want to use a colour display on the Toshiba.

The built-in liquid-crystal display is very legible — one of the best I've seen on a laptop. The machine feels well built, and gives an impression of quality and reliability.

The documentation is a bit spartan. A spiral-bound owner's manual tells all, in a decidedly jinglish accent. It includes the details necessary for adding peripherals, more RAM, and a serial port.

There is a separate MS-DOS manual, which is a reprint of the Microsoft DOS documentation. The BASIC manual has to to be purchased separately. □

Supplier:	Toshiba, 84-92 Talavera Road, North Ryde 2113; (02) 887 3322.
Price:	$3880 (includes T1100 system, one 13 cm FDD unit, RS232C card, RS232 cable, system kit, manual set, power supply, and a carry bag).

Son of LEDGERMASTER

Ledgermaster, haven't you seen that name somewhere before? Perhaps in the May '85 issue of 'Your Computer'? Remember, it was a financial database program, written for cassette-based Microbees, and we promised we'd publish a version for disk-based machines the following month. Well, here it is ... sorry ... It was worth waiting for ...

Ledgermaster is a home and small-business accounting program for tape-based Microbee computers, which first appeared in the May 1985 issue of *Your Computer*.

Since then I've been deluged with letters from Microbee owners who want to get Ledgermaster up and running on their disk machines, and from people who own other brands (poor souls) and want to convert it. As Dame Edna Everage would say, "How can I ignore my public?" So, after lots of re-programming, I'm pleased to announce the birth of 'Son of Ledgermaster', a new version designed for disk machines. Instructions for conversion to other BASICs are outlined below, for those who want to run Ledgermaster on inferior machines, such as the IBM and the Apple.

Operating Instructions

Ledgermaster enables you to create, manipulate, link or print disk ledgers, each of which comprises a base and up to 320 files or transactions.

The ledger base is a list of up to 20 categories of payments (for example, rent and insurance), up to 20 categories of receipts (such as wages and interest), and any 'carried forward' totals you want to include. It's extremely important, want to it forms the nucleus of the final balance sheet.

When you run Ledgermaster, a menu gives you various options, depending on whether or not a ledger is present in memory. As detailed instructions were given in the earlier article, I won't go into them in depth here. The following is only a summary of the main points.

Create: Allows entry of the base categories of a new ledger.

Enter: Allows you to enter a transaction, requesting first the date (note error checking), then the name of the person who was paid (or who paid you), the cheque or receipt number (if any), whether the transaction is a receipt or payment and its category, and finally the amount. All this data is stored in the file created for the transaction.

Save: You can save a full ledger to disk or, if you want to 'cut and paste', save the base or the files alone. Unlike the tape version,

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SuperProject tells you the cost, the finish date and who's over-committed. All the critical activities are highlighted in red.

SuperCalc3

SuperCalc³ Release 2 from Sorcim/IUS is a classic spreadsheet with some key differences. Precious memory is only used by cells holding significant data. Your model can be as large as 9999 rows by 127 columns. There is no need to change disks to graph results. It's up to 10 times faster.

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Ledgermaster II will ask you to specify the drive and filename under which the ledger is to be stored.

Load: You can load a full ledger from disk, or the base or files on their own, or merge the files from a disk ledger with those of the ledger currently in memory.

Sort: Sorts the ledger files in chronological order.

Delete: Deletes a single file or a block of files from a ledger.

New Base: Adds the amount of each file to the 'carried forward' total of the relevant base category, then erases all files. this allows you to 'chain' ledgers by starting a new one where the old one finished.

Print: Ledgers can be displayed on the screen or output to a printer. If a Search string is specified, only files containing that string will be printed. If the search string is a hash mark and a number, such as #99, only those files after the specified file number will be printed. If no search string is set, the printout will comprise three parts: a list of the base categories, a printout of all ledger files and a profit and loss statement. This is quite acceptable for business or taxation purposes.

Entering The Program

The listing shown below will not run, since memory use is too critical to allow REMs and spaces between commands. Enter it exactly as shown, but omit lines containing only a REM and REMs at the end of program lines. Note that variables I, O and Q are listed in lower case so they won't be confused with 1s and 0s.

Save this first draft of the program on disk. The next step is to use GX to delete all spaces in the program (GX/ //). This will take some time! Save the second draft, replace all up-arrows with spaces (GX/↑/ /), and re-number the program to begin at line 1 with one-line increments (RENUM 1,1). You should now have a fully operational Ledgermaster.

Don't despair if the thought of typing a program this size gives you the horrors! Send a cheque or postal order for $20 to Dreamcards, 8 Highland Court, Eltham North, 3095 (mail order only — remember to include a note with your return address!), and I'll send you a tape you can load to disk with TDCOPY, or with the BASIC load and save commands (sorry, I don't have access to a 13 cm machine). If you have a Computer-in-a-Book system, you can send me a formatted disk and a cheque for $18, and I'll copy the program for you. Make sure you pack it extremely well — disks sent through the mail tend to arrive in pieces!

Conversion to Other BASICs

If your machine has less than 32 Kbytes of user RAM, a simple (for example 8 to 12 Kbytes) BASIC, or a screen width of less than 60 characters, forget it! Such a computer is really only suited to video games, and you'd be better off upgrading. But if your machine doesn't fall foul of these minimum requirements, and you have at least a passing acquaintance with BASIC programming, conversion shouldn't be a major task. Assuming not everyone will feel up to it, I should also make it clear that I don't object to user groups or individuals distributing copies — provided my authorship is acknowledged. Otherwise, my team of trained lawyers and Mafia hit-men may descend on you from a very great height!

The main conversion hassle you may have is the odd syntax of Microworld BASIC, particularly in its use of variables, sub-string extraction, print formatting and disk commands.

Variable Conventions

Microworld BASIC doesn't allow you to assign any old name to a variable. Integer or whole-number variables must be designated by a single letter, and cannot take part in real-number maths without special conversion functions. Real-number variables are designated by a letter and a number, such as F2, and can't take part in integer maths. Strings are designated in the same way as real-number variables, but are followed by the conventional '$' sign. These rules impose some minor limitations on Microbee owners, but shouldn't cause problems in most other BASICs.

Variable types may be converted with the INT, FLT, FRACT, STR and VAL commands. INT converts reals to integers by ignoring the fractional part (for example, Z=INT(F1) sets Z=18, where F1=18.7), and FLT converts integers to reals (F1=FLT(Z)/2 sets F1=2.5, where Z=5). FRACT sets a real to the fractional part of another real, thus F1=FRACT(FLT(Z)/2) leaves F1=0.5 where Z=5. STR$ transforms an integer or real into a string (A0$=STR$(X) leaves A0$ containing '123' if X=123). The leading space in the string is reserved for any minus sign.

Variables may be DIMensioned into arrays, although string arrays must first be dimensioned as reals and then converted (as in line 360). The CLEAR command is used to erase all existing array dimensions.

Assuming not everyone will feel up to it, I should also make it clear that I don't object to user groups or individuals distributing copies — provided my authorship is acknowledged.

Sub-String Extraction

Microworld BASIC doesn't use LEFT$, RIGHT$ or MID$, but rather the command v$(;s,e), where v$ is the string from which the sub-string is to be taken, 's' is an integer denoting the first letter to be included, and 'e' is an integer denoting the last. So, if A0$=A1$(;4,X), A1$='hippopotamus' and X=6, A0$ is set to 'pop'. Where the command includes only a single integer or integer expression, all letters from the one designated by the integer to the end of the string will be extracted (in our last example, if A0$=A1$(;6), A0$ would contain 'potamus').

The search command sets an integer to the position within a string of a particular sub-string, taking the format i=SEARCH(a$,b$,n), where 'i' is the integer variable to be set to the search result, a$ is the string to be searched, b$ is the string you're searching for and 'n' is an integer which specifies that you're looking for the 'nth' occurrence of b$. If 'n' is omitted, the command assumes you're looking for the first occurrence. For example, if C=SEARCH(A1$,A0$), A1$='hippopotamus' and A0$='pot', C would equal 6 (the sub-string was found starting at the 6th letter of A1$). If A0$='cat' the search result (C) would equal 0, indicating that the sub-string wasn't found. If A0$='p' and we used B=SEARCH(A1$,A0$,3), B would equal 6, since the third occurrence of the sub-string starts at letter 6 of A1$.

If your BASIC has no search command, you can synthesise it with a suitable subroutine. If we use variable X as the search result, X0$ as the string under search and X1$ as the sub-string, the subroutine will be as follows: ▶

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```
1000 REM  'SEARCH' replacement Subroutine

1010 W=1: X=0: Y=LEN(X1$)-1: Z=LEN(X0$)-Y

1020 IF Z<0 THEN RETURN

1030 X2$=X0$(;W,W+Y): REM ie: X2$=MID$(X0$,W,W+Y)

1040 IF X2$=X1$ THEN LET X=W: RETURN

1050 W=W+1: IF W<=Y THEN 1030

1060 RETURN
```

Print Formatting

Ledgermaster uses a 64 by 16 screen, though there is no reason why a larger (say 80 by 24) format wouldn't work just as well. The display/print commands you'll encounter in the program are listed below.

CLS: Clears the screen and positions the cursor at top left.

CURS a,b: Positions the cursor 'a' (1 to 64) characters to the right of screen and 'b' (1 to 16) lines down.

CURS 0: Turns off the flashing cursor until the next PRINT command.

PRINT: Prints a carriage return and line feed. It's the equivalent of PRINT CHR$(13) CHR$(10).

PRINT SPC(n): Prints 'n' spaces — like PRINT TAB(n) PRINT |An c|. The square brackets designate a 'PRINT USING' command and the 'A' denotes ASCII text. This version prints the character that is the ASCII equivalent of integer 'c', 'n' times. It's the same as 'FOR X=1 TO n: PRINT CHR$(c);: NEXT X'.

PRINT |Iv n|: Prints the integer variable 'v' right-justified in a field 'n' characters wide (only used in line 343).

PRINT |Fn.m r|: Prints the real variable 'r' right-justified in a field 'n' characters wide. Limit the real number to 'm' decimal places.

OUT#n: A Microbee curiosity used to redirect print output (for example, lines 166 and 216, where variable q designates that print is to go to the screen if q=0, or to a printer if q>0). OUT#0 and IN#0 are used at various points in the program to turn the screen back on where it has been disabled by some other command.

Disk Commands: Microworld BASIC uses the OPEN command to open a disk file for sequential read or write operations. The format is:

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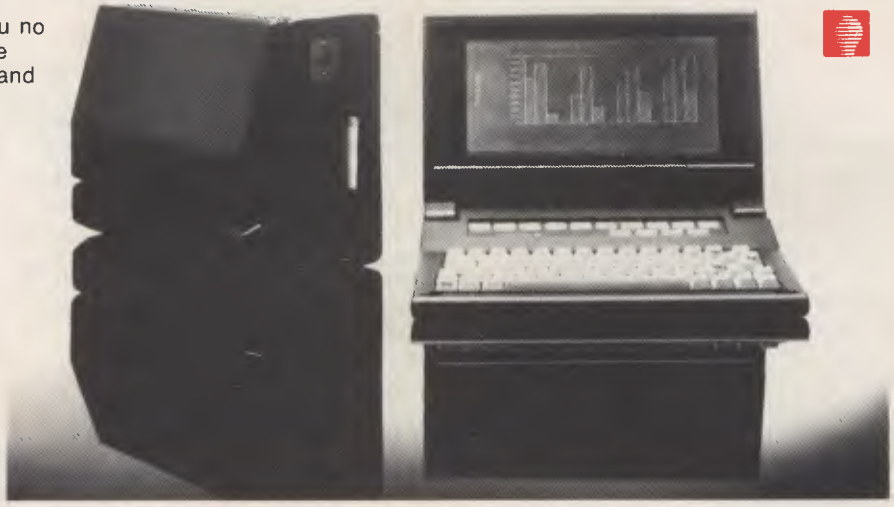

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OPEN "f",6,"d:FILENAME.EXT"
where 'f' is the function ('I'=READ, 'O'=WRITE), the '6' is a port vector allocation which can be ignored in conversion, 'd' is the drive code ('A', 'B' or 'C'), and the FILENAME and EXTENSION are as in CP/M (maximum of eight and three characters respectively). A string variable may be substituted for any of these attributes.

After a file has been OPENed, a sequence of IN and OUT commands will be used to turn off the screen and re-direct output to the disk port. These commands are irrelevant on other machines. Various other commands, which I've listed below, are used in association with disk operation.

DISKRESET n: This resets the computer's knowledge of the directory of the disk in drive 'n', preventing a BDOS error if the disk is changed before a READ/WRITE operation is performed.

CLOSE 6: This closes the disk file that was opened with the OPEN command. The '6' is a Microbee peculiarity.

ON ERROR GOTO: Microworld BASIC generates an Error Report if you try to OPEN a file which doesn't exist on the particular disk. This command suppresses the report and directs the program to continue at the specified line number if an error occurs.

ON ERROR GOTO 0: Cancels the above.

General Syntax: Some of the general commands used in Microworld BASIC differ a little in other dialects. The ON v GOTO command (see Line 18) jumps to the first line number where v=1, the second where v=2, and so on. Some BASICs jump to the first line number where v=0, and if yours is one of these the command should be amended to ON v-1 GOTO. The STRS(v) command reserves v bytes of memory for the strings, and v=FRE($) sets v equal to the number of free bytes of string space remaining at the time it's executed. PLAY x,y plays a note 'x' (from low frequency=1 to high frequency=22) for y/20 seconds. If x=0 a silent delay is produced. v$=KEY$ reads the keyboard and sets string v$ to any key being pressed at the time. If no key is being pressed, the instruction doesn't wait, but returns a null string (ASCII value 128).

How It Works

Much of Ledgermaster's operation is explained by REMs in the listing, but you'll also need to read these notes to understand it fully. The following are the main program variables ('n' is an integer in the range 0>n<=V).

C: Number of current file being accessed.
H: Disk file type (Base=1, Files=2, Full Ledger=3).
P: Number of 'payment' categories in Base.
R: Number of 'receipt' categories in Base.
S: Files in ledger are Sorted (=1) or Unsorted (=0).
V: Maximum number of files: must be >C.
K5$: Ledger filename (maximum of eight characters).
A0$(n): File string — contains date, payee/or, receipt number, payment/receipt (P or R), category designation letter and ▶

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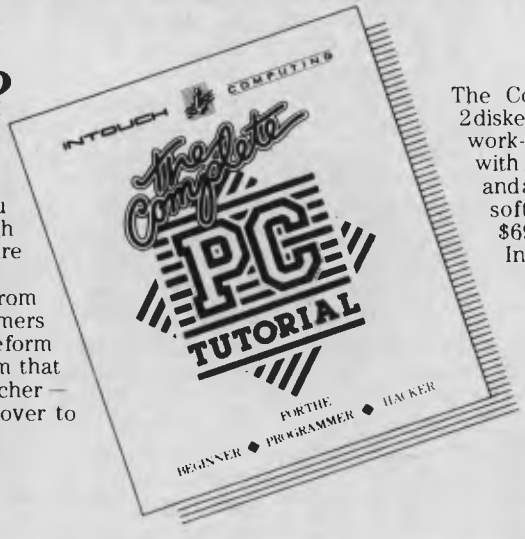

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Much of Ledgermaster's operation is explained by REMs in the listing, but you'll also need to read these notes to understand it fully.

amount. Fields are separated by
B0$(n): Payment category.
B1$(n): Receipt category.
B2(n): Payment category amount 'carried forward'.
B3(n): Receipt category amount 'carried forward'.

When the program is first run, the Initialisation routine (accessed from line 2) reserves sufficient string space, clears and resets the arrays, and converts arrays required for strings (A0$, B0$ and B1$) into string arrays. V determines the function of the initialisation routine — the maximum number of files per ledger can be altered simply by changing the value assigned to it in line 357. Crashes will occur if this exceeds 320 on a 32 Kbyte Microbee. Owners of other machines may have to experiment to find an appropriate value.

Lines 3 to 5 then set N to a value which indicates the status of the arrays (or whether a base and/or files are present), and this is used by lines 6 to 14 to determine what options will be displayed on the menu. Line 15 alerts you if the ledger is full. The program then prompts you to select an option, and jumps to the appropriate section when a valid key is pressed (lines 17 to 18).

Note the unusual input subroutine (commencing in line 274). This prints a line of hyphens across the 15th line of the screen, then a prompt (K2$) at left of the 16th line, followed by a number of stars (*), according to the maximum number of characters (G) allowed in the input field. As each character is entered, it replaces one of the stars, the input ending when RETURN is pressed or when the field is full (lines 281, 282 and 284). DELete and BACKSPACE are implemented by lines 285 and 286. A null string may only be entered if I>0 (line 282).

Create Base

Line 68 first asks for a 'File Title' to help identify the file, then stores it in B0$(0) (line 69 — be careful when converting, as some BASICs don't permit an array element numbered 0). If yours is one, I'd suggest you DIM B0$ to 21 elements, use B0$(21) to store the File Title and modify the rest of the program accordingly. The routine goes through two similar loops, the first (Payments) in lines 70 to 73, and the second (Receipts) in lines 75 to 78. These display the respective base categories on each loop via one of two access points in the 'Print Base' subroutine, then ask for a category and an 'Amount Carried'. These inputs are stored in the appropriate arrays. The loop terminates when the base category counter (P or R) reaches 20, or if a null is entered when you're prompted for the category. T is then set to the number of categories having 'Carried Forward' amounts, C is set to 1 to indicate that a base is present, and the program returns to the Menu.

Enter begins at line 86. S is set to 0: the new entry means the ledger is 'unsorted', the File string (A0$(C)) is set to a null, and the 'File Entry' print subroutine is accessed. Since there is nothing in the file, only the file number (C) is displayed. If at least one file is present, line 88 accesses the 'Extract Date Variables' subroutine, and F1, F2 and F3 are set to the date of the last file (see below). Lines 89 to 94 ask for the day, month and year parts of the date, some error checking being performed at each level (for example, 'day' must be >0 and <32). Entries are stored in F1 (day), F2 (month) or F3 (year). A null entry causes the program to jump the remaining date entry lines, leaving the variables holding the values borrowed from the last file by line 88. Lines 95 to 99 check that the day doesn't exceed the number of days in that month and that the 29th of February hasn't been entered on a non-leap year, an error message being generated if an illegal value is detected. Lines 100 to 102 convert the date variables into a string.

Line 103 trims the leading space from the date string, displays it, then asks for a 'From/to' input. If this is a null, 'Paid' is inserted into the file by line 104. Line 105 displays the file so far and asks for a receipt or cheque number, and line 106 inserts 'B'card' into the file if ↑B (CTRL B) was pressed, or 'Cash' if ↑A was pressed. Line 107 displays the file, asks if it's a receipt or payment ('R' or 'P' is stored). Lines 109-113 then update the file, display the Base Receipt or Payment categories (as appropriate), and ask for one to be selected. The letter code is stored and you are asked for the 'Amount' (line 115 — error signalled by X=1). Lines 116 to 119 permit the current file to be re-typed, the next file to be entered, or a return to the menu.

Delete starts at line 142, asking for the number of the (first) file to be deleted (o). Invalid file numbers are rejected, otherwise the file is displayed, and line 144 asks if it's the one you want. If the answer is 'N' the program returns to the menu, otherwise line 145 asks for the number (L) of the last file to be deleted (displayed by line 148), or (RETURN) if only one file is involved. Lines 149 to 150 make the deletion, condensing the arrays to allow for the missing file/s.

Sort starts at line 22 (low in the program to enhance its speed), asks if you're sure, and refuses to operate if the ledger is already sorted (S=1). Line 24 then converts the date part of each file into a number (F4) and stores it in the A1 array, then lines 25 to 29 carry out an insertion sort of the file variables. BASIC sorts are extremely slow, so a counter is displayed as each array element is selected. S=1 on completion.

New Base begins at line 222. This line asks if you're sure and line 223 asks for a new File Title and stores it in B0$(0) (see 'Create Base'). A null input retains the old File Title. Lines 224 to 225 begin a loop which extracts the 'P' or 'R' string from each file (O is set to its ASCII value), the Category string (Z is set to the appropriate number from 1 to 20), and the Amount string (converted to a real in F1). Line 226 adds F1 to the the appropriate element in either the B2 or B3 array, and the loop continues. Line 227 calls the subroutine at line 360, and returns to the menu.

Print starts at line 154, asking if you want any 'Search String' (K4$). If K4$ begins with a hash mark (#), line 155 sets H to the value of any following number (line 156 rejects invalid file numbers). Line 157 asks if you're using the VDU or a printer. If it's a printer, lines 159 to 164 allow you to select the type. During these routines Q is set to the output mode (0 if VDU, >0 if printer), and L is set to the number of lines per page (VDU=12, Printer=57). If printer output was selected, line 166 asks for a key, then turns the VDU off and the printer on. Line 167 copies the Base 'Carried Forward' arrays (B2 and B3) into the 'Ledger Balance' arrays (B4 and B5). Lines 168 to 169 set some of the print variables, E being the total number of lines in the file, O the ▶

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80 CHARACTERS PER LINE	YES	YES	YES	YES	YES	YES
66 CHARACTERS PER LINE	YES					
132 CHARACTERS PER LINE	YES					
(PAPER HANDLING)						
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PRINT ON POST CARDS	YES					
(SOFTWARE COMMANDS)						
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EMPHASIZED	YES					
COMPRESSED	YES					
UNDERLINE	YES					
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ITALICS	YES					
DOUBLE DENSITY BIT IMAGE	YES					
(CHARACTERS)						
9X9 FONT	YES					
TRUE DESCENDERS	YES					
ITALICS	YES					
COMMODORE GRAPHICS	YES	YES	YES	YES	YES	YES
(OTHER FEATURES)						
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Sort starts at line 22 (low in the program to enhance its speed), asks if you're 'Sure', and refuses to operate if the ledger is already sorted (S=1).

number of lines occupied by the base categories, and U and W being counters.

The print routine loop begins at line 170, lines 170 to 172 detecting any key pressed, aborting if it's 'A', or looping until another key is pressed if not. Lines 173 to 183 use the line counter (D) to detect top of page, and print a page heading if a printer is used or clear a section of screen if the VDU is used. If at the top of the listing (o=0) and if no search string is defined, the Base categories are printed out by lines 184 to 194, otherwise line 195 prints what is being searched for. Lines 196 to 197 print the files themselves by accessing the 'File Entry' print subroutine (fully detailed by REMs in the listing), then lines 198 to 199 add the Amount to the appropriate Balance array element. Lines 200 to 210 are invoked once the files are printed, and are responsible for printing the final balance.

Load and Save are detailed by REMs in the listings and the descriptions of the main variables (above). O=Command (Cmnd.) type (files only, full ledger, and so on) and H=disk file type. Ledger files are saved or loaded three at a time, since it's the most efficient way to use the Microbee cassette system. Although not necessary for disk use, it's been retained to maintain consistency with the cassette version.

Dead Bugs

Two bugs have been corrected in this version. When entering a file cheque/receipt number a ↑ C entry was intended to enter 'Cash'. This didn't work because the BREAK key was disabled, hence it's been changed to ↑ A (line 106). A new line (48) has been inserted in the Load Routine to overcome a problem which occurred when 'Base' alone was loaded. □

```
00001 POKE 140,1  REM Disable BREAK key
00002 GOSUB 357  REM Initialise Storage Arrays
00003 IN#0: OUT#0  REM VDU On - Main program loop begins here
00004 N=8: IF B0$(0)="" THEN LET N=2 ELSE IF C=1 THEN LET N=4
00005 K0$=KEY$: K4$="": i=0: q=0: IF C<3 AND N=8 THEN LET N=5
00006 GOSUB 322: INVERSE: CURS 28,4: PRINT "^MENU^": NORMAL
00007 PRINT \ SPC(14) "Create^.....^1";
00008 PRINT SPC(4) "Load^.....^2": IF N=2 THEN 16  REM No Base
00009 PRINT SPC(14) "Enter^.....^3";
00010 PRINT SPC(4) "Save^.....^4": IF N=4 THEN 16 REM No Files
00011 PRINT SPC(14) "Delete^.....^5";: IF N=5 THEN 16 REM <3 Files
00012 PRINT SPC(4) "Sort^.....^6"
00013 PRINT SPC(14) "Print^.....^7";
00014 PRINT SPC(4) "New^Base^...^8"
00015 IF C=V+1 THEN PRINT \ SPC(21) "***^LEDGER^FULL^***"
00016 K2$="Select^Menu^Option": GOSUB 246  REM Get key
00017 X=INT(VAL(K0$)): IF X=0 OR X>N THEN 16  REM Check key range
00018 PLAY 22,1: ON X GOTO 68,33,86,123,142,22,154,222
00019 REM
00020 REM ------------------ Sort Routine ----------------------
00021 REM
00022 GOSUB 252: IF K1$="N" OR S=1 THEN 3 REM "No" or already sorted?
00023 X=0: GOSUB 341  REM Set A1 Array to file dates
00024 FOR X=1 TO C-1: GOSUB 316: A1(X)=F4: NEXT X
00025 FOR X=1 TO C-2: GOSUB 341: FOR M=X+1 TO C-1  REM Sort
00026 IF A1(M)=>A1(X) THEN 29  REM Later or same date?
00027 K0$=A0$(M): A0$(M)=A0$(X): A0$(X)=K0$ REM Substitute files
00028 F1=A1(M): A1(M)=A1(X): A1(X)=F1 REM Substitute sort dates
00029 NEXT M: NEXT X: S=1: GOTO 82
00030 REM
00031 REM ---------------------- Load ----------------------------
00032 REM
00033 N=3: IF C>1 AND C<V+1 THEN LET N=4  REM Merge available?
00034 K5$="LOAD": GOSUB 231: IF K2$="" THEN 82  REM Get Filename
00035 ON ERROR GOTO 239: OPEN "I",6,K5$+".LGR": CLOSE 6  REM Valid?
00036 ON ERROR GOTO 0: GOSUB 348: IF o=0 THEN DISKRESET "A": GOTO 3
00037 OPEN "I",6,K5$+".LGR": IN#6ON: OUT#0: OUT#0OFF  REM Get disk file
00038 INPUT K1$,D,H,X,Y,Z,E  REM Input File Header
00039 IN#0: OUT#0  REM VDU back on
00040 IF o= AND H<3 THEN LET o=0  REM Cmnd.=Ledg., Disk=Files/Base
00041 IF o=1 AND H=2 THEN LET o=0  REM Cmnd.=Base, Disk=Files
00042 IF o>1 AND H=1 THEN LET o=0  REM Cmnd.=Files/Ledg., Disk=Base
00043 K0$="": J=1: L=D-1: IF o<4 THEN 46  REM Goto 46 if not Merge
00044 J=C: L=L+C: C=L: S=0: K0$="^-^Merge"
00045 IF C>V+1 THEN LET C=V+1: K0$=K0$+"^(Part^only)"
00046 IF o=2 OR o=3 THEN LET C=D: S=Z  REM Files/Ledg.
00047 IF o=1 OR o=3 THEN LET B0$(0)=K1$: P=X: R=Y: T=E  REM Base/Ledg.
00048 IF o=1 AND C=0 THEN LET C=1  REM Corrects bug in tape version
00049 K1$=K1$+K0$: CURS 0,12: PRINT [A64^32]  REM Display File Title
00050 CURS (62-LEN(K1$))/2,12: PRINT K1$: CURS 26,13
00051 IF H=1 OR o=1 OR C=1 THEN PRINT "^^(Base)": GOTO 54
00052 IF (H=2 OR o=2) AND C>1 THEN PRINT "^^(File)": GOTO 54
00053 IF S=0 AND C>1 AND o>1 THEN PRINT "(Unsorted)"
00054 IF o=0 THEN 82 ELSE LET N=X: IF Y>X THEN LET N=Y
00055 CURS 0: PLAY 0,10: IN#6ON: OUT#0: OUT#0OFF  REM VDU Off, Disk On
00056 FOR X=1 TO N  REM Load Base
00057 IF (o=2 OR o=4) AND H=3 THEN INPUT K0$,K0$,F1,F1  REM Dummy load
00058 IF o=1 OR o=3 THEN INPUT B0$(X),B1$(X),B2(X),B3(X) REM Real load
00059 NEXT X: IF o=1 THEN 61 ELSE FOR X=J TO C STEP 3  REM Load Files
00060 INPUT A0$(X),A0$(X+1),A0$(X+2): NEXT X
00061 IF C<V+1 AND o>1 THEN GOSUB 360  REM These lines clear
00062 Y=P+1: IF P<20 THEN GOSUB 361    REM irrelevant array
00063 Y=R+1: IF R<20 THEN GOSUB 362    REM elements
00064 IN#0: OUT#0: CLOSE 6: DISKRESET "A"  GOTO 82 REM Tidy up and end
00065 REM
00066 REM ----------------- "Create" Routine -------------------  ▶
00067 REM
```

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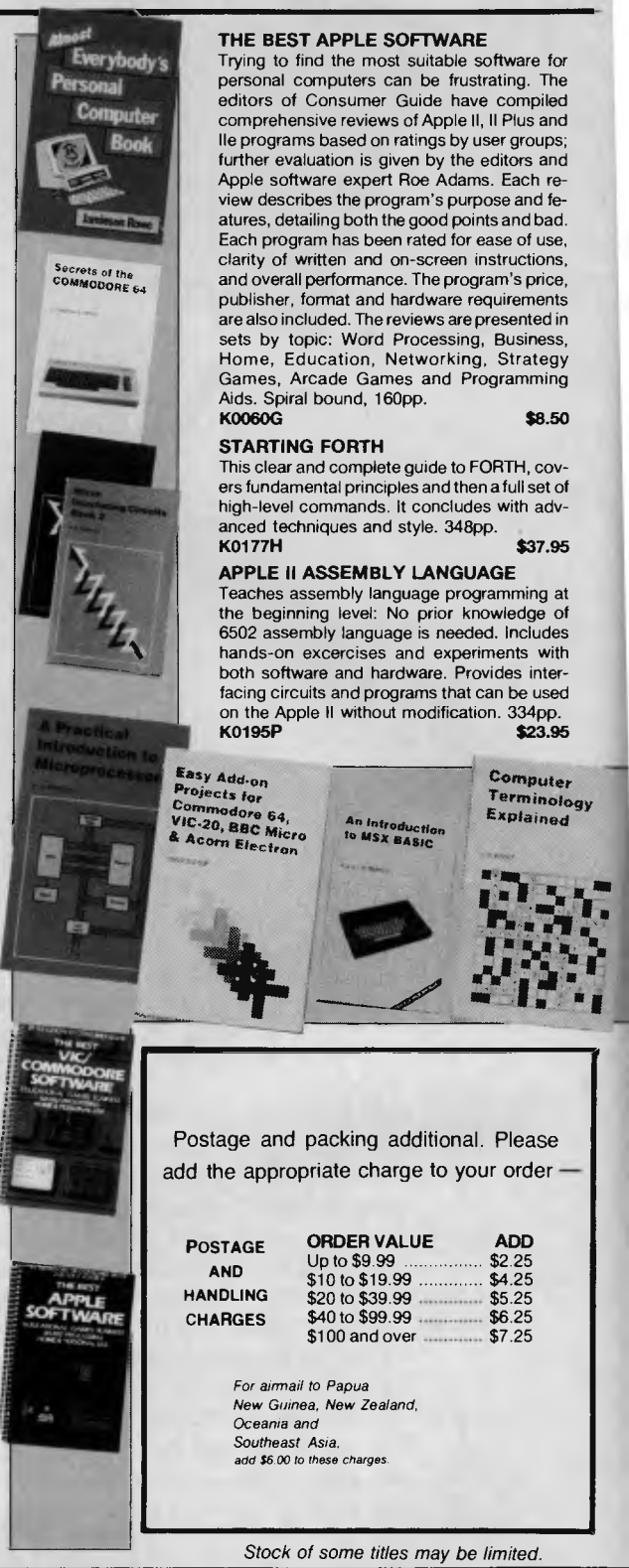

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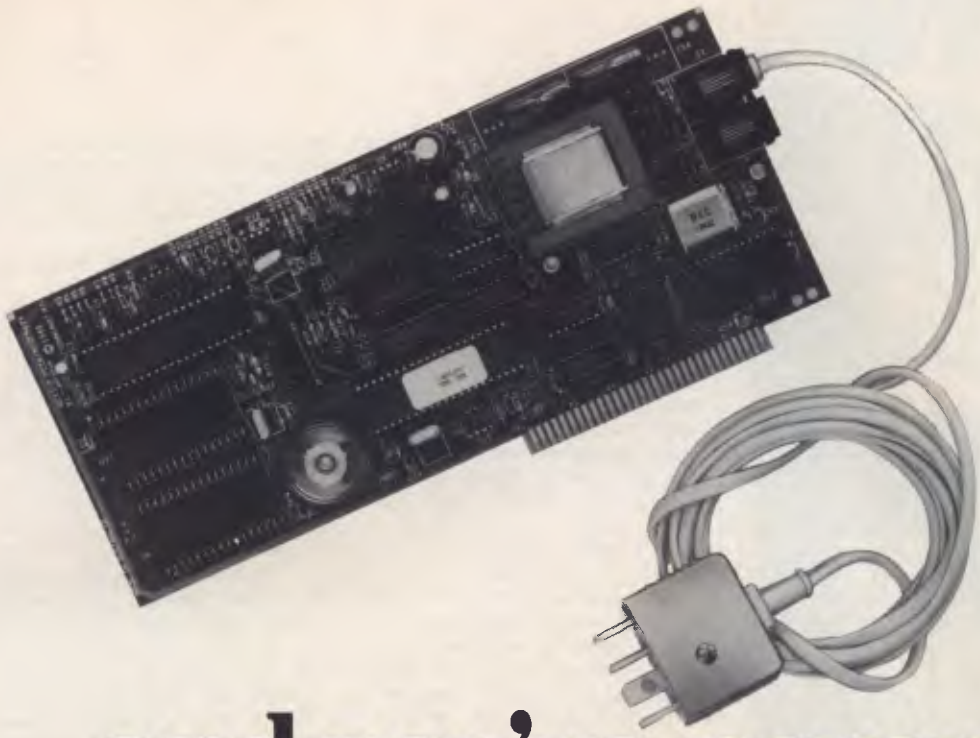

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LEDGERMASTER II

```
00068 GOSUB 355: IF K1$="N" THEN 3  REM Are you sure?
00069 G=24: K2$="File^Title": GOSUB 322: GOSUB 274: B0$(0)=K1$: I=1
00070 GOSUB 328: P=P+1: GOSUB 269: B0$(P)=K1$: K3$=K1$ REM Payments
00071 IF K3$="" AND P=1 THEN LET B0$(1)="Payment": GOTO 73
00072 IF K3$="" THEN LET P=P-1: GOTO 74
00073 GOSUB 257: B2(P)=F3: IF P<20 AND K3$<>"" THEN 70
00074 PLAY 22,1
00075 GOSUB 331: R=R+1: GOSUB 269: B1$(R)=K1$: K3$=K1$ REM Receits
00076 IF K3$="" AND R=1 THEN LET B1$(1)="Receipt": GOTO 78
00077 IF K3$="" THEN LET R=R-1: GOTO 79
00078 GOSUB 257: B3(R)=F3: IF R<20 AND K3$<>"" THEN 75
00079 PLAY 22,1: T=0: FOR X=1 TO 20: IF B2(X)>0 THEN LET T=T+1
00080 IF B3(X)>0 THEN LET T=T+1 REM Count no. of Carried Forward's
00081 NEXT X: C=1: K3$="": GOTO 3
00082 CURS 0: PLAY 22,1; 0,5: GOTO 3
00083 REM
00084 REM ------------------ "Enter" Routine ---------------------
00085 REM
00086 IF C>V THEN 3  REM No more entries if ledger full
00087 S=0: A0$(C)="": M=C: GOSUB 292: I=C-1: G=2 REM Display file
00088 IF C>1 THEN LET X=C-1: GOSUB 316  REM Get last file date
00089 K2$="Day": GOSUB 274: IF K1$="" AND F1>0 THEN 95
00090 F1=VAL(K1$): IF F1=0 OR F1>31 THEN 89 REM F1=Day
00091 K2$="Month": GOSUB 274: IF K1$="" AND F2>0 THEN 95
00092 F2=VAL(K1$): IF F2=0 OR F2>12 THEN 91 REM F2=Month
00093 K2$="Year": GOSUB 274: IF K1$="" AND F3>0 THEN 95
00094 F3=VAL(K1$): IF F3=0 THEN 93 REM F3=Year
00095 RESTORE: FOR X=1 TO INT(F2): READ Z: NEXT X REM Check days
00096 DATA 31,28,31,30,31,30,31,31,30,31,30,31     REM in month and
00097 IF FRACT(F3/4)=0 AND F2=2 THEN LET Z=29      REM Allow for Feb.
00098 IF INT(F1)<=Z THEN 100  REM Invalid no. of days in month
00099 CURS 1,16: PRINT "***^DATE^ERROR^***";: PLAY 10,12: GOTO 89
00100 K0$=STR$(INT(F1)): K1$=K0$(;2)+"/"  REM Form date string
00101 K0$=STR$(INT(F2)): K1$=K1$+K0$(;2)+"/"
00102 K0$=STR$(INT(F3)): IF F3<10 THEN LET K1$=K1$+"0"
00103 K1$=K1$+K0$(;2): GOSUB 291: K2$="From/To": G=16: I=1
00104 GOSUB 274: IF K1$="" THEN LET K1$="Paid"
00105 GOSUB 291: K2$="Cheque/Receipt^No.": G=7: GOSUB 274
00106 IF X=2 THEN LET K1$="B'card" ELSE IF X=1 THEN LET K1$="Cash"
00107 GOSUB 291: K2$="Receipt^(R)^or^Payment^(P)"
00108 GOSUB 246: IF K1$<>"R" AND K1$<>"P" THEN 108
00109 GOSUB 309: GOSUB 322
00110 IF K1$<>"P" THEN 112
00111 M=P: IF M=1 THEN LET K1$="A": GOTO 114 ELSE GOSUB 328: GOTO 113
00112 M=R: IF M=1 THEN LET K1$="A": GOTO 114 ELSE GOSUB 331
00113 K2$="Category": GOSUB 246: X=X-64: IF X1 OR X>M THEN 113
00114 GOSUB 291
00115 G=9: I=0: K2$="Amount": GOSUB 274: GOSUB 262: IF X=1 THEN 115
00116 GOSUB 291: K2$="Next=<CR>^^Menu=M^^Re-do=R^": I=1
00117 GOSUB 246: IF K1$="R" THEN 87  REM Re-do?
00118 IF K1$<>"M" AND X<>128 THEN 117
00119 C=C+1: IF X=128 THEN 86 ELSE 3  REM Update file counter & loop
00120 REM
00121 REM ------------------ "Save" Routine ---------------------
00122 REM
00123 N=3: IF C=1 THEN LET N=1  REM If C=1 then allow Base Save only
00124 K5$="SAVE": GOSUB 231: IF K2$="" THEN 82  REM Drive/Filename
00125 q=0: ON ERROR GOTO 126: OPEN "I",6,K5$+".LGR": q=1 REM New File?
00126 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: IF q=0 THEN 129
00127 K2$="OVERWRITE^"+K5$+"^(Y/N)": GOSUB 246 REM Filename in use
00128 IF K1$="N" THEN 124 ELSE IF K1$<>"Y" THEN 127
00129 GOSUB 348: IF H=0 THEN DISKRESET "A": GOTO 3  REM Menu if invalid
00130 K0$=B0$(0): N=P: IF R>P THEN LET N=R REM is Base array counter
00131 CURS 0,12: PRINT [A24^32]; "Saving^"; K5$; [A33^32]: CURS 0
00132 OPEN "O",6,K5$+".LGR": OUT#6  REM Next line saves Header
00133 PRINT "'";K0$;"',";C;",";H;",";P;",";R;",";S;",";T
00134 IF H=2 THEN 136 ELSE FOR X=1 TO N  REM Save Base arrays
```

```
00135 PRINT B0$(X);",";B1$(X);",";B2(X);",";B3(X): NEXT X
00136 IF C<2 OR H=1 THEN 64  REM End if Base only
00137 FOR X=1 TO C STEP 3  REM Save File array
00138 PRINT A0$(X);",";A0$(X+1);",";A0$(X+2): NEXT X: GOTO 64
00139 REM
00140 REM ---------------- "Delete" Routine -------------------
00141 REM
00142 G=3: K3$="^file^to^be^deleted": K2$="First"+K3$ REM Get first
00143 GOSUB 274: o=INT(VAL(K1$)): IF o<1 OR o=>C THEN 142 REM Valid?
00144 M=o: GOSUB 292: GOSUB 252: IF K1$="N" THEN 3 REM Display file
00145 G=3: K2$="Last"+K3$+"^-^or^<CR>": i=1: GOSUB 274 REM Get last
00146 L=INT(VAL(K1$)): IF K1$="" THEN LET L=o REM Single file only
00147 i=0: IF L<o OR L=>C THEN 145 ELSE IF L=o THEN 149 REM Valid?
00148 M=L: GOSUB 292: GOSUB 252: IF K1$="N" THEN 145 REM Display file
00149 K3$="": Z=L-o+1: X=0: GOSUB 341: FOR X=L+1 TO C REMAdjust files
00150 A0$(o)=A0$(X): o=o+1: NEXT X: C-C-Z: GOSUB 360: GOTO 82
00151 REM
00152 REM ---------------- "Print" Routine --------------------
00153 REM
00154 G=20: i=1: H=1: K2$="String^search": GOSUB 274: K4$=K1$
00155 IF ASC(K4$)=35 THEN LET H=INT(VAL(K4$(;2))): K4$="#"
00156 IF H=0 OR H>C-2 THEN 154 REM Loop if invalid number in K4$
00157 K2$="Screen^(S)^or^Printer^(P)": GOSUB 246
00158 L=12: IF K1$="S" THEN 167 ELSE IF K1$<>"P" THEN 3
00159 GOSUB 322: K2$="PRINTER^Type:^": PRINT \\ SPC(15); K2$
00160 PRINT \ SPC(20) "Parallel^^^^^^-^^Key^1"  REM q is MicroBee
00161 PRINT SPC(20) "Serial^300bd^^-^^Key^2"    REM Printer port
00162 PRINT SPC(20) "Serial^1200bd^-^^Key^3"    REM allocation
00163 PRINT SPC(20) "Abort^-^^any^other^Key"    REM vector
00164 GOSUB 246: X=X-48: IF X<0 OR X>4 THEN 3
00165 L=57: q=X: IF X>1 THEN LET q=X+2  REM Adjust to port number
00166 GOSUB 245: OUT#0: OUT#0OFF: OUT#qON: PRINT  REM Printer on
00167 FOR X=1 TO 20: B4(X)=B2(X): B5(X)=B3(X): NEXT X REM Balance var's
00168 D=0: F3=0: F4=1: o=T: U=0: W=0: E=C+P+R+T+4
00169 IF K4$<>"" THEN LET E=C: o=1  REM If Search String defined
00170 G=1: K0$=KEY$: IF K0$="" THEN 173 ELSE PLAY 22,2  REM Key?
00171 IF K0$="A" OR K0$="a" THEN 216  REM Abort if Key <A>
00172 K1$=KEY$: IF K1$="" THEN 172  REM Wait for another key
00173 IF D>0 THEN 184 ELSE IF q>0 THEN 177  REM D is line counter
00174 REM Next line clears screen if D=0 & not using printer
00175 FOR X=3 TO 14: CURS1,X: PRINT [A64^32]: NEXT X: CURS1,3: GOTO 184
00176 REM Next 7 lines print page heading if D=0 & using printer
00177 D=2: PRINT "LEDGER:^^"; B0$(0); SPC(26-LEN(B0$(0)));
00178 K2$="^to^": IF S=0 THEN 181  REM Sorted?
00179 K0$=A0$(1): GOSUB 310: K2$=K1$+K2$ REM Print File#1 date
00180 K0$=A0$(C-1): GOSUB 310: K2$=K2$+K1$: PRINT K2$; REM Print last
00181 PRINT SPC(34-LEN(K2$)); "Page^"; F4: F4=F4+1 REM Print Page No.
00182 PRINT "No.^^^^^DATE^^^^TRANSACTION"; SPC(17); REM Print heading
00183 PRINT "CLASS"; SPC(16); "AMOUNT^($)": PRINT [A7^45]
00184 IF o=0 OR K4$<>"" THEN 194 REM If Search String or not at top
00185 U=U+1: IF U>P THEN 188 REM Base Cat's (Payments) printed?
00186 F1=B2(U): IF F1=0 THEN 185 REM Any Carried Forward?
00187 K0$=B0$(U): X=LEN(K0$): Z=0: GOTO 190
00188 W=W+1: F1=B3(W): IF F1=0 THEN 188 REM Receipts
00189 K0$=B1$(W): X=LEN(K0$): Z=11
00190 IF o=T THEN PRINT "^CARRIED^FORWARD:^^^"; ELSE PRINT SPC(20);
00191 IF q>0 THEN PRINT SPC(22); K0$; SPC(27-X-Z);
00192 IF q=0 THEN PRINT K0$; SPC(33-X-Z);
00193 o=o-1: PRINT [F10.2^F1]: GOTO 211  REM Print amount carried
00194 IF K4$="" OR K4$="#" OR o<>1 THEN 196
00195 PRINT \ SPC(10); "SEARCH;^"; K4$ \: o=0: G=3: GOTO 211
00196 M=H: IF K4$="" THEN LET M=H-T
00197 IF M<1 OR M>=C THEN 200 ELSE GOSUB 293  REM Print file
00198 IF M=0 THEN LET B5(N)=B5(N)+F1 ELSE LET B4(N)=B4(N)+F1
00199 GOTO 211  REM Add balance in file to BASE category
00200 IF K4$<>"" THEN 211  REM Goto 211 if Search string set
00201 M=M-C: IF M=0 THEN PRINT: GOTO 211  REM File End
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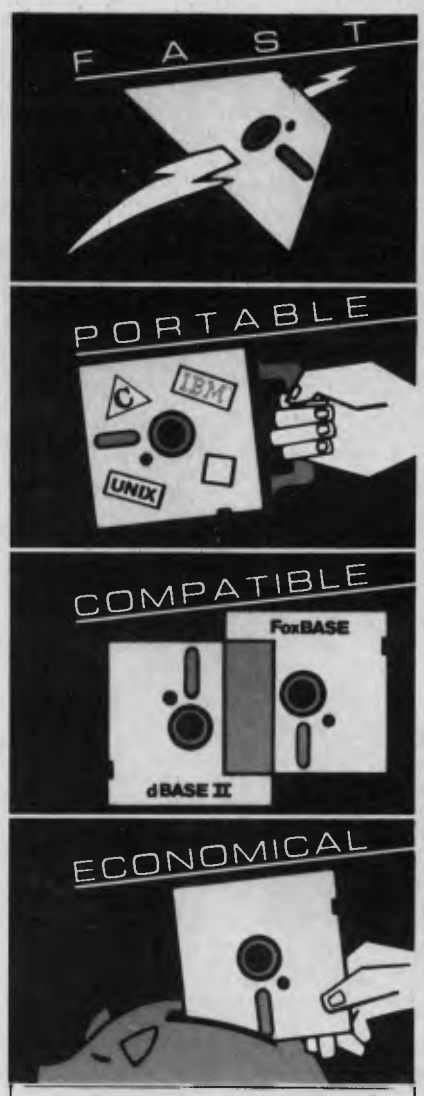

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LEDGERMASTER II

```
00202 IF M>P THEN 205 ELSE IF B4(M)=0 THEN 215  REM Payments
00203 PRINT SPC(20); B0$(M); SPC(22-LEN(B0$(M))); [F10.2^B4(M)]
00204 F3=F3-B4(M): GOTO 211
00205 M=M-P: IF M>R THEN 208 ELSE IF B5(M)=0 THEN 215  REM Receipts
00206 PRINT SPC(20); B1$(M); SPC(22-LEN(B1$(M))); [F10.2^B5(M)]
00207 F3=F3+B5(M): GOTO 211
00208 X=67: IF q=0 THEN LET X=51  REM Print total at end
00209 IF H=E OR H=E-2 THEN PRINT SPC(X+2); [A10^45]: G=1
00210 IF H=E-1 THEN PRINT SPC(X); [F11.2^F3]: G=1
00211 D=D+G: IF D<L THEN 215  REM L is Lines per page counter
00212 REM Delete next line if not using fan-fold paper
00213 IF q>0 THEN PRINT \\\\\\\  REM Perforation gap = 7 lines
00214 D=0: IF q>0 THEN 215 ELSE GOSUB 245: IF K0$="A" THEN 218
00215 H=H+1: IF H<=E THEN 170  REM Detect end of print run
00216 IF q>0 THEN OUT#qOFF: GOTO 218
00217 IF K0$<>"A" AND K0$<>"a" THEN GOSUB 245
00218 q=0: GOTO 3
00219 REM
00220 REM ---------------- "New Base" Routine --------------------
00221 REM
00222 GOSUB 252: IF K1$="N" THEN 3  REM Are you sure?
00223 i=1:G=24:K2$="New^Title":GOSUB 274: IF K1$<>"" THEN LET B0$(0)=K1$
00224 FOR Y=1 TO C-1: K0$=A0$(Y): X=SEARCH(K0$,"|",3): GOSUB 311
00225 o=ASC(K0$): GOSUB 310: Z=ASC(K0$)-64: GOSUB 310: F1=VAL(K0$)
00226 IF o=80 THEN LET B2(Z)=B2(Z)+F1 ELSE LET B3(Z)=B3(Z)+F1
00227 X=Y: GOSUB 341: NEXT Y: C=1: GOSUB 360: GOTO 79
00228 REM
00229 REM ---------- Drive/Filename Selection Sub. -------------
00230 REM
00231 POKE 257,1: K2$="Select^Drive?^(A/B/C)": GOSUB 246
00232 IF X<65 OR X>67 THEN LET K2$="": GOTO 235  REM A, B & C only
00233 DISKRESET K1$: K2$=K5$+": ^Filename": G=8: GOSUB 274
00234 K5$=K1$  REM Store Filename in K5$
00235 POKE 257,0: RETURN  REM POKE 257 forces Upper/Lower case
00236 REM
00237 REM ----------- Invalid File Reference Message -----------
00238 REM
00239 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: CURS 1,16 REM Close file
00240 PRINT [A63^32];: CURS 22,16: PRINT "<<<^NO^SUCH^FILE^>>>";
00241 CURS 0: PLAY 0,20: DISKRESET "A": K5$="": GOTO 82
00242 REM
00243 REM ---------------- "Key to Continue" Sub. ----------------
00244 REM
00245 K2$="KEY^to^Continue"  REM Accessed at Lines 245 & 246
00246 G=1: GOSUB 274: X=ASC(K1$)  REM Next line converts to upper case
00247 IF X>96 AND X<123 THEN LET X=X-32: K1$=CHR$(X)
00248 RETURN
00249 REM
00250 REM ---------------- "Sure (Y/N)" Sub. --------------------
00251 REM
00252 K2$="Sure^(Y/N)": GOSUB 246: IF K1$<>"N" AND K1$<>"Y" THEN 252
00253 RETURN
00254 REM
00255 REM ---------- "Previous Balance" Input Sub. ------------
00256 REM
00257 G=9: K2$="Balance^Forward": GOSUB 274: GOSUB 262
00258 IF X=1 THEN 257 ELSE RETURN  REM Loop if invalid amount
00259 REM
00260 REM ---------------- "Money Input" Sub. -----------------
00261 REM
00262 X=1: F1=VAL(K1$): IF F1<=0 AND i=0 OR F1=>1000000 THEN 265
00263 X=0: F2=FRACT(F1): F3=F1-F2+FLT(INT(F2*100))/100
00264 K1$=STR$(F3): K1$=K1$(;2)  REM Round off to 2 decimal places
00265 RETURN
00266 REM
00267 REM ----------------- "Category" Sub. ------------------
00268 REM
```

```
00269 G=12:K2$="Category"
00270 REM
00271 REM ------------------ Main Input Sub. ---------------------
00272 REM G = No. of Characters, i = Null allowed, K2$ = Prompt
00273 REM
00274 GOSUB 323: Y=LEN(K2$): CURS 1,15: PRINT [A64^45] [A63^32];
00275 X=V+1-C: IF X>V THEN LET X=V  REM Limit Free Files Counter
00276 CURS 1,16: PRINT K2$;: CURS 52,16: PRINT INT(FRE($)); "^:"; X;
00277 CURS Y+3,16: Z=0: K1$="": FOR X=1 TO G: PRINT "*";: NEXT X
00278 CURS Y+1,16: PRINT "?^";  REM Print Prompt Line
00279 K0$=KEY$: X=ASC(K0$): IF X=44 OR X=124 OR X=128 THEN 279
00280 IF X=8 OR X=127 THEN 285 ELSE IF X>13 THEN 283  REM B/S or DEL
00281 IF Z>0 THEN CURS 0: RETURN  REM End if <CR>
00282 IF i>0 THEN LET K1$="": RETURN ELSE 279
00283 Z=Z+1: CURS Y+Z+2,16: PRINT K0$;  REM Print input so far
00284 K1$=K1$+K0$: IF Z=G THEN RETURN ELSE 279  REM End of string?
00285 K0$=K1$(;1,LEN(K1$)-1): K1$=K0$  REM <DEL>ete key?
00286 IF Z>0 THEN CURS Y+Z+2,16: PRINT "*";: CURS Y+2,16: Z=Z-1
00287 GOTO 279
00288 REM
00289 REM ------------ "File Entry" Print Sub. -----------------
00290 REM
00291 M=C: GOSUB 309  REM M is File number
00292 GOSUB 322: PRINT "FILE:"
00293 IF K4$="" OR K4$="#" THEN 295  REM Implement search if active
00294 K0$=A0$(M): IF SEARCH(K0$,K4$)=0 THEN LET G=0: RETURN
00295 K0$=STR$(M)+".": K0$=K0$(;2): X=LEN(K0$) REM K0$=File No.
00296 PRINT K0$; SPC(4-X);: K0$=A0$(M): GOSUB 310  REM Date
00297 PRINT SPC(9-LEN(K1$)); K1$; "^";: IF q>0 THEN PRINT "^";
00298 GOSUB 310: PRINT K1$; SPC(18-X);  REM Item
00299 GOSUB 310: PRINT K1$; SPC(9-X);  REM Cheque/Receipt No.
00300 GOSUB 310: M=0: IF K1$="P" THEN LET M=11  REM Rec/Pay?
00301 IF q=0 THEN PRINT K1$; "^";  REM Don't print in full on VDU
00302 GOSUB 310: N=ASC(K1$)-64: K2$=B0$(N): IF M=0 THEN LET K2$=B1$(N)
00303 IF q>0 THEN LET X=LEN(K2$): PRINT K2$; SPC(16-X); ELSE PRINT K1$;
00304 GOSUB 310: F1=VAL(K1$): IF F1>0 THEN PRINT SPC(M); [F10.2^F1]
00305 RETURN
00306 REM
00307 REM ----------- Extract File Section Sub's. --------------
00308 REM
00309 A0$(C=A0$(C)+K1$+"|": RETURN  REM "|" delimits sections
00310 K1$="": X=SEARCH(K0$,"|"): IF X=0 THEN RETURN
00311 K1$=K0$(;1,X-1): K0$=K0$(;X+1): IF q>0 THEN LET X=X-1
00312 RETURN
00313 REM
00314 REM ------------ Extract Date Variables Sub. -------------
00315 REM
00316 K1$=A0$(X): F1=VAL(K1$): Y=SEARCH(K1$,"/")+1: K1$=K1$(;Y)
00317 F2=VAL(K1$): Y=SEARCH(K1$,"/")+1: K1$=K1$(;Y)
00318 F3=VAL(K1$): F4=100*F3+F2+F1/100: RETURN
00319 REM
00320 REM ------------- Print Screen Heading Sub. --------------
00321 REM
00322 CLS: PRINT K5$;: CURS 53,1: PRINT "by^L.R.Ford";
00323 CURS 16,1: INVERSE: PRINT "^*^Dreamcards^LedgerMaster^2^* "
00324 NORMAL: PRINT [A64^45];: RETURN
00325 REM
00326 REM ------------------ Print BASE Sub. -------------------
00327 REM
00328 GOSUB 322:PRINT"PAYMENT^CATEGORIES:^^(";B0$(0);")":K2$="Category"
00329 IF P=0 THEN RETURN  REM Payments
00330 FOR X=1 TO P: K0$=B0$(X): F1=B2(X): GOSUB 334: NEXT X: RETURN
00331 GOSUB 322: PRINT "RECEIPT^CATEGORIES:^^("; B0$(0); ")"
00332 IF R=0 THEN RETURN  REM Receipts
00333 FOR X=1 TO R: K0$=B1$(X): F1=B3(X): GOSUB 334: NEXT X: RETURN
00334 J=X+3: K=3: IF X>10 THEN LET J=J-10: K=35  REM Set cursor var's
00335 CURS K,J: PRINT CHR$(X+64); ".^"; K0$; SPC(13-LEN(K0$));
```

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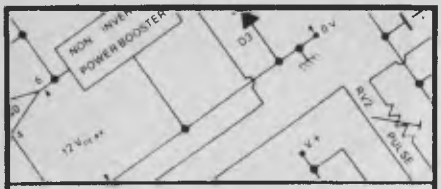

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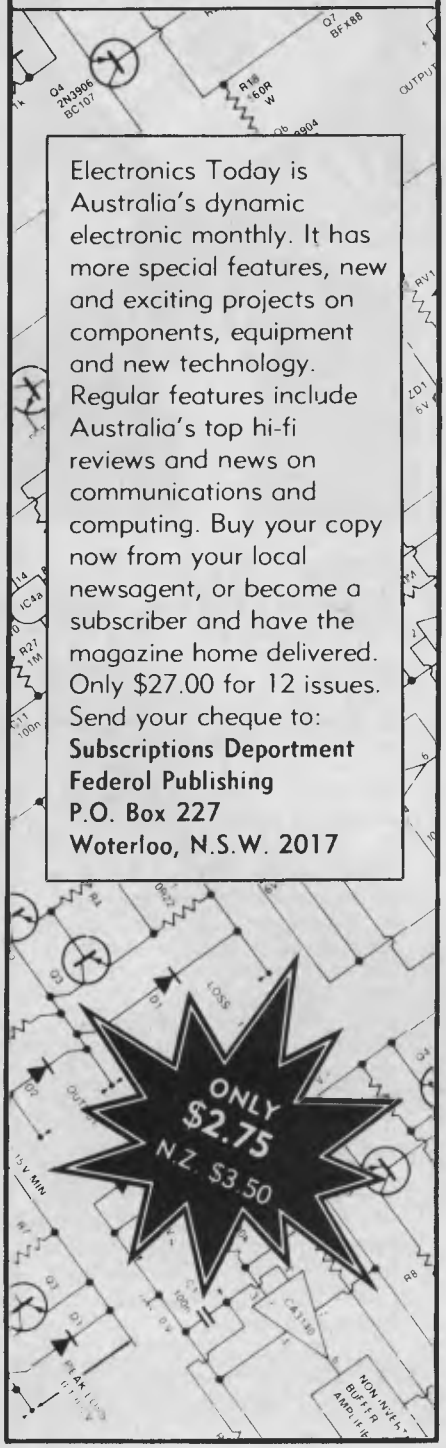
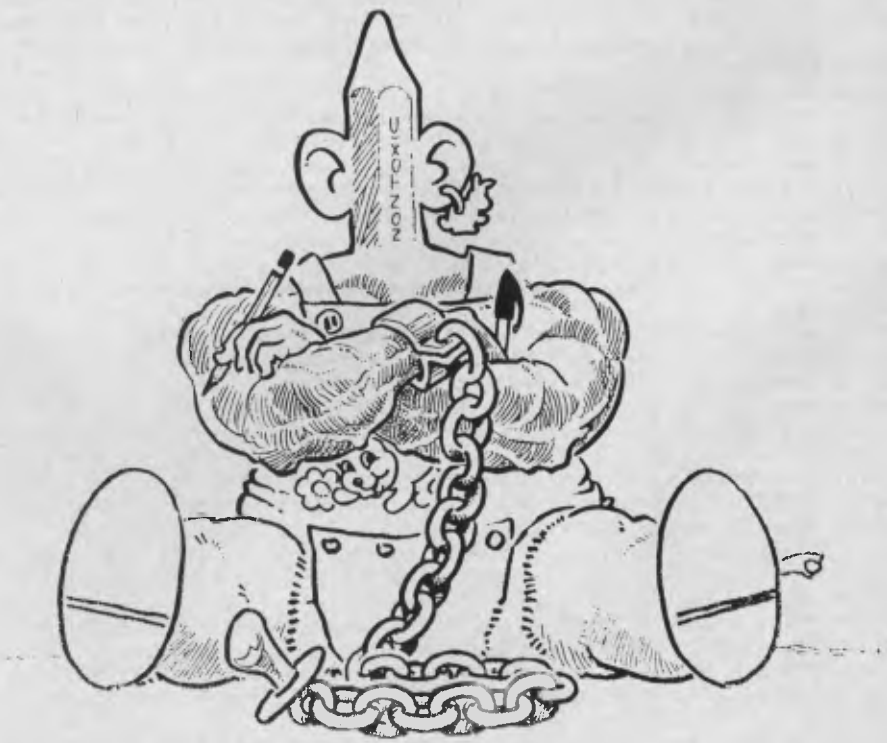



```
00336 IF F1>0 THEN PRINT [F10.2^F1]  REM Print any balance
00337 RETURN
00338 REM
00339 REM ---------------- "Counter" Print Sub. -----------------
00340 REM
00341 IF X>1 THEN 343 REM Don't re-print "WAIT" if Counter>0
00342 CURS 1,12: PRINT [A26^32] "*^WAIT^*" [A92^32]
00343 IF X>0 THEN CURS 28,13: PRINT [I4^X];  REM Print Counter
00344 CURS 0: RETURN
00345 REM
00346 REM ---------------- Save/Load Type Sub. ------------------
00347 REM
00348 K2$="Base^(1)": IF N>2 THEN LET K2$=K2$+",^Files^(2),^All^(3)"
00349 IF N>3 THEN LET K2$=K2$+",^Merge^(4)"
00350 GOSUB 246: H=INT(VAL(K1$)): IF H>N THEN LET H=0
00351 o=H: RETURN
00352 REM
00353 REM ------------- Initialise Arrays Sub. -----------------
00354 REM
00355 IF C=0 THEN 357  REM Print caution if existing ledger00356
      GOSUB 252: IF K1$="N" THEN RETURN  REM Sure?
00357 CLEAR: K5$="": V=320: STRS(V*51+1400)  REM V is Max. No. of files
00358 DIM A0(V+2),A1(V+2),B0(20),B1(20),B2(20)
00359 DIM B3(20),B4(20),B5(20): GOSUB 361: GOSUB 362
00360 FOR X=C TO V+2: A0$(X)="": NEXT X: K1$="": RETURN
00361 FOR X=Y TO 20: B0$(X)="": B2(X)=0: NEXT X: RETURN
```



Instruction Set

Mandelbrot II **66**

Subtitled 'Philsie's Guide to Achieving Practical Paisley', this is the sequel to last month's half-baked Mandelbrot recipe. Beautiful things can be achieved with plain mathematics, though you might have to bust the budget on processor power. Cooking time: approximately 65 hours in an 8088 oven preheated to 6 MHz.

PCs in Marketing **72**

After a mysterious break in the Marketing communications, we find Les "simulating reality on the computer". We're told this is not to be confused with being under "analysis", although he does ask an unusual number of "what if" questions. The key to the riddle lies in your spreadsheet.

C for Smarties **79**

Following Les on your path to programming expertise? Well, this month he's right into C expressions. Not the censorable, sailor-swears-at-his-mother type (this is still a family magazine — one copy goes to my brother, one to my mother, one to ...) but the linguistic expressions without which you wouldn't C a thing.

Structured Programming — Part 11 ..... **83**

Phil is still caught up with phone book notation, trying to list all the long-winded variable names in order of mathematical niceness. He thinks it's 'interesting' that we know exactly how many names we're dealing with (but, of course, he's not giving that sort of data specification away). WHILE he's probably NOT EOF loopy, we think his idea of fun is BASICally rough as guts.

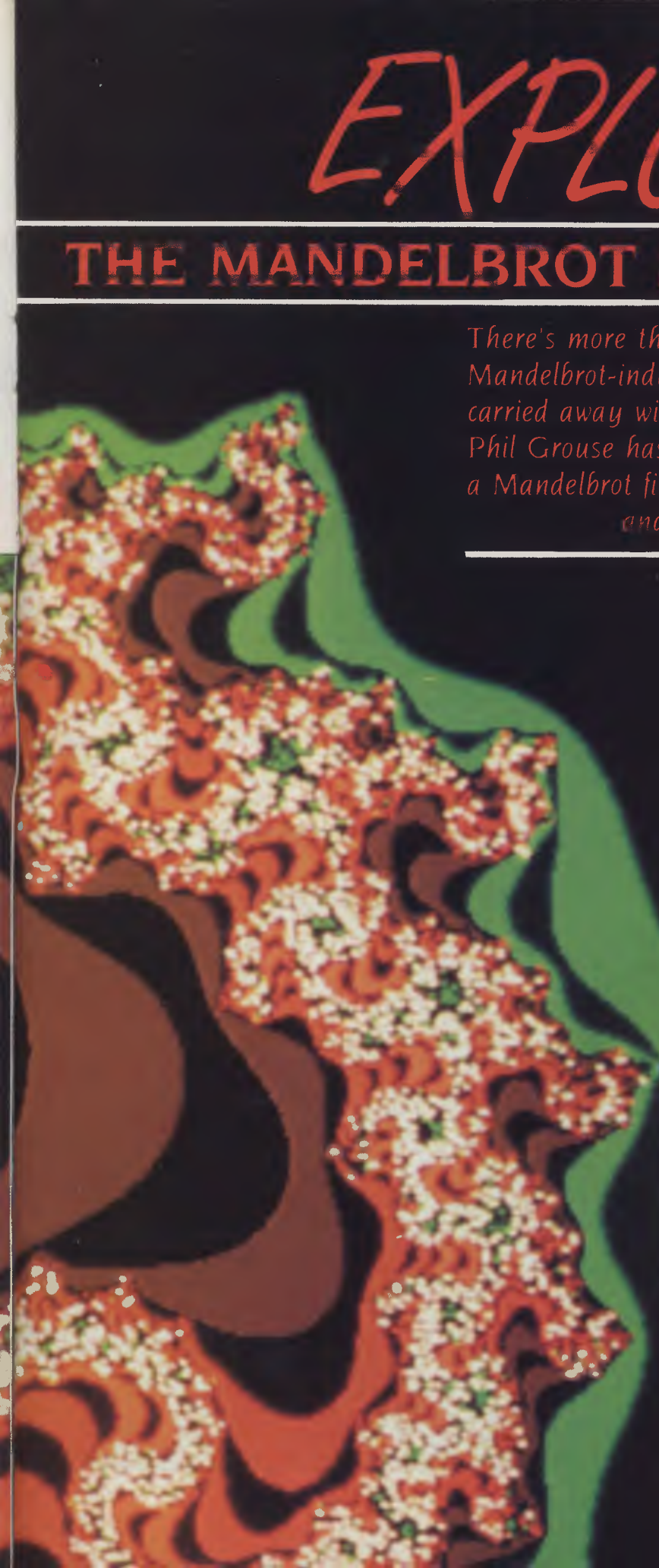
Do the Logomotion **88**

Choo-choo, choo-choo cha-boogie — the grand turtle Papert started the craze, irreverent apprentice turtle, Teensy Tim, gives it to you step by step, trailing some simply amaaaayzing patterns as he goes.

EXPLORING

THE MANDELBROT SET — Part 2

There's more than a hint of paisley in this month's Mandelbrot-induced graphics. You, too, can get carried away with mathematical pictures, now that Phil Grouse has supplied the program for displaying a Mandelbrot file on the RGB screens of IBM PC and PC-compatible micros ...



IN JANUARY, we began a discussion of a particular branch of fractal geometry known as the Mandelbrot Set. I predicted then that it would provide the same kind of fascination (and, therefore, massive consumption of computer time) as Conway's *Life Game*. It seems I wasn't far off the mark. Mandelbrot pictures are popping up in the most unlikely places, mainly those with mainframe computers and multi-user systems. It seems the excitement has struck certain New South Wales universities and governmental research organisations, and no doubt many private organisations have noted an unusual slowing down of response times and unduly long file update operations. Wonder why?

THE MANDELBROT SET

This month, I've included a BASIC program for displaying a Mandelbrot file on the RGB screen of an IBM PC (the program for generating such files was published in January). I've also provided an improved version of that program, and another one written in C with a somewhat different approach. In fact, I have difficulty managing the various Mandelbrot programs and files which have been spawned during the past few weeks, and have to keep a diary describing the programs, their related files and intended usage.

The program in Listing 1 is for IBM (or Microsoft) advanced BASIC. If you can compile it, so much the better. It's painfully slow, but the logic is right. If I get a chance, I'll do it again in 8088 Assembler and publish it.

The computer used is a Compupro System 8/16 called Cassius, and he's been promised an 80286 and colour-co-ordinated 80287 for Mandelbrot-type number crunching. Cassius is no sloucher, but the file generator takes about four days to complete!

Sperry Country

The program assumes you have an RGB monitor. Since we're using a screen mode with 320 by 200 pixels, BASIC allows us only four separate colours and a choice of two fixed palettes, which is restricting. We've been fortunate enough to have access to a Panafacom Duet-16 with four times that resolution and 16 colours; we used the Panafacom for January's picture. This month, we have access to a Sperry PC, which has the same resolution as the Panafacom, but with a palette facility. Up to 255 different colours can be displayed on the Sperry, but only 16 at a time. (This choice of computer should please some of our Queensland readers — Sperrys abound in that country.)

100 Display Picture: Procedure

As I indicated in the first part of this series, trimming the least significant bits of the COUNT value is a bit rough. The resulting range (0 to 15) doesn't always provide pleasing results. A better move is to form a massive file, with all the detail, which can subsequently be used to establish more suitable files for picture creation.

Just to show how polylingual we are, Listing 2 is a C program which creates a monstrous 500 Kbyte file. It outputs a single 16-bit word for each pixel in a 'screen' with 640 columns and 400 rows, which happens to match the Panafacom and the Sperry nicely, but is four times larger than the IBM PC can handle. I wanted to show you some really elegant pictures while these particular beasties were here — hence the program. Each word in the file contains a value of COUNT in the range 0 to 511 — just one bit too big for a byte per pixel, which is of no concern to us, since

```
110 'Display screens from Mandelbrot file.
120 '
130 WID%=320: DEPTH%=200
140 DIM P$(DEPTH%),C(15)
150 INPUT 'Name of input file ';N$
160 OPEN N$ AS #1 LEN=WID%/2
170 FIELD #1, WID%/2 AS A$
180 GOSUB 360:   'LoadFile
190 WHILE Z$ <> "Q" OR Z$ <> "q"
200     SCREEN 0 'Text mode
210     INPUT "Which palette (0 or 1)";PAL
220     FOR K% = 0 TO 15
230         PRINT 'Colour (0 to 3) for value ';K%;
240         INPUT C(K%)
250     NEXT
260     SCREEN 1 'graphics mode
270     KEY OFF
280     COLOR 0,PAL   'Black background
290     GOSUB 590:   'Show
300     GOSUB 480:   'Await
310 WEND
320 'End of procedure DisplayPicture
330 END  :REM End of main program
340 '
350 '
360 'LoadFile: Procedure
370 'Load named file into P$ array
380 '
390 FOR M%=1 TO DEPTH%
400 'Each element of P$ is a 160 byte string = 320 nybbles
410     PRINT".";
420     GET #1 'A$ is 320 items
430     P$(M%)=A$
440 NEXT
450 RETURN
460 '
470 '
480 'Await: Procedure
490 'Wait for a keystroke.  "Q" means quit.
500 '
510 BEEP
520 Z$=INKEY$
```

we're using a hard disk system with a fair bit of room.

The computer used is a Compupro System 8/16 called Cassius, and he's been promised an 80286 and colour-co-ordinated 80287 for Mandelbrot-type number crunching. Cassius is no sloucher, but the file generator takes about four days to complete! It runs in background mode under Concurrent PC DOS, so you can use the machine for other purposes while it crunches away. You can do exactly the same thing if you have an IBM PC XT or equivalent under Concurrent DOS, but if you run ordinary DOS you'll need to find something else to do for a week or so. I've excluded statements which adjust the priority of the process and other nasty DOS things, since we don't want to be too system-dependent. The putw call at the end of the program listing writes out a single 16-bit word containing COUNT to the file OFILE (which you nominate as a parameter when invoking the program). We compiled it under Computer Innovation's C86 system.

To inject some order into this rapidly proliferating program area, we'll refer to the 32 Kbyte picture files as 'Class 1' files. They suit the IBM PC — they have 320 by 200 pixels, and each 16-bit word in the file holds four COUNT values (each as a nibble in the range 0 to 15).

We'll call the 500 Kbyte file produced by the program in Listing 2 a 'Class 2' file. If we had a machine with 640 by 400 pixels capable of 512 colours, we could use all the information in the file for picture display purposes. Alas, although we have the desirable resolution with the Sperry (the Panafacom having moved on), we can only display 16 different colours. Somehow, we now need to map the pixel values from the range 0 to 511 to the smaller range of 0 to 15.

Before throwing away too much detail, we reduced the file size by a factor of two, using a 'shrinking' program. By halving each value and ignoring the remainder the file can be fitted into one byte instead of

```
530 WHILE LEN(Z$)=0
540     Z$=INKEY$
550 WEND
560 RETURN
570 '
580 '
590 'Show: Procedure
600 'Do the actual display of Depth% rows
610 '
620 FOR M%=1 TO DEPTH%
630     FOR N%=1 TO WID%/2
640         'For each byte plot 2 points
650         Q$=MID$(P$(M%),N%,1):A%=ASC(Q$):B%=INT(A%/16):C%=A%-16*B%
660         PSET(2*N%-1,M%),C(B%)
670         PSET(2*N%,M%),C(C%)
680     NEXT
690 NEXT
700 RETURN
```

Listing 1. *The Advanced* BASIC *(for* IBM PCs *with an* RGB *monitor) program for displaying 32 Kbyte Mandelbrot picture files. The listing was generated from flowblocks by Stylus.*

```
#include 'stdio.h"
#define null 0

int limit, wid, depth;
double acorner, bcorner, side, gap;
FILE *ofile;

main(argc,argv)
int argc;
char **argv;
{
        printf("Opening Mandelbrot picture file ...\n");

        if(argc != 2) abort("Usage: mandel filename");

        if((ofile = fopen(argv[1],"wb")) == null)
                abort("Could not open data file");

        limit = 512;  /* Max number of iterations */
        wid = 640;    /* Pixels across screen     */
        depth = 400;  /* Screen depth in pixels   */

/* The following is a really interesting area */
        acorner = -0.845;
        bcorner = 0.224355;
        side = 0.0014;
        gap = side / wid;
        printf("Gap is %9.8f\n",gap);

/*      bdos(145,204);  Down priority to 204 */
/*      bdos(147,0);    Detach from console */

        generate();
        fclose(ofile);
}

generate(){

        int m,n,count;
        float ac, bc,i,j,k,az,bz;

        for(m = 0; m < depth; m++) {
                for(n = 0; n < wid; n++) {
                        ac = n * gap + acorner;
                        bc = m * gap + bcorner;
                        az = bz = i = j = k = count = 0;
                        while (count < limit & i+j <=4) {
                                az = ac + i - j;
                                bz = bc + 2 * k;
                                count++;
                                i = az * az;
                                j = bz * bz;
                                k = az * bz;
                        }
                putw(count,ofile);
                }
        }
}
```

Listing 2. *A C program for creating highly detailed picture files. A screen of 640 by 400 is assumed, but the file may be used to generate 'standard' 32 Kbyte files for the* IBM PC. *Play around with different values for acorner, bcorner and side — if you have the computer time. The program file is* MANDEL.C.

two. The program in Listing 3 does that. It's written in PL/I-86, but you can redo the logic in BASIC, if you put your mind to it. We call the 250 Kbyte file which it creates a 'Class 3' file. The beauty of a Class 3 file is it fits on a floppy disk, which is important if you want to transfer the file to another machine (apart from using comms). The loss of the least significant bit doesn't seem to matter much, so it's worth doing.

Our next program uses an ad hoc algorithm to reorganise the pixel values in a Class 3 file. Since the Sperry can only handle 16 colour values, the MASK program crams the Class 3 range of 0 to 255 into 0 to 15. The resulting file still uses one byte per pixel, and it still has 640 by 400 elements. We call it a 'Class 3a file'. The final program (in Listing 5) extracts 320 by 200 subsets from a Class 3a file and generates a Class 1 file to suit the IBM PC. These can then be displayed using the BASIC program in Listing 1.

Files in form Class 3a are suitable for display on the Sperry, since it can support the additional resolution. The program which was used to display the pictures accompanying this article will be published later.

Finally, if your language isn't PL/I (and why not?), try your hand at converting these rough diamonds into works you'll be proud of. For starters, try speeding up the program in Listing 1. □

```
Shorten:
    proc options(main),;
/* Reduce 500 Kbyte Mandelbrot picture file to 250 Kbytes */
dcl
        (in,out)        file,
        eof             bit,
        (rec,rec2)      char(128);
/* The input and output files are named when invoking the program */
open file(in) sequential keyed env(f(128)) title('$1.$1');
open file(out) output sequential keyed env(f(128)) title('$2.$2');
eof='0'b;
on endfile(in) eof='1';
read file(in) into(rec);
    do while(~eof);
    Call Emit(1);
    read file(in) into(rec),
    Call Emit(65);
    write file(out) from(rec2),
    read file(in) into(rec),
    end;

Emit:
    proc(n);
/* Emit 64 bytes from position n following */
dcl
        n,
        z2      char(2),
        z       char,
        j       based(p),
        p       ptr,
        i,k;
p=addr(z2),
k=n;
put edit('.')(a);
    do i=1 to 127 by 2;
    z2=substr(rec,i,2); /* sets j also */
    j=j/2;  /* discard least signif. bit */
    z=ascii(j); /* now fits into 8 bits */
    substr(rec2,k,1)=z;
    k=k+1;
    end;

end Emit;

end Shorten;
```

Listing 3. A PL/I *program to generate a shorter* (Class 3) *file* (250 K*bytes*) *from a* Class 2*file*.

```
mask:
        proc options(main);
/*  This program translates a 250 Kbyte class three file into a
*//* 250 Kbyte class 3a file. The translation scheme sets odd
*//* values (less than 66) to zero. Otherwise the following  */
/* table applies:                                             */
/*                                                           */
/*     0 - 24      becomes     0                             */
/*    26 - 28          "       1                             */
/*    30 - 32          "       2                             */
/*             .   .   .                                     */
/*    62 - 64      becomes    10                             */
/*      66 +           "       11                            */
/*      80 +           "       12                            */
/*      90 +           "       13                            */
/*     100 +           "       14                            */
/*     120 +           "       15                            */
/*                                                           */
/* Other schemes may be better for denser regions.           */



dcl
        (in,out)        file,
        eof     bit,
        z       char,
        rec     char(128),
        i,j,k;
open file(in) sequential keyed env(f(128)) title('$1.$1 );
open file(out) output sequential keyed env(f(128)) title('$2.$2'),
eof='0'b;
on endfile(in) eof='1'b;
read file(in) into(rec);
        do while(~eof);
                do i=1 to 128;
                z=substr(rec,i,1);
                j=rank(z);
                k=convert(j);
                z=ascii(k);
                substr(rec,i,1)=z;
                end;
        write file(out) from (rec);
        read file(in) into(rec),
        end;

convert:
        proc(j) returns(fixed);
dcl
        j,k;
/* Perform translation of j to k */
if j>=120 then k=15;
else if j>=100 then k=14;
else if j>=90 then k=13;
else if j>=80 then k=12;
else if j>=66 then k=11;
else if j~=2*floor(j/2) then k=0;
else k=floor((j-2)/4)-5;
return(k);
end convert;

end mask;
```

Listing 4. *This* PL/I *program converts a* Class 3 *picture file into a* Class 3a *file suitable for input to the* EXTRACT *program in* Listing 5.

```
extract:
        proc options(main);
/* Accepts a 250Kb masked input mandel file as a byte */
/* sequence of pixels in range 0-15.  Accepts a corner */
/* defining a sub-rectangle of 320 by 200 in the main  */
/* 640 by 400 of the input file.  If acceptable, the   */
/* output file is created in class one form.           */
dcl
        (in,out)        file,
        Row(640)        fixed(7), /* One row of 640 bytes */
        OutRow(1280)    fixed(7), /* 4 rows of 320 bytes */
        OutRec(320)     fixed,    /* 64o byte record for 4 rows */
        i               fixed,
        (r,c)           fixed;

open file(in) sequential keyed env(f(640)) title('$1.$1');
open file(out) output sequential keyed env(f(640)) title('$2.$2');
put edit
('This program extracts a 32o by 200 mandel picture from',
 'the first file and creates a YC-type picture file. The',
 'input file is 250 Kbytes, the output file is 32 Kbytes long.',
 ' ','Specify the bottom top corner of the extracted box.',
 'The row must lie in the range 0:200 and the column in 0:320.',
 'Row and Column? ')(skip,a);
get list(r,c);
        do while(c<0 | c>320 | r<0 | r>200);
        put edit('Range error!  Try again. ')(skip,a);
        get list(r,c);
        end;

/* skip the first r 640 byte rows in the input file */
i=r;
        do while(i>0);
        call ReadRow;  /* skips a row */
        i=i-1;
        end;

/* Now use the next 200 rows */
        do i=1 to 50;/* each 4 rows of 320 pixels */
        call ReadRow; /* sets up the Row array */
        call SetRow(1);  /* sets 1st lot of 320 bytes */
        call ReadRow;

        call SetRow(321);
        call ReadRow; /* 3rd row */
        call SetRow(641);
        Call ReadRow;
        Call SetRow(961);
        call WriteRow; /* emit as 4 160 byte Rows */
        end;

ReadRow:
        proc;
/* reads next 640 bytes into Row */
read file(in) into(Row);
end ReadRow;

SetRow:
        proc(n);
/* puts 320 bytes at start of OutRow array */
dcl
        n,i;
        do i=c+1 to c+32o while(i<=640);
        OutRow(n+i-c-1)=Row(i);
        end;
end SetRow;

WriteRow:
        proc;
/* writes out the 4 rows in OutRow(1 to 1280) from OutRec */
dcl
        i;
        do i=1 to 320; /* each word of OutRec */
        OutRec(i)=Merge(Outow(4*i-3),OutRow(4*i-2),OutRow(4*i-1)
        ,OutRow(4*i));
        end;
write file(out) from(OutRec);

Merge:
        proc(a,b,c,d) returns(fixed);
dcl
        (a,b,c,d)       fixed(7),
        (a8,b8,c8,d8)   bit(8),
        (a4,b4,c4,d4)   bit(4),
        b16             bit(16),
        i;
/* Assemble and return a 16 bit word from the 4 nybbles */
a8=unspec(a); b8=unspec(b); c8=unspec(c); d8=unspec(d);
a4=substr(a8,5,4);
b4=substr(b8,5,4);
c4=substr(c8,5,4);
d4=substr(d8,5,4);
b16=c4||d4||a4||b4;
unspec(i)=b16;
return(i);
end Merge;
end WriteRow;
end extract;
```

Listing 5. *This PL/I program selects a sub-screen from the 640 by 400 area in a Class 3a file, and produces a Class 1 file for display on the* IBM PC.

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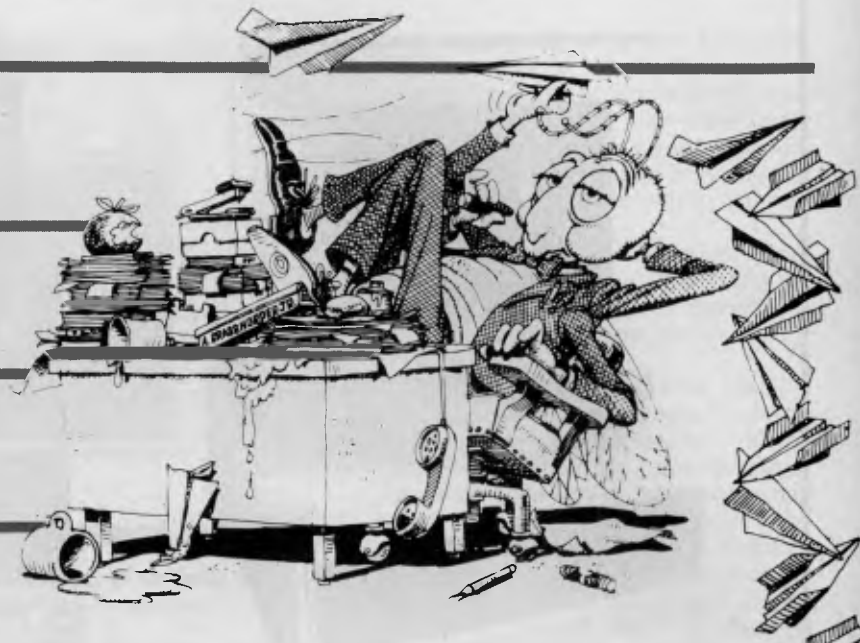
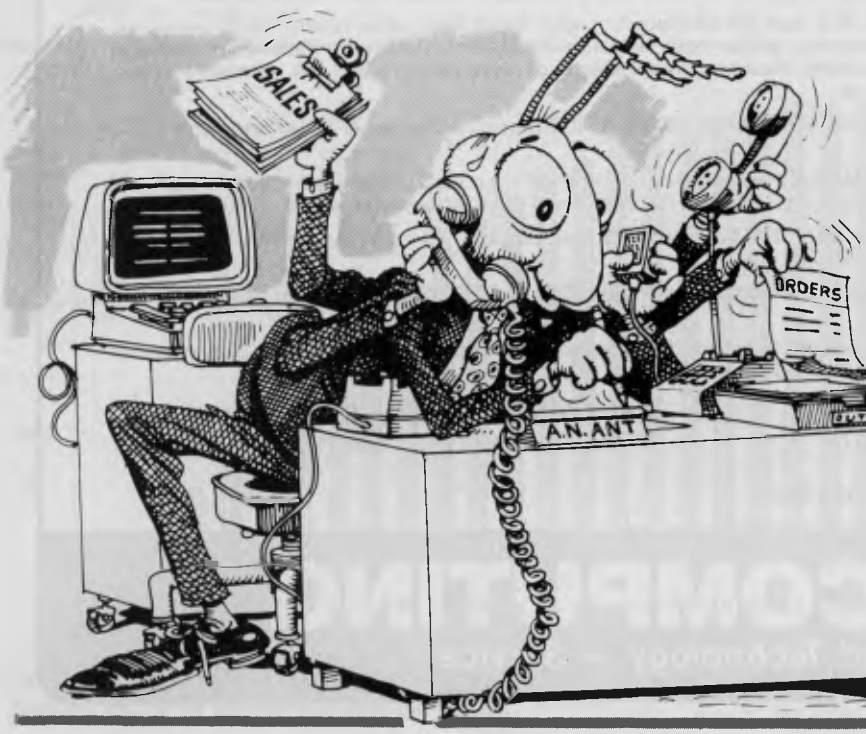


Les Bell gets into sampling instant coffee while discussing modelling techniques in marketing, and takes a brief but favourable look at the new Framework II.



THIS MONTH I want to look at some simple techniques for modelling marketing situations using a spreadsheet. I will look first at a situation involving a static market.

Modelling is a technique for simulating reality on the computer, and is not to be confused with analysis, where current data is used to ascertain the factors which account for performance. Models are set up on the basis of these factors and questions about future performance are answered — the classic 'what-if' case for which spreadsheets are particularly powerful.

Let's start by looking at a simulation of the introduction of a new product into a static market. In this situation, a new product generally can't hope to attract consumers by increasing the total market, and must rely upon drawing consumers

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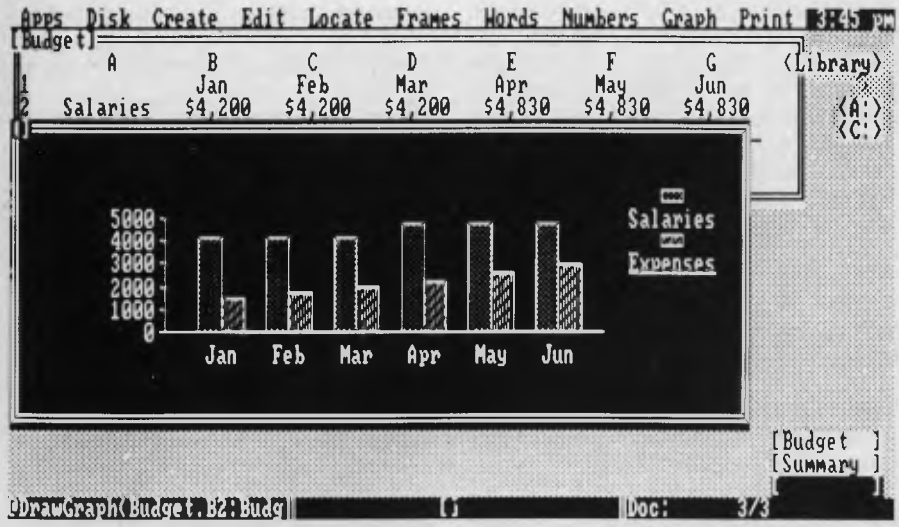


Framework II, *with its strong analytical capabilities, is an almost ideal tool for marketing practitioners. It is also excellent for the preparation of reports, models and presentations.*

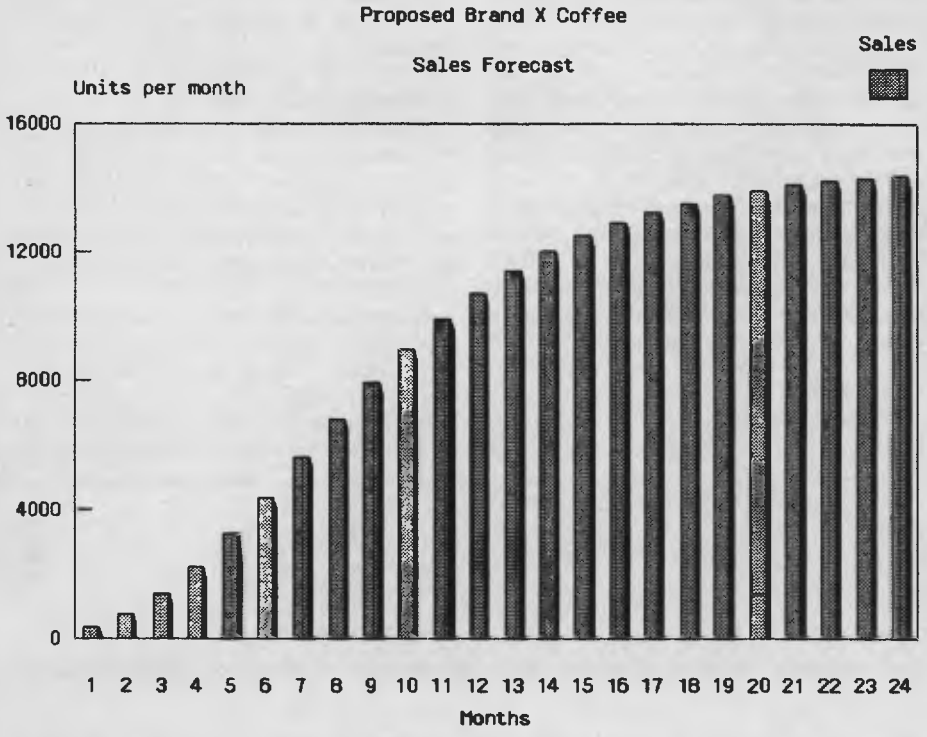
away from other brands. Take, for example, the instant coffee market — it's hard to imagine that more people could drink instant coffee, other than through natural population growth.

If you were contemplating the introduction of a new brand of instant coffee you would probably start your researches by taste-testing your product against competitive brands, ascertaining the probability of consumers switching brands. From this we can construct a simple model of buyer behaviour by creating a brand-switching matrix, showing the probability of a consumer switching from his current brand to one of the others on the market.

Multiplying this by the sales for each brand will produce the sales potential for the new product (assuming all consumers who are not loyal to some other product can be persuaded to switch to the new one).

Setting up a spreadsheet model of the expected sales is simple. I have used the instant coffee market as an example — the brand names and statistics in Figure 1 are fictitious.

The brand-switching matrix example was set up by simply entering the brand names in both rows and columns. The figure at each intersection is the fraction of consumers who would switch from one brand to another. I've inserted the monthly sales figures for each brand at the end of the spreadsheet. Multiplying each brand's sales by the fraction of consumers who would switch to the new brand (Brand X) and summing these figures gives the sales potential for Brand X.



Multiplying the sales-potential figures by the 'Gompertz factor' produces a sales forecast for the 24 months following the launch.

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To enter this model into a spreadsheet, go to cell B1 and enter the name of the first brand, move across to cell C1 and enter the next brand, and so on across to F1, the new brand.

Move to A2 and repeat the brands down that column. The brands listed down the page are called the 'away' brands, while those listed across the page are known as 'to' brands. Now in B2 enter the fraction of consumers who are considered loyal to the first brand; the fraction who would switch to the next brand in C2, and so on, until you've completed the entire matrix. Column G can be used to contain the sum of each row (a formula of @sum(B2:F2) or similar), which should add up to 1 if all consumers are accounted for.

We can now enter the actual sales figures for the brands currently on the market in column H. Enter the label 'Current Sales' in H1, and the sales figures for the different brands in the column beneath that. In the next column (I), we calculate the loss of each brand to the new product by the formula +F2*H2, copied down to +F5*H5. In cell I7, we can calculate the total sales potential, @sum(I2:I6).

You should discover why no new instant coffees have been released onto the market in the last few years: it's difficult to achieve a good market share in a static market dominated by a few brands.

However, we can't hope to achieve 100 per cent of the potential immediately after the product launch! It's much more likely that sales will follow an S-shaped curve, starting slowly at first, then gaining momentum and slowing down again as it becomes more difficult to attract the remaining potential buyers.

Such a curve can easily be modelled on a spreadsheet, and is called a 'Gompertz Curve'. It follows the equation

$$y = cab^x$$

The Gompertz Curve is quite applicable to marketing. Kotler points out that it represents the relationship between marketing effort and results, although most people intuitively understand it as the 'law of diminishing returns'. It's also used as a model of a demand function.

To create a Gompertz curve select three cells on the spreadsheet to contain the values for a, b and c (values between 0 and 1 for a and b, and of 1 for c work best); create a row of month numbers, say 24 for a two-year forecast; and beneath that insert the equation and copy it across the spreadsheet.

Having generated a Gompertz curve with values between zero and one we can multiply the sales potential figures by the 'Gompertz factor' to generate a sales forecast. The values of a and b will have to be derived by trial and error; the lower the value of a, the more 'S' shaped the curve will be, and the lower the value of b, the faster it will peak.

Experimenting with this spreadsheet (or small set of spreadsheets) will show how a small model can be constructed to provide insight into processes such as product launches. For example, what will be the effect if a competitor launches a campaign which reduces the number of consumers you can switch away from them? Plug in the appropriate value to find out.

Framework II

I worked through this example on my Lisa the first time, but since not too many marketing people have Lisas I decided to repeat the exercise on the IBM PC. Simultaneously, a 'new' integrated software package, Framework II, arrived in the office for evaluation.

Framework II is almost identical to its predecessor, although it has several enhancements, such as the provision of support for the Intel Above Board (an add-on extended memory board which allows up to 4 Mbytes of memory to be installed in a

	Newcafe	Copper B	Rich Roa	Gold Pot	Brand X	Total	Current Sales	Loss to
Newcafe	.8	.04	.04	.05	.07	1	50000	3500
Copper B	.03	.75	.05	.04	.13	1	40000	5200
Rich Roa	.04	.02	.8	.04	.1	1	32000	3200
Gold Pot	.02	.04	.02	.85	.07	1	40000	2800
Brand X	.02	.02	.03	.04	.89	1	0	
							Sales Po	14700

Month	1	2	3	4	5	6	7	8	9	10	11
Sales	369.2473	771.4671	390.9692	229.0373	250.5544	395.7135	596.1196	788.4877	922.8588	965.3869	897.3431	0712.

a	b	c
.01	.8	1

x	1	2	3	4	5	6	7	8	9	10	11
G(x)	.0251189	.0524807	.0946237	.1516352	.2211261	.2990281	.3806884	.4618019	.5389699	.6098902	.6732887

Framework is an almost ideal tool for marketing practitioners: its analytical capabilities are very strong, and it is also excellent for the preparation of reports, models and presentations.

PC). This memory can't be used by all programs; it can only be used as a RAM disk drive or spooler or by programs which are specially written to use it. It's especially significant in the case of a big program such as Framework II, which leaves relatively little memory, even in a 640 Kbyte PC, for file workspace.

Now re-packaged as a spreadsheet with a neat word processor attached, Framework still combines most of the functions used in executive decision support. Spreadsheet, graphics, database, word processing and communications are all bound together by an outline processor and a powerful programming language.

The Framework spreadsheet now supports the 8087 numeric data processor and uses sparse-matrix techniques to increase spreadsheet size. Spreadsheets and databases are now larger when initially created — the older Framework gave the impression it could only deal with small sheets. As spreadsheets go, this one is more than adequate; I can imagine very few situations which would be beyond its capabilities.

Even if you have limited memory and want to build a large spreadsheet, Framework supports a virtual-memory scheme on a hard disk. At the price of speed, you can have space. Framework's graphics are more than adequate for most marketing-oriented work, with the exception of presentation graphics, for which you should use Grafix Partner or a full package, such as Execuvision. However, Framework is fine for internal use, graphs for meetings, and the like.

The word processor is more than adequate for the vast majority of applications, particularly for the composition of reports which consist of multiple sections. Framework's outline processor enables you to combine separate chapters, each of which may contain a mixture of text, spreadsheet and graphics.

In this example, I was able to create separate frames for the sales forecast and the Gompertz curve spreadsheet, allowing the latter to be used in several different applications. A third frame contains the sales forecast as a graph. Using Framework's re-calculation feature to calculate all the frames together provides instant updating.

Framework is an almost ideal tool for marketing practitioners. Its analytical capabilities are very strong, and it is also excellent for the preparation of reports, models and presentations. Its built-in FRED programming language can be used to implement small information systems, such as sales prospect tracking systems and correspondence management.

Incidentally, Ashton-Tate has now entered the publishing business in a big way, both with books on general topics and specific support material for its products. Among the company's recent releases is *Framework; On-the-Job Applications*, which describes applications for the package in a number of different areas of business including personnel and marketing management, operations management, budgeting, and accounts receivable. The book has more than a hundred pages of FRED source code, and the marketing examples include an advertising media-analysis system. □

Figure 1: *Spreadsheet model of expected sales.*

12	13	14	15	16	17	18	19	20	21	22	23	24
1911412.	1212004.	84[illegible]	[illegible]	12912.	86[illegible]	1325213529.	7113756.	0713939.	8814088.	6914208.	8814305.	7814383. 77

12	13	14	15	16	17	18	19	20	21	22	23	24
7287206.	7763344.	8166558	[illegible]	[illegible]	9014964.	9203885.	9357869.	9482909.	9584142.	9665907.	973182.	9784875

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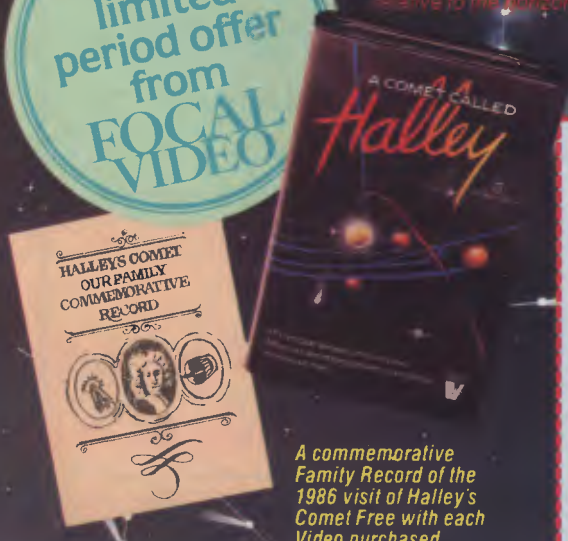

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C FOR SMARTIES
PART 5

You should C Les Bell's expression when he's programming — positively beatific, it is. And once he gets into assignment versus equality, you'd think he was bound for South Africa. But for those who are here to learn C programming, he also has a lot of useful information on expressions.

AN EXPRESSION is a series of tokens — such as variable names, operators and functions — which is evaluated to produce a value. In C, everything is an expression.

The best way to think of an expression is as everything that could go on the right hand side of an equals sign. This will also help you assess whether an expression is well-formed or not. Previous experience in virtually any programming language gives programmers an almost instinctive feel for what is a well-formed expression.

So, for example, the character sequence

```
32 * f * f
```

is an expression, since you could write the statement

```
v = 32 * f * f;
```

In C, however, that statement is itself an expression; generally, the compiler throws away the result, but it can be used, as in the statement

```
x = y = v = 32 * f * f;
```

If f = 2, the expression

```
v = 32 * f * f;
```

produces a result of 128, so that the statement

```
y = v = 32 * f * f;
```

stores 128 into the variable y. But this statement is in turn an expression, the result of which can be used.

An Exercise

This program calculates an expression. What will it print?

```
main()
{
    int x,y,v,f;
    f = 2;
    x = y = v = 32 * f * f;
    printf("x = %d, v = %d\n",x,v);
}
```

Add a line near the beginning:

```
v = 127;
```

and change the next line to read

```
x = y = v == 32 * f * f;
```

The program now looks like this:

```
main()
{
    int x,y,v,f;
    v = 127
    f = 2;
    x = y = v == 32 * f * f;
    printf("x = %d, v = %d\n",x,v);
}
```

Now what will the program print?

The reason for this is that the double equals sign (==) is the equality test operator in C, and is not involved in assignment. So what the modified program does is to compare v with 32 * f * f, then store the result into y and then x. If v is equal to 32 * f * f, then that expression evaluates to true, which in C is the value 1. If the two are not equal, the expression is false, and x ends up with the value 0.

Notice also that the statement evaluates from right to left because the comparison test is of higher precedence than assignment, while the two assignments are of equal precedence but associate right to left.

Compare this with the operation of BASIC, where the statement

```
110 Y = V = 32 * F * F
```

would store 1 into Y if F equals 2 and V equals 128, but would store 0 into Y if F equals 3 and V equals 128. In other words, that statement reads as 'Y equals the logical truth or falsity of the proposition that V equals 32 times F squared'.

It is for this reason that the 'assignment if' and the 'equality comparison if' are two separate symbols in C.

The simplest expressions are simply constants, as we have seen. Slightly more complex are expressions which contain a single variable.

However, the kind of expression we are interested in here is the kind that has more than one variable or constant. Such expressions combine two or more variables or constants to produce a result.

All computer systems and programs break up into three stages: input, process and output. Input and output are a separate topic; the process part of the operation comes down to expressions, performed in the order specified by the flow control statements.

Expressions have a type, which is the type of the result of evaluating the expression.

Arithmetic Expressions

Arithmetic expressions produce a numeric result. Examples include:

```
32 * f * f
x % 100
(y / x + 1) * 100
```

C provides the usual arithmetic operators (+, −, *, / representing plus, minus, times and divide respectively) as well as the integer modulus (or remainder) operator, %. Thus the expression x % 100 is read as 'the remainder of x divided by 100'.

You'll notice that multiplication and division are of higher precedence than addition and subtraction, and that all these operators associate from left to right.

Note that exponentiation is not provided; the ^ operator means something entirely different. Depending upon your compiler, a pow or power function may be provided, or you may have to write your own.

These are all examples of binary infix operators; in other words, they require

two arguments, and are written in between those arguments. C also provides one unary prefix arithmetic operator, the minus sign, used to indicate a negative constant or to produce the negative of a variable.

These facilities are provided by most high-level languages. Two other operators are provided which are unique to C, and are particularly useful. These are unary operators which can be prefix or postfix; that is they can be written before or after a variable.

The ++ operator increments the associated variable; if it is written before the variable, the incrementing is done before the variable value is read for any other use in the expression, while if it is placed after the variable, the value of the variable is read and then the variable is incremented. The -- operator is used similarly, but it decrements the associated variable.

Operator	Explanation	Associativity
)	Parentheses	left to right
[]	Array subscript	
->	Pointer to structure element	
!	Logical NOT	right to left
~	One's complement (bitwise NOT)	
++	Pre/post increment	
--	Pre/post decrement	
-	Unary minus	
*	Pointer indirection (Unary *)	
&	Address of	
sizeof	Size of type or structure	
(typecast)	Forces type conversion	
*	Multiplication	left to right
/	Division	
%	Remainder (Modulo)	
+	Addition	left to right
-	Subtraction	
<<	Left shift	left to right
>>	Right shift	
<	Less than	left to right
<=	Less than or equal	
>	Greater than	
>=	Greater than or equal	
==	Equality test	left to right
!=	Non-equality test	
&	itwise AND	left to right
^	Bitwise exclusive OR (XOR)	left to right
|	Bitwise OR	left to right
&&	Logical AND	left to right
||	Logical OR	left to right
? :	Ternary which operator	right to left
=	Assignment	right to left
+=	Assignment with operator	
-=		
&=		
etc		
	Expression separator	left to right

Table 1. *Precedence and associativity.*

Let's look at an example:

```
main()
{
    int a,b;
    a = 5;
    b = ++a;
    printf("a = %d,b = %d",a,b);
}
```

What will this program print?

Now swap the ++ operator so that it comes after the a. The sixth line should read:

```
b = a++;
```

Now what will the program print?

For the first question, if you said a = 6, b = 6 you are correct. If you said b = 5, you missed the point about prefix and postfix operation. Remember that a will be incremented and then the result stored into b.

After the operator has been moved, the program will print a = 6, b = 5 because the value of a is copied into b *before* it is incremented.

This may seem like a minor distinction, but it is a major one when your program is displaying strange behaviour.

Logical Expressions

C provides a particularly rich range of logical operators. We shall first examine the relational operators which superficially appear to produce numeric expressions — and in a sense they do — but are in fact logical operators.

Equality testing is done with the == operator. Notice that there are two equals signs not one. *Perhaps the most common bug in C programs is the use of a single equals sign where two are meant.* Because all statements are expressions in C, the compiler will not complain about this — either is syntactically correct. Watch out for this bug.

As a general rule, once I have finished typing in a program, I use my editor's search command to locate all if statements and examine the associated expressions for missing equals signs. It's tedious but I have often located bugs this way before compiling the programs.

Next month, we'll look at the remaining operators for bit manipulation and other purposes. □

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HOW TO WRITE A STRUCTURED PROGRAM — Part 11

LAST MONTH, we developed a data structure for a phone-book listing using flowblock notation. Six flowblocks were provided, each specifying part of the overall data structure. Unlike the flowblocks used previously, the set shown this month represents a non-procedural specification. The value of using flowblock notation for data specifications is that the task of writing programs for that data structure is made much simpler. In many cases, there is almost a one-to-one correspondence between the data structure and the program structure. The Jackson Methodology builds on that relationship as a program design approach — it has a mathematical niceness about it.

Of necessity, I will assume you have access to that last article, though some of the material is repeated.

Since we're using rough-as-guts BASIC, *parameters just aren't on. Instead, we ensure the subroutines just use the respective global variables. Now, if we were using* PL/I, *it would be a different story ...*

```
PhoneBook
+-------------------------------+
| Call Initialise               |
| FOR Pg = 1 to LastPageNumber-1|
|  +----------------------------|
|  | Call.Page                 |
|--------------------------------|
| Call LastPage                 |
+-------------------------------+
```

(a) *Program mainline.*

```
PhoneBook
+-------------------------------+
| FrontCover                    |
| FOR Pg = 1 to LastPageNumber - 1|
| +------------------------------|
| |  Page(Pg)                   |
|--------------------------------|
| LastPage(LastPageNumber)      |
| BackCover                     |
+-------------------------------+
```

(b) *Data structure "mainline".*

Figure 1. *The program and data structure "mainlines" for the telephone book.*

```
Initialise
+-----------------------------------------------------------------+
| input "Name of input file";f$                                   |
| open f$ as #1 len=32                                            |
| field #1, 32 as entry$                                          |
| input "Number of records to print";N                            |
| input "Number of lines per page";LinesPerPage                   |
| input "Number of columns per line";ColsPerLine                  |
| EntriesPerPage = LinesPerPage*ColsPerLine                       |
| NormalPages = INT(N/EntriesPerPage)                             |
| IF EntriesPerPage*NormalPages = N                               |
| +---------------------------------------------------------------|
| | NormalPages = NormalPages - 1                                 |
|-----------------------------------------------------------------|
| LastPageNumber = NormalPages + 1                                |
| EntriesOnLastPage = N - EntriesPerPage*NormalPages              |
| LinesOnLastPage = INT(EntriesOnLastPage/ColsPerLine             |
| IF EntriesOnLastPage = LinesOnLastPage*ColsPerLine              |
| +---------------------------------------------------------------|
| | LinesOnLastPage = LinesOnLastPage - 1                         |
|-----------------------------------------------------------------|
| ColsInLastLine = EntriesOnLastPage - ColsPerLine*LinesOnLastPage|
| LinesOnLastPage = LinesOnLastPage + 1                           |
+-----------------------------------------------------------------+
```

Figure 2. *Initialise opens the required file and sets up the variables related to the last page and last line.*

Our task this month is to write a flowblock specification for a program which reads a file containing the ordered phone-book entries, and prints them according to the required data specification. We begin, conventionally enough, with the mainline shown in Figure 1a. Figure 1b is the matching data structure 'mainline' or primary structure. The program ignores the FrontCover and BackCover structures.

The Initialise module (shown in Figure 2) deals with the establishment of the variables LastPageNumber, LinesOnLastPage and ColsInLastLine from the given values for LinesPerPage, N (the number of entries), and ColsInLastLine. It also opens the input file.

It's interesting to note that our data specification has forced us to ensure that we know in advance just how many name entries are in our file. While that's not a problem, most file-processing programs read items from a file one by one, until the end-of-file mark is detected. To take that approach, we would need to modify the main data structure (Figure 1b) to use a WHILE NOT EOF loop, rather than the FOR loop shown here. For the purposes of this exercise, we'll assume N is supplied by the user. We'll also allow the program user to specify LinesPerPage and ColsPerLine.

Roughing It

Notice our calls to Page and LastPage omit the parameters. Since we're using rough-as-guts BASIC, parameters just aren't on. Instead, we ensure the subroutines just use the respective global variables. Now, if we were using PL/I, it would be a different story ...

Initialise looks horrendous, but it actually follows the data specifications described last month. The two IF constructs ensure the last page is not completely empty. The complexity is a direct result of running with the number of entries N, rather than with the more general end-of-file detection. If you are serious about this subject, I would urge you to follow the solution given here, then modify the original data structure for endfile detection

and reprogram accordingly. We've used long-winded variable names so that the logic will be easier to follow.

Because the data structure presumes the name and address elements are all in an array, we're taking the easy way out by assuming the data file is organised for direct access. Each element is assumed to occupy 32 bytes (defined in the OPEN statement). You would not normally tackle a real phone-book operation like this unless it were a very short one; the number of different records accessible in a direct-access file in BASIC is limited to 32,767. For more than 32,767 entries you would need to resort to packing more entries into a single record. BASIC allows record lengths of up to 32,767, but at the expense of RAM buffer space.

The program module for Page is almost identical to its data-structure counterpart. So, too, is the LastPage flowblock in Figure 4. The major changes result from the need to cover for BASIC's inability to handle parameters for subroutines.

The Line module (Figure 5) must print a complete line for page Pg and line number Ln. The LastLine module (Figure 6) takes care of the special case of the last line on the last page.

Still determined to print out the phone book, this month Phil Grouse helps you write a flowblock specification for the program which will finally perform this worthwhile task.

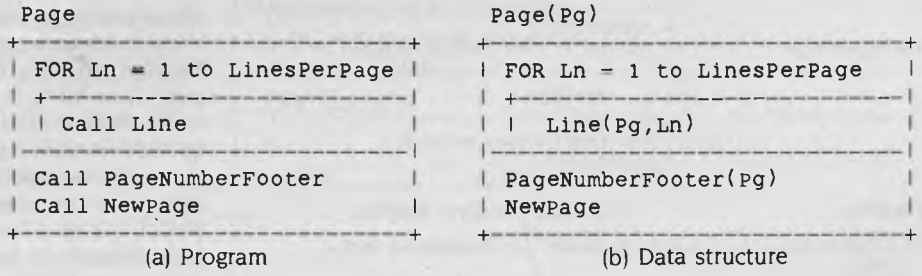
The last module corresponds to the Name data structure. Both are shown in Figure 7. The value of index is used as a record number, and the GET #1,x statement reads a 32-byte record (numbered x) into the file buffer, from where it is available as the string entry$. We have 'printed' directly to the screen, but you would normally use an LPRINT statement to send the data to the line printer.

We have omitted the logic for the modules PageNumberFooter, NewLine and NewPage because of their obvious simplicity. Most printers will respond to CHR$(12) as a form-feed character if you need to implement NewPage.

In Summary

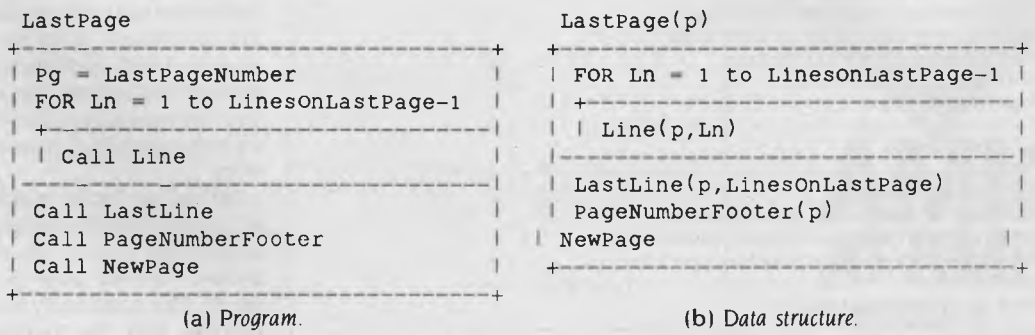
This has been a simple exercise in converting a flowblocked data structure into a corresponding program structure. We have shown that the selection of a particular data-structure specification has a profound effect on the way in which the program is written. We have also shown there is a strong 'binding' between both forms.

As an exercise, you should try this same method for the case where the number of records is not known in advance, and where you have enough room in memory to store an entire page buffer at a time.



(a) Program (b) Data structure

Figure 3. *Program and data structure for a complete page. Line is defined in Figure 5.*



(a) *Program.* (b) *Data structure.*

Figure 4. *The LastPage module prints the final page of the book.*

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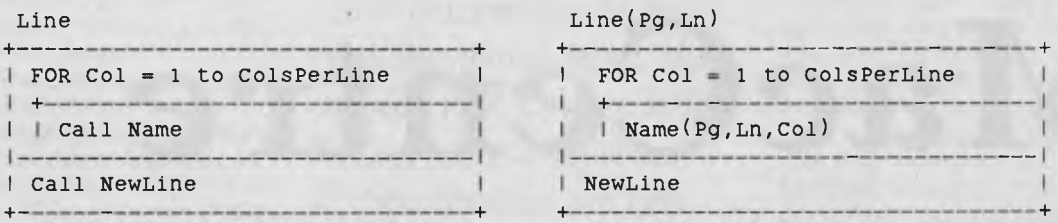
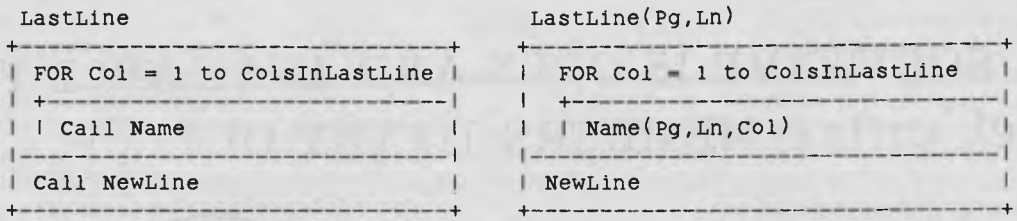


(a) *Program* (b) *Data structure*

Figure 5. *Line must print a full line for page* Pg *and line* Ln*; hence the* Name *module must print the record corresponding to page* Pg*, line* Ln *and column* Col.



(a) *Program* (b) *Data structure*

Figure 6. *LastLine takes care of the very last line of the book.*

```
Name
+-------------------------------------------------+
| j = 0                                           |
| IF Pg < LastPageNumber                          |
| +-----------------------------------------------|
| | i = LinesPerPage  | i = LinesOnLastPage       |
| |                   | IF Col > ColsInLastLine   |
| |                   | +-------------------------|
| |                   | | j = ColsInLastLine-Col+1|
|-------------------------------------------------|
| index = (Pg-1)*LinesPerPage*ColsPerLine         |
|          + (Col-1)*i + Ln + j                   |
| get #1,index                                    |
| print entry$;"  ";                              |
+-------------------------------------------------+
```

Figure 7a. *Program flowblock for* Name.

```
Name(Pg,Ln,Col)
+-------------------------------------------------+
|  j = 0                                          |
|  IF Pg < LastPageNumber                         |
|  +----------------------------------------------|
|  | i = LinesPerPage  | i = LinesOnLastPage      |
|  |                   |  IF Col > ColsInLastLine |
|  |                   |  +-----------------------|
|  |                   |  | j = ColsInLastLine-Col+1|
|-------------------------------------------------|
| index = (Pg-1)*LinesPerPage*ColsPerLine         |
|          + (Col-1)*i + Ln + j                   |
| Entry(index)                                    |
+-------------------------------------------------+
```

Figure 7b. *Data structure flowblock for* Name.

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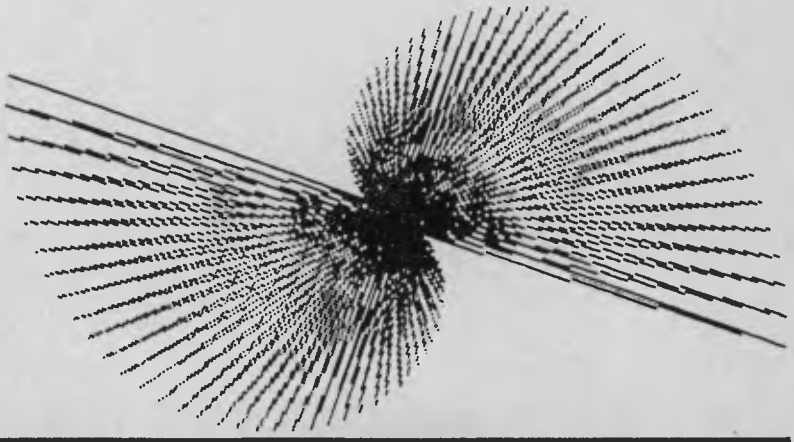


do the LOGOMOTION

If you've just won Tattslotto, you can dash out and buy yourself a Logo program for your computer. If your current net worth is a little strained, yet you'd still like to dip into Logo, then stay tuned. Tim Hartnell will take you on a tour of turtle graphics with Tim's Teensy Turtle, a graphics Logo program for the small wallet.

A LOT of outright bull is written about Logo. Seymour Papert, the grand turtle who invented Logo, writes about it in his book *Mindstorms* as though Logo is one of man's greatest inventions since the Sydney Harbour Bridge. Now, I'm not knocking old Turtle Seymour completely, because Logo is fun and does have a considerable degree of merit for some applications, but it's not half as wonderful as some people make out. I am, however, capable of being persuaded I'm wrong (so if you want to persuade me, send your hate mail care of *Your Computer*).

Logo is a lot more than turtle graphics. The language is one of the most vigorous offspring of those languages beloved of artificial intelligence researchers, such as Lisp and Prolog, but is a damned sight easier to use than they are. And although Logo is more than turtle graphics, these graphics are the bit most people think of when Logo is mentioned. They're also easy and fun to run.

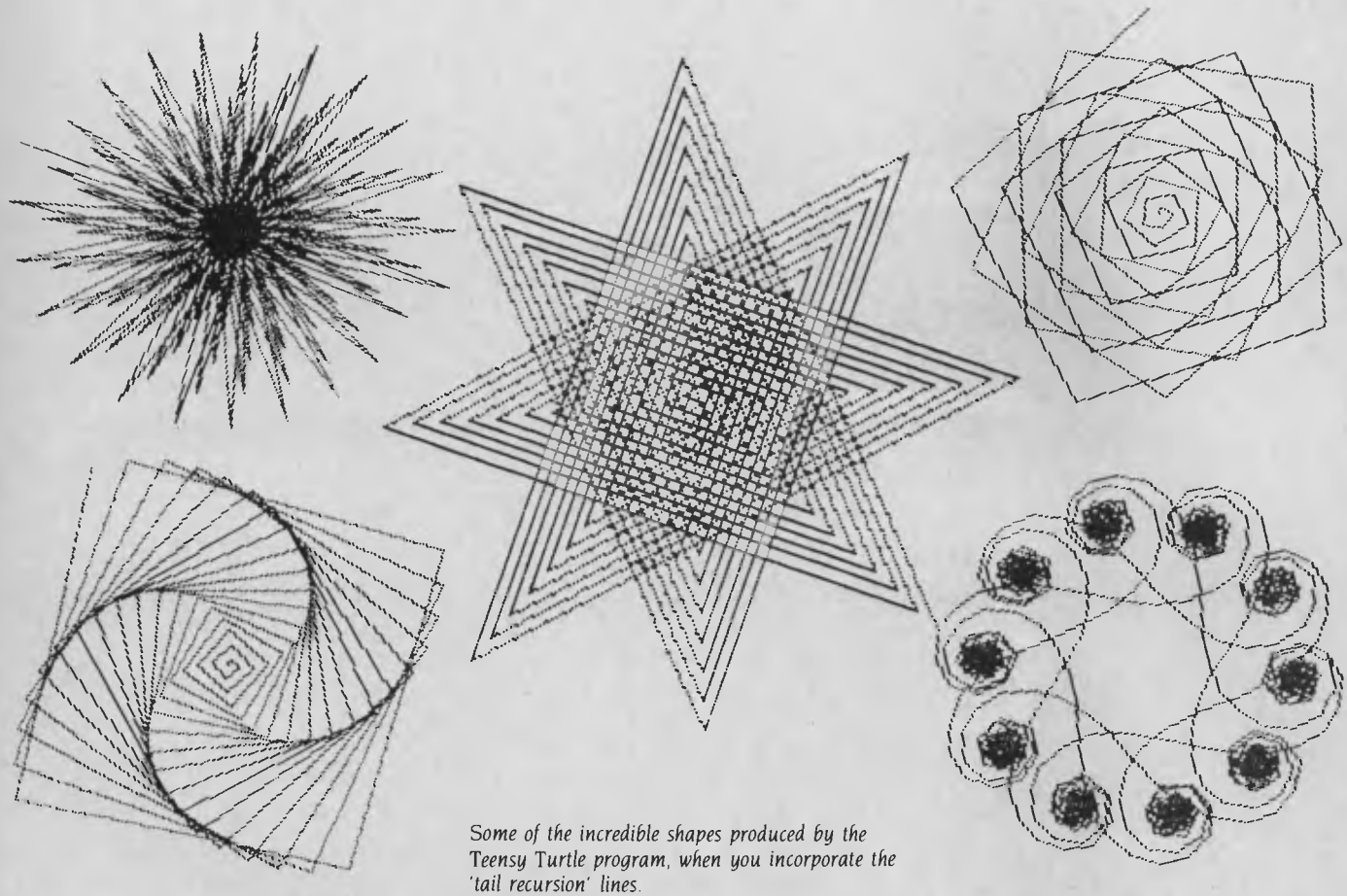
So, my Teensy Turtle program is designed to let you experiment with Logo in the simplest possible way. All you need is a copy of BASIC, not a copy of Logo. The program, as listed here, is for the IBM PC running in graphics mode. It should be fairly easy to adapt for other machines, keeping in mind the X in Line 110 is half the number of pixels across the screen, and the Y is half the number of pixels down. PSET (X,Y) puts a dot at this location. Line 160 draws a line relative to the previous co-ordinates. The subroutine from Line 190 onward simply ensures the INPUT lines appear at the bottom of the screen, and that they are cleared after they're used.

Type in Listing 1, and you're underway. One incredible advantage of Logo is it allows you to get underway knowing the meaning of only three words — RIGHT, FORWARD and REPEAT. What other computer language allows enjoyable and meaningful interaction with such a meagre vocabulary?

Taking the Turtle Trip

Once you have the program in place, run it (you can terminate a run simply by entering -99 when asked how many repeats you want). We'll see what we can do with it.

The graphics produced by Logo are called turtle graphics because we imagine a miniscule turtle (about the size of my brain) is crawling around the screen, leaving a slimy trail as it goes. It begins each run of the program sitting slap bang in the middle of the screen, facing straight up it. We say — when the turtle is doing this — that it is facing at an angle of zero degrees. If the turtle turns through 90 degrees, it ends up facing to the right-hand side of the screen. Another 90 degrees and it is facing straight down. Turn through 180 degrees from this point, and it is back where it started, at zero degrees.



Some of the incredible shapes produced by the Teensy Turtle program, when you incorporate the 'tail recursion' lines.

```
10 REM Tim's Teensy Turtle - 1
20 KEY OFF:SCREEN 1:CLS
30 DEF FN R(X)=X*3.141593/180
40 NGLE=0
50 GOSUB 190:INPUT "No. of repeats ";RPE
T
60 IF RPET=-99 THEN GOSUB 190:END
70 GOSUB 190:INPUT "Angle turn to the ri
ght ";RITE
80 GOSUB 190:INPUT "Steps forward ";FRWD

90 GOSUB 190:INPUT "Clean before drawing
 (Y/N) ";A$
100 GOSUB 190
110 IF A$="y" OR A$="Y" THEN CLS:X=160:Y
=100:PSET (X,Y)
120 FOR A=1 TO RPET
130 NGLE=NGLE+RITE
140 X=X-SIN(FN R(NGLE))*FRWD
150 Y=Y-COS(FN R(NGLE))*FRWD
160 LINE -(X,Y)
170 NEXT A
180 GOTO 50
190 LOCATE 22,1
200 PRINT "
        "
210 LOCATE 22,1
220 RETURN
```

Listing 1.

Table 1.

Shape Produced	Repeats	Angle	Steps
Square	4	90	50
Triangle	3	120	60
Pentagon	5	72	35
'Circle'	30	12	10

Table 2.

Repeats	Angle	Steps	Clean (Y/N)
4	90	40	Y
1	45	0	N

Table 3.

Repeats	Angle	Steps	Clean (Y/N)
4	90	40	N
1	45	0	N

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Table 4.

Shape Produced	Repeats	Angle	Steps	Increment
8-pointed star	60	135	6	2
5-pointed star	130	144	1	1
Flower	70	77	1	1
Web-Flora	95	96	8	1
Infinity Tile	100	88	2	1
Stellar Burst	110	188	1	1.3
Butterslice	55	182	1	3
Backspin	180	93	2	0.5

Table 5.

Repeats	Angle	Steps	Increment
710	199	10	5
600	175	3	7
700	134	10	9
120	99	12	60

You control the turtle by telling it you want it to move forward a designated number of tiny turtle STEPS, then turn right through a specified ANGLE. You can also get the turtle to REPEAT this action as many times as you require. These three commands allow you to create an extraordinary range of shapes.

Run the program, and answer the prompts, using the numbers in Table 1. In each case, when it asks "Clean before drawing (Y/N)?", press the "y" key.

You can see, for all the shapes in Table 1, if you multiply the number of repeats by the angle, it comes to 360. As there are 360 degrees in a circle, once the turtle has turned through 360 degrees it will be back facing its original direction. The square — with four sides — uses an angle of 90 degrees, or 360 divided by 4; the triangle — with three sides — uses an angle of 120 degrees, or 360 divided by 3; and so on. This turning through 360 degrees, so the turtle ends up facing the direction in which it began, is called, in Logo circles, The Total Turtle Trip Theorem!

For a more interesting pattern, start a new run of the program and reply to the prompts with the answers listed in Table 2.

Now give the program the replies in Table 3 three times in a row (that is, go right through the two lines, then start them again, three times in all). You'll be delighted (I promise) to see what happens.

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Now our Teensy Turtle program is capable of much greater magic than this. In real Logo, as in languages such as Pascal, C and BBC Micro BASIC, there is a feature called 'recursion'. We are going to imitate 'tail recursion' (which sounds as if you're vanishing up your own 8-bit bus), in which a program calls itself and, in effect, runs itself from within itself! Complex as this may sound, your dim turtle can do it, just by adding two lines to the program:

```
85 GOSUB 190:INPUT "Step increment";ICST
165 FRWD=FRWD+ICST
```

Believe it or not, simply adding these two lines unveils a powerful magic in your turtle, as you'll discover for yourself when you run the program using the data in Table 4.

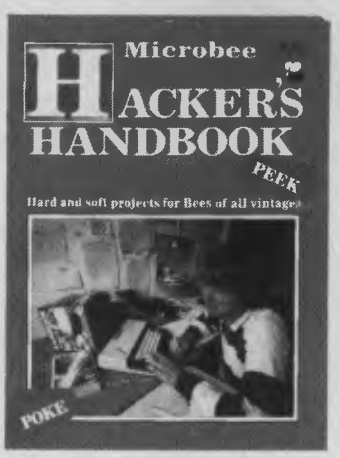
Once you've had your fill of the program in that form (and, perhaps, saved it in that way), change line 165 to:

```
165 RITE=RITE+ICST
```

This will ensure the angle is increased each time, instead of the step size. Again, the results make the effort well worthwhile, as your teensy turtle will show when you use the numbers in Table 5. Start a new run from scratch each time you run these.

I'd be extremely interested to see the best shapes you produce with this program, as well as finding out about any modifications, adaptations or additions you make to it. Send them to me at YC.

A quick commercial break to finish. My company, Interface Publications, sells a graphics Logo package (disk plus detailed tutorial) called Logo-K for $39.95 for the IBM PC. This may be of interest to you if you've won Tattslotto and want to explore turtle graphics in detail. □



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This program does not 'predict' winning numbers, but it provides a quick way of seeing what prize(s) you have won. If you play 10 games each week and use the same set of numbers, or buy a five- or 10-week coupon, you will appreciate Lottor, which also checks your Super 66 number. It supersedes earlier Lotto checking programs, which no longer display the correct division and may not accept two supplementary numbers.

You may wish to PRINT line 120 on the screen, as a reminder to renew your multi-week coupon. As the Super 66 number changes with each renewal, it should be EDITed with the GX command. Enter your own numbers carefully in lines 340-430 — a slight error will result in your not knowing that you won something until the cheque from Tatts arrives in the mail.

Ash Nallawalla, Werribee, VIC.

```
00100 REM A program for any MicroBee with MicroWorld BASIC
00110 REM A program to check your 6/45 Lotto ticket against the winning numbers
00120 REM First draw 6 Jul 85; last 7 Sep 85
00130 REM Super 66 # 088867 entered in Line 00170
00140 CLEAR:CLS
00150 PRINT TAB(20)"LOTTO RESULT ANALYSER"\\
0160 DIM A(7): REM 8 winning numbers incl 2 supplementary
00170 S1$="088867"
00180 INPUT"Enter the Super 66 winning number (6 Digits)";S0$
00190 IF LEN(S0$)<>6 THEN 110
00200 PRINT"Enter the six winning numbers separated by commas:"\
00210 INPUT">> "A(0),A(1),A(2),A(3),A(4),A(5)
00220 PRINT\"Enter the 2 Supplementary numbers separated by a comma:"\
00230 INPUT">> "A(6),A(7)
00240 CLS
00250 PRINT"Winning Lotto numbers were: ";
00260 FOR I=0 TO 5:PRINT A(I);:NEXT I:PRINT"   [";A(6);A(7);" ]"
00270 DIM H(9,5): REM 10 games * 6 numbers
00280 FOR I=0 TO 9
00290  FOR J=0 TO 5
00300   READ H(I,J): REM Get data for games
00310  NEXT J
00320 NEXT I
00330 REM The numbers on your ticket
00340 DATA 2,9,15,19,24,33
00350 DATA 6,11,15,20,29,38
00360 DATA 12,14,18,27,36,40
00370 DATA 3,6,11,12,30,32
00380 DATA 6,10,27,40,44,45
00390 DATA 7,16,21,34,35,37
00400 DATA 3,9,20,28,38,39
00410 DATA 6,8,15,18,22,33
00420 DATA 13,15,20,41,42,43
00430 DATA 5,7,23,30,32,43
00440 REM Display results of analysis
00450 INVERSE:PRINT" GAME #    NUMBERS MATCHED      SUPPS     DIVISION     ":NORMAL
00460 FOR J=0 TO 9
00470   IF J=9 THEN PRINT"Game";J+1;":     ";:GOTO 490
00480   PRINT"Game ";J+1;":     ";
00490   N=0:M=0
00500     FOR I=0 TO 5
00510       FOR K=0 TO 5
00520         IF H(J,K)=A(I) THEN PRINT A(I);:N=N+1
00530       NEXT K
00540     NEXT I
00550     FOR I=0 TO 5
00560       IF H(J,I)=A(6) THEN PRINT TAB(36)A(6);:M=1
00570       IF H(J,I)=A(7) THEN PRINT TAB(39)A(7);:M=1
00580       IF H(J,I)=A(6) AND H(J,I)=A(7):M=1
00590     NEXT I
00600     ON N-2 GOSUB 690,720,750,780: PRINT
```

Microbee

```
00610 NEXT J
00620 PRINT"Winning Super 66 number was: ";S0$;". Your number is: "S1$
00630 IF S0$=S1$ THEN PRINT"You won the Super 66 Jackpot!":END
00640 IF S0$(;1,5)=S1$(;1,5)OR S0$(;2,6)=S1$(;2,6)THEN PRINT"You won $ 6666.66 in Super 66!":END
00650 IF S0$(;1,4)=(S1$(;1,4)OR S0$(;3,6)=S1$(;3,6)THEN PRINT"You won $ 666.66 in Super 66!":END
00660 IF S0$(;1,3)=S1$(;1,3)OR S0$(;4,6)=S1$(;4,6)THEN PRINT"You won $ 66.66 in Super 66!":END
00670 IF S0$(;1,2)=S1$(;1,2)OR S0$(;5,6)=S1$(;5,6)THEN PRINT"You won $ 6.66 in Super 66!":END
00680 END
00690 REM if any 3 numbers plus either supplementary number match
00700 IF M=1 THEN PRINT [A3 7];TAB(51)"*** 4 ***";
00710 RETURN
00720 REM if any 4 numbers match
00730 PRINT [A4 7];TAB(52)"*** 3 ***";
00740 RETURN
00750 REM if any 5 numbers match
00760 PRINT [A5 7];TAB(53)"*** 2 ***";
00770 RETURN
00780 REM if all 6 numbers match
00790 PRINT [A6 7];TAB(54)"*** 1 ***";
00800 PLAY 16;16;20;23;0;20;23,8
00810 RETURN
```

```
                    LOTTO RESULT ANALYSER

Enter the Super 66 winning number (6 Digits) 088123
Enter the six winning numbers separated by commas:

>>  2,9,15,20,29,38

Enter the 2 Supplementary numbers separated by a comma:

>>  33,39
Winning Lotto numbers were:  2 9 15 20 29 38   [ 33 39 ]
 GAME #       NUMBERS MATCHED          SUPPS       DIVISION
Game  1:      2 9 15                   33          *** 4 ***
Game  2:      15 20 29 38                          *** 3 ***
Game  3:
Game  4:
Game  5:
Game  6:
Game  7:      9 20 38                     39       *** 4 ***
Game  8:      15                       33
Game  9:      15 20
Game 10:
Winning Super 66 number was: 088123. Your number is: 088867
You won $ 66.66 in Super 66!
```

TRS-80 MC10

TOWER OF HANOI

The object of the game is to move the stack of counters from left to right, while abiding by two rules:

```
1 REM tower of hanoi
2 REM 13/6/84 - j.l. elkhorne
3 DIM A(4,2):DIM B(4,2)
4 :
50 B(0,0)=320:B(1,0)=352:B(2,0)=384:B(3,0)=416:B(4,0)=448
55 B(0,1)=331:B(1,1)=363:B(2,1)=395:B(3,1)=427:B(4,1)=459
60 B(0,2)=342:B(1,2)=374:B(2,2)=406:B(3,2)=438:B(4,2)=470
```

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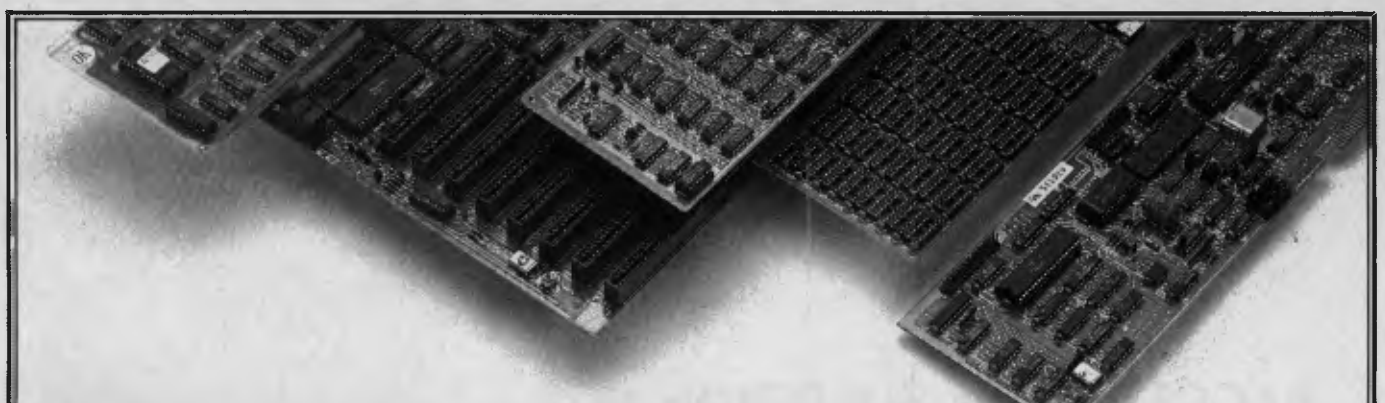
TRS-80 MC10

■ Move only one counter at a time.
■ A larger counter cannot sit on top of a smaller one.

There are two positions to the right of the original stack. My program does not permit you to hop an intervening space, as would be possible (but not permissible) in the original.

J. L. *Elkhorne*,
East Malvern, VIC.

```
90 :
100 REM patterns-colours 2-6
110 S$(1)="          ":REM 9 BLKS
120 S$(2)="         ":REM 1 YEL
130 S$(3)="   ///    ":REM 3 BLU
140 S$(4)="  ?????  ":REM 5 RED
150 S$(5)=" OOOOOOO ":REM 7 BUF
160 S$(6)="_________":REM 9 CYAN
170 CLS:GOTO 1000
190 :
200 REM search (point is v,h)
210 R=0:C=0
230 FOR H=20 TO 28 STEP 2
240 :  FOR V= 8 TO 52 STEP 22
250 A(R,C)=POINT(V,H)
260 C=C+1:NEXT
270 C=0:R=R+1:NEXT
280 RETURN
290 :
300 REM prompt for move
310 PRINT@ 32,"1.":REM YELLOW SQ.
320 PRINT@ 64,"2./":REM BLUE
330 PRINT@ 96,"3.?":REM RED
340 PRINT@128,"4.O":REM BUFF
350 PRINT@160,"5. ":REM CYAN
360 PRINT@224,"ENTER COLOUR NUMBER AND","DIRECTION (L/R) - AS 1R"
```

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TRS-80 MC10

```
370 PRINT@288:RETURN
390 :
400 REM set-up
410 PRINT@320,S$(2):PRINT@352,S$(3)
420 PRINT@384,S$(4):PRINT@416,S$(5)
430 PRINT@448,S$(6):RETURN
490 :
500 REM move
510 PRINT@288,:INPUT P$
520 B=VAL(P$):D$=MID$(P$,2,1)
540 IF B<1 OR B>5 OR D$<>"R" AND D$<>"L" THEN PRINT@288:GOTO 510
550 B=B+1:RETURN
590 :
1000 REM mainline
1010 CLS:GOSUB 400
1020 GOSUB 300:GOSUB 500:T=T+1: GOSUB 200
1090 :
1100 REM locate
1110 FOR R=0 TO 4:FOR C=0 TO 2
1120 IF A(R,C)=B THEN 1200
1130 NEXT:NEXT
1190 :
1200 REM move test
1210 IF D$="L" AND C=0 THEN PRINT@70,"WRONG DIRECTION!":SOUND24,9:GOTO 1020
1220 IF D$="R" AND C=2 THEN PRINT@70,"WRONG DIRECTION!":SOUND 42,8:GOTO 1020
1230 IF R=0 THEN 1300
```


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TRS-80 MC10

```
1240 IF A(R-1,C)<>-1 THEN PRINT@70,"NOT THE TOP!":SOUND110,13:GOTO 1020
1290 :
1300 REM move
1310 R0=R:C0=C:R=0
1320 IF D$="L" THEN C=C-1
1330 IF D$="R" THEN C=C+1
1350 IF R=4 THEN 1400
1360 IF A(R,C)=-1 THEN R=R+1
1370 IF A(R,C)>B THEN R=R-1:GOTO 1400
1375 IF A(R,C)>-1 AND A(R,C)<B THEN PRINT@70,"SMALLER UNDER!":SOUND 44,14:GOTO
1380 GOTO 1350
1390 :
1400 REM new
1410 PRINT@B(R,C),S$(B);
1415 PRINT@B(R0,C0),S$(1);
1420 R=5:C=3
1490 :
1500 REM test end?
1510 IF POINT(52,20)=2 THEN 1700
1520 GOTO 1020
1590 :
1700 REM score
1710 PRINT@0,"YOU TOOK";T;"TURNS."
1720 FOR R=1 TO 8:SOUND RND(144),4:NEXT
1730 GOTO 1730
1999 END
```


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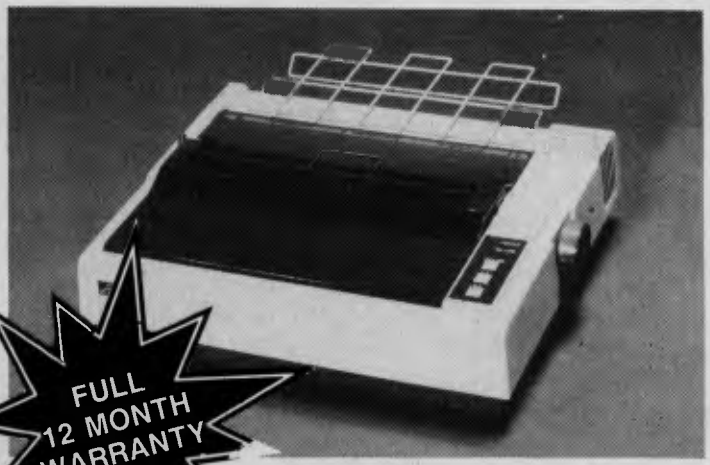

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GOLDEN EAGLE POKIES

This game will cost you a dollar for every pull of the handle, and you can win some cash by spinning one of the winning combinations. The characters rank in order of value from the 'gold bar' to the 'lemon' (this is explained in the program's instructions). When the game is running, you simply enter Y or N to indicate whether you want to have another spin or exit the program. Note: pressing return gives the same result as entering Y.

James Saunders,
Riverside, TAS.

```
00100 REM ##########################
00110 REM # By J.Saunders 6-10-85 #
00120 REM ##########################
00130 DIM Z1(6)
00140 V=5:M=0:B=11
00150 CLS:NORMAL:CURS 10,1:PRINT "*** WE
LCOME TO THE GOLDEN EAGLE POKIES! ***"

00160 CURS 2,4:PRINT"This is a Poker Gam
e.  It will cost you one dollar for each
"\"spin.  You will be given five dollars
 credit to begin with,"
00170 PRINT"and you may win more money b
y spinning up one of the winning"\"combi
nations.  These combinations are listed
on the next page."
00180 PRINT"The game is quite simple and
 self explanatory, so Goodluck!"\
00190 DATA 0,0,31,63,127,255,255,255,255
,255,255,255,127,63,31,15
00200 DATA 227,118,12,152,153,255,255,25
5,255,255,255,255,255,255,195,0
00210 DATA 128,0,248,252,198,143,31,255,
255,255,255,255,254,252,248,240
00220 DATA 1,1,0,0,0,0,0,0,0,1,3,7,7,3,1
,0
00230 DATA 195,230,236,24,24,126,255,255
,255,249,241,243,255,255,255,255
00240 DATA 0,0,0,0,0,0,0,0,0,128,192,224
,224,192,128,0
00250 DATA 0,0,0,0,1,1,3,7,15,15,15,15,1
5,31,24,0
00260 DATA 0,0,3,127,255,241,227,199,255
,255,255,255,254,192,0,0
00270 DATA 0,24,248,240,240,240,240,240,
224,192,128,128,0,0,0,0
00280 DATA 0,0,0,0,1,3,3,3,7,15,31,63,16
,8,4,3
00290 DATA 60,36,126,255,255,255,255,255
,255,255,255,24,60,60,0,255
00300 DATA 0,0,0,0,128,192,192,192,224,2
40,248,124,8,16,32,192
00310 DATA 255,128,190,161,161,161,161,1
90,161,161,161,161,161,190,128,255
00320 DATA 255,0,60,66,66,66,66,66,126,6
6,66,66,66,66,0,255
00330 DATA 255,1,249,133,133,133,133,249
,145,145,137,137,133,133,1,255
00340 DATA 0,0,0,0,0,3,7,14,15,6,3,1,0,0
,0,0
00350 DATA 1,115,54,12,24,255,111,253,18
3,254,247,223,253,118,60,0
00360 DATA 128,0,0,0,0,192,96,240,240,22
4,192,128,0,0,0,0
00370 DATA 0,30,63,126,254,255,255,252,2
52,248,120,48,0,0,31,0
00380 DATA 60,122,127,112,113,255,254,25
4,255,127,127,51,17,17,255,0
00390 DATA 0,56,124,254,254,255,255,127,
31,31,15,7,1,0,252,0
00400 FOR I=63488+65*16 TO 63488+86*16-1
00410 READ A:POKE I,A:NEXT I
00420 A1$="ABC":B1$="DEF":C1$="GHI":D1$=
"JKL":E1$="MNO":F1$="PQR":G1$="STU"
00430 Z1$(1)=A1$:Z1$(2)=B1$:Z1$(3)=C1$:Z
1$(4)=D1$:Z1$(5)=E1$:Z1$(6)=F1$
00440 PRINTTAB(6);"Would you like sound
[Y/N] :- ";
00450 INPUT A0$:IF A0$="N"OR A0$="n" THE
N LET B=0
00460 CLS:CURS 14,1:PRINT"*** THE WINNIN
G COMBINATIONS ***"
00470 PRINT\\"  Some combinations are wo
rth more than others.  ie. three"\"of a
kind is worth the most, while if the fir
st and second"\"windows are the same, (o
r the second and thir";
00480 PRINT"d), this is worth"\"more tha
n the first and the third windows the sa
me.  e.g :-"
00490 PRINT\\"All the symbols have an or
der of value, e.g (from left)."
00500 PCG:CURS 7,9:PRINT E1$;" ";E1$;" "
;E1$;:NORMAL:PRINT"    >    ";:PCG:PRINT
 E1$;" ";E1$;"XXX";:NORMAL:PRINT"    >
  ";:PCG:PRINT E1$;"XXX";E1$
00510 CURS 10,12:PRINT E1$;:GOSUB 1580:P
RINT A1$;:GOSUB 1580:PRINT F1$;:GOSUB 15
80:PRINT D1$;:GOSUB 1580:PRINT B1$;:GOSU
B 1580:PRINT C1$:NORMAL
00520 CURS 10,13:PRINT"Bar    Apple Stra
wberry Bell    Pear    Lemon"
00530 CURS 16,15:PRINT"-=*(PRESS ANY KEY
 TO START)*=-"
00540 Q1$=KEY$:IF Q1$=""THEN 540
00550 HIRES:CURS 23,4:PRINT"*** GAMBLER
***"
00560 PLOT 160,60 TO 310,60 TO 310,220 T
O 160,220 TO 160,60
00570 PLOT 175,180 TO 297,180 TO 297,155
 TO 256,155 TO 256,180
00580 PLOT 255,180 TO 255,155 TO 217,155
 TO 217,180
00590 PLOT 216,180 TO 216,155 TO 174,155
 TO 174,180
00600 PLOT 175,180 TO 175,155
00610 PLOT 296,180 TO 296,155:PLOT 160,1
40 TO 310,140
00620 PLOT 190,60 TO 190,140: PLOT 280,6
0 TO 280,140
00630 PLOT 205,96 TO 210,78 TO 258,78 TO
 263,96 TO 205,96
00640 PLOT 173,100 TO 178,100 TO 178,104
 TO 173,104 TO 173,100
00650 PLOT 175,104 TO 175,125:PLOT 176,1
04 TO 176,125
00660 PLOT 175,75 TO 175,100:PLOT 176,75
 TO 176,100
00670 PLOT 176,104 TO 185,125:PLOT 175,1
04 TO 166,125
00680 PLOT 176,100 TO 185,75:PLOT 175,10
0 TO 166,75
00690 PLOT 293,100 TO 298,100 TO 298,104
 TO 293,104 TO 293,100
00700 PLOT 295,104 TO 295,125:PLOT 296,1
04 TO 296,125
00710 PLOT 295,100 TO 295,75:PLOT 296,10
0 TO 296,75
00720 PLOT 296,104 TO 305,125:PLOT 295,1
05 TO 286,125
00730 PLOT 296,100 TO 305,75:PLOT 295,10
0 TO 286,75
00740 PLOT 285,220 TO 290,230 TO 305,230
 TO 310,220
00750 PLOT 288,226 TO 307,226:PLOT 288,2
25 TO 308,225
00760 PLOT 287,224 TO 307,224:PLOT 287,2
23 TO 308,223
00770 PLOT 286,222 TO 308,222:PLOT 286,2
21 TO 309,221
00780 PLOT 310,125 TO 320,125 TO 320,140
 TO 310,140
00790 PLOT 320,129 TO 321,129 TO 321,136
 TO 320,136
00800 GOSUB 1040:GOSUB 1100:GOSUB 1160:G
OSUB 1220
00810 Q=1:GOSUB 1160:GOSUB 1100:GOSUB 10
40
00820 X=INT(RND*7):IF X=0 THEN 820
00830 Y=INT(RND*7):IF Y=0 THEN 830
00840 Z=INT(RND*7):IF Z=0 THEN 840
00850 PCG:CURS 29,9:PRINT G1$
00860 FOR I=1 TO 3:FOR U=1 TO 6
00870 CURS 24,6:PRINT Z1$(U):CURS 29,6:P
RINT Z1$(U):CURS 34,6:PRINT Z1$(U):FOR P
=1 TO 80:NEXT P:NEXT U:NEXT I
00880 CURS 24,6:PRINT Z1$(X):PLAY B
00890 FOR I=1 TO 2:FOR U=1 TO 6
00900 CURS 29,6:PRINT Z1$(U):CURS 34,6:P
RINT Z1$(U):FOR P=1 TO 80:NEXT P:NEXT U:
NEXT I
00910 CURS 29,6:PRINT Z1$(Y):PLAY B
00920 FOR I=1 TO 2:FOR U=1 TO 6
00930 CURS 34,6:PRINT Z1$(U):FOR P=1 TO
80:NEXT P:NEXT U:NEXT I
00940 CURS 34,6:PRINT Z1$(Z):PLAY B:NORM
AL
00950 GOSUB 1280
00960 IF M+1>0 THEN CURS 29,11:PRINT"$";
M+1:IF B<>0 THEN PLAY 0,3;11;11;11;11;11
;11;11;11
00970 V=V+M:M=0
00980 CURS 4,14:IF V>9 THEN PRINT"YOUR T
OTAL NOW IS :- $";V ELSE PRINT"YOUR TOTA
L NOW IS :- $";V;" "
00990 CURS 4,15:INPUT"ANOTHER GO ? [Y/N]
:- "R1$
01000 CURS 4,15:IF B=0 AND V=0 THEN PRIN
T"SORRY YOU'RE BROKE !!!!!":END ELSE IF
V=0 THEN PRINT"SORRY YOU'RE BROKE !!!!!"
:PLAY 4,2;2,4:END
01010 IF R1$<>"N" AND R1$<>"n" THEN CURS
 26,14:IF V>9 THEN PRINT V-1;" ":CURS 29
,11:PRINT"    ":GOTO 820
01020 IF R1$<>"N" AND R1$<>"n" THEN CURS
 26,14:IF V<10 THEN PRINT V-1;"  ":CURS
29,11:PRINT"    ":GOTO 820
01030 PRINT"OK! BYE FOR NOW.        ":END
01040 REM ROUTINE TO MOVE HANDLE STAGE 1
01050 PLOT 322,129 TO 322,165 TO 330,175
 TO 330,210
01060 PLOT 323,129 TO 323,165 TO 331,175
 TO 331,210
01070 IF Q<>1 THEN PLOTR 322,129 TO 322,
165 TO 330,175 TO 330,210
01080 IF Q<>1 THEN PLOTR 323,129 TO 323,
165 TO 331,175 TO 331,210
01090 Q=0:FOR T=1 TO 240:NEXT T:RETURN
01100 REM MOVE HANDLE STAGE 2
01110 PLOT 322,129 TO 322,151 TO 331,159
 TO 331,180
01120 PLOT 323,129 TO 323,151 TO 332,159
 TO 332,180
01130 PLOTR 322,129 TO 322,151 TO 331,15
9 TO 331,180
01140 PLOTR 323,129 TO 323,151 TO 332,15
9 TO 332,180
01150 FOR T=1 TO 240:NEXT T:RETURN
01160 REM MOVE HANDLE STAGE 3
01170 PLOT 322,129 TO 322,140 TO 327,146
 TO 327,156
01180 PLOT 323,129 TO 323,140 TO 328,146
 TO 328,156
01190 PLOTR 322,129 TO 322,140 TO 327,14
6 TO 327,156
01200 PLOTR 323,129 TO 323,140 TO 328,14
6 TO 328,156
01210 FOR T=1 TO 240:NEXT T:RETURN
01220 REM MOVE HANDLE STAGE 4
01230 PLOT 322,131 TO 327,131 TO 327,132
 TO 322,132
01240 PLOT 322,133 TO 327,133 TO 327,134
 TO 322,134
01250 PLOTR 322,131 TO 327,131 TO 327,13
2 TO 322,132
01260 PLOTR 322,133 TO 327,133 TO 327,13
4 TO 322,134
01270 FOR T=1 TO 240:NEXT T:RETURN
01280 REM MONEY CHANGE
01290 IF X=Y AND X=Z THEN GOSUB 1340:GOT
O 1330
01300 IF X=Y THEN GOSUB 1420:GOTO 1330
01310 IF Y=Z THEN GOSUB 1500:GOTO 1330
01320 IF X=Z THEN LET M=M+2
01330 M=M-1:RETURN
01340 REM THREE OF A KIND
01350 IF X=5 THEN LET M=M+30
01360 IF X=1 THEN LET M=M+25
01370 IF X=6 THEN LET M=M+21
01380 IF X=4 THEN LET M=M+18
01390 IF X=2 THEN LET M=M+16
01400 IF X=3 THEN LET M=M+15
```

Microbee

```
01410 RETURN
01420 REM 1st & 2nd
01430 IF X=5 THEN LET M=M+7
01440 IF X=1 THEN LET M=M+6
01450 IF X=6 THEN LET M=M+5
01460 IF X=4 THEN LET M=M+4
01470 IF X=2 THEN LET M=M+3
01480 IF X=3 THEN LET M=M+2
01490 RETURN
01500 REM 2nd & 3rd
01510 IF Y=5 THEN LET M=M+7
01520 IF Y=1 THEN LET M=M+6
01530 IF Y=6 THEN LET M=M+5
01540 IF Y=4 THEN LET M=M+4
01550 IF Y=2 THEN LET M=M+3
01560 IF Y=3 THEN LET M=M+2
01570 RETURN
01580 REM SPACER
01590 NORMAL:PRINT"      ";:PCG:RETURN
```

VZ200

VZ-200 CASSETTE INLAYS

This program is for all you VZ-200/300 users who have piles of cassette tapes and want to index their contents so it's easy to find what you want. This program uses the PP-40, a printer/plotter distributed by Dick Smith, and makes extensive use of the graphics command supported by this printer. The program contains comments for those users unfamiliar with the required commands, and for those who are thinking of converting the program.

Ian Dutfield,
Cromer, NSW.

```
5 GOSUB 1000 'TITLE
10 'CASSETTE TAPE INSERTS
20 'BY IAN DUTFIELD
25 'FOR THE VZ-200
30 '   16/3/85
40 'FOR USE WITH PP40
50 'PRINTER
60 'USE IN 40 COLUMN MODE
70 'SET PRINTER TO TEXT MODE
75 ' CAN BE CONVERTED TO OTHER
   PRINTERS.
80 LPRINT CHR$(17)
90 'CR AND LINEFEED
100 LPRINT CHR$(13)
110 LPRINT CHR$(10)
120 'SET COLOUR TO BLACK
130 'FIRST GO INTO GRAPHIC MODE
140 LPRINT CHR$(18)
150 LPRINT "C0"
160 'RETURN TO TEXT
170 LPRINT CHR$(17)
```


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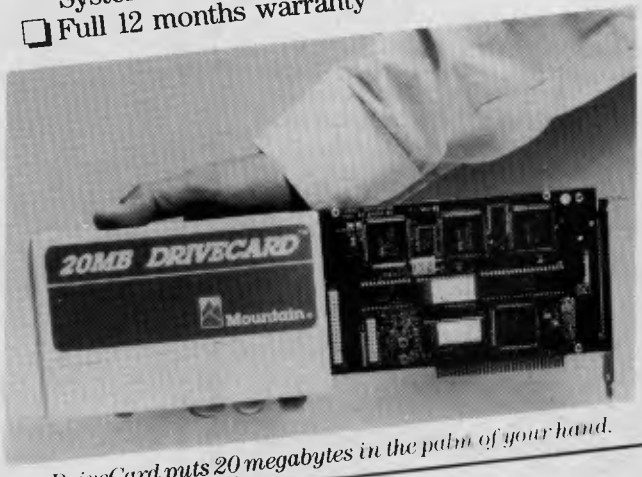

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VZ200

```
180 LPRINT " *** CASSETTE INLAYS ***"
190 LPRINT ""
200 ' INTO GRAPHIC MODE TO
210 ' PRINT NUMBERS AND LINES
220 LPRINT CHR$(18)
230 LPRINT "S1"
240 ' SET SIZE
245 ' PRINT NUMBERS
255 LPRINT "P1."
260 'DRAW LINE
270 LPRINT "J446,0"
280 ' GO BACK TO PRINT NUMBER
290 LPRINT "R-200,0"
300 ' PRINT OTHER NUMBER
310 LPRINT "P2."
315 LPRINT"R-292,-30"
320 LPRINT"P3."
321 LPRINT"J446,0"
322 LPRINT"R-200,0"
323 LPRINT"P4."
324 LPRINT"R-292,-30"
325 LPRINT"P5."
326 LPRINT"J446,0"
327 LPRINT"R-200,0"
328 LPRINT"P6."
329 LPRINT"R-292,-30"
330 LPRINT"P7."
340 LPRINT"J446,0"
350 LPRINT"R-200,0"
360 LPRINT"P8."
370 LPRINT"R-292,-30"
380 LPRINT"P9."
390 LPRINT"J446,0"
400 LPRINT"R-200,0"
410 LPRINT"P10."
420 LPRINT"R-315,-30"
430 LPRINT"P11."
440 LPRINT"J446,0"
450 LPRINT"R-200,0"
460 LPRINT"P12."
470 LPRINT"R-315,-30"
```

VZ200

```
480 LPRINT"P13."
490 LPRINT"J446,0"
500 LPRINT"R-200,0"
510 LPRINT"P14."
520 LPRINT"R-315,-30"
920 SOUND 31,1
930 PRINT"(INVERSE) FINISHED":FOR T=1 TO
1500:NEXT:RUN
1000 'TITLE PAGE
1010 CLS
1030 COLOR 8,0
1035 POKE 30744,1
1040 PRINT@0,"CTRL+Q,CTRL+T*30,CTRL+W";
1045 PRINT@448,"CTRL+E,CTRL+Y*30,CTRL+R"
;
1060 FOR Y=32 TO 416 STEP 32
1070 PRINT@Y,"CTRL+U"
1080 NEXT Y
1090 FOR Y=63 TO 447 STEP 32
2000 PRINT@Y,"CTRL+I"
2010 NEXT Y
2040 PRINT@109,"VZ-200"
2050 PRINT@195,"*** CASSETTE - INLAYS **
*"
2060 PRINT@298,"BY IAN DUTFIELD"
2070 PRINT@388,"PRESS ANY KEY TO CONTINU
E"
2080 IF INKEY$="" THEN GOTO 3000
2090 IF INKEY$="" THEN GOTO 3000
2095 SOUND 31,1:GOTO 4000
3000 SOUND 28,1
3010 PRINT@388,"(INVERSE)PRESS ANY KEY T
O CONTINUE"
3020 SOUND 10,1
3030 GOTO 2070
4000 CLS
4005 POKE 30744,0
4010 INPUT"(INVERSE)SET UP PRINTER AND P
RESS <RET>";P$
4020 PRINT:PRINT:PRINT"PRINTING"
4030 RETURN
```

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Microbee

HIGH-RES ON SCREEN 2

This program allows you to plot on 'screen 2' of the Microbee, simply by exchanging the data of both screens, and will also handle colour information. It therefore eliminates the need to peek and poke the alternate screen. You can insert your own program after line 720, but my listing incorporates a library of screen utility subroutines. These are mainly BASIC statements, so you can take the program apart at your leisure.

Ian Florence,
Magill, SA.

```
00100  REM HIRES ON SCREEN 2 for the MICROBEE by Ian Florance 1985
00110  REM (it also works on colour bees!)
00120  REM
00130  REM This program eliminates the need to poke, poke and
00140  REM peek to and from the alternate screen.
00150  REM It does this by a machine code subroutine
00160  REM which exchanges the screens.
00170  REM Therefore you can simply use as per normal the usual
00180  REM basic commands.
00190  REM ALSO the program allows you to alter the screen
00200  REM display so that you can see both screens at once.
00210  REM All the screen options use BASIC statements which
00220  REM you may find useful.
00230  REM
00240 GOTO510
00250  REM SUBROUTINE TO LOOK AT SECOND SCREEN
00260 IN#0 OFF:OUT 12,12:OUT 13,4:IN#0 ON:RETURN
00270  REM
00280  REM SUBROUTINE TO LOOK AT FIRST SCREEN
00290 IN#0 OFF:OUT 12,12:OUT 13,0:IN#0 ON:RETURN
00300  REM
00310  REM SUBROUTINE TO GO TO INTERLACE SCAN
00320 IN#0 OFF:OUT 12,8:OUT 13,75:IN#0 ON:RETURN
00330  REM
00340  REM SUBROUTINE TO GO TO NORMAL SCAN
00350 IN#0 OFF:OUT 12,8:OUT 13,72:IN#0 ON:RETURN
00360  REM
00370  REM SUBROUTINE TO EXCHANGE SCREENS AND ENTITLE THEM WITH
00380  REM SCREEN 1 & SCREEN 2
00390 CURS 28,1:COLOR 6:COLORB0:PRINT"SCREEN 2":B=USR(A):COLOR 13:CURS 28,1:PRIN
T"SCREEN 1":COLOR 7:COLORB1:RETURN
00400  REM
00410  REM MACHINE CODE DATA TO EXCHANGE SCREENS
00420  REM       (it will also handle colour as well!)
00430 DATA  58, 0, 248, 71, 62, 0, 50, 0, 248, 62, 64, 211
```

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Microbee

```
00440 DATA  8, 58, 0, 248, 50, 0, 248, 79, 62, 0, 211, 8
00450 DATA  58, 0, 248, 254, 0, 120, 50, 0, 248, 32, 34, 62
00460 DATA  64, 211 , 8, 121, 50, 0, 248, 33, 0, 248, 17
00470 DATA  0, 252, 1, 0, 4, 126, 8, 26, 119, 8, 18, 19, 35
00480 DATA  11, 120 , 177, 32, 243, 62, 0, 211, 8, 33, 0
00490 DATA  240, 17 , 0, 244, 1, 0, 4, 126, 8, 26, 119, 8
00500 DATA  18, 35, 19, 11, 120, 177, 32, 243, 201
00510 CLEAR:SD8:STRS(768):C=0:DIM E(256),F(256):A=PEEK(161)*256-2048
00520  REM Machine code is completely relocatable
00530  REM I have chosen 2k down from top of memory
00540 FORI=ATOA+91:READ B:C=B+C:POKE I,B:NEXTI
00550 IF C<>7314THEN CLS:PRINT:PRINT"ERROR IN MACHINE CODE DATA - CHECKSUM ERROR
":STOP
00560  REM clear both screens
00570 COLOR 7:COLORB4:CLS:PRINTTAB(28);'SCREEN 2":B=USR(A):COLORB1:CLS:PRINTTAB(
28);"SCREEN 1"
00580  REM MENU
00590 A1$="PRESS '1'- view screen 1, '2'- view screen 2, '3'- normal scan,
 '4'- exchange screens 1 & 2, "
00595 A1$=A1$+"'5'- interlace scan mode on,         any other key to continue"
00600 C=LEN(A1$):FORI=1TOC:E(I)=PEEK(61503+I):POKE 61503+I,ASC(A1$(;I,I)):NEXTI
00610 REM next line is to poke in color if necessary
00620 IF PEEK(153)=255THENFORI=1TOC:OUT 8,64:F(I)=PEEK(63551+I):POKE 63551+I,7:N
EXTI:OUT 8,0
00630 A1$=KEY$:IFA1$=""THEN630
00640 FORI=1TOC:POKE 61503+I,E(I):NEXTI
00650 IFPEEK(153)=255THENFORI=1TOC:OUT 8,64:POKE 63551+I,F(I):NEXTI:OUT 8,0
00660 IF A1$="2"THENGOSUB250:GOTO590
00670 IF A1$="1"THENGOSUB280:GOTO590
00680 IF A1$="5"THENGOSUB310:GOTO590
00690 IF A1$="3"THENGOSUB340:GOTO590
00700 IF A1$="4"THENGOSUB370:GOTO590
00710  REM
00720  REM YOUR program may be inserted from here on
00730  REM My program draws a four-leaf clover and cardiod
```

Microbee

```
00740  REM on screen 2, switches on interlace scan and returns
00750  REM to the menu
00760 B=USR(A):COLORB0:SD4:HIRES:X1=128:Y1=128:X2=384:Y2=128:S1=1.6*30:S2=30
00770  REM x1,y1 is the centre of the first figure & x2,y2 the center of the 2nD
00780  REM s1 & s2 are the scaling factors for the x & y coords
00790 FORF1=0TO6.28STEP0.04:C1=COS(F1):C2=SIN(F1)*S2:R1=1+C1:R2=SQR(ABS(COS(2*F1
))):COLOR 6:SET INT(R1*C1*S1+X1),INT(R1*C2+Y1):COLOR 13:SET INT(R2*C1*S1*2+X2),I
NT(R2*C2*2+Y2):NEXTF1
00800 COLOR 4:CURS 18,2:PRINT"CARDIOD":CURS 40,2:PRINT"FOUR-LEAF CLOVER"
00810 SD8:COLOR 7:COLORB1:B=USR(A):GOSUB310:GOTO590
```


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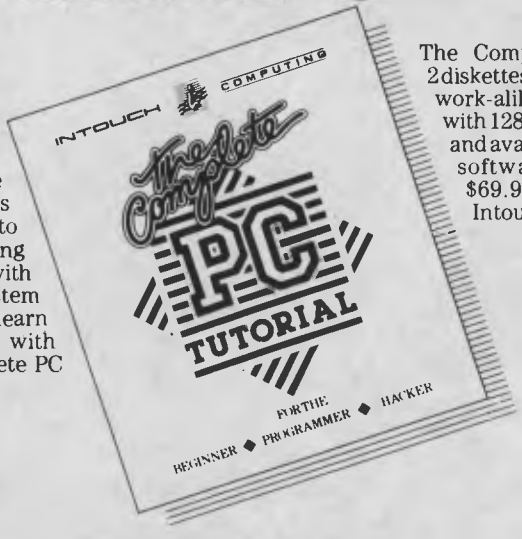

The Complete PC Tutorial comprises 2 diskettes and operates with an IBM-PC or work-alike running PC-DOS or MS-DOS with 128K RAM or better. It's unprotected and available from most software outlets at $69.95 or direct from Intouch Computing.

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MAGNUM 5901B

Amstrad

BYTECYCLE SURROUND

Bytecycle Surround is a two-player game in which each player tries to force the other into the energy field surrounding the playing area, or to crash into the trail of a bytecycle.

Player one moves using the joystick, and player two moves using the cursor arrow keys. This arrangement can be changed by altering the key numbers in lines 530 — 560.

Bruce Daniel,
Mudgee, NSW.

```
1 ' Bytecycle Surround
2 '
10 MODE 0:CLS
20 GOSUB 500
30 x1=299:y1=200
40 x2=340:y2=200
50 sx.1=-4:sy.1=0 : x=4 : y=2
60 sx.2=+4:sy.2=0
70 WHILE NOT(P1 AND P2)
80 IF NOT INKEY(up.1) THEN sy.1=y:sx.1=0
90 IF NOT INKEY(up.2) THEN sy.2=y:sx.2=0
100 IF NOT INKEY(dw.1) THEN sy.1=-y:sx.1=0
110 IF NOT INKEY(dw.2) THEN sy.2=-y:sx.2=0
120 IF NOT INKEY(lf.1) THEN sx.1=-x:sy.1=0
130 IF NOT INKEY(lf.2) THEN sx.2=-x:sy.2=0
140 IF NOT INKEY(rt.1) THEN sx.1=x:sy.1=0
150 IF NOT INKEY(rt.2) THEN sx.2=x:sy.2=0
160 P1=TEST(x1+sx.1,y1+sy.1) : P2=TEST(x2+sx.2,y2+sy.2)
170 IF P1<>0 OR P2<>0 THEN 300
180 MOVE x1,y1 : x1=x1+sx.1 : y1=y1+sy.1 : DRAW x1,y1,2
190 MOVE x2,y2 : x2=x2+sx.2 : y2=y2+sy.2 : DRAW x2,y2,3
200 WEND
```

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YC 3 86

Amstrad

```
210 '
300 IF p1<>0 THEN p$="Player 2" ELSE IF p2<>0 THEN p$="Player 1"
310 SOUND 2,91,49,14,0,1,1
320 IF p1<>0 AND p2<>0 THEN p$="Nobody"
330 w$=p$+" has Won."
340 LOCATE 10-LEN(w$)\2,2
350 PEN 14:PRINT w$
360 WHILE INKEY$<>"":WEND
370 PEN 15:LOCATE 4,24:PRINT "Press <ENTER>";
380 ky$="":WHILE ky$<>CHR$(13) AND ky$<>"X":ky$=INKEY$:WEND
390 RUN
400 '
500 INK 0,10:INK 1,26:INK 2,6:INK 3,14:BORDER 0
510 MOVE 0,0
520 DRAW 639,0,1:DRAW 639,399:DRAW 0,399:DRAW 0,0
530 up.1=72 : up.2=0
540 dw.1=73 : dw.2=2
550 lf.1=74 : lf.2=8
560 rt.1=75 : rt.2=1
570 RETURN
```

Amstrad

BYTE RIDER

The aim of the game is to guide your byte around the memory grid, without crossing over the trailing cells of used memory. Cover as many locations as you can before memory runs out, by moving the joystick in the direction you want to turn.

Bruce Daniel,
Mudgee, NSW.

```
100 INK 0,24:INK 1,11:INK 2,0:INK 3,26:BORDER 1
110 hs=0:x$=CHR$(24)
112 SYMBOL AFTER 254
113 SYMBOL 255,255,129,129,129,129,129,129,255
120 MODE 1
130 WINDOW £0,2,39,5,24
140 WINDOW £1,1,40,1,3
150 PAPER £2,3:CLS £2
160 PAPER £1,0:CLS £1
165 PAPER £0,2:CLS £0
170 CLS £1:LOCATE £1,14,1:PEN £1,3:PRINT £1,"BYTE RIDER !":PEN £1,2
180 LOCATE £1,1,2:PRINT £1,x$;"Score :";x$;USING "££££";sc;:LOCATE £1,20,2:PRINT
 £1,x$"High Score :";x$;USING "££££";hs;
190 PEN 1:LOCATE 1,1
200 gd$=STRING$(228,255)
210 FOR lp=1 TO 3:PRINT gd$;gs$;:NEXT lp:PRINT LEFT$(gd$,76);
230 LOCATE 1,1
240 LOCATE £1,7,3:PRINT £1,"Press <FIRE> to Begin Play.";
250 nc=3:cl$=CHR$(207):cx=16:cy=334:sc=0:jk=8
260 WHILE (JOY(0) AND 16)<>16 AND (JOY(0) AND 32)<>32:WEND
270 FOR lp=2000 TO 500 STEP -50
280 SOUND 2,lp,2,15
290 NEXT lp
300 ENV 1,127,75,1
310 SOUND 2,500,-1024,12,1
320 CLS £1
330 LOCATE £1,20,3:PRINT £1,x$;"High Score :";x$;USING "££££";hs;
340 LOCATE £1,1,1:PEN £1,2:PRINT £1,"BYTE RIDER !  by Bruce Daniel 1985.":PEN £1
,1
350 LOCATE £1,1,3:PRINT £1,x$"Score :";x$
360 WHILE TEST(cx,cy)<>3:LOCATE £1,8,3:PRINT £1,USING "££££";sc+1:PLOT cx,cy,3:
TAG:PRINT cl$;:TAGOFF:sc=sc+1
370 jy=JOY(0):IF jy<>1 AND jy<>2 AND jy<>4 AND jy<>8 THEN jy=jk ELSE jk=jy
380 IF jy=1 THEN cy=cy+16 ELSE IF jy=2 THEN cy=cy-16 ELSE IF jy=4 THEN cx=cx-16
ELSE IF jy=8 THEN cx=cx+16
390 WEND
400 IF sc>hs THEN hs=sc
410 IF sc>hs THEN hs=sc
```

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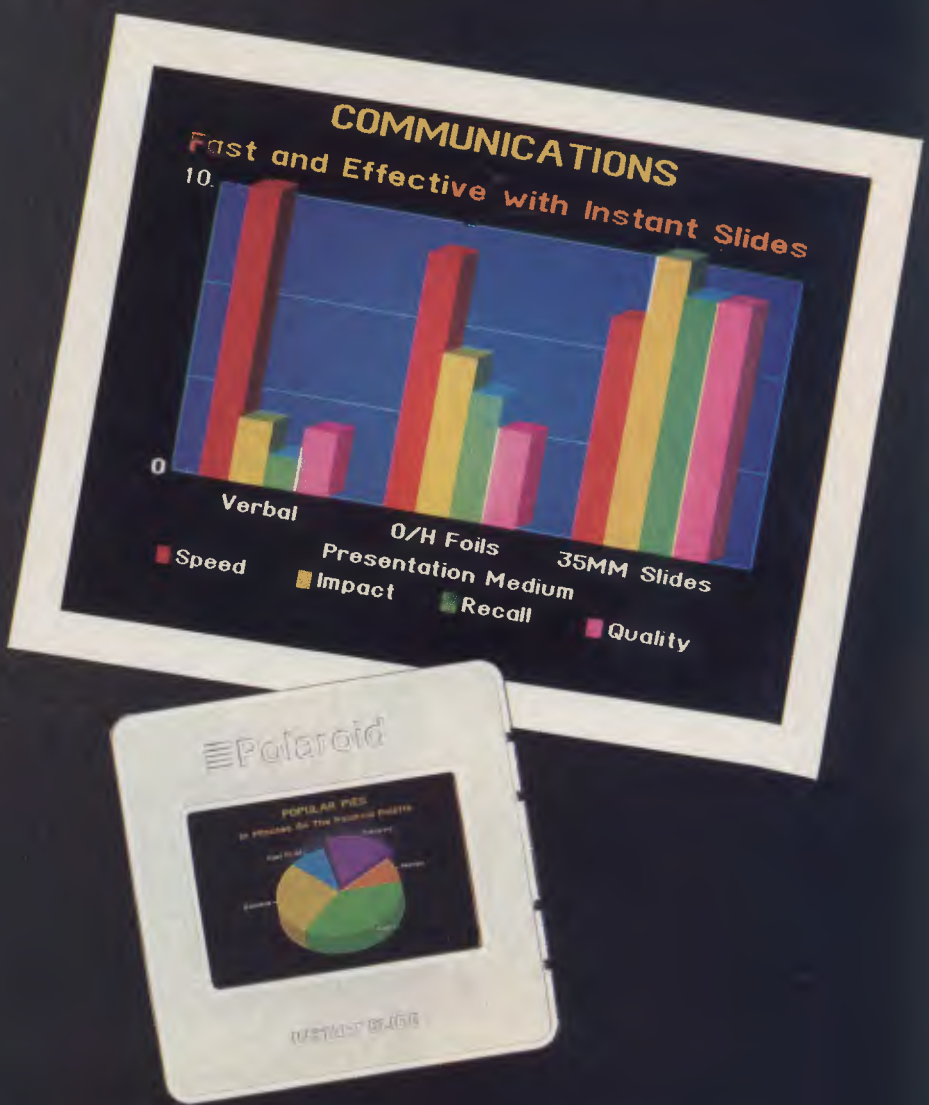

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Ogilvy MPE 0006

Amstrad

```
420 SOUND 128+2,4000
430 ENV 2,6,-1,3
440 SOUND 2,1110,110,0,2,0,7
450 SOUND 5,0,110,0,2,0,7
460 INK 3,15,3:INK 2,11,12:INK 1,12,11:INK 0,3,15
470 BORDER 6,24
480 FOR td=1 TO 1800:NEXT td
490 INK 0,24:INK 1,11:INK 2,0 INK 3,26:BORDER 1
500 GOTO 150
```

TRS-80 PC4

BLACK JACK

This rather untidy Black Jack program for the TRS-80 PC4 (Casio PB-100), works most of the time. It was written and then partially debugged (hence the untidyness) in a couple of hours. Several parts of the original code have been contorted almost beyond recognition, just to get it going; and some parts required modifications, which should have made no difference, before they would work. There are a couple of bugs unlocated — a black jellybean goes to anyone who can find them. The clues: every once in a while when a three or an ace is drawn, the PC4 doesn't print the suit. And when a king is drawn after the second card, it sometimes cancels the running total for the hand ('T') and starts again at 10. Where possible, logical variable names have been used; for example, 'P' for points, 'T' for total, 'C' for clubs, and so on. Where this wasn't possible, the first unused variable that came into my head got the job.

You will need to expand the variables to 60 with the DEFM 34 command, and have the 1 Kbyte RAM pack installed. Good Luck!

G. Thornley,
Crafers, 5152.

```
1 PRINT "Black Jack"
10 FOR Y=1 TO 13
11 C(Y)=Y
12 D(Y)=Y
13 H(Y)=Y
14 S(Y)=Y:NEXT Y
15 F=0:T=0
30 GOSUB 250
40 IF A<10;P=A+1:PRINT P;
50 IF A=10;P=10:PRINT " J";
60 IF A=11;P=10:PRINT " Q";
70 IF A=12;PRINT " K";
80 IF A=13;P=11:F=F+1:PRINT " A";
90 IF U=1;PRINT "♠";
100 IF U=2;PRINT "♦";
110 IF U=3;PRINT "♥";
120 IF U=4;PRINT "♣";
130 IF A=12;T=T+10
131 IF A≠12;T=T+P
135 IF T>21;GOTO 200
140 B$=KEY:IF B$="H" THEN 30
145 B$=KEY:IF B$="S" THEN 160
150 B$=KEY:GOTO 140
160 Z=INT (RAN#*8)+17
165 PRINT "    YOU=";T;" DEALER=";Z
170 IF Z=21;IF T=21;PRINT "IT'S A DRAW!"
175 IF Z<22;IF Z>T;PRINT "DEALER WINS."
180 IF Z<22;IF T>Z;PRINT "YOU WIN!"
190 IF Z>21;PRINT "DEALER BUSTS"
200 IF T>21;IF F>0;T=T-10:F=F-1:GOTO 135
205 IF T>21;PRINT "   ";T;": YOU BUST. "
210 INPUT "ANOTHER",V$
220 IF V$="Y";GOTO 10
230 END
250 U=INT (RAN#*4)+1
254 A=INT (RAN#*13)+1
255 IF U>0;IF U<5;IF A>0;IF A<14;GOTO 260
256 GOTO 250
260 IF U=1;IF C(A)≠0;C(A)=0:RETURN
270 IF U=2;IF D(A)≠0;D(A)=0:RETURN
280 IF U=3;IF H(A)≠0;H(A)=0:RETURN
290 IF U=4;IF S(A)≠0;S(A)=0:RETURN
300 GOTO 250
```

Reviews

Microsoft Excels 116

Excel was just the tempting cheesy morsel required to lure our Grouse into the mousetrap — he's rapt.

Dac it Easy 120

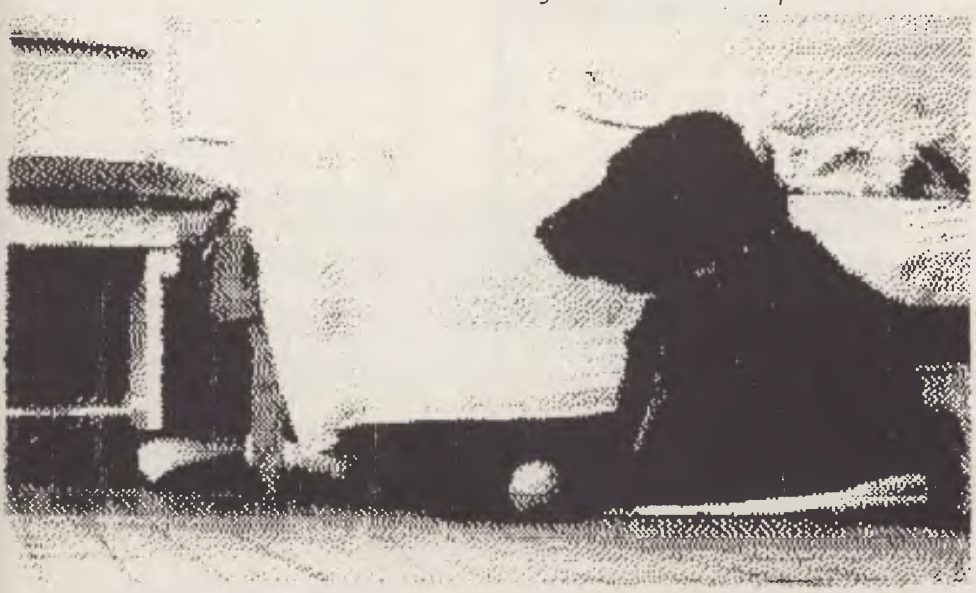
Phil Grouse and the seven modules, Accounts Receivable, Accounts Payable, General Ledger, Inventory, Forecasting, Billing and Purchase Orders — this is no fairy story. It's a powerful, efficient account of cold, hard cash, and it's cheap.

Close Encounters of the Graphic Kind 124

A new suite of interactive adventure games brings you and the gremlins into graphic contact. Don't fret, you're still in charge of the sound effects. Yikes! Eeeek! Aaaargh! Oooff! Biff! Boing! Splurk! Whew!

Thunderscan 128

With this high-resolution scanner for the Apple Macintosh, you can digitise the photo of your favourite rain dancer, your charcoal drawing of a dense cumulo nimbus cloud cover, any artistic impression of a sunny day; and you can edit these images, insert text, change the contrast and print the result.



MICROSOFT EXCELS

Phil Grouse joins the MS Mouse Club. That's him in the 16,384th row of the 256th column in the spreadsheet of Microsoft's alternative to Lotus' Jazz — the two of them just clicked. Speed, ease of use, sophistication — our Mousketeer says Excel has the lot.

A FEW MONTHS ago I reviewed Lotus Jazz for the 'fat Mac'. Jazz follows the structure of most integrated packages, providing a word processor, spreadsheet, graphics, database, communications and so on. In a machine with just two floppy drives, such packages put considerable strain on storage facilities.

Rather than providing something for everyone, Microsoft Excel consists of a well-conceived, integrated package, which is limited to spreadsheet, graphics and database. The emphasis is on the spreadsheet aspect, although the business graphics are also first class. The database facility is limited, and should be considered more as an extension of the spreadsheet facility than as a sub-system in its own right.

There is no word processor associated with Excel — an omission hardly likely to disturb too many potential users. By the time most buyers of an integrated package unwrap their new purchase, they'll probably already be using a word processor of some description, and the thought of learning yet another set of commands is decidedly unattractive.

Excel comes on two disks, requiring a Macintosh with 512 Kbytes of memory and an external disk drive. The printer is optional, but strongly recommended. One disk included Switcher, a partitioning system which supports several programs. Switcher will let you copy parts of a worksheet into a memo being written with Microsoft Word, for example. Given the storage limitations of our floppy-based Mac, Switcher hardly seemed a practical proposition. The story could be very different with a hard disk, but the moral is 'try before you buy'.

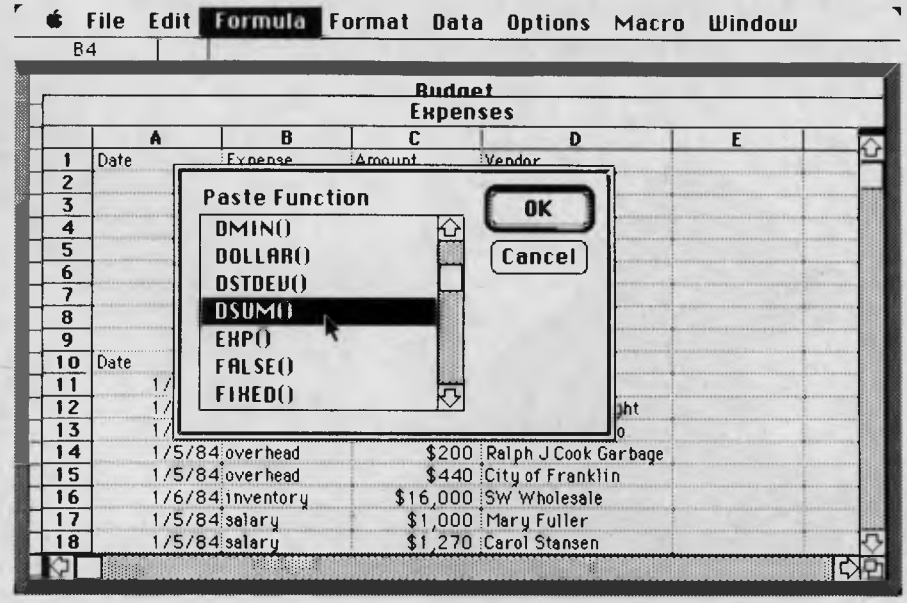


Figure 1. *Pasting a function into a cell. The dialogue box is used to select the required function name.*

Without Switcher, you can still leave Excel to execute another program and return to your work, without having to load the original disk again.

The program disk is protected, but Microsoft provides a back-up copy. The data disk is not copy protected.

The spreadsheet component of Excel lives up to its name. As an infrequent user of spreadsheet systems, I found Excel simple to use. It relies heavily on the mouse, which is well suited for marking selected cells, or for defining ranges of cells. Selected cells need not be confined to rectangular collections of cells — they can consist of a set of rectangular areas. The menus are clear, and the context-sensitive help system almost makes the manual superfluous.

Despite its ease of use, Excel is a very sophisticated package, which supports a maximum of 16,384 rows of 256 columns. While this may seem quite a large spreadsheet, the real limit is determined by internal memory and disk capacities. In particular, the total size is determined by the location of the right-most cell in the last-used row. Excel does not appear to use sparse matrix storage techniques, so unused cells still take up space. The advantage of this approach is the speed of execution. In most applications, the space limitation won't matter, especially since Excel has excellent facilities for linking several worksheets.

The associated database facility is also limited by the maximum number of rows; Excel treats each row as a database record, the columns defining the various fields in each of them. A limit of 16,384 records is still fairly respectable for a database, but storage limitations mean that, in practice, the limit is well below that figure.

Excel allows you to define (or name) a database anywhere on a worksheet with the Set Database command. Database operations include sorting, searching, copying and totalling. Powerful search criteria are used to extract information from a database.

The Mouse

Apart from being used for conventional Mac operations such as pull-down menus and range specification, the mouse is ideal for changing the sizes of columns. To change a column width simply put the mouse cursor on the dividing line between

the column headings and pull the line across. Even editing text in the formula bar is simplified by using the mouse.

The mouse saves a great deal of typing effort. A function name in a formula can be entered by selecting it from a function pull-down menu (for example, the space function command).

Admitting the utility of a mouse is a change of heart for me. I've always been an 'aniconic' individual: icons are for the illiterati or non-typists. Excel has made me re-think this position.

Generating graphs from ranges of spreadsheet data is also very simple, and heavily mouse-oriented. Like a number of other integrated systems, Excel uses pointers to data rather than duplicating data for creating related displays. This means the internal data structure for a graph consists of a type specification (pie, bar, line), axis text, and a set of pointers back to the spreadsheet marking the row/column headings and the various data sequences. As a result, changes to any of the spreadsheet values are automatically reflected in the associated graph. A similar principle also applies to Excel's recalculation mode. With automatic recalculation enabled, a change to a key value cell results in the immediate recalculation of all cells which depend on that cell, as well as the updating of any related graphic data.

Although Excel doesn't have goal-seeking functions, it does provide for the control of repetitive recalculations. In particular, you can set a minimal difference between cells so continuous recalculation occurs until the difference drops below the threshold. This feature can be used for programmed 'goal seeking', as well as complex numerical iterations, such as the summing of infinite series.

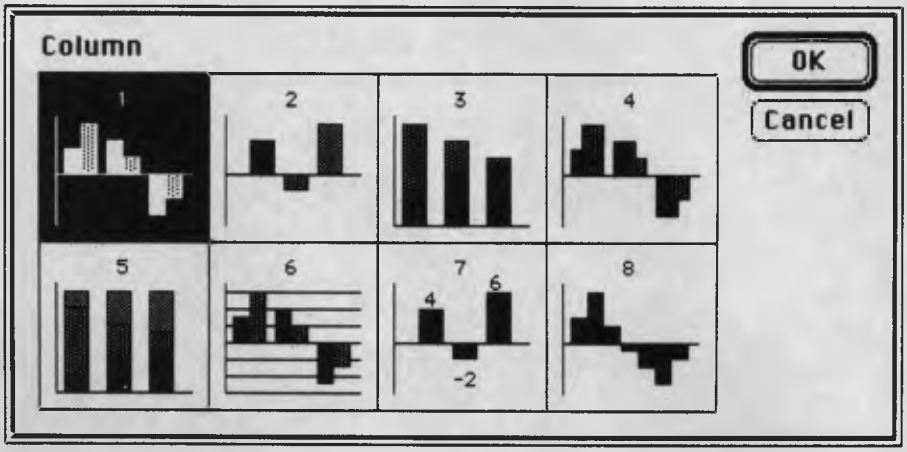


Figure 2. *This gallery window allows selection of eight types of column graph.*

The graphing facility provides for a wealth of formats, as well as the means for annotating graphs. The range includes bar, pie, line, area, column and scatter diagrams. Each type has a number of alternative forms of presentation.

One of the most impressive aspects of Excel is its ergonomic design. It's extremely well conceived and executed, so even the novice user can effectively use the system. I quickly discovered that graphs could be moved around the screen, and resized.

There is a sample undocumented graphics macro on the data disk, which stretches the graphics facilities to create an analogue clock face on the screen, complete with second hand. Study of this macro reveals some of the inherent power of the macro language.

The spreadsheet component of Excel lives up to its name. As an infrequent user of spreadsheet systems, I found Excel simple to use. It relies heavily on the mouse, which is well suited for marking selected cells, or for defining ranges of cells.

Macros

A 'macro' is an Excel program. There are two kinds: a command macro (which carries out a sequence of actions automatically), and a function macro (which, like one of the built-in functions, performs a calculation and returns a value). Both forms are made up of formulae in cells on a 'macro sheet'. When creating a macro sheet, Excel provides you with an additional set of functions — the Excel macro language. Most of these functions have direct counterparts in the Excel menu bar, while others provide the means for conditional and unconditional branching within the macro program. The macro language is extensive and powerful.

Documentation

Excel's documentation is first class. There is a loose-leaf user's guide, a separate spiral-bound manual called 'Arrays, Functions

RATINGS:	POOR	GOOD	V. GOOD	EXCELLENT
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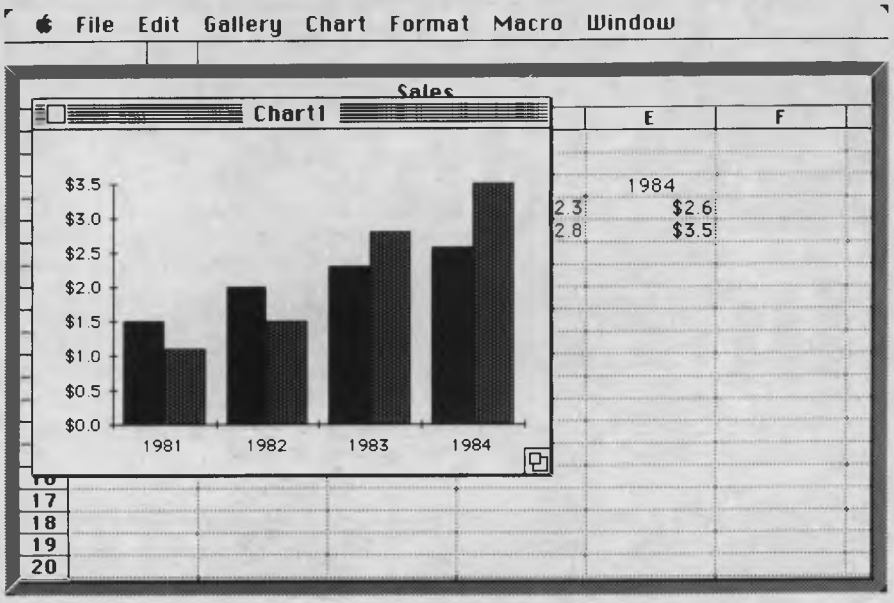

Figure 3. *A column graph overlays this worksheet, which contains the associated data series. If one of the data cells is changed, the graph is automatically updated.*

and Macros', a 22-page booklet entitled 'Using Switcher with Microsoft Applications', and a smaller 20-page quick-reference guide. All four are superbly printed and illustrated in two colours. The indexes are comprehensive and simple to use.

The user's guide is in four main sections: Learning Excel, Using Excel, Excel Reference, and Appendices. The Learning Excel section takes you on a hands-on tour through a number of spreadsheets, associated databases and graphs.

Summary

Excel is perhaps the best spreadsheet system presently available on any personal computer system. It's difficult to find fault with any of its components or architecture. My only complaint is it doesn't use sparse matrix storage methods, although there is a clear advantage in speed of operation. As RAM prices continue to fall, this objection will surely be short-lived. Congratulations Microsoft. □

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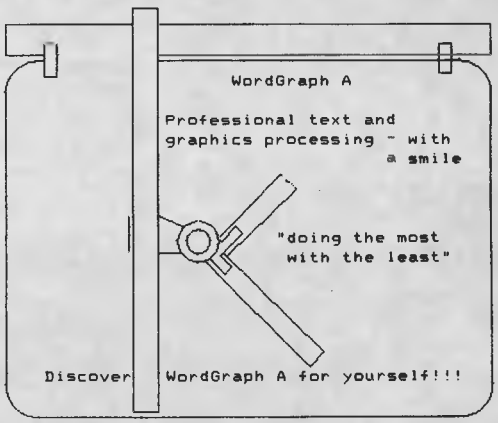

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DAC IT EASY

"NO ONE in his right mind will spend $3000 for a standard accounting package when he can get the same thing for only $50", said DAC Software president, Kevin Howe. Between March and August 1985, this Texas-based firm sold more than 20,000 units. DAC Software claims to have been profitable since April '85, and projects first-year sales of $3.5 million, which is quite an achievement!

Over the years, users have been conditioned to accept prices running into four figures for limited accounting packages. Individual modules typically sell for around $500. By contrast, the Dac system contains seven modules, and was introduced late last year for $US49.95. (The regular price is $US69.95.) Dac Easy is being sold here, without copy protection, for $199 by Video Technology of Dulwich Hill, New South Wales. Even so, it's still remarkably good value.

Why are other accounting packages so expensive? The answer is the cost of user support: in many cases, the wholesale price of an accounting package is very low, but the dealer marks it up to cover 'handholding' costs. By contrast, DAC Software offers a limited support facility for users who would rather make an initial small outlay and rely largely on their own resources. Video Technology offers an "inexpensive one-year service agreement". The Australian consultants are all qualified accountants, although at the time of writing only the eastern states were covered. In the United States, $50 buys either a one-hour telephone consultation, or five separate calls. (The user pays for the phone calls.) The service in Australia is the same, and the cost is still $50. A money-back guarantee applies if the user is not satisfied with the product.

Our review copy was for the IBM PC/XT/AT family and compatibles, and there is also a PCjr version. Dac Easy runs under PC-DOS (or MS-DOS) version 2.0 or later. The package requires a minimum of 128 Kbytes of RAM, one floppy disk drive, an 80-column display and a 132-column printer. No great play is made of specific IBM features, and the screen is strictly monochrome (although it runs fine on an RGB monitor).

Dac Easy's seven modules, which are not available separately, are Accounts Receivable, Accounts Payable, General Ledger, Inventory, Forecasting, Billing, and Purchase Orders.

Despite the fact that we gave him heaps of moral support and encouragement Phil Grouse just couldn't bring himself to do the huge accounting-package comparo this month. However, one product caught his eye: Dac Easy is powerful, but cheap (and it has a pretty cover). Phil decided to cheque it out, as a kind of peace offering.

There is no suggestion that the software has been cut to a price. Dac Easy is an impressive package with excellent functionality. The user interface is good, and you would have to work hard to get into trouble. The program guards against many types of error, and the manual suggests a recommended logon procedure to prevent common mistakes. All inputs are range-checked for validity, and the all-important task of performing a back-up is simple.

Documentation

Perhaps the only area worthy of criticism is the 240-page documentation — a well-written manual would have softened the task of learning to fire up and use the system. The text is clear, but brevity is scarcely a virtue in this context. The type is unnecessarily small, and the installation section and index are both skimpy. A section on setting up your own chart of accounts is really needed, especially since the product is aimed at people without accounting experience.

The terminology is also a rather odd, and somewhat confusing. Consider this extract from page 16: "In order to fully use the disk space, Dac Easy accounting uses blocks, which means that separate assignments are not made for each record. Instead we assign groups of records which makes the files faster and more efficient." Presumably the reference is to record buffering, but why not say so?

Although the date is currently in the American format (MM/DD/YY), an Australian version, which will also allow for multiple sales tax rates, is due for early release.

Minor Irritations

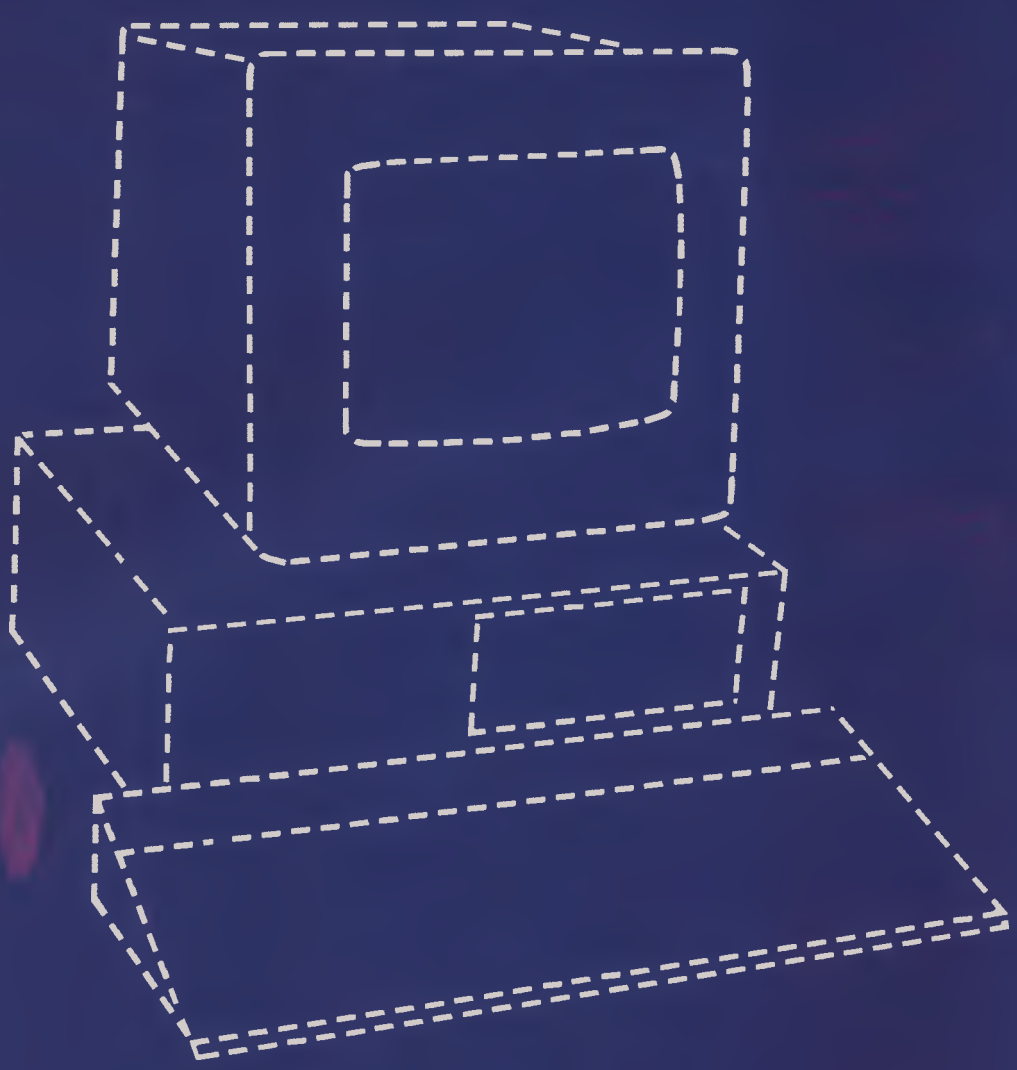
The inventory module doesn't support FIFO (first in, first out) or LIFO (last in, first out) access, and it isn't easy to void cheques. There is no payroll or tax module, nor is there a monthly budgeting feature. Nevertheless, this is still a handsome package: the inventory system supports fractional units, and it takes up surprisingly little room. Unlike many accounting packages, Dac Easy can be used realistically on floppy disk-based systems.

Dac Easy requires the user to know the maximum size of his or her data files in advance. In the 'old days' (circa IBM 360/40), creating files in OS/360 JCL certainly needed this information, but MS-DOS allows files to grow. The reason for file size-specification here is that a hashing algorithm is used to convert alphanumeric keys into record addresses for speed of access, so the range of records must be known in advance. Should files grow beyond their pre-assigned limits, there is a re-hashing utility, which retains the existing data but enlarges the file space.

The combination of buffering and hashing certainly gives the software a considerable speed advantage. It appears to be written in compiled BASIC, and runs at least as fast as many of its higher-priced competitors. Password protection at five levels is also available.

Although individual files can be accessed under DOS, their internal hashed structure means it isn't possible for data to be shared with other PC programs.

Getting started with Dac Easy requires a fair bit of dedication, but it's well worth the effort. As there is no on-line tutorial, it's essential to make a careful study of the manual — particularly the second chapter. You must also complete some file-size calculations and use the menu-driven utilities to establish the new files. Adjustments may also be necessary for oddball printers, and data may have to be transferred from existing company files.



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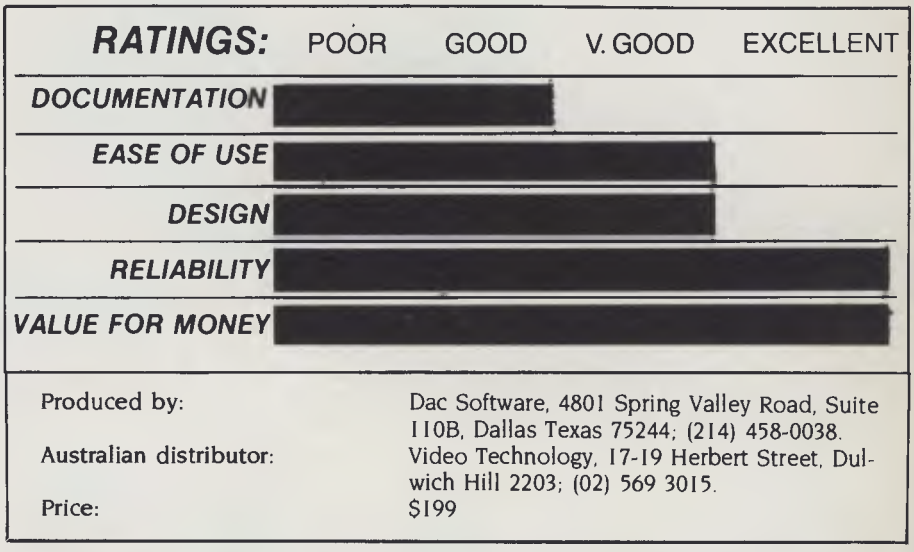
Using Dac Easy is certainly easier than *learning* to use it. The whole system is menu-driven. An on-line help facility would have made it much, much simpler to use. On the other hand, once the system is understood, operation is quite straightforward.

A level of prerequisite knowledge is demanded of intending users. In particular, certain elementary DOS commands, such as COPY, DIR, DEL and FORMAT, must be understood. More importantly, you will also need an understanding of elementary accounting practices.

Dac Easy retains historical data to support the review of any revenue, asset, liability or expense account. You can also trace vendor payment histories, customer purchase patterns and use of inventory. The historical data also makes various what-if calculations possible. Statistical techniques are available for Trend, Percentage Base, and Trend Line Analysis, using Least Squares.

Each of the seven modules can generate reports, and any report can be created from a single print menu. The Accounts Payable prints cheques, the Purchase Order module prints purchase orders, and the Billing system prints invoices. You can design forms to suit custom-designed stationery. All reports bear the time and date of creation.

Overall, the Dac Easy accounting package is extremely good value for money.□



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CLOSE ENCOUNTERS —OF THE GRAPHIC KIND—

Ian Allen braves the phantom worlds of a new series of interactive graphic adventure games.

THE TROUBLE with life is you only get one. Reincarnation may be a nice concept, but we can't *all* have been Marie Antoinette in a previous existence. I'd like to think I was Indiana Jones or Han Solo at some stage, but I've got a suspicious feeling I wasn't. Harrison Ford has already been there and done both. I guess there's a lesson in that: fantasy enables you to do anything, which is the appeal of adventure games.

Part of the fun of observing computer evolution is watching various concepts develop and mature. It's worth subscribing to magazines like *Your Computer* just for their historic value — so you can read today's issues a couple of years from now. The pace of change is extraordinary!

Three years ago, a company called Infocom was the state of the art in adventure games. It was the first to successfully implement the concept of interactive adventures — games where what happened depended entirely on your responses. For example, if you chose to pick up the axe rather than the lantern, you would face a different series of encounters. They were the first popular games to provide more than one way of arriving at a solution, and a different journey every game. Infocom's 'Zork' series must rate with 'Space Invaders' and 'Flight Simulator' as all-time best-sellers. Almost everybody has played them at least once.

The big weakness, (some would say advantage) of the Zork series is the games are text only. They describe events and locations, but it's up to the player to imagine the rest. Given the advances in computer graphics, it would have been no surprise if Infocom had developed graphic adventures, but instead the company improved the parser or syntax recognition features of its games.

'Hitchhiker's Guide to the Galaxy', released in 1985, is regarded by afficionados as a supreme achievement in this area. It can understand and respond to quite complex use of the English language. Much of its wit and humour stems from another Infocom first — when the company collaborated with the author Douglas Adams.

Sound FX

The advantage of involving an author in game development is that the adventures are then constructed with real plots; fiction revolves around the actions and reactions of its characters, and builds into a crisis and resolution. This element of overall drama was long overdue in adventure games and, like all good ideas, it seems obvious in retrospect. It's never long before such conceptual leaps are further developed, and Infocom now has serious competition exploiting the same ideas. A recently released bundle of interactive adventures was not only written in collaboration with major science-fiction authors, but also has colour graphics and sound effects.

The Telarium series includes 'Rendezvous with Rama', 'Farenheit 451' and 'Dragonworld' — all based on well-known science-fiction novels — and 'Amazon', which was written in collaboration with Michael Chrichton, the author of *The Terminal Man* and *The Andromeda Strain*.

The games come with the now mandatory package of dossiers, and 'secret' sealed briefings and instructions. They also include an encrypted 'hints' sheet, which you are advised not to refer to unless the going gets really tough. Each game program is quite large, filling two double-sided disks. Obviously, the graphics represents a fair amount of this storage.

Rama In Orbit

I immediately zeroed in on 'Rama', because it's based on an Arthur C. Clarke

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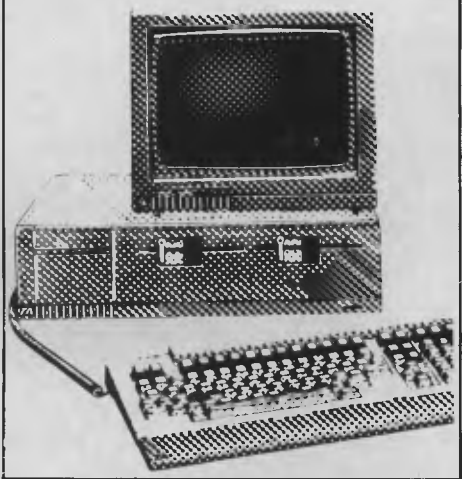

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novel. Arthur Clarke is a remarkable writer, and one of the great science-fiction visionaries. Back in the 1940s he conceived the principle of space stations and geostationary orbit (the orbit about 36,000 km above the Earth, where a satellite will rotate at the same rate as the Earth spins). In other words, an object in geostationary orbit will effectively hover above a fixed point on the Earth; Aussat, Intelsat and numerous other communication satellites use this principle. In fact, the orbit has become so crowded that nations are now arguing about space on it. (Clarke could have patented the idea but didn't, since he didn't expect to live long enough to see it happen.)

Rama has historic significance for science-fiction buffs like me because Clarke was also the first to predict interactive games. His novel *The City and the Stars*, first published in 1953, included the following passage:

> "When you entered the saga, you were not merely a passive observer, as in the crude entertainments of primitive times ... You could go into these phantom worlds with your friends seeking excitement and as long as the game lasted there was no way it would be distinguished from reality."

The 'Rama' liner jacket carries the above quote, plus Clarke's response to being involved in a personal vision come true:

> "When I wrote those words in *The City and the Stars* over three decades ago, I certainly never dreamed that this sort of thing would happen during my lifetime — still less that I would be involved! 'Rendezvous With Rama' is a splendid interactive adventure, based on my novel. The exploration of its subject, an alien starship, is a fitting context for this exciting and ambitious computer software. It is the shape of things to come."

'Rendezvous with Rama' is about humankind's first encounter with an alien spacecraft. The story goes that the craft was originally thought to be on a parabolic orbit, like Halley's comet, but it now appears to be headed directly into the sun. The one human spacecraft capable of interception is under your command. You have to land on the craft, find out as much as you can about it, and hopefully survive. You not only have to worry about what you might encounter inside, but you also have to make sure you get off Rama before it gets too close to the Sun.

It's Raining Meteorites

Telarium says the resolution of the game does not necessarily coincide with what happens in the book. I can't vouch for that because the game had one unexpected obstacle: it requires joystick skills. You have to use a joystick to guide your craft to a landing on Rama, which should be easy, but there is a meteorite shower to contend with. My eye/hand co-ordination is pretty limited (I only ever managed to clear one screen of Space Invaders), and several attempts ended in failure.

I suspect the joystick was included as a way of increasing player involvement, but once on board Rama it could be put away. Before I play again, I'm going to find a 12-year-old to pilot me through the landing.

The Heat Is On

Disappointed, I turned to 'Farenheit 451'. If you haven't read Ray Bradbury's book you've probably seen the movie. (If not, watch for it on a late-night television). Basically, it's about a world where books and magazines like this are considered to be disseminators of subversive ideas, and are therefore banned. The rationale is that ideas make people unhappy, so by disposing of all books you can create a 'happier' society. Ironically, firemen have been detailed to burn any reading material they find (451 degrees Fahrenheit is the temperature at which paper burns), and they don't bother to put out the fires, since buildings in this world are fireproof.

As with all games in the Telarium series, the objective in Fahrenheit 451 is not specific. You are Guy Montag, former fireman, a dangerous and subversive renegade. The authorities would like to see you dead, and so have declared that you are to be shot on sight. Your prospects are dim, but if you can contact the underground and find your love, Clarissa, who knows?

The adventure is set in a future, post-war New York. The streets are patrolled by firemen and robot hounds, specifically designed to kill undesirables like you 'on scent'. You must not lose track of time, because the hound patrols run like clockwork. I managed to make contact with a member of the underground, who gave me an address and a literary phrase to quote to identify myself. What a concept! Think of the future educational possibilities — we could create a new breed of adventures which forces students to look up quotes in real books.

The colour graphics in the Telarium series of adventure games are quite a plus. They usually occupy the top third of the screen, but on special occasions they expand to fill two thirds. The text is always at the bottom. As you wander about, the graphics reflect the varying scenery. Occasionally, you're prompted to change disks or turn them over.

You'd think pictures would limit the imagination, but I'm not so sure. Remember, these are computer graphic images, and while they're surprisingly detailed, they're still nowhere near the resolution of a photo or video still. The pictures evoke the flavour of a location, but there's plenty of room to use your imagination. In fact, when combined with the text, the images are very effective and involving, evoking various feelings from dread to uneasiness, to comfort and even pleasure.

Each Telarium game is supplied with a list of key words recognised throughout the series. This sensible addition means you have few problems with the language parser when playing, and you don't have to go through annoying 'guess the keyword' exercises when trying to input a command. It also makes it very easy when switching from one Telarium game to another.

'Dragonworld' uses a similar screen layout and format to 'Rama' and '451'. It's based in the mythical world of Simbala, where the last dragon has been kidnapped and evil is afoot. You must find your friend Hawkwind, and set out to rescue the dragon and undo the evil.

'Amazon' is the oddball of the series. Sometimes it uses spectacular full-screen graphics, but at other times it's text only. Amazon also has three levels of difficulty. The game opens and you discover that mysterious disasters have been plaguing a team of researchers working in the jungle. As an NSRT agent, you have been selected to get to the bottom of these occurrences. Unfortunately, this was as far as I got, since I managed to find and fall into an unprogrammed pitfall which left me in limbo. Nevertheless, I'm still intrigued enough to want to pursue this game further.

Telarium plans to expand its present series, and will undoubtedly do well. I can only wonder what we'll see in the future, especially given dramatic increases in computer memory and disk storage capacities. Three years from now, adventure games should be absolutely incredible.□

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THUNDERSCAN

HOW THEY came up with the name we're not quite sure, but Thunderscan enables the Mac to convert any image fed through the printer into a pattern of dots on the screen, and from there the image may be altered or enhanced to suit the needs of the user. To run Thunderscan, you'll need a Macintosh computer (128 Kbytes or larger) and an Imagewriter printer.

Setting Up

The Thunderscan package consists of a 60-page manual, a software disk, the digitiser cartridge, and a few other bits and pieces. The instructions and tutorial are straightforward and practise is all that is required to master most of the quite impressive array of options and enhancements.

The digitiser looks just like a printer ribbon with the addition of a little red eye on the left side. Before installing the scanner the printer cable is disconnected from the Mac and the supplied Print/Scan switch is connected between computer and printer; this remains in place to allow easy switching between functions. (It's also necessary to make two minor changes to the Imagewriter's internal switches — these are explained in the Thunderscan documentation.) The standard cover is replaced with a special cover, which permits free travel of the connecting cable while the scanner moves back and forth across the image. These steps, and the installation or removal of the cartridge, should be carried out with both the printer and computer turned off.

Once the Thunderscan has been inserted in the printer and the software has been loaded into the Mac, you're ready to start digitising. Not only is the software 'friendly', it's also very versatile, turning the Mac into a kind of mini-darkroom. It enhances some Macpaint features and displays some nice programming touches — for example, the auto-scrolling capability allows you to watch your image float across the screen!

Scanning

With the printer on and set to friction feed, the picture, drawing, photograph, map, text or whatever is inserted. Having got this far, you then turn the printer off and focus the 'eye' on the whitest area of the

image. With the printer turned back on, the area to be scanned is determined, the magnification set to any value up to 400 per cent (you can also reduce the image by up to 25 per cent), and then you can sit back and watch the printhead move back and forth for a couple of minutes, depending on the size of the scan.

You'd be forgiven for assuming this product has something to do with weather forecasting — in fact, it's a high-resolution digitiser for the Mac. Rob Vines got hold of a Thunderscan package before the Australian release and, among other things, digitised his baby.

The image gradually appears on the screen, along with a lot of information about the progress of the scan. Without going into details, the contrast and brightness can be altered at any time during or after each scan, as can a host of other variable factors. And the software seems very forgiving of errors in settings.

A bell rings to let you know when the scan is complete; it is possible to extend the scan at this point, but there is a limit if you wish to be able to touch up the image on the screen. This limit depends on the magnification chosen, the area scanned and/or the amount of space remaining on the disk, but the software alerts you to any danger when the scan area is first determined.

Fiddling With the Image

Once inside the computer, the digitised image can be altered considerably. Using the 'halftone' or 'high contrast' selections from the Scan menu allows you to lighten or darken the image. You can thus alter the whole image, or you can select just a small area for modification, using Macpaint's familiar selection rectangle. The other tools on the palette are the 'hand' for scrolling, the 'pencil' for fine adjustments, and the 'eraser'.

The image can be saved either as a scan image or as a Macpaint document. The latter is the only realistic, long-term storage method, since one large scan image can account for almost half a disk (200 Kbytes) due to the amount of memory required to save all the grey-shade information (the grey map). So once you are happy with the clarity and contrast of the image, it should be saved as a normal Macpaint image, occupying 10-20 Kbytes.

Whichever way the image is saved, Thunderscan software offers several advantages over Macpaint when working with the image. First, Thunderscan's 'Image Window' makes it easier to work with a large image than the screenful available on Macpaint. This window shows the full-size image, not some minuscule 'Show Page' version.

The second advantage is the image re-

mains in memory, so there is no waiting for disk access when scrolling. While on the subject, I should mention that when scrolling with the 'hand', giving the mouse a slight 'push' sends the image floating across the screen. Apart from looking rather graceful, this saves time and allows you to get a better idea of what you are working with.

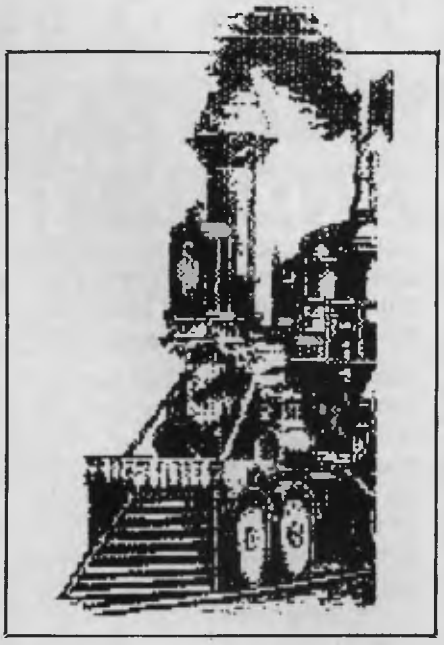
A major attraction of Thunderscan is its ability to copy the full image to the clipboard, rather than just a screenful, as in Macpaint. This capability is available when working on any Macpaint document, not just those created by Thunderscan.

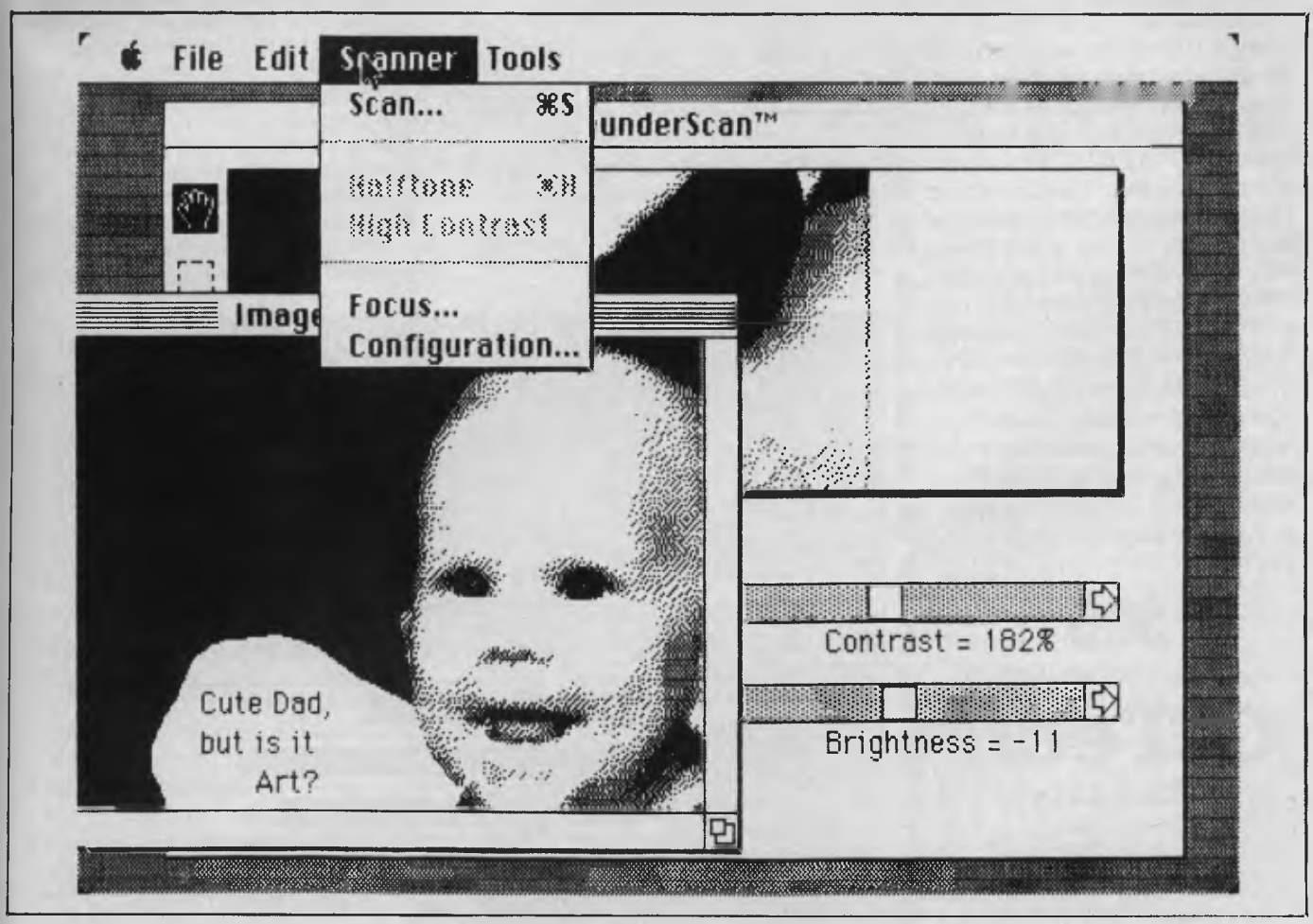
Finally, it is possible to print only part of the image, rather than the whole lot. High-resolution printing is also possible, and results in an image half the size of the original (unless you magnified the original 200 per cent) but with twice the resolution. In practice, I have been happy with normal printing, so, like most aspects of this device, it is necessary to learn by trial and error what options look best in each case.

What Scans?

I achieved good results with both black-and-white and colour photographs. Colours show up as shades of grey and, as in the old days of black-and-white TV, you'll find you soon adjust. Line drawings are ideal subjects. Maps can pose problems; due to the one-pixel uncertainty in the position of a character or line when scanning, the map outline may appear rather ragged and any text could be a little distorted. The Thunderscan documentation, however, offers some help in surmounting these difficulties. Again, it's simply a question of experimenting.

Thunderscan is not an optical character-recognition device, but it's worth having a go at scanning text because sometimes ▶





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Once inside the computer, the digitised image can be altered considerably. Using the 'halftone' or 'high contrast' selections from the Scan menu allows you to lighten or darken the image. You can thus alter the whole image, or you can select just a small area for modification, using Macpaint's familiar selection rectangle.

the results are quite all right. Since all scanned images are produced as Macpaint documents, no text-editing can be performed, but then I didn't buy Thunderscan to save typing, anyway.

Conclusion

I am very impressed with Thunderscan and happy with my purchase. The Mac does many things better than other computers, but the ability to scan anything you can feed through the printer sets the machine apart from anything in its class. Like watching a photo develop in a darkroom before your eyes, the whole Thunderscanning process is quite breathtaking. Even if you only buy it for recreational pursuits, you'll find this well-designed product a pleasure to use. □

Distributors:	International Solutions, 60-64 Shepherd Street, Chippendale 2008; (02) 319 1488. Imagineering, 77 Dunning Avenue, Rosebery 2018; (02) 662 4499.
Price:	$520 from International Solutions, and $594 from Imagineering.
Best points:	Ease of use; software design.
Worst points:	None.

RATINGS:	POOR	GOOD	V. GOOD	EXCELLENT
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EASE OF USE				
DESIGN				
RELIABILITY				
VALUE FOR MONEY				

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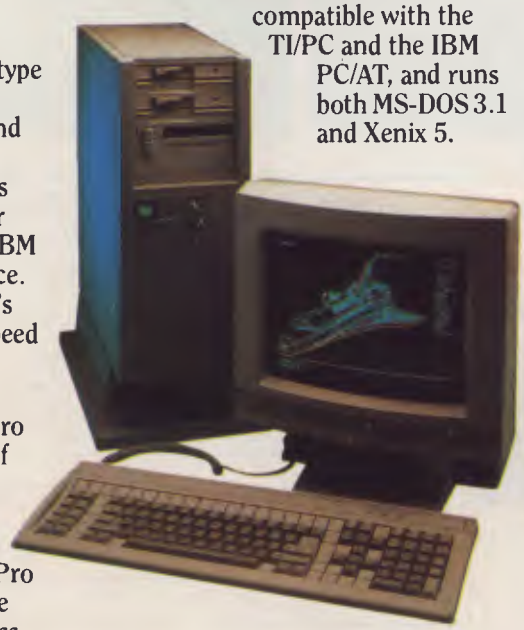
COMPATIBILITY – The Pro is compatible with the TI/PC and the IBM PC/AT, and runs both MS-DOS 3.1 and Xenix 5.



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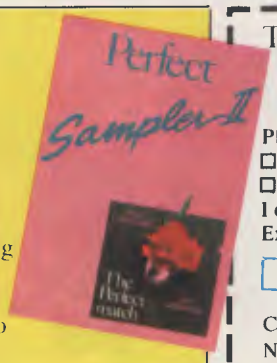

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New Products 134
What's new? Our New Products editor, Rose has escaped (leaving would-be contributors to the page with a terse message), and Ewart Stronach, car salesman extraordinaire, will be taking over in the month of PCOTY.

Your C64 138
Ian cleans up a few points which have been bothering him about the Amiga, and explains how to lessen the effects of garbage collection on the C64.

Your Bee 140
Colin waxes lyrical over the animated Hoards.

Viatel Grapevine 142
Microbees give schools easy access to the grapevine; Viatel joins the birds and the sheep and the cows and the horses, on the farm; and business users look forward to two-way telex facilities in 1986.

Your BBC 144
"Have you ever thought what would happen if hackers could tear themselves away from their attempts to penetrate ASIO, *the Pentagon and other soft targets long enough to rid their disks of programs that hadn't been used for years?"*

Lotus Hotline 146
John Nicholls continues to chop the tips off the Australasian Lotus Users' Association monthly newsletter.

Your IBM 148
John Hepworth compares two recently released versions of the most widely used compilers for Pascal and BASIC ...

IBM Underground 150
... then parks his new Ultra ute beside the old Norton, and drives whichever best suits the occasion.

Readers' Classifieds 151

PCOTY Month 154

NEW PRODUCTS

If you have a genuinely new product or service you would like mentioned in this section, our news editor would like to hear about it. Each month the YC mail box is inundated with press releases vying for a column centimetre or two in 'New Products', so we've instituted a rule to make the selection procedure a little easier: if you include vital details, such as price and phone numbers for publication, your release goes into the pile marked 'editor'; otherwise, it's destined for the pile marked 'shreditor'.

Software

20/20 Integrated Spreadsheet
Digital Centre, (02) 419 7588; (03) 266 1688
Price: $795
This package runs on Digital's Rainbow under MS-DOS. The spreadsheet allows complete migration of worksheet data and formulae between Rainbows and larger Digital micros. It is claimed to have most of the features of Lotus 1-2-3, and some extras. The screen can be split into four windows, each containing a graph, or the 132-column mode can be used to view a large section of the spreadsheet. A project scheduling component, simple databases and data import/export facilities are included.

Control
Creative Computing, (07) 369 5422
Price: $6500
Control is an accounting package for the IBM PC/AT and compatibles, running under Xenix. Modules may be purchased and run separately or together, and include inventory control, order processing, debtors, creditors, invoicing, sales analysis, purchasing and general ledger. The system is particularly suited to wholesalers, distributors and retailers, where multi-terminal facilities are needed. It was developed and written in Australia in the C language.

Desqview
Sourceware, (02) 411 5711
Price: $220
Desqview is described as a multi-window software integrator for the IBM PC and compatibles. It enables users to run several applications simultaneously, to view each program in a window, and to transfer data between applications. It also provides keystroke macros, an auto-dialler and menu-driven DOS commands, and is compatible with IBM Topview Program Interface Files. Desqview is also available bundled with AST's RAMpage board.

Do-it (for the Rainbow)
Digital Centre, (02) 419 7588; (03) 266 1688
Price: $220
Do-it is a utility which lets you temporarily interrupt an application to run another application. It has a built-in notepad and calculator, it can print text or graphics screens, and can enter VT100 Terminal Emulation mode, with just a few keystrokes. The help screens can be customised for specific applications. (Do-it will not work with *all* Rainbow applications).

Estcom
Business Scope, (07) 262 2877
Price: $2500
Estcom is an estimating program which incorporates spreadsheet-like screens. It enables estimates to be created from a variety of sources, including Autocad II drawings. Price increases can be made by supplier, product group, classifications or location, or any combination of these. Estimates can be archived and recalled at any time, and a wide range of reports, including Materials Requirements, Estimate Summary and Price Variance Report, is provided. Estcom interfaces with most word processors.

Expert Edge
Human Edge, (03) 690 5014
Price: $895
Expert Edge is a rule-based expert-system development tool which allows a user without any background in artificial intelligence or programming to build an expert system. Knowledge is entered in 'natural language', and the program can explain why a particular question was asked and explain how a conclusion was reached. It operates on the IBM PC and compatibles, and requires a minimum of 256 Kbytes of RAM and two disk drives.

Game Show for the Commodore
Commodore dealers
Price: $49.95
Game Show is a quiz program for two teams and a compere. Questions are displayed on the screen and both teams take turns at supplying the answers. Players are allowed five incorrect answers before the computer offers the correct response. The three topics currently available are 'Words', 'People, 'Places and Things' and 'You and Your World'. An authoring system allows the user to add subjects to the game, and additional question disks are available.

KCAD #2V
Kingdom, (02) 807 4822
Price: From $2450
Designed to operate on IBM compatible computers under MS-DOS, KCAD offers full two-dimensional facilities, automatic dimensioning, numeric control output, symbols, multi-layers, bills of quantities and 'rubber band'. An advanced version, KCAD #2X, allows rotational isometric projections to be used, as well as the features of the 2V version.

PC Profiles
Integro, (02) 233 8666
Price: $1950 for 100 scorings
This computer-based personality-assessment system is based on the concept that the way people react to situations corresponds with developed behavioural patterns. Respondents key in the answers to 24 questions. The scores are then calculated and interpreted into a graphical analysis, and a printed report describes three aspects of the respondent's personality: the behaviour they show other people, the way they react under pressure, and their self-image. Results of the testing system allow individuals to heighten their self-understanding and to identify the work environment in which they are most likely to succeed. People don't pass or fail the profile — it simply measures the differences in 'normal' behaviour patterns. The original system is supplied with 100 scorings, and lots of 50 extra scorings are available for $750.

Phoenix-Pro Management System
Digital Centre, (02) 419 7588; (03) 266 1688
Price: $3165
On large projects, where strict control is vital to remain on schedule, Phoenix-Pro provides network analysis (using the PERT algorithm), milestone tracking (for keeping track of progress), and milestone plotting (for graphic representation of activity schedules). In addition, it can be used for developing seminars by keeping checklists, designing curricula for a whole year and tracking student progress. The package is intended for use on the Digital Professional 300.

SQL/PC
IBM, (02) 923 5123
Price: $900
SQL/PC is functionally the same as SQL on mainframes. It is a relational database management

system for the IBM PC/XT/AT, which provides users with the ability to quickly create and update their own tables, join data from several tables, interactively define and format reports and query data by value, without concern for file structure. Data security, dynamic changing of database descriptions, automatic data dictionary, automatic optimisation, and stored routines are all supported.

Synergy for Digital's Professional 300
Digital Centre, (02) 419 7588; (03) 266 1688
Price: $995
Synergy is an integrated system running under the Professional Operating System Version 2.0. It provides a windowing environment for the Pro, allowing multiple applications to be run concurrently. Information may be transferred between applications via a 'clipboard'. The applications included are a spreadsheet, data manager, graphing program, calculator (with scientific functions), Prose-Plus (a word processor), communications, file services, and a chess program for light entertainment.

Tasword 64
Dolphic Computers, (02) 438 4933
Price: $55.90
Tasword 64 is a new version of the word processor for Amstrad and Sinclair Spectrums, designed for the Commodore 64. It features 80 characters per line on screen, automatic word wrap and right justification, block move and copy, margin setting, paragraph reforming, global search and replace, fast scrolling and two help pages. A tutor is provided for the first-time word processor user.

Teacher's Toolkits
Systems Research Institute of Australia, (09) 325 7644
Price: $35 to $40
The Teacher's Toolkits are designed for maths teachers who want to enrich day-to-day teaching and increase the students' grasp of mathematics. The toolkits available are Mathematics Volumes I and II, and Astronomy. The Mathematics Toolkits cover graphing functions, general utilities and probability simulations, while the Astronomy program uses Halley's Comet, Kepler's laws, calendar functions and a model solar system to aid maths and science teachers. The Mathematics Toolkits are not drill routines, but are designed to be used as a resource in maths lessons. Programs provide dynamic displays and can be used as teacher demonstrations with a single machine, or in a computer laboratory by a class. The focus is on mathematics, not computer skills. The programs run on 16 Kbyte or 32 Kbyte Microbee computers.

The Performance Pathfinder
Integro, (02) 233 8666
Price: $850 for 100 scorings
The Performance Pathfinder evaluates an organisation's productivity, climate and needs. The evaluation is made by assessing information input by company staff — from employees to managers. The results are analysed by the computer and delivered instantly in the form of easy-to-read charts and graphs. From these results a company can evaluate it's own progress and build on positive factors, while eliminating negative ones. For IBM PCs and compatibles.

WPS-Plus Word Processor
Digital Centre, (02) 4197588; (03) 266 1688
Price: $1050
WPS, already available for the DEC-mate and VAX, is now available on the Rainbow, enabling documents to be transferred between these machines, complete with formatting information. WPS-Plus performs on-screen bolding, pagination and word wrapping. It also includes list processing, sorting, maths functions and communications. A two-dimensional editor aids in drawing organisational charts, and an extensive computer-based instruction course is provided.

Xi Expert System Builder
Personal Computer Software, (02) 923 2899
Price: $1700 for Xi and tutor
Xi is a tool for building expert system applications to run on a personal computer. It consists of a language, plus a set of facilities for the expression of human know-how in a computer program. Rules are kept in English inside the computer and Xi generates sets of menus automatically from the rules, so Xi itself becomes the application. Both forward and backward reasoning are used, and an extensive help facility is available. Xi costs $1495 without the tutor.

Xywrite III
Kowhai Systems, (02) 546 6499
Price: $595
Xywrite III is a new version of Xywrite for the IBM family and compatibles. It provides full proportional spacing support, windows allowing editing of nine files simultaneously, named format styles, global search of multiple files, automatic hyphenation, full path-name support, six-column printing, word-wrap within columns, sorted directories and extensive online help.

New Machines

The Compatible PC/XT and PC/AT.
Dicker Data, (0) 525 2122
Price: $2995 (excluding tax) for a 10 Mbyte PC/XT
The Compatible XT has an eight-slot motherboard, 8088 CPU running at 4.77 MHz, 640 Kbytes of RAM, one serial and two parallel ports, a real-time clock and a games port. It has a 130-watt power supply and a flip-up lid for easy servicing. The AT model is based on the 80286 running at 6 MHz, 640 Kbytes of RAM, an eight-slot motherboard and 200-watt power supply. Both machines are supplied with DOS 3.1.

Peripherals and Extensions

AST's RAMpage board
Sourceware, (02) 411 5711
Price: $1299 for IBM PC; $1599 for AT version
The RAMpage board is an expanded memory board for the

IBM PC. It exceeds the PC-DOS limit of 640 Kbytes with 2 Mbytes of paged memory, and is compatible with the Lotus Expanded Memory Specification. The extra memory is accessed in 16 Kbyte pages, which are swapped in and out of the PC's normal address range. The board comes with Superdrive and Superspool utilities (which access the expanded memory, leaving lower memory free) and the Desqview windowing software.

Riteman C+ Dot Matrix Printer
Anitech, (02) 648 1711
Price: $559
The Riteman C+ comes complete with a built-in Commodore interface and the necessary cable and connectors. It prints at 105 cps and is able to print all 82 Commodore graphics characters, as well as the standard 96-character ASCII set with true descenders. In addition, it can print white characters on a black field, and has four national character sets. The front- loading design makes it possible to use paper of any thickness, even card stock.

Trailblazer 10,000 bps Modem

Netcomm, (02) 888 5533
Price: $5895 (excluding tax)
Netcomm has released a local version of this high-speed modem. It features new technology based on the Motorola 68000, has a Texas Instruments TMS 320 signal processor chip, and will connect to any computer through a standard RS232 port. Rather than dividing the telephone signal band width in two (as with most modems), the Trailblazer creates 512 ranges, which are constantly monitored to select the wavelength with the least degree of interference. This ensures a very high degree of data integrity. An automatic speed selection feature allows the modem to identify remote connections operating under other speeds, such as 300 bps and 1200 bps, and to instantly connect to the low-speed modem. In command mode, the Trailblazer operates under a super-set of the industry-standard AT command language.

BDT Six-bin Multifeeder
Calidad, (02) 358 6244
Price: $4999 (excluding tax)

This amazing-looking contraption illustrates the lengths you have to go to to overcome laser printers' inadequate paper input. Most machines restrict you to a single cassette holding 120 sheets. The BDT Multifeeder adds six trays, each holding 200 sheets. The operator can select, via the computer, whether to print on letterhead, plain paper or forms from any of the six trays. The Multifeeder suits any 'Canon engine'-type laser printer.

Miscellaneous

Computerised Name and Address Management
NEC *Information Systems*, (02) 419 6199
Price: $25
Written by Ken Smyth, this guide is designed for companies involved in, or moving into, computerised direct marketing. It provides in-depth coverage on coding, marketing information, record layout, file maintenance, computer output, job specification and documentation. One chapter is devoted to the selection of computer hardware and software, and issues such as security, returned mail and file conversion are addressed.

Topaz Micro UPS
Online Control, (02) 43 1313
Price: $1692 (excluding tax) for 400 VA unit
The Topaz Micro uninterruptible power supplies are designed to suit personal computers, minicomputers and other power-dependent equipment, such as PABX telephone systems. In the event of power blackout or brownout, the UPS provides battery-backed AC sinewave power for up to 35 minutes at full load. This enables continuous operation through the majority of power interruptions, and provides adequate time for orderly shutdown during longer power failures. The UPS also provides suppression of electrical line noise during times of normal power supply, thus further protecting the connected electronic equipment. A 1KVA unit is available for $2134 (excluding tax), and both units are fitted with standard Australian plugs and sockets. □

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```
RD    READ "NAME: ",NAM,! QUIT:NAM="" "
      IF NAM'?2.A1","1A.E WRITE "PLEASE ENTER AS LAST,FIRST MI",! GO RD
TEL   READ "TEL # ",TEL,! IF TEL'?3N1"-"4N WRITE " NNN-NNNN PLEASE",! GO TEL
      SET ^DATA(NAM)=TEL GO RD
PRT   WRITE "      NAME",?20,"TELEPHONE #",! SET NAM=""
LP    SET NAM=$ORDER(^DATA(NAM)) QUIT:NAM="" "  WRITE NAM,?20,^DATA(NAM),! GO LP
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In line 6, the $ORDER command gets the next subscript in order, from the ^DATA file, thereby SETting NAM to the next name in the file.

CCSM, the Database Language, frees you from the tyranny of typed and restrictive languages . . . NO declarations of variables or data files. Look at these Features:

- **Full Screen Editor**
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(4)	CCSM Multi User System with documentation		$599.95	
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BY IAN ALLEN

Amiga

The build-up to the release of Commodore's new Amiga has been quite astonishing. It brings back memories of the heady excitement before the launch of the IBM PC (and plenty of commentators say there is reason for comparison).

If you've just returned from six months in the Antarctic, you may be forgiven for wondering how downmarket Commodore came up with an upmarket trump. The answer is money and vision (or at least enough vision to recognise somebody else's vision). The Amiga is not a Commodore brainchild, but the work of the small Amiga Corporation. Unfortunately for the corporation, it ran out of cash before completing the Amiga's development, so the baby went onto the market and cash-laden Commodore snapped it up. (Interestingly, Atari, now owned by former Commodore boss Jack Tramiel, entered into litigation about the matter. It seems Atari also had designs on the Amiga, but lost out).

In many ways, the union of Commodore and Amiga is a happy one, especially for consumers. Brilliance alone does not sell computers: it takes marketing and manufacturing muscle and, most importantly, software. Commodore can supply the former, and the early indications are that there will be no shortage of the latter.

The Amiga's future seems assured, but I'm not about to join the fray and make grandiose predictions. The Amiga definitely has an exciting combination of graphics, power and features, but already Microbee Systems' new Gamma has shown that Commodore won't be the only kid on the block with a new toy. The extent of Commodore's success will depend on how quickly the company can capitalise on being the first.

Meanwhile, for we 64/128 users, there are a few peripheral observations worth noting.

The most important point to note is that the Amiga doesn't support the CBM serial bus. "So what?", I hear you ask. "Who would want to hook a 1541 to an Amiga anyway?" Certainly not me, but I'm not particularly keen on junking my CBM dot-matrix and daisywheel printers (together they're worth more than $1000). Perhaps some third-party supplier will release an add-on box to create the interface, but that's an 'if'. How long can you hold your breath? If you have a non-CBM printer, you should find it much easier to interface to the Amiga.

The Amiga will work with a television, or composite video colour or monochrome monitor, but to get the best out of its graphics you really need a digital RGB monitor. I'm not sure if it's the same as the 128's RGBI (red, green, blue — the 'I' stands for illuminance) monitor. How many RGB standards can there be?

The point about peripherals is if the Amiga requires you to start all over again, you might as well look around at what else is going.

Commodore 64/128 users need not panic about the Amiga. It's priced and targeted at a different market, and besides, the 64 remains the versatile machine it always was. There are more than 5,000,000 of them about, and no software company can afford to ignore so sizable a market. The 128 remains the easiest way to migrate to a more powerful machine, and it's more than adequate for all but multi-tasking, or the most demanding number-crunching or graphics.

Garbage Collection

The other day a friend who likes to follow the horses rang me. He was using a program which works out the form, but recently, after about an hour of entering details, his computer locked up. The cursor stopped blinking, and even the RUN/STOP RESTORE sequence had no effect. He went away in disgust, but when he came back, all was well again.

This experience is known as 'garbage collection' — not the type you have every Monday and Thursday, but the type your computer has once in a while. I like to think of it as a computer's nervous breakdown; it means it's time to see the shrink and unscramble the brains.

It's all related to memory. Like humans, computers have only so much memory. Some of the 64's memory is used by its operating system and BASIC interpreter, which is why you don't normally have access to all of it. When you use BASIC you can access 38 out of the 64 Kbyte total. Think of this free space as an empty bookshelf: when you load your BASIC program, it starts filling up one side of the shelf (at the bottom of free memory); when you RUN the program, the variables it creates are stored in the space immediately next to where the program ended, and they fill up more space as the program creates new ones.

Variables are easy for the computer to store and change — it's like taking a book from the shelf, updating it and putting it back exactly where it came from. Once created, variables always use and re-use exactly the same space. Strings are another matter: they can be made up of anything between 0 and 255 characters.

The 64 copes with this variety in string size by storing strings at the other end of the shelf (the top of free memory). As you input new strings or redefine old ones, the computer can't simply pull out the string's 'book' and update it, because it might not fit back into its previous spot. Instead, the 64 simply creates a new book and adds it to the shelf. It keeps track of which book is currently maintaining a string index.

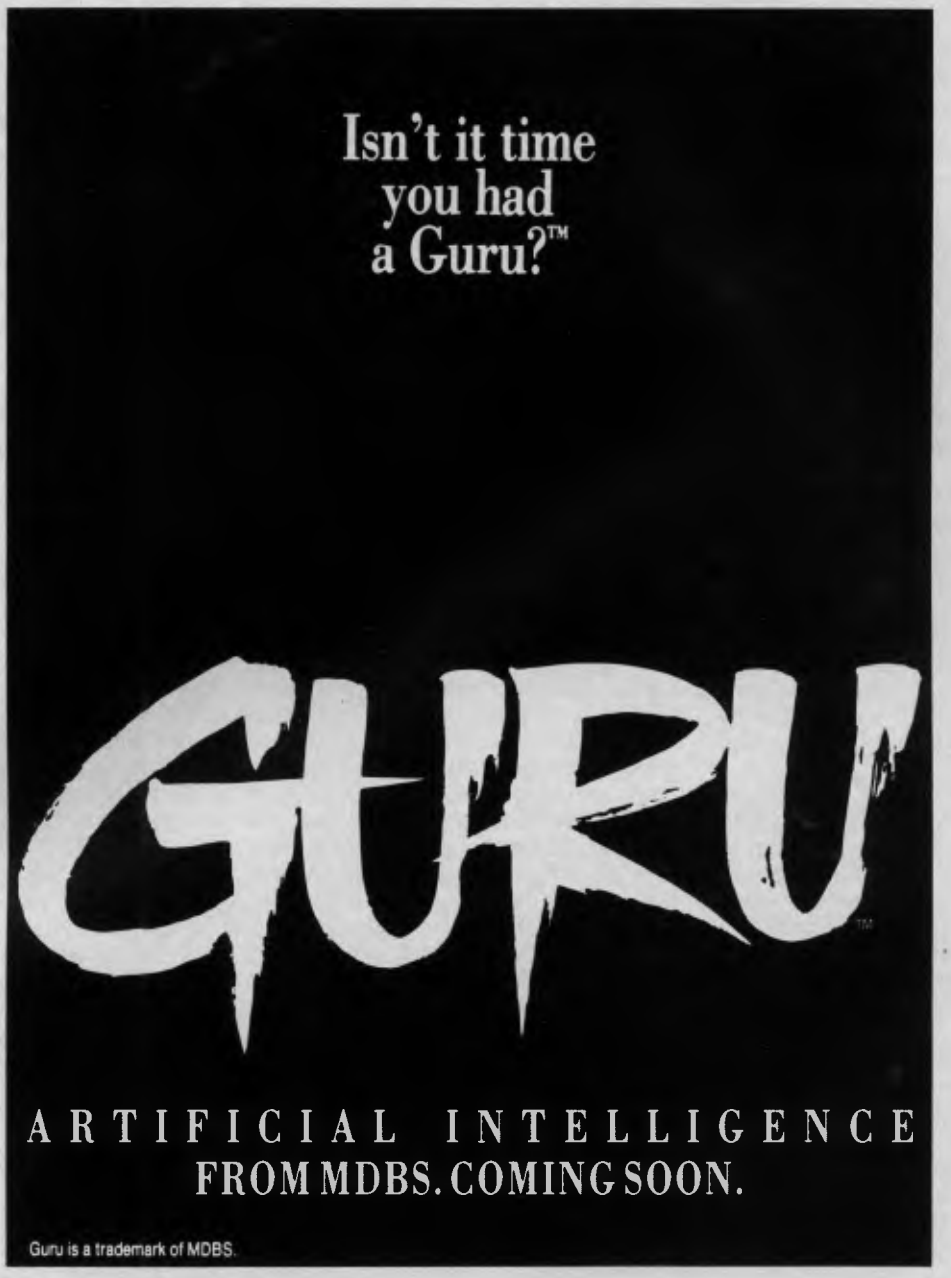
If your program uses and redefines strings quite often, it fills up the shelf and will eventually run out of space, which is when garbage collection occurs. The computer knows a lot of its memory has been spent on strings (or books) the program has updated or discarded, so it systematically goes through its string index, moves the books which are still active to the end of the shelf and discards the garbage. The process has been known to take more than hour, but five minutes is more common.

You can lessen the effects of garbage collection by employing a few simple programming techniques. For instance you can use a special type of string variable called a 'static' string, which doesn't take up any of the string memory (the shelf). Static strings are defined by the BASIC program in a line which is accessed only once, but are *never* redefined because they take up shelf space and slow down garbage collection. Use static strings whenever possible.

The number of dynamic strings (dstrings) you keep also influences collection time. If you limit your program to a small number of dstrings, garbage collection is likely to be quick.

If you can find a point in your program where you can discard all your strings (including static ones) *and* all your numeric variables, execute a CLR. This is very quick, and wipes everything except the program. If you want to keep some of your information, consider storing it to disk before doing the CLR, so you can read it back into clear memory. A better alternative is to set all unwanted dstrings to null (A$="") and use FRE (0), so X=FRE(0). By setting the unwanted dstrings to null, you erase them from the active index. FRE(0) forces a garbage collection (in order to tell you how much free RAM you have), but since you have few remaining active dstrings, collection time will be quick.

Finally, avoid moving strings around. If you have to sort a string array, it's more economical to create a variable array which contains an index to the string array, and sort the index array instead. (Moving numeric variables doesn't affect memory space). □



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Your MICROBEE

BY COLIN TRINGHAM

MICROBEE programs have come of age — the ultimate arcade game has arrived! If you think I'm getting carried away because I was given a free copy you're wrong. I bought 'Hoards of the Deep Realm' last week, and can't praise it enough. This is surely the standard by which all future programs will be judged.

'Hoards' is only available on disk and comes as two separate programs: one containing scenarios of each of the 50 games, the other containing the operating program.

Starting at level one, you avoid the enemy and gather treasures. When all the treasures are collected, you may proceed to level two, and so on. Some levels are encouragingly easy, while others have some difficult puzzles to be solved before you're allowed to move on.

The animation of 'Hoards of the Deep Realm' is first class, and the graphics looked really outstanding on my colour system. ('Hoards' also works on a monochrome system.)

If you're clever (and persistent enough) to solve all 50 levels, you can then start to design your own scenarios with the inbuilt editor system. The new files you create will not be copy protected, so you can hand round your own version of this great program to your friends. (Of course, they'll need the original disk, since the operating program is copy protected.)

'Hoards' costs $29.95 for the disk in 13 cm and 9 cm versions, and comes with a 10-page booklet. The credits for the program read like those of a feature movie it allegedly took over a year to produce. I hope we don't have to wait another year for a program of this standard.

Online Tips

Microbee owners can always pick up some good ideas from *Online*; I've been experimenting with the interesting machine code screen-clearing techniques mentioned in *Online* number 14. Unfortunately, these don't shift the colour at the same time, so I've been fiddling with my own machine code routines to clear the screen at varying speeds with accompanying sound effects. I'll print these out if anyone wants them — write to *Your Computer* and I'll submit them to the Pocket Programs section.

During my experiments I wrote a routine to duplicate the first 64 PCG characters of memory in reverse (left to right) at the top of the PCG memory. This certainly cuts down a lot of PCG design time. There is nothing very startling about the program and you could sort it out for yourself if you needed to produce lots of symmetrical PCG characters. Just remember, if you put a byte into the A register of the Z80 chip and rotate it through the carry bit, then rotate another register — say C, in the opposite direction, also through carry, after eight such steps you will have the eight bits in the register C in their reverse order.

If you're in the area of a Microbee Systems store, it's always worth while having a quick browse in the bargain bin of programs. On my last visit there were lots of cassettes and 13 cm disks for sale, with quite good programs at a considerable discount. During a quiet moment I managed to glean from one of the helpful sales people exactly how to combine two BASIC programs on disk. Let me explain the procedure.

Suppose your two programs are called 'ONE.MWB' and 'TWO.MWB'. You will have checked that their line numbers don't clash. Save program ONE to disk in the usual way, then load program TWO and type:

```
OPEN "0",6,"TWOPR":OUT
#6:LIST:PRINT" CLOSE 6:IN# 0":CLOSE
6:OUT#0
```

in the immediate mode. Press Return and there will be some disk activity. Now type NEW and load program ONE. In the immediate mode, type:

```
PEN "I",6,""TWOPR":IN#6
```

Press Return again, and when the disk activity has stopped you will have both programs combined as one. Now save this new program to disk in the usual way. This is especially useful if you're building up a library of USR routines and another of PCG shapes, as I'm doing now.

Microbee Systems also had one of its new colour monitors on display, which was interesting to compare with my own Taxan Vision 2 monitor (which sells for around the same price). My impression was that the definition was better on the Microbee monitor, so if you're intending to buy a colour system it would be worth looking at one of the Microbee units.

Finally, a hint for all those who are starting to produce arcade games for the Microbee: don't overlook the possibility of reprogramming the registers in the 6545 CRT controller IC to produce a 64 by 32 screen. This means your PCG characters will be only eight dots high, but you will have to produce fewer intermediate vertical characters to give the same degree of movement vertically and horizontally. □

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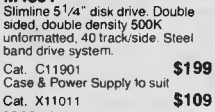

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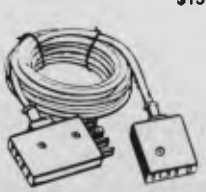

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VIATEL GRAPEVINE

BY NORMAN KEMP

AUSTRALIA'S OWN Microbee is probably the world's first computer to include a ROM-based system which will allow school pupils to access a public information database. The addition of a Viatel ROM to the new Microbee Alpha Plus series was revealed at the beginning of the year by Microbee's managing director, Owen Hill, following the New South Wales State Contracts Board's approval of Microbee Systems as an official supplier of computer systems to schools.

"The inclusion of this software enables a school to access Telecom's teletext information database, Viatel, using a low-cost Microbee modem," said Hill. "This same capability on other contract computers requires schools to spend an additional amount, ranging from between $500 and $600."

The top-of-the-line Alpha Plus, which will also incorporate the modem, has 512-by 256-pixel built-in, high-resolution colour graphic software for communications, word processing and programming, as well as extensive expansion capabilities. With these facilities it will be an aggressive competitor in the Viatel market, where prices for basic units are beginning to tumble.

One of the Alpha Plus competitors will be the Sega, a Japanese computer which never quite cracked the Australian home market when it was introduced in 1980, but which has maintained a steady, if low profile in selected shops. The Sega is now being distributed by Sands Business Systems, of Melbourne.

According to Peter Dulmanis, Managing Director of SBS, the Sega has been considerably modified for a new role as a terminal for videotex communications, and particularly for Viatel. Software has been written for it in Australia, to enable the Sega to be attached to a television set. With a keyboard, the Sega retails for around $499.

Said Dulmanis, "The home market for computers as such has practically died, but Viatel is opening up a lot of new opportunities. It may be a year or more before people begin to realise the scope of videotex information and how easily it can be accessed by the right equipment. Prices for this type of equipment are falling so fast that a complete terminal with processing capabilities and software can now be bought for the cost of a modem a few months ago. It can be attached inexpensively to a television screen, and can be used at home."

Although he would not predict the annual sales figures for the terminal, Dulmanis said SBS is negotiating with Visionhire, which could make the Sega available for renting to home users.

There could also be a strong business interest in the Sega as a Viatel terminal, and several units are currently being tested by the Elders Pastoral group and Mayne Nickless which has diversified computer operations.

Expansion

During the next few months, Viatel will be catering more to the business user than personal or educational applications. The third issue of Viatel's directory and subject index surfaced at new year, full of the sort of headings prospective users would like to see. Unfortunately, many of them are not yet on information databases, although the number is growing.

Some course information, as well as undergraduate courses and science and technology studies from universities and TAFEs is becoming available, but Viatel doesn't yet provide comprehensive courseware for classroom instruction or for exchanging educational software. Schools could perhaps be encouraged to share electronic mailbox services or bulletin boards for specific information, but the day Viatel is an accepted medium for teaching is still far away.

Home users may feel more gratified as the service expands. Banking services and teleshopping are two of the obvious growth areas. Many of the proposed services are far from complete at this stage, but Viatel is listing a number of potentially interesting topics, such as travel (including airline and hotel reservations), real estate, business training, buying guides, insurance, personal and housing loans, restaurants, solicitors and stockmarket reports.

An example of the depth of services which will become an everyday Viatel facility has been foreshadowed by Agtex, a farming service maintained by the Department of Agriculture and Rural Affairs, in association with the State Bank of Victoria. Information available through Agtex includes livestock returns, harvesting predictions and fruit and vegetable market reports, pest and disease details, and weather and technical briefings.

Health and safety aspects are covered by 'Pestlist', a register of all chemicals that can be used for agricultural production in Victoria. The user can type in the name of an insect, disease or weed, and the program will display all products considered appropriate for dealing with the problem. Alternatively, a search can be made for a chemical by name or for a list of products of which a certain chemical is a component.

Agtex has been developed not only to display material on a screen, but also to provide a hard copy of the Department's consumer bulletin, 'Agnotes'.

This year should see the introduction of 'Viatel Private', the name given by Telecom to a section for use by special-interest groups (SIGS), which will have virtually closed facilities for their activities. The scheme is aimed primarily at groups of business people who want to communicate through Viatel on a confidential basis and maintain a private network. A typical example would be a distributor dealing with regional agents or branch offices, but the scheme could also apply to hobby groups with strong professional connections. Philatelists, for instance, are given to searching determinedly for rare stamps to make up a collection, while also wanting to keep in touch with other collectors interested in the commercial and trading value of these items.

Viatel SIGS can also bring together people with a common interest, but who live too far away from each other for regular meetings. With Viatel, such groups could have weekly or monthly sessions to swap information, and use the mailbox facilities for brief and rapid communications.

Another development scheduled for 1986 is two-way telex. The present service allows telex to operate outwardly from the sender; the new system will allow a reply to be sent by the recipient, paving the way for international linkups. The service automatically informs the sender that the message has been despatched, and keeps a record of its being received. A variant of the service will provide a facility for a user to send a telex to a Viatel mailbox number, from which it can be transmitted overseas.

By continually adapting and adding to its services, Viatel hopes to increase its business usage by at least 20 per cent over coming months. At the end of 1985, there were almost 10,000 registered users on Viatel, of which around 60 per cent were non-business or professional users.

In the long term, the success of Viatel will depend on its being accepted as a tool and adjunct for many business enterprises, and it's towards this end that Telecom is aiming in 1986. □

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CP1 **GAMES.** Menu-driven, compiled games, including an excellent one that prints bio-rhythm charts, a clever horse race, and a space trader programme for the wheelers and dealers.

CP2 **GAME.** A 191k version of Adventure, the classic game which can absorb your attention for days at a time. This is a 550 pt version with an expanded cave and smarter creatures.

CP3 **GAMES.** More fascinating games to absorb time you can't spare — such as a six level chess game, Othello, a well-written multi-level version of Pacman and an extensive Wumpus adventure game.

CP4 **GAMES.** Some outstanding games written in Mbasic, with source. Includes golf, a hunting game (like space invaders) called Duck where the ducks fight back, and a super adventure game where you can choose your personal strengths. Also contains a keyboard translator like Smartkey.

CP21 **UTILITIES.** A whole heap of useful programmes to catalogue your files, arrange the directory display, make emergency alterations to the disk, allow printing and computing at same time, count words, print the screen, copy better, erase, unerase, delete, make batch commands, etc.

CP23 **Z80 MACRO ASSEMBLER.** The syntax closely follows RMAC and MAC. A bargain at a fraction of their cost.

CP25 **Z80 DISASSEMBLER.** Includes DASM, an easier to use version of ZZSOURCE, and XLATE, a very good 8080 to Z80 translation routine. Source and documentation are included.

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CP29 **EZCPR.** Whereas ZCPR is a famous replacement for CP/M with fancy tricks that will keep you from returning to CP/M, EZCPR Is a much easier to install lookalike for ZCPR that works on just about any system. Well worth having.

CP61 **MX80 PRINTER GRAPHICS.** A comprehensive graphics package for those with Epson MX-80 printers and look alikes. Includes sample files.

CP81 **LANGUAGE — FORTH.** This is the famous F83, which adopts the latest Forth standard. Has built-in editor, compiler, etc.

CP82A **LANGUAGE — SMALL C COMPILER, VERSION 2.1.** Inexpensive way of learning to use C. A published handbook is widely available.

CP83 **LANGUAGE — SMALL C LIBRARY.** Contains 105 C functions, many described in Jim Hendrix's "Small C Handbook". A lot are written in assembler and most are OK for any CP/M system.

CP101 **COMMUNICATIONS. TURBO PASCAL BULLETIN BOARD.** A complete bulletin board package that has been highly praised by users.

CP102 **COMMUNICATIONS. MDM730.** A popular and widely used system. Easily adapted to different machines. Source code and extensive documentation is included. An Apple/CPM version is also available.

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MS/DOS

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M3 **GAME. ADVENTURE.** You guessed it, the original classic written in C with source. Compiled for immediate play.

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M81 **LANGUAGE. FORTH.** This is F83, the latest standard, with built-in editor, compiler, etc.

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BY BRUCE MITCHELL

FROM TIME to time I receive requests for information about some of the rarely used DFS commands. Newcomers to the BBC's disk system often take some time to get around to using all the commands available, and even then don't realise they've probably missed an option or two on the way. The *OPT4 commands, for example, are not exploited to their fullest by some programmers, while commands like EXEC are frequently used, but mostly just to boot a program.

EXEC makes it possible to use a word processor, such as 'View' or 'Wordwise', to enter a listing. While this is something you probably wouldn't do while developing your own software, it's a very handy technique when slogging through a magazine listing or pages of assembler code. Single letters or symbols can be used to represent long variable names or common assembler mnemonics, then converted to their 'proper' forms with search and replace commands after everything's typed in. To convert the resulting file (let's call it 'PROGRAM') to BASIC, all you need to do is save it, drop out of the word processor into BASIC, enter '*EXEC PROGRAM', and save the listing under a different name.

Programmers have many options when choosing how users should start a program. The traditional method is to hold down SHIFT, tap BREAK, and release SHIFT a second later. In some machines (for example, those supplied to the Western Australian Education Department), the keyboard link (fourth from the right) is set to boot the disk system at switch-on, or when BREAK is pressed. There may be a reason for this (weaning devoted Apple users?), but I know of cases where the combination of the Beeb's power supply and Western Australia's over-enthusiastic mains (above 270 volts at times) have removed all traces of the disk directory. Not a great idea, in retrospect!

When the disk system is booted, it looks in the $ directory for a file called '!BOOT'. (The '!' prefix is used so that, under most circumstances, it will appear first in a disk catalogue.) What happens next depends on how the boot option (0-3) has been set on the disk. The options are stored in the disk's directory and are set using the *OPT4 command.

*OPT4,3 makes the disk system execute the commands in the !BOOT file as if they were being typed in, so, not surprisingly, it's called the EXEC option. A BASIC program could, for example, be started with the following instructions:

*BASIC (in case you weren't in BASIC when you pressed SHIFT/BREAK)
PAGE=&1100 (to save having to download a program from within itself)
*TV0,1 (be kind to your eyes and turn off the video interlace)
MODE 1 (clear the screen while the program loads)
CHAIN' program'.

My most useful EXEC file, *TV0 1MODE 3*WORDNEWPRINTER Epson*CAT, is copied on to all my word processing disks. It gets 'View' up and running and 'Catalogue' displayed, and all with no keystrokes (it assumes a printer driver called 'Epson' is on the disk).

Although you can create !BOOT files for EXEC purposes using the DFS *BUILD command, it doesn't let you edit your typing mistakes. A better way is to use your word processor, but avoid using formatting commands.

Option 2 is used to RUN programs which are in machine code. Occasionally, a disk set to boot with option 3 (EXEC) will do amazing (and often very distressing) things, such as filling the screen with rubbish. If this happens, try *OPT4,2 to load and *RUN the !BOOT file. Machine code games can be booted by renaming them $.!BOOT and selecting *OPT4,2.

A third option,*OPT4,1, loads !BOOT and leaves it at that. If you find a sensible use for it, please let me know. If you prefer peace and quiet, with no auto-starting, you can keep your disk drive in its place with *OPT4,0.

Another command which seldom gets used is *DESTROY. It can be devastating if used carelessly, so it's quite understandable that people should avoid it. But it's very handy when wading through all those old disks which contain bits and pieces you think might come in handy one day, but wouldn't use in a month of Sundays.

Have you thought what would happen if hackers could tear themselves away from their attempts to penetrate ASIO, the Pentagon and other soft targets long enough to rid their disks of programs that hadn't been used for over a year? So many disks would be freed, the disk-manufacturing industry might well flop.

Clearly, '*DESTROY' is the means to this end. Try it! Get an old disk, lock all the files you really need with '*ACCESS <filename> L', and wheel out the destroyer. Naturally, you'll have to take off the safety catch (with '*ENABLE'), then type '*DESTROY *.*' and make sure *nothing* you really need is listed! If you really want to kiss them all goodbye, press 'Y' and '*COMPACT' the remaining files (preferably while in mode 7). Presto — lots more disk space! □

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SEPARATE SOFTWARE

Hyperdrive 20 (or HyperDrive 10) will also run all Macintosh programs, including Switcher, and it will run them up to 5 TIMES faster!

HyperDrive 20 comes complete with its own unique software which increases the power *and* sophistication of your Macintosh. A Security program lets you protect your files by encrypting them with your own password, making it impossible for anyone else to access your files.

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HYPERDRIVE COMFORT

One last thing: when you have HyperDrive installed, there is one thing you *won't* lose:

YOUR WARRANTY!

Even when your Macintosh is opened up (by an Apple Dealer) your Apple Warranty remains valid.

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DECISIONS, DECISIONS . . .

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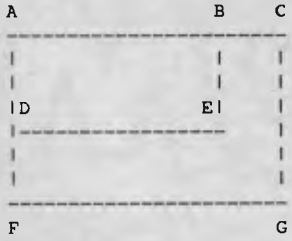
LOTUS HOTLINE

BY JOHN NICHOLLS

LAST MONTH, I offered some tips on using Lotus 1-2-3 Release 2. Here are a few more, along with some surprises ...

■ **1-2-3 on floppies:** If you no longer need the Help facility, or if you never use it, anyway, copy the 123.HLP file to another disk, delete it from your system disk, and replace it with the Printgraph files. This will save having to change disks to run Printgraph.

■ **Reclaiming unused space:** A problem often faced when using 1-2-3 is running out of memory, even though the worksheet on which you're working may appear to be of moderate size. Have a look at the illustration below.



The rectangle ABED contains all our data, but at some time we entered something in the cell in the corner marked 'G'. When we did this, 1-2-3 reserved the rectangle ACGF, and allocated memory to every cell in the rectangle. It continues to do so, even after all entries in the area bounded by BEDFGC have been deleted and you've /File Saved and /File Retrieved the worksheet. You can check the limits of the worksheet at any time by using the keys <End> <Home>, which take the cursor to the bottom-right corner of the worksheet — G in the figure above.

To reclaim the unused space, first determine the limits of the range you're actually using (ABED). Don't use <End> <Home> — it will take you to cell G. Issue the command '/File Extract Formulas', specifying the range ABED. By selecting 'Formulas' instead of 'Values', you get an exact copy of your original worksheet. Then use the '/File Retrieve' command to bring back the new worksheet. If you issue the '/ Worksheet Status' command before and after this process, you'll be able to see how much memory you've saved.

Note that Release 2 of 1-2-3 allocates memory in a different way — you don't need to go through the process I've just described. If you have both versions, it might be interesting to compare the memory used by each by loading the same worksheet into both.

■ **Reviewing Range Settings:** When you issue the command '/Range Name Create' or '/Print Printer Range', and move the cursor to indicate the bottom-right corner of the range, the range is highlighted, a blinking cursor appears in that corner, and the range is shown on the second line of the control panel (A2..H21, for example). If you then press the fullstop key, the blinking cursor will move clockwise to the next corner (A21), and the range will change to H2..A21. Press the fullstop again and the cursor will go to the top-left corner of the range (A2), and the range will change to H21..A2. Finally, pressing the fullstop again takes the cursor to the top-right (H2), and the range changes to A21..H2.

In this example, all four corners of the worksheet are visible on the screen at the same time. On a larger worksheet, where you can't see all the corners, you can use this technique to verify the correctness of the range you're specifying. Note also that you can specify a range by starting with any one of its corners and the diagonally opposite corner.

Incidentally, when you're specifying a range, pressing the Backspace key cancels the specification and returns the cell pointer, unanchored, to the cell where the pointer was located when you began the command.

■ **Fuel consumption:** An interesting application I saw recently was one designed to calculate a car's fuel consumption in any of the commonly-used formulae. It assumes you fill the tank every time you buy petrol. Column headings and the appropriate formulae are shown below.

Column	Column Heading	Formula
A	Date	
B,C	Cost C/Ltr	
D	Odometer	
E	Litres	@IF(B4=0#OR#C4=0,0,B4/C4)
F	Gallons	+E4/4.54609
G	Klms	@IF(D4=0,0,D4-D3)
H	Miles	+G4/1.61
I	L/100K	@IF(E4=0,0,E4/(G4/100))
J	Kl/Ltr	@IF(E4=0,0,G4/E4)
K	MPG	@IF(H4=0,0,H4/F4)

Wish List

Reading the specifications of 1-2-3's competitors drew my attention to some features which 1-2-3 lacks (there aren't too many). Please, Lotus, this is what I'd like:

■ An 'Undo' feature, for recovering a column or row deleted by accident.

■ Automatic saving to disk at frequent intervals.

■ 'Linking' spreadsheets so that values of a dependent spreadsheet automatically reflect changes in supporting spreadsheets.

■ The ability to change background, foreground and border colours.

■ A copy-protection scheme which allows you to use the program on a hard disk and back up the hard disk, without 'uninstalling' the program first.

Why People are Laughing at Lotus 1-2-3

So reads the start of an ad by an American company called 'Enlighten', which is selling a program with the unlikely name of 'Chuckle Pops'. The ad says, "Chuckle Pops puts hundreds of the funniest jokes right at your fingertips. Just a simple keystroke suspends any program and displays a hilarious joke on your screen. Read one. Read a few. You chuckle, you guffaw, you scream with laughter..."

I must try this the next time I accidentally delete a column instead of a row.

INDICATE

You can use several commands to change the appearance of the screen display and to sound the bell with 1-2-3 Release 2 macros. These are:

{BEEP}	Sounds the computer's bell or tone.
{INDICATE}	Changes the indicator in the upper right corner
{PANELOFF}	Suppresses redrawing of control panel during macro
{PANELON}	Undoes {PANELOFF}
{WINDOWSOFF}	Suppresses redrawing display screen during macro
{WINDOWSON}	Undoes {WINDOWSOFF}

Although I haven't tried it, there are apparently four bell tones, which you invoke by entering 1, 2, 3, or 4 after the {BEEP} command. Sounds like fun.

Be careful when using {INDICATE}: I heard of someone who changed the READY indicator to a four-letter word, and then realised he didn't know how to change it back again. You can't say I didn't warn you. □

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Technical Data - HR31 200

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V. Scan Frequency:	60Hz
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Display Size (H x V):	245mm x 170mm
Retrace Time (H x V):	0.5Ms x 0.4msec
Resolution:	640 x 200 lines
Input Terminals:	9 pin "D" type connector
Dimensions:	11"(H) x 15"(W) x 13"(D) 266(H) x 367(W) x 318(D)mm
Shipping Weight:	15.9kg

Model HR31 200

Models HR 39 & HR 134

(All models Right-hand controls only.)

Technical Data - HR 39 & HR 134

CRT Size:	12" Diagonal (29cm)
Phosphor:	HR 39 (Green); HR 134 (Amber)
Sync-H. Scan Frequency:	18.432kHz
V. Scan Frequency:	50/60Hz
Signal Input:	Video - TTL Level Positive Sync. H - TTL Level Positive Sync. V - TTL Level Negative
Video Response:	20MHz
Display Size (H x V):	203mm x 135mm
Display Time (H x V):	44Ms x 18.99msec
Resolution:	Centre 1,000 lines Corner 800 lines
Display Formats:	9 x 14 matrix, 2000 characters in 80 x 25 format
Input Terminals:	9 pin "D" type connector
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BY JOHN HEPWORTH

IN THE beginning was BASIC, a language written to teach students to program. Then the real world intervened, and adopted BASIC as the most common language for microcomputers.

Just before microcomputers started their main rush forward, another teaching language called Pascal was born. Pascal was designed to teach structured programming (some say to the exclusion of all other factors).

Initially, these two languages couldn't have been further apart, but as they grew older they became more and more alike (at least in their most highly developed forms). BASIC and Pascal have now become the most common languages used by MS-DOS programmers.

New versions of the most widely used compilers for Pascal and BASIC have recently been released, and it was very interesting to use both Microsoft's QuickBASIC version 1.00 and Borland's Turbo Pascal version 3.0, and compare their strengths and weaknesses.

Borland pioneered the availability of powerful compilers at realistic and affordable prices with Turbo Pascal (the current recommended retail price is $106).

Microsoft has accepted the challenge, and priced QuickBASIC (which is available for the IBM-PC and close compatibles) at $175.

Tree Directories

MS-DOS 2.00 is equipped with a tree-structured directory, which features multiple levels of subdirectories. Early versions of most computer languages for the IBM-PC made no provision for handling files in subdirectories, other than the default directory on each drive. This meant writing programs to make full use of subdirectories was extremely difficult. QuickBASIC and Turbo 3 fully support subdirectories in the compiled programs, as well as in Turbo 3's integral editor.

Early BASIC implementations relied on line numbers to control program flow, while Pascal used block structures and allowed the user to define procedures and functions. Turbo Pascal continues this tradition, and allows nesting of functions and procedures many levels deep. QuickBASIC also allows subprograms with local variables and passing of parameters, but there is some restriction on nesting of subprograms.

QuickBASIC also allows line numbers to be minimised (and often avoided completely), and supports alphanumeric labels as the target for GOSUB and GOTO.

BASIC has always been noted for its ability to manipulate strings and provide for flexible input and output. Early versions of Pascal were weak in these areas. Most of the string manipulation features of BASIC are now emulated in Turbo Pascal, and strong interactive I/O is also a feature. QuickBASIC is still the winner on string length, providing for strings 32 Kbytes long, while Turbo's limit is 255 characters.

New Features

In addition to support for tree directories, both compilers have new commands and new features. QuickBASIC allows static arrays, and supports subprograms. There is some provision for locking and unlocking either whole files or individual records, which is essential when networking is used.

QuickBASIC also introduces COMMAND$, which takes the command string used to run the compiled program, strips out the program name and returns the remainder of the string for the program to use.

Turbo Pascal version 3 adds provision for redirected input and output, which makes writing filters and other such utilities a cinch.

Provision of graphics and turtle graphics, along with functions and procedures to make and remove subdirectories and change directories, are all worthwhile improvements.

Speed

I used seven benchmarks to compare the speed of the various compilers. They were the Sieve of Eratosthenes, an empty FOR-NEXT loop, a FOR-NEXT loop incrementing an integer variable on each pass and a FOR-NEXT loop with floating point multiplication and division on each pass, plus string concatenation, table look-up and a disk read/write routine. Separate runs were made of the disk I/O benchmark with hard and floppy disks.

Speed proved to be almost totally hardware-dependent, with the floppy disk taking about eight times as long as the hard disk.

QuickBASIC and IBM BASIC Compiler version 1.00 had the same times on all tests and are shown together in the Table 1. In each case the time taken by a compiler to complete the benchmark is shown as a percentage of the time the same benchmark took under BASICA.

The overall winner (excluding the disk I/O dead-heat) was Turbo Pascal version 3, which averaged ten times the speed of BASICA.

Editor and Ease of Use

QuickBASIC offers compatibility with source code written for the BASICA interpreter and GW-BASIC. Programs can be written with these interpreters and interactively debugged, then compiled for run-time speed. Turbo Pascal is unique among compilers in that it has a built-in editor, and the ability to drop back to the editor *with the error highlighted* when either a compile-time or run-time error is found (run-time errors can only be found this way when the program is compiled to memory and not to disk). In both cases program development is much simpler than when a compiler is used that does not have a compatible interpreter.

I now use both compilers. I use Turbo for the brilliant editor, easy access to MS-DOS function calls and the compact, fast code generated. For compiling source from other authors, for quick and rough jobs, for the availability of long strings and for linking modules created at different times or with different languages, QuickBASIC gets the nod.

The review copy of Turbo Pascal 3.0 came from PC-Extras, (02)-319-2155, while QuickBASIC was provided by Microsoft, (02)-452-5088. □

	BASICA	QuickBASIC & IBM BASIC 1	Turbo Pascal Version 2	Turbo Pascal Version 3
Empty For/Next Loop	100%	20%	5.6%	4.4%
For/Next with Integer Addition	100%	1%	0.8%	0.5%
Floating Point Calculation	100%	13%	72%	32%
String Concatenation	100%	30%	23%	23%
Table Look-up	100%	21%	0.9%	0.9%
Disk I/O	100%	100%	100%	100%
Sieve Of Eratosthenes	100%	14%	0.5%	0.6%

Table 1. *Results of the benchmark testing.*

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IBM UNDERGROUND

BY JOHN HEPWORTH

DIVERS HAVE lifelines, racing drivers have seat belts, jet pilots have parachutes and PC users have Ultra Utilities, a collection of five programs to recover erased files, create custom copy-protection schemes, patch individual bytes or strings in files, and solve lots of other problems.

Files on the Disk

Ultra Utilities, now up to version 4.00, consist of a disk with more than a dozen files, including one called README.NOW, which acts as a table of contents for the other files on the disk. The program files are U-ZAP.EXE, U-FORMAT.EXE, U-FILE.EXE, U-MIND.BQS and U-OPT.EQE; and the documentation files are DOC41.TQT, DOC42.TQT, U-MIND.DQC and U-OPT.DQC. SKELETON.BAS, TEST .ATR and TEST.HDR are used by U-MIND.BQS. The disk won't fit all the files in the original length, and those with names such as <filename.xQx> have been squeezed. USQ.COM returns them to their original length, either to print out the documentation or to run the previously squeezed programs.

An Aside

When unsqueezing the documentation files, it isn't necessary to make an unsqueezed file on a disk and print that file; just type USQ at the DOS prompt. When asked for IN—FILE, type the name of the file to be unsqueezed, and when asked for OUT—FILE, type PRN and the unsqueezed file will be printed by USQ.

U-Zap

U-Zap is the most used and useful program in the set. It allows the user to display the contents of any sector on a disk, or in a specific file. Individual bytes can be changed in a file so that messages in compiled files can be changed, bugs can be removed and other patches can be made.

Two examples: I downloaded a useful little routine from a bulletin board, which worked well, except the author had a lousy sense of humour and tended to display tasteless little jokes on the screen at random. I went into the downloaded file with U-Zap, and typed space characters over all the so-called jokes.

There was also a problem with BASIC programs compiled with the IBM BASIC version 1.00: the printer is reset every time a program compiled with this compiler is run. The equivalent of the assembler instructions is within the compiled code:

```
MOV AH,01
INT 17
```

This routine appears as a four-byte string, expressed in the file in hex as B4 01 CD 17. U-Zap allows it to be found easily and changed to B4 02 CD 17. This checks printer status, but doesn't reset it. Sure, DEBUG or Norton Utilities could be used, but U-Zap is quicker and easier.

U-Zap also allows individual disk sectors to be copied from one part of a disk to another, or from one disk to another. Every byte in a sector can be filled with a predetermined value, guaranteeing total erasure.

Yet another option allows for interrogation of disk sectors to display their innermost secrets (and the secrets of those who have copy-protected a disk). It will show the logical (not physical) sector number of each sector on a track, which in a normal DOS 2.00 disk would be between one and nine, but on a protected disk could be up to 255. The length of each sector will also be displayed. Use of non-standard sector lengths and sector numbers, as well as extra tracks, are well-known copy-protection devices.

U-Format

U-Format is a beaut. It allows individual tracks to be re-formatted, and the user chooses whether the data on the track is to be preserved or destroyed. Non-standard tracks can be formatted, so if you really want to, you can create copy-protected disks. I hope few people choose to copy-protect their software — it's a major problem for genuine users with hard disks, and doesn't prevent piracy. Piracy can only be overcome by pricing goods fairly and giving value for money, as Ultra Utilities, PC-Talk III, Turbo Pascal and Sidekick have proven.

U-File

U-File is a program which allows users to unerase files. If a file is erased from a disk and an attempt to unerase is made before any other data is written to that disk, there is a very good chance it will be successful. U-File unerased perfectly on floppies, but don't bother trying it on your hard disk — hardly any of the Ultra Utilities can operate on files on a hard disk.

Other possibilities include building a file from scratch by taking individual sectors and combining them into files. This is a potentially dangerous practice, since an error could destroy data. If an attempt to unerase hasn't been fully successful, do a DISKCOPY to another disk and build a file from scratch on the copy.

U-File can list the sectors allocated to a file, either on screen or on the printer. The entire disk can also be mapped on screen or printer, by listing each sector and the file number allocated to it (a less-than-intuitive technique).

U-Mind

U-Mind writes database programs in BASIC. It allows the user to 'paint' the database screen display on screen, and define the fields and screen layout. It then goes away, generates a database definition and, when instructed, writes a BASIC program for the database. SKELETON.BAS is merged into the generated program automatically, and provides the core routines, while TEST.ATR and TEST.HDR are also used by U-Mind.

U-Opt

U-Opt is the only disappointing unit in the set. It's claimed to optimise BASIC source code for the compiler by eliminating unnecessary line numbers, but, when I tested it, *all* line numbers were eliminated at the start of lines, and GOTO's and GOSUB's had no target line numbers to find. Not surprisingly, the compiler reported large numbers of severe errors. The 'Optimised' code was useless.

Ultra Utilities vs Norton Utilities

"Hang on," you say, "is it fair to compare user-supported software which is distributed free (satisfied users are asked for a donation) with a commercial product which costs around $100?" Walt Buchanon, who wrote Ultra, claims that his motivation for writing the utilities was he found Norton lacking, and wanted something to fill in the gaps. By so doing, he has invited comparison. I'm under the impression that Ultra Utilities was written before DOS 2.xx became dominant, and doesn't exploit its features, while Norton Version 3 has kept up with the changes.

Ultra does offer functions, such as U-Format, which aren't available elsewhere. Being able to search for strings in files and modify files is excellent. Norton 3.00 has the better user interface and disk-use displays, seems to be bullet-proof, and supports hard disks (while Ultra will only read and modify floppies). The two are complementary — they have individual strengths, and cover a different (but overlapping) range. Get the Ultra Utilities from your user group and put it beside the Norton Utilities you already have — together they make an unbeatable team. □

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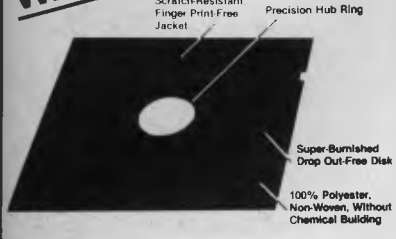

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WE NEVER PROMISED NUFFINK...

HA HA! GOTCHA! Just when you thought we were stabilising our Next Month promises — and actually running the stories we said we would — we snuck in a fictional Next Month last month (that is, last month's Next Month).

Not entirely fictional, mind you, but you will find a couple of the promised stories missing from this issue. Intentionally, of course — we have to drive home the 'we really plan to run it, but no guarantees' disclaimer once in a while.

Seriously now (we never do anything intentionally): we failed to deliver *accounting* (back to counting on toes and fingers for another month), *birdwatchers* (hope we haven't ruffled too many feathers) and *sorts* (hope we haven't ruffled too many birdwatchers).

Once we've blown it like this we get a little wary of making promises, but we hope we may find it possible to maybe perhaps include these articles in consideration for planning what might go into the April issue, if in fact we do produce such an issue, and if there is space for the articles, and if the world doesn't end tomorrow.

Want a definitive answer? Okay, here's a promise: we'll try to do better next time, *after* we've taken our Dale Carnegie courses . . .

APRIL SHOWERS SUPERSTARS

If we said there's only one thing to talk about in April we'd be lying, but there is one thing *everyone* will be talking about — *Personal Computer of the Year*.

After a hectic round of judging we've sorted out the stars from the blahs to present you with a short-list in this issue — next month, you can find out just what was the best new release of the past year, in both software and hardware.

Speaking of past, we might point out that because April has a P as its first lowercase character (and because we're all lowercase in the YC office), it's going to be our P issue.

It starts with *Personal Computer of the Year* and, of course, *Software Product of the Year*. We'll also have a special bumper section of *Pocket Programs* — pages and pages of them.

Then our favourite contributors will spill forth with their polished purple prose (and cons?), not to mention reviews of *Word Perfect* and *Word Machine* from Troll Software. What's that? There's no P in Word Machine? It's for the Apple, you pool!

Plastic Macintosh fanciers will enjoy perusing our reports on GEM, both as a contender in Software Product of the Year and in Pim Harpnell's (formerly Tim Hartnell, until we edited him into shape for April) report on *The Rise And Fall Of A>*.

Uncle Pil has promised us a *Structured Programming* special on Halley's Comet. Some practical joker said that's where Phil and Structured Programming belong ..

Meanwhile, we'll be shipping in pizza, pasta, and puff pastry from the Paris cake shop.

TROPICAL PARADISE PUSH ...

We're also still enduring passionate debate around the office on the subject of P-ing off (an abbreviation of the old sailors' term, pushing off) to a tropical paradise.

Natalie's out of food, Damien's out of chile, Andrea's out of champagne, and Matt's just plain out. There's not a lot holding us, except our promise (and the security guards). While the argument rages we're still putting together pages, so for the moment there's a chance we'll make it to our fifth birthday issue in July.

You can blame Rose dVines. She got tired of waiting, and dParted in February to spend six months cruising around the country in her Daihatsu off-roader, loaded down with strapped-on pushbikes, shiny new pots 'n' pans, and a jerry can with *Escaped from Your Computer* painted on it.

The crew watched in horror as the heavily armoured Daihatsu burst through the barbed wire that surrounds the Federal Publishing compound. The bitch made it!

Now everyone wants to go, even though the guards have reinforced the fencing and fitted seven new machine guns. Vicious dogs patrol the exterior, and mines have been laid in Joynton Avenue. Rose may be our only hope ... we're going to need outside help.

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