

COMPUTER MAGAZINE OF THE YEAR*

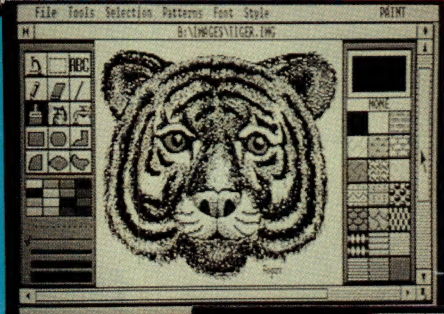
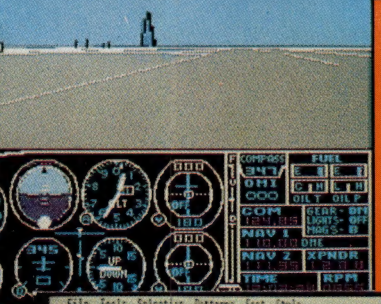
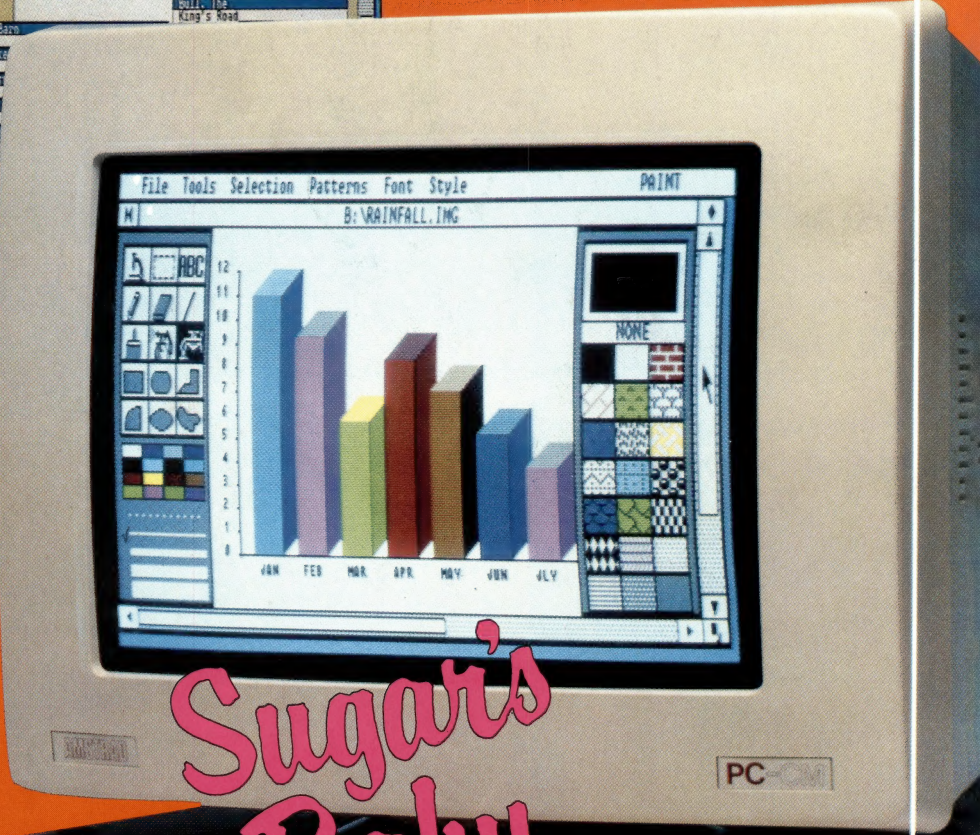
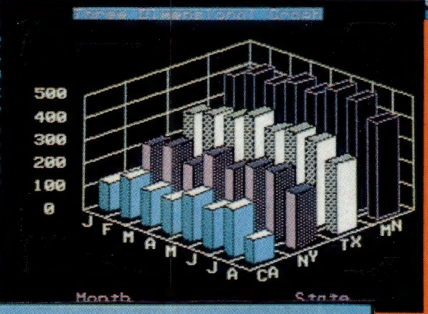
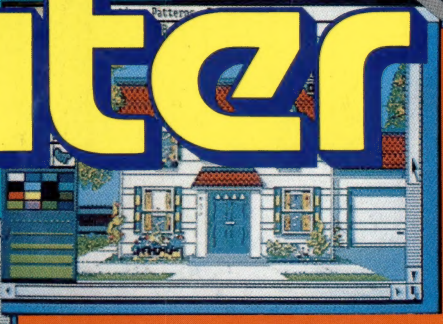
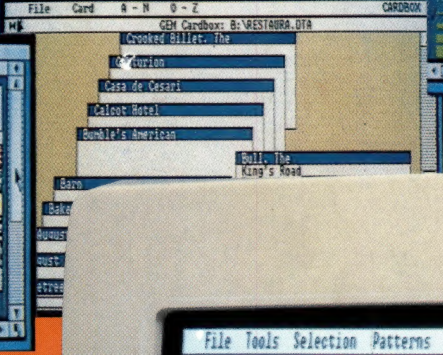
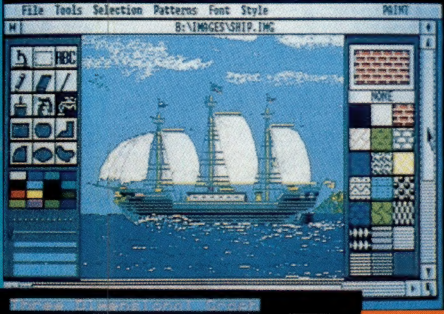
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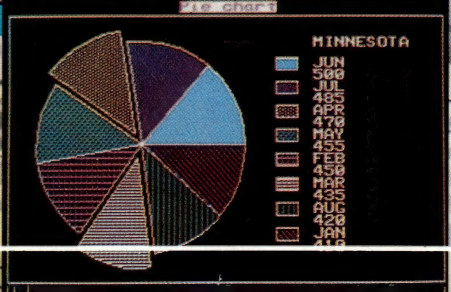
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*Sugar's
Baby*

The Amstrad PC1512

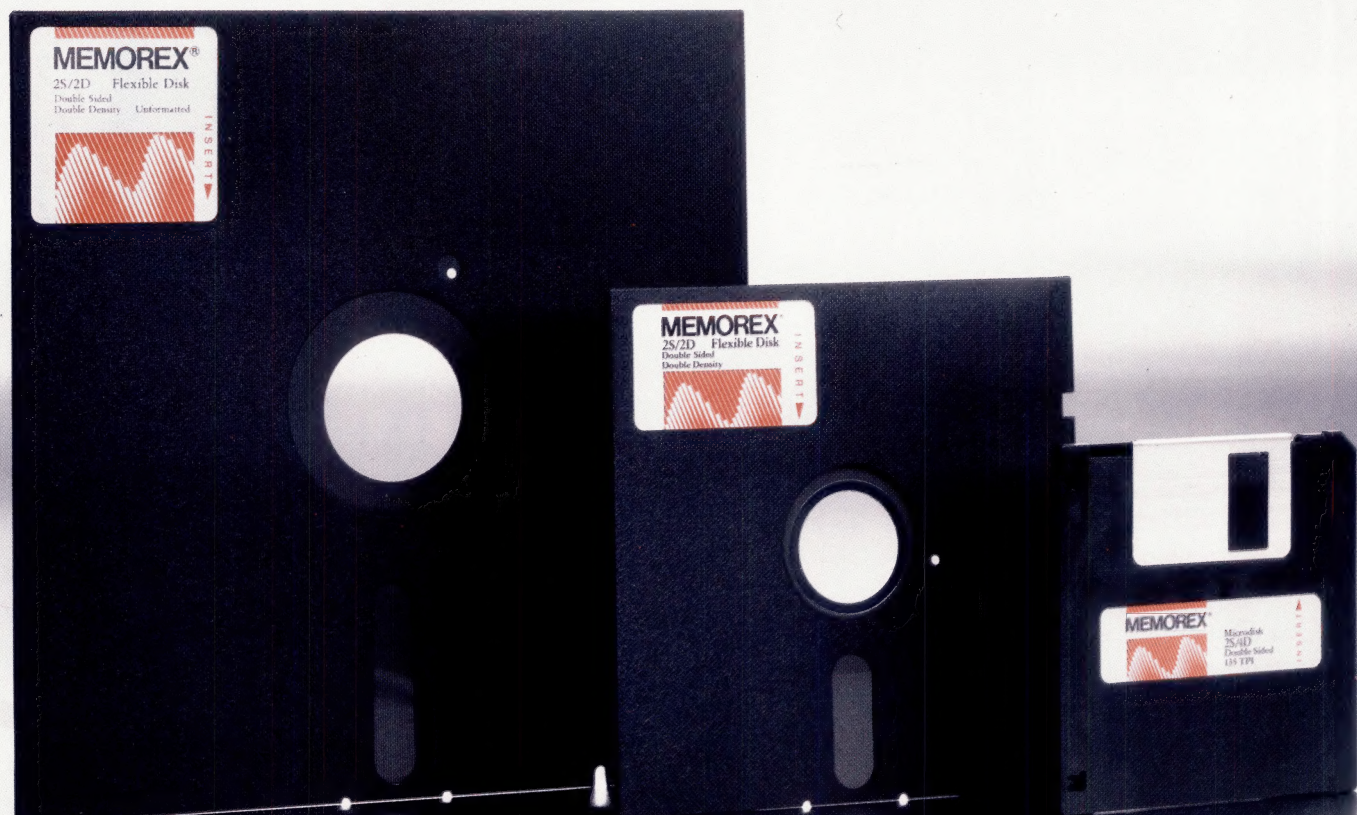
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and still ATtesting**



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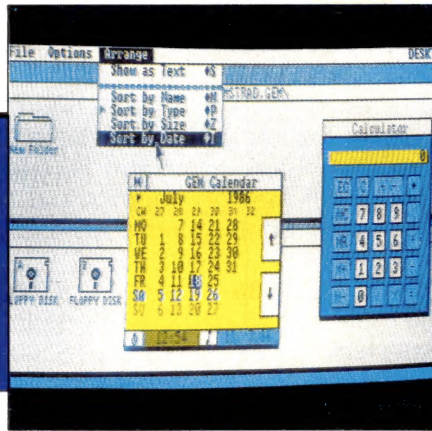
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MERRY CHRISTMAS BONUS

52-Page Program Present	Attached
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HI-TECH C COMPILER

The HI-TECH C COMPILER is an all Australian high performance C compiler for the Z80 and 8086/8088 processors. Now in use at thousands of sites in Australia and overseas, it combines an excellent user interface and diagnostic messages with smaller, faster generated code than any other compiler. It runs on CP/M-80, PC-DOS, MS-DOS, CP/M-86 and Concurrent CP/M. It allows for the generation of ROM based code and comes with a macro assembler, linker and librarian. The 8086 compiler supports large and small memory models and the 8087 maths co-processor. A cross compiler running under MS-DOS and producing code for the Z80 is also available.

Prices:	8086 Compiler for MS-DOS or CP/M-86	\$300.00
	Z80 Compiler for CP/M-80	\$250.00
	Z80 Cross compiler for MS-DOS	\$300.00

SNAKE

SNAKE is a utility for MS-DOS functionally equivalent to the Unix MAKE command. It automates the recompilation of any modified modules of a programme. This is an indispensable tool for any serious programmer using C or any other compiled language.

Prices:	SNAKE	\$89.00
	SNAKE + BTree + ISAM	\$249.00

BTREE & ISAM

BTree is a b-tree based index and data file manager supplied in C source code form. ISAM is a higher level set of routines providing powerful database management, also in C source form. ISAM requires BTree.

Prices:	BTree	\$119.00
	BTree + ISAM	\$179.00

MACRO ASSEMBLERS

HI-TECH Software has macro assemblers to run under MS-DOS or CP/M for the following micros: 8080, 8085, 8086, 80186, Z80, NSC800, 6800, 6801, 6805, 6809, 6301, 6303 and 64180. All use standard manufacturers mnemonics and come with a powerful linker librarian and object code convertor. The assemblers absolute or relocatable code and Intel and Motorola Hex formats are supported.

Price: \$250.00

A BOOK ON C

"A Book on C" by Al Kelley and Ira Pohl is an indispensable guide for every C programmer, whether a beginner or an experienced professional. An excellent introduction and a comprehensive reference to the C language, it has many examples and working programmes.

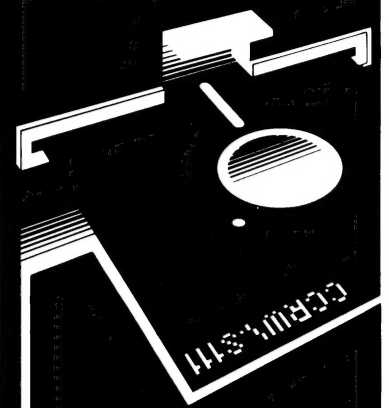
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Power to the People

IT HAS LONG been a rule chez Bell: no computers at home. 'We don't want the domestic bliss shattered by the whirring of disk drives', is the official reason. But really, after ten years of mucking about with PCs, the simple truth is that I'm fed up with carrying the damn things around. Have been for years.

I sit and watch Matt struggling up the stairs to the office with yet another AT clone, a laser printer or a Mac: I think, 'If computers are such great mind expanders, how come they're doing so much for Wheelie's biceps?'

And so life has been neatly divided, at home and away, for the Bell ménage. In part, the idea of being pursued homewards by computers while spending all day with the beasts has been slightly horrifying. But then, there have been times when I've been pursued by an idea for a C program, or an algorithm of some sort, and the lack of an accessible computer has meant the idea has been lost. But I've always been happy to pay that price; sometimes the rest has done me good.

But the times, they are a changin'. These days, I spend something like 100 nights a year away from home; not just from home, but also from the office. A lot of my time is spent in hotel rooms, where the best form of entertainment is either the tube or a Le Carre novel (and there aren't enough of those, let me tell you!).

So, in an attempt to a) beat the backlog of work accumulating and b) beat the boredom, I finally decided to buy a portable computer which I could take with me on my travels. I haven't been able to do this before, because I'm a power user (in fact, a megalomaniac): I need lots of power to perform even simple tasks. Our main office machine is an 8 MHz 80286 Viasyn/Compupro system (you may have read Jerry Pournelle's comments about these in *Byte*, but he's always had the model before ours) with stacks of memory and cache buffer-

ing and a huge hard disk.

To me, laptop machines have always seemed like toys — floppy-only, limited battery life. The promise was there: of instant access to information, wherever you needed it, whenever you needed it; of total convenience. But none of the machines on the marketplace came near this holy grail.

But today I took delivery of a new machine which breaks this mould forever. The new Toshiba T3100 is a staggeringly useful machine which is truly portable. Laptop, at a push, although it requires mains power. So what? I don't really believe anyone actually works on planes!

So here I sit — at home, for once — writing an editorial. At last, I'm using Framework II seriously, because I know I can use it wherever and whenever I need to, whereas before I had to be near a PC. (By the way, for those who are wondering how to get Framework II working on the Toshiba 3100, which has no up- and down-level keys, they are Ctrl-Shft-Alt — and + on the numeric pad, respectively).

Incidentally, a word on Framework II: this package is now the favourite program of 90 percent of the computer press and certainly of all the serious journalists I know. I personally believe that with the exception of specialised software development in C, dBase, and the like, I could do virtually all my work in Framework II. It's that powerful a package.

Put Framework into a box the size of a T3100, and you have an incredibly general, widely applicable and potent machine. I can take it with me around the world and write articles, prepare budgets, track expenses, figure my flight times and even develop some software on the side. Wherever I am. In the Grand Hotel Krasnopolsky, Amsterdam, or the Portland Intercontinental, London.

Even at home! Oh dear, this may have been a mistake...

Les Bell

FREE SOFTWARE

SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

Well, almost free. We don't charge for the public domain software but there is a small service charge of \$15 per disk to cover promotion costs, selection, testing, copying, etc. Disks are available for CP/M, MS-DOS and APPLE. Mail and telephone order only.

The programmes have been carefully selected, tested and documented. They'll run on a wide variety of computers that accept 5¼" disks. We have tried to choose programmes as machine-independent as possible. However we cannot guarantee the suitability of programmes for your particular machine. Wherever possible we include source-code.

MS-DOS programmes are aimed at the IBM-PC and close compatibles. The NEC APC III will often require the software library extension card to be able to execute these programmes.

Documentation is included on the disks where required — often it is very extensive. Unfortunately, we are unable to provide telephone tutorials on using the programmes.

MS-DOS disks are formatted for standard MS-DOS 2.11 360K. Testing has been carried out for CP/M disks on a Z80 Kaypro II.

About 120 different formats are supported, including Kaypro, Osborne, Tandy, Microbee, Bondwell, Commodore 128, Televideo and Apple II.

MS/DOS

DISK No.

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M19: NAME THAT TUNE. Designed in the trivia tradition, your computer plays well-known but frustratingly elusive melodies.

UTILITIES

M21: UTILITIES. These are essential and include file maintenance superstars like **SWEEP** and **WASH** as well as library and squeeze/unsqueeze programmes. Lots of them.

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M25: SELECTED UTILITIES. Dozens of highly useful utilities, with documentation, compiled and ready to go. Includes Autodex (super file manager), Membrain (ramdisk) Squeeze and Unsqueeze, Directory Printer, Calendar, File Finder (great for hard-disk), Keyboard Definer, etc.

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M29: DISK LIBRARIAN. A collection of some of the best programmes available for cataloguing your disks and keeping track of files. Provides an alphabetical master list, etc.

M32: DISK DOCTOR COLLECTION. Some of the best debugging and file repair programmes around. Includes Jaz, Easy-Zap, Diskit, etc. OK for hard disks too.

M33: HARD DISK UTILITIES. A special collection of utilities from more than two dozen other disks. For cataloguing, sorting, backing up, changing file attributes, etc.

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M35: CP/M EMULATION. Run CP/M software on your PC! Well documented and source coding is provided.

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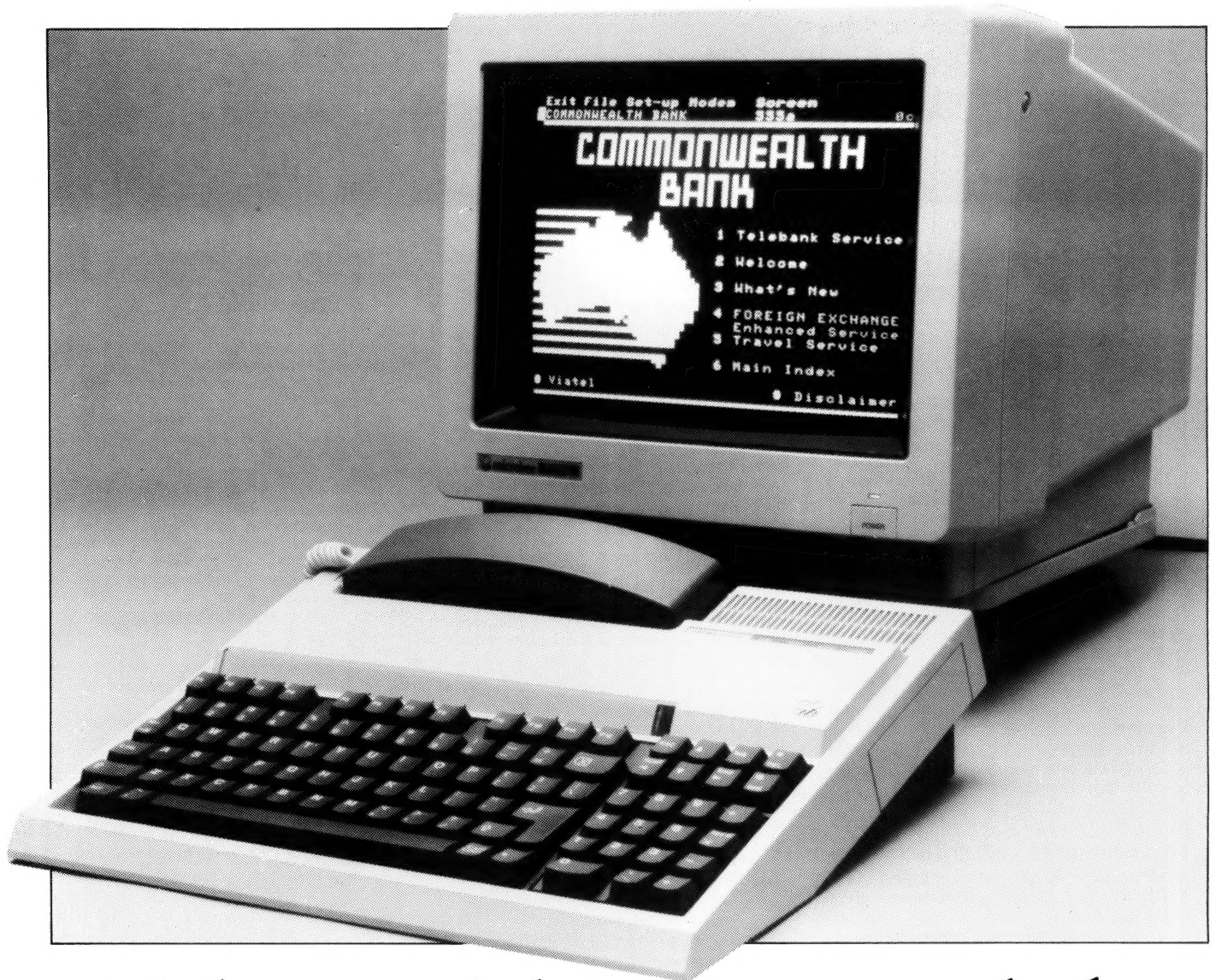
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With one of these on your desk, you may not need a computer.

Thinking about a computer for the office? There's one fact that computer sales people generally won't be too keen to admit: most of the time, computers in offices are used for one thing: simple word processing. Typing up letters, memos and reports.

When they're not being used for that, they're most likely to be used as a communications terminal, fetching information from remote databases. Fairly basic information, too. Like how many Japanese yen the Australian dollar is worth today, or when the first plane leaves for Canberra tomorrow.

It tends to be pretty basic stuff, and doing

it with a computer costing thousands of dollars can be expensive overkill. Rather like using the space shuttle to do your weekend shopping.

Now Microbee Systems has the answer: a new desktop tool called the **TeleTerm**. It's a simple, easy to use word processor, combined with the two main kinds of communications terminal (ASCII and Videotex). It comes complete with built-in telephone and automatic dialling data communications modem. And it costs much less than any computer capable of doing the same jobs: only \$990.00 (not including the video monitor or printer of your choice).

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HI-TECH INITIATIVE

THE SOUTH AUSTRALIANS ARE becoming more and more convincing in the high technology arena what with their entrepreneurial spirit and nicely worked out co-operation between, government, industry and education.

October found them busy in Hong Kong where they had mounted a modest trade show with a handful of carefully selected local high tech companies. They were also running a series of seminars on what they had to offer and how to do business with them.

South Australian Development Minister Lyn Arnold was there. He said: "In broadening and upgrading its economic base away from the traditional mainstays of agriculture, motor vehicles, white goods and food processing, South Australia did not give priority to high technology because it was the flavour of the month or because our trading competitors were doing so. We were building on a considerable strength that already existed through our long involvement with the defence industry, particularly in defence research."

He added that from the beginning, South Australia had never set about buying itself high tech industry. It had never offered big subsidies or relocation payments to lure companies to set up operations in Adelaide.

"Furthermore, we didn't particularly want the biggest names in technology to locate fabrication plants in our state. We wanted to foster a spirit of entrepreneurship and innovation and to create a climate in which companies would want to invest."

He emphasised that they had never wanted companies that would merely treat Adelaide as a distribution point for overseas technology. They had wanted local companies that would use Adelaide as their base for tackling overseas markets.

Lyn Arnold has a gaggle of ministerial portfolios, including State Development and Technology, Employment and Further Education. This allows him an extraordinary opportunity to co-ordinate research and industrial activities and to ensure that the educational underpinning for future developments is firmly in place.

The line-up at the Hong Kong show included:

Computer Protocol – a consultancy that already has a presence in Malaysia and provides expertise in data communications, networking and distributed computing;

Werner Electronic Products – promoting its controlled evacuation system and DUCT teleconferencing;

Labtam – already well-established in a number of Asian markets particularly with its Plasmascan for multi-element analysis;

Micro Byte Systems – with its so-called "glass typewriter" which allows electronic typewriters to serve as daisy wheel printers for computers, and FRED — a micro-based video training aid for the disabled;

Offering Interact Video and Videotex – either operated by coin or as an information unit with a range of applications; it's ideal for dispensing free tourist information;

Masterpac – demonstrating its sophisticated financial planning software complete with windowing and powerful search functions;

Forensic Science Technology International – whose specialised crime detection systems are becoming well known in police, customs and immigration circles;

Chan Computing Services – whose QikDraw provides architectural and engineering professionals with powerful CAD software in both 2D and 3D versions;

British Aerospace – 30 years in space and defence business in Australia and now busy promoting its Australian designed and made medium density satellite search stations which are aimed at the banking and corporate market;

Construction Software Services – with its integrated programs such as RIPAC for quantity surveyors, CHEOPS for contractors, and ADACS for architects;

Pancom Systems – demonstrating 12 modules of ICIS designed for insurance agents;

Labservice – which is looking for either a joint venture partner or distributor for its power conversion products; and

Transtek Systems – whose ultrasonic cleaners are aimed at the jewellery, optical, dental, medical and other small parts markets.

The general opinion was that the range of products South Australia had taken to Hong Kong was well targeted to suit that market. However it will be some time before the participants are able to gauge the worth in dollar terms of the mission.

Brian Werner, managing director of Werner Electronic Products, summed up the general feeling at the close of the show: "We were looking for quality of interest, not quantity." □

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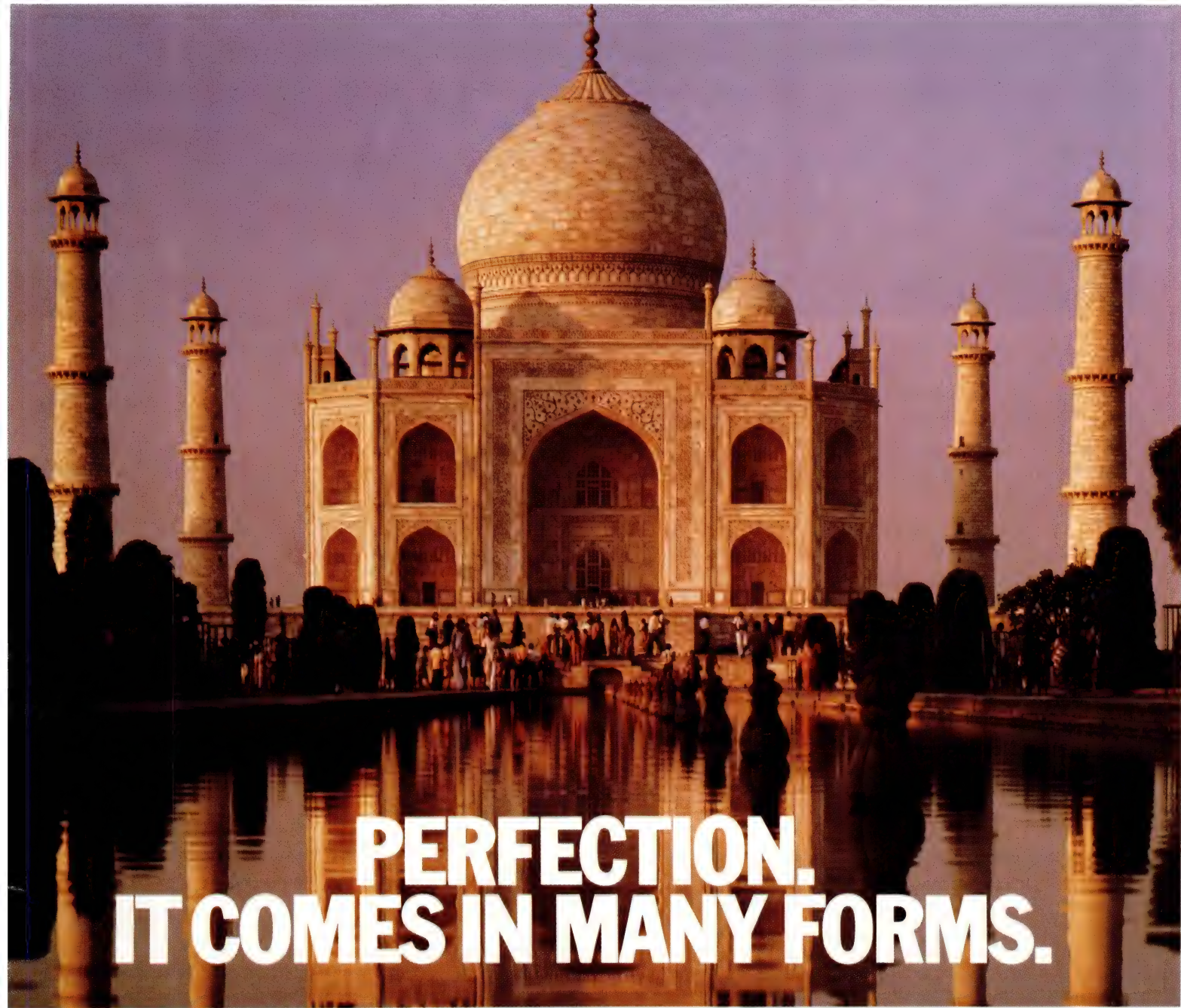
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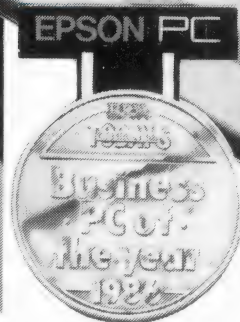
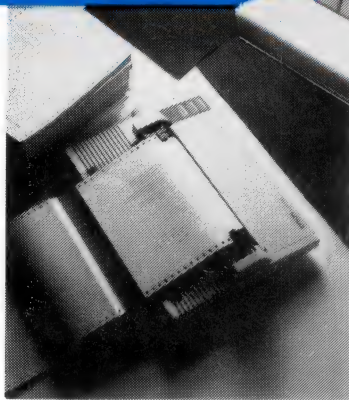
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BRIEFLY . . .

■ All is not roses in Europe where the European Community's research program on information technology, Esprit is about to run out of funds. There are 200 projects, with a total budget of approximately US\$730 million, approved under the Esprit program. Responsibility for funding is shared equally by the community and industry.

The EC has called for a second round of support for the program which is seen as Europe's main hope of closing the gap with the US and Japan. But the British Minister of State, Mr Geoffrey Pattie, who chairs the EC Research Council, has challenged the emphasis on integration in the technology projects and has recommended a much more modest approach overall.

The Esprit program has never received the wholehearted support of member nations, especially West Germany and the UK, which both believe it is more important to pull down market barriers than pour public funding into research.

■ That energetic and youthful British enterprise, Amstrad Consumer Electronics, reported a huge surge in its profits for the year. Income leapt from 6.8 million pounds to 29.5 million and the company more than doubled its sales — from 136.1 million pounds to 304.2 million, for the year ending June 30, 1986.

Amstrad wrote off the intellectual property rights of Sinclair Research which it had acquired earlier this year when Sinclair ran into financial trouble. This action resulted in an extraordinary charge on Amstrad of 2.9 million.

Amstrad, which has launched 12 new products in the past year, has benefited from the softness of the world semiconductor market which helped keep costs down just as sales of the company's microcomputers started to accelerate.

However Chairman Alan Sugar is revamping the company's US strategy. Clearly he is not happy with the failure of US distributor Sears World Trade to sell his PCs.

Mr Sugar had anticipated Sears would take 100,000 machines but the distributor shipped only 70,000. He has announced a new US agent to help market his newest models but says Amstrad will handle some of the jobs itself.

Amstrad's latest Australian offering is previewed in this issue — see page 34.

MICA MERGER

Remember Information Electronics, the innovative Canberra terminal manufacturer that once resided in what is now Wang's manufacturing plant in the ACT's Technology Park?

When IE folded, its R and D division provided the nucleus of a new company called Mica Associates which has gone on to make a significant impression on the domestic terminal and intelligent workstation market.

Mica has sold its workstations and networking capabilities to some of Australia's leading organisations, including BHP, the Department of Aviation and Telecom, which has bought 100 Mica Units.

Mica's latest product is the IBM-compatible V400 series.

Mica's technology has now been brought under the Techway marketing umbrella through an arrangement by which Techway acquires Mica and Techway itself is on the receiving end of up to \$2.5 million investment by the Australian Industry Development corporation (AIDC), in return for 15 per cent equity in the company. AIDC already held 43 per cent equity in Mica.

Techway's strength lies in adding value and transforming technology and products into solutions. Mica will bring to Techway its highly regarded line of products and its expertise in communications. It also combines the not inconsiderable skills of industry identities, Dr Peter Jones of Techway and Mica's Tony Rich.

This industrial merger is a nice one. In particular, it ensures the continuing productivity of Mica, one of Australia's most innovative manufacturers, and support of the company in its drive for export dollars. □



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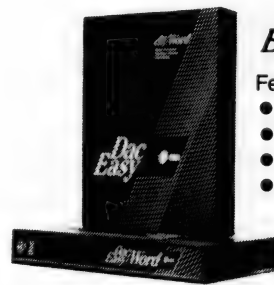


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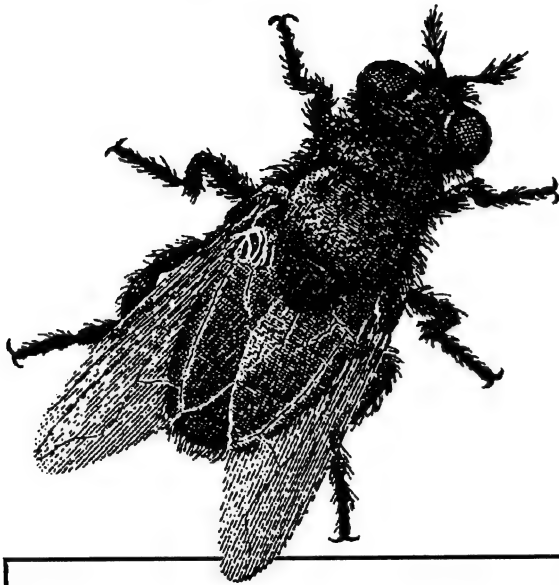
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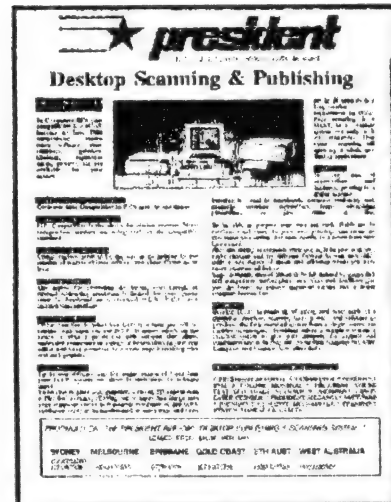
With the PAGEmaster III you don't need to be a creative genius because What You See Is What You Get (WYSI WYG). Your page layout is on the screen in front of you. The PAGEmaster III allows you to move images around the screen, change their size and proportions, set your own type and scale it to fit the space available.

The system will read your PC wordprocessor disks or produce graphics directly onto the screen.

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AMERICAN GRAFFITI

BY HOWARD A. KARTEN

SOME OBSERVATIONS ON LANGUAGES

IT USED TO BE, in the early days of computers, you had to be something of a linguist to be able to actually use one. The only way to communicate was via the eyeball-twisting numbers of machine language. Even after symbolic assembly language took the fun out of programming, communicating with a computer was still not the world's easiest task.

Millions still cling to the hope that somehow, computers will be made less opaque as a result of 'easier-to-use' or 'user-friendly' languages. One result of this sometimes frail-looking hope is computer users — particularly those in the sub-species *hacker* — keep trying to learn new, or different, languages. And, of course, language developers keep humouring them with newer languages.

All in all, it's not terribly different from those ads appearing in the back of some of the more sensationalist publications: 'increase your IQ', 'lose weight faster', 'increase your bust size'. They always hold out hope that finally, this month, this product, will be the one to do it. So it is with computer languages.

There is a notion that virtuosity is proportional to the number of languages known, a notion which seems deeply ingrained in the human psyche. Learn a foreign language, my father used to admonish me on his more idealistic days, and it will make you a better person later in life. (The old gent never said how, exactly; it was like an article of faith with him.)

Knowing a foreign language has in fact been of limited use. If a snooty waiter in a French restaurant tries to fob off yester-

day's *poisson saute aux pommes frites*, I'm able to deflate him by saying offhandedly, 'No, I think I'll skip the fish and chips today.'

On the other hand, having learned COBOL, Fortran, SNOBOL, PL/1, and a few other programming languages has been of inestimable value to me. Learning two assembler languages on my own, without benefit of formal classes, gave me a lot of confidence in my abilities to educate myself. In the process, I also got some good glimpses into the nature of language and of computers, and I've managed to sharpen my skills generally when it comes to logic, speaking, and organizing work and projects.

In any case, the desire for a better man-machine interface has given rise to a plethora of programming products. Thus, Lotus Development Corp's recently-introduced 'HAL,' the 'human access language' intended to make it easier to use 1-2-3, was widely hailed. Before that, there were speech-recognition, front-end products, promising to provide entre to the computer via the most widespread language of all — spoken English.

But despite the appearance of C, Pascal, ADA, Lisp, Better BASIC, and numerous fourth-generation languages, it somehow seems communicating with a computer is only a bit easier today than it was yesterday.

There always seems to be a tradeoff in overcoming the language barrier. For example, the more elegant and easy to use a language is, the more advance study required to use it. BASIC was created by a Dartmouth college mathematics professor so students would be able to learn a programming language quickly, without excessive study. It is easy to learn; too bad, then, that

programs written in BASIC seem to run slower than those written in many other languages.

All of this seems to point up an interesting law of the physical universe, which I have (somewhat immodestly) dubbed Karten's Law of Conservation of Frustration: frustration can be neither created nor destroyed, but instead, remains constant, changing only its location or its form.

Like everyone else, I have hopes of finding a language that will make it easier for me to deal with my computer. To that end, I've enrolled in a few language courses. I figure Creative Swearing 101 should come in handy in dealing with computer manuals written with English words, but impossible to understand. Euphemisms 2 should be useful when I attempt to wade through the hype of advertisements; and Advanced Legalese should help me understand the few rights actually granted in 'shrinkwrap licenses' and in getting vendors to deliver on those alleged '30 day, money-back guarantees' that so often accompany products today.

My course in Aussie is already paying off; I've learned my first bit of Aussie: G'day, mate.

RUMBLES ON THE ROM FRONT

A recent development by Microsoft has taken CD-ROM (compact disk read-only memory) data storage one step closer to commercial success.

For at least the past two years, observers have been eagerly awaiting, and predicting, the commercial success of optical disk storage. Although optical storage of data has been hailed as an inexpensive way to distribute large databases, it has not yet really caught hold in a big way.

At a September meeting of

SIGCAT, the Special Interest Group on CD-ROM Applications and Technology, Microsoft announced it is working on an extension to MS-DOS 3.x aimed at any CD-ROM disks formatted in the 'High Sierra' file format. This will enable any micro using MS-DOS release 3.1 or 3.2 to access a CD-ROM disk as drive C: or D:. The operating system extensions are expected to be available by the time you read this.

Microsoft expects to license CD-ROM manufacturers to use the software with their drives. Each manufacturer will probably have to make minor modifications to customize the software for the manufacturer's specific product. IBM, following its customary policy, declined to speculate on what course it might follow regarding the Microsoft developments.

In another CD-ROM-related development, Lotus Information Services, a subsidiary of Lotus Development Corporation, announced a CD-ROM system aimed at providing financial data for spreadsheet users in a faster, more easy-to-use (and of course, most costly) manner.

The system, called Lotus Financial, provides weekly updates of financial information on CD-ROM disks, as well as daily updates via another Lotus subsidiary. Among other abilities, the system permits users to load financial data, such as real-time stock prices, into 1-2-3 without exiting 1-2-3 to obtain the data.

PROPRIETARY IBM

A recent agreement between IBM and Intel Corporation which makes the 8086, 80286, and 80386 chips may spell trouble for some IBM-compatible clone manufacturers. IBM has been hinting for some time now that it plans to do something to protect its market share from clones, ▽

which are faster and less expensive than the products bearing the Big Blue Escutcheon.

The agreement calls for sharing of some chip technology and designs between the two firms. One aspect of the technology permits customization of an otherwise standard chip, such as the 80386 superchip now beginning to appear in advanced machines.

What this means is a company like IBM could start with a chip available to all buyers, such as the 80386, and customize it, making it proprietary and therefore more difficult, and certainly more expensive, for clone makers to duplicate the functions of the original item. IBM has already taken this design approach with the IBM PC Convertible and the RT.

IBM just happens to own a slice of Intel.

SHORT BYTES

The July 30 agreement between the US and Japan regarding prices of DRAM (dynamic RAM) and EPROM (erasable programmable ROM) chips is already having an effect on prices of US hardware. The agreement calls for Japanese vendors to sell their 256 Kbyte DRAM and EPROM chips at 'fair market' prices. This has caused the price of the 256 Kbyte chip to rise from around \$US2.50 to more than \$US5.00, and in some cases higher than that. However, since the agreement does not cover finished boards, some board manufacturers have already moved their board manufacturing operations off-shore, to the Far East ...

IBM has begun shipping its PC Convertible with internal modems installed. IBM had said earlier that it expected to start those shipments by the begin-

ning of the fourth quarter of the year; and now expects to fill all current orders before the end of 1986 ...

Speaking of IBM, the company, like many others in the computer industry, is going through some rough times. In September, the company offered early retirement, hoping to reduce its work force by several thousand. In mid-October, the company announced more bad news: third-quarter net income was down 27 percent compared to the third-quarter 1985 ...

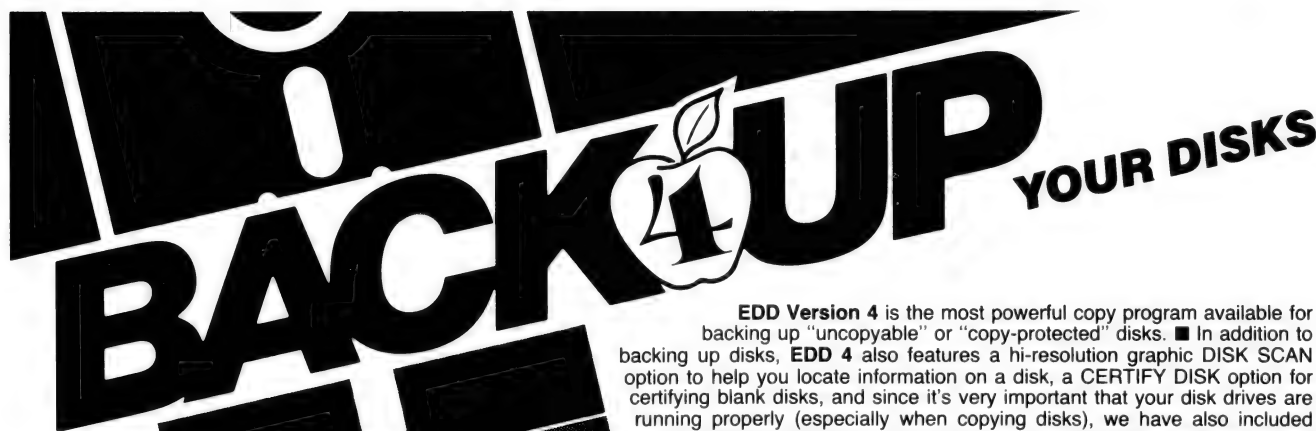
On the other hand, Apple Computer fared particularly well. Earnings for Apple's fourth quarter were up 47 percent compared to the fourth quarter 1985, and for the fiscal year, net earnings more than doubled, from \$US61.2 million in 1985 to \$US154 million in 1986 ...

Apple confirmed widespread

rumour and user experience that upgrade kits for the Apple Laserwriter Plus have experienced high failure rates. The \$US800, 16-chip ROM set adds additional fonts to the Laserwriter's capabilities. Dealers have said the failure rates range anywhere from 25 percent to 60 percent of all kits shipped. Apple has not made any general recalls ...

Printer maker Okidata introduced a six-page-per-minute laser printer based on the Ricoh laser engine. The device costs \$US2195 — about the lowest price for any laser printer yet announced in the US. Only a few years ago, \$2195 bought a moderately fast formed-character printer ...

Want to turn your 80286-based system into an 80386-based one? Computer Classifieds of Miami, Florida, will be selling a \$US500 board that does just that. □



EDD Version 4 is the most powerful copy program available for backing up "uncopyable" or "copy-protected" disks. ■ In addition to backing up disks, **EDD 4** also features a hi-resolution graphic DISK SCAN option to help you locate information on a disk, a CERTIFY DISK option for certifying blank disks, and since it's very important that your disk drives are running properly (especially when copying disks), we have also included an EXAMINE DISK DRIVE option. ■ Even though **EDD 4** has been preset to copy the broadest range of copy-protections possible, **EDD 4** can be "modified" to back up almost any disk that runs on your Apple! ■ For the dedicated user, in addition to **EDD 4**, we are offering an **EDD 4 PLUS** version that includes a specially designed hardware card which allows **EDD** to copy EVERY bit of information from each track accurately! You can bet that if **EDD 4 PLUS** can't copy it nothing will! ■ **EDD 4** runs on an Apple II, II Plus (including most compatibles, IIe, IIc, and III (using emulation mode), and is priced at **\$125.00**. ■ **EDD 4 PLUS** runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at **\$190.00**. ■ Mastercard and bankcard orders can be made by phone. All orders must be prepaid.

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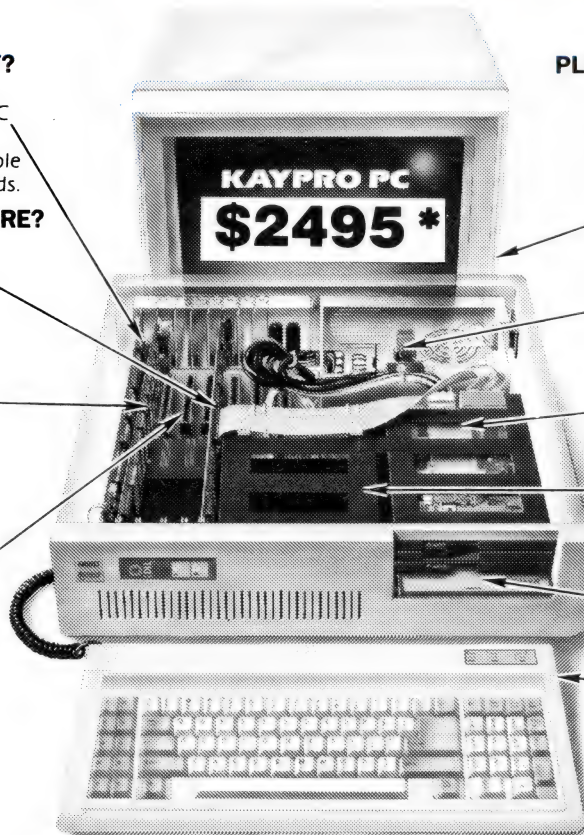
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Detachable, IBM PC AT-style keyboard with security keylock.



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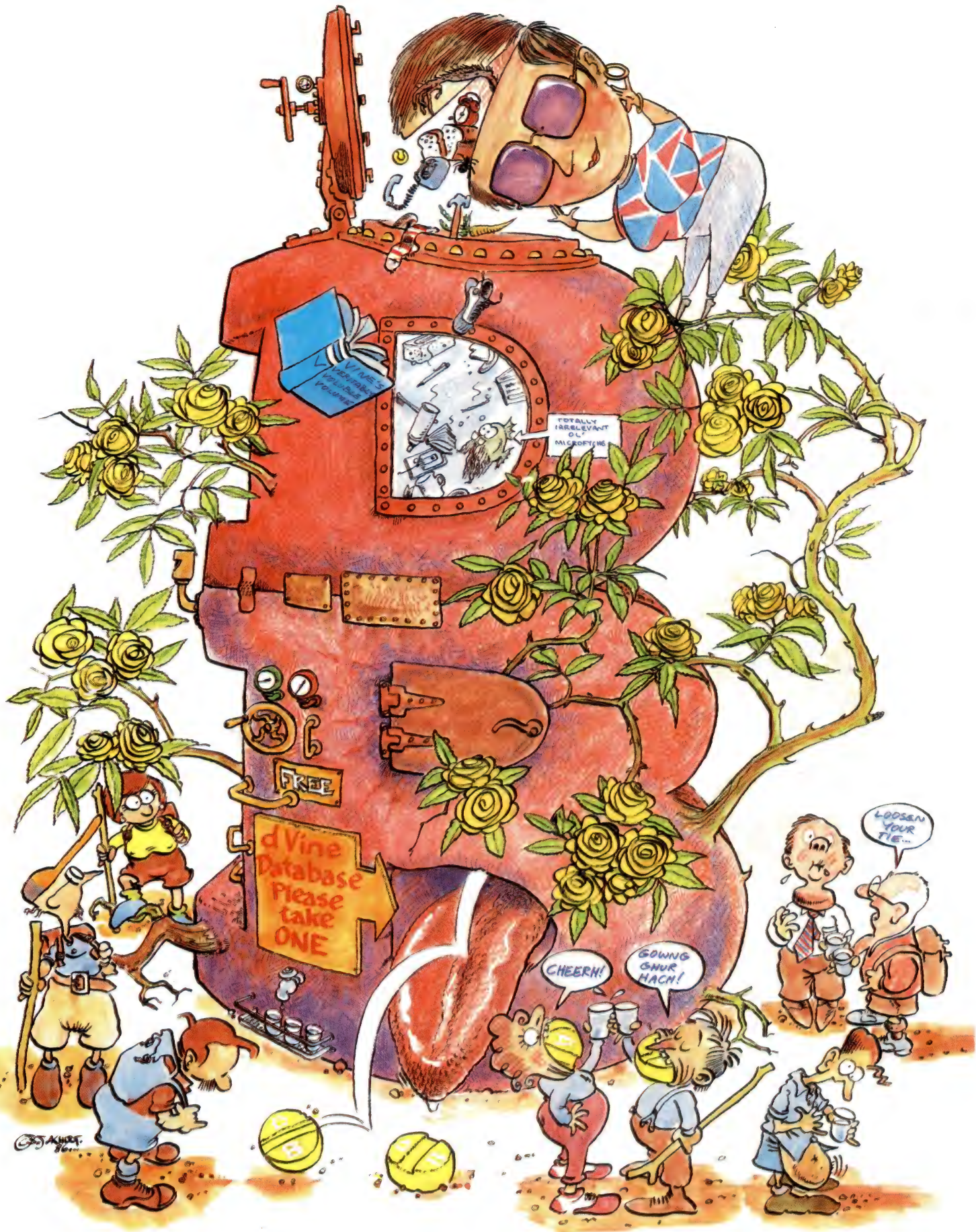
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Databasics

Do you crave gently paced interaction with an interpreter; or are you hankering for compiled speed thrills? Do you want to relate? And, if so, are you ready for an entity relationship?

These are some of the questions you need to ask when choosing a database. The database market today offers a bewildering array of products, ranging from simple file managers to artificially intelligent integrated relational database management systems. You can buy a public domain system for the price of the disks themselves, or spend more on the software than you do on your hardware. The choice is yours; but making the *correct* choice requires a great deal of groundwork.

A lot of that groundwork was done in our Great Database Search (various issues of *Your Computer* from September 1984 to January 1986), in which we examined many of the available database systems in detail. However, while Dataflex and KnowledgeMan/2 won out in our estimation, these products are not necessarily the best choice for *you*. Not everyone wants an all-powerful, relational database. For some, that choice would be a waste of time and money. And, like most of the computer world, new products — and new

releases of old favourites — are appearing on the scene all the time. How can you assess these?

Choosing the database which is right for you involves three things: understanding database systems, understanding your own data management needs, and knowing the database market.

Manual and Computerised Databases

A database is basically a filing system: a collection of related information. A library catalogue, the phone book, a personnel filing system are all databases. We work with such manual systems (and their limitations) all the time.

Some disadvantages of traditional manual filing systems are:

Bulk: Such systems can quickly grow to consume large resources in storage space and facilities.

Slow retrieval times: In large systems, finding the required information can be a lengthy process.

Difficulty in manipulating data: Sorting and reordering can be a major project.

Data redundancy: The same information is often stored in more than one place in manual systems; this is a waste of time and resources, and can cause inconsistencies when trying to update information.

Lack of security: Both in terms of restricting access to information, and with regard to safeguarding the information from accidental damage.

Computerised filing systems perform the same functions as manual systems, but, with careful design, they can eliminate the restrictions and problems of manual systems. A well-designed, computerised database lets you manipulate data and produce complex reports with ease, reduces space requirements, eliminates data redundancy, and increases the speed with which information can be retrieved. Many systems also let you design security features and, because it is easy to make back-up copies of data, electronic databases provide insurance against accidents such as fire.

Database Jargon

The software needed to organise a database on a computer system is called a database management system (DBMS), or just a 'database'. Some of the lower-powered systems are called file managers, or list managers.

Three main terms are used when describing information stored in a computer database. A *file* is a collection of related information, such as a list of sales prospects, a membership list or a personnel

file. Different database products may use different terms for a file, such as 'table', 'relation', or 'database' (that term crops up all over the place).

Most database management systems organise files into rows and columns, with each row representing a *record* and each column a *field*. A record is the equivalent of a single card in a card-filing system, or a single entry in the telephone book: it contains all the information relating to one entry in the file. Each record consists of fields (sometimes called 'attributes'). A field is a piece of information describing one aspect of a record.

For example, Table 1 shows a file called SUPPLIER, with each record supplying information about one parts-supply company. The fields in each record are SUPPLIER, STREET and SUBURB.

Indexed Files

One of the delights of computer databases is the ability to quickly order or rearrange information. Most databases provide facilities for sorting information already entered; sorting produces a copy of the original file sorted in a specific order. For example, the SUPPLIER file in Table 1 could be sorted on SUPPLIER to produce an alphabetical listing in supplier order.

Indexing is an alternative to sorting, which usually provides increased retrieval speed and the advantage of not wasting space by producing a copy of the original file. Indexing a database usually produces

The ability to reorder information is one of the big advantages of computerised databases over manual filing systems: imagine the work involved in rearranging a personnel file from alphabetical employee-name order to payroll-number order. On a computerised system, this sort of job can be accomplished in minutes.

an index file. For example, the CONTACTS database could be indexed on LAST-NAME: this would produce an index file containing only the last names of the contacts and a pointer to where the full record is in the database. Because the index contains much less information than the main file and is in a specified order, it is

much quicker to search through it and find the desired record. The CONTACTS file could also be indexed on other fields, such as COMPANY, and then the appropriate index chosen when processing. The field used to create the index is called the *key field*.

This ability to reorder information is one of the big advantages of computerised databases over manual filing systems: imagine the work involved in rearranging a personnel file from alphabetical employee-name order to payroll-number order. On a computerised system, this sort of job can be accomplished in minutes.

List Managers and Relational Databases

There are two main categories of database on the market: list managers and relational databases.

List managers provide facilities for storing and manipulating information in single files, and are suitable for use by non-programmers. They cannot relate information in separate files; for example, you could not directly match records in a file, SALES, containing the fields employee-id, last-name, first-name, department-id, with a file, DEPARTMENT, containing the fields department-id, department-name, and manager. If you were trying to keep track of all this information with a list manager, you would have to place it all in one file; this means you would end up with a lot of repeated information (such as the department manager's name) in each record. Very cumbersome. However, many tasks can be accomplished efficiently using single files, and some of the list managers on the market provide very sophisticated tools for manipulating information. They also tend to be a lot cheaper than the more powerful systems, and easier to use.

The second main category is the relational database managers. These databases are capable of manipulating and 'relating' information in two or more files, enabling complex structures and applications to be developed. This category includes products like dBase, Knowledge-man and Dataflex.

The term 'relational' is applied to a lot of systems with widely different capabilities. It seems many manufacturers use it in the very loose sense mentioned above: that is, the ability to relate information in two files. It does, in fact, have a stricter definition; but essentially, a relational database should enable you to develop

INVENTORY File						
PART#	PARTNAME	QTY	ORDER	SUPPLIER	STREET	SUBURB
A-2321	mudguard	150	20	Jill's Autos	15 Grumble Parade	Camperdown
F-3411	floor mats	200	40	Con's Cars	9/54 Allison Road	Granville
W-9002	needle valve	7	10	Para Parts	321 Parramatta Road	Parramatta
D-0007	cam shaft	18	10	Con's Cars	901 Parramatta Road	Granville
F-6555	brake pads	92	50	Jill's Autos	15 Grumble Parade	Camperdown
H-2639	wheel nuts	390	250	Con's Cars	9/54 Allison Road	Granville

PARTS File				
PART#	PARTNAME	QTY	ORDER	SUPPLIER
A-2321	mudguard	150	20	Jill's Autos
F-3411	floor mats	200	40	Con's Cars
W-9002	needle valve	7	10	Para Parts
D-0007	cam shaft	18	10	Con's Cars
F-6555	brake pads	92	50	Jill's Autos
H-2639	wheel nuts	390	250	Con's Cars

SUPPLIER File		
SUPPLIER	STREET	SUBURB
Jill's Autos	15 Grumble Parade	Camperdown
Para Parts	321 Parramatta Road	Parramatta
Con's Cars	9/54 Allison Road	Granville

Table 1. Sample database files — these are just a collection of related information, whether they are called 'tables', 'relations,' or 'databases.'

systems in which information from multiple files can be connected, and with no data redundancy (that is, no information stored more than once in a database). The various systems on the market do this to a greater or lesser degree, with some, such as Knowledgeman and Zim, providing superior multi-file capabilities.

Some of the databases on the market don't fit exactly into either category. For example, some of the more powerful databases available are designed around structures other than the relational model; Zim is one such, and it is based on the 'entity-relationship' model. It has similar capabilities to the relational databases, but goes about the job in a different way. Power:Base tries to split the two categories down the middle — offering relational capabilities in a completely structured, menu-driven environment. There are also integrated products on the market incorporating database modules.

Case Study

It's easier to get an understanding of the relative powers of list managers and relational databases by studying an example.

Let's use the INVENTORY file from Table 1. Each record provides the following details about a particular part:

1. Part Number
2. Part Name
3. Quantity on Hand
4. Reorder Level
5. Supplier
6. Supplier's Street
7. Supplier's Suburb/Town

If we use a list manager, this is the simplest way of working — putting all the information into one file. All the information is there at a glance, and with the list manager we can sort and manipulate this information in various ways.

But we've had to enter supplier's details for Jill's Autos and Con's Cars more than once. And, something else has happened ... someone has updated Con's address, but hasn't changed it on all records. This is one of the inherent problems of list managers. While it's easy to notice this in a small file, it's much harder to track when you're dealing with hundreds of records. We could have avoided this by creating two files — PARTS and SUPPLIERS — but there's no easy way to cross-reference the files: we'd have to look up a part in one file, note the supplier, and then look up the supplier in the other.

Relational databases to the rescue! If

As a general rule, the ease with which a database can be used is inversely proportional to the power of the system. Systems which combine ease-of-use with flexibility and power are rare, although all the top contenders in the market aim at this mix, with varying degrees of success.

we use a relational database — one which can handle multiple files — we'll split the information between two files: PARTS and SUPPLIERS. This means supplier information need only be entered once, and we can then use the database's relational commands to create a link between the two files.

For example, if we create the PARTS file with fields one to five from above, and the SUPPLIERS file with fields five to seven, we can then use the multi-file handling capabilities to relate information from one file to the other. With such a set-up, we can search through the PARTS file looking for the desired records, and then *automatically look-up* the supplier's details in the SUPPLIERS file: the Supplier field provides the link and the database manager does the work of noting the supplier and finding it in the second file. Also, any changes we make to the supplier's details need only be recorded once. No data redundancy, and no inconsistencies.

Defining Your Needs

The first thing to do when trying to decide which database to buy, is to define your information needs:

What do you want the system to do? Are you looking for a program to keep a membership list for your organisation; or do you want to build a full-featured inventory tracking system?

How is your current system organised? If your current system is working fairly well, but you need the advantages of speed and

flexibility provided by a computerised system, you may want to be able to convert your present structures onto a computer. Can the database you're looking at accommodate your file structures? Do you have files with a very large number of fields — can the database handle this many?

How much information do you have? How much will it grow? Can the database handle the total volume?

What sort of reports do you require?

What are your likely future requirements? You may buy a database now merely to keep track of a customer list, but in six months time you'll probably be wanting to link this to an inventory file or a monthly sales analysis. Count on your requirements increasing — will the database meet future needs as well as those more immediate?

The more accurately you know your information needs, the easier it will be to evaluate the different databases.

Assessing Your Resources

As well as your needs, you should examine your current resources:

Has anyone in your organization had database experience? With databases in general? Or one in particular? Will you need to train someone from scratch to learn the new system; if so, how easy is the system to learn? Is it worth trying a different system if you already have expertise with another?

How much does the database cost? How much will it cost to use it on a network or to provide multiple copies for employees?

What is your current hardware? If you're using IBM PC/XT/ATs or compatibles, the market is wide open to you. If you have a Macintosh, CP/M-based machine or some more esoteric brand, your choice of databases — especially those with a lot of power and flexibility — is limited. Depending on the importance of the database application/s you wish to develop, and the state of your current applications, it may even be worth changing hardware to be able to select the appropriate database. If you don't have a computer yet, choose your database (and other software) *first* and then see which machines will run it.

Many of the databases on the market won't run unless you have at least 512 Kbytes of main memory and a hard disk. When you buy a program, will you have to upgrade your current hardware to be able to use it? ▷

Who is available to convert your current information over to the required format. Apart from development staff, do you have the staff to perform data entry, or will you need to employ someone? Is data entry handled efficiently by the product you're looking at? If you're currently using a database or spreadsheet system but want to upgrade, can the new system automatically convert your existing information to its own format?

How Much Power?

As a general rule, the ease with which a database can be used is inversely proportional to the power of the system. Systems which combine ease-of-use with flexibility and power are rare, although all the top contenders in the market aim at this mix, with varying degrees of success. If you want a program which can create complex applications, you — or someone else in your organisation — are going to have to devote a fair amount of time to learning the system. Count it as part of the expense.

However, with many of the top-line databases it is possible for a novice to learn *the basics* with no more effort than it takes to use a simple list manager. If you want quick solutions to moderately uncomplicated problems, one of the powerful products may be the best investment, as it will offer scope for future development and expansion: just make sure it provides plenty of guidance for the first-time user. For example, dBase III Plus's 'Assistant' and program generator give newcomers an easy route to producing useful data management structures and routines. On the other hand, a program such as Qpro-4 would scare the pants off a novice.

If you only want to convert your card files to their electronic equivalent, don't go buying a fully fledged database management system; it'll do the job for you, but you'll be wasting your money. A list manager is fine for such work.

The relational and multi-file database systems form the section of the market where the real power play happens. If you need a system which is powerful, comprehensive and flexible, one of these systems will most likely fit the bill.

Assessing a System's Power

Some questions for assessing the power of a system include:

Is it a list manager or multi-file database?

Is there an in-built programming language?

Systems with their own programming languages provide scope for developing applications to suit your own needs. Some of these languages are almost as complete as dedicated programming languages such as BASIC, and offer the added advantage of incorporating the database manipulation commands used in the rest of the system.

Does it interface with other languages? Some of the databases have interfaces (or third-party add-ons) which let them incorporate code developed in dedicated programming languages; or which let you develop a complete system in a programming language incorporating the structures and data manipulation commands of the database. The Knowledgeman option, K-C, is such a program, creating a link between Knowledgeman and the programming language C. With such a system, it is possible to develop almost any application you can think of.

Is it compiled or interpreted? Compiled proce-

dures generally run faster than interpreted procedures, although there are other considerations (such as what language the database itself was written in) when checking the speed of a database. There are third-party compilers available for dBase III; they add to the expense, but often add more than just speed.

Is there support for networking and multi-using?

If you're developing an extensive system, network or multi-user support may be important, so more than one person can work on your information at one time.

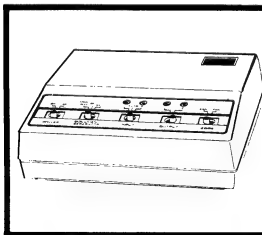
Make sure you see the database in action — preferably in a real-life situation. Some retailers will refer you to current users; if not, check out a local user group if there is one. When you do enter the retailer's lair, have a checklist — such as that in Table 2 — in hand. For simple applications, this may be a little over the top; just make sure you find out what you need to know — not what the salesperson wants to tell you.

Market Rundown: The Leader

Having looked at what databases are, and how to assess them, let's have a brief look around the market.

Ever since the database management system has become a popular tool for microcomputers, one name has dominated the market. That name is dBase, and all other systems on the market use it as the yardstick for measuring their power and their success. dBase originally gained widespread acceptance as dBase II, and has since matured through a number of versions and a major rewrite and upgrade to become dBase III Plus. For a long while, dBase II had no real competitors, and when other powerful database systems started to appear, Ashton-Tate responded with dBase III, a much-improved model of the original program.

Whether dBase is the best database on the market is a matter for dispute, and obviously depends on what you want to do with it. However, being the market leader gives it a number of advantages over other



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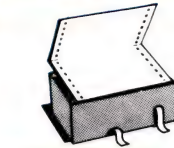


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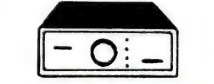
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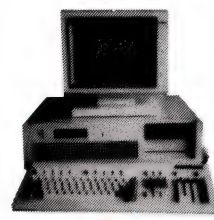


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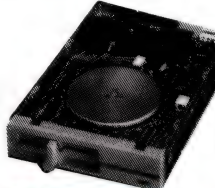
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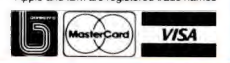


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 - courses
 - newsletters, books
 - third-party software
 - user groups
5. **Security**
 - built-in password protection
 - file encryption
6. **Portability**
 - hardware and operating systems under which it functions (including multi-user and network systems)
 - ability to exchange data between other databases, spreadsheets and word processors
7. **Requirements**
 - hard or floppy disks
 - minimum and optimum RAM required
 - minimum operating system
 - other hardware requirements (such as graphics cards)
 - other software requirements (is it a complete package, or does it need a host language?)
8. **Copy protection**
 - what sort, if any? and will it run on your hardware?
9. **Cost**
 - single-user
 - multi-user and networks
 - run-time version
 - extras (for example, you may need to add on the cost of training if you choose one of the more complex databases)

Table 1. Sample database files — these are just a collection of related information, whether they are called 'tables,' 'relations,' or 'databases.'

products which may be more powerful, flexible, inexpensive or easier to use.

For a start, support for the product is

abundant: if you can't get what you want from the distributor, third-party support is available in the form of courses, books, consultants, newsletters and user groups. If you come across a problem, it's likely someone else has had the same problem and already found the solution.

Secondly, dBase has had time to mature, with plenty of feedback from users who have identified deficiencies and bugs. It may not be bug-free, but it's been given a work-over like no other on the market.

Thirdly, there is a pile of public-domain software and third-party improvements or enhancements for dBase, including program generators and compilers to increase the speed of both development and operation.

Fourthly, so many people already know how to use dBase that it is possible someone in your organisation is already familiar with it. In that case, you need to decide whether another system offers enough advantages over dBase to make the change-over worth it.

Finally, the latest version — dBase III Plus — is a really excellent product. I can't think of another system which combines power *and* ease of learning and use so well.

The Others

List managers vary markedly in performance and capabilities, ranging from basic to sophisticated. One of the earliest on the scene — pfs:File — provides just the basics; if all you want is an electronic card box, pfs:File will do the trick, and it'll only take you a couple of hours to learn *all* its capabilities. PC-File will give you most of the same capabilities for free — it's a public domain program.

Others in this category offer much more. Reflex provides a whole range of tools for manipulating and extracting the last bit of information from your data; Q&A is part of the 'new wave' of database programs which incorporate elements of artificial intelligence, enabling you to get information out of the system without having to learn special commands and syntax.

Many of the database products available for the Macintosh fall into the list manager category — it's only recently that powerful databases have been appearing for this machine. It's worth noting Ashton-Tate has announced dBase Mac, which should give Mac users most of the powers of dBase III Plus with a few special tricks thrown in.

The three main integrated packages on the market — Symphony, Framework and Open Access — each contain a database module. These packages offer the advantage of combining a variety of functions in one system, with consistent use of commands throughout. They have the disad-

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Databasics

Product	Multi-file Capability	Programming language	Ease of Learning	Ease of Use	Power	Price
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dBase III Plus	8	9	7	7	9	\$1095
Dataflex	9	9	4	7	9	\$1400
Meta4	8	none	5	7	8	\$ 120
Sensible Solution	7	7	5	4	7	\$1030
R:Base 5000	9	5	4	4	9	\$1195
Qpro-4	5	9	3	4	8	\$1080
Paradox	8	9	7	8	9	\$1095
Power-base	6	none	7	9	7	\$ 850
Zim	9	9	4	5	9	\$1400
VP-Info	8	7	5	6	8	\$ 150
pfs:File	none	none	9	9	3	\$ 300
PC-File III	none	none	8	8	3	\$ 10
Q & A	none	none	8	9	4	\$ 499
Reflex	none	none	8	8	5	\$ 312
Superfile	none	none	6	4	5	\$ 725

Table 3. Comparison chart — the higher the rating, the better the database is in that category.

vantages of being formidable to learn, and generally being less powerful than the dedicated databases.

The relational and multi-file database systems form the section of the market

where the real power play happens. If you need a system which is powerful, comprehensive and flexible, one of these systems will most likely fit the bill. dBase falls into this category.

Many of these systems have been reviewed in *Your Computer* since September 1984 (see the Index in this year's July issue). If you're looking at relational systems it's worth reading at least some of these reviews to get an idea of what to expect. Since finishing *The Search*, other systems have appeared which are definitely worth checking out: Zim, Power-base, Guru (Knowledgeman/2 with an expert system included — *very expensive*), VP-Info (a dBase lookalike for a fraction of the price), and dBase III Plus.

Table 3 provides a rundown of the major products on the market. It's designed to give you an idea of the range of capabilities and prices. Each category has been scored out of 10.

With a thorough knowledge of how you work now, what you want to do with a computerised database, and your database buyer's checklist in hand, you should be able to find your perfect match. □



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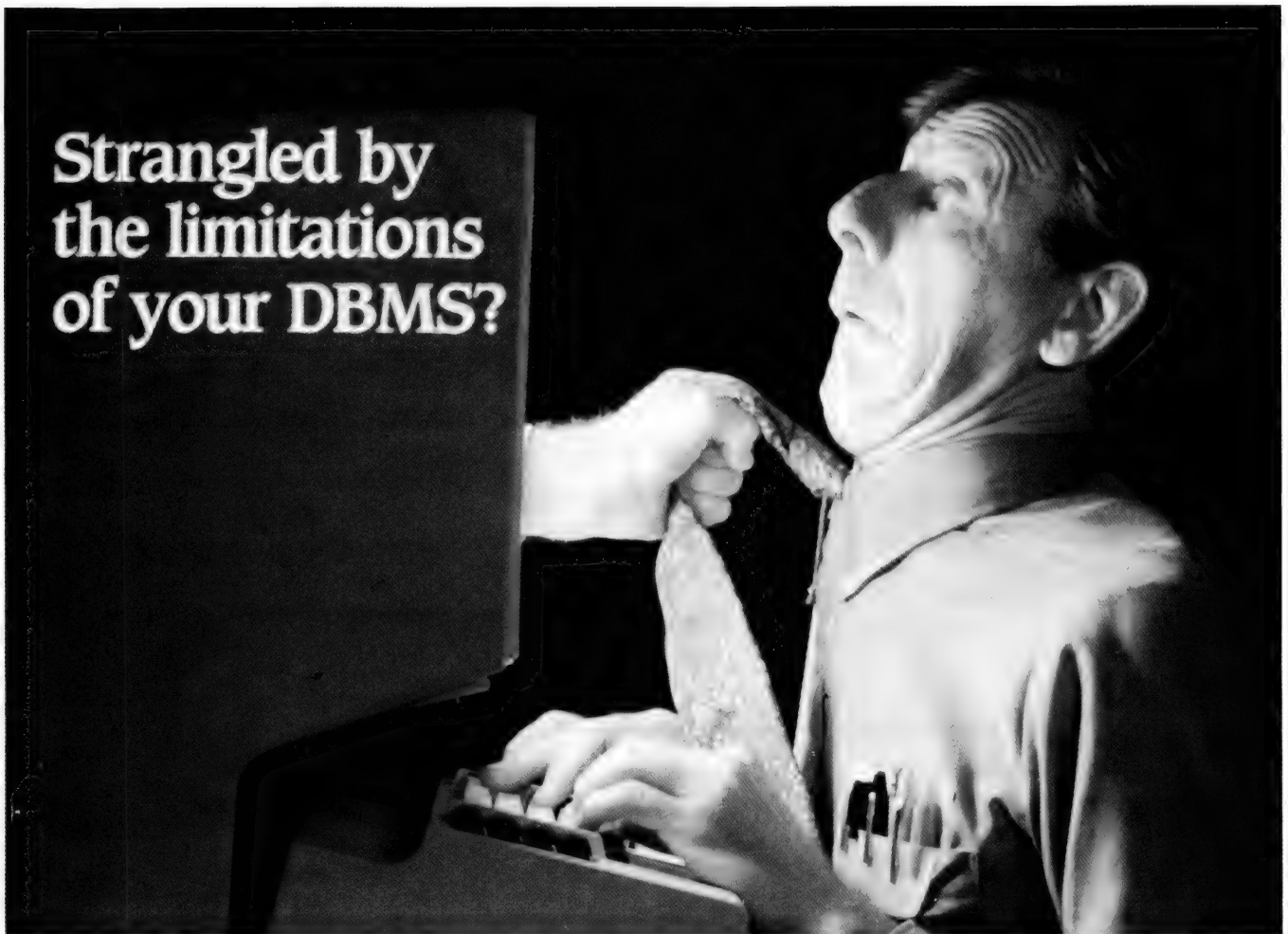


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- You cannot efficiently run your applications in UNIX, VAX VMS and MS-DOS without major surgery, or finding a new DBMS

- Your DBMS supplier asks, "what is networked multiuser anyway?"
- Your database is too big to live on one disk but your DBMS doesn't support multiple disks
- Your database can't answer simple questions like "tell me which inventory items have NOT sold in the past 3 months?"
- You built your application using the nice easy interface, but now it won't get out of the way to allow you to modify the application
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THE LES BELL ENCYCLOPAEDIA OF BATCH FILE PROGRAMMING — Part 1

Everyone thinks Les is a dedicated CP/M hacker — not so, he insists; he just spends more time using CP/M and more time programming for DOS. To prove his point, he put together a few techniques he's been using. This is the first instalment of his two-part encyclopaedia.

BATCH FILES? What are they? Batch files are text files containing, at the elementary level, sequences of DOS commands and programs to be run. The most common use of batch files is to ensure that a sequence of commands is executed correctly without relying on the user's memory to get it right.

For example, some software packages require you to use the back-up command on the subdirectories only, and not back up the root directory of their hard disk. In this case, you could perform the job manually by issuing a separate back-up command for each subdirectory:

```
C:\FW>BACKUP C:\BIN A: /S
C:\FW>BACKUP C:\FW A: /S
C:\FW>BACKUP C:\DB3 A: /S
C:\FW>BACKUP C:\C86 A: /S
```

This is fine as long as you have a good memory and can be sure you (or the user for whom you have set up the PC) will remember to back up all the subdirectories. You might also wonder if you have the patience to type in all those commands — but you'll have to sit there anyway, feeding floppy disks into the machine, so typing the commands is not a great inconvenience. However, if the back-up commands worked without human intervention, waiting around just to type the commands would be a real pain in the ...

You can solve the problem with a batch file; just create a text file called BACKALL.BAT, with the back-up commands in it:

```
BACKUP C:\BIN A: /S
BACKUP C:\FW A: /S
BACKUP C:\DB3 A: /S
BACKUP C:\C86 A: /S
```

You can do this with your favourite editor or word processor (provided it can edit ASCII text) or with EDLIN if you have to, or you can simply copy the file from the keyboard into the file:

```
C:\FW>COPY CON BACKALL.BAT
BACKUP C:\BIN A: /S
BACKUP C:\FW A: /S
BACKUP C:\DB3 A: /S
BACKUP C:\C86 A: /S
^Z
<- press Ctrl and Z together here
1 File(s) Copied
C:\FW>
```

Now, typing the name of the batch file will invoke it, causing DOS to execute each of the back-up commands in turn —

```
C:\FW>BACKALL

C:\FW>BACKUP C:\BIN A: /S
(etc)

C:\FW>
```

There are a few rules about the names you give batch files or, more particularly, about the way DOS searches for program files (which includes batch files).

When you give a command at the DOS prompt, like this:

```
C:\FW>DO SUMMAT
```

you are presumably trying to invoke a program called DO, to operate on the file SUMMAT. DOS will search the current (sub)directory for the file DO.COM and, if it finds it, will load and run the program. If DO.COM is not found, then DOS searches again for DO.EXE and will load and run this program if possible.

If neither of these files is found, DOS searches for a batch file called DO.BAT, and if this is found, it invokes the batch file processor and runs DO.BAT.

If none of these files is found, DOS will then repeat this search pattern for each of the (sub)directories named in the current search path. This can be displayed and set using the PATH command.

To summarise, DOS's search process is as follows —

1. In the current directory, search for a .COM file;
2. In the current directory, search for a .EXE file;
3. In the current directory, search for a .BAT file;
4. For each subdirectory in the PATH —
 - a. Search for a .COM file,
 - b. Search for a .EXE file,
 - c. Search for a .BAT file;
5. If none of the above succeeds, print an error message.

The implication for batch file naming is that you cannot give a batch file the same name as an existing .COM or .EXE file, unless that other file comes later in the search path. For example, we could not have named our back-up batch file BACK-

Batch Files

UP.BAT, since then the BACKUP commands in the batch file would simply reinvoke the batch file repeatedly, causing the system to hang up.

Under DOS 3.0 and later, it is possible to give batch files and programs the same name and distinguish between them by prefixing the name of each with the appropriate path, or by using the SUBST command. I'll give an example of this later.

Elementary Batch Commands

By simply placing a list of DOS commands or programs to be invoked into a batch file, you can automate the most common procedures under DOS. However, the results are not terribly elegant, nor can you do things like prompting the user to change disks. However, DOS provides a number of commands, in most cases special to the batch processor and not available from the DOS prompt, which make these things possible. The first three of these are ECHO, REM and PAUSE.

ECHO has two purposes. First, it can be used to turn on and off the echoing of DOS commands to the console. In the example above, each separate BACKUP command was visible, making it clear that a series of programs was being run, rather than a single one. To make it look like a single program, add ECHO OFF at the beginning of the line. This suppresses the echoing of commands to the screen. Naturally, ECHO ON turns it on again, and when the batch file ends, echoing is turned on again for the next batch file.

The second use of ECHO is to display messages for the user. For example,

```
ECHO Please insert transfer disk in A:  
will display the message  
'Please insert ... A.'  
on the screen.
```

There is a bug in the batch file processor: if the last line of your batch file does not have a carriage return at the end, it will be echoed anyway, regardless of the state of the ECHO switch.

The REM command is similar to ECHO, except it is used to insert comments into the batch file. If ECHO is set ON, the REM comments will appear as the batch file runs, but if ECHO is OFF, the REM comments do not appear.

Finally, the PAUSE command displays the message

```
Strike a key when ready ...  
and halts execution temporarily. This is used to allow you to change disks, and is usually preceded by some kind of ECHO message.
```

What's my Percentage? — Elementary Parameters

A common use for batch files is to run compilers. For example, I commonly use the Computer Innovations Optimising C86 C compiler, which is actually four separate programs which have to be run in sequence. So, to compile the program WX2.C, I must give the commands:

```
C:\C86>CC1 WX2  
C:\C86>CC2 WX2  
C:\C86>CC3 WX2  
C:\C86>CC4 WX2
```

(the output of the compiler passes is not shown.) Obviously, this is an ideal candidate for a batch file, called MAKEWX2.BAT:

```
ECHO OFF  
CC1 WX2  
CC2 WX2  
CC3 WX2  
CC4 WX2
```

There are a couple of problems with this batch file. First, what if I now want to compile the program SRC.C? Do I now have to create a new batch file with different commands called MAKESR.BAT which would look like —

```
ECHO OFF  
CC1 SR  
CC2 SR  
CC3 SR  
CC4 SR
```

Furthermore, what if the first pass of the compiler discovers a syntax error in my program? It will produce an error message, telling me what's wrong, but then CC2, 3 and 4 will run, and they will either produce error messages, pushing the first, helpful, message off the screen or (much worse) they will run normally on the files left over from the previous compilation, pushing the error message off the screen and leaving me with an unchanged program!

Let's deal with the first problem. Batch files can be created which do not have the names of files and disk drives embedded within them, but which instead are given these **parameters** at the time they are run. A parameter is something that changes each time the batch file is run, and which is given to the batch file by typing it on the command line which runs the batch file.

To do this, we modify either of the MAKE??? .BAT files above, by replacing the filenames with a parameter. The resulting batch file, MAKE.BAT, looks like this:

```
ECHO OFF  
CC1 %1  
CC2 %1  
CC3 %1  
CC4 %1
```

The '%1' symbols stand for the first word on the command line after the batch file name itself (this can be referred to as %0). So, to run this batch file to compile WX2.C, we invoke it with the command line

```
C:\C86>MAKE WX2  
while to use it to compile SRC.C, we type  
C:\C86>MAKE SR
```

In each case, the word after 'MAKE' on the command line (WX2 or SR) replaces %1 in the batch file, which then issues the correct commands to compile the appropriate file. You can see that this is so by removing the ECHO OFF command.

Advanced Batch Commands

You can make batch files even more powerful by using some batch commands which are more usually found in programming languages. These allow you to test for various conditions or to loop around, repeatedly executing commands on different files.

The first command is the GOTO command. This transfers control to the command after the label which is the target for the GOTO. A label consists of a colon (:) followed by a word, as the first thing on the line of the file. Here's a short (nonsensical) example:

```
ECHO OFF  
ECHO This should be printed  
GOTO OVER  
ECHO This should never be printed  
:OVER  
ECHO Now we're finished
```

Obviously, GOTO by itself is not much use; it has to be used in conjunction with other statements. In fact, in batch files, the only command which is used in conjunction with GOTO is the IF command, which comes in several variations.

The first IF variation allows you to test whether a file exists; this is useful in backup batch files, compiler control batch files and others. Let's see how it can be used with Lattice C, for example, to take care of errors in compilations: ▶

Batch Files

```
ECHO OFF
ERASE %1.Q
ERASE %1.OBJ
LC1 %1
IF NOT EXISTS %1.Q GOTO ERR
LC2 %1
IF NOT EXISTS %1.OBJ GOTO ERR
LINK C+%1,%1,,LC.LIB
GOTO OVER
:ERR
ECHO Error compiling %1.C
:OVER
```

Here there are two passes of the compiler; the first one reads a file with a .C filetype and produces a corresponding .Q file, while the second reads the .Q file and produces a .OBJ file, which is then linked with the C compiler library to produce the desired .EXE file.

If either pass of the compiler discovers an error, it will not produce its output file, and we rely on this fact to control the batch file and jump to a command which prints an error message. Notice, if everything works okay, we have to jump past the error message so it doesn't appear.

Notice also that although the compiler may discover an error and not produce an output file, there may be an existing output file from a previous compile. We must therefore delete any such files before starting, otherwise our logic won't work.

Finally, notice that the IF EXISTS test can be modified to work 'backwards' by using the 'NOT' modifier, which makes it perform a GOTO if the specified file does not exist. The NOT modifier can also be applied to the other IF tests.

There is a better way of testing for errors after programs have run, but the programs have to be written specially to take advantage of it. This uses a special 'system variable' called the ERRORLEVEL, which is set by some programs as they return control to the operating system: a value of zero (0) indicates normal program termination with no errors, while a value of one (1) or higher indicates some error. In general, the higher the ERRORLEVEL value, the more severe the error.

Batch files can test for errors with the IF ERRORLEVEL statement. For example:

```
IF ERRORLEVEL 1 GOTO ERR
```

but notice that this is read as 'if errorlevel greater than or equal to one goto err'. In other words, execution will continue normally if the ERRORLEVEL is zero, but will branch to :ERR if it is one or greater. Here's an example of a smarter batch file for the C86 compiler:

The implication for batch file naming is that you cannot give a batch file the same name as an existing .COM or .EXE file, unless that other file comes later in the search path.

```
ECHO OFF
CC1 %1
IF ERRORLEVEL 1 GOTO ERR
CC2 %1
IF ERRORLEVEL 1 GOTO ERR
CC3 %1
IF ERRORLEVEL 1 GOTO ERR
CC4 %1
IF ERRORLEVEL 1 GOTO ERR
LINK %1,%1,,C86S2S
GOTO OVER
:ERR
ECHO Error compiling %1
:OVER
```

This works because each pass of the Computer Innovations compiler sets the ERRORLEVEL as it exits.

The final variation on the IF command allows comparison of strings. Its basic format is:

```
IF 'string1'=='string2'
```

There are a couple of points to notice

```
echo off
if '%1'==' ' goto explain
cc1 %1 %2 %3 %4 %5
if errorlevel 1 goto err
cc2 %1
if errorlevel 1 goto err
cc3 %1
if errorlevel 1 goto err
cc4 %1
if errorlevel 1 goto err
link %1,,NUL,c86s2s
goto done
:err
echo error compiling %1
goto done
:explain
echo usage:-
echo cc file [flags]
echo example:- cc hello.c -hc:\c86\c:\v -f -x
echo this batch file assumes that you are using
echo the c86s2s library (small model, dos2, software f.p.)
echo and LINK.EXE to link
:done
```

Figure 1

about this. First, the two strings must be enclosed in quotes, and secondly the comparison operator is '='; that is, double equals signs and not a single equals like in most other languages.

This can be used in batch files in a variety of ways. For example, a batch file which cleans up a subdirectory by copying files to a floppy disk might optionally delete .BAK files like this:

```
IF '%3'=='DELETE' ERASE *.BAK
```

Notice the parameter must be enclosed in quotes, since it is simply picked up off the command line when the batch file is invoked, like this:

```
C: C86>CLEANUP *.DOC A: DELETE
```

Another use for string comparison is testing to see whether the user has supplied certain command-line parameters. For example, Figure 1 shows the full batch file, CC.BAT, which I actually use to drive the Computer Innovations compiler. Notice the use of the test -

```
if '%1'==' ' goto explain
```

which tests to see if %1 is a null string, and if so, explains the correct usage of the batch file.

The final complex batch command is FOR. This is similar in some respects to the FOR loop in BASIC, in that it allows repetitive looping inside batch files — and more. Its basic format is -

```
FOR pvarname IN (parmlist) DO command
```

where pvarname is a pseudo-variable name and parmlist is a list of parameters, such as filenames. A pseudo-variable name is rather like a command-line parameter, except that it is not just numbered, it is also named, and takes the form of two per cent signs and the name: %%-name. The parameter list can include filenames, keywords, commands, and even command-line parameters like %1, %2 and so on.

For example, suppose we wanted to separately compile and then link together three C language source files. We could do it by removing the link command from the batch files shown above, running the batch file three times and then giving the link command manually.

A better way to do it, at the expense of

Batch Files

error checking, would be to construct a batch file using the FOR command as shown in Figure 2. This will compile the three files PROG1.C, PROG2.C and PROG3.C, and then link them with the compiler's library to produce the program MYPROG.EXE. Of course, a more versatile way to do this would be to create the batch file shown in Figure 3, which I'll call MAKE3.BAT, which allows you to invoke the file with a command line like

```
C: C86>MAKE3 IMAIN SFUNCS  
IFUNCS INDEX -2 -F
```

This will compile the first three files (IMAIN.C, SFUNCS.C and IFUNCS.C) to produce the program INDEX.EXE. The -2 and -F parameters are command line options for the compiler, causing it to produce code optimised for the 80286 processor and use 'frugal' optimisation, respectively.

The price paid for this flexibility is error checking, but we shall investigate ways to improve this later.

The SHIFT command is the last command supported by the DOS batch pro-

```
ECHO OFF  
FOR %%VAR IN (PROG1 PROG2 PROG3) DO CC1 %%VAR  
FOR %%VAR IN (PROG1 PROG2 PROG3) DO CC2 %%VAR  
FOR %%VAR IN (PROG1 PROG2 PROG3) DO CC3 %%VAR  
FOR %%VAR IN (PROG1 PROG2 PROG3) DO CC4 %%VAR  
LINK PROG1+PROG2+PROG3,MYPROG,,C86S2S
```

Figure 2

```
ECHO OFF  
FOR %%VAR IN (%1 %2 %3) DO CC1 %%VAR %5 %6 %7  
FOR %%VAR IN (%1 %2 %3) DO CC2 %%VAR  
FOR %%VAR IN (%1 %2 %3) DO CC3 %%VAR  
FOR %%VAR IN (%1 %2 %3) DO CC4 %%VAR  
LINK %1+%2+%3,%4,,C86S2S
```

Figure 3

cessor. With standard batch file parameters you can only have 9 parameters, plus the batch filename; that is, %0 to %9. %10 is viewed as %1 immediately followed by a 0. The SHIFT command has the effect of discarding the current %0 (you probably didn't need it anyway) and putting %1 in its place. Then %2 is shifted into %1, %3

into %2, and so on until finally what would have been the inaccessible %10 is shifted into %9.

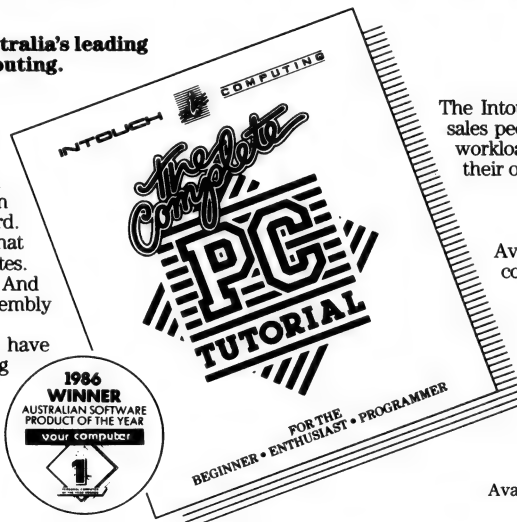
Now, batch files with 10 or more parameters are a bit mind-boggling to contemplate, but SHIFT could be used in conjunction with FOR loops. However, I've never needed it so far. ▶

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CHARLIE'S 0175

Batch Files

```
REM Loop processor for various files
ECHO OFF
FOR %%X IN (CH1.DOC CH2.DOC CH3.DOC CH4.DOC CH5.DOC) DO CD %%X
REM CD.BAT - Copy file then delete it
COPY %1 \ARCHIVE\%1
DEL %1
```

Figure 4

Extending Batch Processing

The IF and FOR commands give considerable flexibility in controlling the execution of individual commands. To control the execution of sequences of multiple commands, we have to use GOTO, which the experienced programmers amongst us recognise as **A Bad Thing**.

The lynchpin of good programming practice is the ability (and the desire) to have subroutines or procedures. This applies to all programming languages, from BASIC to C and PL/I, including DOS batch files.

Now, surely in batch files all you have to do to get subroutines is have one batch file call another? Sounds fine in theory. We could write a pair of batch files to, for example, copy files to a new subdirectory and then delete the old version as shown in Figure 4.

If you try this, you'll find it doesn't work. Naming one batch file inside another works like a GOTO; control transfers to the named batch file but then never returns, so the batch file terminates at the end of the 'subroutine' batch file.

How, then, can you call one batch file from within another? You can, but the technique is well hidden in the DOS manuals. The secret is that each batch file requires its own copy of the batch file processor to run correctly. When it terminates, its copy of the batch file processor disappears from memory and control returns to the batch processor for the calling batch file, which then resumes where it left off.

The batch file processor is part of the resident portion of the COMMAND.COM program. You can invoke a new copy of COMMAND.COM and pass it a command (like a batch file name) by using the command

```
COMMAND /C command line
```

A version of the batch files given above which would work is shown in Figure 5. Notice there is an ECHO OFF statement in both batch files; this is because CD.BAT starts running under a completely fresh copy of COMMAND.COM which has ECHO set ON.

In practice, copies of COMMAND.COM inherit a lot of information about the current DOS set-up — it's just that the current state of ECHO is not part of that. In particular, COMMAND.COM manages an area of memory called the environment, in which various strings are stored which control the way DOS operates. You can see these strings by typing SET and pressing return; this will display the contents of the environment:

```
C:\C86>SET
COMSPEC=C:\COMMAND.COM
PATH=C:\;C:\BIN;C:\C86
PROMPT=$p$g
C86TEMP=f:
```

As you can see, all environment strings take the form varname=string. Some are obvious, like PROMPT=, which saves the current prompt string which sets the DOS prompt, and PATH=, which is set by the PATH command in your AUTOEXEC.BAT file (what do you mean, you don't have a PATH command in your AUTOEXEC.BAT file?). Others are specific to particular packages, like the C86TEMP variable, which specifies where the C86 compiler will put its temporary files (drive F: is a memory disk, for speed). Finally, the COMSPEC string, which is present on all systems, specifies from where COMMAND.COM will reload its non-resident portion if it should be overwritten.

The important point is that copies of COMMAND.COM receive a copy of their parent's environment, and therefore have access to all these variables. But because it is a copy of the environment, changing any variables will have no effect on the parent's environment. In other words, variables are local, not global.

However, there is one way in which a copy of COMMAND.COM can affect its parent, and that is through the ERRORLEVEL variable. When a copy of COMMAND.COM terminates, it returns its current ERRORLEVEL value to its parent, so that if this batch file encountered an error the

calling batch file knows about it, too.

It is possible to make batch files interactive, in other words, to make them ask questions. The easiest way to do this is with the ERRORLEVEL, by writing a short program which asks for a yes or no response and sets the ERRORLEVEL accordingly. Such a program, ASK.COM, is in the public domain, in the PC/Blue user group public domain library and available from user groups around the country.

ASK.COM asks the user for a Y/N response and sets the ERRORLEVEL to 0 for a Y response and 1 for N. This can then be tested by an IF command. For example, I use this technique in my AUTOEXEC.BAT file:

```
echo off
path c:\;c:\bin;c:\c86
xtime
prompt $p$g
set c86temp=f:
subst g: c:\bin
echo Want Sidekick loaded?
ask
if errorlevel 1 goto nosk
sk
:nosk
```

This sets things up on my system, and then asks if I want Sidekick loaded into memory. If I answer with a Y, then SK.COM is run, otherwise execution jumps past this point. This technique can be extended to allow menus to be constructed.

Listing 1 shows a C version of the ASK program, written for Computer Innovations Optimising C86. This version compiles to rather a large size at 10 Kbytes — not really a problem, but the public domain version is rather neater at 256 bytes. The problem is that I'm too lazy to write any assembly language if I can avoid it: the C version took 10 minutes to write, while an assembler version would have taken me hours.

Likewise, Listing 2 shows a C program called CHOOSE.C. This allows you to enter a single digit as a menu choice, and then sets the ERRORLEVEL to that value. This program could easily be extended to allow selections higher than 9. Figure 6 shows a menu batch file which uses the CHOOSE.EXE program.

Members of the Your Computer Bulletin Board can download Les's listings from that most useful facility. (Sign up now or be doomed to a lifetime of typing.) □

```

echo off
:start
cls
echo          Main Menu
echo 1 - Run WordStar
echo 2 - Compile choose.c <
choose
if errorlevel 2 goto mc
if errorlevel 1 goto dows      /* CHOOSE.C - set ERRORLEVEL interactively */
if errorlevel 0 goto done      /* Programmed by LB */
:mc
command /c cc choose          #include "stdio.h"
goto start
:dows                          main()
command /c ws                 {
goto start                    int choice;
:done                          static char temp[] = (" ");

                                if((stdin = fopen("CON","rb")) == NULL) {
                                    abort("ask: Unable to open console stream");
                                }

                                fputs("Please enter your choice: ",stdout);
                                while(!isdigit(temp[0] = getchar()));
                                choice = atoi(temp);
                                putchar('\n');
                                exit(choice);

```

Figure 6

```

/* ASK.C - set ERRORLEVEL interactively */
/* Programmed by LB */

```

```

#include "stdio.h"

main()
{
    int answer;

    if((stdin = fopen("CON","rb")) == NULL) {
        abort("ask: Unable to open console stream");
    }

    fputs("Press Y or N: ",stdout);
    while((answer = toupper(getchar())) != 'Y' && (answer != 'N'));
    putchar('\n');
    if (answer == 'Y') exit(0);
    else if (answer == 'N') exit(1);
}

```

Listing 1

```

                                if((stdin = fopen("CON","rb")) == NULL) {
                                    abort("ask: Unable to open console stream");
                                }

                                fputs("Please enter your choice: ",stdout);
                                while(!isdigit(temp[0] = getchar()));
                                choice = atoi(temp);
                                putchar('\n');
                                exit(choice);

```

Listing 2

Thanks to Les Stein, you don't have to be an Einstein to understand and operate a computer.

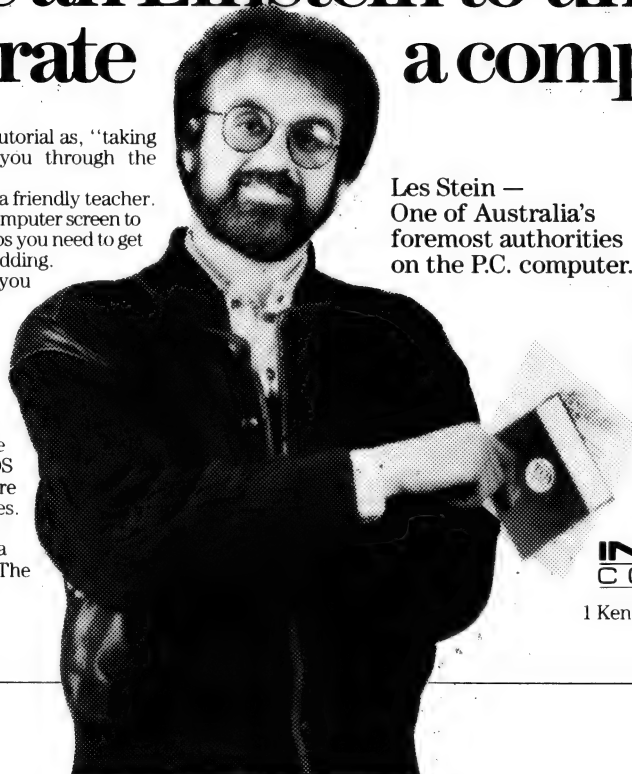
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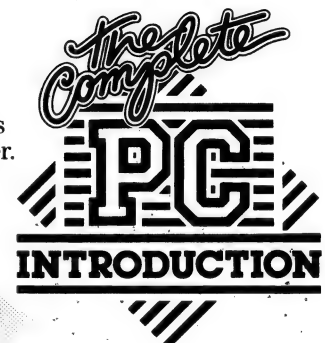
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CHARLIE'S 0195

Sugar's Baby

When does a new MS-DOS machine stop being a clone or outright copy and start being a boldly innovative workalike? I suspect the answer is 'Shortly after Alan Sugar's engineers at Amstrad get their hands on it'.

My introduction to Amstrad was in January 1986 when I reviewed the Amstrad PCW8256, a CP/M-based unit designed primarily as a word-processing plant. The PCW8256 broke new ground in design features, and the latest offering — or set of offerings — also makes giant leaps forward in many areas.

My first impression as I unwrapped the new toy was surprise at the lightness of its construction. It is a small machine, with a footprint about two-thirds the size of a regular PC, and the case is constructed totally of plastic. It feels rigid and strong nonetheless. The top of the computer has a recess large enough to fit the base of the monitor and includes a slot for four pen-light cells to power the real-time clock and battery-backed RAM. The front panel contains a single half-height disk drive, located in the middle of the right-hand side, with provision for the second drive on the opposite side.

Those of you familiar with what we accept as 'normal' PC configuration will by now doubtless be asking "If the drives take up the whole of the front panel, where will I fit full-length cards?" Good question. Close examination of the back of the machine, as an alternative to reading the manual, shows the rear quarter of the top lifts off to display three expansion slots running transversely across the rear of the machine. Now that's lateral thinking! Not only does it allow a much smaller footprint, but it allows easy access without disassembling the entire beast.

The monitor, in this case mono (and I mean *mono* — sparkling black and white!) sits on a tilt-and-swivel base which fits neatly into a recess on the top of the machine. The power cable runs from mains to the monitor and two cables join it to the computer. The power switch is on the back

of the monitor and this powers up the entire kit. The cable length is just sufficient for the monitor to mount in this manner and there are some applications where the monitor might be more conveniently located further away than this cable allows. The two monitor cables, and the RS232 and parallel interface plugs are all on the rear of the unit, but both the mouse and keyboard plug into the left-hand side of the main case. A joystick interface is provided on the right rear of the keyboard, much more convenient than the traditional 'buried in the rear' standard.

The keyboard is made of the same rigid plastic and closely follows the IBM layout. Minor differences in the placing of some of the control keys made touch usage unusual at first, but it's close enough for anyone to adapt to quickly. The Caps-lock and Num-lock keys both have red LEDs on them and the tilt angle of the board is adjustable. The keyboard weighs little, but shows no tendency to wander around the desk during use. It's clipped together and I couldn't resist taking it apart. As with most modern electronic equipment, there is not a lot in there, but its comforting to know it's easy to get to. The cable connection is coiled and allows you to work at a respectable distance from the monitor.

The first monitor I tried was the black and white mono. As the Amstrad comes equipped with a colour board as standard, the monitor is capable of displaying all the colours as shades of grey. This makes a lot of difference when running software written for colour, much of which would be unreadable without this feature. External controls include contrast, brightness and vertical hold. The face of the monitor is very flat and not recessed at all.

While it's easy to use after the culture shock of returning to mono, I suspect it would make excellent sense to pay the paltry \$400 extra and get the colour version to start with. Under normal conditions, to upgrade to colour from a basic IBM PC would cost around \$435 for a colour board, *plus* up to \$1000 dollars for a

Under the guidance of leading light Alan Sugar, UK company Amstrad has been having remarkable success in uncovering market niches and stuffing them full of Amstrad products. Now, Amstrad has entered the over-stuffed world of IBM compatibles. Can it succeed in this apparently niche-less realm? Ewart Stronach examines ...

monitor capable of displaying the Amstrad's resolution of 640 x 200 pixels with 16 colours. The colour monitor supplied is crisp and clear.

All the software I tried behaved exactly as on my Lingo PC-88 and therefore exactly as it would on a True Blue. The speed of the Amstrad adds a new challenge to most games and makes a percentage of them downright unplayable.

The Heart of the Beast

So much for the appearance, let's look inside —

Removing the rear section where the cards are inserted allows a reasonable look at the architecture. The 8086 is visible, together with a socket for an 8087 co-processor. The space for additional RAM is easily accessible and the slots are within easy reach. There are a number of VLSI (Very Large Scale Integration) chips which indicate this is a total re-think of design rather than a copy.



— the Newly Cloned Amstrad

The power supply is in the monitor, which makes a lot of sense both from the available space in the main case and from the heat position. The mouldings of the case are well designed, affording maximum rigidity with minimum weight. Access to the rest of the machine is more complex with screw heads hidden under lift-out tabs. As the user sections of the Amstrad are so easy to get at, this is not a problem.

The single circuit board appears well-made and clearly marked. The board takes up only about two-thirds of the area of the base and carries, apart from memory chips, just 32 ICs — an incredibly small number. There must be a heap of functions built into the VLSI chips. Disk control comes straight from the mother board with a standard 34-way ribbon to the drive. The connector for the second drive, plus the power cable, are already in place, and while the front panel warns against using anything but Amstrad's upgrade kit,

I feel sure any proprietary drive could be fitted, as the disk-control chip is standard.

A machine with two drives costs \$450 more than the single-drive version, and if my supposition is right, many users could upgrade for a lot less. The single drive fitted is covered with a case of what appears to be light-gauge zinc-coated steel. Whatever it is, it acts as an efficient RF shield. I have a portable phone which I use as a benchmark for RF interference. There are many machines which almost preclude the use of this phone, but the Amstrad hardly affects it.

Choose Your Environment

In operation in the MS-DOS mode the machine appears identical to Big Blue. The operating system supplied with the machine is Digital Research's GEM (Graphics Environment Manager), and it gives a novice an easy introduction to computing without the need for extensive knowledge of normal DOS commands. Now is not the

time to review the software package, but GEM is very like Microsoft's Windows. Both these operating systems effectively hide the operating system inside a set of menu- and mouse-driven 'windows', with functions activated through the mouse.

Personally, I prefer to see a DOS prompt. But then again, I had to learn the hard way and perhaps if introduced to a system like GEM from the start would be happier with it. A nice touch is a utility provided with the GEM suite which allows you to set-up a battery-backed RAM file; this lets you set any number of parameters such as printer ports, mouse-movement scaling, joystick control, initial screen mode, size of RAM disk and more. This lets you easily accomplish a number of tasks usually taken care of by time-consuming batch files.

The system provided for testing was obviously not a production model. There were sundry 'after-thoughts' on the circuit board, and I am prepared to put down the ▶

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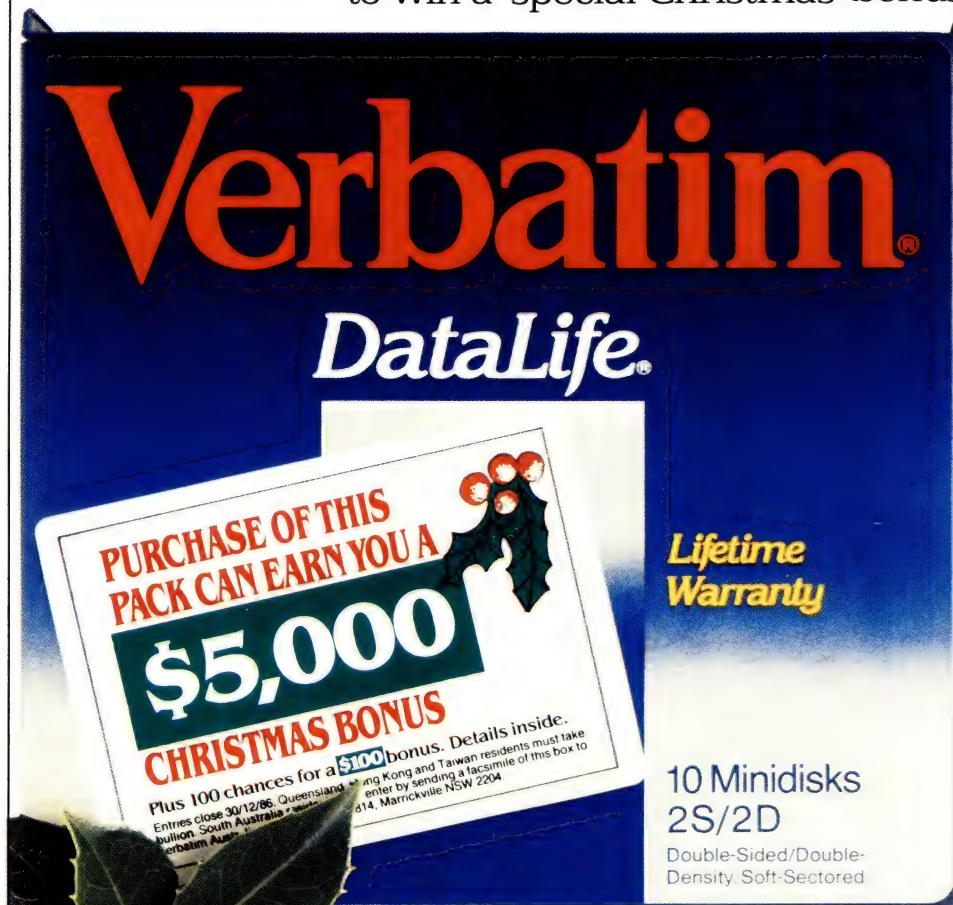
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Amstrad

few problems I encountered to this fact. Twice during extended operation the machine suffered from the dreaded 'Auto-reboot syndrome'. For no apparent reason it appeared to switch off for a second then return to life at 'power-on' status. Other machines were running from the same power source without problem.

The other minor annoyance was a rather regular failure to read disks on the first or second attempt. Trying the disks in another machine showed no problem and an examination of the disks with Norton's Utilities displayed no bad sectors. However, every program I tried ran without hitch and every indication is that, as Amstrad states, the PC1512 is totally compatible.

Cheap Shots

There can be no doubt about value. Amstrad's pricing should make the industry sit up and listen; the company intends to move into the lower end of the business market with aggressive advertising and the support of the Australian parent, AWA.

Our review machine was supplied by the distributor, Mitsubishi Electric AWA of Ryde, NSW. The basic machine comes with an 8086 processor running at 8 Mhz, single 360 Kbyte disk drive, 512 Kbytes of memory (expandable to 640 Kbytes), real-time clock with battery back-up, serial and parallel interfaces, colour graphics board, mouse and joystick ports, three full-length expansion slots, and a monochrome monitor capable of displaying 16 shades of grey. Software includes Microsoft MS-DOS 3.2, Digital Research's DOS Plus with GEM, Gem Desktop, GEM Paint and Locomotive Software BASIC 2 operating under GEM. A detailed user manual is provided. All this for only \$1499!

All the above but with a colour monitor will cost \$1899, while the addition of a second floppy drive to the base model will bring the price up to \$1949. If you want both the colour monitor and the two drives, you'll have to pay \$2349.

Hard-disk models, with 10 and 20 Mbyte capacities, will be released soon.

When you compare this with the alternatives, there is little competition at this stage. The cheapest 'clone' I have seen costs \$1095 for a bare, single-drive, 256 Kbyte machine with no monitor and MS-DOS only (and suspect support). The cost of a monitor varies from about \$150 to \$200 for monochrome and starts at about \$500 for bottom-line colour. The mouse alone could cost you over \$300 if you fall



Lateral thinking! The PC1512s expansion slots run transversely which gives a much smaller footprint and allows easy access.

for Microsoft's 'thimble and pea' trick. Microsoft will not sell a mouse without software, but you can now buy the hardware from other sources for about \$165. The GEM software is advertised at \$299 at discount software houses.

The board takes up only about two thirds of the area of the base and carries, apart from memory chips, just 32 ICs — an incredibly small number. There must be a heap of functions built into the VLSI chips.

At the top end of the scale a phone call to a local IBM supplier elicited the following prices: bare IBM XT with twin drives and 256 Kbyte memory — \$3942; memory upgrade to 512K — \$455; mono video card — \$381; mouse — \$275. That's a total of \$5053, without software, for a comparable machine.

I would have preferred to see a basic business package of software rather than

the GEM suite, but Amstrad assures me its software prices will be as keen as its hardware. The Amstrad comes with a 90-day warranty, with an option to purchase an extended warranty with on-site service for 12 months for a very reasonable \$125.

I see the Amstrad PC1512 in a dual role. Firstly, as a viable bottom-line business machine — with all the capability of MS-DOS machines at up to four times the price, and the added security of backup and warranty from a well-known organisation. In this office environment it should also be a clear contender as add-on equipment to existing units in the form of terminals or workstations. The PC1512 would make a superb network member, regardless of the brand of the host.

The second application is, of course, in the home. There are many home users who have outgrown the 'toy' computer and must make the decision which upgrade path to follow. The software base available for IBMs and compatibles makes the PC/MS-DOS world a logical choice, and the Amstrad comes in at the affordable end of the scale. I can hear the Apple users howling for blood in the background, but feel that as an introduction to serious business use, you can't beat MS-DOS. And don't we all kid ourselves we are buying our toys so our children will go out into the workplace, familiar with a system used in a large percentage of offices. □

Performing AT

PERFORMANCE! That's what we like, and that's what we got (in *big* doses) with our latest set of AT comparison tests. Every time we run a set of these tests we marvel at the latest advances in desktop power, but we need only wait a month or two until a new group comes up for judgement and the old standards are wiped.

Will it never end? We certainly hope it's not gonna!

This time around we didn't find a new overall leader — it would be damned hard for anyone to trounce the Earth Computer Systems machine which put itself so far in front of the pack in our last comparison — but the four machines tested wedged themselves into the top six of the more than 20 ATs we've had under the stop-watch so far.

And in most cases they provided that performance at a price that puts their 'bang for the buck' rating well out in front.

Video Technology's locally assembled machine was a stunner, sandwiching itself between our former giant-killers, the ECS and ITT's Xtra XL, for second place overall. Just behind the ITT came Keller Automation's Micro 10, followed closely by the

Maybe the TI, maybe the Kaypro said Matt after his first session ATtesting in our January Yearbook; maybe the Micro Five, maybe the President, and then again . . . he concluded in our May Shootout; September's Duel gave us a definite 'Hmmm' and this month? Matt's done wheelies with four more hot rods and found a solution to his fickle!

new Osborne SP and Sperry's beautifully compact Micro IT (yes, that's Micro *eye-tee*, not it as in *thing*.)

Back AT the Beginning

This issue's AT comparison started out to be a 'square-off' session, with updates on some of our past players.

First, we wanted to test the latest 8 MHz IBM, as we've been comparing the challengers to the original machine for a year now.

It's certainly time for an update but, despite our best intentions, IBM couldn't deliver. Next time, we mumble to ourselves . . .

We also wanted to re-run the Micro Five tests. Those who've followed this performance epic will remember we tested the first Micro Five landed by Archives, and couldn't clean up the too-full hard disk in the short time available to us. We expect the machine to record noticeably better figures when tested under the same conditions as the rest of our ATs, but again we'll have to wait — the company couldn't hold one back from its anxious customer long enough for us to run the tests on a new unit.

It's a tribute to this machine's potential that only now, after this issue's tests, has it been pushed further from the top of the table than third.

Our final 'catch-ups' succeeded. After a dismal early performance from Osborne we were finally given the latest machine — it redeemed the Osborne name in a spectacular fashion. And Sperry, whose delightful PC/IT had slipped down the lists in the face of increasing recent competition, delivered its latest gem, the Micro IT.

WhAT's So Special?

As before, we don't want to waste space telling you about these machines' similarities to all the other ATalikes, so we'll just look at different or interesting aspects of their design:

Video Technology VT-AT: Well, was this one a surprise! We're wary of anyone who claims to locally assemble machines, wondering why they would bother, but these days it does seem to have some real advantages.

First, it's probably economical now that our costs are competitive on a world scale. But — most importantly — it can allow



The VT-AT from Video Technology: We were wary, but what a surprise!

Speed!

The development of a great design without the associated R and D and tooling costs.

Video Technology buys parts selectively from the USA, as well as Asia, to enable it to put together a machine with specs well ahead of your typical clone. For example, it has no less than four serial ports, plus one parallel, all built into the main board — no slots wasted, and ready for multi-user operation out of the box.

The VT machine comes with a 40 Mbyte Miniscribe voice-coil hard disk (they are *quick*), a floor stand for 'tower' operation, two years warranty (that beats the 90 days — if you're lucky — of many of the others!) and the availability of an on-site service contract, handled by Olivetti, for a meagre \$730 for two years.

We would almost suspect that the Video Technology people built the test unit specially to impress us, so high was the finish quality.

(That sort of 'clever trickery' is just as lacking as real marketing in the fledgeling computer industry, perhaps because few of the testers would know the difference if they ever opened the machine. However, one of these days the computer industry will grow up, at which stage I expect I could earn a lot of money teaching them some of the proven tricks of the motor industry.)

Osborne SP: There was little about our test Osborne to make it stand out from the crowd — until we fired it up! The SP stands for Special Performance, and it does...

In fact, the machine we tested was a prototype mounted in a very standard, boring AT-clone case — the production model will feature a much more stylish tower-mount casing and a desktop version will also be available.

As you'll see, it matters little how the Osborne looks — its price/performance balance is outstanding.

Keller Micro 10: Victoria's Keller Automation provided another surprise packet for our tests — on the outside another bland AT box, on the inside a spirited performer with a few special features.

It looks impressive, and it is, although pricing is starting to look a fraction steep up against the latest crop of competitors



Sperry's compact Micro IT: it's a giant bruiser.

(the 'way under \$10,000' price is without the hard disk!).

Interesting features include the ability to select wait states as well as processor speed, the wide range of options including huge and very fast hard disks, provision for up to 15 Mbytes of RAM, built-in serial and parallel ports, and an external reset button.

Sperry Micro IT: What a delight! After all these giant, desk-filling standard ATs, the 'baby' Sperry, with its smaller-than-a-PC footprint, is a refreshing change.

The super-compact design (Sperry's heavyweight high-resolution monitor almost dwarfs it) fits almost every feature of a standard AT into a box of less than half the volume, with very few compromises.

The one noticeable drawback is the limitation on expansion slots — boards slide sideways (horizontally) into the machine, so its height holds you to five slots. That won't be a problem for many people, where the size of a full-scale AT often is. Sperry's approach makes sense — for the 'power-user' who wants a fast desktop the Micro IT is ideal, while the users who want expandability for multi-user operation can take the full-sized, tower-mount IT.

It's a shame the Micro IT doesn't have a micro price — if it did have, it would be my unquestioned first choice in a desktop because of its convenient and attractive package size.

Power AT Work!

Down to the business we love best — performance! The four machines had just what we wanted, as our performance tests quickly proved.

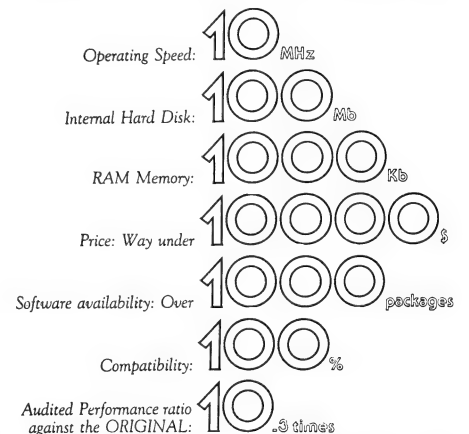
We've carried full descriptions of the tests themselves several times (the September issue was the last — and we'll probably do so again next time around),

so we'll simply give you an abbreviated rundown here —

We ran each of these machines through a series of nine tests designed to give a measure of overall performance in the everyday work situation — claims based on straight processor speed are often decidedly misleading because they take no account of other important factors, such as disk performance. You can see from our 'percentage of IBM' comparison chart that many machines with very high processor ratings drop back when overall performance is measured.

Only three of our tests, BBBMARK (a simple Microsoft BASIC loop), CBSIEVE (the Sieve of Eratosthenes in compiled CBASIC), and the Lotus recalculation are direct measures of processor speed.

The Lotus tests measure the time taken to load, recalculate and save a large (but simple) spreadsheet, while the dBase tests measure the time taken to create a ▶



Keller Automation call its machine 'The Perfect 10' and describes it with this great-looking promotional sheet.

AT Speed!

file from calculated fields, index it, and partially delete/pack the file.

DOIT measures floppy to hard disk transfer speed, and is used to load the other test software onto the machines to start with.

Five tests are disk intensive — the Lotus load and save, stage two and three of the dBase benchmark, and DOIT — and usually show up some interesting differences between machines.

ATtesting, ATesting . . .

So how did our latest stars perform? Let's take them for a spin . . .

DOIT: This measure of floppy-to-hard-disk transfer speed is usually a great leveller, but it couldn't level the Video Technology and Micro 10 machines.

The VT-AT ran a blinding 33.5 seconds, by far the best time we've ever recorded. The Micro 10 wasn't far behind at 42.3 (the third-best we've seen), while the Osborne and the Sperry turned in a 'more normal' 60.5 and 65.2 seconds respectively.

Score one — the first of many — for the locally assembled Video Technology AT.

BBBMARK: There was very little in it — in fact, the differences are academic, as all the machines logged times obviously in the hot-rod 10 MHz category.

The VT clocked a punchy 5.3 seconds,

but was matched to the tenth by the Osborne SP. Just behind them, at 5.5 and 5.6 respectively, were the Micro 10 and the Sperry.

Only the 12.5 MHz ECS which starred last month could keep them from the top of the table.

Cbsieve: This processor-only test occasionally throws us a few surprises — we would suspect timing errors on our part if not for the fact we run it 10 times as long and then divide the result .

The scores are on the board, however, and they show the Sperry is a champion — it won this one with 2.7 seconds, ahead of identical times of 2.9 for the other three. Little David was looking happy to mix it with the three Goliaths . . .

Lotus Load: We love the clunk of a voice-coil drive in the morning! Score another for the Video Technology machine, which ran through this one in 18 seconds neat.

It was a clear win, ahead of 20.2 for the Micro 10, 22.5 for the Osborne, and 23.6 for the Sperry. You'll see from the performance chart that it's rare for a machine to stand out on this one — almost all the machines tested so far have hovered between 22 and 24 seconds.

Lotus Recalculation: Osborne gets back into the action in a hair-splitting result — 4.4 seconds to the Video Technology's 4.5.



The Perfect 10 from Keller Automation — another surprise packet (and with special features!)

The others weren't hanging about, either, with 4.6 for the Sperry and 4.7 for the Micro 10. Whhooosh!

Lotus Save: Another great equaliser, and all our contenders were up to the challenge — beating the former kings, the ITT and the Archives Micro Five (no, no relation to the Micro 10). Incidentally, we are intentionally leaving the Earth Computer Systems machine alone in these discussions of 'past champions' — it is so far ahead we'd sound like a broken record.

The top-scorer this time was the Sperry on 12.3 seconds, from the Osborne at 12.4, the VT at 12.7 and the Micro 10 at 12.9.

dBase Bmark: The first, compute-bound stage of this three-stage benchmark was incredibly close — after almost four minutes of number-crunching just four seconds separated the machines.

The VT came up trumps again at 220 seconds, followed at one-second intervals by the Sperry, the Osborne and Keller's Micro 10.

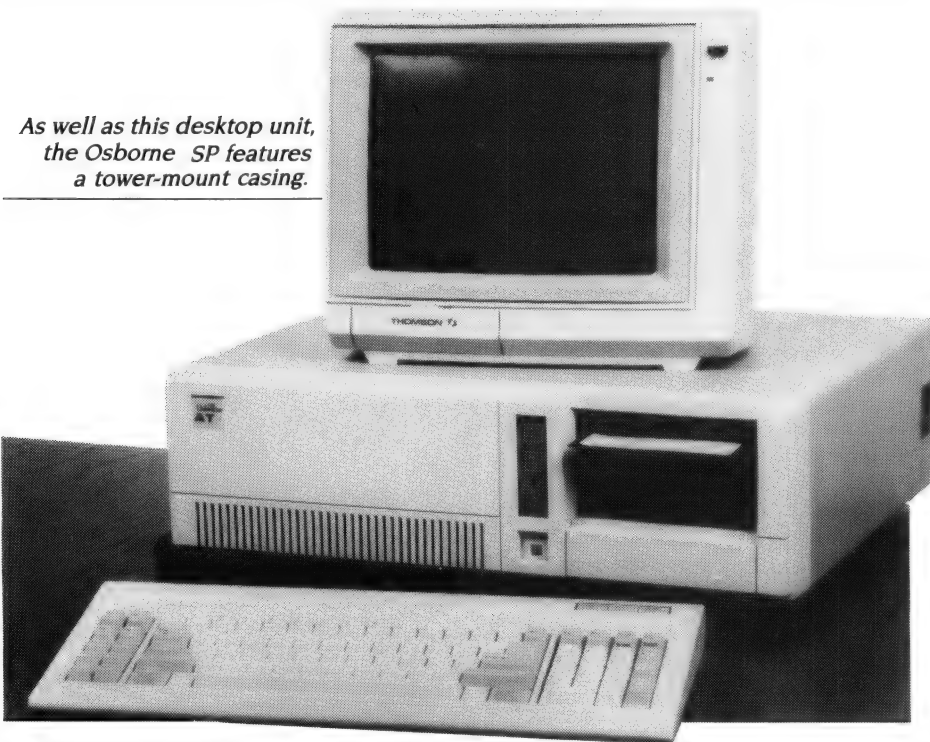
The story changed a little — both in order and in the size of the margins — on the disk-intensive second and third stages.

On stage two Video Technology waltzed away with 249 seconds, ahead of the Micro 10 on 294, the Osborne on 297 and the Sperry on 336.

Stage three saw a similar result: the VT out front on 276 seconds, a close battle for second going to the Micro 10 on 329 seconds from Osborne's 334, and the Sperry bringing up the rear with 367 seconds.

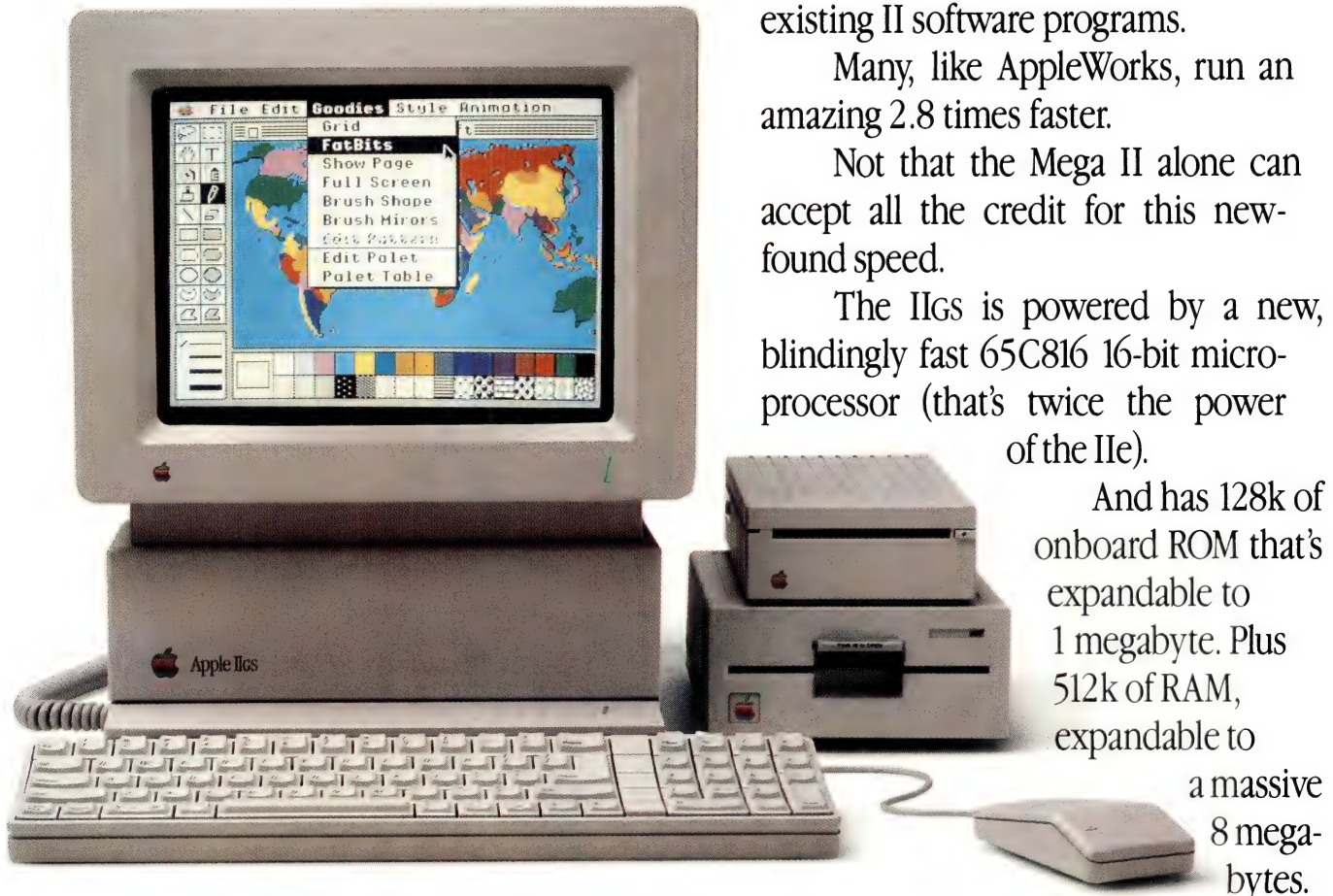
Overall performance? The Video Technology machine was unbeatable, moving into second place on our chart of all the ▶

As well as this desktop unit, the Osborne SP features a tower-mount casing.



Over the page
is a new
computer.
Inside it are
two more.

The new Apple IIGS.



existing II software programs.

Many, like AppleWorks, run an amazing 2.8 times faster.

Not that the Mega II alone can accept all the credit for this new-found speed.

The IIGS is powered by a new, blindingly fast 65C816 16-bit microprocessor (that's twice the power of the IIe).

And has 128k of onboard ROM that's expandable to 1 megabyte. Plus 512k of RAM, expandable to

a massive 8 megabytes.

The new Apple IIGS features among other things, a built-in Apple IIe and IIc.

Both of these computers, or rather, their functions, have been built into the Mega II chip you see here (and that's its actual size, of course).

Two years in the making, you'll find the revolutionary Apple Mega II microchip alongside many other new custom chips on the IIGS motherboard.



We put it there for one simple reason.

Compatibility.

The IIGS runs virtually all of the 10,000

Which means you can run the most advanced software without running out of memory.

The IIGS was partly named after its graphics, and no wonder.

The IIGS can create graphics as clear and sharp as the photographs you see in this magazine.

But with one major difference.

The range of colours.

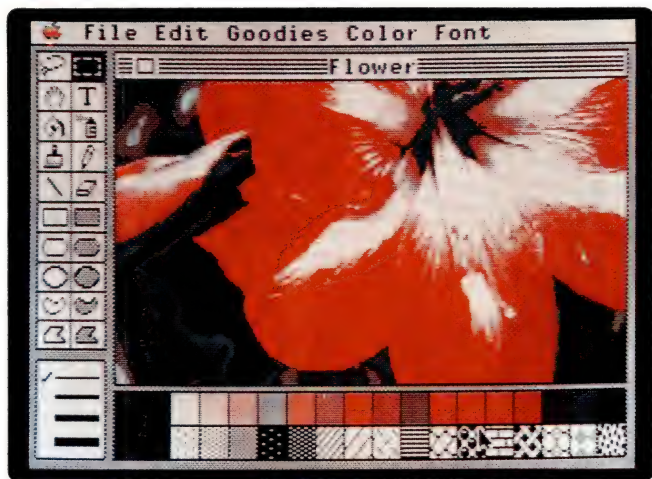
The IIGS has 4,096 in all. From delicate violet to electric red.

Any 256 can be used at a time in either of two graphic modes: 640 × 200 dots or 320 × 200 dots.

But you haven't heard anything yet. And we mean that literally.

The IIGS is so human, it even speaks.

The secret is a 32 channel Ensoniq sound chip, the kind you find in \$40,000



sound synthesizers (who says Apples aren't value for money?).

It allows you to compose for and play up to 15 instruments at a time.

(Now you know where the other half of its name comes from.)

Naturally, with such high-fidelity sound, it makes sense to add the optional Bose RoomMate hi-fi speakers.

It also made sense to redesign the IIG keyboard to give you maximum freedom.

This one is detached, so you can move it all over your desk.

Or hold it in your lap.

And to make number crunching easier, there's a numeric keypad built in.

The Mouse, now standard, can be attached to either side of the keyboard.

(We didn't want to make left-handers feel left out.)

Also standard on the IIGS is MouseDesk. The software program that gives the IIGS its Macintosh-like interface.

So now, transferring ideas into action is as easy as clicking a button.

And while the IIGS is easy to use, it's just as easy to expand.

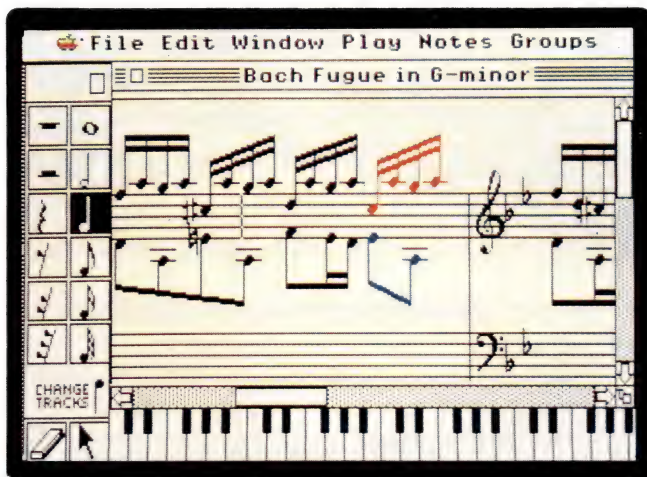
There are eight expansion ports at the back of the machine where you can plug in peripherals.

Anything from disk drives to modems, joysticks to printers.

You can share a LaserWriter with up to 30 other computers, thanks to AppleTalk, built into every IIGS.

Not only can you plug in a cord, you can plug in a card.

Take off the top of the IIGS and you'll find eight expansion slots where once again



it's easy to make the IIGS smarter, faster or more powerful.

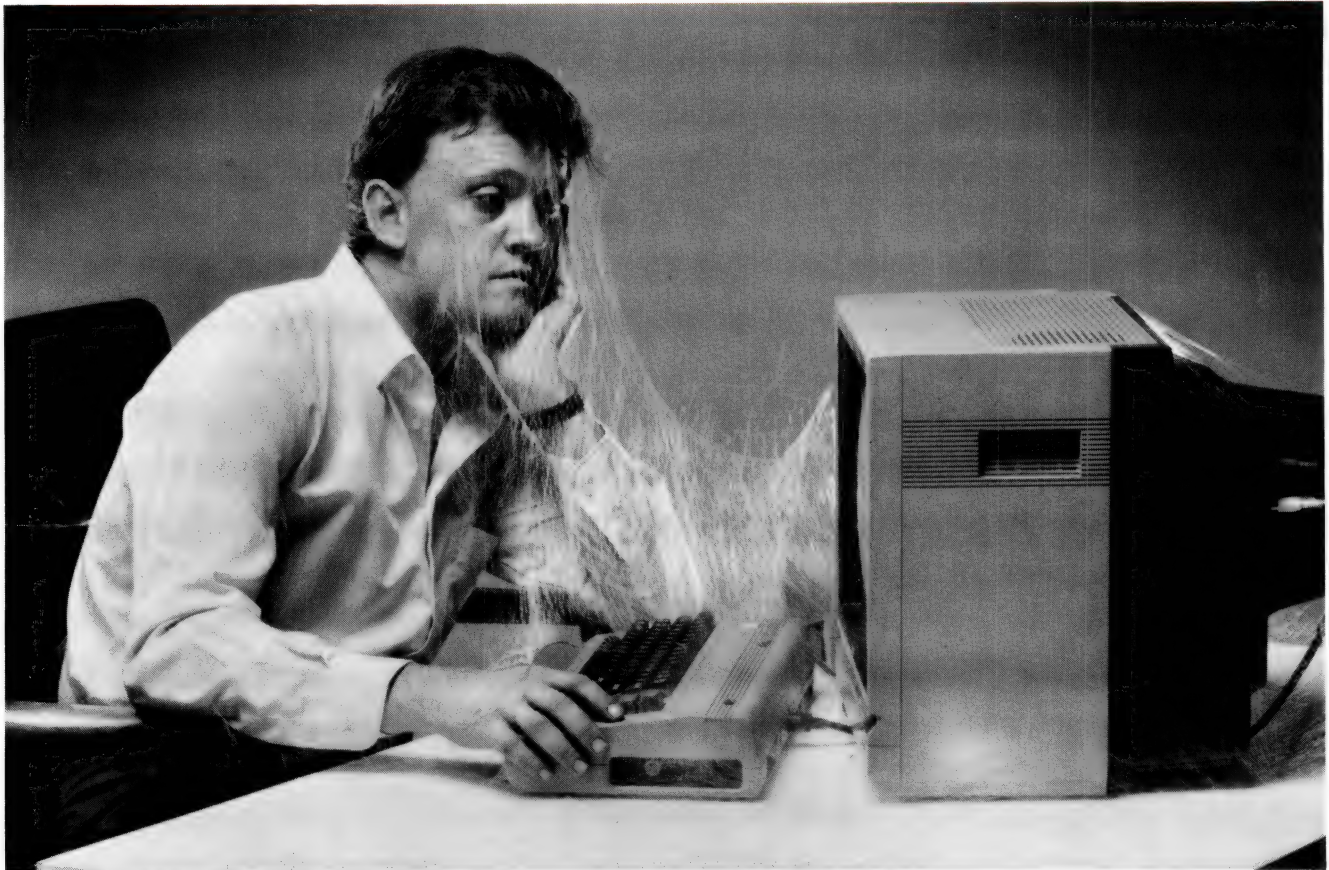
As improvements become available, you'll also be able to plug them in. So your IIGS will never become obsolete.

The new Apple IIGS.

It's even greater than the two computers inside it.



NetComm believes Commodore owners have waited long enough.



It seems Commodore owners are a patient lot. While other PC users were discovering the delights of communications, you had to wait for someone to design a modem just for you.

And while the others were enjoying the convenience of auto dial and auto answer, you were left waiting again.

But now, with the introduction of NetComm's Modem 64/128 for Commodore, your wait is over.

The Modem 64/128 is a full-feature, two-speed auto modem compatible with all existing commercial and public domain software, including Commodore 1650 software.

It operates at 300/300, 1200/75 and 75/1200 baud.

It comes complete with Videotex and Terminal software and even a VIATEL subscription form.

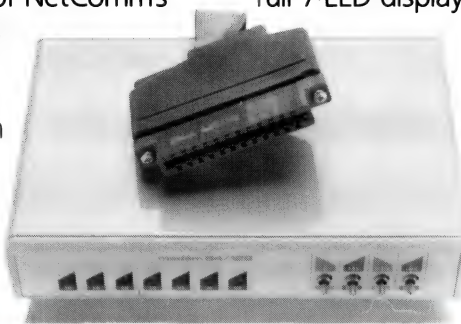
It provides auto dial, auto answer and auto disconnect features you'd only expect to find on much more expensive modems.

All modem features are software controlled, with a full 7-LED display reporting all operational modes.

And it comes complete, with Telecom approval, ready to plug in and run.

All this, plus NetComm's legendary reliability, for less than \$300, excluding tax.

So now, what are you waiting for?



NetComm

Total Solutions for Data Communications

NetComm (Aust) Pty Ltd • NSW PO Box 284 Pymble NSW 2073 Tel: (02) 888 5533 Telex: AA27488 MODEMS Minerva: 07:DNC002 Viatel: 288855330
VICTORIA 94 River Street South Yarra 3141 Tel: (03) 241 0534 QUEENSLAND Suite 6 Level 11 AMP Place 10 Eagle Street Brisbane 4000 Tel: (07) 229 7376

AT Speed!

Machines tested so far, but the others were close behind.

The Osborne and the Micro 10 had an incredible tussle for number two in this test — only the big difference in the floppy-to-hard-disk transfer test topped it in the Micro 10's favour.

The little Sperry came in last, but still sits proud in the top section of our all-machines table. It's a giant-bruiser...

EmmachisAT?

Now we get to the juicy bit. The Video Technology and the Osborne just don't deserve to be this fast at their price. I think I see yet another new rule book being written in the near future.

The Osborne starts life at \$3750, tax paid and including mono monitor but without hard disk. If you want to get going quickly and cheaply you can have a 20 Mbyte standard drive for \$1320 for an all-up, ready-to-run price of just on \$5000.

But if you want the performance we've seen here, you need the 44 Mbyte Mini-scribe at \$2310 — which still gives you stunning value at \$6000 for one of the hottest machines in town.

The Video Technology unit is a little faster, and costs a little more — but given the quality and the extras like four serial ports and two years' warranty, its \$7300 tax-included retail price is top value.

The Micro 10 we tested weighs in at \$13,500, but was a top-of-the-line version with a 72 Mbyte voice-coil hard disk. Starting price in the Micro 10 range is \$6198 for the base unit.

The Sperry starts out at \$6470, but by the time you add its high-resolution graphics card and appropriate professional-quality monitor (\$3000) and then apply sales tax you're looking on the high side of \$11,000 — it's worth the money, but is certainly not in the bargain class of the Osborne or the Video Technology.

WhATwun For Me?

If you've been following this series, I suppose you've realised by now that I am one of the most fickle people you've seen — every time we run a comparison I jump on a new bandwagon, or so it seems.

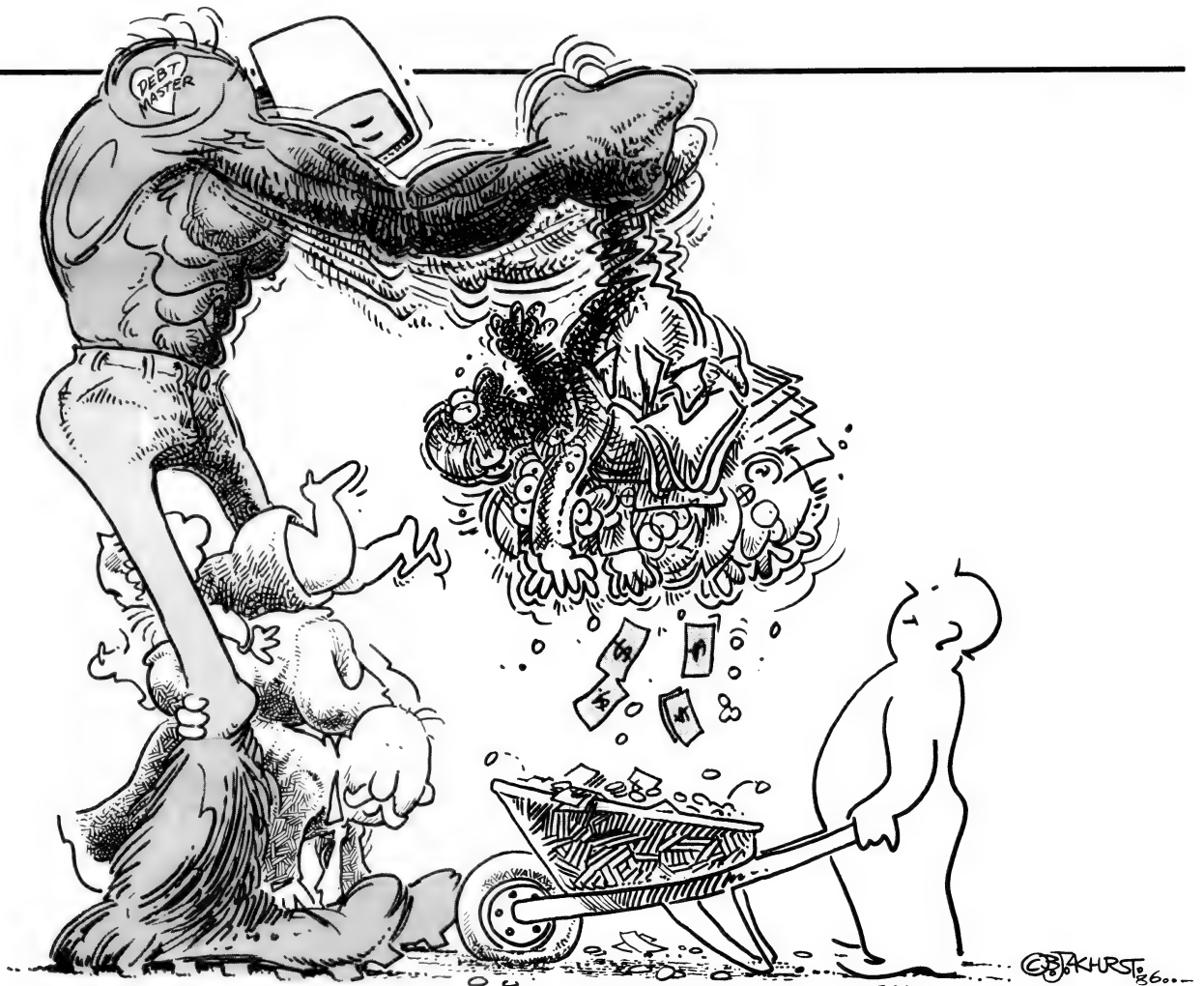
Well, here I go again. Today I want the Video Technology machine for its wonderful balance of performance, price and quality.

But my budget-conscious side says Osborne, which provides the zip (let's face it, what I'm looking for is a one-dollar Cray) at a decidedly attractive price.

Of course, the Sperry would look good on my desk, I still like the zoom-for-the-money of the Dick Smith Multitech and the Hypec Lingo, the balanced value of the Televideo, the...

Oh, hell, I'd enjoy almost every machine on the list. Let's settle this the simple way: the first company to give me one wins! □

	BBBMARK	CBSIEVE	Load	Lotus		dBase II			DOIT	Issue Tested
				Recalc	Save	Stage 1	Stage 2	Stage 3		
ECS 12.5 MHz	3.7	1.75	12.4	3.0	11.7	144	209	228	54.0	November 1986
Video Technology	5.3	2.9	18.0	4.5	12.7	220	249	276	33.5	December 1986
ITT Xtra XL	5.5	2.65	16.5	4.4	13.0	238	267	298	50.0	September 1986
Micro 10	5.5	2.9	20.2	4.7	12.9	223	294	329	42.3	December 1986
Osborne SP	5.3	2.9	22.5	4.4	12.4	222	297	334	60.5	December 1986
Sperry Micro IT	5.6	2.7	23.6	4.6	12.3	221	336	367	65.2	December 1986
MicroFive	5.6	2.89	22.0	4.9	12.9	294	258	353	66.2	May 1986
DSE Multitech	5.5	2.93	22.8	4.5	24.4	224	322	359	64.4	November 1986
NEC APC IV	6.9	3.68	22.5	5.5	13.0	280	331	372	42.7	November 1986
Hypec Lingo AT	6.9	3.69	23.0	5.8	13.0	280	326	366	69.0	September 1986
Televideo Telecat	6.9	3.70	22.2	5.8	13.5	281	366	403	55.0	September 1986
NCR PC8	7.0	3.70	23.3	6.0	14.0	280	315	351	68.0*	January 1986
Sanyo MBC 990	7.5	3.63	23.2	5.9	15.5	303	378	422	40.5	November 1986
TI Turbo	7.3	3.64	23.4	6.0	14.4	307	391	435	46.0	January 1986
Compaq 8 MHz	6.9	3.69	22.5	5.5	13.8	281	434	476	62.3	January 1986
President AT	6.9	3.56	23.5	6.0	14.1	306	382	425	85.5	May 1986
HP Vectra	6.9	3.69	23.2	5.5	23.0	283	472	514	70.0	May 1986
Sperry PC/IT	6.9	3.71	22.8	5.8	25.1	287	393	573	71.3	May 1986
Ferranti PC2860-AT	7.0	3.71	23.5	6.0	24.2	284	458	501	67.0	November 1986
IBM AT	9.1	4.89	23.8	7.7	23.3	378	408	458	57.0	January 1986
Kaypro 286i	9.1	4.89	23.5	7.7	25.5	379	403	452	77.3	January 1986



DEBTMASTER — Part 2

In this instalment of the ultimate debt-recovery program, Lindsay Ford tells you how to enter a debtor onto file. We can almost guarantee your debtors are experiencing 'hairs prickling on the back of the neck'.

In Part 1, I described the Debtmaster menu program. If you have it up and running you'll be able to change the system date, enter a debt-recovery base and exit from the system. In this part we'll cover the sub-program which lets you put a debtor on file or change the details of an existing debtor (Menu keys N and C). Name the sub-program NEW.MWB and use the rules for program entry described in Part 1.

Entering a Debtor

When you press N from the Menu this program runs, the date is displayed and the screen fills with prompts for the various items of data that make up a debtor entry (see Figure 1). Make sure the DATE is cor-

```

First letter of NAME:  S           Date 14/12/86
Debtor's NAME:        MR. JOHN SMITH*****
Debtor's ADDRESS:     44 JONES ST.,*****
                      BULLAMAKANKY 4130*****
                      *****
Re:                   CONCRETING: PAVING & PATIO AT*
                      YOUR HOME*****
Reference:             AJC 86-414**
Amount:               1200*****
Star Characters (*) indicate unused characters in data field
  
```

Figure 1. Sample screen layout to enter data for a new account.

```

00001 REM ---- NEW ----
00002 POKE 140,1: GOSUB 73: CURS 0: CLEAR: STRS(20000):
      DIM A0(250),A1(250),A2(10): REM Set up arrays
00003 FOR X=1 TO 10: A2*(X)="": NEXT X: REM A2* a string array
00004 OPEN "I",6,"DATE.DBT": IN#6ON: OUT#0: OUT#0OFF:
      INPUT K3$,K4$,M,D,U: IN#0: OUT#0: CLOSE 6: REM Get date file
00005 E=M: A2*(1)="0": A2*(2)=K3$: W=1: REM W=1 if NEW, 0 if CHANGE
  
```

Taking Care of Business

rect (press RETURN to exit if not), then enter the data as follows:

First letter of NAME: This identifies the disk file in which the debtor entry is to be stored. Use the first letter of the surname, otherwise the account may be hard to find when you need it.

If a disk file (S.DBT in our example) already exists, it will be loaded into memory and the program will warn you if it is full. This is unlikely unless your business is very large or you haven't bothered to Write-Off or Summons old overdue bills, as each file can hold 250 accounts (to a maximum of 18 Kbytes of memory). If you do happen to fill a file, it's better to start a new Debtmaster disk than to store the debtor on another disk file.

Debtor's NAME: Enter the name the way it is to appear on the bill. Make sure the spelling is correct — Mr Smith's account may be a little hard to track down if you enter him as 'Mr Smth'.

Debtor's ADDRESS: Three lines should be ample for all but the most unusual addresses. Don't forget the postcode.

Re: This is important to allow the customer to identify the account you're talking about and so you can analyse your performance in various areas of business. Work out different short words or codes to describe the different types of work you do or goods sold (concreting, landscaping, or whatever), then enter this first, followed by a colon. If you follow this practice with all accounts, you can use the Search program (Part 5 of this series) to do a printout of all entries for the specific types of work and the total earnings (or outstanding) from it.

Note the colon after the work description is not essential. It limits the amount of text that will go into the Paid Bills Ledger (in our example only 'Concreting' would appear), resulting in a tidier appearance than if the text appears in full).

Reference: This field is optional (press RETURN if not required). It's designed to allow you to enter the invoice number, but it's also a good idea if you have more than one person in your business to enter their initials so Search can check on their performance. Use three initials to avoid confusion (for example, if I use LF to identify my accounts, then Search will also turn up words such as 'Caulfield' or 'Alfred'.) The problem is avoided if I use LRF.

Amount: Enter the amount owing. There is no need to enter trailing zeroes (for exam-

```
00006 IF U>999 THEN LET U=U-1000: W=0: GOTO 6: REM Reset U
```

```
*** MAIN INPUT ROUTINE ***
```

```
00007 K5*="": GOSUB 65
```

```
00008 CURS 22,16: PRINT "Press <RETURN> to Abort";
```

```
FILENAME INPUT
```

```
00009 CURS 26,5: PRINT " "; GOSUB 60: IF X=13 THEN 50 ELSE IF X<65
```

```
OR X>90 THEN 9 ELSE CURS 27,5: K5*=CHR(X): PRINT K5*: P=X
```

```
00010 GOSUB 74: ON ERROR GOTO 11: C=0: OPEN "I",6,CHR(P)+".DBT":
```

```
IN#6ON: OUT#0: OUT#0OFF: INPUT C: FOR X=1 TO C:
```

```
INPUT A0*(X),A1*(X): NEXT X: REM Load the File (if any)
```

```
00011 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: N=C+1: K0*="FILE": IF
```

```
W=1 THEN 21: REM Skip next routine if NEW
```

```
00012 IF C>0 THEN 14 ELSE GOSUB 73: CURS 22,16: PRINT
```

```
"<<< CAN'T FIND " ; K0* ; " >>>"; REM Error if no such file
```

```
00013 CURS 0: FOR X=1 TO 10: A2*(X)="": NEXT X: PLAY 22,1; 0,10:
```

```
GOTO 7: REM Clear account data array and start again
```

If "CHANGE" then find account to be altered. If found then account will be in A1*(J). C=Number of accounts in file.

```
00014 GOSUB 73: PRINT "Enter a few letters of debtor's name ";
```

```
[A16 42];
```

```
00015 G=0: L=16: S=30: V=16: GOSUB 54: IF K0*="" THEN 7: REM Get
```

```
name input. Abort if <RETURN>
```

```
00016 GOSUB 74: FOR X=1 TO C: K1*=A1*(Z): REM Look for name
```

```
00017 FOR X=1 TO 10: J=SEARCH(K1*,CHR(124)): A2*(X)=K1*(;1,J-1):
```

```
K1*=K1*(;J+1): NEXT X: IF SEARCH(A2*(3),K0*)=0 THEN 20
```

```
00018 GOSUB 65: N=2: E=INT(A0*(Z)): GOSUB 73:
```

```
PRINT "Is this the one (Y/N)? *"; CHR(8); REM Print any
```

```
account that seems to match
```

```
00019 GOSUB 62: IF X=89 THEN NEXT#Z 21 ELSE IF X=78 THEN
```

```
GOSUB 74 ELSE 19: REM Continue if "N" (X=78)
```

```
00020 F0=FRE(*): NEXT Z: C=0: K0*="NAME": GOTO 12: REM Error if
```

```
can't find account. FRE(*) is only for crash protection.
```

```
TEXT ENTRY
```

```
00021 GOSUB 73: F0=FRE(*): IF (C=250 OR F0<2000) AND W=1 THEN
```

```
CURS 25,16: PRINT "<<< FILE FULL >>>"; GOTO 13: REM Don't
```

```
allow a NEW account if file full
```

```
00022 GOSUB 73: CURS 20,16: PRINT "Press <RETURN> for new line";
```

```
Debtor's Name
```

```
00023 C=C+W: G=0: L=30: S=27: V=6: GOSUB 54: IF K0*<>"" THEN 24
```

```
ELSE IF W=0 THEN 25 ELSE 2
```

```
00024 IF K0*="" THEN 53 ELSE IF ASC(K0*(;LEN(K0*)))<47 THEN LET
```

```
K0*=K0*(;1,LEN(K0*)-1): GOTO 24 ELSE LET A2*(3)=K0*:
```

```
IF W=0 THEN GOSUB 65: REM Don't allow punctuation at end
```

```
of name string
```

```
Debtor's address
```

```
00025 G=W: FOR V=7 TO 9: GOSUB 54: G=0: IF K0*="" THEN 26 ELSE LET
```

```
A2*(V-3)=K0*: IF W=0 THEN GOSUB 65
```

```
Re
```

```
00026 NEXT V: G=W: FOR V=10 TO 11: GOSUB 54: G=0: IF K0*="" THEN 27
```

```
ELSE LET A2*(V-3)=K0*: IF W=0 THEN GOSUB 65
```

```
Reference
```

```
00027 NEXT V: L=12: V=12: GOSUB 54: IF K0*="" THEN 28 ELSE LET
```

```
A2*(9)=K0*: IF W=0 THEN GOSUB 65
```

```
Amount
```



Taking Care of Business

ple, you can enter \$500.00 as 500, \$61.50 as 61.5, and so on). Note you can't enter an amount over \$999,999.99. If you're dealing in invoices that big, you can afford to hire an accountant.

When the account is entered you will be asked if you want to "Allow this client extra time to first reminder?" This lets you permit the customer to exceed your account terms, and if you answer Y, you will be asked to enter a figure of from 1 to 9 weeks. If, for example, the first reminder is set to go out in 30 days and you use this facility to give a customer an extra four weeks, a reminder letter won't be sent to him or her until 58 days have passed.

This completes the data entries required to put an account onto the system. You will now be given from two to four options:

Key M — This stores the entry and takes you back to the main menu.

Key N — This lets you enter another account. It is not included if you've set the date access switch in the base to allow entry of accounts of varying dates.

Key R — Use this if you've made a mistake. The entry is ignored and you can type it out again.

Key T — This is only available if the TYP program (Part 6 of this series) is on the disk. It allows you to type out the customer invoice.

Changing a Debtor Entry

This option (Menu key C) lets you change the details, other than the actual account date or the file on which the account is stored (in these cases the account must be cancelled and re-entered), of an existing debtor. It is useful when a debtor changes address, or if you've made a typing mistake which you didn't notice when you entered the account. Don't use it to change the amount owing if a part-payment is made — part-payments and cancellation of accounts are covered in Part 3.

The screen prompts are as in the NEW DEBTOR option. Enter the first letter of the debtor's name (as for a NEW account) and the file will be loaded. An error message will occur if no such file exists, and you will have the option of trying a different letter or of returning to the Menu (the correct file can be found with the Search facility detailed in Part 5).

Once the file is loaded, the program will ask you to enter the first few letters of the debtor's name. In our example in Figure 1, you could type SM, SMITH or even JOHN.

```
00028 G=W: L=9: V=13: GOSUB 54: IF K00="" AND W=0 THEN 33
00029 F0=VAL(K00): K00=STR(F0): K00=K00(1,2): X=SEARCH(K00,"."):
IF X>0 AND LEN(K00)>X+2 THEN LET K00=K00(1,X+2): REM Convert
input to correct string format
00030 IF X>LEN(K00)-2 THEN LET K00=K00+"0": GOTO 30: REM Add
trailing zeroes
00031 CURS 27,13: PRINT [A9 42]: IF F0<.01 OR F0=>1000000 THEN 20:
REM Don't allow illegal values
00032 A2*(10)=K00: GOSUB 65

If CHANGE then allow user to re-set time period on account

00033 T=0: IF W>0 THEN 36 ELSE GOSUB 73:
PRINT "Re-start reminder time period (Y/N)? *"; CHR(8);
00034 GOSUB 62: IF X=89 THEN LET E=M: A2*(1)="0" ELSE
IF X<>78 THEN 33
00035 GOTO 42

If NEW then allow user to set extra time to first reminder

00036 GOSUB 73: PRINT "Allow this client extra time to first
reminder (Y/N)? *"; CHR(8);
00037 GOSUB 62: IF X=78 THEN 42 ELSE IF X<>89 THEN 37
00038 GOSUB 73: PRINT "How many weeks (1-9)? *"; CHR(8);
00039 GOSUB 62: X=X-48: IF X<1 OR X>9 THEN 39
00040 T=X: GOSUB 73: PRINT "Extra time of"; T; " weeks (Y/N)? *";
CHR(8);
00041 GOSUB 62: IF X=78 THEN 36 ELSE IF X=89 THEN LET T=T*7 ELSE 41:
REM Convert input into number of days

Assemble account string and date variable

00042 A0(N)=FLT(E+T): K00="": FOR X=1 TO 10: K00=K00+A2*(X)+CHR(124):
NEXT X

ENTRY COMPLETE: Find out what user wants to do now

00043 A1*(N)=K00(1,LEN(K00)-1): K00="": Z=0: IF W=0 THEN 45 ELSE
IF D<2 THEN LET K00="<N>=Next entry ": REM If NEW then allow
user to proceed to make another entry
00044 ON ERROR GOTO 45: OPEN "I",6,"TYP.MWB": Z=1:
K00=K00+"<T>=Type ": REM If NEW and TYP.MWB is on disk then
allow user to type out account
00045 ON ERROR GOTO 0: CLOSE 6: GOSUB 73: PRINT "PRESS: <R>=Re-do ";
K00; "<M>=Menu *"; CHR(8);

00046 GOSUB 62: IF X=82 THEN 2 ELSE IF D<2 AND X=78 OR X=77 THEN 40:
REM If key "R" then ignore entry and start again. If Date
access flag set then return to Menu
00047 IF Z=0 OR X<>84 THEN 46: REM If "T" then type

Save file with new (or changed) entry

00048 GOSUB 73: CURS 26,16: PRINT "-Saving File-"; CURS 0
00049 OPEN "O",6,CHR(P)+" .DBT": OUT#6: PRINT C: FOR Y=1 TO C:
PRINT A0(Y); " ,"; A1*(Y); "':": NEXT Y: OUT#0: CLOSE 6

Save Date file

00050 GOSUB 74: OPEN "O",6,"DATE.DBT": OUT#6: PRINT "':"; K3#1
" ,"; K4#; " ,"; M; " ,"; D; " ,"; U: OUT#0: CLOSE 6
00051 GOSUB 73: CURS 0: IF X=78 THEN 2: REM loop if "N"

If user wants to "Type" then save account in a temporary file
and run TYP program

00052 IF X=84 THEN OPEN "O",6,"TEMP.000": OUT#6: FOR X=1 TO 10:
PRINT "':"; A2*(X); "':": NEXT X: OUT#0: CLOSE 6: RUN "TYP"

00053 CURS 0: RUN "DEBT"

MISCELLANEOUS ROUTINES & SUBROUTINES
```



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The program will then search the file for the letters you entered and will give an error message if the sequence isn't found. If a matching entry is found it will be displayed exactly as it was when you first entered it (that is, as in Figure 1), and you will be asked if this is the account you want. If you reply N, the program will continue its search.

Once the correct account is located, the cursor will be positioned under the first letter of the Debtor's NAME. If the change you want to make is in this line, type it out again and press RETURN when you've finished. The program doesn't let you type only part of the entry, thus if the account in our example was really meant to go to Mrs Smith and you simply type 'Mrs' RETURN that's what the name will consist of — 'Mrs'. This shouldn't be a problem, as data entries are quite short (they have a maximum of 30 characters).

If you don't want to change a particular line, press RETURN and the cursor will drop to the line below. Once you've made the required alteration/s (if any) the new text will be displayed and the program will ask if you want to re-start the time period for reminders. This lets you start again if you've been sending accounts and reminders to an incorrect address.

You will now be asked if you want to return to the menu (Key M) or re-do (that is, retype the account — Key R).

Next Time

Once you've entered the NEW program you'll be able to start putting accounts onto the system. In Part 3 we'll cover how to mark accounts paid, only part-paid, cancelled, written off or referred for legal action.

Text Input Subroutine:

S=Horizontal Position for start, H=Current Horizontal position, V=Vertical position, G allows null entry if =0, L=Maximum string length permitted, K0%=Input String

```
00054 H=S: K0%="": CURS H-1,V: PRINT " "; REM Display Cursor at
start of appropriate line
00055 GOSUB 62: IF (G=0 OR H>27) AND X=13 THEN RETURN ELSE IF X=13
THEN 55: REM Implement <RETURN> key
00056 IF X<>8 AND X<>127 THEN 58 ELSE IF H>S THEN CURS H,V: PRINT
CHR(8); "*"; CHR(8); H=H-1: K0%=K0%(;1,LEN(K0%)-1) ELSE
CURS H-1,V: PRINT " "; REM Implement <DEL> & <BACKSPACE>
00057 GOTO 55
00058 CURS H,V: PRINT CHR(X); H=H+1: K0%=K0%+CHR(X): IF LEN(K0%)<L
THEN 55: REM Add key pressed to string and continue if string
not too long
00059 RETURN

00060 GOSUB 62: REM Get key in K0%
00061 K0%=CHR(X): RETURN
```

Get key subroutine

```
00062 X=ASC(KEY%): REM Clear key buffer
00063 X=ASC(KEY%): IF X>96 AND X<123 THEN LET X=X-32: REM Get key. If
lower case then convert to capital letter
00064 IF X=124 OR X=128 THEN 63 ELSE RETURN: REM If X=128 then no key
has been pressed. Don't let user enter ASCII 124 as this is
used as the account string delimiter
```

Display prompts and any existing text in A2% array

```
00065 FOR X=3 TO 14: CURS 1,X: PRINT [A63 32]: NEXT X: CURS 22,3:
IF W=1 THEN PRINT "00<<< NEW"; ELSE PRINT "<<< CHANGE";
00066 PRINT " DEBTOR >>>"\"First letter of NAME:00000*"; IF
K5*<>" THEN PRINT CHR(8); K5%;
00067 PRINT SPC(23-LEN(K3%)); "Date: "; IF W=1 THEN PRINT K3% ELSE
PRINT A2%(2)
00068 PRINT "Debtor's NAME: "; SPC(12); [A30 42]: CURS 27,6:
PRINT A2%(3)
00069 PRINT "Debtor's ADDRESS: "; FOR Y=7 TO 11: IF Y=10 THEN
PRINT "Re: "
00070 CURS 27,Y: PRINT [A30 42]: CURS 27,Y: PRINT A2%(Y-3): NEXT Y
00071 PRINT "Reference: "; SPC(16) [A12 42]: CURS 27,12: PRINT A2%(9)
00072 PRINT "Amount: "; SPC(19) [A9 42]: CURS 27,13: PRINT A2%(10)
00073 CURS 1,16: PRINT [A63 32]: CURS 1,16: RETURN

00074 GOSUB 73: CURS 30,16: PRINT "-Wait-"; CURS 0: RETURN
```

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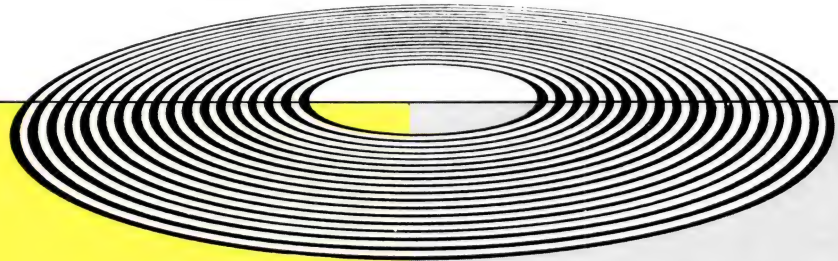
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Twenty



Turbo



Tips

— Part 1

Borland International's Turbo Pascal has, for many of us, revolutionised the way in which we program. In this two-part article, Peter Hill (one of those in revolt) shares 20 ways of making life with Turbo Pascal more fun.

TURBO PASCAL, now in its third release, has more than 400,000 users worldwide. Its speed, power and *especially* its low price have done more to introduce Pascal and structured programming to the mainstream of microcomputer users than all the efforts of Pascal proponents and structured-programming *aficionados* combined.

Turbo Pascal has also attracted a deal of criticism. On the one hand, some of those who are familiar and comfortable with BASIC or assembly language have raised their eyebrows at the 'tyranny' of its structure and the need to pre-declare all variables; on the other, esoteric arguments about Borland's adherence to the ISO Pascal standard and potential difficulties with portability of standard Pascal programs from mainframes have been raised.

While this article is not a defence of either camp, I feel it's worth stating my own position: I use whatever language will suit my immediate needs, and for some time nearly all my needs have been met by Turbo Pascal versions 2 and 3 (although I'm looking forward with interest to the release of Borland's version of Modula 2). I don't port software between mainframes and micros; if you do, you may find the arguments about portability of some relevance. If you don't, I believe it is not unrealistic to say Turbo Pascal has now become the defacto Pascal standard for microcomputers.

I don't believe that Turbo Pascal is perfect. In particular, the limitations on program size and data space dictate against its use for major projects; it is, however, sufficiently fast and flexible for medium-size projects and writing utilities.

Having got that off my chest, it's time to turn to the meat of this article. The following Turbo tips are things I have picked up in my Turbo travels which I thought worth sharing.

Tip 1. Disk Directories

BASIC users will initially be dismayed that the simple FILES '**.*' procedure of various BASICs is not available in Turbo Pascal. Indeed, writing such a procedure in Turbo Pascal requires some knowledge of interrupt procedures. Listing 1 (Program Diry) is suitable for incorporation within programs which require an equivalent to BASIC's FILES statement.

It is possible to modify and extend this program fragment substantially to show

```

PROGRAM Diry;
(
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alone or within users programs
)

TYPE
  Regset = RECORD
    ax,bx,cx,dx,bp,si,di,ds,es,Flags : INTEGER;
  END;
  FileNameType = ARRAY[1..80] OF CHAR;
  Str80 = STRING[80];
  Dta_Def = RECORD
    Filler : ARRAY[1..21] OF BYTE;
    Attribute: BYTE;
    FileTime : INTEGER;
    FileDate : INTEGER;
    FileSize : ARRAY[1..2] OF INTEGER;
    FileName : FileNameType;
  END;

CONST
  Carry = 1;
  Directory = $10;

VAR
  Pattern : STRING[40];
  Size : REAL;
  TotalSize : REAL;
  NrFiles : INTEGER;
  VolLabel : Str80;
  Marker : CHAR;

PROCEDURE Recurse;
VAR
  Dta : Dta_Def;
  Param : Regset;
  SearchStr : STRING[70];
  r1,r2 : REAL;
  DtaSave : ARRAY[1..2] OF INTEGER;
  FUNCTION Pack_Name(VAR Location; Size : INTEGER) : Str80;
  VAR
    Counter : INTEGER;
    InterimStr : Str80;
    Letter : ARRAY[1..1000] OF CHAR absolute Location;
  BEGIN
    Counter := 1;
    InterimStr := '';
    WHILE (Letter[Counter]<>chr(0)) AND (Counter <= Size) DO
    BEGIN
      InterimStr := InterimStr+Letter[Counter];
      Counter := Counter+1;
    END;
    Pack_Name := InterimStr;
  END; (Function Pack_Name)

```

Listing 1. Listing a directory.

TURBO TIPS

```

BEGIN (Procedure Recurse)
  WITH Param,Dta DO
  BEGIN
    ax := $2F00;
    MsDos(Param);
    DtaSave[1] := es;
    DtaSave[2] := bx;
    ax := $1A00;
    ds := Seg(Dta);
    dx := Ofs(Dta);
    MsDos(Param);
    ds := Seg(Pattern[1]);
    dx := Ofs(Pattern[1]);
    ax := $4E00;
    cx := $FF;
    MsDos(Param);
    TotalSize:=0;
    WHILE (Flags AND Carry) = 0 DO
  BEGIN
    SearchStr := Pack_Name(FileName,sizeof(FileName));
    IF ((Attribute<>16)
      AND ((Attribute AND Directory) <> 0)
      AND (SearchStr <> '.')
      AND (SearchStr <> '..')) THEN
      BEGIN
        SearchStr := SearchStr+chr(0);
        ax := $3B00;
        ds := Seg(SearchStr[1]);
        dx := Ofs(SearchStr[1]);
        MsDos(Param);
        Recurse;
        ax := $3B00;
        SearchStr := '..'#0;
        ds := Seg(SearchStr[1]);
        dx := Ofs(SearchStr[1]);
        MsDos(Param);
      END
    ELSE
      BEGIN
        r1 := FileSize[1];
        r2 := FileSize[2];
        if r1 < 0 then r1 := r1+65536.0;
        if r2 < 0 then r2 := r2+65536.0;
        REPEAT SearchStr:=SearchStr+' '
          UNTIL Length(SearchStr)=13;
        Size:=(r2*65536.0+r1)/1000;
        TotalSize:=TotalSize+Size;
        IF Size<1 THEN Size:=1;
        CASE Attribute OF
          8:VolLabel:=SearchStr;
          2,35,38,39 :(this is hidden);
          16:Write(SearchStr,'sdir ',CHR(179),');
          ELSE
            BEGIN
              Write(SearchStr,Size:3:0,'k ',CHR(179),');
              NrFiles:=NrFiles+1;
            END
        END;
      END
    END;
  END; (Case)
END;
ax := $4F00;
MsDos(Param);
END;
ax := $1A00;
ds := DtaSave[1];
dx := DtaSave[2];
MsDos(Param);
END;
END; (Main body of program)
Write('Pattern?:');
Read(Pattern);
IF Length(Pattern)=0 THEN Pattern:='.*.*';
ClrScr
NrFiles:=0;
VolLabel:= '';
Pattern := Pattern+chr(0);
Recurse;
WriteLn;
HighVideo;Write('>');LowVideo;
Write('Total of ',TotalSize:4:0,
  ' kB', ' in ',NrFiles,' files ');
IF VolLabel<>' ' THEN
  BEGIN
    HighVideo;Write('>');LowVideo;
    Write('Volume label ',VolLabel);
  END;
WriteLn;
Write('Press any key to continue...');
REPEAT UNTIL KeyPressed;
ClrScr;
END.

```



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TURBO TIPS

directories only, show files only, show the long file form including date and time of file creation, or to show hidden and system files. I have presented a short version because it provides the basic functions without being excessively long. In order to incorporate it in a program, you should make the following modifications:

1. change the top line from PROGRAM Diry; to PROCEDURE Diry;
2. change the last line from END. to END; {Procedure Diry}
3. place the line {\$IDiry.Inc} in your program
4. name the above procedure DIRY.INC

Tip 2.

Fast Screens

Turbo Pascal generates 'well-behaved' code; that is, the code it produces does not directly address hardware, but rather works through the MS-DOS and ROM BIOS function calls. This ensures a degree of portability across various machines. However, one unfortunate consequence is functions such as writing to the screen can be *v-e-r-y* slow.

One solution to this problem is to directly address the part of memory dedicated to maintaining the screen. This approach does reduce portability, as other MS-DOS computers, such as the NEC APC III and the Hewlett-Packard HP150, use different memory addresses for the screen. But the problem is not insurmountable, since the code can easily be modified for the particular machine if the correct screen-memory address is available. If you are wondering whether this is worthwhile when compared with the simplicity of using Write or WriteLn, then I can only add this gives an almost instantaneous screen refresh for a complete screenful of text!

Listing 2 illustrates the use of the procedure Write—A—Line (WAL) instead of Write or WriteLn. The parameters which are passed to this procedure are —

- Attr — the video attribute required (see Table 1);
- Return — if a carriage return is required at the end of a string, pass a value of 1, else pass a value of 0;
- C — the column to start the string;

R — the row to start the string;

CurrentStr — the string to display.

Essentially, this routine places the ASCII values of the characters directly into memory locations which happen to be the memory locations allocated to the video display. The value \$B000 (Hexadecimal B000 or Decimal 45056) is the starting address of video memory, and C is the calculated offset from this starting address, dependent on the row and column desired. The starting address given above is for the monochrome adapter. For the colour-graphics adaptor, you should substitute \$B800 for \$B000 in the above. The attribute you require can be derived from the video attribute list in Table 1. You get the attributes by adding together the desired characteristics; for example —

$$128+2+8+64=202$$

will give you a bright, blinking green foreground on a red background.

A call to the procedure WAL within the body of a program might look like this:

```
ThisStr:='Bright green on black';
```

```
WAL(10,1,15,5,ThisStr);
```

The result of this will be equivalent to the standard Turbo Pascal statements:

```
ThisStr:='Bright green on black';
```

```
HighVideo;
```

```
GotoXY(15,5);
```

```
WriteLn(ThisStr);
```

```
LowVideo;
```

As you can now see, this is a more compact method of writing to the screen. As you will see when you use it, it is also *much* faster. You'll appreciate it when you have a full screen of text to present.

Tip 3.

Redirection of Input/Output

While this process is described in the Turbo Pascal manual, it would not be unkind to say some clarification could benefit the less-technical user. MS-DOS (and, of course, PC-DOS) allows redirection of input and output. This means the output of one program can serve as the input to another, and vice-versa. Using this facility, it is very simple to write a number of small utility programs which can feed off each other. In combination, these trivial programs can add up to a very flexible set of extensions to the operating system. The two examples below can be used together to create an uppercase ASCII file from a Wordstar file, in the following manner:

```
WS2A <Wfilename|UCASE >ASCIIfile
```

In this command, the program WS2A is to take its input from the named Wordstar file and place the output of the operation ▷

```
PROCEDURE WAL(Attr,Return,C,R:Integer; CurrentStr:STRING[80]);
VAR
Count,Col,LenCurrentStr :Integer;
BEGIN
LenCurrentStr:=Length(CurrentStr)-1;
Col:=C+LenCurrentStr;
C:=(R-1)*160+((C-1)*2);
FOR Count:=1 TO LenCurrentStr DO
BEGIN
Mem[$B000:C]:=Ord(CurrentStr[Count]);
Mem[$B000:C+1]:=Attr;
C:=C+2;
END;
IF Return=1 THEN GotoXY(1,R+1) ELSE GotoXY(Col,R);
END;
```

Listing 2. Writing directly to the screen.

Value (Decimal)	FUNCTION
128	Blink
64	Red Background
32	Green Background
16	Blue Background
8	Intensity
4	Red ForeGround
2	Green ForeGround
1	Blue ForeGround

Table 1. Video attributes.

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```

PROGRAM WS2A;
($G2048,P2048)
(
ws2a WordStar to ASCII
USEAGE
ws2a <infile >outfile
)
VAR
C :Char;

BEGIN
  REPEAT
    Read(C);
  (
    IF Ord(C)>127 THEN C:=Chr(Ord(C)-128);
    C:=Chr(Ord(C) AND $7F);
    IF C<>^Z THEN Write(C);
  )
  UNTIL C=^Z;
END.

```

Listing 3. Converting Wordstar files to ASCII format.

```

PROGRAM Ucase;
($P2028,G2028)
(
Filter input to all upper case including WordStar type files
with the MSB set.
Useage ucase <input >output OR
dir|lucase
)

VAR
C :Char;

BEGIN
  REPEAT
    Read(C);
    C:=UpCase(C);
    If C<>^Z THEN Write(C);
  UNTIL C=^Z;
END.

```

Listing 4. Lower-to-upper case conversion.

in the named ASCII file. The '|' symbol is used to 'pipe' output from one program to another. Thus, the Wordstar file will be first converted to upper case, and the output of this procedure will be piped to the WS2A program for conversion into ASCII format.

There are a couple of points to note in the programs UCASE and WS2A: as we are using DOS 'standard' files, there is no need to specify the opening, closing or assignation of the files; and the \$G and \$P (get and put) compiler directives are essential, with the numbers following them indicating the buffer sizes allocated to each task. The uppercase conversion pro-

gram uses the standard Turbo Pascal function UpCase.

Tip 4. Buffered Input/Output

Turbo Pascal defines a standard type of file called 'TEXT'. This file is essentially a file of lines of text, separated by the Carriage Return/Line Feed combination. Such files are commonly found in many programming situations; for example, ASCII files created by word processors, PRN files created by Lotus 1-2-3, and Pascal source files conform to this type.

One feature of Turbo Pascal is the ability to set the buffer size of such files. The

default buffer size is 128 bytes, which essentially means a block of 128 bytes is read and processed, and then a new disk access is required. Although the optimum buffer size depends on the particular application, it is certain that 128 bytes is significantly less than the optimum.

For most purposes, a buffer size of 1024 bytes will result in a faster disk-access time, with fewer and quieter disk accesses. The buffer-size parameter is set when the file variable name is declared.

For example: VAR

TextFile :TEXT[\$800]

will give a 2048 byte (or 2 Kbyte) buffer size. Some experimentation is worthwhile here; larger buffers may give better results, but they also chew through available data storage if they are declared as global variables.

Tip 5. Global Gobblers

Turbo Pascal has a limit of 64 Kbytes of data-storage area. This limit can be circumvented by the use of pointers, but the technique is complex and also dependent on the actual program under consideration. One way to ensure you at least get your full complement of 64 Kbytes of storage is to minimise the use of global variables, and place variables in procedures whenever possible.

Listings 5 and 6 provide examples of this. The minor difference of including the help-file specification in the Open—Help—File procedure saves 4 Kbytes of space in the data area, since the space for the help file is only allocated when it is required.

```

PROGRAM Sample1;
VAR
Input,Output,Help:TEXT[$1000];
PROCEDURE Working_Procedure;
BEGIN
  (* Main Program procedure*)
END;

PROCEDURE Open_Help_File;
BEGIN
  (*Open the help file*)
END;

BEGIN (Main Program)
  REPEAT
    Working_Procedure;
  UNTIL Help_Called;
  Open_Help_File;
END.

```

Listing 5. Conserving data-storage space — 1.

TURBO TIPS

Turbo Pascal generates 'well-behaved' code, which ensures a degree of portability across various machines, but which makes functions such as writing to the screen v-e-r-y slow.

```
PROGRAM Sample2;
VAR
  Input, OutPut :TEXT($1000);
PROCEDURE Working_Procedure;
BEGIN
  (* Main Program procedure*)
END;
PROCEDURE Open_Help_File;
VAR
  Help :TEXT($1000);

BEGIN
  (*Open the help file*)
END;
BEGIN (Main Program)
  REPEAT
    Working_Procedure;
  UNTIL Help_Called;
  Open_Help_File;
END.
```

Listing 6. Conserving data-storage space — II.

Tip 6. Use Libraries

After programming in Turbo Pascal for some time, you will find you are covering familiar ground. For example, opening a text file to read in data consists of a number of steps, no matter what you are going to do with that data, namely:

- Get the file name (from input or command line parameters);
- Check the file exists;
- If it does, assign the name;
- Reset the file.

If you take the time to set up appropriate libraries of tried and tested routines for these functions, that time will be rapidly paid back. Probably about 50 percent of any conventional new program will comprise routines which are either identical to, or minor modifications of, routines

found in most other Turbo Pascal programs. By using library routines, you will achieve faster program development, more reliable programs due to bugs being progressively eliminated, and space savings because you will 'include' these routines in your programs.

Tip 7. Consistent Syntax

Pascal allows the free and interchangeable use of upper and lower case letters, together with long variable names. This makes it easier to enhance program clarity. If you are also consistent in your use of case and word separators, your code will be easy to read and debugging won't be so arduous. I use a number of conventions when writing programs:

■ Reserved words are all in upper case, such as WHILE.

■ Variables, types and standard functions are in a combination of upper and lower case, with no separators; for example, ClrScr, CountToDate, LineBuffer[n].

■ Procedures and function names are in mixed case, with the underscore as a separator, for example Count—The—Lines, Rotate—Matrix.

With this system, it is relatively straightforward to follow the source code. It is not important you adopt *this* convention; it is important you adopt *a* convention.

```
PROCEDURE Show_Indenting;
BEGIN
  In_One_Step;
  WHILE NOT Saturday DO
  BEGIN
    Day:=Day+1;
    WeekDay:=Succ(WeekDay);
  END;
  REPEAT
    Go_To_Work;
  UNTIL Saturday;
END; (Procedure Show_Indenting)
```

Listing 7. Example of code indentation.

Tip 8. Consistent Indentation

It is similarly important to have a consistent indentation approach, and one which does not unnecessarily increase the size of the code. I have adopted an approach which indents within a block of code, which is best illustrated by example. Have a look at Listing 7: this approach allows a high degree of clarity without the overhead involved in some schemes. □

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BORLAND BOOSTS PASCAL

AS PHONECALL SHARKEY told us: a good program these days is hard to find. This profundity makes the discovery of a pair of powerhouse products from Microway even more significant.

I'll start with my conclusion: if you are a serious user of Turbo Pascal, and you want to extend your ability to grapple with the full possibilities of this implementation of the language — buy these two programs, developed by a Californian company, Turbo Power, and distributed in Australia by Microway, in Melbourne. With that off my chest, I'll look at the products themselves.

Turbopower Utilities

THE FEBRUARY 1986 issue of *Byte* designated the Utilities as "program of the month" in their *According to Webster* column. Another US publication, *Compute Language* (November 1985) described the program as "a first-class package all the way".

And indeed it is. Turbopower Utilities is designed for the IBM PC or close compatibles using DOS 2.x or higher, with at least 96 Kbytes of memory (though you can't do much with less than 192 Kbytes). It consists of three disks, a slickly produced 140-page manual, and a quick-reference card.

There are nine programs in the set. And despite what I said above about them being primarily of use to those who indulge in Turbo Pascal, five of the programs — being operating system enhancements — are independent of Turbo Pascal, and can be of real use to anyone. The other four allow detailed optimisation of Turbo

Borland International's Turbo Pascal, has become the de facto standard version of the language for micro use, with some 400,000 copies sold. As often happens with popular software products, a number of support programs have been developed by third-party companies. Tim Hartnell was bowled over in Melbourne's Chesterville Road by two such turbo-powered animals.

programs. The first three components are alone worth the cost of the package.

Let's have a look at the programs within the Utilities, one by one –

Pascal Structure Analyzer (PSA) is designed to find subtle coding problems which the compiler doesn't catch, such as variables which are referenced before they are initialised (even straight-laced Pascal programmers fall from grace sometimes), modified value parameters, or initialised variables which are never used. PSA also produces a complete cross-reference of every variable, function and procedure in your program, together with all the calls

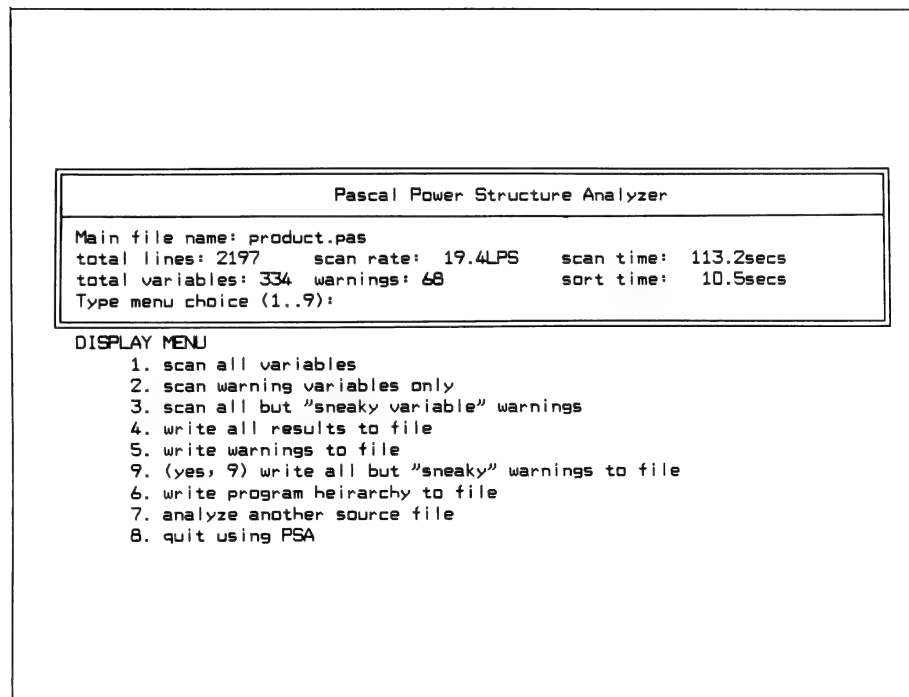


Figure 1. Screen display after the Pascal Structure Analyzer has completed processing a file.

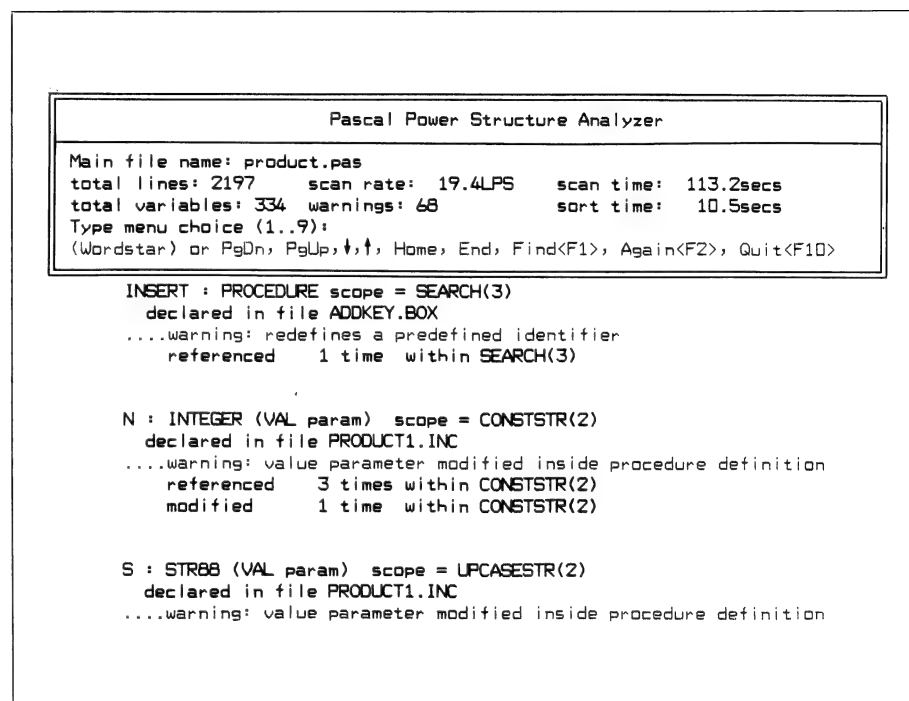


Figure 2. Selecting option 2 in PSA gives a scan of the warning variables only.

Pascal Power

```
Usage: DIFF [options] [OrigFile ModFile] [output redirection]
Entering DIFF by itself will start an interactive prompting session.
OrigFile and ModFile are DOS text filenames optionally preceded by
drive and path name. Both files must be specified. Output of DIFF describes
how to convert OrigFile into ModFile. Output sent to standard output.
Options:
-DB Disregard Blank lines and formfeeds during comparison.
-DS Disregard all Spaces (blanks and tabs) during comparison.
-DC Disregard Case (upper or lower) during comparison.
-OP Disregard Pascal comments during comparison.
-DK keylist Disregard characters in "keylist" (use #n,^c for unprintables).
-M show matched lines in the output report.
-N[DI] do Not show lines to be Deleted from OrigFile|Inserted to ModFile.
-NH do not show Header (Insert;Delete;Match and line no.) for each line.
-Wn Write a maximum of n differences before quitting (0<n<32767).
-S create an EDLIN Script instead of a list of differences.
-B output in Blocks of inserts and deletes (cannot use with -S).
-C output ONLY a count of the differences.
Defaults:
All text is significant. Show deletes and inserts by line, including header.
Process all lines regardless of number of differences. Do not create script.
Examples: DIFF -S myfile.pas myfile.bak >myfile.s00
DIFF -W200 -DB -DS -OP -DK ; c:\pascal\lib\io.inc io.inc
MICROWAY C>_
```

Figure 3. The Difference Finder (DIFF) options — white space, case, Pascal comments or arbitrary characters can be ignored.

```
Usage: SDIR [options] [directory specification] [output redirection]
SDIR indicates file attributes as n:normal, r:read only, h:hidden,
s:system, d:directory, m:modified since backup.
Options:
-AN[IE] sort by file Name|Extension Ascending.
-AS[IT] sort by file Size|Time Ascending.
-AT sort by file Time Ascending.
-DM -DE -DS -DT sort in Descending order
(two sort keys may be specified. If no key is specified the
default is -AN -AE. If one key is specified, the second defaults.)
-HEO show hidden files [Only].
-SEO show Subdirectories [Only].
-M[n] show files Modified since n days ago. (n defaults to 0)
-B[n] show files Modified Before n days ago. (n defaults to 0)
-MB show only files Modified since Backup.
-TEO include Titles [Only] (volume label, bytes used/remaining).
-Sn use cluster size n for Size calculations. default from disk.
-W write out Whole pathname with each file.
-E write out Everything (pathname, filename, size, etc.
-C use a Compressed format (names only) for output.
-P[T] Print the directory at normal [Tiny] size.
Examples:
sdir -m >today.dat sdir -dt -h -pt c:\bin\*.com sdir -b2 -mb
MICROWAY C>_
```

Figure 4. The Super Directory (SDIR) can be used with the Command Repeater (REP) for some very useful work. This is the help and options display after entering 'SDIR-?'.

made to them, and an hierarchical diagram of your program structure. PSA can handle programs which are thousands of lines long (your RAM is the only real limit) and can cope with up to 4000 variables.

Pascal Execution Timer (PET) allows you to work out just which parts of your programming are carrying the heaviest burden. If you know where in your code the computer is spending most of its time when the program is running, you'll have a pretty good idea of where to concentrate your optimisation efforts. PET measures the time spent in each procedure and function of your program, working in units of 200 microseconds. It shows the number of calls to each routine, the average time per call, and the maximum depth of recursion for each routine.

Pascal Execution Profiler (PEP) performs a similar function to the PET, but instead of simply timing the various bits of the program, PEP uses a statistical sampling routine (using a resident program which takes over the system clock, and a short subroutine which you add to your source code) to produce a graph showing where the program is spending its time. You tell PEP to sample the program from 40 to 8,000 times a second, for example. Once the program has run it produces the histogram showing what it has discovered. If you find there is one 'hot spot', you can focus on this and run the program just on this section. You can continue to zoom in on a section of the program until you're checking out a single byte. I can't imagine why you would ever want to get down to that level, but it shows the power of PEP.

Pascal Source Code Formatter (PSCF) is the last of the Turbo optimisation programs. It produces a 'pretty' listing of your source code, with a standard approach to such things as indentation, capitalisation, spacing and comments. You can also use the REMOVE option to get rid of all indentation and superfluous spaces — to 'squish up' a program. Like the other programs in the utilities, there are lots of parameters you set at the start of the run to suit your needs. In fact, when you first run any of the programs in this package, the number of possible options seem overwhelming. "Couldn't they have made it a bit easier?" I thought, but later realised that the manual explains clearly how to enter the parameters you need. It also emerges that you need all these options in order to make the tools as flexible as possible.

Pascal Power

Going OS for Enhancements

The first of the operating system enhancements is **Command Repeater (REP)**. This allows you to run — as many times as you like — any command which is typed in at the DOS prompt, in a batch file or from an external program. Since REP can read and parse information from the standard input, it can be followed by instructions which tell it what to do with a specific file. REP sends up to 255 programmable keystrokes to the program which is executed.

Pattern Match and Replace (RPL) is, essentially, a 'find and replace' job, such as your word processor offers, except it does not just look for specific strings to swap. Based on the Unix utility GREP, the command can look for matching Unix-type 'regular expressions'. You can use wildcards, tagged matches, groups and so on. RPL takes a set of patterns and files as an input, and produces lines of output based on all that input. The input and output can be of any size, limited only by disk space and an individual line length of 1024 characters.

Difference Finder (DIFF), as its name suggests, is used to find the differences between two text files. You can also tell DIFF to generate an EDLIN script to rebuild one file from the other. Not only does it do a straight comparison between two files (much as the DOS COMP command), but after finding a difference it will 'intelligently' look ahead until it can start matching again. Using the wide range of choices open to you, DIFF can be told to disregard white space, case, Pascal comments or arbitrary characters.

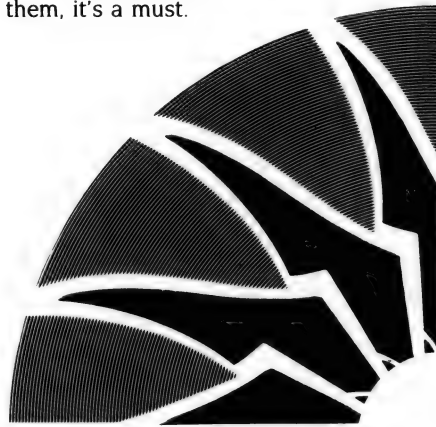
File Finder (ROOT) is a particularly handy utility; it will locate all files, in any subdirectory, to match your specifications (either specific names, or wildcards such as *.BAK to find all back-up files). Once you've got them, you can act on them (copy, run, delete and so on) using any of a number of single keystrokes (so you can delete all your *.BAK files by sending the output to a delete command running under REP).

And finally, there's **Super Directory (SDIR)**. There are several programs like this knocking around in the Public Domain, but I've seen none as flexible as this: it displays the MS-DOS disk directory with (as usual) a large number of options, including sort order, extended pattern matching, hidden file display and date filtering; and it can be used in combination with REP for some very useful work.

The Utilities come with fully-commented source code (in Turbo Pascal), along with a detailed, disk-based programmer's manual. This delves into the algorithms used in the programs, and also describes ways of using Turbo Pascal to take advantage of advanced DOS facilities.

But it doesn't end there. If you poke around the disk, you'll discover it also contains six additional utilities in source-code form: a program lister, a fast fixed-string replace utility, a character-mapping program (TRANSLIT), a utility to change file attributes, including data and time, a Wordstar-to-ASCII converter, and a binary-to-hex converter (complete with checksum support).

In keeping with the direction set by Borland, all the disks from Turbopower are non-copy-protected, there's a 140-page bound manual, and a quick-reference card. Phonecall Sharkey would approve. For the price, the Turbopower Utilities are a valuable and worthwhile purchase. If you're willing to spend a bit of time learning how to use the commands (and most worthwhile software takes a while to get the hang of, but is a joy once you've 'got it'), and if your programming needs demand any *one* of the nine commands, it is worth buying. If you want two or more of them, it's a must.



Turbo Extender

WHILE FIVE OF the nine programs in the Utilities are of value to non-Turbo Pascal programmers, this second product from Microway, Turbo Extender is aimed only at TP people.

If you've made solid use of Turbo Pascal, rather than just playing around with it creating short routines, you may well have ▶

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been frustrated by the limitations of the 64 Kbytes of code and data statements. And if you're working on a large program, you have the waste of time, and hassle, of having to wait while your entire program is compiled from scratch every time you want to test it. Turbo Extender may be just what you're looking for.

There are seven programs in the Turbo Extender pack –

Large Code Model (Bigturbo) provides the ability to write Turbo programs as large as will fit into the RAM you have on board — right up to the 640 Kbyte maximum addressed by MS-DOS.

You can actually load all your code into RAM at once, and thus pass parameters and return function results using normal Pascal syntax, with no limitations on which routines may call one another.

Any number of sub-program modules (up to what your RAM will let you hold, of course) can be compiled separately. This means you do not have to recompile every line of your program when working in a single module.

Bigturbo works without having to resort to the usual tricks of chaining, overlays or using memory-resident code. Instead, Bigturbo programs consist of a .COM file and a group of .CHN files, which are dynamically loaded at runtime. This dynamic loading can provide an advantage in that not all of the program need be loaded at the same time. However, at other times it may be desirable to convert your Bigturbo program into a single .EXE file. While MS-DOS limits .COM files to 64 Kbytes, .EXE files can be any size up to the limit of RAM.

EXE file generator (Buildexe), takes as input the object code of a Bigturbo application, including the main .COM file and all .CHN files loaded at runtime. Buildexe processes these files and creates a single output file. Now, running Buildexe on a Bigturbo application is totally optional, but is probably a good idea if you're creating a program which you eventually want to sell. (Note you can distribute object code based on the library routines of Turbo Extender without paying royalties, provided your object code doesn't substantially replicate, or compete with, the functions provided by the Extender itself.)

Shell File Generator (Shellgen) works in two quite distinctive ways. In one mode, it creates the structural equivalent of any Pascal source file, which can then be used as a fast-compiling 'placeholder' in any

If you are producing Pascal programs to sell, and you don't want your customers to get their hands on your fiendishly clever code, Pascal Encryptor (Pcrypt) will foil them.

large program you develop. In the other mode, it will convert a complete existing program to the multi-module equivalent form to be used for Bigturbo.

Large Data Model (Bigarray) is a routine which allows you to leapfrog over the largest data object (64 Kbytes) directly supported by Turbo Pascal, and produce one- or two-dimensional arrays of any type and size. Bigarray provides a set of routines to transparently access, build, display and store these arrays. There are five different models for large arrays supported by Bigarray, and the most interesting of these are the first and second model. The first, and fastest, supports arrays as big as will fit in your RAM, while the second lets you produce arrays as big as your disk will hold, using a paging algorithm to keep the most frequently accessed sections of the array in RAM for best performance.

Runtime Disk Cache (Cache) acts as a kind of self-refreshing RAM disk, in which the most frequently accessed disk material is stored. When the cache can use data from RAM, rather than the physical drive, it will do so. Otherwise, the material comes from the disk for normal use, while a copy of it resides in the cache for future reference.

Overlay Mapper (Overmap) comes into its own when memory space is a little tight and you're forced to use Turbo overlays. A *static* analyser tells you which procedures end up in which overlay files, as well as the size of each in its overlay group. A *dynamic* analyser tells you how many times each overlay file is read during execution, as well as the load address of each overlay module in memory. These allow you to both optimise performance, and to free extra memory for your own use.

If you are producing Pascal programs to sell, and you don't want your customers to get their hands on your fiendishly clever code, **Pascal Encryptor (Pcrypt)** will foil them. If you distribute your program as a Bigturbo-compiled module, you can stop people cracking your code, but you have to give them the Bigturbo control code as well. Pcrypt, as its name makes pretty clear, plays around with your source code so no-one, not even yourself, will be able to understand it. And as a bonus which seems pretty unbelievable, but it's true folks, an encrypted source file will compile anywhere from 15 to 400 per cent faster than the original unencrypted file, and can end up from two to seven times smaller than its unencrypted parent.

Both Turbo Extender and Turbo Utilities are supplied with a well-produced 140-page manual, a quick-reference card, and a refreshingly reasonable licence agreement, allowing you to use the packages to develop your own programs for sale, even allowing you to incorporate them in your own applications.

As I said at the beginning, if you are a serious user of Turbo Pascal, and you want to extend your ability to grapple with the full possibilities of this implementation of the language — buy Microway's programs. The staff at Microway knows the packages inside out and can give informed telephone support. □

Product Details

Product:	Turbopower Utilities & Turbo Extender
Manufacturer:	Turbo Power, Campbell, California, USA
Distributed by:	Microway Software, 292 Chesterville Rd, Moorabbin 3189. (03) 555 4007
Price:	Turbopower Utilities \$206 exc. tax Turbo Extender \$225 exc. tax

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DOS-Defying Mace

Just erased the newly completed Great Australian novel? Or wiped out the company's debtors' ledger? When your fingers start working faster than your brain, its time to try a new weapon in the fight against disk-destroying dumbos. Ewart Stronach looks at the latest.

MACE n. 1. *Weapon consisting of a heavy iron club with spiked head.* 2. *Symbol of authority borne before figures of authority.* 3. *Program for the maintenance of disk files for IBM PC, XT, AT and compatibles.*

When Natalie asked me to review another disk file maintenance program my immediate reaction was 'It'll have to be good to beat XTREE.' While I had been thinking of getting a mace to control the kids, I hadn't really thought of having one to control my hard disk.

Mace+Utilities is, in fact, named after its author, Paul Mace. It does a lot more than XTREE and, according to Mr Mace, provides IBM-and-compatible users with a set of simple, powerful tools for preventing the loss of valuable work, recovering work that is lost, and disk housekeeping. Mace automatically detects data in the process of going bad and moves it to a safe area before its permanent loss; it cleans up directories; 'unfragments' existing files; and moves all available storage to the back of the disk, so newly created files will be in one piece and easily retrieved. So says the preamble to the 60 page manual. What's it like in action?

Phoenix Rising

The software won't run until its installed. To do this, you log onto drive A with the distribution disk inserted, and type 'HINSTALL C' to place the program in the appropriate sub-directory on your hard disk. Copy COMMAND.COM and CHKDSK.COM onto the same directory and you're ready to go.

To operate the program, you must place a call to RXBAK.EXE in your AUTOEXEC.BAT file. This module of Mace will then automatically cause the data necessary for a recovery from an accidental reformat to be written to another section of the disk.

After an accidental reformat, the data is recovered and the disk totally restored without further drama. This backup is called every time you boot and in fact may be called as often as you like if you are doing anything you feel may jeopardise the integrity of your disk.

From the Mace+ sub-directory, a call to Mace will display a menu. Function key F1 gives you on-line help. F3 provides an automatic diagnostic function, called Diagnose. Diagnose reads each sector of the designated drive, looking for errors: if no errors are found, it displays a map of the data area; if it cannot read a sector, it marks the screen and reports the location; if the data belongs to an active file, it will report which file and proceed to recover as much data as possible. The recovered data is written to a designated file and unreadable sections are written as a row of asterisks. If the file is an executable program, it will not work; however, text and data files may be rebuilt easily.

The F4 key simply runs CHKDSK with the /V option, reporting the degree of fragmentation of files. File fragmentation will occur with any regularly used and altered file. As disk space is filled, DOS looks for available (empty or reusable) space anywhere on the disk. This means to read a long file, the disk heads may have to move all over the disk searching for data. This adds considerable time to operations and also causes your read/write heads to do far more work than is necessary.

One Mace function allows you to collect all the fragments of a file and place them sequentially on the disk. The time saving for reading large files, such as databases and spreadsheets, is significant. When invoked, this function performs all the Diagnose functions and then reconstructs all

the files in an orderly fashion at the front of the disk. All free space is placed at the rear and all bad sectors are locked out to prevent other data being written to them. A report on the state of the files is created on disk, ready for later printing.

F6 is an automatic Squeeze/Sort. It removes deleted entries from all directories and closes up the space. This can dramatically speed up operations, particularly along complex directory paths. The Sort function moves references to other directories to the top in alphabetical order (or you may optionally decide on a sort by name, extension, date or length). You also have the option of removing the Read-Only attribute on EXE, COM and SYS files.

The use of F8 initiates the backup file mentioned in the opening. This file will be used to restore lost data or recover from accidental erasure or formatting.

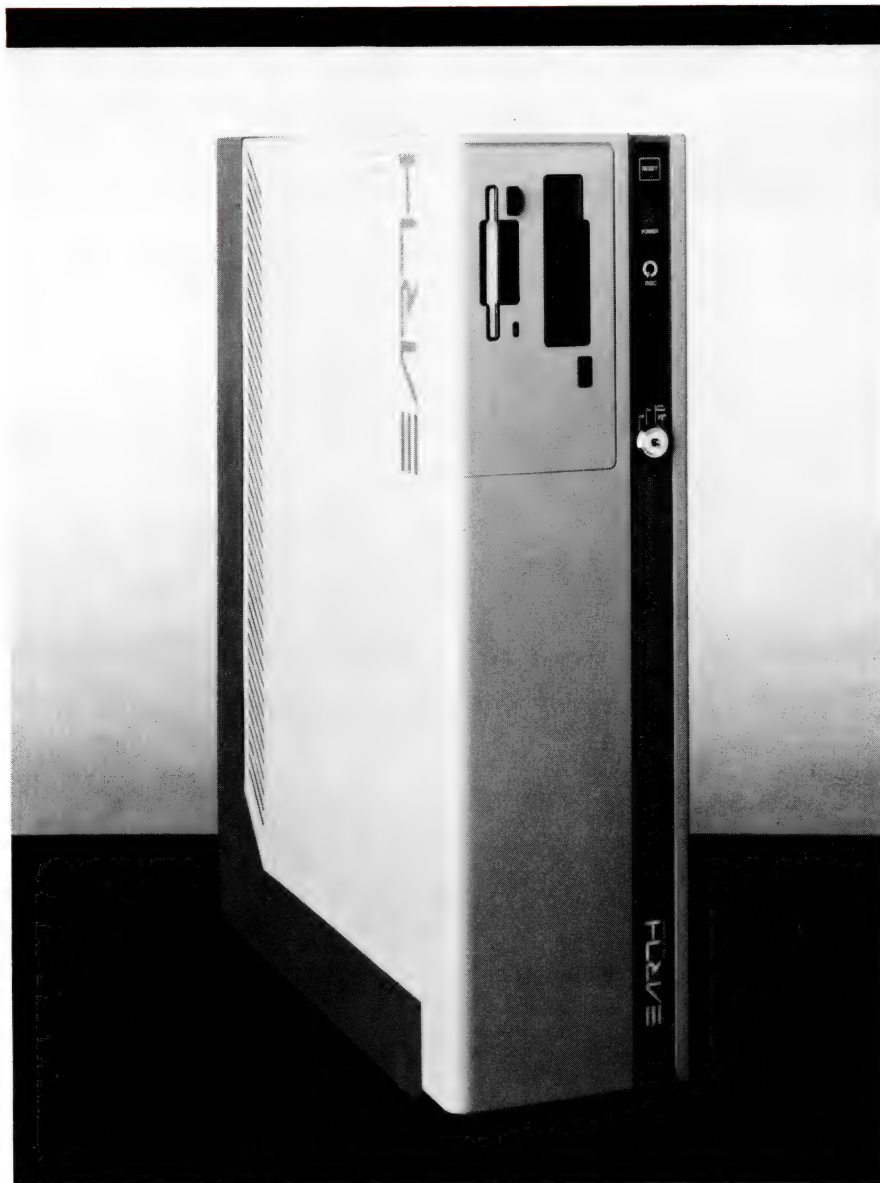
The Second Set

F2 calls a whole new set of utilities, and resets the function keys. After pressing F2, F1 offers help on the new set of utilities, and F2 now provides a semi-automatic directory call which displays directories in the normal manner. F3 will reconstruct the boot sector of the disk after a disaster, operating on a floppy as well as the hard disk if you have taken the time to install the program on your super-sensitive floppy.

F4 runs CHKDSK (as in the previous mode) and F5 (Unformat) will instigate recovery from an accidental reformat. The disk will be restored to the stage it was at the time the last backup was made with RXBAK.EXE, so it's important to make regular calls to RXBAK. If you have failed to make a backup, Unformat will partially recover from this situation but a lot of data may be lost.

In the utility mode, F6 offers most hope▷

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WHEN YOU WANT THE BEST!

RESTORE BACKUP.M_U AUTOMATIC OPERATION

UTILITY KEY = F5

RESTORE BAKUP.M_U will recover from an accidental reFORMAT of a hard disk by finding and copying the essential information previously stored in BACKUP.M_U to the right places. Beware! The disk will be restored to the same state as when the file BACKUP.M_U was last updated by RXBAK.EXE (typically, the last time the machine was turned on, provided RXBAK is called by AUTOEXEC.BAT.)

BACKUP.M_U must have existed for this to work. You can create it with F8 Create Backup.M_U, or by running F5 or F7.

If BACKUP.M_U did not exist, use UnFORMAT.

Files that have been moved or altered may contain some useless information; all others will be restored!

Follow the prompts.

THE PC/AT PROBLEM

It does exist and MACE+ will keep you ahead of the game for as long as there is available space to move the files into.

The problem is not just one isolated bug: IBM acknowledges there are bad clock chips on one run of drive controller boards. They do not acknowledge that the mating of the CMI early machines does not fully address the mating of the CMI drive to the Western Digital controller chip. Also, the CMI drive itself just plain doesn't like to be moved, wiggled or vibrated while on or off. No one manufacturer did a bad job, but their cumulative inadequacies result in occasional madness and the loss of your data. The only permanent cure, if you experience this problem, is to get your dealer (under your one year warranty) to send the drive back to IBM. Tell him to stock the replacement he gets and sell it to someone else; you want a CDC 20Meg Storage Master drive, or, if you can stand the racket, a Seagate ST4026. In any case, you do not want a slower access drive, one with band-stepper head positioning. Possibly, the new IBM manufactured or Tandon drives will be less prone to die in ordinary use.

MACE+ ERROR MESSAGE: 24, 25, 26

Message --> 24--FAULTY BOOT SECTOR.

Diagnosis --> An intermittent error was detected in the boot sector. This will make the disk un-bootable--that is, the system will not come up when power is turned on and this is the hard disk or the diskette in drive A:

Action --> You can limp along with OTHER UTILITIES RESTORE BOOT, but should consider re-formatting the disk. On a hard disk, if this persists after format, you might have to move the partition up a track with FDISK.

Message --> 25--FAULTY SECTOR IN FAT 1

Diagnosis --> An intermittent bad sector was detected in the first copy of the File Allocation Table (there are two).

Action --> Floppy disks: copy everything to another disk and re-format; if the problem recurs, throw the disk away.

Action --> Hard disks: You will have to BACKUP, FORMAT and RESTORE as soon as possible. If the problem persists, move the partition up a cylinder with FDISK.


Message --> 26--FAULTY SECTOR IN FAT 2

Diagnosis --> Same as above.

The Mace+Utilities manual is an information-packed 60-page utility in its own right, as these excerpts show. The author has indulged in some editorialising, however.

**Disk-File Maintenance
for the PC, XT, /AT and Compatibles**

MACE+ UTILITIES™



Eliminates Hard Disk Risks!

UNFORMAT will restore all your sub-directories and files automatically on any hard disk.

UNDELETE gets erased files back with four keystrokes and without cross-linking.

RECLAIM automatically extracts files from unmountable disks.

Optimizes Hard Disk Performance!

CONDENSE un-fragments up to 32Meg. (1 Megabyte per minute (or faster)! Just as fast on a full disk (30 bytes free). Doubles the speed at which programs load, find, and store data by piecing files in one physical piece on the disk and by organizing sub-directories, programs, data, and empty space into separate blocks. Makes UNDELETING a cinch. A must for LAN's!

SQUEEZE/SORT in a single operation: Speeds up the PATH by squeezing deleted references from directories. Sorts your directories on any field.

for those of us who are rotten housekeepers. Called Reclaim, it will read as much as it can from the File Allocation Table and, thus informed, rebuild the files it can read from a damaged disk. This includes physically damaged disks as well as those accidentally over-written or reformatted. The data will be written to new files, either on the hard disk or to floppies, and may be cleaned up with a text editor after recovery. You won't always get a total recovery and unreadable portions are replaced with asterisks, but it sure beats re-typing the whole thing.

UnDelete restores deleted files. The DOS DELETE command does not in fact 'rub out' the data; it merely changes the first bit of data on the disk and tells the File Allocation Table that section of the disk is available for over-writing. Provided nothing has been written there since the deletion, it is a simple matter for UnDelete to change the first bit of data back, tell the File Allocation Table to mind its own business, and rewrite the directory. You and I would need all day and a mind like a steel trap, but UnDelete does it all in seconds. A good memory is important

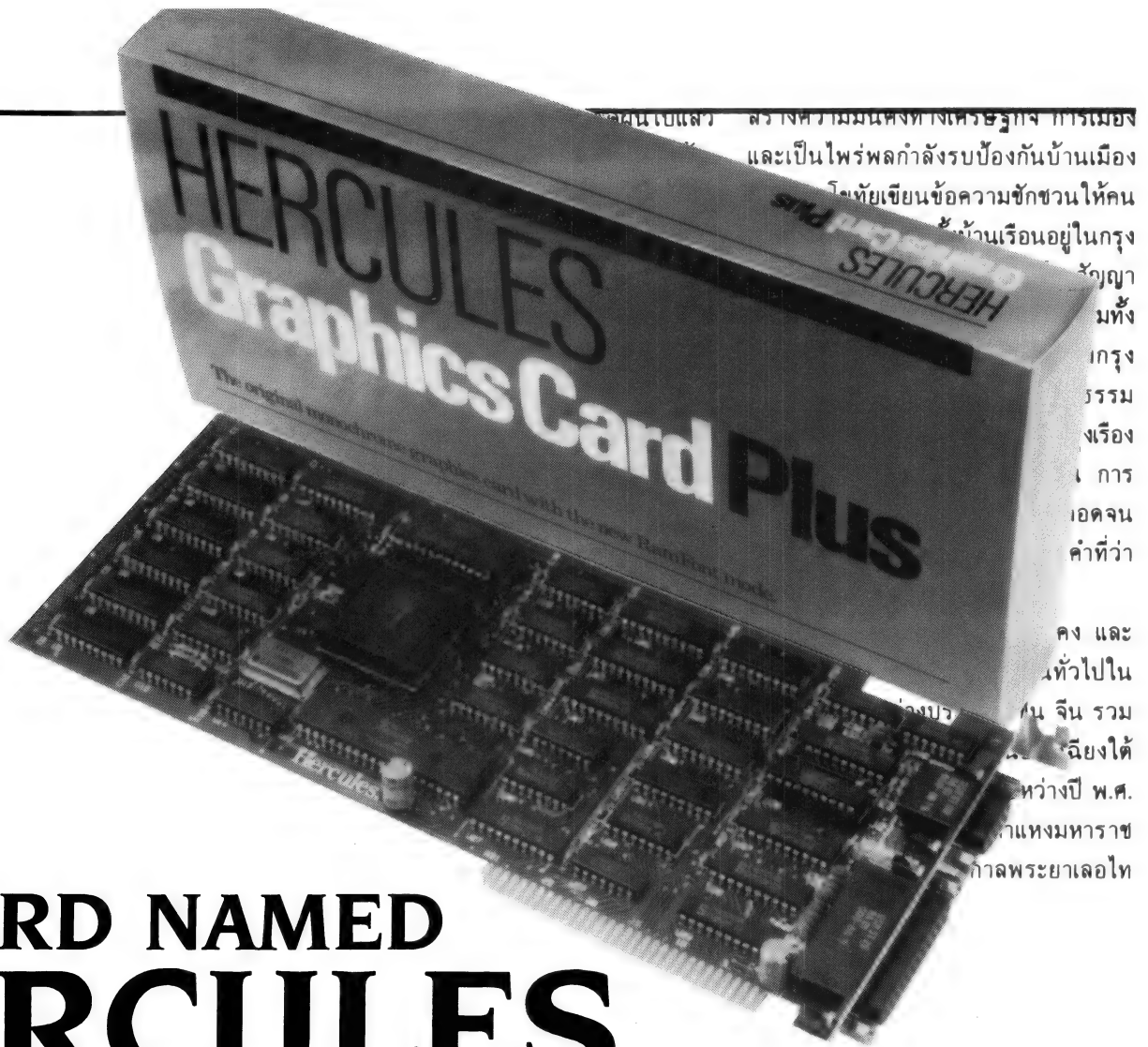
here, as UnDelete presents you with a list of the deleted files minus the first letter. Be warned against my habit of renaming often used files with a single letter.

The documentation includes a series of tips and hints for use of the software and contains a very concise descriptions of hard and floppy disks. A clear description of how DOS uses disk space makes for a better understanding of what the program offers and how it works.

One word of warning: before *any* operation on a suspect disk it is vitally important you make a backup before starting. This point is stressed in the manuals and I cannot stress it enough. Hard disks are funny things and capable of some strange actions, particularly if getting on in years and use. I have had one report from a Mace user who irrecoverably lost a directory while using the Squeeze function. This does not mean Mace is unreliable; it merely indicates there may be circumstances which the author of the program has not allowed for.

If Perfect Information wants its review copy back, I'm ready to put up a fight. ☐

Product:	Mace+Utilities
Manufacturer:	Paul Mace, Ashland, Oregon, USA
Review Copy From:	Perfect Information, PO Box 946, Crows Nest 2065, (02) 9576686
Price:	\$153



A CARD NAMED HERCULES

Hercules has put more muscle behind improving the flexibility and speed of the IBM PC display, with the Hercules Graphics Card Plus. John Hepworth, rhino card-boy (a long-time devotee of the old Hercules card), takes this latest release through its paces.

EVER SEEN a wildlife documentary from Africa, with a shot of a lumbering rhinoceros and a few birds riding along on its back? There is no question that IBM is the rhino in the PC world, setting the standard, and forging the path. The birds? They could be the specialist manufacturers who sense a gap in the IBM line-up, and create a product for that niche.

One of the early specialist firms to achieve substantial market penetration, to the extent of forging a quasi-official video standard, is Hercules Computer Technology of Berkeley, California.

Van Suwannukul, co-founder of Hercules Computer Technology, came from Thailand. He needed to display Thai script on an IBM PC, and found that the IBM Color Graphics Adaptor did not have ade-

quate resolution. The IBM monochrome monitor had adequate resolution, but the IBM Monochrome Display Adapter was text only, with a fixed range of characters in ROM. Suwannukul's personal needs led to the design of the original Hercules Graphics Card, which allowed high-resolution graphics on the IBM monochrome monitor.

Text and Graphics

All the common video board/monitor combinations for IBM PCs have two modes; text mode (IBM calls it Alpha/Numeric) uses characters defined in ROM; graphics mode (all points addressable to IBM) writes each pixel on the screen individually.

Text mode is fast. To write a capital A to

the screen, the application program only has to tell DOS to do it. The character is defined in ROM as an arrangement of pixels within a rectangle, and so can be swiftly transferred to the screen.

Graphics mode is very flexible, and essential for line and shape drawing, but rather slow when the application program has to put text onto the screen because the ROM characters are not available, and the application program must explicitly define each pixel required to display the desired character.

The ideal would be hardware which, in addition to the standard text and graphics modes, allowed a custom character set to be defined in RAM. These fonts could then be written to screen as fast as the ROM fonts.

The Hercules Graphics Card Plus is just such a board. Used in conjunction with the IBM 5151 TTL (or equivalent) monochrome monitor, it offers text mode identical to that of the IBM Monochrome Display Adaptor, and also the 720- by 348-pixel graphics mode of the original Hercules Graphics Card. In addition, the Hercules Graphics Card Plus offers 'Ramfont' mode.

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Van Suwannukul's need to display
Thai language script on an IBM PC
led to his designing the original
Hercules Graphics Card.



Ramfont

Ramfont allows the definition of up to 3000 custom characters, which can be held in RAM and then read to the screen at high speed. Why bother, when DOS only know about 255 characters? Many possibilities immediately become apparent — foreign and custom characters, extended character sets for Asian languages using ideograms, and animation. Multiple character sets could make possible desktop publishing software with high speed and true WYSIWYG display.

Foreign Characters

ROM characters only come in one font, reminiscent in style of the traditional typewriter output. What if the user wants a foreign character set — say Greek or Russian — where either some additional characters are required, or the whole character set is different? Sure, application software can be re-written to graphically display the new character set, but how can one do a task as mundane as DIR in the desired characters?

With Ramfont comes a flock of prede-

defined fonts: 8 by 10, 8 by 14, 8 by 8, 8 by 8 italic, 9 by 16 SNSF, Bigserif, Blcksnsf, Block, Bold, Broadway, Computer, Courier, Future, Greek, Hollow, LCD, Medieval, Sanserif, Script, Slant, Small, Standard, Stretch, Super, Thin and Thnserif. All but Greek are variations on the standard IBM character set.

Hercules provides a program called RAMFONT.COM, which loads a selected font file into the board and uses it in lieu of the ROM font. Suddenly all character-based activity is in the new font. If you select Greek, for example, all the characters are displayed in modern Greek script — even Wordstar, Word and all the DOS commands are in the new font.

The fonts vary in attractiveness and legibility, but even if one is not to the user's satisfaction, it can form an excellent starting place for development of a custom font using the DEBUG-like font editor called Fontman.

Animation

One of the demonstration programs provided with the Hercules Graphics Card



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Plus is CHESS.COM, a simulation of a chess board during play. Here each combination of a piece and a square have been defined as a number of custom characters, which combine on screen to create the image. No longer must each square be painstakingly drawn, pixel by pixel — the sub-characters can be fired to the screen at amazing speed. The program does not play a game of chess, it is merely a demonstration using the chess image to demonstrate the way a complex picture can be rapidly constructed and moved.

Asian languages requiring 255 or more custom ideograms could also be displayed with the same technology.

WYSIWYG vs WYSIMOLWYG

Nearly every word processor on PCs claims to be 'what you see is what you get'. Unfortunately, on IBM PCs they are, at best, 'what you see is more or less what you get', though the best packages, such as Microsoft Word, are getting very close to WYSIWYG.

Most packages will only show characters with constant spacing, even if italics, justification, superscript and subscript are shown on screen. If you want to mix 8-point and 24-point type on a line, with most packages the finished product must be imagined or printed — it won't be seen on screen. Even with the limitation of constant pitch, graphics mode must be used if any special character display is needed, which means speed falls right off. Try a page layout package, which really shows the finished product on screen, and learn how slow things can become!

Ramfont offers potential solutions to these problems. Not only can those superscript, subscript, italic and other variations be pre-loaded and recalled at ROM speed, but the potential is there to write software which creates character elements, quickly giving WYSIWYG displays.

Software

Included with the Hercules Graphics Card Plus are drivers for Microsoft Word 3, Lotus Release 2, Framework II and Symphony 1.1. The Lotus driver will display a graph in a small window over the top of the worksheet. The Word driver allows Word to be used in a 90-column by 40-row mode, in addition to the 80 by 25 mode, and the additional speed offered by Ramfont when using italics, super and subscript on screen is really worthwhile.

Compatibility

Time for a quick reminder about the memory map of the IBM Monochrome Display Adaptor, the Hercules Graphics Card and the IBM Color Graphics Adaptor. IBM set aside 4 Kbytes for the video buffer, from B0000 for the Monochrome Display Adaptor, and 16 Kbytes from B8000 for the Color Graphics Adaptor. The EGA buffer overlaps this whole area.

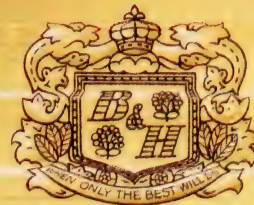
In text mode the Hercules board emulates the IBM Monochrome Display Adaptor, and uses the same memory address. In graphics and Ramfont modes the Hercules needs a lot more memory, and is switched to either the half configuration, using 32 Kbytes starting at B0000, or full configuration, using 64 Kbytes again starting at B0000. Hercules boards use a program called HGC.COM to switch from text configuration to the half or full configuration, or the equivalent code can be incorporated into the application program. A program called SETMODE.COM is used to switch to and from Ramfont modes, and equivalent code can be incorporated within an application program or driver.

In full mode the Hercules video buffer overlaps the area reserved for the IBM CGA, and one or the other must be removed. The same restriction also applies to all the third-party video boards which emulate the IBM CGA, except for Hercules' own CGA adapter. The half mode ensures that, if a CGA is also in the system, the Hercules and the CGA will not conflict over memory addresses.

Software compatibility is a different matter. Software written to use the text mode will run on any mono, CGA, EGA or Hercules board without problems. Graphics software must be written for the individual board — CGA graphics software will not run on EGA or Hercules. Fortunately, most serious packages have for years included support for Hercules Graphics, still one of the finest graphics displays available. On test, the Hercules Graphics Card Plus ran all software written for the previous Hercules Graphics Card, without any glitches or variations in performance.

Do-it-Yourself Graphics

Writing your own graphics software for any Hercules board is not difficult, but the board isn't directly supported by IBM's BASICA. Past Hercules users will be aware of HBASIC.EXE, the patch to BASICA which comes with the board. This allows use of graphics in interpreter BASIC on ▶



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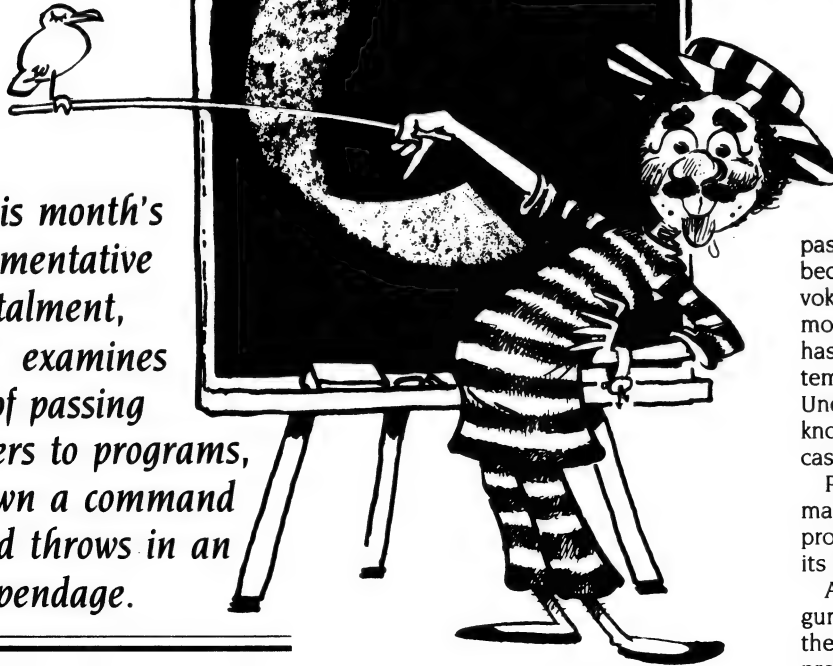
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FOR SMARTIES

In this month's argumentative instalment, Les Bell examines ways of passing parameters to programs, flags down a command line, and throws in an appendage.



argc, argv

THE C LANGUAGE is, of course, designed to operate primarily with the UNIX operating system, and many of its features reflect both demands UNIX makes on the language and opportunities it offers in turn. One of these features is the passing of arguments from the operating system command line to a C program.

Those who have used the CP/M and MS-DOS operating systems will know they pass command-line arguments in the default DMA (Direct Memory Access) buffer, as well as parsing the first two filenames into the default file control blocks (FCBs). The user still has to move one of the default FCBs out of harm's way, as well as parsing the command-line tail.

UNIX is nowhere near as crude, and fortunately (*almost* without exception) C compilers emulate the UNIX behaviour when running under CP/M and MS-DOS.

UNIX passes arguments to a C program through two parameters, in exactly the same way as if the `main()` function was in fact a sub-function of some larger program — which, in a sense, it is. The two parameters which are passed are `argc` and `argv`, which are declared and used in the following way:

```
main(argc, argv)
int argc;
char *argv[];
{
    ...
}

or

main(argc, argv)
int argc;
char **argv;
{
    ...
}
```

Both declarations for `argv` are the same thing: `argc` is the number of arguments on the command line and `argv` is an array of pointers to the arguments, wherever they are in memory.

The number of arguments on the command line includes the name of the command itself. If you write a program called `fido`, and then invoke it with the command line

```
fido arg1 arg2
```

then `argc` will be three. There will be three arguments, called `*argv[0]`, `*argv[1]` and `*argv[2]` respectively. While UNIX actually

passes `*argv[0]` to a program — it has to, because a program could have been invoked under an alias and may need to modify its operation depending on what it has been called — other operating systems may not pass the command name. Under CP/M and MS-DOS, you always know what the program is called, in any case.

Perhaps the simplest example of command-line argument usage is the echo program (Listing 1) which simply echoes its arguments back to the command line.

As an exercise, enter a sequence of arguments — they can be anything — using the `v` command and then run the echo program. See how it reacts.

Take a look at the `printf` line in the program. Why does it have two format strings, `%s` and `%c`? What happens if the `%c` and everything from `(i<argc-1)` through to `'\n'` are taken out? What is the function of the conditional expression `(i<argc-1) ? ' ': '\n'` in the `printf` statement?

Command-Line Flag Processing

Quite commonly, C programs and utilities are controlled by command-line flags, which generally consist of a hyphen followed by one or more letters. Listing 2 is an example of a function which can process such command line. Listing 3 indicates how such a function may be called from a program.

Finally for this month, Listing 4 is a short program which DOS users will probably find handy for modifying `AUTOEXEC.BAT`, `CONFIG.SYS` and other text files. It's called `ATC`, and its purpose in life is to append a line onto the end of the specified file. It works in two ways; you can either type a command like:

```
AT les.tdo
```

Finish off C compilers review which will append the line 'Finish off C compilers review' to the end of the file `LES.TDO`, or you can type something like `AT phones.dir`

C FOR SMARTIES

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The final blank line signals the end of input.

If you try this program, you'll find strange results in certain circumstances and under certain operating systems. First of all, if you type in the line to be ap-

```
main(argc,argv)
int argc;
char *argv[];
{
    int i;

    for (i=1; i<argc;i++)
        printf("%s%c",argv[i],(i<argc-1) ? ' ': '\n');
}
```

Listing 1. Echo Program.

Listing 2. ▷

ended on the command line, you'll find that multiple spaces — for example, to lay out a table — are reduced to single spaces. This is because the command-line processor ignores spaces and works on the words only. Under variants of the CP/M operating system, you will find your line converted into upper case by the CCP (console command processor) before the AT.C program can get to it. Concurrent CP/M and Concurrent DOS convert the line to lower case. To get around these problems, use the program in its multi-line prompting mode. □

```
/* Control flags */
unsigned short lflag, dirflag, timesortflag,hiddenflag;

char *matchstring;
static char dfltstring[] = ("*.");

main(argc,argv)
int argc;
char *argv[];
{
    /* Initialise flags, etc */
    init();
    process_options(argc,argv);

    /* Remainder of program goes here */
}

init()
{
    lflag = FALSE;
    dirflag = FALSE;
    timesortflag = FALSE;
    hiddenflag = FALSE;
    matchstring = dfltstring;
}
```

Listing 3.

```
process_options(argc,argv)
int argc;
char **argv;
{
    int i,j;
    for(i = 1; i < argc; i++) { /* For each word on command line */
        if (argv[i][0] == '-') { /* If 1st char is a '-' */
            j = 1;
            while (argv[i][j]) { /* For each character in turn */
                switch(toupper(argv[i][j])) {
                    case 'L':
                        lflag = TRUE;
                        break;
                    case 'D':
                        dirflag = TRUE;
                        break;
                    case 'T':
                        timesortflag = TRUE;
                        break;
                    case 'H':
                        hiddenflag = TRUE;
                }
                j++;
            }
        }
        else /* If 1st character is not '-', must be a filespec */
            matchstring = argv[i];
    }
}
```

```
/* AT.C - Append line to end of text file */
#include "stdio.h"
#define MAXLINE 128
```

```
main(argc,argv)
int argc;
char **argv;
{
    FILE *outfile;
    char buffer[MAXLINE];
    int i;
    if(argc<2) {
        printf("Usage: at file line");
        exit(1);
    }
    /* open file and prepare to append line */
    if((outfile = fopen(argv[1],"a")) == 0) {
        printf("at: could not open file %s",argv[1]);
        exit(1);
    }
    if(argc>2) {
        /* Line to append is argv[2] through argv[argc-1] */
        /* Start with empty line */
        buffer[0] = '\0';
        for(i=2;i<argc;i++) {
            strcat(buffer,argv[i]);
            if(i == argc - 1) strcat(buffer,"\n");
            else strcat(buffer," ");
        }
        fputs(buffer,outfile);
    }
    else {
        /* No command line, get it from stdin */
        putchar ('>');
        gets(buffer,MAXLINE);
        while (strlen(buffer) > 0) {
            strcat(buffer,"\n");
            fputs(buffer,outfile);
            putchar ('>');
            gets(buffer,MAXLINE);
        }
        fclose(outfile);
    }
}
```

Listing 4. Append Program. ▷

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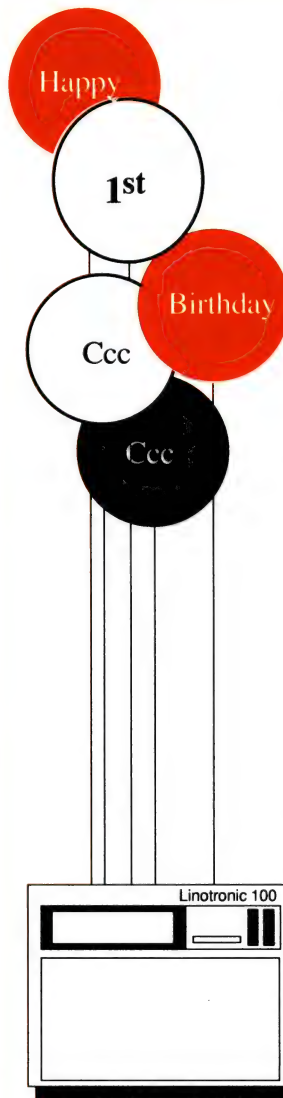
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BYTING PRODOS BACK — PART 2

Stewart Fist takes more bytes of the Apple's ProDOS and reveals how a seedling can take up a whole block in his continuing tutorial on file handling. Read on especially if you've had problems keeping Appleworks files on hard disk . . .

BEFORE WE MOVE ON, let's review the main points made in Part One.

ProDOS allocates disk space in blocks, rather than sectors (there are two blocks per sector). Free space is allocated in a strict sequence from the lower block numbers to the higher and, for this reason, ProDOS itself will always occupy the lowest blocks on a standard floppy. Block six is the bit-map recording which blocks on the disk are in use and the primary directory is at block two, with subdirectories allocated as needed and treated as normal files.

Files are treated in three different ways, according to length. If the files are less than 512 characters long (212 for Appleworks files) they are called 'seedling' files and are stored in only one block. If they are medium length (up to 128 Kbytes) they are called 'saplings', and are stored in

from three to 256 blocks. Larger files are called 'trees'.

When you re-save a file (supposedly writing over one already on the disk), ProDOS firstly writes the whole new file into spare space, and then changes the file header and the bit map to indicate the superseded file is no longer in use.

The bytes preceding the volume (disk) name in the directory block (see Figure 1) indicate: A the hex number of the previous block — \$0000 in this case; and B the block number of space allocated for main directory extension — \$0003 (read the bytes in reverse order, remember!)

The byte preceding each file name uses two half bytes to give us C the storage type, and D the length of the file name. These two half bytes are changed to zero when a file is inactive.

Deeper into the Directory Block

The bytes following the file name in the directory provide a lot of information about how and where data is stored on the disk. Fortunately, Pro-Byter — which printed out the directory in Figure 1 — groups these bytes together to make them more comprehensible.

You'll see in Figure 1, directly to the right of the file name E a single byte F which tells us the file type. ProDOS has made provision for a large number of file types; you can see the major ones in Figure 2.

File type \$19 (the file type of ADDRESS-FILE) is an Appleworks database program, while the SEEDLING file below is from the word-processing section of Appleworks. Apple has made provision for a whole range of file types, from Pascal to Binary ▶

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Includes Viatel software now with Hercules graphics card and teledownload support, and terminal software. Upload and download ASCII, XMODEM, Viatel, or Kermit files, emulate mainframe terminals including the IBM-3101, VT-100, VT-52, TV-910/920, H-19 and more... Windows, colour options, special protocols, the works!

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RS232 version: \$279
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Blast Error Transmission Corrector

Mini Computer Systems,
(03) 528 2711

Price: Not Supplied

A communications software package which eliminates wasted time re-sending corrupted files or blocks of data. BLAST (Blocked Asynchronous Transmission) is a powerful package that allows data communication between more than 100 different computers. Any machine with BLAST can talk to any other machine with BLAST. Useful in satellite communications where re-transmission is costly, BLAST re-sends any corrupted data simultaneously with the main data stream.

Carbon Copy Remote PC Users

Sourceware, (02) 411 5711

Price: Not Supplied

PC support professionals can control and monitor their long-distance user sites on-line using the Carbon Copy remote control package. Designed for the PC/XT/AT range it provides a link up between users which, once connected, makes the remote unit totally mirror the operation of the host and vice versa. Each user can see what the other is doing, allowing long-distance monitoring of operations, diagnoses, software support and a whole host of other functions.

Costcom Construction Costing

T.P.M. Construction, (02) 519 3407

Price: \$2700

Developed inside the construction business for effective control over crucial aspects of management, cash-flow projections, budget administration, orders, sub-contractors payments, client reports, justification of progress claims and memo-writing. Put together in conjunction with builders, it reflects its 'on-the-job' origins, and is menu-driven for easy use. Recommended hardware is MS-DOS with 640 Kbytes RAM, 10 Mbyte hard disk and colour monitor.

Dentics Package for Dentists

Sanyo Office Machines,
(02) 929 4644

Price: *Won't hurt a bit!*

Designed to run on Sanyo's MBC-755 with its in-built colour monitor, this package is set up as a workstation to sit beside the dentist, who can key in information to become part of the patient's record. The information is displayed as colour graphics, which can be explained to the patient. It provides automatic billing and takes care of other administrative and accounting tasks to enable the dentist to keep financial track of the practice. Open wide while I just slip in this disk!

Keytext Document Tracker

AWA Computers (02) 922 3300

Price: Not Supplied

Designed for operation inside the PICK operating system, Keytext is a system which automatically builds and maintains interactive on-line indices, enabling you to combine words and phrases to instantly retrieve relevant documents. Aimed at users who have a need to constantly search numerous files such as word-processing documents, reports, price lists, financial statements and even technical reports.

Lewis Letter Magic

Custom Made Software,
(02) 399 8566

Price: \$478

From Dr Geoffrey Lewis — who gave us Cross Cheque and Pay-Pack — comes a new gem called Letter Magic. It will enable you to write and print a complete standard letter with only five key-strokes. If you are writing a one-off letter, you start with the date, name and address immediately inserted. Full mail-merge and label-printing facilities are included. With only the commands needed to write short letters, it is easy to use and uncluttered with seldom-used functions.

New Educational Software for IBM JX

IBM Australia, (02) 923 5847

Price: Not Supplied

Three new educational packages developed by Active Learning Systems of Byron Bay, NSW, and marketed by Big Blue. Designed to both teach a subject and make computer-learning painless, the three programs are One World, Australia — A Profile, and Home-

town. One World makes the study of countries thorough and interesting. It has a database containing demographic, political, economic and geographical information about many countries which lets students gain a better understanding of similarities and differences in the human situation. Australia — A Profile was developed to encourage students to learn to use computers to analyse information, draw conclusions and facilitate the study of patterns of geography and demography in Australia. The data was compiled from the Australian Bureau of Statistics. Hometown assists students to undertake research into aspects of their local community. It provides a ready-made framework so students can store, analyse and compare information collected in field surveys. Areas include age, sex, occupation and housing. The package also provides for nine 'open fields' so students can store data specific to their local community.

New Hi-Tech C Compiler

Hi-Tech Software, (07) 38 3852

Price: \$250 (Z80),

\$300 (MS-DOS or CPM/86)

A new version (3.02) of the Hi-Tech C compiler with new features including much improved error handling and reporting. When a syntax or semantic error is detected, the source line containing the error is displayed and the point within the line at which the error was detected is noted. It is also possible to redirect the error message to a file or the printer. When generating assembler output, the C source lines are interspaced with the assembler code. Installation for hard disk is included.

Pass Key

Inteldata, (03) 878 7440

Price: \$49

A self-contained software package that unlocks the information you need to design password security for your programs, files and on-line operations. The software contains a tutorial on detection techniques, algorithms to test your codes and assign access difficulties, plus a stand-alone program that may be incorporated into existing software. For the Macintosh or IBM.

PC-Eighty CP/M to MS-DOS

FBN Software, (062) 86 1102

Price: \$120 including V20 chip. PC-Eighty allows users of CP/M 2.2 to run their old software on MS-DOS machines. Using NEC's V20 chip in place of the CPU chip (the only hardware change needed), it allows users to move their existing CP/M operating systems to their PC and run applications as a 'task' in the new environment. DOS-resident programs such as Sidekick can run under the system. The program allows for a full 64 Kbyte CP/M system with a RAM disk of up to half a megabyte, and optional use of a hard disk.

Softlogic Disk Utilities

SNS Leading Edge, (02) 958 2399

Price: \$120

Four new disk utilities from the US. Disk Optimiser, Cubit, Carousel and Double DOS. Disk Optimiser re-organises hard disks so all empty spaces are moved to the back of the disk and files are rearranged in the front of the disk. This increases the disk access speed. Cubit squeezes files before writing them to disk, then expands them before retrieval. It also works on cassette files. Carousel allows up to 10 application programs to be loaded and run simultaneously. Each time the user switches from one application to another (by simple key-strokes), Carousel unloads the current application from RAM into allocated storage space and loads the new one. Double DOS allows the user to run two software applications side by side. A background application such as printing a spreadsheet can continue while you work on a word processing file, for example. Buy all four utilities and get a discount.

Peripherals and Extensions

Hercules Graphic Card Plus

Sunshine State Scientific,

(07) 52 9522

Price: \$654

This new board dramatically speeds up the display of multiple

NEW PRODUCTS

fonts on the IBM PC, and enhances such applications as Lotus, Symphony and Microsoft Word using software drivers developed by Hercules. It uses a new hardware mode called RamFont, which combines the speed and simplicity of text mode with the flexibility of graphics mode. Ramfont enables software publishers to customise their programs and display multiple fonts as easily as older cards display monochrome text. With RamFont, Microsoft word can now display italics, boldface, superscript and subscript at the speed of text mode — more than four times faster than without. 24 fonts may be stored in RamFont including scientific characters, foreign-language characters and special graphics symbols. Described as an ideal tool for 'What You See is What You Get' appli-

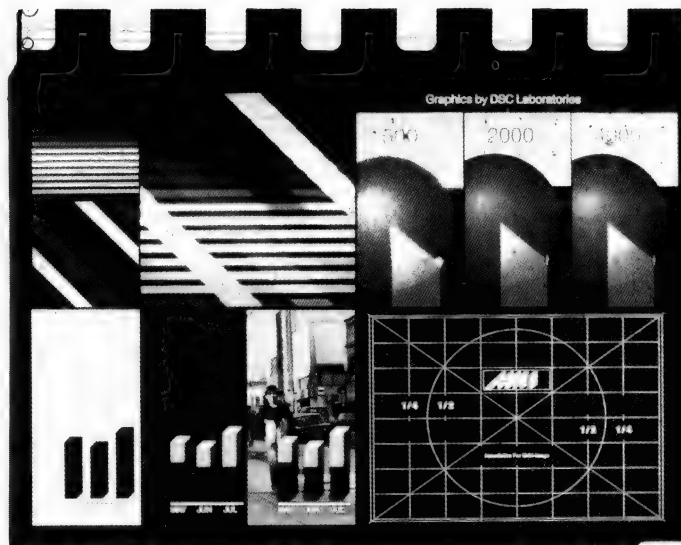
cations in in-house publishing. Character size may be varied from four to 16 pixels high and from eight to nine pixels wide.

High-Capacity Winchester Sub-system

Alloy Australia, (03) 561 4988

Price: Not Supplied

This high-speed, high-capacity hard-drive sub-system enables IBM PC/ATs to be instantly converted to network file servers. The ID-106's 125 Mbytes of storage has an average access time of a mere 30 milliseconds, achieved through the incorporation of a rotary voice-coil actuator which guarantees error-free operation in even the most intensive disk-accessing activities. Disk caching provides further increases in retrieval speeds by enabling commonly used information to be held in memory. ▽



Jdiskette

Minicomp, (02) 957 6800

Price: Not Supplied

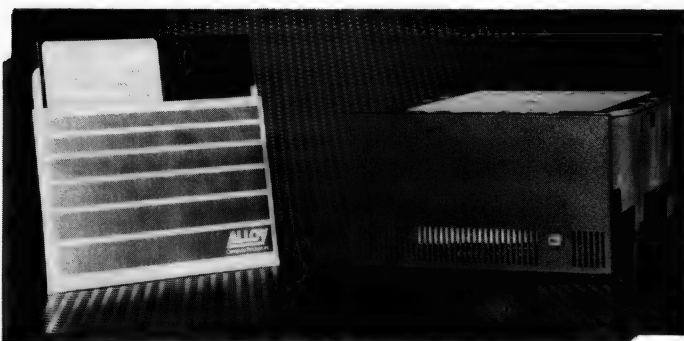
Jdiskette is a combination of hardware and software which turns your PC disk system into an AT system. The controller card replaces your current card and is designed to support dual speed 1.2 Mbyte drives. Jdiskette lets you format, read and write the IBM AT format on high-density diskettes and supplies all the software free.

Jlaser Plus

Minicomp, (02) 957 6800

Price: Not Supplied

Drive your laser printer at its maximum speed by by-passing the standard buffer and controller, sending data direct to the 'engine'. You'll be able to print full-page graphics of 300 dpi resolution with unparalleled speed. With Jlaser Plus, the computer can transfer 1.8 Mbits per second, bypassing the speed limitations of standard communications. An optional scanner interface cuts a standard page scan from 40 secs to 15.5 secs. Available in eight- or 16-bit models for PC/XT/ATs. ▽



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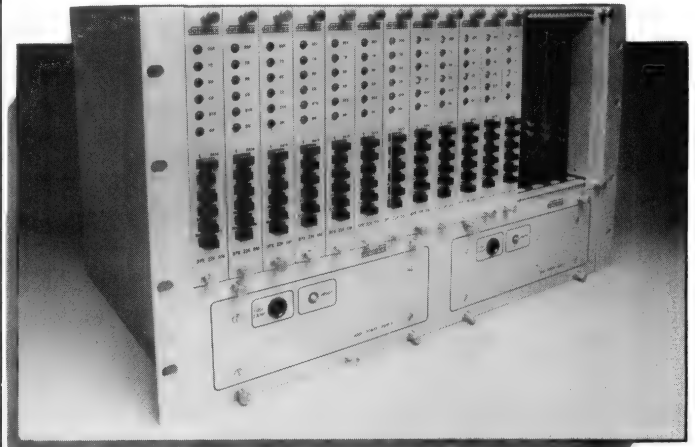


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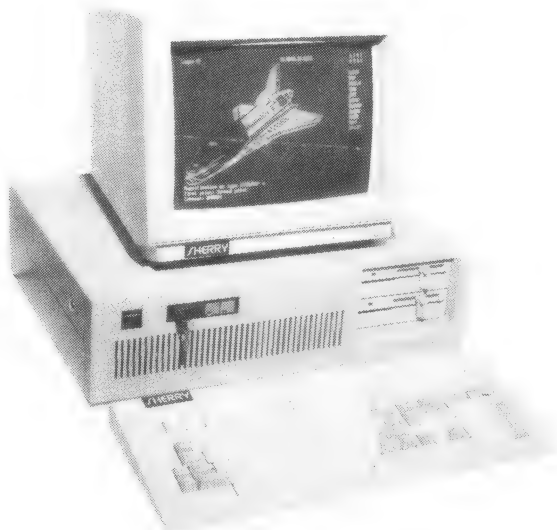
Modem Racking System

Dataplex, (03) 735 3333

Price: Rack \$1680, Cards \$1800

A racking system designed for applications requiring multiple modems. It offers a reduction in the number of lines and modems needed to support multiple-speed dial-up systems. The 16-slot rack features dual redundant


power supplies and is ideal for crowded computer rooms. It can handle all standard CCITT speeds from 75 to 2400 bps. The DPX-244, Australian built modem includes auto speed, auto dial, speed change, auto answer, Hayes compatibility, call timing, error correction and security callback.



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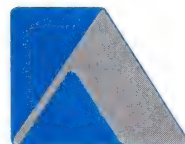
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IRAM2

Minicomp, (02)957 6800
Price: Not Supplied
Available with either 512 Kbytes or 2 Mbytes of memory and the software drivers, this board takes the place of an additional hard disk for many applications, offering up to five times the speed of a hard disk. Driven by a program called Jetdrive and supported by Jspool for print spooling, it is designed to run under PC-DOS 2.0 or higher. Both software packages may be purchased separately.

Services

Manual-writing Service

Plato's Communication Services,
(03) 232 0493
Price: Varies
Good at writing the software but lack the pencil-pushing skills to compile a manual? Nicholas Romas of Plato's Communication Service may be able to help. Working closely with the programmer, Plato's will produce a software manual with a professional standard of editing and up-dating. ▶

Rent A Plotter

Tech Rentals, (03) 879 2266 and in other capitals.
Price: Not Supplied
Hewlett Packard's HP7550A high-speed plotter has been added to the range of equipment available from Tech Rentals. Equipment of this nature is often beyond the reach of casual users and short- or long-term rentals could save you a bundle. Other such esoteric items as digitising oscilloscopes are available. ▶

Videodisc Training

Syme Information Technology,
(03) 698 6353
Price: Not Supplied
The first Australian release of business training packages in interactive PAL videodisc, designed to run on IBM or compatible machines, linked to a videodisc player. The packages use computer graphics overlays on background video images. The first packages cover 33 subject areas including marketing and selling techniques, effective writing, interviewing skills and others.

Miscellaneous

Experimental 'Brain Chips'

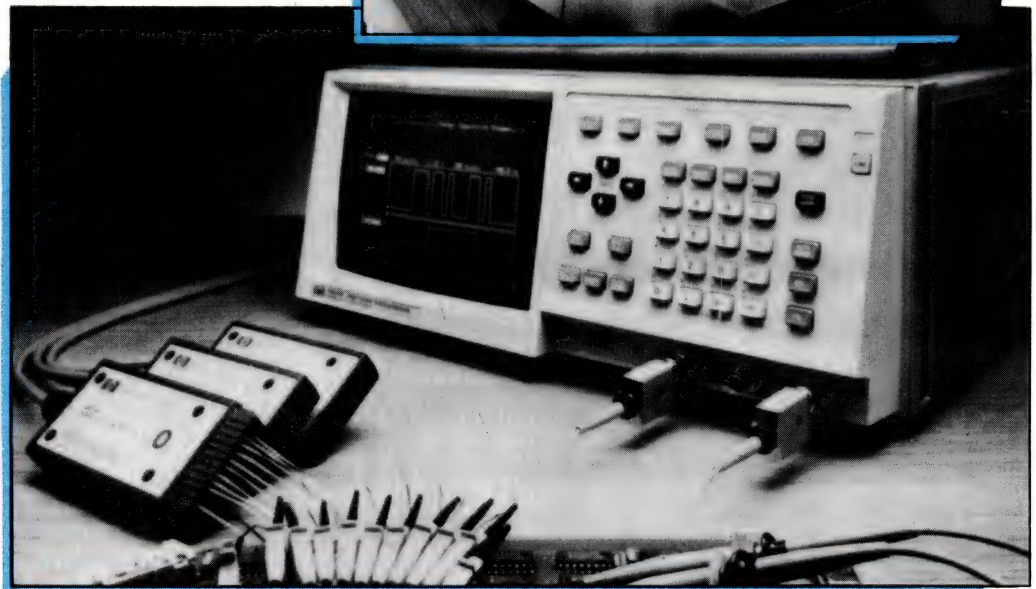
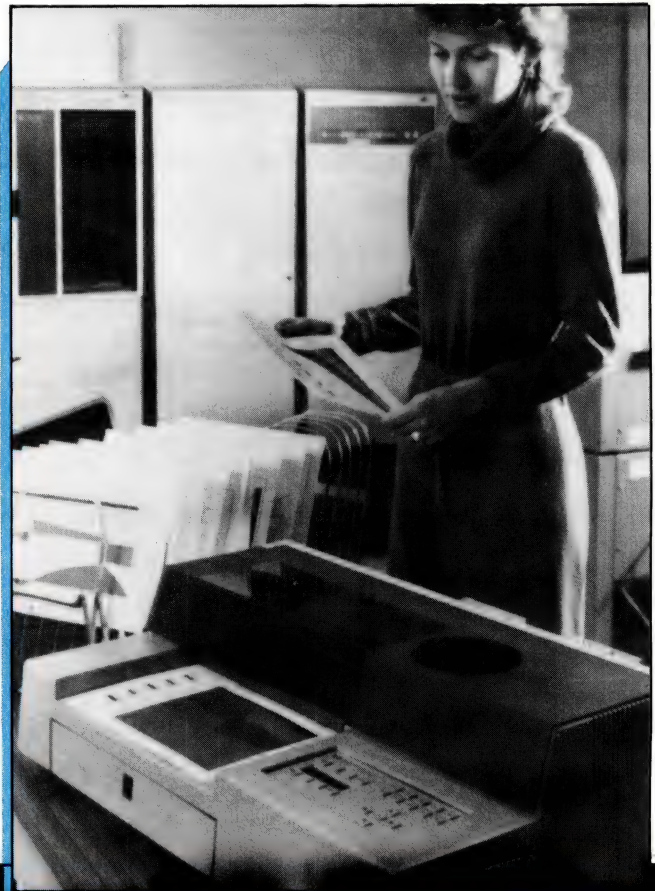
AT&T Bell Laboratories
Not yet a product as such, but not far off. Currently under test in USA is a new design of chip called electronic neural networks (ENNs) — compact and highly interconnected networks of many simple components, such as resistors and amplifiers. Like their living counterparts, these artificial 'neurons' function continuously and collectively to obtain quick answers. The most complex chip so far — 256 electronic neurons — contains 25,000 transistors and 100,000 resistors.

Fire-proof Cabinets

Chubb Australia Ltd (02) 699 3100
Price: Not Supplied
Described as the best thing next to your computer, the Chubb

CS090 Micro Cabinet protects floppy disks and other media not only from the most intense fires but also from dust, static, magnetic fields, humidity, unauthorised access, pilferage and acci-

dental or malicious damage. Tested in Germany at temperatures of up to 1090 degrees Celsius for over thirty minutes, the inside temperature of the CS090 didn't budge past 30 degrees. ◻



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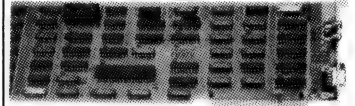
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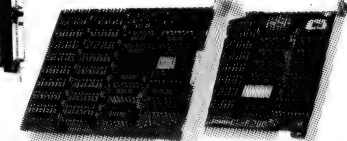
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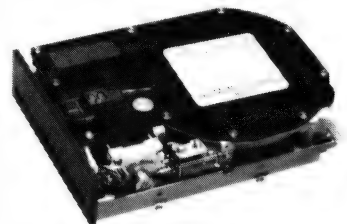
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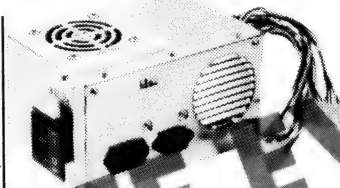
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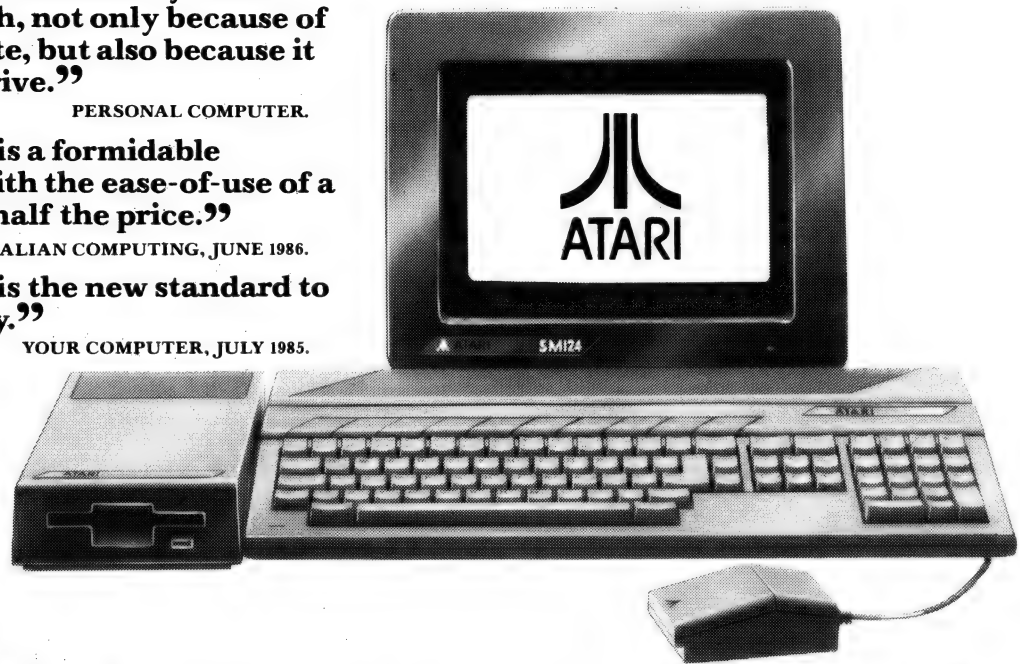
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Disk Drives

ONE OF THE annoying things about the C64 is its disk drive. The much maligned 1541 is painstakingly slow and prone to costly head mis-alignments. It does, however, have a couple of things going for it. Firstly, it stores 170 Kbytes of data — a respectable amount for a single-sided, single-density floppy. Secondly, it is the only drive on which 100 percent of C64 programs will work.

The latter is the main reason why Commodore is still able to find a healthy market for these drives, I suspect. The Skai and MSD alternatives are hampered by the fact the 1541 has proprietary ROM routines inside it. Their drives may emulate a 1541, employing the same DOS commands and track and sector layout, but copyright laws require their internal operating routines do not exactly duplicate Commodore's.

The subtle differences wouldn't be a problem were it not for the fact many software houses rely on quirks of the 1541 for their protection schemes. If you've ever used Easyscript you will have heard that famous 'knocking' noise as the program loads. This is part of Easyscript's protection scheme: hidden errors are written onto the disk and the loader program tries to read those errors. If it doesn't find them, it assumes you have a pirated copy and locks up your computer.

The only problem with this form of protection is it is hard on the 1541. Its inbuilt DOS responds to most disk errors by attempting to read that section again. The head crashes onto a base plate (to reset its position) and then steps out to re-read the error-causing track. It attempts this several times before it gives up and reports an error to the computer (the report the Easyscript loader is waiting for). Each time the head hits the base plate it is susceptible to a slight mechanical shift which may throw it out of alignment.

Easyscript was written in 1982 and uses a fairly simple form of protection. Since then we have seen the arrival of increasingly sophisticated piracy programs, and each advance in piracy techniques has brought an increase in the sophistication of the protection schemes. I suspect the software houses are fighting a losing bat-

Even Commodore's own 1571 disk drive, which is theoretically compatible with the 1541, will not load some of the protected 64 programs because of the ROM differences! The clear loser has been the average honest user. Our poor 1541s keep going out of alignment, and it's not just costly, but downright inconvenient having a drive in the repair workshop.

tle with all of this, but the clear winner has been Commodore, whose 1541 is the only drive which can run all the protection schemes, and thus, all the programs. Even Commodore's own 1571 disk drive, which is theoretically compatible with the 1541, will not load some of the protected 64 programs because of the ROM differences! The clear loser has been the average honest user. Our poor 1541s keep going out of alignment, and it's not just costly, but downright inconvenient having a drive in the repair workshop.

For all fellow sufferers, here's a tip which may save you trauma. One of the common sources of disk errors is caused by attempting to load programs that use half-tracks. Half-tracks are tracks halfway between the standard ones. After loading a program which uses half tracks as part of its protection, it's quite easy for your drive to end up stuck in 'half-track' mode. Even turning it off and on will not reset it.

If your drive is issuing lots of READ and WRITE errors, this could be the problem. Before sending it in for repair, try format-

ting a disk without having a disk in the drive. You can do this by typing:

```
OPEN 15,8,15:
PRINT#15,"NO:NAME,ID":CLOSE15
```

The drive will make a bit of noise, but that's because it's encountering errors (no disk inside it), and each error is causing it to reset itself. You are trying to knock it out of 'half-track' mode. I actually got this tip from someone who fixes out-of-alignment 1541s. He reckons 'half-track' errors cause about 50 percent of 1541 head mis-alignments. On his advice I tried it when my own drive went wonky and it worked beautifully!

The 1201 Monitor

Most users who upgrade to a 128 eventually want a monitor which works in 80-column mode. The colour monitors start at around \$400, but since there is little software exploiting 80-column colour, you would be wise to consider a monochrome monitor. You can use these in both 40- and 80-column modes, and the cheaper ones are quite affordable.

I'm using a Commodore 1201 amber monitor as I write this. It costs around \$200 and is perfectly adequate for most purposes. It suffers a little due to its compensating circuitry which limits its total brightness. Because of this, it works best with dark border, dark background and bright text; if I make the border bright, the text dims. I use it for 80-column word processing and 40-column telecomputing and I'm quite happy with it. It's also light and easy to carry about, with the 128D in my other hand.

There are more expensive monochrome monitors about, and I'm sure some of them improve upon the 1201, but it's really a question of horses for courses. One thing I have noticed is Microbee Systems sells a monitor that looks identical to the 1201, except it has a built-in 12-volt power output and no provision for a loud-speaker. It's a fair bet both monitors originate in the same factory, so performance should be identical. If you can live without the sound, you'll find the Microbee monitor is considerably cheaper, retailing at \$140 for a green screen and \$150 for amber. □

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A FEW QUESTIONS have been asked about the PAMS Registry, so to clear up any misconceptions regarding how it is run, and why, a quick summary follows.

The Registry has been formed to provide a central point for all bulletin boards to be listed, along with their system details. It is run by me, and the running costs (stationery, postage and so on) are paid for by AED.

The lists are available to anyone; David Lutz from Teledata, for example, has arranged for the PAMS area there to receive the registry files (I get the pleasure of uploading them).

All that means is that, as long as all the system operators co-operate, we will eventually have a real-up-to-the-minute (well almost) PAMS list that everyone can and should use.

In case you'd like the lists, but don't want to download them, Select Software (see the company's advertisement in this issue, for details on how to order) has added the PAMS list disk to its public domain software library; ask for disk number CP107 (for CP/M) or M107 (for MS-DOS). Select Software will get monthly updates from the registry.

Because the Hi-Soft RIBM has shut down, the registry in Melbourne will now be looked after by John Blackett-Smith, sysop of The National FIDO BBS, with Rowan Stevens helping to keep tabs on the Melbourne systems (*Thanks guys!*).

The sysop of the Brisbane registry, Hi-Tech BBS' Clyde Smith-Stubbs, went to the United States just as the registry sent out the first dispatch, so by now the files should be available for access in sunny Queensland.

Don Crago and Grayham Smith of The Electronic Oracle, are looking after South Australia; and Graeme Platt of NEMO is keeping an eye on the Western Australian front (are we going to keep the Cup, Graeme?).

Crosstalk XVI —

Fix that Answer Back

Prophet and other Systems send out a ^E (ENQ ASCII character) when the system is ready for you to enter your name. Crosstalk and other terminal packages respond to this by sending a preset string of characters.

Using the defaults in Crosstalk ends up with a log-on name of 'Crosstalk — XVI John Smith', which isn't very effective and generally results in deletion of your log-on account when the sysop sees you.

There are two ways to fix the problem,

set the ANSBACK option to off (page 51 of the Crosstalk manual) or set function key # 4 to your real name. Just a reminder — save the options or you'll have to remember to clear the thing every time you use Crosstalk.

Security

One of the things that never ceases to amaze me is the way a normal (read sane, but then computer people are all nuts)-person logs on to a bulletin board system and proceeds to tell all and sundry what equipment they have. If we translate this into real life, it could be likened to walking down the street and telling a total stranger what computer you have, where you live, the PIN to your bank account, and giving them the key to the door!

Be careful. Most boards, including Prophet, require you to register by giving a name, address and contact phone number for use by the sysop. Some boards, including Prophet, allow you not to have your suburb displayed on-line, and even allow you to use a pseudonym when accessing the system.

This doesn't mean you can't enjoy using all bulletin board systems, just exercise a bit of common sense, and remember to keep a record of your computer details (serial/model numbers), in case you are unlucky enough to be robbed. Also, make sure you are insured — it might not look like much, but wouldn't it be costly, if not impossible, to replace?

PAMS List Updates

ACT

■ The Professional Computer Users' Group Inc (PCUG): phone (062) 58 9967; supports all baud rates; runs 24 hours, seven days; FIDO access — Mem/LVA; sysop is Alan Salmon.

New South Wales

■ Adventure Line C-64 BBS: phone (02) 636 9027; weekdays 2200-1700, Reg/VA; weekends 2200-0800.

■ Australian Connection BBS: phone (02) 625 4418; 24 hours public access.

■ Blackboard TBBS: phone (02) 526 1343; 24 hours, Reg/VA; sysop Will Black.

■ Freecom C-64 BBS: phone (02) 525 0051; 24 hours, Reg/VA.

■ Realtors FIDO-Net: phone (02) 387 5335; 24 hours; V22 B103, 212.

■ Renegade FIDO-Net: phone (02) 631 2715; 24 hours; all baud rates; sysop Sam Sarkis; public access.

Corrections:

Abcom RIBM supports V22 (1200 baud).

CCUA C-64 BBS now requires membership.

Computer Connection hours are Week-days: 1700 — 2100; 1600 Saturday through until 0900 Monday.

Frontier Systems now running FIDO and supports V21/22/23 B102/212.

Palantir C-64 BBS supports V21/22/23.

Sentry now runs FIDO and is Mem/VA

Name changes:

Hackers Haven C-64 now Fantasy C-64.

Off-line:

Appletech — Status unknown.

Irata BBS — Status unknown.

Victoria

■ ABE: phone (03) 288 3599; 24 hours; V21/22; public access; sysop Richard Gardiner.

■ ABBACUS: phone (057) 83 1964 — details unknown.

■ Atlantis RBBS-PC: phone (03) 277 6824; 24 hours; public access; sysop John Edwards.

■ AUSOM: phone (03) 877 1990; 24 hours; public access; sysop Grahame Willis.

■ C-64 BBS: phone (03) 489 4555; 24 hours; public access; sysop Alan Miles.

■ Colour C-64 BBS: phone (03) 579 2147; 2300-0800 daily; public access; sysop Alard Eales.

■ Commodore Board: phone (03) 875 1023; 2200-0800 daily; public access; sysop Keith Jarvis.

■ Macboard BBS: (03) 435 9152; 24 hours; V21/22; public access.

■ Microlink: phone (03) 233 0230; details unknown.

■ Public Resource: (03) 690 7220; 24 hours public access; sysops D. Harvey, W. Clarke and R. Nagy.

■ Termicomnet: phone (03) 589 1692; 24 hours; public access.

■ Thunder-Net Amiga: phone (03) 791 1124; 24 hours; public access.

Corrections:

Microbee RCPM: phone (03) 82 1571; sysop Mike Thompson.

Off-line:

Hi-Soft BBS — Permanently shutdown.
Melbourne PIE BBS — Status unknown.

Queensland

Correction:

Brisbane Microbee Users' Group Bulletin Board (BMUG-BBS): phone (07) 38 4833; V21; 24 hours daily; public access; sysop Graham Scott.

Please report any changes or new listings to: Australian PAMS Co-ordinator, Prophet Bulletin Board, PO Box E41, Emerton 2770. Electronic address: ACSnet prophet@runx; Teledata prophet; BBS (02) 628 7030. □

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The Baby Beeb

I'D HOPE TO play with Lego again this time, but the arrival of the Baby forced a postponement. I suppose I'll get used to calling the new Beeb the Master Compact, but at the moment that sounds more like the result of mating a small American car with a CD stereo system. Such is progress.

For a cut-down version of the BBC Master, it certainly has more features than we were led to believe: if a word-processing system is your main requirement, it would be excellent value with View 3.0 as well as the 640 Kbytes-per-disk Advanced Disk Filing System. By any standard View 3.0 is a great word processor, which now really is — dare we say it? — free of bugs and bad habits. There's also the ABC word processor for beginners. Although unnecessarily gimmicky, it would probably be popular with sub-teenage users.

For people not wanting to hang hard disks, temperature probes, turtles or dishwashers off the banks of peripheral ports you find on other BBC machines, it offers an economical alternative which might be hard to overlook. The RS232 port (not RS423, note) will allow you to connect goodies like modems, plotters, serial printers or whatever takes your fancy, and the normal Master's Econet upgrade will make it a very attractive machine to those not needing all the features of the Master ET. Naturally a parallel printer port is supplied as standard.

The Compact's BASIC 4 has been upgraded to run even faster than the standard Master's. What you don't get are the user port, 1 MHz bus, DFS, Tube, cassette, clock, analogue port or UHF video. The last is certainly no great loss, but the lack of a user port will prevent the use of the Lego interface, Concept keyboards and so on, unless peripheral manufacturers come good with the appropriate plugs.

What you *do* get that isn't in the standard Master is an edge connector carrying useful lines from all over the machine, a digital joystick/mouse port, View and

For people not wanting to hang hard disks, temperature probes, turtles or dishwashers off the banks of peripheral ports you find on other BBC machines, it offers an economical alternative which might be hard to pass by.

Logo. The last two are supplied on disk rather than in ROMs. Once loaded into sideways RAM, they're just as accessible as the ROM-based versions we've been used to. The battery-backed RAM is still there to save your configuration status.

Whether the Compact's separate keyboard is a blessing or a nuisance is very much a personal preference: I love separate keyboards, but I hate the leads. Not one to be easily satisfied, I also detest cordless keyboards, because whenever you squirm into a comfortable position you inevitably lose communication between the keyboard and the main box. The Compact — perhaps due to someone's feelings of insecurity — has three leads, and is therefore thrice damned. However, my dislike of the physical arrangement was immediately dispelled when I began using the keys: they're an absolute delight. Not only are they lighter to use than the Master's, they're quieter.

Choice of Drives

In the UK you can have a Compact fitted with any sized disk system you like, as long as it's 9 cm; but it looks as if 13 cm drives will be offered in addition to 9 cm models in Australia. With all BBC software currently on 13 cm disks, this certainly makes sense, even though most major educational software publishers (such as 4Mation, ESM, and Jacaranda) will be publishing on 9 cm disks.

The 9 cm drives are superb. Having

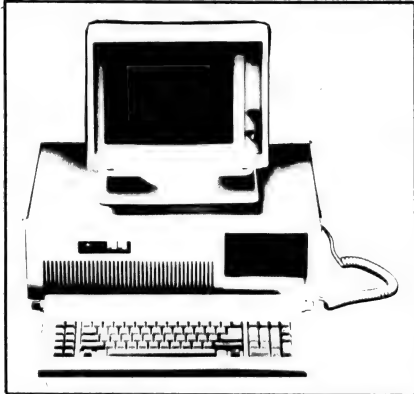
spent a fair bit of time flogging an IBM IX into life of late, I was almost convinced all 9 cm drives are noisy and slow and should be designated official disaster areas. It's a real pleasure to use the Compact's disk system: not only does it clip 25 percent off the time taken by a 13 cm DFS system to transfer data to and from disk, it is also very quiet. A typical *SAVE time for a 60 Kbyte file was 5.9 seconds, or about half the time taken by an IBM IX — and the furniture didn't even rattle. I would strongly recommend purchasing twin drives, if only to save your sanity when backing up disks. The *BACKUP facility requires 38 disk swaps to copy a disk — there must be a better way!

The Compact comes with one disk of demonstration software (nice to look at on a colour monitor, but pretty useless) and a great disk containing applications, utilities and entertainments. There's a Mac-lookalike desktop for those who enjoy using a \$1330 computer to imitate a \$13.30 calculator or a \$1.33 wristwatch. There's also a painting utility that is a pain to use because of its dependence on cursor keys. The kids switched to Aqua Attack after two frustrating minutes. Wreaking havoc on the seabed was entertaining for about a quarter of an hour, but it was Logo that took over for the rest of the weekend.

Likes and dislikes? The disk system and keyboard are definitely likeable, as is the inclusion of View 3.0 and Logo. My chief dislike in any machine is incompatibility with its ancestors. As far as software is concerned, this is not a problem with the Compact. But frustration is around the corner for anyone running the new beside the old, as nearly all connectors are different: only the RS232 and RGB connectors are the same.

At a price of around \$1330 plus tax, including a disk drive, it is certainly good value for people needing the most useful features and all the compatibility of the Master, without the frills. □

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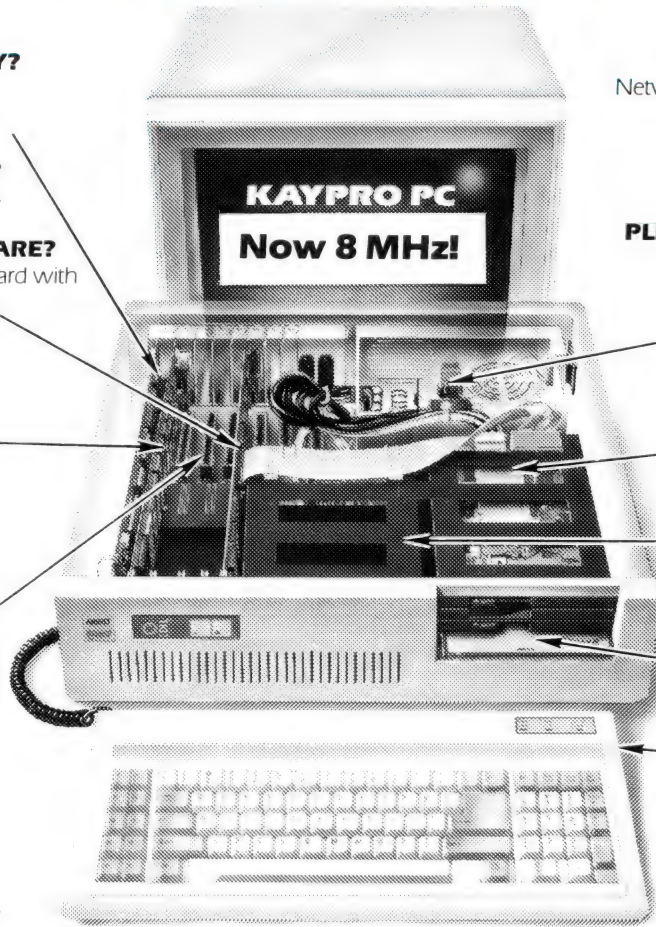
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ONE OF THE little-known aspects of DOS is the Environment. DOS consists of three files: in the PC-DOS variant they are IBM-BIO.COM, IBMDOS.COM and COMMAND.COM, while the MS-DOS equivalents are TBIOS.SYS, TDOS.SYS and COMMAND.COM.

Loosely speaking, the guts of PC-DOS and MS-DOS are in IBMBIO.COM and IBMDOS.COM, or TBIOS.SYS and TDOS.SYS. COMMAND.COM is the command processor which, among other things, accepts the commands typed at the prompt and processes them for action by the lower levels of DOS.

COMMAND.COM needs an area in which it can 'remember' things. Have you used the PATH command to set a path for DOS to search and find the programs you want to run? Is your screen prompt customised with the PROMPT command? In both these cases, DOS inserts a string into the environment to indicate the current setup. Want to inspect the contents of your environment area? Just enter the command SET with no parameters, and the contents of the environment will be displayed.

Setting the Environment

Additional strings can be inserted or modified by the user with the SET command, and programs can also insert, modify or remove environment strings. The environment expands as required, as long as no resident programs (like Sidekick) have been installed. With resident programs, the environment can't expand beyond 127 bytes, although if the environment is already larger than this *before* you load your program, that's okay.

Take a look at your environment now. Type the command SET, and at least two lines will appear on screen.

```
A: >set
```

```
PATH=
```

```
COMSPEC=A: COMMAND.COM
```

Even if the user has not set a path, DOS needs to be aware of this, and so the first line tells DOS no path has been set.

That second line? COMMAND.COM has two components. One of these, called the transient portion, is overwritten by application programs which need a little extra memory. It must be reloaded from disk when the application program terminates and the command processor is again re-

quired. Now you know the reason for the command 'Insert COMMAND.COM disk in drive A: and press any key when ready' which often appears on a floppy system.

Having to insert a boot disk into the A drive is a real pest for users of hard disks, who would prefer to be able to reload a copy of COMMAND.COM from the hard disk. The COMSPEC= string tells DOS in which drive and directory COMMAND.COM can be found and from which it can be reloaded. It can be changed with a command like SET COMSPEC = C: DOS, though with some 2.x versions of DOS this is not always successful.

Let's change the environment a little. Enter a path yourself, like this one:

```
A: >PATH C: UTILITY;C: NORTON;C: DOS
```

From a batch file or from the command line enter a variable name and a value for that variable:

```
A: >SET REFLEX = HERC
```

In this case, when the program REFLEX is used with a Hercules board, it looks into the environment for a variable called REFLEX. If it has the value HERC, then the video is aimed to the Hercules board rather than the more common Colour Graphics Adaptor. Now we're in the swing of things, add another two lines:

```
A:>SET ANSWER=XXXXXXXXXXXX
```

```
A:>PROMPT $p$g
```

Entering the SET command now without any parameters shows the new contents of the Environment:

```
A: >SET
```

```
COMSPEC=A: COMMAND.COM
```

```
PATH=C: UTILITY;C: NORTON;C: DOS
```

```
REFLEX = herc
```

```
ANSWER = XXXXXXXXXXXXXXX
```

```
PROMPT=$p$g
```

Why that line starting with ANSWER? In the past I have mentioned the use of ASK.COM and SETERROR.COM to allow a batch file to give a message to the user and accept input from the user. They set the ERRORLEVEL accordingly, which allows a later command in the batch file to take variable action dependent upon the user input.

The only problem is user input is limited to one character. A longer string, such as a filename, can't be input. What if you could insert a string into the environment at boot-up, use a utility program to pass a message to the user, accept input and modify that environment string? Then a

later line in the batch file can retrieve the modified string and act upon it.

A neat little program called INQUIRE.COM, crafted in assembler by Mark Irving, of Drummoyne NSW, will do just that. I've put a copy of the program on the Your Computer Bulletin Board on (02) 953-8074. It is invoked with the line in a batch file:

```
INQUIRE message
```

This displays the message, accepts up to 12 characters of user input, and modifies the ANSWER = xxxxxxxxxxxx line previously inserted in the environment to ANSWER = message. The contents of an environment variable can be retrieved in a batch file with the syntax %VARIABLE%.

An example might clear up the fog I'm sure is developing. Make a batch file called TEST.BAT, containing the following commands:

```
echo off
```

```
set answer=XXXXXXXXXXXX
```

```
INQUIRE Show directory of what filename/type?
```

```
dir %answer%
```

```
echo on
```

INQUIRE.COM must be in the default directory, or be able to be found through the current path.

Run this batch file. When prompted, enter the specification of the files you want listed, such as F*.*. INQUIRE reads your response, and replaces the xxx... in the environment with it. The fourth line of the batch file reads out your response from the environment and acts upon it.

Unfortunately, space precludes me from showing complex applications. Any samples must be cut to the bone, and the briefest of pointers to possible uses of the topic in hand are the most that will fit. In my July *Your IBM* column, I showed how to use Turbo Pascal to write filters which could be piped through DOS. The filters themselves were not important and the application (printing a Wordstar file) was even less so. What was essential was the discussion of compiler directives and buffer sizes. The application was selected on the basis most users would have a Wordstar file available to test the examples, not that it was a desirable way of printing Wordstar! Here, the four-line sample batch file could be expanded into line after line of devious code, and I am sure many of you will do just that. □

Icebergs Ahoy!

I SUPPOSE change is inevitable in all aspects of life — but I sometimes wish the computer companies would slow down their race a little and give us all a rest for a while.

It's the new system software for the Mac which has brought on this rash of conservatism — I normally welcome each new software release with a cry of joy, but this is about the thirty-third time I've had to update all my software with a new system and it's no longer fun.

I've spent a laborious couple of days installing Finder 5.3 and System 3.2, which are the latest — but the rumour mills are already churning out that System 3.3 is on the way.

Apple has gone through three versions of Finder in as many months, and despite the fact that the Mac Plus has only just appeared in reasonable numbers, there are already two (or more) versions of the new 128 Kbyte ROMs circulating in Australia.

I suppose we've got to expect problems associated with substantial changes such as the recent swap from the old MFS (Macintosh File System) to the new HFS (Hierarchical File System). HFS was definitely needed to handle the new 800 Kbyte floppies and Apple's 20 Mbyte hard disk (HD20).

Unfortunately, the price we pay for keeping the Mac user-friendly is in having extremely complex systems software. Whenever substantial changes are made, we must expect a period of bugs, malfunctions and crashes. It's a fact of life; we don't have to like it, but I guess we must learn to live with it for a while.

There's no doubt Apple is having trouble finding the bugs in HFS; the company wouldn't constantly be changing its System or Finder if it wasn't. On the ROM front, Apple says the difference between Version 1 and 3 (Version 2 didn't ever make it here!) is a "patch for the SCSI port", but there's probably more to it than that.

The problem is compounded by the fact that an increasing number of users now have access to Laserwriters, the Hard Disk 20 and Appletalk networks. Unfortunately, the combined complexity of hardware, ROMs, system, utilities and applications software has almost reached critical mass. A user-explosion is imminent unless everything is allowed to cool down a bit.

If you are a new or old Mac user buying new software, you must be prepared to check for incompatibility and instability for some time to come. Deal only with a retailer who will promise to replace, exchange or refund on software that doesn't work up to expectations.

We are at the stage where the difference between System version 3.1 and version 3.2 might be inconsequential for some users, and soul-destroying for others. It's become the luck of the draw — "What works with what?" — and there's very little being published to guide us.

If it Works — Don't Change It

Unless you've got a real need for the HFS file system, it is probably best to stay with the combination of the Finder 4.1 and System 2.0. This is what both Apple and commonsense suggest, although some people are said to be using the HFS system on old Fat Macs without any problems, even though they lack part of the necessary code which is only found in the new ROMs.

If you intend adding new systems to your disks, remember every higher version of Finder has an increased requirement for disk and memory space, and you might have trouble fitting some of these on to old disks or using them with Switcher.

There's also a difference in the way the new Finders organise files on disk, and since the System and Finder are on the outermost disk tracks (where most problems occur), you are especially likely to get problems if your disks are old. Remember also that the HFS file system needs shorter filenames, so you might have to rename.

Getting the Pips

Software developers are complaining bitterly that Apple still hasn't given them full details of how HFS operates — but even if they did know, and understand, there are probably so many permutations and combinations at present that new software would run into trouble, anyway.

What we seem to be facing with the Macintosh is a problem similar to that faced by IBM software developers for a number of years. Remember the '96 per cent compatible' ads? (On average, only 4 per cent of the code was fatal!) At the same time every clone-maker tried to get around the BIOS problems in its own way.

But while IBM could blame the clone-makers, Apple has no one else to finger but itself — although the company rightly points out that many software developers haven't strictly followed the guidelines. The software companies, on the other hand, maintain the guidelines are inadequate, incorrect or impossible.

If you are a new or old Mac user buying new software, you must be prepared to check for incompatibility and instability for some time to come. Deal only with a retailer who will promise to replace, exchange or refund on software that doesn't work up to expectations.

Hayden has admitted that Musicworks crashes with HFS because the company didn't adhere to Apple's recommendations (use Musicworks 1.0 on floppy only). But MacPaint gives problems too; it must reside on a system disk for the clipboard functions to operate correctly.

Microsoft's Word and File also crash with HFS, as do the old versions of MacTerminal, MacWrite, Sidekick's Notepad+Click-On Worksheet, and Font/DA mover. New versions are on the way.

Switcher 4.4 adds about 20 Kbytes to each of the applications you are using, and all must be in the same folder; Excel also requires that all linked documents must be in the same folder; and a number of other popular applications (such as Dollars and Sense, and Filevision) will only work from 400 Kbyte floppies. Think Tank 1.1 can't access folders and is occasionally unstable, while 1.2 runs okay. And the new HFS version of Jazz still has some bugs.

As the Captain of the Titanic wrote in his morning report "Apart from a few icebergs, conditions are excellent!" □

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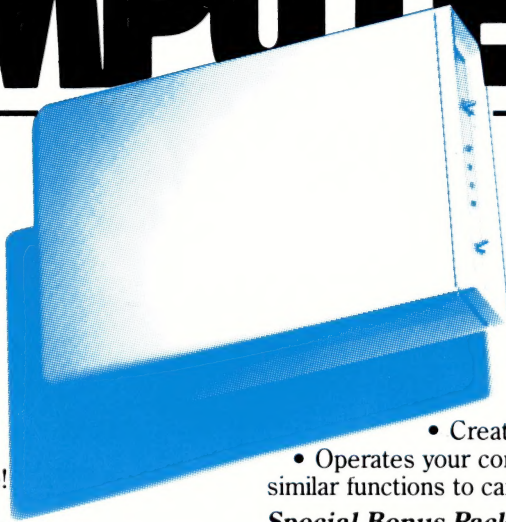
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