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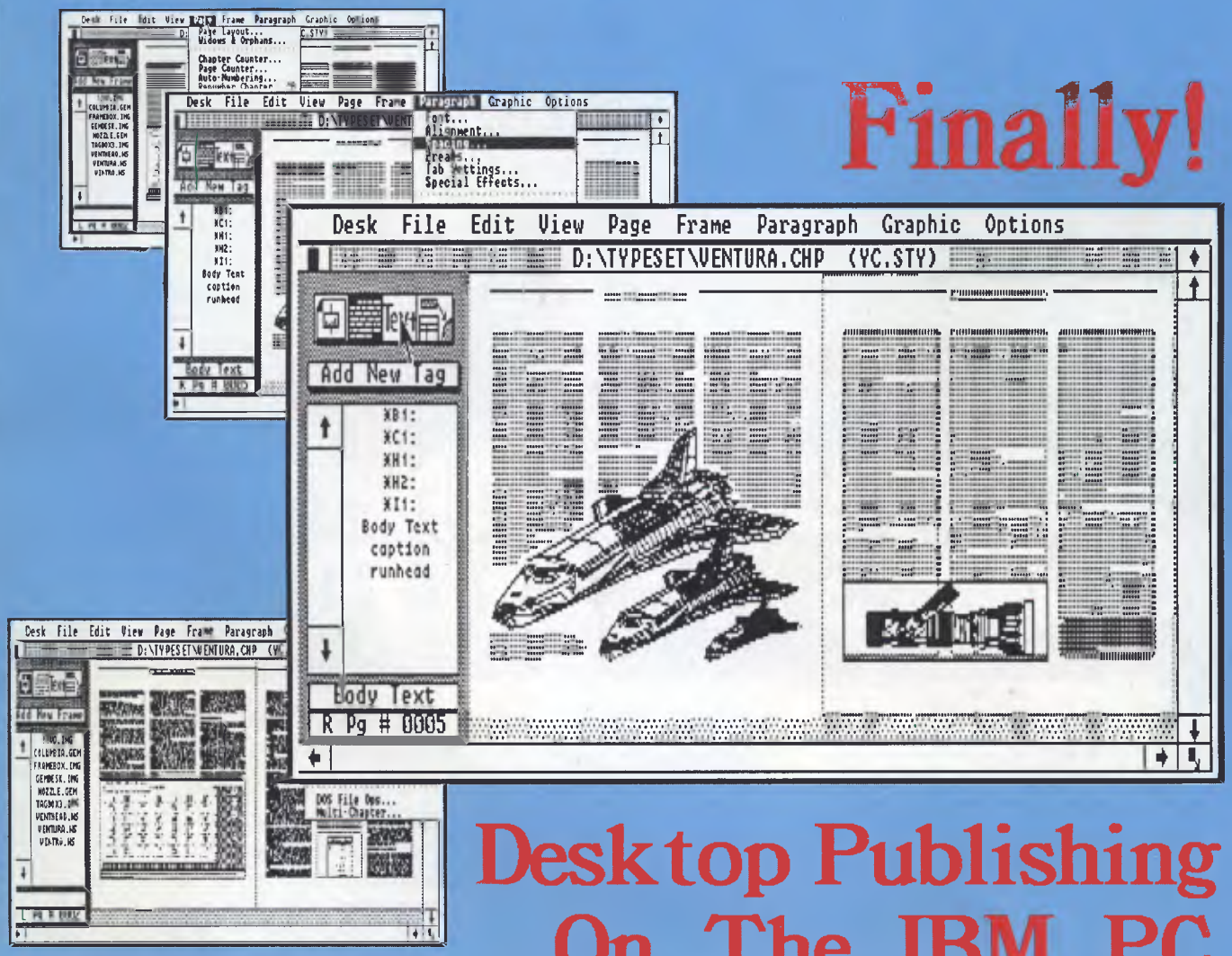

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EDITORIAL

Reading Big Blue's Stars

I AM WRITING this in late December: the computer industry's silly season, when things wind down for Christmas. It's a time to reflect on the events of the last year, and to attempt to forecast what the next year will bring.

Right now, I'm trying to piece together a picture of what IBM is up to. It's been a difficult year for the jolly blue giant, with its share of the United States PC market dropping from over 70 per cent to under 55 per cent in the space of a few months, thanks mainly to imports of Taiwanese and Korean clones. Faced with entering a price war against the Eastern hordes, IBM has two choices: either lift the game with some kind of new product or quit the game.

Certainly the decision-makers at IBM have thought about the latter option, but I think they will stay in the PC market. Consider: the PC is becoming increasingly important in business and many users who currently have a mainframe terminal are switching to PCs. Now they don't want to have both a terminal and a PC — they want the PC to function as a terminal, and IBM itself is fuelling this trend with new models of its 3278 and 5250 emulation adaptors, network gateway support and provision of support for SNA LU 6.2.

Is it at all likely, then, that IBM will withdraw from the PC market and expose itself to a situation where the bulk of terminals attached to IBM mainframes are non-IBM PCs?

What IBM must do, therefore, is produce a machine that can compete against the Asian clones. It can't compete on price alone, since at these low prices, neither IBM nor its dealers can make enough money to pay for adequate support or product development. It must therefore compete on performance as well as price.

Right now, the way to achieve low cost is shown in IBM's JX. Sure, the machine itself is fairly unexciting; it's a plain-vanilla low-performance 8088-based PC. But consider: the JX uses surface-mount technology, in which the electronic components mount on top of the board rather than through holes, making for cheaper assembly — particularly on robotic assembly lines — as well as for denser mounting. It also uses a simpler, lighter, mechanical assembly, the new low-cost 9 cm disk drives, and makes use of three custom LSI circuits to further reduce component count and decrease cost. These chips, coincidentally, make the JX a difficult machine to clone (albeit no-one is terribly interested anyway).

If I were IBM, here's what I'd do ... I'd take the surface-mount technology, the use of custom LSI chips, the 9 cm disk drives and the low-cost mechanicals, but instead of the 8088 processor I'd use the 80286, to produce a low-cost, high-performance machine I'll call the JX/286. I'd build in serial and parallel ports as standard, with plenty of memory, and provide only a few expansion slots. The resulting machine would be cheap to manufacture (and IBM has a robotic assembly line in Carrollton, Texas that's currently idle, yet ideal for this job) and difficult to clone. It would offer significantly higher performance than Asian clones, at a price only slightly higher –low enough to attract customers, yet high enough to offer IBM and its dealers decent margins.

Is such a machine likely? Certainly, IBM has recently introduced a new machine in the United States, called the XT/286. However, it is built in the same way as the XT and AT, and at US$4,000, is too expensive to have much impact on the clones. A JX/286 would be a better prospect. I also know that IBM's Wangaratta factory recently installed a whole new set of surface-mount assembly equipment, and you couldn't convince me IBM plans to manufacture JXs there.

Add to this the consistent rumours that DOS 5 will be released in March, and things start to make sense. DOS 5 (also known as DOS 286) will only run on the 80286 processor. Microsoft's usual policy in releasing new versions of DOS is to let IBM release it as PC DOS first, thus ensuring its adoption as an 'industry standard'. Hence, I believe, IBM intends to release a new, 80286-based, machine around March.

Now it might not be a JX/286; it might be a new release of the AT. But frankly I doubt it — such a machine would not only be too expensive to compete against the clones, it would also fail to compete against IBM's next rumoured product, the so-called 'Fort Knox' machine, which is based on the 80386 processor. If IBM produces just another AT, it's done the wrong thing.

And what of the 80386? Expect to see IBM release this box in the third quarter of 1987. ▷

EDITORIAL

Expect it also to contain some proprietary technology — such as custom LSI circuits — which will make it difficult for the Taiwanese and Koreans to clone and produce economically. It might even contain a customised version of the 80386 processor, with modified microcode to add extra instructions which its software will use — IBM has performed this kind of trick before, with the modified 68000 and 8087 processors in the XT/370.

And once IBM starts to ship such a machine, we can expect a confused marketplace. First, we will have two architectures for 80386-based machines: the Compaq/Phoenix AT-derived architecture and IBM's. Which will win acceptance in the marketplace?

And then, what software will we run on these machines? With the power of a superminicomputer at the disposal of a single user, what do you do with it? The obvious application for the 80386 is in multi-user supermicros; as a single-user machine it is overkill, unless we use up its power in some productive way –such as in smarter user interfaces, embedded expert systems and other software which currently does not exist. Right now, our ATs are still running the same software as the earlier PCs, only faster, after four years of development. Market forces, together with the cost of developing and launching innovative software, will conspire to shackle us to the same old software.

Meanwhile, Apple's commitment to a software-based architecture (extremely simple hardware, with the operating system handling all graphics, I/O, menus, dialogue boxes, and so on) is paying off. Because of this approach, software written for the Mac is extremely hardware independent, allowing Apple to introduce new machines which can take advantage of existing software in new ways. For example, large-screen add-ons are already available for the Mac, allowing desk-top publishing software to display full-size pages. While these are currently from third-party suppliers, look for Apple to introduce a big-screen Mac about the time you read this. You can also expect a 68020-based Mac, providing the faster screen redrawing which is essential for desktop publishing software.

In addition, with the Chooser desktop accessory, Apple has provided the basis for network access in a way that is transparent to the user. You can expect some significant announcements concerning large-network support for the Mac.

Other suppliers are out there too, of course, and we must remember that as the market expands so existing suppliers may fade from sight — yet they are still there, often with stable, mature and well-developed systems which meet the needs of specific markets. The result is a rich market in which buyers are able to select from a wide range of hardware and software to meet their needs.

So 1987 looks like being an interesting year: will IBM do as I predict, or will it pull out of the market? Will DOS 5 catch on quickly, or will people prefer to wait for the 80386-based machines and operating systems? And will Apple continue to gain ground by providing a stable yet flexible alternative to IBM's confusion of machines and cards?

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A PEEK AT PC'87

PC'87, Sydney's Eighth Australian Personal Computer Show, will be returning to Centrepoint from March 17 to 20 for what is hoped will be another successful event.

This year's show will not include the customary weekend day, which makes it a bit hard for computer enthusiasts to get a glimpse at the latest innovations, but will be staged from Tuesday to Friday with a special late opening till 8pm on the Thursday.

Last year's show received a tremendous response from the market although complaints about too many onlookers has brought the change in dates.

Show organisers, Australian Exhibition Services (AES), have decided to keep the children at home with kids under 16 having to be accompanied by an adult to enter. (That should give the big kids a chance to have a look and play.)

AES managing director, Graeme Selby, acknowledged that the market had changed since the first show in 1983. "The Show must reflect the requirements of the market. While computer shows have failed, AES is continually looking at ways to improve the personal computer events, for exhibitors and visitors," said Selby.

The new stance with the restrictions is, according to Selby, an attempt to attract "an even more business oriented visitor" — this is a different tack considering that AES's shows have been directed at the computer enthusiast and have attracted home users as a large part of the audience.

This year's up-market show is set to attract a more desktop publishing oriented line of products and a special streamlined registration arrangement has been installed to facilitate easier admission to the show.

The big guns of personal computing in NSW were quick to take sites at the show with many potential exhibitors missing out. Lack of suitable exhibition space has created a Catch 22 situation where major exhibitors continue to want more space which in turn means a smaller number of exhibitors are able to participate.

Some of the big names which will be bearing nearly all at the show are Big Blue, Olivetti, Apple, Microsoft, Imagineering, Telecom and a number of other key companies. Fields such as hardware, software, peripherals, communications equipment and software, micrographics, word processing, ancillary equipment and supplies and publications will be represented.

For those able to get a few hours to see technology at its best, the open hours at the Centrepoint are from 10am to 7pm Tuesday and Wednesday, 10am-8pm on Thursday and 10am-6pm Friday.

If you're not in Sydney during March, it may pay to keep an eye out for Melbourne's Ninth Australian Personal Computer Show, to be held at the Royal Exhibition Building from May 31 to June 3, 1987, with promoters promising likewise large crowds.

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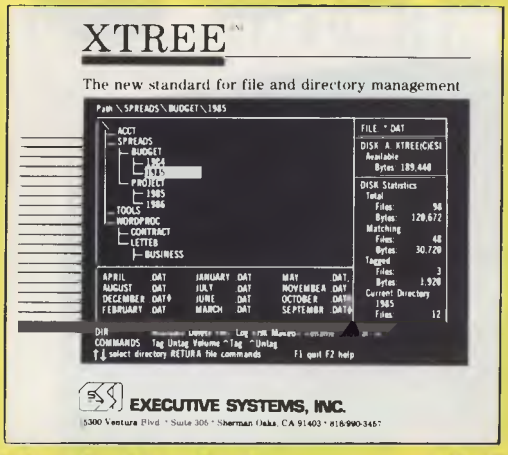

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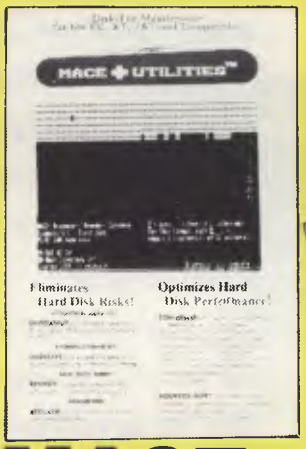

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Instead of some unknown, unbranded questionable blank disks from Taiwan, Interface sells only the reknowned ***Le Floppie*** disks from Imagineering.

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[_] ___ boxes of DSDD 5 1/4 (suitable IBM) - $15.95 per box of 10

[_] ___ boxes of SSDD 3 1/2 (suitable Mac) - $49.95 per box of 10

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GREEN AND GOLD WANG

Wang may have to change color after being awarded the Federal Government's green and gold "Australia Made" certificate mark.

The approval from the Advance Australia Foundation, which administers the award, coincided with the announcement that Wang's Australian manufacturing operation will begin exporting to the United States for the first time.

Wang will be exporting three workstations and communications devices that are being manufactured in Canberra. The products have also been accepted in the United Kingdom, New Zealand and throughout Europe.

By the end of this financial year, Wang expects to have earned A$9 million in export revenue with the largest sum coming from their model 4245 color workstation, the product which captured the export contracts to the US.

COMPEC SUCCESS

Australia looks set to capitalise on overseas markets, following recent involvement in exhibitions in Europe and the Compec '86 show in England.

Exhibitors at the Compec '86 show drew around 1,200 enquiries and 160 dealers expressed interest in securing distribution rights.

Among the 12 Australian companies at the show several received orders with Brisbane-based Qcom negotiating sales of its corporate retriever to London Weekend Television, Police departments as well as Burroughs (UK) which is seeking to market the retriever on its BTOS range of computers.

Strong interest was shown for the Pulsar Electronics slimline keyboard. Adelaide-based Abraxas Software with its video management and insurance packages and Interface Management Systems (Melbourne) which found many bidders for its Systematic database manager and Freedom accounting package.

Further shows will be held this year with the Australian Trade Commission (AUSTRADE) looking at potential ventures in Ireland and France.

TA DA FOR TA

A desire to become compatible with IBM by European companies, has seen greater interest expressed in Triumph-Adler's (TA) PC enhancement board.

Designed at TA's Sydney head office, the bus enhancer has captured much interest amongst suppliers and users of TA's Alphatronic P-50 which now comes in at 98 per cent compatibility with IBM.

According to Phillip Bross, TA's national marketing manager, Europe resisted Big Blue's invasion but finally succumbed to IBM's steamroller affect. "In Europe a number of manufacturers had originally resisted the IBM-compatibility requirement but this is now changing, hence the increasing overseas interest in the Australia TA board," said Bross.

TA has received a number of inquiries from P-50 distributors overseas including a UK order with other countries such as Denmark, Switzerland, Austria and Germany evaluating the board.

ISD, MIC, SL & UOA

Integrated Silicon Design (ISD), the Adelaide based designer of software for advanced silicon chip technology, has struck a marketing agreement with the George Brown Electronics group.

ISD is a joint venture company involving the Management Investment Company, Samic Limited, and the University of Adelaide.

Under the arrangement with the George Brown group, ISD will provide gate array and custom chip design facilities, VLSI software design and component application engineering support.

The recent agreement follows similar collaboration between the companies on gate arrays. The product is being serviced under licence from Fairchild Semiconductor Corporation in the United States.

Director of George Brown, Bob Crabbe, said the latest arrangement provided the electronics group with an engineering support unit and ISD with a marketing arm for its software division.

WHAT CADS!

Entercom Computer, the Australian distributors of AutoCAD, has been granted a permanent injunction against the South Australian software distributor Best Instrument Industries from distributing unauthorised versions of AutoCAD.

The ruling was handed down following an unusual surprise visit by Entercom staff and their solicitors to the premises of the South Australian computer house.

The visit was carried out after Justice Jenkinson, in the Victorian District of the Federal Court, granted an urgent (ex-parte) order for the visit.

This is the second time Entercom has had to carry out such action to protect AutoCAD copyright — a visit was paid to the offices of Computers Galore (Victoria) in a similar fashion in 1985.

PLUSSES FOR PULSAR

Pulsar Electronics (Victoria) has come out a double winner in the Victorian Education Department's annual systems evaluation.

The Pulsar 9000 multi-user computers have been approved for use in schools for the third successive year, and the company was also notified that its SAM modem was recommended throughout the education system. The Queensland Education Department have followed suit and added Pulsar to their approved list.

The approval, which is estimated to mean a further $1 million in sales, is for the the supply of the products for school administration purposes.

Pulsar presently has more than 600 terminals installed in schools, most of them also using administration software developed by their Schools Administrative Computing Unit in Moorabbin.

COPYCATS

ACI Computer Services (Victoria) has agreed to a settlement with Perth based New Concept Computers over copyright infringement of ACI's Application Manager software.

The Application Manager was developed by ACI as a front end menu system for IBM personal computers equipped with hard disk storage. ACI technicians found that the object code on their Application Manager and New Concept Computers DOS Menu Manager, were identical.

The still-young amendments to the Copyright Act 1968, provide that object and source codes written in Australia are covered by copyright.

New Concept Computers has agreed to cease production and infringment of copyright, and to compensate ACI for damage relating to sales of the DOS Menu Manager.

Due to the large demand for Application Manager, with more than 1500 copies installed nationwide (despite New Concepts encroachment), ACI plans to expand into overseas markets.

AMERICAN GRAFFITI

BY HOWARD KARTEN

DESKTOP PUBLISHING

AS WE'VE OBSERVED before in this space, it's a very paradoxical business, is all this computer-stuff. Today's 'newest' item can literally become next year's obsolete product; contradictions and confoundments abound, and desktop publishing is a good example.

Here's one paradox: for the past 10 years, would-be 'experts' — consultants, market researchers, and others — have tried to force-feed us the idea of the 'paperless office'. LANs would link all our individual and corporate computing efforts, information would be stored and transmitted in digital form, and so on; documents would henceforth exist increasingly on magnetic media –CD-ROMs and CRTs — rather than as cellulose and ink. That, in fact, was an important factor in helping me talk my wife into buying a computer a few years ago: it would help us keep better track of information, and maybe even cut down on the paper flow into our house.

Sure.

In the past five years, the amount of paper-based information received at Karten Manor has not decreased — it's grown, and grown considerably. The papers which cross my desk threaten to bury my keyboard and several rooms of my house.

Desktop publishing contains, for many reasons, some particularly good examples of paradox. For example, lots of folks unthinkingly associate computers with Orwellian invasions of privacy and advancing totalitarianism. Yet desktop publishing (any kind of self- or small-scale publishing, really) is the very antithesis of totalitarianism! (In the USSR, I've read, copying machines are strictly controlled.)

Several decades ago, the great American press critic A. J. Liebling observed — perhaps somewhat sourly — that, "Freedom of the press is free for anyone who owns one." Today, almost anyone can own one.

Another paradox swirling about desktop publishing is this: the number of newspapers has been steadily declining all over the free world in the past two decades, with much of the decline commonly attributed to advancing technology (for example, computerised phototypesetting). Yet desktop publishing shows every sign of leading to an explosion in the number of newsletters and 'small-press' publications! Technology giveth, and technology taketh away.

Yet another paradox. Today, there are more bulletin boards and terminals in existence than ever before (virtually no observer of the computer or social scene foresaw the incredible proliferation of public-access messaging systems). To a very high degree, these are pure digital, pure-information systems; that is, they are dedicated to making available information in a fairly unadorned form. Yet desktop publishing aims to use graphics, charts, layout, typography, and so on. In other words, desktop publishing tends to refute the idea of sending out (or making available) a mass of unadorned electronic bleepery.

Perhaps the final paradox is that while the world is becoming more digital, in publishing, things analog — such as typeface and layout — are still a very important aspect of the product. So desktop publishing is a way of adding value to digital information — by presenting it in a more analog format!

However interesting these paradoxes may be to think about, they should not, and will not, deter any would-be desktop publishers from their appointed rounds. We can all look forward to receiving more newsletters, flyers, and other computer-generated paper in our mailboxes — not over our telephone wires — and my desk, and yours, will become even more swamped with paper.

I've promised my wife that I'll begin my annual Spring cleaning and return Karten Manor to its once-pristine state ... I'll be just in time for the forthcoming deluge of desktop- published material.

COMPUTER EXPLOSIONS

The batteries of three Compaq Portable II's have exploded, according to Compaq Computer Corporation. No injuries have occurred in the explosions, which were apparently caused by errors made by technicians incorrectly soldering a particular pin on the Compaq motherboard, thereby erroneously providing a charge to the battery in question. Since lithium batteries are commonly used on clock/calendar boards, no micro owners should get too smug about this problem.

SHORT BYTES

■ A lawsuit against Lotus, alleging errors in 1-2-3, filed some months ago by a Florida contractor, has been dropped. The contractor prepared a bid using 1-2-3, may have made an error in doing so, and lost money as a result.

■ If you have an IBM PC and worry about running out of slots, Advanced Transducer Devices (Sunnyvale, California) has a product for you. The company's Slot Saver I/O card is a US$49 item which contains two serial ports, one parallel port, and an RGB video port. The Slot Saver snaps onto another ATD card, such as a memory card, memory, or a mono or colour graphics card; and together, the two half-cards take up only one slot, but provide a lot more functionality within that slot.

■ Several products recently introduced by California vendors (who are frequently on the front lines of innovation) bring IBM functionality to Apple products.

For example, a keyboard for the Apple Mac from Datadesk International, (Van Nuys, California) imitates the IBM PC AT keyboard. And a system called DOS Boot allows IBM PC software to run on the Apple II GS. This second product, from vendor Orange Micro, includes a board, an external 5.25 inch disk drive, and software, and will cost less than US$700. □

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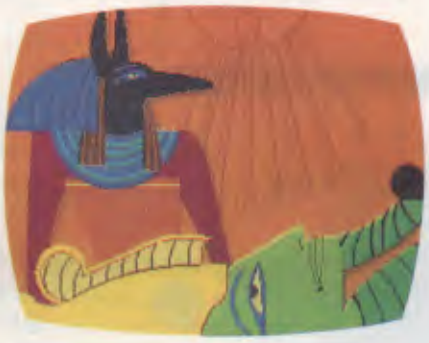
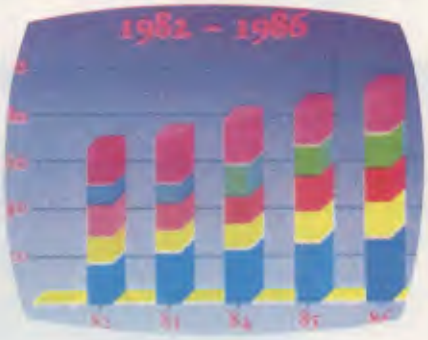


Compatibility with the IBM Enhanced Graphics Adapter Board



Compatibility with the IBM Colour Graphics Adapter

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- MultiSync is compatible with the IBM Professional Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Colour Graphics Adapter and other IBM compatible graphics adapters.
- MultiSync's wide compatibility makes it possible to upgrade boards or software without purchasing a new monitor.
- MultiSync has a maximum horizontal resolution of 800 dots and a maximum vertical resolution of 560 lines for superior clarity of display.
- MultiSync offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colours depending on the graphics board and software being used.
- MultiSync features a TEXT SWITCH with a choice of seven colours (red, blue, green, cyan, yellow, white and magenta) displaying word processing, spread sheets, databases or other software in crisp alphanumeric text on a dark-bulb black background.
- MultiSync has a 35 cm (14") diagonal tube and a large, 250 × 180 mm (W × H) viewing area.

SPECIFICATIONS

Picture Tube	370 HYB 22 dark glass, direct etched
Size	35 cm (14"), 90° deflection
Dot Pitch	0.31 mm
Input: Video	RGB (Intensity)
Level	TTL or analog
Sync.	TTL positive/negative, separate or composite analog composite or Sync. on green
Terminal	D-Sub 9 pin
Synchronisation: Horizontal	15.5 kHz – 35 kHz
Selection	Automatic
Vertical	50 Hz – 60 Hz
Resolution: Horizontal	800 dots (max.)
Vertical	560 lines (max.)
Bandwidth	30 MHz (3 dB)
Display Colours	8/16/64 in TTL mode Multicolour in analog mode
Active Display Area	250 × 180 mm
Misconvergence	Less than 0.6 mm
Power Supply	240V. 50 Hz
Power Consumption	78 W max.
Dimensions	368 (W) × 227.6 (H) × 382 (D) mm
Weight	15.2 kg

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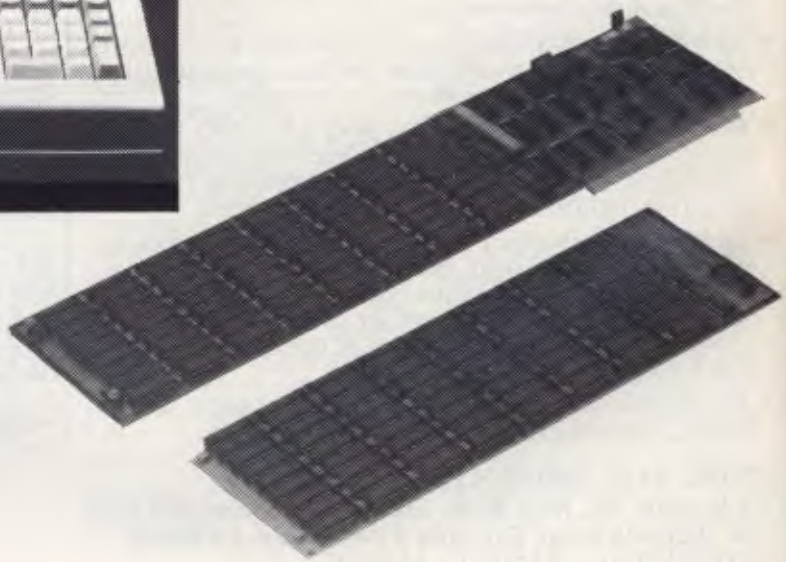

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Move Over Mac - It's PC Publishing!

Finally! Desktop Publishing has arrived on the IBM PC. After lots of promises, several false starts, some half-baked solutions and a whole lot of vapourware we can now sit down at our IBM and produce camera-ready artwork for our magazines, newsletters, books and corporate documents.

You can even produce magazine covers, as we discovered in our little experiment for this issue. It isn't a work of art, but it illustrates desktop publishing and does a fine job of it given the conditions under which it was produced (among other things, the Customs strike tied up the software we needed to get super-high-resolution screen snapshots so we had to settle for the eye-bending CGA screen).

That's it, Mac users, you can laugh no more. We have it, and it works! Pagemaker, Ventura, Harvard Professional Publisher are but the first trickles from the soon-to-be-opened floodgates, yet they are far better than your existing software.

(Of course, I've been looking at enough stunning new Mac software recently to make an excellent case for the opposition as well, but we'll leave that for another time . . .)

The New Breed

The IBM desktop publishing programs represent a new generation in the technology - we're getting away from the half-baked software scorned by anyone who knows type.

What desktop publishing has lacked so far is proper hyphenation/justification, kerning, type condensing/expansion, and other advanced text-handling - and they're all appearing in these new programs. So are new capabilities for handling large slabs of typesetting, and books/manuals complete with chapter and section headings, numbering, indexes and tables of contents.

The following pages contain reviews/previews of some of the new software. We produced the Ventura and Harvard reviews on the packages themselves to give you a guide to the results you can get with very little practice or preparation.

We also have some details on President's Megapage system, which we used for the cover. We're now working on a full review.

Not covered this issue is Pagemaker. We have a Beta-test copy, but it's early and buggy. It looks good, however, especially in colour on the EGA. The almost-multi-tasking of Microsoft Windows provides the best-yet environment for page layout software.

You Need A Hotrod

Before we all go overboard fitting our IBMs out for desktop publishing, let me warn you it can be an expensive proposition.

First, if you want to retain your sanity, you have to have an AT - or something faster. A Compaq 386 wouldn't go astray. Because the IBM has no built-in support for graphics, the processor has to do all the work of redrawing the screen - and doing that for a complex layout on the standard PC can take longer than forever.

You really want one of the top machines from our AT performance tests table, like the Earth Computer Systems 286, the ITT Xtra XL, the Video Technology AT, the Osborne AT or the latest President AT.

And you must ensure it comes with the fastest of hard disk drives - add $2000-plus to your finance application for a Miniscribe voice-coil drive. All these programs spend a lot of time reading from or writing to the disk, and your average cheap-clone AT drive just isn't up to the job.

Don't sign that application and send it off yet, though - you still need to consider spending a small fortune on your display. Yes, you can run Ventura and Pagemaker on the standard Colour Graphics Adapter, but it looks awful, gives you an inaccurate view of your document, and is plain hard on the eyes.

EGA To Please

I would strongly recommend the Enhanced Graphics Adapter, simply because it is becoming the standard for high-resolution displays on the IBM. There are many excellent copies of the EGA around, but you can still count on spending between $600 and $1000 for one, as well as another $800-plus for the colour monitor.

A cheaper, and very effective, solution is to use the Hercules graphics card. Because it runs with a mono monitor, it will cost you a lot less overall.

Wait! I haven't finished. Real desktop publishing *demands* a Postscript printer like the Apple Laserwriter. That'll be $10,000, please . . .

Yes, you can use your Laserjet, but it won't do the same job. If you have one, you will have to upgrade it with the DDL (a page description language like Postscript) option as soon as it is available. Hmmm, another $4000 or so.

Desktop publishing isn't cheap. You can do it for less than $10,000, but that will be doing it the hard way. The bottom line on that finance application really should read $20,000 - or $25,000 to be safe.

Don't feel bad about it, though - just remember, to do the same thing before desktop publishing would have cost you $100,000.

Footnote: *This item was written after the Ventura review, and we've now had a little more experience with both it and its opposition. It is undoubtedly the best of the IBM packages - in maturity, in style, and in capabilities.*

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 indispensible 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.

Price: **$34.95**

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A Grand Ventura From Xerox

Desktop Publishing has arrived in the IBM PC world - finally! We've waited - and watched the Mac users with envy - for a long time, but now it's our turn. And, says Matt Whelan, it looks like we'll be glad we waited . . .

Ventura Publisher, like all the IBM desktop publishing programs we've been hearing about, has been a long time coming. Not only did it suffer the normal delays after the usual pre-announcement, but it also fell into the hands of Xerox - a company noted for its ability to sit on a good thing until someone else neatly wraps up its market.

Xerox bought the marketing rights to Ventura Publisher and has spent the past six months deciding what to do with it. It still isn't sure.

However, it has thankfully decided not to restrict it to Xerox hardware, so it will be available for the IBM/Clone market at around the time you read this. Some time later in the year the company will probably get around to packaging it with Xerox hardware to sell as a 'system'.

Ventura is an excellent program - but not so excellent we can understand the $1800 price tag. Mass-market PC software just doesn't cost that much, and anyone who wants to pretend their product is so up-market it should be twice the price of mainstream PC software deserves the up-market (read minimal) sales they will surely get.

Give us a break, Mr Xerox - we already have to spend a fortune speeding up our PCs for desktop publishing; this pricing is enough to make us decide to stick with the Macintosh!

Ventura is three times the price of the best desktop publishing software around - Ready Set Go version 3. And RSG's price was increased intentionally because people didn't take it seriously at the under-$300 tag of the previous version.

Xerox (and Ventura) must be taking advantage of the scarcity of IBM desktop publishing software. Their joint baby is certainly far better than anything that went before it, but it does not have the same advantage over the other soon-to-be-released packages like Pagemaker and Harvard Professional Publisher.

I may be being a little unfair, because there is more to Ventura than any other package we've seen, so let me put those statements in perspective: If you need *all* of Ventura's features, it's well worth the price. The problem is, I consider only about five per cent of the market wants all the features. For book publishers and people preparing software or hardware manuals it is way out in front, but the rest of the world wants an RSG3-style package with the emphasis on advanced word processing and layout.

In that field it is competitive, but not three times as competitive . . .

Now For The Good News

Okay, I've had my say about the price - now it's time to look at the rest of the package, which *is* impressive!

Ventura runs under GEM, Digital Research's Graphics Environment Manager - the WIMP (Windows, Icons, Mouse and Pull-down menus) environment that was so close to the Macintosh Apple threatened to sue (and won a settlement). It's unbelievably ironic that Xerox's product is hampered because Apple has claimed the rights to a user interface it 'stole' from Xerox in the first place!

However, GEM is still close to the Macintosh-style interface, and as such is a 'friendlier' environment than Microsoft Windows (under which Aldus Pagemaker will run). Windows, though, is a more powerful 'shell' as it provides what is near enough to multitasking for the average user not to notice the difference.

This means that while Pagemaker is running you'll also be able to call up a word processor to produce copy and a paint program to produce illustrations - or even a game to while away the time.

There are two distinct disadvantages to the GEM approach: the first is the painful situation (as on the Mac) where you have to continually shut down one program and start another (unless you happen to be able to get totally organised with all copy and illustrations prepared before you start). The second is a by-product of the first: the programmers writing a package which runs under GEM have to put more effort (and code) into their program for it to be nearly as effective.

For example, Pagemaker for the PC does not allow you to type text straight into the page, simply because you can do it on the same screen with Windows Write or the Notepad and then 'cut-and-paste'. Thus the Aldus programmers don't have to write word-processing functions into their program, and can concentrate instead on streamlining the page-

layout code or whatever other parts of the package they want to improve.

Having Your Cake . . .

Of course, I would like it both ways - the ability to run other programs at the same time *plus* the built-in extras Ventura provides. Anyone who has used Pagemaker on the Mac will find it strange not being able to create new text on the PC version.

(I should point out at this stage that any comments I make about the PC Pagemaker may well be irrelevant, as the copy I am using is a Beta-test version; the release product may well be different.)

The Ventura programmers have done a fine job with those extras, however, and if you are even moderately well organised you can put together a publication very quickly.

If you are particularly well organised you can do it in a flash, because Ventura allows you to pre-code your text for font size changes, type characteristics and a number of other items.

Ventura introduces some new concepts to the Apple-defined world of desktop publishing. They take some getting used to at first, but once grasped they make the job a whole lot easier.

The most significant of these is the use of *tags* associated with blocks of text - you can define up to 64 tags per document, and then simply click on a paragraph or block of text, then click on a tag (from a menu in the side-bar beside your layout page) to give the text those characteristics.

For example, your Body Text tag (the default) may specify 10-point Times Roman on 11-point leading, justified, hyphenated, with extra spacing above and below the paragraph and with a paragraph indent of whatever size you nominate. A tag for cross-heads may lift that to 12-point bold, ragged right, while a heading tag can specify 48-point bold, centred.

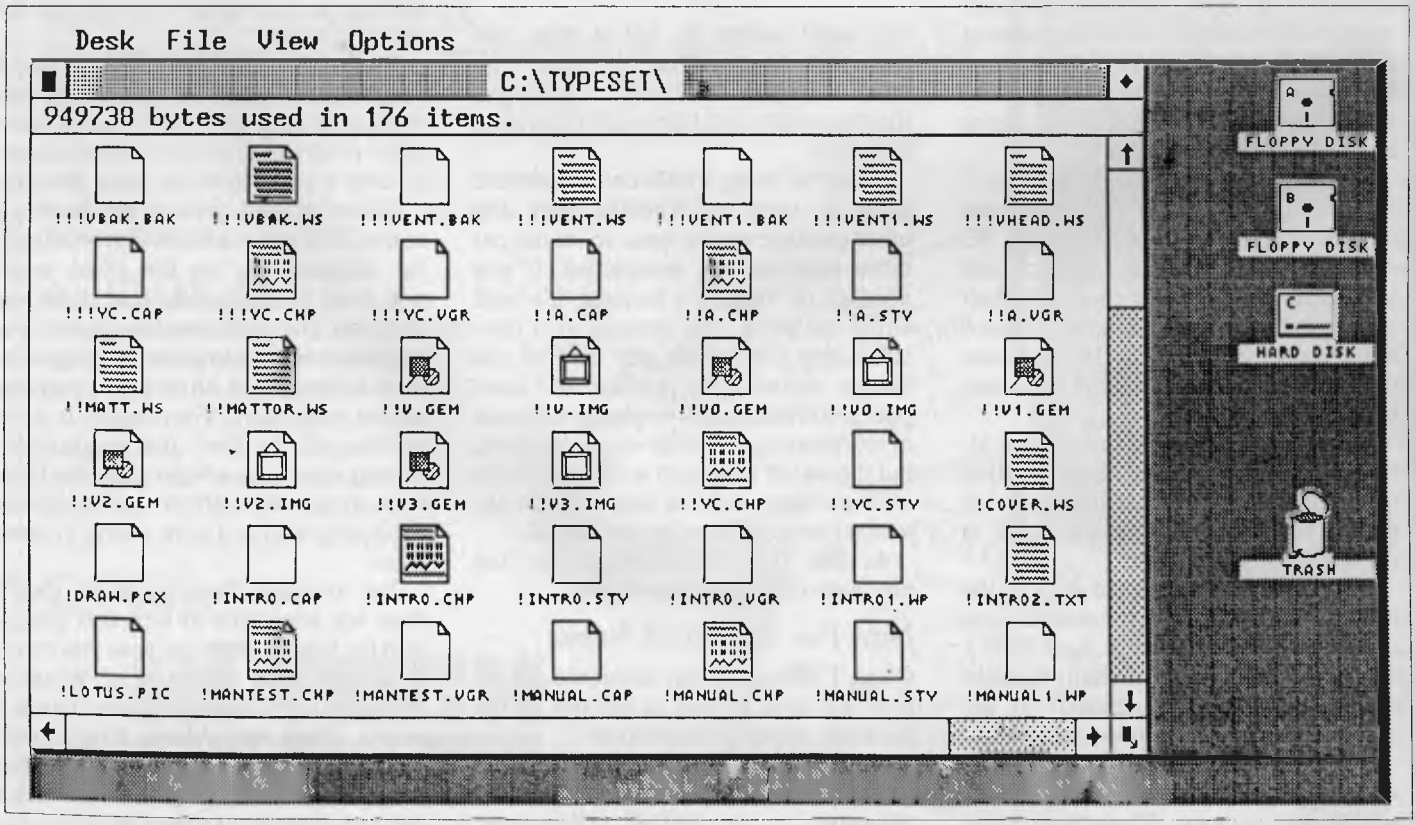
You can go on to create more tags as needed for style variations, including special effects like drop-caps (the big first letter at the start of this review) and bullets (a black 'blob', box or other special character of your choice as a highlight at the start of a paragraph).

Instant Change

If you change a tag's properties, all text associated with the tag changes immediately to the new style.

This is a feature typical of command-driven systems (including a lot of traditional typesetting) that can be invaluable when you want to change the appearance of a document - doing so the Macintosh/Pagemaker way means going back and changing each portion of text individually, a tedious job on most documents of more than a page in length.

Most importantly, these tags can be inserted in the text as it is being typed in your favourite word processor, so getting a finished result can be as simple as plac-



Ventura runs under Digital Research's GEM (Graphics Environment Manager). The GEM interface looks more than somewhat like Apple's Macintosh - so much so Apple threatened to sue DR. The point-and-click style is really the only sensible way to handle WYSIWYG desktop publishing.

ing the text on the layout page. You simply place the tag name, preceded by an 'at' sign (@) and followed by an equals sign, where you want to tag the text.

Body text is the default and doesn't need to be marked; otherwise, the tags affect only the tagged paragraph.

Various other commands can be inserted directly into the text to individually control text attributes, insert special characters, choose fonts, set point size, kern characters and perform base-line jumps.

For example, text typed into your word processor like this:

This is <F2P12IB>Helvetica Bold Italic<F255P255M> in 12-point.

would produce this:

This is ***Helvetica Bold Italic*** in 12-point.

The angle-brackets indicate a command: <Fnn> selects font number *nn*, <Pnn> will select point size, <I> will give italics, <B> bold, and so on for a wide range of attributes. Setting a font or point size of 255 returns the type to the normal tagged attributes, which would otherwise happen by default at the end of the paragraph.

Other inserted commands available include line breaks, discretionary hyphens, non-breaking spaces, footnotes and index entries. All of these features are available while laying out pages with Ventura, of course, but the ability to pre-format when it suits is invaluable.

The ability to set these characteristics means you can prepare straight ASCII text in any manner and have it preformatted when it is taken into the page for layout. However, if you use one of the popular IBM word processors - Wordstar, Multimate, Word Perfect, Word, Windows Write, and Xerox Writer - Ventura automatically carries its text attributes into the document without any special coding.

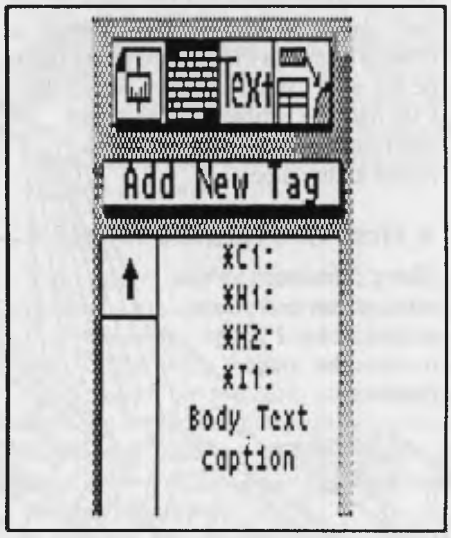
An interesting feature is Ventura's ability to read a file from one word processor and write it out to a new file in another word processor's format. Anyone who, like us, receives material in several different formats will love this one!

Also useful is the ability to define your function keys to represent various tags while you are working in Ventura. Then you can tag text as you type or edit it without having to move backwards and forwards between Tag and Text modes.

More Ventura Gems

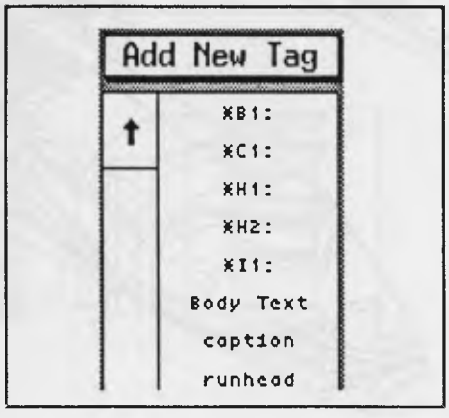
The ability to embed commands, combined with in-built handling of multi-level chapter/section headings with automatic numbering (up to eight levels), table of contents generation, indexing, and footnoting, sets Ventura apart from earlier WYSIWYG programs.

So does its use of style files for the



Above: *This is a 'snapshot' of the Ventura side-bar menu. The four icons at the top represent the four modes - Frame, Tagging, Text editing and Drawing. We've selected Tagging, which brings up a list of tags associated with this document. This snapshot was taken from a standard IBM CGA screen.*

Below: *A similar snapshot from the Hercules Graphics adaptor shows the tags used for this article - the obscure ones match our usual typesetting coding.*



basic components of page layout, text attributes (tags), chapter design and so on. You can establish styles for a whole range of documents, from letters to magazines to books, and keep them on disk as the basis for future publications. A range of sample styles (and 'chapters' to go with them so you can see the result) is provided with the package.

In many ways it spells the beginning of the end for command-driven systems like TeX, whose major advantage was the ability to define a style (plus headings, section headings and so on) for large slabs of text and change the style quickly to reformat the document. So far TeX is still the answer for mathematical and scientific typesetting, but in all other respects it seems the WYSIWYG programs will take over.

Page layout with Ventura is based around four modes: Frames, Attributes, Text and Graphics.

The first thing you need to do is establish frames on the page, into which you place your text and graphics. Once you've added a frame (it can be placed with the mouse, then its position can be adjusted finely using a specifications box) you can move it, resize it, or crop the image within it.

When you select Load Text/Image you are given the choice of word processor format to load. (Or, Image or Line-art format if you want to load a picture. Ventura supports GEM Draw, Autocad, Lotus 1-2-3 and Mentor Graphics line-art and bit-image graphics from GEM Paint and PC Paintbrush.) You can load a single file, or multiple files - the file names are placed in the side-box where you can clock on them, then click on a frame, to flow the text into the page.

The text is kept in its original disk file, and is saved back to that file, complete with any added tags and changes, each time you save the chapter.

A Big Improvement

This is another big improvement on the desktop publishing programs we're used to on the Mac - they place the text in the page and then save the whole lot in their proprietary format. That means even if you correct a hundred errors on the laid-out page, none of these will make it back to your original

copy. This may not seem like a problem initially - after all, the publication is done and correct - but you'd be surprised how many times you might decide to use the same copy - or even have to re-make the same publication after a disk crash or other problem.

The all-in-one method has another drawback - the size of the resulting publication file (most of which is disk-wasting duplication) and the time it takes to save a document (an inordinate amount with large publications on the Mac).

The only problem with Ventura is keeping track of the files that combine to make up the publication - but Ventura even helps you with that.

Multi-chapter documents can be combined into a publication file. Once you do that you can then print, generate a table of contents, or create an index for the entire publication. This mode also includes a file-management utility that lets you copy all files associated with a chapter or publication.

So far I've only discovered one significant problem with Ventura's separate-file operations - and it really *is* significant. When it reads a Wordstar file (and when it stores it back to disk) it inserts spaces after hyphens which appeared at the end of a line in the Wordstar file. As these rarely end up at the end of a line in the Ventura layout, the extra space is definitely *not* appreciated.

Another strange piece of behaviour - although it causes no harm - is the fact it writes your Wordstar file back with wider margins than standard - about 75 characters compared to the 65 it usually starts out. I haven't yet tried it with any other word processors (would I ever *use* another word processor?) so I can't say if this is a Wordstar-only problem, although I suspect it isn't.

The only other 'worthwhile' bug I've encountered so far is the fact Ventura seems to 'forget' about line graphics - rules and boxes - occasionally. It doesn't lose them - they still appear on the screen and on the printer - but for some reason you can't select them if you want to change or delete them. It may turn out to be the way I'm using them, but so far I've had the problem three times and found it slightly more than a minor annoyance.

A Host Of Features

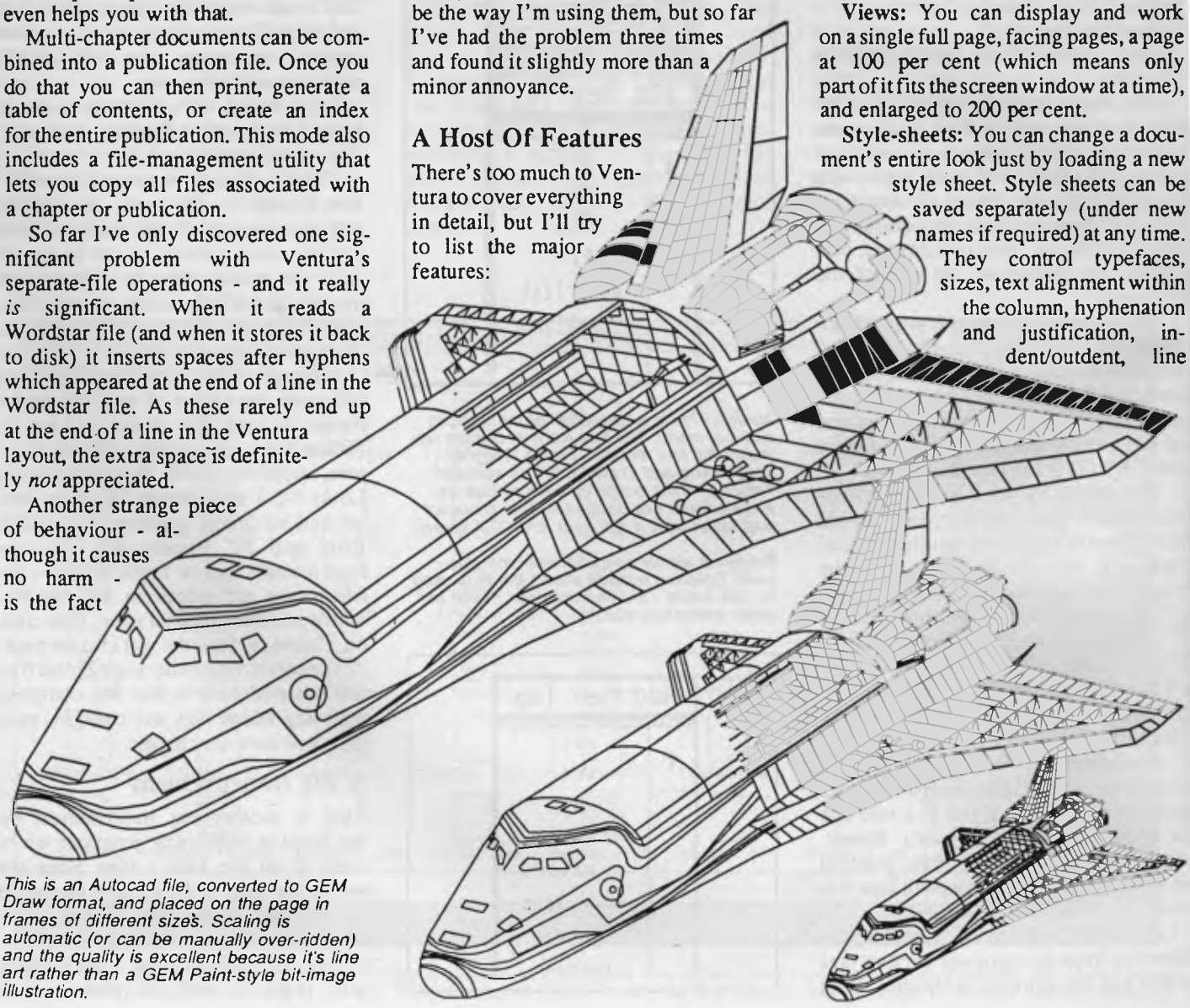
There's too much to Ventura to cover everything in detail, but I'll try to list the major features:

Formats: You can have up to eight columns to a page or frame, with more than one frame on a page. Column widths and gutters can be set individually. Vertical rules can be placed automatically between columns. Up to three ruling lines or boxes can be placed above, below or around each frame.

Content: Formats up to 150 Kbytes of text to a chapter in a 640 Kbyte machine (30 Kbytes in a 512 Kbyte machine), and up to 64 chapters can be chained together in a publication, giving a theoretical limit of around 5000 pages (although the page counter only goes up to 999).

Views: You can display and work on a single full page, facing pages, a page at 100 per cent (which means only part of it fits the screen window at a time), and enlarged to 200 per cent.

Style-sheets: You can change a document's entire look just by loading a new style sheet. Style sheets can be saved separately (under new names if required) at any time. They control typefaces, sizes, text alignment within the column, hyphenation and justification, indent/outdent, line



This is an Autocad file, converted to GEM Draw format, and placed on the page in frames of different sizes. Scaling is automatic (or can be manually over-ridden) and the quality is excellent because it's line art rather than a GEM Paint-style bit-image illustration.

spacing, paragraph spacing, temporary margins, page/line/column breaks, special effects like drop-caps and bullets, tabs (up to 16 a paragraph, including left, centre, right, decimal-aligned and leaders), rules, frame and text textures and colours, widow and orphan control, vertical tabs, and automatic section numbering.

If you're staggering under the load already, watch out - there's more where that came from. Automatic header/footer control allows two lines for each with left, centre and right-aligned text including automatic page-numbering and section headings in the header or footer as required.

You can have a choice of Arabic numberals, upper- or lower-case Roman numerals, upper- or lower-case letters, or alphabetic (One, Two, Three) for your automatic page numbers.

Automatic footnoting ensures footnotes appear at the bottom of the page they are referenced.

Text attribute setting goes past the normal selection of bold, italic, underline, subscript and superscript to add strikeout (for the legal types), small caps, and the ability to change selected text to all lower case, all upper case, or 'capitalised' (the first letter of each word changed to a capital). Selected text can be moved horizontally (kerning) or up/down by a specified amount.

The Fastest WYSIWYG

Ventura has a couple of features which make it potentially the fastest WYSIWYG program for the PC - in fact, it is the only one we've seen which will run on the standard PC without boring you to death.

I hasten to warn that I don't believe anyone should attempt desktop publishing on the standard, sluggish machine - but if you must do it, do it with Ventura. You can select the size when type turns to 'Greek' on the screen. Setting this to a high number will speed things up noticeably, as the CPU doesn't have to 'draw' a squiggly representation of text (which you can't read anyway) - it simply shades the area of the screen occupied by type to give you an idea of the page's appearance.

Then, to really speed up screen handling, you can tell Ventura to hide pictures - again, it shades the screen to show where they are placed. This makes a dramatic difference, as calculating and drawing graphics on the screen brings the tired old PC (and even many of the slower ATs) to its knees.

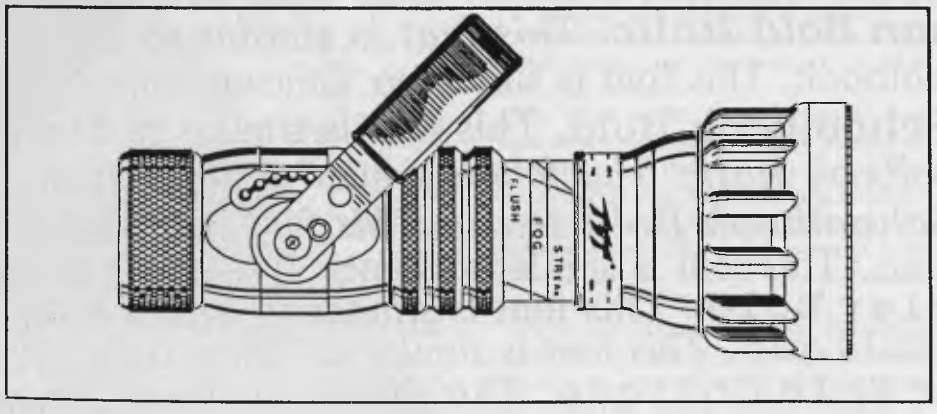
A Bright Future

You may have noticed a brief reference to setting colour attributes earlier - this is another of Ventura's advances. While there is just about no use for colour at the moment, page description languages like Postscript have colour commands built-in and it won't be long before we see high-quality colour printers appearing.

Ventura lets you set colour attributes for just about everything, while drawing and image files created in colour will be imported in colour. You can't see it on the screen unless you have an EGA card (Enhanced Graphics Adapter), but it's there!

At the moment, the only colour output supported is the Xerox (naturally) 4020 eight-colour inkjet printer

Ventura is capable of producing high-quality text and graphics output but, as always, it is limited by the quality of the output device. You won't see its best work if you use a Hewlett-Packard Laserjet, for example, until HP comes up with its Postscript-like DDL (Document Description Language). The Laserjet is too limited in its choice of fonts and, particularly, font sizes - an excellent illustration of that comes when you use Ventura installed for the Laserjet and then use it installed for Postscript. The font menus look decidedly bare in the HP version.



When All Else Fails

I must admit to getting a little angry at first when I saw that even the Postscript font menu was missing a few of my favourite type sizes. Yes, you're right - *when all else fails, read the manual.*

It explained that the font metrics file had to reside in memory, so to allow larger chapters it had been restricted in its range of font sizes. All I had to do was edit a text file listing the available fonts, and run it through a supplied utility, to produce a new font metric file with everything I ever wanted.

All of a sudden my favourite type sizes were back on the menu. Good work, Mr Ventura!

Speaking of the manual . . . you could be forgiven for thinking Ventura was designed specifically to aid in the production of its own manual. Looking at this book - which is quite a useful guide to the product, with almost all the information you'd ever want (it even tells you how you can produce ready-to-typeset material direct from dBase III) - you begin to understand the usefulness of some of the features.

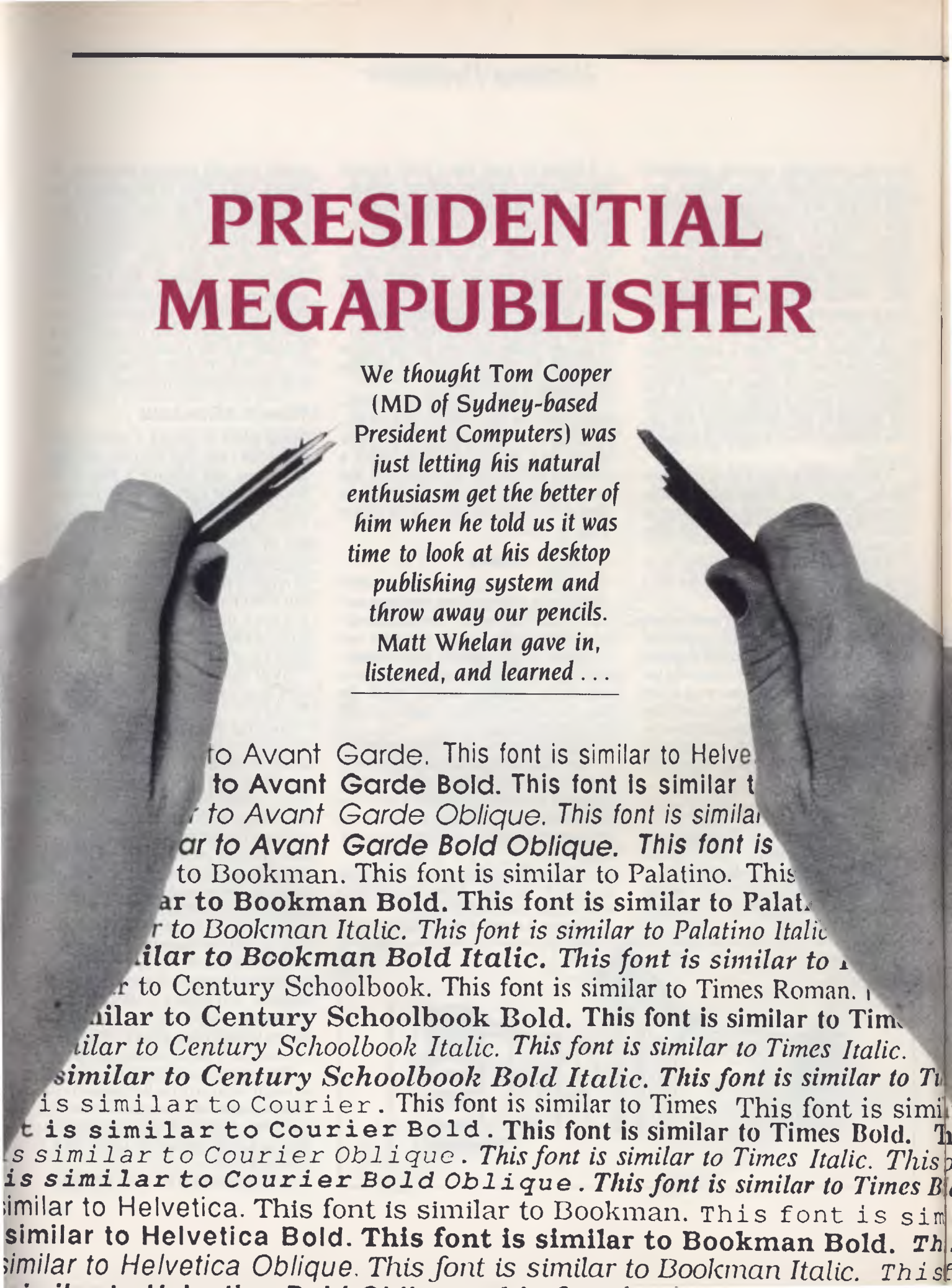
While it's a bit of a bore graphically, it is neat, consistent and comprehensive (and it has lovely headers, footers, numbered chapters and sections, table of contents, and index). Naturally, it was produced entirely on the software it covers (which many other DTP software vendors can't say about their products).

The pre-release manual I received was a 'rough' version of the Reference Guide. Release copies of Ventura will come with the fancy boxed red and grey version, plus a Quick Reference Guide and a Training Guide.

I'm impressed. Yes, *even* at $1800.

PRESIDENTIAL MEGAPUBLISHER

We thought Tom Cooper (MD of Sydney-based President Computers) was just letting his natural enthusiasm get the better of him when he told us it was time to look at his desktop publishing system and throw away our pencils. Matt Whelan gave in, listened, and learned . . .



Megapublisher

HOW WOULD YOU like a small box attached to your PC, which would read in full-page documents or graphics images in seconds, allow you to manipulate the result on the screen in an instant and print it out as quickly as you read it in?

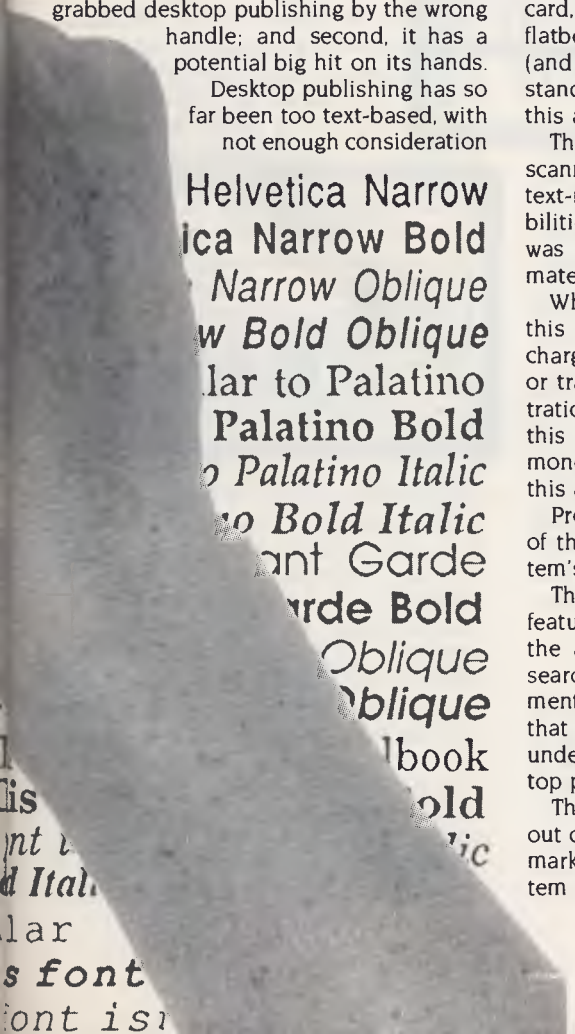
You would? Yes, but of course it should be a real Optical Character Reader (OCR) as well as a bit-image scanner, and for good measure it should double as a facsimile machine controlled by your PC, right?

No, this isn't a dream — you can buy one today.

President Computers' spectacular claims for its Mega Page 'desktop scanning and publishing system' had left me slightly bemused — until I saw it in action. The company's 'Mega- everything' system really does offer faster throughput and more potential versatility than anything I've seen.

After a brief 'play' session with the system (we'll be doing a full review for an upcoming issue) I've reached two (very preliminary) conclusions: first, President has grabbed desktop publishing by the wrong handle; and second, it has a potential big hit on its hands.

Desktop publishing has so far been too text-based, with not enough consideration (or rapid enough development) given to getting graphics, including photographs, into the page. President's system, based as it is around a bit-image scanner, is at the opposite end of the scale.



It's hard to describe this system without appearing to make the same mistake I suggest President has — sounding like it's all scanner and nothing else. But the way the scanning/printing combination works is the key to the system's potential in all areas.

The Megascan software, Megabuffer card, and Advanced Vision Research flatbed scanner are so clever in concept (and execution) that President has, understandably, concentrated its promotion on this aspect.

The company's proud boasts for its scanner tend to overshadow the system's text-manipulation and page-design capabilities — it was almost as if all publishing was based around duplicating existing material.

While there is a significant market for this style of work (for example, anyone charged with updating a technical manual or training guide which used many illustrations would be foolish not to examine this system), the real desktop publishing money will be found half-way between this and typical text-oriented systems.

President is well-placed to grab a share of this market, and that's where the system's big potential lies.

The most recent addition (major new features are appearing almost weekly) is the ability to interface with Digital Research's GEM (the IBM operating environment that was so close to the Macintosh that Apple sued DR) and, because it runs under GEM, the Ventura Publisher desktop publishing software.

These developments move President out of the 'black-box' proprietary software market into the real world where its system becomes useful across a range of third-party applications.

The also-recent provision of facsimile facilities takes the system a step beyond desktop publishing, while the conversion to OCR capabilities (which should have happened by the time you read this) adds yet another dimension to what already looks like the office machine of the future.

The MegaInsideStory

It's hard to describe this system without appearing to make the same mistake I suggest President has — sounding like it's all scanner and nothing else. But the way the scanning/printing combination works is the key to the system's potential in all areas, so it needs to be covered in detail.

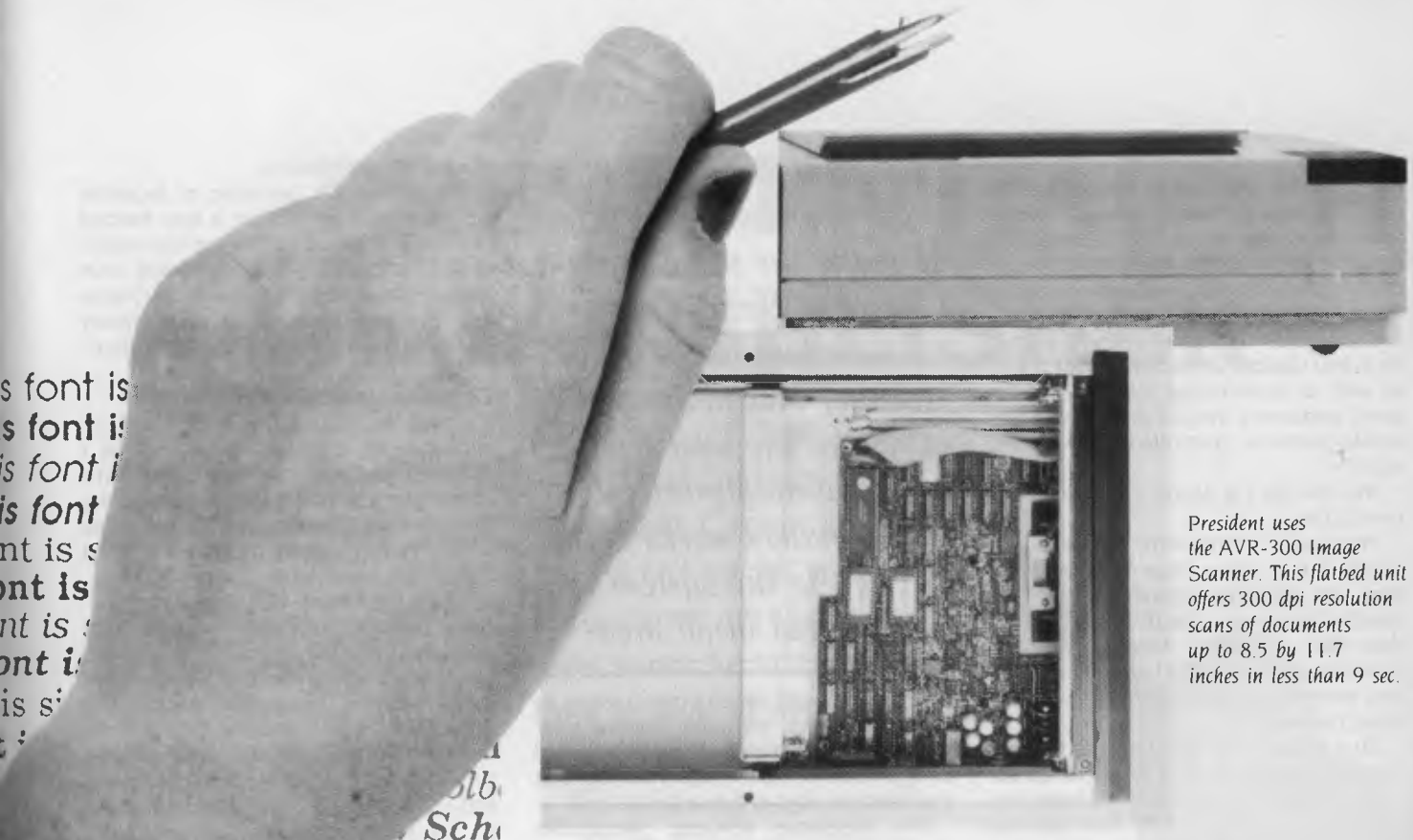
It's best to start with the printer, because it holds the major departure from traditional practice. Normally, a desktop publishing laser printer will have a controller which is a computer in itself. The Apple Laserwriter, for example, is the most powerful computer Apple makes — it has its own Motorola 68000 processor and a staggering two megabytes of memory, for page composition, downloaded fonts and so on.

The President system completely bypasses the printer controller, driving the laser engine directly. Thus it will work equally well with any Canon-engined laser, even the no-featured cheapies.

This system moves the printer controller inside the computer, into a card called the Megabuffer which features its own 1.3 Mbytes of memory (enough to handle a complete bit-image page at the Canon's 300 dots-per-linear-inch — or 90,000 dots-per-square-inch — resolution).

When the Megascan software reads a page from the scanner (also 300 dpi) in a maximum of nine seconds, it reads it directly into this buffer — in effect, directly into the printer! Yet while it is in the buffer, you can manipulate it on the screen (down to the pixel level), resize items, place text on it from disk, and a number of other page-layout operations before saving it to disk or pushing the print button.

When you tell it to print it does so — instantly. Anyone who has watched a laser compose a graphics/text page — or even measured the time it takes to send a megabyte of bit-image data from the PC to the printer — would find the speed almost impossible to believe. I know, I kept checking for sleight-of- hand; I wasn't convinced until I saw a change made on the page and the page printed again — at the same speed, complete with alteration. ▷



President uses the AVR-300 Image Scanner. This flatbed unit offers 300 dpi resolution scans of documents up to 8.5 by 11.7 inches in less than 9 sec.

It's a spectacularly successful technique, although I still have one reservation: so far, MegaPage lacks the versatility of a page-description language such as Postscript. For example, a Postscript printer font is kept as a mathematical representation and can be scaled accurately to any size — using bit-image output means you have to have a separate bit-image representation of every font you wish to use, in every size you plan to use.

The MegaPage system has an impressive range of fonts available at this early stage — Avant Garde, Bookman, Century Schoolbook, Courier, Helvetica, Helvetica Narrow, Palatino, Times and so on — but each font takes up a disk on its own, and is limited to sizes between 6 and 30 point. Eight font families are provided as standard, but the range of sizes and styles is distinctly limited compared to a Postscript printer (but competitive with other bit-image printers like the Hewlett-Packard Laserjet Plus).

Megamore

MegaGEM, Megafreeze, MegaFax — will it ever mega end? It seems so, fortunately, because some of the other add-ons being released have megaordinary names, such as Filemaster and Charactermaster.

MegaGEM is the software package which links GEM applications (like Ventura Publisher and the Mac-style GEM Draw and GEM Paint) to the Megascan image/text-editing system. It consists of three separate programs: a GEM desktop accessory for scanner control and image-format translation; a printer driver for 300 dpi output from GEM applications; and a second driver for 300 dpi output from Ventura Publisher.

It allows the AVR-300 scanner to read images into the Megabuffer from within any GEM application, including Ventura. It can also transfer pixel images between the buffer and GEM image files.

Megafreeze is a memory-resident screen-capture program, which allows you to take a 'snapshot' of your screen (at the same resolution you are running on your display) and place it in the buffer. Then you can enhance it, add text to it, use it as an illustration in a larger document, and so on. Its potential for anyone producing user documentation for PC software is enormous.

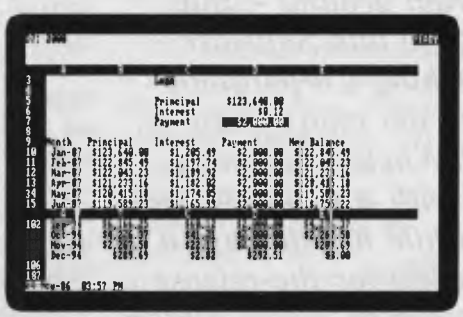
Unlike most screen-capture software, Megafreeze is compatible with high-resolution modes, including the IBM Enhanced Graphics Adaptor (EGA) and the stunning 1280 by 800 pixel Wyse 700 display.

Up to 76 screen freezes can be placed in the buffer at one time, depending on the size option selected and the screen resolution.

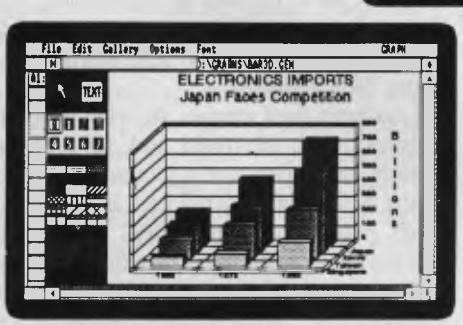
MegaFax is what it sounds like — it al-

Megapublisher

"Anyone charged with updating a training guide or technical manual would be foolish not to examine this system." The illustration shows 3 of the 6 zoom levels available with MegaScan — these allow the user to enhance or edit the image in detail.



Megafreeze takes 'snapshots' of the screen and captures it in a 1.3 Mbyte buffer — the snaps can then be enhanced, have text added to them, and be used in other documents.



lows the President system to be used as a facsimile machine. We've yet to try it, but from reports we've heard the quality of the transmitted images is excellent.

Charactermaster and Filemaster are new developments which hadn't appeared when we saw the system. Charactermaster is the software which allows the scanner to be used as a true OCR — reading text into ASCII files, rather than simply a bit-image of the text.

Filemaster is a fascinating concept — it is designed for the storage of large amounts of information such as office correspondence and so on. The idea is you will be able to scan the documents — or any printed matter you like — and save the images on Compact Discs (up to 1.6 Terrabytes, we're told) for storage and retrieval.

Izzit Megabucks?

The complete President system looks a little frightening at $25,000 plus tax, but when you look at the components of the package it's a value-for-money competitor for any of the serious desktop publishing set-ups I've seen.

That price includes a President 'Publisher 286' computer with a megabyte of RAM, a 47 Mbyte voice-coil (fast) hard disk, a 60 Mbyte tape drive, the Megascan software, Megabuffer card, mouse, scanner, modified laser printer (which, incidentally, can still be used in native mode), GEM and Ventura Publisher. There are five package levels available for those who already have their own computer or laser printer, or who want only parts of the package. These packages start at $4000. □

Tim Hartnell compared President's desktop publishing system and Pagemaker for the PC with Pagemaker for the Mac in our January 1987 Yearbook.

The Harvard School Of Publishing

Harvard Professional Publisher had all the right credentials to become the best desktop publishing program around - until Bestinfo and Software Publishing Corporation removed too many features. Matt Whelan has been playing with a Beta-test copy and, while he will save a full review for the release version, had to devote a little space to a preview . . .

Some of my best friends are desktop publishers, but I wouldn't want them living in my street . . . that's (roughly) the view I've held for the past year.

I've spoken far and wide of the wonders of producing camera-ready artwork on a PC, yet I would not use desktop publishing in this magazine. (At least not in the mass-market sense - we've come very close to it, controlling typesetting machines from our office computers, for the past five years.)

We produce dLetter, our monthly newsletter for dBase users, on a Macintosh/ Laserwriter combination, but I have never considered the technology to be up to the standard of a national magazine.

Until now. (Or very soon thereafter).

We're finaly starting to see WYSIWYG (incidentally, remember when they used to call Wordstar a WYSIWYG word processor?) software that also has real type-handling capabilities. My argument has never been with the 300 dpi resolution of current laser printers (the average person doesn't notice a difference unless you put it side-by-side with phototypesetting), but with the lack of professional-quality hyphenation, justification, kerning and spacing in existing software.

The new wave of programs, both for the Macintosh (Ready Set Go 3 and Pagemaker 2.0) and for the IBM (Pagemaker, Ventura Publisher, Harvard Professional Publisher), all provide these previously missing features.

Very Professional Publisher

As is usually the case with similar software, some handle this critical aspect better than others. Harvard Professional Publisher claims to handle it best.

Harvard, from Software Publishing Corporation (of Harvard Presentation Graphics and the pfs: series fame), has the pedigree. It was developed by Bestinfo as the low-end version of its Superpage professional layout and typesetting software.

Superpage is an IBM AT-based multiuser (networking) system designed for professional typesetting operations. It includes many features the average desktop publisher would never use, but it also boasts techniques we'd all love to have available. It drives several major brands of typesetting equipment as well as the Apple Laserwriter and other Postscript devices (like the Dataproducts and QMS printers and the Linotron 100 and 300 typesetters). It is a high-powered multiuser package which, because it is designed for professional use, is dedicated to producing clean, carefully-spaced type.

The bad news about Superpage is its $10,000 price tag. The good news about Harvard is its 'street' price will be one-tenth of that (recommended retail will be around $1200, but Imagineering's dealers are likely to chop that down almost instantly).

With its background Harvard could have been the ultimate desktop publishing program. It isn't. It has inherited Superpage's excellence in type handling - in this area it's said to be the best on the market - but it is missing many of the features found on opposition programs like Ventura.

I suspect two causes for the lack of features: first, Bestinfo had to remove enough of Superpage's gee-whizzery to retain its high-priced market; and second, when beginner-oriented SPC took over worldwide marketing it insisted on a totally menu-driven user interface with limits on the complexity of menus.

What Harvard does it does brilliantly. What it doesn't do can be incredibly frustrating.

Early Warning

My criticisms may be unfair. I've been using Beta test versions of Harvard rather than the release product - and I've had no manual to help me along the way. Mind you, I've *seen* the manual and, apart from noticing it was a model of clarity and packed full of useful information, I saw little I hadn't already learnt from using the package.

Besides, the Help system works well in my current version (Beta 16 - I started with Beta 8), although I must admit to an unwise but ingrained reluctance to hit the Help key while using any software.

Unlike Pagemaker and Ventura, Harvard handles its own graphics rather than running under GEM or Windows. This is good news and bad news . . .

The good part is the fact you don't have to carry the memory and disk-space overheads of these shells. The bad part is you don't get their assistance in providing device drivers. With the others you have a choice of several screen drivers, for example, all the way from the standard IBM Colour Graphics Adapter (CGA) to devices like the Wyse 700 with its stunning 1280 by 800 resolution. To run Ventura you have to have either a Hercules Graphics Adapter or an IBM Enhanced Graphics Adapter (EGA).

While I agree with Bestinfo's belief that you have to have a high-resolution display for desktop publishing, the others do a workable job on the board most people have, the CGA.

Harvard is also limited in its choice of output devices - you can use only the Apple Laserwriter (or other Postscript printers/typesetters) or the Hewlett-Packard Laserjet.

Again, these are what you really need for desktop publishing (in fact, until HP turns up with its DDL page description language Postscript is the *only* way to go), but Harvard does nothing for those who are content to put up with dot matrix output.

Still, if Harvard's main selling point is type quality, I guess the company is right to avoid low-quality printers.

In many ways Harvard and Ventura take similar approaches.

Harvard also uses text tags that can be put in while the copy is being written, although the method for tagging text once you're on the layout screen is far less simple.

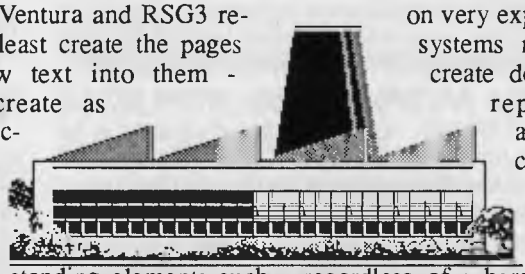
The tag information is stored in a format file, and altering the format will alter the way your document looks.

You can create tags as needed for style variations, including special effects like drop-caps (the big first letter at the start of this review) and bullets. Harvard also pays sepcial attention to tables, list indents and other hard-to-manage text attributes.

Tags are enclosed in angle-brackets -< and > - and, unlike Ventura, their effect lasts beyond the end of the paragraph. In Harvard they behave more like the embedded commands of traditional typesetting, establishing text attributes from that point on until overridden by another command.

In some applications, the fact these tags can be inserted in the text as it is being typed is even more significant than in Ventura. That's because of Harvard's ability to flow multiple pages from a single page design - the sort of capability many a book or technical-paper publisher would kill for.

This feature is yet another advance for WYSIWYG in the battle against command-driven systems. Even the advanced newcomers like Ventura and RSG3 require you to at least create the pages before you flow text into them - Harvard will create as many pages as necessary, using the nominated left- and right-hand page styles (including standing elements such as rules, headers, footers and page numbers), after you design the first page's text area.



You can add illustrations, breakouts and so on anywhere by creating masks or runarounds after the text has been flowed - it will re-flow around them.

More Similarities

Before we get too far off the subject of Harvard's similarities to Ventura (or vice versa) I must moan about an unhappy coincidence - they share a 'bug'.

Harvard also seems to 'forget' about line graphics ccasionally, in exactly the same way Ventura does. It doesn't lose them - but for some reason you can't select them if you want to change or delete them. At least Harvard has an 'out' - we haven't seen the release version yet.

Another shared feature is the separate-file aproach to document storage. Harvard keeps your text and graphics in their original files, although it rewrites the text with line lengths to match the justified column width, and with hyphenation points marked with tildes (you can use tildes to mark hyphenation points).

Harvard keeps a format file for your tags, separate left and right page style files (if they are different), a file for each page of the document, a page layout file (with details of custom text, rules and boxes) and a publication file. The publication file is actually a database recording details of the other files.

One area where Harvard is unlike any other desktop publishing program I've seen so far is its ability to create text runarounds.

You may have noticed the way the text flowed around the edges of the space shuttle drawings in the Ventura review on the preceding pages. This is a useful effect, but so far has been available only on very expensive page makeup systems n Ventura I had to create dozens of small text-repelling frames to achieve that effect because its runarounds work only on the frame containing the illustration, regardless of where the illustration sits in that frame.

It took about thirty minutes to create the runaround on the space shuttle. The runaround you see on this page, performed by Harvard, took about thirty seconds.

(Had I been more experienced with Ventura I probably could have done it in 10 minutes, but that's still 20 times as long!)

More To Say

There's a lot more to be said about Harvard Professional Publisher - more details, more praise, and more criticisms.

But I'm not prepared to put my money behind it (or, if necessary, to slam it) until I spend some more time with it -and, most importantly, until I've seen the release version and had a good read of the manual. Watch this space for the full review! □

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While AT-class computers will give super performance, Ventura Publisher will run quite acceptably on a standard PC provided it has at least 512K memory, Winchester disk and graphics card. A mouse is also required. Printers and image scanners are optional, depending on your needs.

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TOUCHING BASE

In the 'Your Computer' office is a pile of databases at whose base sits Rose dVines, frantically riffling through the pages of multiple manuals. We bring her food, strawberry daiquiris, small gifts to lighten the load on her mind. As we mentioned a month or two ago, she has become rather like a database herself — a database on databases. Here she imparts more of her accumulated wisdom, this time on four recent database releases.

My story is slightly different to the editorial licence deployed in the introduction to this article. My accumulation of knowledge is far from voluntary. Each time I wander into the *Your Computer* office, Natalie oozes from her desk cooing "Rose, just the person I want to see. Here's a teensy new database I'm sure you're dying to review." And with that, she dumps several hundredweight of manuals and a fistful of disks into my clenched hands, and propels me towards the door with the soothing words "No hurry, by next week will be fine."

Trying to keep up with the database market is a full-time job. New products, new versions of old favourites, cheap copycat versions and useful add-ons appear each week. I currently have nine different databases or database-related products sitting on my hard disk waiting for review, being used as standards for comparison, or being used in real-life development work.

In an effort to clean up my disk and appease my editor, I've placed four of those databases under the microscope: Reflex, Powerbase, Tas Plus and Guru. 'Database' is used rather loosely here, as two of the

products — Reflex and Guru — merely incorporate a database as part of their features. Powerbase has been around for some time, but Release 2.2 has only recently hit the streets, offering greatly improved speed, and fewer restrictions. Tas Plus is a rewrite of TAS, and it gave me a feeling of *deja vu*. No wonder: its author also wrote the Sensible Solution, one of the Great Database Contenders (see YC, January, 1986), which didn't really appeal to me.

Reflex

'Reflex: the Analyst' comes from software company Borland International — famed for producing good software at very reasonable prices. Judged purely as a database, Reflex is a smooth, fast 'list manager'; not particularly powerful, but excellent for handling single-file applications. However, Reflex is much more than a database. Borland's advertising is largely aimed at current users of dBase and Lotus 1-2-3 who wish to get a better understanding of all the information stored in their databases or spreadsheets. Reflex provides a whole set of tools for representing data so it is easier to digest.

The central concept in Reflex is the 'view'. A view is merely a way of representing stored information, and Reflex provides five ways of doing this: the Form, List, Graph, Crosstab and Report views.

The Form view provides detailed information, one record at a time. It is similar to a single card in a card-filing system. While Reflex can be used with data from other programs, you can also use it as a standalone product, and so there are ample facilities for creating and building Reflex databases, with the form view providing the standard entry screen. Reflex's database-creation process must be the simplest method around; to create a field, all you do is type its name where you want on the form-design screen. The first value you enter determines the 'type' of the field — whether it's text, numeric or date. Fields can also be repeating text or integer — two methods of saving space — or calculated from other fields and Reflex functions, a very useful feature indeed.

The List view displays several records at a time in a row-and-column format. Both the fields to be shown and the order in which they are shown may be specified. You can filter a database, using operators such as >, <, =, AND, OR and NOT, so only a selected group of records is displayed. You can also use these operators to do a 'partial retrieve' of a file; this is especially useful when dealing with a large database, as Reflex keeps the work file in memory, and you may find yourself hitting the limits of that memory.

Borland is aiming Reflex at current users of dBase and Lotus 1-2-3 who wish to get a better understanding of the information stored in their databases or spreadsheets. Reflex provides a set of tools for presenting data so it is easier to digest.

The Graph view provides graphic representation of selected fields from a file. The graph formats available include scattergrams, pie charts, bar and line graphs. Once the desired fields have been selected, the graph is drawn automatically. It is then possible to select a point on the graph and have the appropriate List or Form details displayed (in separate 'windows' on the screen, if you want).

A numeric summary table is provided by the Crosstab view. After selecting which data to use, the Crosstab view can provide averages, totals, counts, standard deviations, minimums, maximums and variances.

The Report view lets you create custom printouts by designing the format on screen. You can design anything from mailing labels to complex reports with multiple break levels, calculated fields and conditional (IF ... THEN, CASE and CHOOSE) expressions. The Report view also contains utilities for importing and exporting data to other programs, and for merging databases. My one complaint is this view is not integrated with the rest of the program — you have to exit to DOS and then run the Report view separately; a poor piece of design.

Other Reflex features include a variety of numeric, logarithmic, trigonometric, statistical, date and financial functions, with useful examples of each provided in an appendix. Information in Reflex files can be sorted and searched, and a Vary feature lets you quickly create dummy records to test 'what-if' analyses of information.

Importing and Exporting

Obviously, an important feature of Reflex is its ability to import data from other programs, so you can use it to analyse your current data. Reflex can handle data from File, dBase, Lotus 1-2-3 and Symphony, as well as standard ASCII files. I converted a number of dBase files, with no problems at all. However, exporting data from Reflex to other programs is not quite as neat, and requires some manipulation at the receiving end.

The extensive and consistent use of menus, function keys and built-in help screens makes Reflex easy to use and quick to learn. Reflex works well either with or without a mouse. I liked how the system always offered a list of permissible selections (such as fields or files) at each point. The manual is delightfully clear and concise, and not too overwhelming in size!

If it still seems there's too much work involved in developing a system using Reflex, Borland has produced another product called Reflex Workshop, which does almost all the work for you. Workshop contains 22 'templates' — ready-made files and views which will accomplish a variety of common business tasks in such areas as sales and marketing, administration, production and operations, and accounting and financial planning. Some of the templates included are Scheduling Appointments, Project Management, Managing Employment Applications, Mailing Lists, Tracking Sales Leads, Researching Store Check Inventory, Summarising Repair Turnaround, Analysing Product Costs, Tracking Petty Cash, Maintaining Letters of Credit, Reporting Business Expenses and Planning Commercial Real Estate Investment. If you need to quickly get a system running which will perform any of these tasks, or a variety of others, Reflex Workshop provides a simple answer.

For a buck under $250, Reflex is excellent value. As a standalone database product, Reflex outdoes most of the other list managers on the market. It's quick, slick, easy to learn and easy to use. And, if you already have dBase or Lotus, but want to get a better handle on all those figures, Reflex is packed with useful features for storing, manipulating, analysing and reporting on anything which fits into a single-file structure. This is definitely a pro-

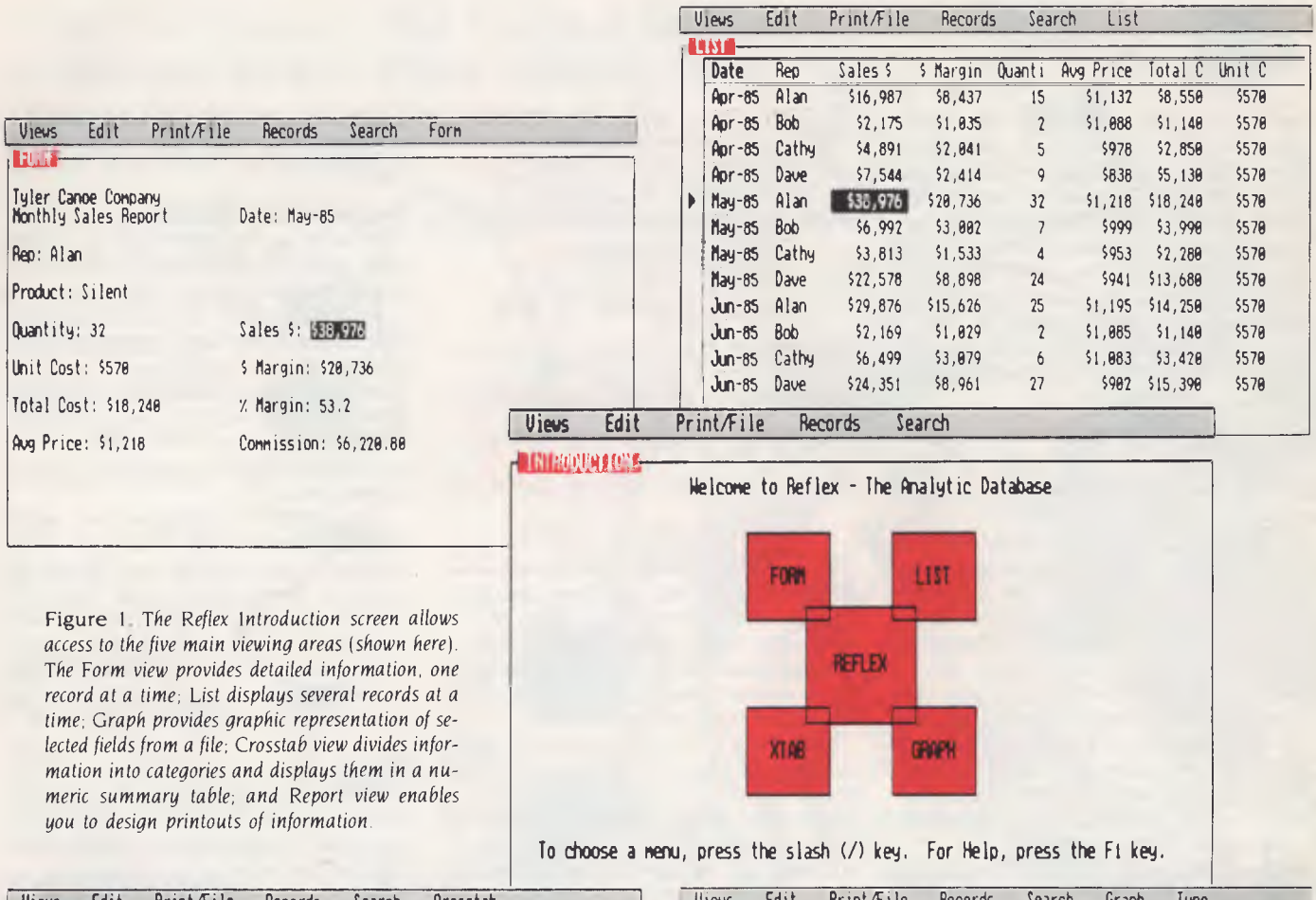

Figure 1. *The Reflex Introduction screen allows access to the five main viewing areas (shown here). The Form view provides detailed information, one record at a time; List displays several records at a time; Graph provides graphic representation of selected fields from a file; Crosstab view divides information into categories and displays them in a numeric summary table; and Report view enables you to design printouts of information.*

gram which can be used quickly and effectively by the non-programmer.

Powerbase

Powerbase is a rare beast — a menu-driven, relational database *without* a programming language. This combination is rare because completely menu-based systems tend to lack the power and flexibility needed to produce relational, multi-file applications. While products like dBase III

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VIASOFT is an easy-to-use communications program for Telecom Australia's VIATEL database service. It is currently available for Amust 816, Bondwell 14, Kaypro 2, 4 and 10, Osborne 1 and Osborne Executive computers.

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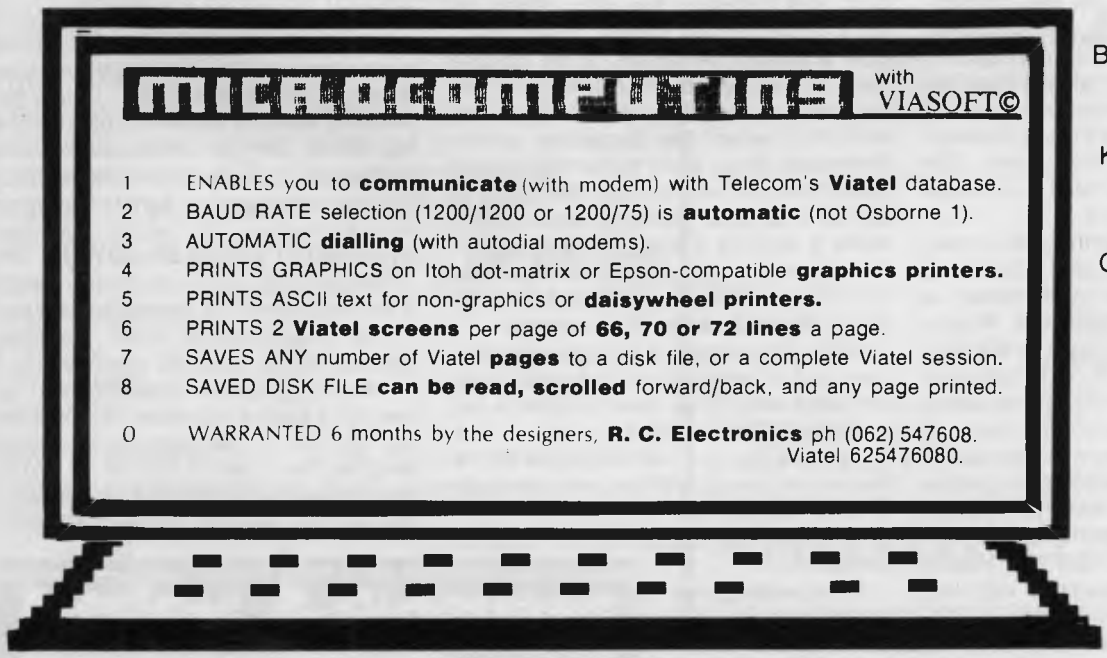

Amust 816

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Bondwell 12, 14

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Kaypro 2, 4, 10

*

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*

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DEALER ENQUIRIES WELCOME

Plus and Knowledgeman/2 can be menu-driven, the really powerful commands are generally easier to handle by using the in-built programming languages; Powerbase attempts to combine power and ease-of-use, and it does a damn good job of it.

One of my jobs when I'm not writing for *Your Computer* is recommending hardware and software for various community organisations. Quite often they need something more than a simple list manager, and so I point them in the direction of one of the relational database managers. But I do so with some qualms, as many of these systems are difficult to learn, especially if you need to use the multi-file facilities. You usually end up getting your hands dirty with programming if you want to make the most of them. Many community groups are underpaid and overworked, and certainly can't afford to pay a programmer to develop a tailor-made system.

Powerbase slots neatly into the void between the simple list managers and the relational heavies. It gives you relational capabilities, but with push-button ease, making it ideal for organisations which have neither the time to devote to learning a complete database language, nor the money to pay someone else to do it for them.

The system's ease of use is provided not merely by the menu system, but also by a system of online help and well-thought-out prompts. These aids are developed consistently throughout all the program's functions, and so it only takes a short online tutorial to provide most users with all the knowledge they need to start developing applications with Powerbase. The documentation — if you need it — is also well-designed and helpful.

Everything, from designing a record format and validating data input, to creating forms, reports and your own menus, is done through interaction with Powerbase's prompts. Your answers to the program's questions enable it to produce code which would normally take hours of programming.

File definition involves a screen-painting process, and field building is done in response to prompts from Powerbase. Apart from the fairly standard alphanumeric, numeric, money, date and logical fields, Powerbase also supports calculated, look-up and functions fields. Calculated fields are computed from values in other fields in the same record; look-up fields use a look-up file to provide the appropriate value; and function fields show the maximum, minimum, average, sum or count of a field in another file. Report definition is also carried out using a screen painter and prompts, and a simple-to-use label-generating routine is provided.

Something you can't do in Powerbase is create a complete screen — each screen you create will contain prompts from Powerbase. This means it's no good for developers who want to create a system with a unique appearance for a customer.

Zoom Zoom . . .

Relational capabilities are provided by the Datazoom feature (the marketing bods must have been let loose on that one). It lets you relate information from one file to another, automatically finding a related record in a lower-level file when you have indicated a selected field in the main file.

For example, you have two files — one listing all the community organisations in your local council area, with one field indicating the funding body for each organisation, and a second file with details on each of the funding bodies. To automatically obtain all the details on the funding body for a particular organisation, you find the appropriate record in the first file, and then select the Datazoom option. Powerbase drops down to the next level of related records, and displays the details of the funding body. Defining 'zoom-linked' fields is done by a simple prompting process when you first create your files, and you can zoom down (or up) 10 levels, which should be more than enough.

While Datazoom is a very powerful feature, and its simplicity is a delight, there are some restrictions. Most notable is the inability to list more than one record in a lower-level file: you can only zoom to the first record specifically matching the higher-level record; you cannot then check through the subordinate file for other information.

Three ready-to-run applications are included in the Powerbase package: an electronic phone directory, a stock-tracking system and a project-management system. Apart from being useful in themselves, they give you an idea of the sort of things you can do with the program. You can also buy Powerbase templates, which provide ready-to-use structures and systems for applications such as human resource management, job costing and inventory control.

There are some things I don't like about Powerbase. The program uses the function keys F9 and F10 for highlighting desired options and F8 for selecting an option in each phase of operation. I found this rather clumsy, and would have liked to be able to use alternative keys (such as the Enter key) for selection, and initial letters or the cursor keys for highlighting options.

Because of the amount of information provided by screen prompts, the screen sometimes looks a bit crowded. Powerbase lets you define a help message for each field, but this message is often lost in the surrounding info. A bit more control of the screen's appearance would be handy.

There are also limitations on field definitions which, while not really hampering me in setting up applications, started to irritate me, and emphasised the fact that a system which is so easy to use must lose a little in flexibility.

None of these problems is important enough to reduce the utility of Powerbase. It costs $895, which, I guess, is what the market will bear. Seems to me most of the databases (and other types of software) on the market are overpriced. I wonder what a product like this could do if Compuware — the manufacturer — did a Borland and went for super-competitive pricing. While $895 is affordable for most businesses, it represents quite a hurdle for community groups, services and clubs — organisations for which Powerbase would make the ideal choice.

Rumours are afoot a multi-user version is in the pipeline. I'm looking forward to it.

Price considerations apart, Powerbase deserves to do well. Its combination of power and simplicity is stunning and, unless you have the resources of a programmer on staff, or limitless time to spend learning the finer points of a system, Powerbase is an excellent choice. In fact, it may well be the only choice.

TAS Plus

If, on the other hand, price is your main worry, and yet you need the power of a relational database, then TAS Plus is worth a look. At $199, it undercuts almost everything else on the market (notable ex-

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ceptions being the fascinating Australian product Meta4, and the dBase clone VP Info). For your money, you get a programmable database which can link up to 16 files.

TAS Plus is built around a data dictionary. Every field defined is placed in a central file. This means if you want to use a field such as ADDRESS1 in a number of different files, you need only define it once, and from then on TAS Plus will look up the field's characteristics automatically when you use it in another file. Not only is this time saving, but it also ensures consistency throughout your files, which is especially important when you wish to relate fields.

There are three ways to create fields and files. You can add them directly to the data dictionary. You can use the 'Create database' option, which prompts you for field names and types, and then automatically updates the data dictionary; you can then add data to your database through a default entry screen or you can 'paint' your own. You can also use the 'Create program' option to paint a data-entry screen, defining the fields as you go, with TAS Plus creating a data entry program and data dictionary entries to match. Fields may be alphanumeric, numeric, date (either mm/dd/yyyy or mm/dd/yy), time, overlay (combining two or more fields) or one-dimensional arrays (in other words, a list of values).

Adding and editing data can be done using the default TAS Plus screen layout (one record per screen), or a painted screen design. Almost no data validation facilities are available, unless you write a program to perform validation checks. Records may be retrieved sequentially, or by using key fields, and it's possible to search for either exact matches or the closest match. You can also browse through a column display of 10 records at a time, and edit these records.

Simple reports can be created with TAS Plus's Report Writer. First, you define your report format, specifying the fields to be used and nominating fields (not necessarily key fields) to be used as selection criteria. Once you have saved your report format, you can run it any number of times, listing a different range of records each time, or displaying the whole file. Reports can be sent to the screen, a printer or a disk file.

TAS Plus's programming language is a funny mix. It's a bit light on conditional and procedure facilities. It has a GOSUB command, but no facilities for parameter passing; it has IF ... THEN ... ELSE, FOR ... NEXT, and WHILE, but no AND or OR. This makes record selection difficult — a lack which is also felt at the non-programming level. It's possible to simulate AND and OR, but the developers really shouldn't have left them out in the first place. It's also lacking in functions for manipulating data.

On the other hand, it has some impressive commands, including multiple windows, access to the complete IBM character set, a trace function and debugging.

You can run DOS commands or other programs from within TAS Plus, and you can also import and export dBase and ASCII files. You can have 16 TAS Plus files open at once, and can relate fields and records from one file to another.

Not the Sensible Solution!

When I first started using TAS Plus and realised it was closely related to the Sensible Solution, I wasn't too excited. One of the big marketing points with the Sensible Solution was its 'syntax-error-free language'. This was a program editor which guided you through a series of menus, until each command line was built up from the elements you had chosen. Impossible to make syntax errors, sure; but it drove me nuts! For a start, you were restricted to using the Sensible editor; the menu system didn't help fluency in writing programs; and if you tried to use fields or variables not yet in the data dictionary, you were stopped dead.

Well, you guessed it, TAS Plus has the selfsame editor. For newcomers to programming and databases, it may not be so irritating. You can still create impressive systems with the programming language, and the guidance provided may well prove comforting. For me, it's enough to turn me off the whole program.

Documentation gets about 5.6 out of 10. The manual consists of a fairly thorough tutorial and a reference section, with the former being more useful than the latter. I'd like to have a more comprehensive overview of TAS Plus than the piecemeal view provided. At least it's concise.

Developers can buy a special version of TAS Plus which has fewer restrictions and also comes in a multi-user version. Included in the Developer's Version is TAS source code for a number of the program's own features — including the editor. The single-user version costs $569, and the multi-user $869.

While I don't like TAS Plus's editor, and there are some marked weaknesses in the system, I still think it is remarkably good value for $199. While the environment may be constricting, TAS Plus supplies solid relational facilities at a reasonable price.

Guru

Guru is awe-inspiring. It consists of a powerful, programmable relational database, a spreadsheet, business graphics, communications package, word processor, natural-language facility and an expert-system builder. It requires 512 Kbytes of RAM and a 10 Mbyte hard disk to run (preferably on an IBM AT or compatible), and comes with over 1700 pages of documentation.

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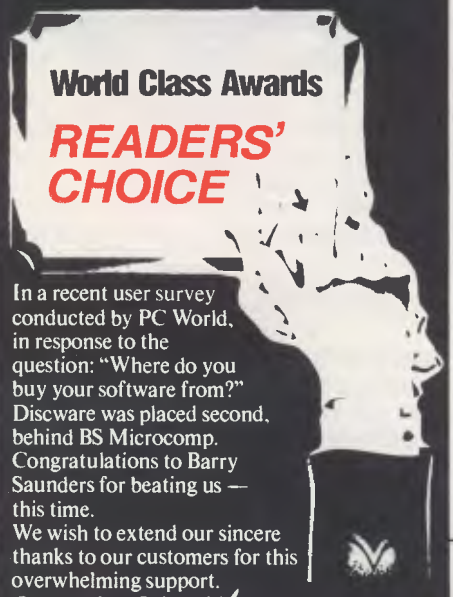

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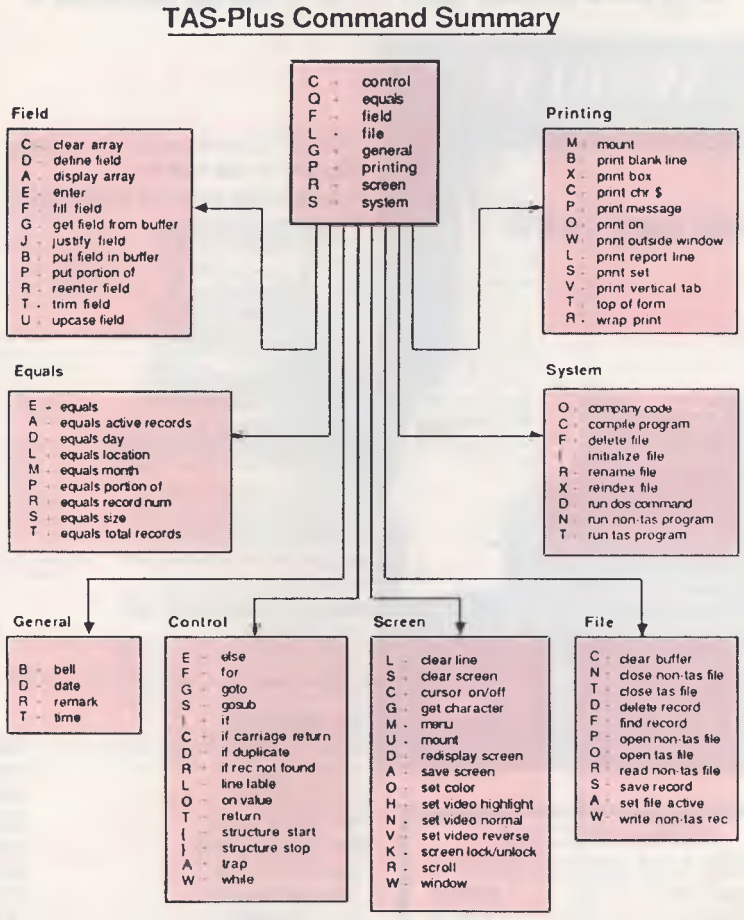

Figure 2. *This well presented manual, which folds back for easy reading, features a reference guide, a schematic of the* TAS Plus *Language, which provides the array of commands at a glance.*

To my immense relief, much of the package was familiar territory. Guru is, in fact, an artificially intelligent version of Knowledgeman/2. I've always liked Knowledgeman, joint winner — with Dataflex — of the Great Database Search (YC January, '86). However, it has never been a system for the faint of heart, and Guru tests the user even further.

As I've already covered the features of Knowledgeman in previous reviews (Knowledgeman Version 1 in *Your Computer* September 1984, and Knowledgeman/2 in January 1986), I'll devote most of my time to the expert-system builder, with just a brief rundown on Guru's 'information management' features.

The manufacturer, MDBS, calls Guru 'Artificial intelligence that means business', and it's the first commercial combination of sophisticated business tools and an expert system. The database is one of the most powerful on the market, with interactive and procedural modes of operation. Its programming language is similar to dBase's, but there are fewer restrictions than in dBase, and it has stronger relational, functional and statistical capabilities. One problem I should mention is Guru doesn't write any of your data to disk during the data entry process; it's not until you exit the data-entry phase that the database file is updated. This is done to make the program faster, but beware lest someone trips over your power lead and you lose a couple of hours' work.

The spreadsheet at first seems a little restrictive, with limited formatting commands, and a worksheet of only 255 by 255 cells. However, each cell can contain not only numbers or formulae, but also programs written in the Kman database language, input to graphs or even a command to the telecommunications program to download data from a dial-up database. A cell can also refer to another spreadsheet, so the actual size of a spreadsheet is enormous.

The graphs available include bar, three-dimensional bar, area, pie, line, scattergrams and high-low-close. They can be based on adhoc queries, spreadsheets or two-dimensional arrays, and you can display multiple graphs on a single screen.

The communications program provides asynchronous communications from 50 to 19,200 bits per second, with complete control over word length, parity and stop bits, and XON/XOFF handshaking. Kermit, Xmodem and unformatted file-transfer protocols are all supported.

Guru's text processor doesn't quite measure up to the standards of the other elements of the system, although it includes most of the usual features of other word processing systems. Its most frustrating feature is its use of Wordstar-like commands to perform non-Wordstar-like functions. On the positive side, you can incorporate Guru commands within the text, and then execute the commands when you print the file; this means you can include up-to-the-minute data in a report or letter you're producing.

As you'll have noticed from my description of these features, everything in Guru is integrated — you can transport data and commands between any of the programs, enabling you to build systems of amazing power and complexity.

The Teacher

At the heart of Guru is the expert-system builder. This is a remarkable system, with enough power to enable it to compete with dedicated microcomputer expert-systems tools. Guru uses the rule-set approach to creating expert systems: you provide a series of rules necessary to make a decision, and Guru follows these rules to reach the same decision. MDBS claims it can handle rule sets containing 3000 rules. If you can dream up a system which requires that many, you'll probably run into hardware limits long before you've reached the software limit.

Guru supports both backward and forward chaining. Backward chaining (the default method of operation) basically involves defining the goal, and then searching the rule set for the first rule which might produce the goal. If this rule is true, it is 'fired' or executed. Forward chaining tests rules and then performs the required actions until the goal variable is assigned a value.

When testing Guru, I set up a system

which would test the eligibility of an organisation to receive funding from an (imaginary) government body. Criteria for approval included, among others, geographical and demographic information, the existence and location of organisations providing similar services, time of year (near the end of the department's financial year?), cost effectiveness, and the political climate.

How to define such variables? Well, I didn't have to, or, at least, not precisely. Guru let's you delve into the realms of uncertainty, where 'fuzzy variables' and Boolean functions such as 'MORETRUE' roam. You can assign 'certainty factors' to variables and create variables which have more than one value (up to 255 are allowed), with each value assigned a probability or certainty factor (that's what is meant by a fuzzy variable). You can also produce multiple values for your goal variable, so you can suggest the *likelihood* of an outcome.

During an expert-system consultation, Guru asks questions of the user to gain sufficient information to produce a result (or to show a result is not possible). Guru can tell you the rules it followed to reach a particular result, and the data used in the process. You can also stop Guru during a consultation, to see why it is asking a particular question.

Talking to Guru

Guru provides almost an overwhelming variety of ways to interact with it. For the new user, there is a system of menus, which overlap on screen to indicate the route by which you've travelled to your current point. Anything you can do using the menus, you can also do using Guru's command language and, in fact, you can do a lot more. Commands may be issued interactively — providing an immediate response from Guru — or from procedure files, which consist of lists of commands. An extensive context-sensitive help system, with hundreds of screens of information, is provided at the press of a key.

Chat is Guru's natural-language interface, which allows you to issue commands in English. Chat starts with a vocabulary of 300 words, plus the names of all the files, fields and variables you are using. You can add words to Chat, and teach it what they mean. The PREVIEW command lets you see the way Chat translates your English command into a valid Guru command — providing a good lesson in how to write your own Guru commands.

You can also interact with Guru through database programs or expert systems built with Guru. Thus, a programmer and an expert in one field could get together, develop an expert system in Guru, and then turn it loose on inexperienced users.

You and Guru

Who should buy Guru? Well, I'd better tell you the bad news.

The documentation is appalling. MDBS has always stuffed up when it comes to writing manuals, and with Guru it's outdone itself. There are four manuals in all: the Menu User's Guide and the Command User's Guide cover the same information for the two different interfaces; the two reference manuals go into the details of Guru's commands. While there are patches of interesting and readable information, there is no description of designing an example expert system, and I spent hours experimenting onscreen before I could come back to the manuals and make any sense of them. It's about time MDBS spent a little more on its documentation — its products would then be unbeatable.

Having said all that, I should mention that the local distributor of Guru, Database Network, recognises the deficiencies in the manuals, and includes a copy of a book called *Manager's Guide to Expert Systems Using Guru* with each package sold. I didn't get a copy with the review program, but evidently this volume more than adequately does the job which should have been done by the manuals.

The other bad news is the price. Guru first reared its head in Australia in mid-'86, with a price tag reading just over $4000. When I was writing this review, I thought I better check with John Ulbrick from Database Network to see if the price had changed at all. Hang on to your pants — the current price of higher knowledge is $10,500 (excluding tax). And, unlike Knowledgeman/2, you can't buy Guru's components in separate modules. This is obviously not a program for mere mortals.

I asked John for enlightenment: evidently MDBS looked round at the competition in the United States, and all it could find was M1, an expert-systems shell from Tecknowledge — priced at US$5000. That's all it needed to jump the price from US$2995 to US$6500, which translates into five figures in our currency. If this is 'what the market will bear', then the market is bats. It's probably an indication of the presence of too many mainframe computer types in the buyers' seats — they've always paid through the nose for very average mainframe software, and now they're applying the same dumb rules in the micro arena. I feel pretty disgusted at the artificial pricing which prevails today. No wonder Borland is such a success.

Anyway, evidently it *is* what the market will bear. Guru received a lot of attention at the First Australian Artificial Intelligence Congress, where it was displayed alongside hardware and software systems selling for hundreds of thousands of dollars. As you can imagine, most of Database Network's customers are banks, other financial institutions, large legal firms and government departments. Many of these organisations already have expert systems 'cells' within their DP departments, and so they have both the money and the expertise to be able to use Guru. Once you've bought your original copy, you can get runtime versions for $450, so well-to-do software developers may also be prospective disciples of Guru.

It's a shame the pricing and documentation put Guru off limits for most of us, as it is the most innovative, powerful and flexible system I've seen on a micro. It should find a welcome home in companies with the resources to tackle it. □

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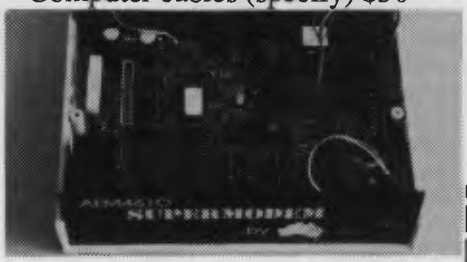

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BYTING PRODOS BACK - Part 4

THE APPLEWORKS database function is one of the more innovative pieces of software writing I've seen over the past few years. Not that it's any great shakes as a database manager; it is probably more correctly described as a super list-manager, but it does what it claims to do, and it does it well.

It has been cleverly written to conserve disk space and overcome problems for inexperienced or occasional users, and it is well integrated with the word processing and spreadsheet modules.

In the words of Schumaker, this level of database manager is "appropriate technology" for most home, education and small-business users.

For readers of this series, the way in which data files are stored on the disk is probably the most interesting aspect of Appleworks. And the way in which the program handles variable record lengths is the most interesting deviation from normal file-handling techniques.

Does Appleworks use a sequential or a random access file?

Actually it uses neither — or both — depending on your biases. Sequential files are written and read in strict sequence, from beginning to end. Their main advantage is that they don't consume unused space. You don't have to allocate a set number of characters to a field and then waste this space if the field doesn't hold data.

A random-access file sets aside a certain number of character spaces (memory locations) for each field (and cumulatively for each record), and these spaces are allocated even if not used. It wastes memory space, but has the advantage that the program can jump quickly to any record in the file without having to laboriously read every record from the beginning.

If you have 200 memory locations reserved for each record, and you want to jump from the beginning to record number 290, the computer can simply calcu-

late 200 x 290 = 58,000, and jump this many locations. One calculation and one jump.

With random-access fields you can also add data to an empty field or make changes to data without having to reshuffle and re-locate all subsequent data in the file.

The Appleworks database function appears to work like a random-access file, except it doesn't reserve (waste) space. When you set up your record fields you give them names, but you don't allocate a field length or character type (except for fields named 'Time' or 'Date', which automatically convert data to a standard format).

Since, with this technique, there is no simple way to calculate where record number 290 begins (since each record is variable in length), Appleworks must do a series of calculations to get to the 290th record.

At the beginning of each record, Appleworks stores a value showing the total record length. The computer therefore only needs to read this value to know how far to jump to the value of the next record. It can therefore do a series of hurdles over the data in the records, landing each time on a control value telling it how big to make the next jump.

It will take 2900 calculations to jump from the beginning to the 290th record, which is a lot slower than a true random-access file. But it is much faster than a sequential file which might require, say, 50,000 characters to be read in order. With the speed of modern single-user desktop computers, the time taken to make 290 calculations isn't noticeable, anyway.

Figure 1 shows a sample record screen dump from an Appleworks database file called Address.File, and Figure 2 is the Pro-byter printout of the format block of that file.

To refresh your memory: the left column on a Pro-byter printout is the ASCII interpretation of the bytes in each block, while the three columns to the right are dual-hex bytes grouped in fours.

The bottom two-and-a-half lines give the program status details — this is Block 9 Part B of a file containing 30 blocks, and the cursor is on byte $100 (decimal 256).

As we have seen previously, Block 1 contains the file index which tells the computer where on the disk to find the other blocks. Space is allocated strictly in order.

Block 2 Part B (Figure 2A) contains the field-name information which flows over to Block 3 Part A (Figure 2B). This field-

```
File: Addre  .File          REVIEW/ADD/CHANGE  Escape: Main Menu

Selection: All records


Record 35 of 157
--------------------------------------------------------------------------------
Prefix: Ms
First Name: Helen
Surname: Besley
Status: -
Company: Burson-Marsteller
Telephone: (07) 221 5288
Address 1: 12th Fl Network House
Address 2: 344 Queen Street
Town/City: Brisbane
STATE: QLD
Postcode: 4000
Data 1: -
Data 2: -


--------------------------------------------------------------------------------
Type entry or use @ commands                                  @-? for Help
```

Figure 1. *A screen dump of a sample record from an Appleworks database file.*

```
nager:Applix   6E616765 720E4170 706C6978
 Pty Ltd:579   20507479 204C7464 08353739
 6038:P.O. B   20363033 380C502E 4F2E2042
ox 103:1/534   6F782031 30331731 2F353334
 King George   204B696E 67204765 6F726765
s Road:Bever   7320526F 61640D42 65766572
ly Hills:NSW   6C792048 696C6C73 034E5357
:2209 Develo   04323230 39204465 76656C6F
ped Z80 card   70656420 5A383020 63617264
 for Apple /   20666F72 20417070 6C65202F
/c k::Ms:Hel   2F63FF6B 00024D73 0548656C
en:BesleyA:B   656E0642 65736C65 79811142
urson-Marste   7572736F 6E2D4D61 72737465
ller:(07) 22   6C6C6572 0D283037 29203232
1 5288:12th    31203532 38381531 32746820
Fl Network H   466C204E 6574776F 726B2048
ouse:344 Que   6F757365 10333434 20517565
en Street:Br   656E2053 74726565 74084272
isbane:QLD:4   69736261 6E650351 4C440434
000 .::Ms:Je   303030FF 2E00024D 73054A65
nny:Bonnin:F   6E6E7906 426F6E6E 696E0250
R:Au           52104175 TRACE:ADDRESS.FIL
BYTE      VALUE     n  BLOCK  9 OF 30
256(#100) 110(#6E)  .  15(#0F)   B     2
```

Figure 2. *The Pro-byter printout of Block 1 of the record in Figure 1*

```
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::::::::   00000000 00000000 00000000
::::::Prefix   00000000 00065072 65666978
rsme2:::::::   72736D65 32000000 00000000
::::First Na   0000000A 46697273 74204E61
me3:::::::::   6D653300 00000000 00000000
::Surnameame   00075375 726E616D 65616D65
4:::::::::::   34000000 00000000 00000006
Statusene05:   53746174 7573656E 65303500
::::::::::Co   00000000 00000000 0007436F
mpanyne06:::   6D70616E 796E6530 36000000
::::::::Tele   00000000 00000009 54656C65
phone07:::::   70686F6E 65303700 00000000
::::::Addres   00000000 00094164 64726573
s 108:::::::   73203130 38000000 00000000
::::     .     00000009 TRACE:ADDRESS.FIL
BYTE      VALUE     d  BLOCK  2 OF 30
492(#1EC) 100(#64)  $  7(#07)    B     2
```

Figure 2A. *Block 2 of the record in Figure 1*

name information takes up a variable amount of space, and is followed by print-format information, if you have set up any print formats.

Notice the capital P in the word 'Prefix' is hex $50 (standard ASCII), and immediately preceding it is $06. It's not hard to work out that this indicates the field-name length. The characters after the x in 'Prefix' are just junk left over from a previous version of the file — the field names must have been changed. Twenty-two bytes are allowed for each category, of which 20 can be used for the name.

I can't provide full details about these field-name header bytes, but some of the more important deserve comment:

Byte 1 & 2: Number of bytes in this header record.

Byte 31 & 32: Cursor direction.

Byte 36: Number of categories per record (from $01 to $1E).

Byte 37 & 38 Number of records in file.

Byte 39 Number of reports in file (up to 8).

Byte 40 to 216 Formatting information.

```
Address 209:   41646472 65737320 32303900
::::::::::To   00000000 00000000 0009546F
wn/City10:::   776E2F43 69747931 30000000
::::::::STAT   00000000 00000005 53544154
ECity11:::::   45436974 79313100 00000000
::::::Postco   00000000 0008506F 7374636F
de 12:::::::   64652031 32000000 00000000
::::Data 1de   00000006 44617461 20316465
:P:P:P:P:P:P   00D000D0 00D000D0 00D000D0
::Data 2:P:P   00064461 74612032 00D000D0
:P:P:P:P:P::   00D000D0 00D000D0 00D0000C
Label format   4C616265 6C20666F 726D6174
::::::::::::   00000000 00000001 08141D25
:::)))))))))   01010129 29292929 29292929
))))))))))))   29292929 29292929 29292929
))))::::::::   29292929 00000007 07070707
::::::::::::   08141507 08090A0B 0C0D0E0F
::::::::::::   10111213 14151617 18181818
::::::::::::   18181818 00000001 02030406
::::::::::::   050E0F10 11121314 15161718
:::::::  ''''  191A1B1C 1D1E1F20 21212121
''''           21212121 TRACE:ADDRESS.FIL
BYTE      VALUE     c@  BLOCK  3 OF 30
16($10)   0($00)     @  9($09)     A     2
```

Figure 2B. *Block 3 of the same record.*

Byte 223 to 337 Selection information.

Byte 358 on Field names in groups of 22.

This variable-length field-name header is followed by report-format information (if any) in groups of 600 bytes (see lower half of Figure 2b). Byte 39 above tells you

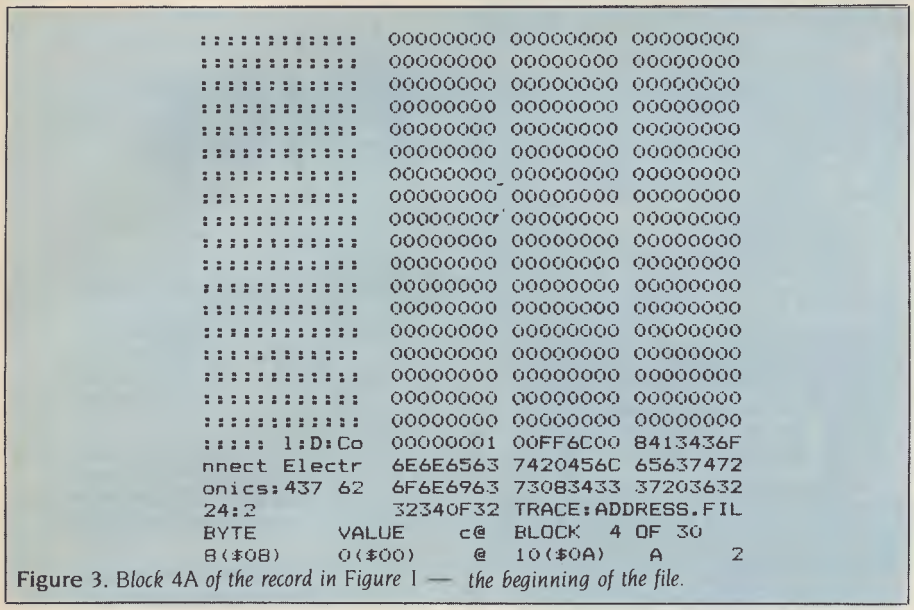

Figure 3. *Block 4A of the record in Figure 1 — the beginning of the file.*

how many report records there are.

As you can see, the record begins with a report name (in this case, 'Label format'), and preceding this is the character measure of the name. The report name can be up to 20 characters in length.

Following this are the bytes which hold details of the column widths, and information such as the number of spaces to be printed to the right of justified columns. There's other information here too, like the vertical positions of filenames in the format.

Bytes 206 to 213 are, progressively: platen width, left margin, right margin, characters/inch, paper length, top margin, bottom margin, and lines/inch.

Record-selection rules are in the bytes from 480 to 593, and the following seven bytes are unused.

If any 'standard values' have been set in the database, Appleworks treats them as if they are the first record in the data file immediately preceding the normal records.

In the Address.File example, the file-proper starts down the track at Block 4A (Figure 3.) It begins with a dual-hex pair ($6C $00, or $0065), giving the length of this particular record.

The third byte in the sequence is usually a measure of the first field length, but often a number of fields will have no data at all, so Appleworks economises on memory space in an interesting way.

If this byte is between $01 and $7F, it is a direct count of the number of subsequent bytes in the field. However a number above $80 indicates that fields are to be skipped. In this example the byte is $84, which shows that the first four fields are empty.

So the subsequent byte ($13) is a measure of the length of the fifth field, which in this example is the 'Company' category. And if we look at the left-hand column, we see it is storing the name 'Connect Electronics', which is 19 ($13) characters long.

The end of the data in each field simply butts up against the length indicator for the next, and the end of each record is indicated by a $FF.

This end-of-record indicator simply butts against the dual-hex byte, giving the next record length, so an absolute minimum of memory space is wasted.

The end-of-file marker is simply three $FFs in sequence, but the program already knows where the file ends from the information contained in the initial directory listing.

Apart from the data you have input, the byte-sequence which constitutes a field can also contain special codes for time and date entries.

Following the field-length byte will be a $CO for a Date category, or a $D4 for a Time category. In the case of a Date field, the following two bytes will give the year in ASCII code (that is, two bytes $38 and $37 = ASCII 8 and 7 = 1987). The third byte gives the month, again in ASCII code ($41 = A = January), and the fourth and fifth indicate the day of the month.

In Time fields the second byte is an ASCII hour code, with 'A' indicating the hours after midnight and 'X' the hours before; while the third and fourth bytes provide a minute code with values from 00 to 59.

The spreadsheet file formats in Appleworks are much more complex than the above, since they deal extensively with column widths, calculations and so on, and I don't propose to go into them in detail in this series.

Spreadsheet files start with a 300 byte header record that contains the basic information about the file, including data such as column widths, printer options, window definitions and standard values.

Following this header is a variable amount of information about the rows — the third and fourth bytes give the row number, and the fifth byte is a control byte which is the start of the row information.

As we saw in the database files, if this control byte is between $01 and $7F it provides a count of the number of subsequent bytes in a cell entry. Above $80 it gives the number of columns to be skipped (for example, $82 means two columns will be skipped).

The cell entries, which correspond with the field entries in the database format, contain all the information necessary to build one cell — but there is a complex code here, with bits being on or off and indicating everything from 'display a blank instead of a zero' to the number of decimal places, and so on.

There are also various control bytes, which are 'tokens' representing the formula typed in by the user. Hex number $DC, for instance, is the indicator for SUM, while $E9 gives the square root and $F0 is the code for 'greater than'. If you need to find out about these codes, you'll have to approach Apple for the information — it is far too complex to include here. □

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— Part 14

In the latest part of his series on C programming, Les introduces the first of his realisable fantasies . . .

WE HAVE NOW covered the major components of the C programming language, and know the theory. The time has come, as the Walrus said to s**t or get off the pot — in other words, to see if we can put our theory into practice.

I remember being very impressed, back in 1976, by the philosophy behind the then-fledgling Dr. Dobb's Journal (then known as Dr. Dobb's Journal of Tiny Basic Computer Calisthenics and Orthodontia, or Running Light Without Overbyte). The Dragon (alias Jim Warren, the first editor) wanted the magazine to act as a contact point for a group of individuals who would write an interpreter for a subset of the BASIC language, to be known as Tiny BASIC. He termed this a realisable fantasy, and it turned out to be highly realisable — the second issue contained the complete source code for Whipple and Arnold's Texas Tiny BASIC!

From now on, therefore, this series will comprise a series of realisable fantasies; each as far as possible a complete, useful, programming project — rather like the electronics construction projects we used to write up for Electronics Today International, only using software instead of hardware. So plug in your soldering iron . . . I mean, fire up your editor, and let's get started.

Realisable Fantasy Number 1 — LS.C

The DIR command in DOS is quite simple-minded, and lacks a number of useful features. For example, it does not sort the listing of files, either by name, type or size. Nor does it show hidden files — but it does show you directories, which you are usually not interested in. Sometimes, you just want a list of filenames, output (using output redirection) to a file, which you will edit by inserting compile commands to create a batch file to rebuild a large program — but DIR gives you a whole lot of file-size and date-stamp information which you will have to edit out.

LS.C (rather cheekily named after the UNIX equivalent to DOS's DIR) is designed to fix these omissions, and also to provide a realistic example for the 'C for Smarties' series. Although written in C, this program directly calls DOS in order to use the DOS Find First and Find Next functions, and in order to understand the program we must first understand how DOS calls operate.

MS-DOS is designed to provide a variety of services to running programs, such as console and printer I/O, file access, memory management and other functions. In C, most of these functions are provided by the function library, such as fopen() to open a file, putchar() to output a character, and so on. These library functions in fact call DOS to perform the appropriate task, and often perform additional housekeeping which would otherwise prove tedious and distracting — that's the function of a high-level-language. But at the lowest level, DOS is accessed in machine code by placing the function number for the desired DOS function intothe processor's AX register, together with additional information which may be required in other registers, and generating software interrupt number 21H.

This interrupt vector is the main entry point for DOS, which then takes control, examines the function number, figures out what we want and then does it.

In C, there are a number of ways of dropping down to this low level. We could write the required function to access DOS in assembly language, compile it with the

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Microsoft MASM macroassembler and link it into our program; but this is messy and, in fact, that's why we're programming in C — to get away from that kind of thing.

Different compilers provide different mechanisms for dropping into assembly language and accessing the interrupt structure of the PC.

The Microsoft C Compiler, Version 4.0, provides a function to do the job:

```
#include <dos.h>
int intdos(inregs,outregs)
union REGS *inregs;
union REGS *outregs;
```

In this case, the union REGS contains a couple of different structures (defined in DOS.H) which provide ways of referring to the processor registers. When this function is called, it transfers the values in the union pointed to by inregs into the processor registers, and then fires off interrupt 21H. When it regains control, it copies the registers back to the union pointed to by outregs.

The Computer Innovations Optimising C86 compiler, which I used in constructing this example, uses a similar approach. The file dos.h defines two structures, tagged regval and segregs, which contain the processor general-purpose registers and segment registers respectively. A structure of type segregs can be loaded with the contents of the processor's segment registers, while regval structures are used with the sysint and sysint21 functions to access DOS or hardware features of the PC.

The DOS Find First function is called in the following way: we declare a struct regval srv, and then load srv.ax with the appropriate function number, and the dx and cx registers with a pointer to the appropriate filename and the attribute byte which we want to match. Then the sysint21 function call will perform the appropriate function, and will load the current data-transfer area with a data structure containing the file size, date and time stamps, size and other information. The segment of code which does is shown in Listing 1.

```
matchatt = NORMAL;      /* Find normal files only - unless: */
if (flags.hflag)        matchatt |= HIDDEN | SYSTEM;
if (flags.dflag) matchatt |= SUBDIR;

srv.ax = FINDFIRST << 8;        /* Find First File function */
srv.dx = dirstr;                /* Filespec to match */
srv.ds = mysegs.sds;            /* This program's data segment */
srv.cx = matchatt;              /* Attribute byte to match */

flags86 = sysint21(&srv,&srv);  /* Do it! */
if ((flags86 & CARRY) == 0) {   /* If carry not set */
                                /* dta contains dir entry */
```

Listing 1.

The Find First function call allows a program to check the contents of a directory, and is therefore central to the operation of this program.

Notice that the FINDFIRST function number must be loaded into the AH register, which is the most significant eight bits of srv.ax, so the function number is shifted left eight times to move it to the right place.

Notice also that the sysint21 function call returns an integer value which contains the processor flags, and that if the carry bit is set, this indicates an error. In this case, the AX register will contain the DOS error code, and can be examined for more information.

For other compilers, such as DeSmet C, the method of calling DOS varies, but most provide some variation of the above technique.

The Find First function call allows a program to check the contents of a directory, and is therefore central to the operation of this program. The calling program sets the processor registers to point to a filename pattern or filespec, possibly containing wildcard characters (* and ?), and DOS then searches through the target directory, searching for the first filename to match the filespec it was given.

If no file is found, DOS returns control to the program, with the carry flag set and with an error code in AX. If it does find a matching file, it loads the directory information into the current Data Transfer Area (what CP/M used to call the DMA address) in the format shown in Listing 2.

Notice the first 21 bytes of this structure are reserved, and in fact contain data which will be used by subsequent Find Next function calls. For this reason, the DTA cannot be moved to directly read data into successive locations in memory, which would be more efficient. Instead, the data is read into a fixed buffer (called dta in the program), and is then copied out to memory.

```
/* Structure returned by DOS Find First/Next File call */
struct find_stuff {
        unsigned char reserved[21];
        unsigned char attributes;
        unsigned short time;
        unsigned short date;
        unsigned long file_size;
        unsigned char filename[13];
} ;
```

Listing 2.

The Find Next function call operates in virtually the same way as the Find First call, except it picks up the data left in the DTA by the previous Find First or Find Next call. The calling sequence is therefore very similar.

Earlier, I've referred to the disk transfer area, or DTA, which is where DOS will transfer all disk reads and writes to and from. This has to be set by another DOS call — in this case, function 1AH.

In this case, rather than use the sysint21() function, which is more complex than needed, I have opted for the bdos() call. This function takes two parameters, the first the function number and the second the contents of the dx register (in this case, the address of the dta):

```
char dta[128];

/* Set up dta and dir-entry pointer */
bdos(SETDTA,dta);
```

(Remember, the name of an array is the address of the zeroth element of the array.)

The directory entry for each file in an MS-DOS directory contains date and time stamps, which are set when the file is created, and updated whenever the file is closed after being written to or modified.

The date stamp is a 16-bit value containing three fields, laid out as follows:

Y Y Y Y Y Y Y M M M M D D D D D

where Y, M and D represent bits of the year, month and day, respectively. Notice that since the most significant bits of the date are at the left end of the word, and become less significant to the right, dates can be directly compared as unsigned short values.

To print the date, it must first be unpacked to separate its component parts. This is achieved by shifting the date to the right until the field we are interested in is at the least significant position, and then masking out the unwanted bits with a bitwise AND operation. Finally, the month number is used as an index into an array of pointers to char, in order to print the appropriate string for the month name — see Listing 3.

A similar technique can be used to unpack the time stamp, which is packed as follows:

H H H H H M M M M M M S S S S S

where H, M and S represent the hours, minutes and seconds bit fields respectively. The function to print the time is shown in Listing 4.

In general, C is pretty good at 'getting down and getting dirty with the machine'. It incorporates a variety of bit-shifting and bitwise, as well as logical operators. However, many C compilers provide another facility which allows exceptionally simple and maintainable code for access to bits.

```
print_date16(date)
unsigned short date;
{
        unsigned short year, month, day;

        static char *mname[] = {
                "illegal month",
                "Jan","Feb","Mar","Apr","May","Jun",
                "Jul","Aug","Sep","Oct","Nov","Dec"};

        year = (date >> 9) + 1980;
        month = (date >> 5) & 0x000f;
        day = date & 0x001f;

        printf("%2u %3s %4u  ",day,mname[month],year);
}
```

Listing 3.

```
print_time16(time)
unsigned short time;
{
        unsigned short hours, mins, secs;

        hours = time >> 11;
        mins = (time >> 5) & 0x003f;
        secs = (time & 0x001f) << 1;

        printf("%02u:%02u:%02u  ",hours,mins,secs);
}
```

Listing 4.

Also packed in each file's directory entry, is an attribute byte, which controls the access to the file of certain programs. The attributes are packed in the following way:

1 2 a d v s h r

The various bits have the following meanings:

1 Reserved for Future Use

2 Reserved for Future Use

a An archive bit, set when a file is created or updated, and reset when the file is backed up. The DOS BACKUP command has a /M option, which only backs up files which have been modified since the last backup, and this works by testing the status of the archive attribute.

d Directory bit. Indicates that this directory entry controls a subdirectory, rather than an ordinary file.

v Volume label bit. Indicates that this directory entry controls the disk's volume label rather than a file.

s System bit. Hides files away and makes them inaccessible, so that programs cannot run, for example.

h Hidden bit. Hides files so they don't appear in conventional directory listings, but hidden .COM and .EXE files will still run.

r Read-only bit. Prevents files being written to (but not deleted!), and is primarily used to indicate that files can be shared on networks.

By using utilities like the DOS 3.2 ATTRIB command to change these attributes, you have more flexible control over the visibility and accessibility of files on your system. However, you'll need some way to examine the attribute byte so LS.C contains a routine to dump it.

The routine in Listing 5 starts by setting up a mask which will mask out all but the left-hand bit of the attribute byte, together with a pointer to the left-hand end of a string of characters. It then steps both the mask and the pointer, printing the character pointed to if the masked bit is a one. Neat, huh?

Also stored in each file's directory entry is its size and, of course, its name. These are copied by the Find First and Find Next calls into the dta, and are then transferred into memory allocated for this purpose, with the malloc() function.

Bit Fields

In general, C is pretty good at 'getting down and getting dirty with the machine'. It incorporates a variety of bit-shifting and bitwise, as well as logical operators. However, many C compilers provide another facility which allows exceptionally simple and maintainable code for access to bits.

Bit fields allow the programmer to define tightly packed structures in which the various elements are adjacent groups of bits. This is particularly useful for accessing individual bits in registers, such as the processor flags, or for accessing bits in control registers, such as those found in communications hardware (I/O ports), disk controllers and the like. Of course, they also save space, in that flags can occupy single bits of the same word or byte.

Most compilers restrict the programmer to bit fields of unsigned type, although a few also allow signed bit fields. They are declared in a similar way to any other structure. Listing 6 shows an example, which would declare a 16-bit field corre-

```
print_attributes(a_byte)
unsigned char a_byte;
{
        int i;
        char *c;
        unsigned char mask;

        static char attribute[] = ("12advshr");

        c = attribute;
        mask = 0x80;
        for (i = 0; i < 8; i++, mask >>= 1, c++)
                fputc(a_byte & mask ? *c : '-',stdout);
}
```

Listing 5.

```
struct flags {
        unsigned dummy : 4;
        unsigned        overflow : 1,
                        direction : 1,
                        int_enable : 1,
                        trap : 1,
                        sign : 1,
                        zero  1,
                        : 1,
                        aux : 1,
                        : 1,
                        parity : 1,
                        : 1,
                        carry : 1;
} ;
```

Listing 6.

```
                /* Filename/size comparison functions */
                int fcomp(),tcomp(), scomp();

                if(flags.sortflag)

                qsort(finfo,count,sizeof(struct find_stuff *),fcomp);
        else if (flags.ssort)
                qsort(finfo,count,sizeof(struct find_stuff *),scomp);
        else if (flags.tsflag)
                qsort(finfo,count,sizeof(struct find_stuff *),tcomp);
```

Listing 8.

```
/* Control flags */
struct {
        unsigned lflag:1, dflag:1, helpflag:1, sortflag:1, tsflag:1,
                pauseflag:1, ssort:1, hflag:1, wideflag:1;
        } flags;

References to these variables are then qualified, thus:

init()
{
        flags.dflag = FALSE;
        flags.hflag = FALSE;
        flags.lflag = FALSE;
        flags.pauseflag = FALSE;
        flags.ssort = FALSE;
        flags.sortflag = TRUE;
        flags.tsflag = FALSE;
        flags.wideflag = FALSE;
        matchstring = dfltstring;
}
```

Listing 7.

gous to the name of an array, and both are constants.

The makefilnam() function is peculiar (if that's the right word) to Computer Innovations Optimising C86. It takes three arguments, all char*: the first is a filename as typed by the user on the command line, the second is a template or default filename and the third is a buffer where the result will be placed.

The function reads each part of the input filename and overwrites the corresponding part of the default; but if there is no corresponding part in the input to a part in the default, it picks up the value of the default. It will therefore supply a drive specifier, path or default filetype (*), should the user omit them — kinda handy.

Storage for 1024 (or so) structures full of directory information is a bit much to build into the program. In particular, if declared as a statc array, some compilers will build this space into the program, making it much larger and slower to load.

For that reason, as each directory structure is read into the dta, some storage space is allocated from outside the program and the structure is copied into it. This storage space is allocated using the malloc() function, which is passed the amount of memory required and returns a char *, which is the address of the allocated memory. This pointer can then be recast as the desired type — see Listing 9.

The memcpy() function is then used to transfer the structure into the appropriate location. Space which has been allocated using malloc() can be freed again for reuse with the free() function.

The process—options() function shows a useful standard way of processing command-line flags. It simply uses a couple of nested loops to process each character of each word on the command line in turn.

This version of the program shown in Listing 10 is written for the Computer Innovations Optimising C Version 2.30a compiler, and uses some functions which are unique to that compiler: crt—cls(), upper() and especially makefilnam().

sponding to the flags register of the 8086. Notice unnamed bit fields are taken as padding — a very convenient feature.

Of course, since bit fields are components of a structure, all references to them must be qualified. See Listing 7 for an example of what I'd declare in LS.C.

Of course, for compilers which do not support bit fields, it is still possible to perform access on packed bit fields, by using shifting and masking operations. See the print—date16() and print—time16() functions for examples.

On occasions, one has to use a function to call several different functions at different times, and LS.C provides an example of this. Most C compilers provide a qsort() function, which will sort an array of variables, given the address of the array, the size of the elements and a function which will compare elements.

In the case of LS.C, we need to be able to sort directories by filename, size and date/time stamp. The qsort function must therefore be able to call the appropriate comparison routine — but we do not (necessarily) have the source code of qsort.c, so we cannot build in a switch statement to call the appropriate comparison function.

The problem is solved by passing the qsort routine a pointer to a function — see Listing 8.

Notice the name of a function is the address of the function, in a manner analo-

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Listing 9.

```
finfo[count] = (struct find_stuff *)malloc(sizeof(struct find_stuff));
/* Then copy it there */
memcpy(finfo[count++],dta,sizeof(struct find_stuff));
```

A version of the program for the Microsoft Version 4.0 C Compiler can be downloaded from the Your Computer Bulletin Board, as can a compiled (.EXE) version of the program. It's unlikely we'll generate versions of the program for other compilers — but you never know your luck, so check the BBS for versions for DeSmet, Eco-C and others. □

Listing 10.

```
/* ls.c - directory utility */
/* Written by Les Bell, 12/18/85 onwards */
/* Version 1.2 */

#include        "stdio.h"
#include        "dos.h"

/* File attribute byte bit values */
#define NORMAL  0x00
#define READONLY        0x01
#define HIDDEN  0x02
#define SYSTEM  0x04
#define VOLUME  0x08
#define SUBDIR  0x10
#define ARCHIVE 0x20

#define TRUE    1
#define FALSE   0

#define MAXFILES 1024
#define FNAMELEN 15
#define SCRDEPTH 25
#define SCRWIDTH 80

/* DOS INT 21H Function calls */
#define SETDTA 0x1A
#define FINDFIRST 0x4E
#define FINDNEXT 0x4F

#define CARRY 0x0001    /* 8086 flags - carry bit mask */

/* Structure returned by DOS Find First/Next File call */
struct find_stuff {
        unsigned char reserved[21];
        unsigned char attributes;
        unsigned short time;
        unsigned short date;
        unsigned long file_size;
        unsigned char filename[13];
} *finfo[MAXFILES];     /* Array of pointers to file data */

/* Control flags */
struct {
        unsigned lflag:1, dfla:1, helpflag:1, sortflag:1, tsflag:1,
                pauseflag:1, ssort:1, hflag:1, wideflag:1;
        } flags;

/* Initial wildcard search pattern */
static char dfltstring[] = ("*.*");
char *matchstring;

main(argc,argv)
int argc;
char *argv[];
{
        extern int sysint21();
        extern int bdos();
        extern char *malloc();

        /* Filename/size comparison functions */
        int fcomp(),tcomp(), scomp();

        struct regval srv;      /* Defined in dos.h - 8086 registers */
        struct segregs mysegs;  /* Ditto - 8086 segment registers */
        int flags86;

        char dirstr[80];
        int count = 0;
        int matchatt;
        char dta[128];  /* Buffer to take file info from DOS func. 4EH */

        /* Set up segment registers */
        segread(&mysegs);

        /* Initialise flags, etc */
        init();
```

```
        process_options(argc,argv);

        /* Set up dta and dir-entry pointer */
        bdos(SETDTA,dta);

        makefnam(matchstring,dfltstring,dirstr);

        matchatt = NORMAL;      /* Find normal files only - unless: */
        if (flags.hflag)        matchatt |= HIDDEN | SYSTEM;
        if (flags.dflag) matchatt |= SUBDIR;

        srv.ax = FINDFIRST << 8;        /* Find First Fie function */
        srv.dx = dirstr;                /* Filespec to match */
        srv.ds = mysegs.sds;            /* This program's data segment */
        srv.cx = matchatt;              /* Attribute byte to match */
        flags86 = sysint21(&srv,&srv);  /* Do it! */
        if ((flags86 & CARRY) == 0) {   /* If carry not set */
                                        /* dta contains dir entry */
                while ((flags86 & CARRY) == 0) {
                        /* Make somewhere to store it and set pointer to it */
                        finfo[count] = (struct find_stuff *)malloc(sizeof(struct find
                        /* Then copy it there */
                        memcpy(finfo[count++],dta,sizeof(struct find_stuff));
                        /* Then do it again! */
                        srv.ax = FINDNEXT << 8;
                        srv.dx = dirstr;
                        srv.cx = matchatt;
                        flags86 = sysint21(&srv,&srv);
                }
        }
        else {
                if(srv.ax == 0x0012) printf("File not found\n");
                else printf ("Unknown error: ax = %x",srv.ax);
        }
        if(flags.sortflag)
                qsort(finfo,count,sizeof(struct find_stuff *),fcomp);
        else if (flags.ssort)
                qsort(finfo,count,sizeof(struct find_stff *),scomp);
        else if (flags.tsflag)
                qsort(finfo,count,sizeof(struct find_stuff *),tcomp);
        if (flags.wideflag) wprint(count);
        else lprint(count);
}

print_attributes(a_byte)
unsigned char a_byte;
{
        int i;
        char *c;
        unsigned char mask;

        static char attribute[] = {"12advshr"};

        c = attribute;
        mask = 0x80;
        for (i = 0; i < 8; i++, mask >>= 1, c++)
                fputc(a_byte & mask ? *c : '-',stdout);
}

print_date16(date)
unsigned short date;
{
        unsigned short year, month, day;

        static char *mname[] = {
                "illegal month",
                "Jan","Feb","Mar","Apr","May","Jun",
                "Jul","Aug","Sep","Oct","Nov","Dec"};

        year = (date >> 9) + 1980;
        month = (date >> 5) & 0x000f;
        day = date & 0x001f;

        printf("%2u %3s %4u  ",day,mname[month],year);

}

print_time16(time)
unsigned short time;
{
        unsigned short hours, mins, secs;

        hours = time >> 11;
        mins = (time >> 5) & 0x003f;
        secs = (time & 0x001f) << 1;

        printf("%02u:%02u:%02u  ",hours,mins,secs);

}

init()
```

```
{
        flags.dflag = FALSE;
        flags.hflag = FALSE;
        flags.lflag = FALSE;
                                flags.pauseflag = FALSE;
        flags.ssort = FALSE;
        flags.sortflag = TRUE;
        flags.tsflag = FALSE;
        flags.wideflag = FALSE;
        matchstring = dfltstring;
}

process_options(argc,argv)
int argc;
char **argv;
{
        int i,j;

        for(i = 1; i < argc; i++) {
                if (argv[i][0] == '-') {
                        j = 1;
                        while (argv[i][j]) {
                                switch(toupper(argv[i][j])) {
                                        case '?':
                                                help();
                                                pause();
                                                break;
                                        case 'C':
                                                crt_cls();
                                                break;
                                        case 'L':
                                                flags.lflag = TRUE;
                                                flags.wideflag = FALSE;
                                                break;
                                        case 'D':
                                                flags.dflag = TRUE;
                                                break;
                                        case 'N':
                                                flags.sortflag = FALSE;
                                                break;
                                        case 'P':
                                                flags.pauseflag = TRUE;
                                                break;
                                        case 'S':
                                                flags.sortflag = FALSE;
                                                flags.ssort = TRUE;
                                                break;
                                        case 'T':
                                                flags.sortflag = FALSE;
                                                flags.tsflag = TRUE;
                                                break;
                                        case 'H':
                                                flags.hflag = TRUE;
                                                break;
                                case 'W':
                                                if (!flags.lflag) flags.wideflag = TR
                                }
                                j++;
                        }
                }
                else
                        matchstring = argv[i];
        }
}

long round_up(val,mult)
long val;
int mult;
{
        long result = 0;

        while (result < val) result += mult;
        return result;
}

int fcomp(entry1,entry2)
struct find_stuff **entry1, **entry2;
{
        return(strcmp((*entry1)->filename,(*entry2)->filename));
}

int tcomp(entry1,entry2)
struct find_stuff **entry1, **entry2;
{
        if ((*entry1)->date > (*entry2)->date) return 1;
        else if ((*entry1)->date < (*entry2)->date) return -1;
        /* Same date, now compare times */
        else if ((*entry1)->time > (*entry2)->time) return 1;
        else if ((*entry1)->time < (*entry2)->time) return -1;
        /* Same all through */
        else return 0;
```

```
}

int scomp(entry1,entry2)
struct find_stuff **entry1, **entry2;
{
        if ((*entry1)->file_size == (*entry2)->file_size) return 0;
        else if ((*entry1)->file_size > (*entry2)->file_size) return 1;
        else return -1;
}

help()
{
        printf("\nls directory utility version 1.1, December 1986");
        printf("\nUsag:-");
        printf("\n      ls filename.typ [-flags]");
        printf("\nFlags are:-");
        printf("\n      c       -       clear screen");
        printf("\n      d       -       include directories in search");
        printf("\n      h       -       include system and hidden files");
        printf("\n      l       -       produce long format listing");
        printf("\n      n       -       do not sort output");
        printf("\n      p       -       pause output every screenful");
        printf("\n      s       -       sort by size");
        printf("\n      t       -       sort by date and time of creation/update");
        printf("\n      w       -       print wide listing");
        printf("\n");
}

pause()
{
        char *prompt;
        int i;

        prompt = "Press any key to continue";
        fputs(prompt,stderr);
        bdos(8);
        for (i = 0 ; i < strlen(prompt) ; i++)
                fputs("\b \b",stderr);
}

wprint(nentries)
int nentries;
{
        short i,j;
        int nacross, nlines;
        long total_size = 0, total_k = 0;
        char format[10];

        nacross = SCRWIDTH / FNAMELEN;
        strcpy(format,"%-");
        itoa(FNAMELEN,format+2);
        strcat(format,"s");
        if ((nentries % nacross) == 0)
                nlines = nentres / nacross;
        else
                nlines = nentries / nacross + 1;
        for (i = 0 ; i < nlines ; i++) {
                for (j = i ; j < nentries; j += nlines) {
                        printf (format,lower(finfo[j]->filename));
                        total_size += finfo[j]->file_size;
                        total_k += round_up(finfo[j]->file_size,1024);
                }
                fputs("\n",stdout);
                if (flags.pauseflag)
                        if((i+1)%(SCRDEPTH-1) == 0) pause();
        }
        printf("Total Size %6lu - %lu Kbytes on floppy",total_size,total_k/1024);
}

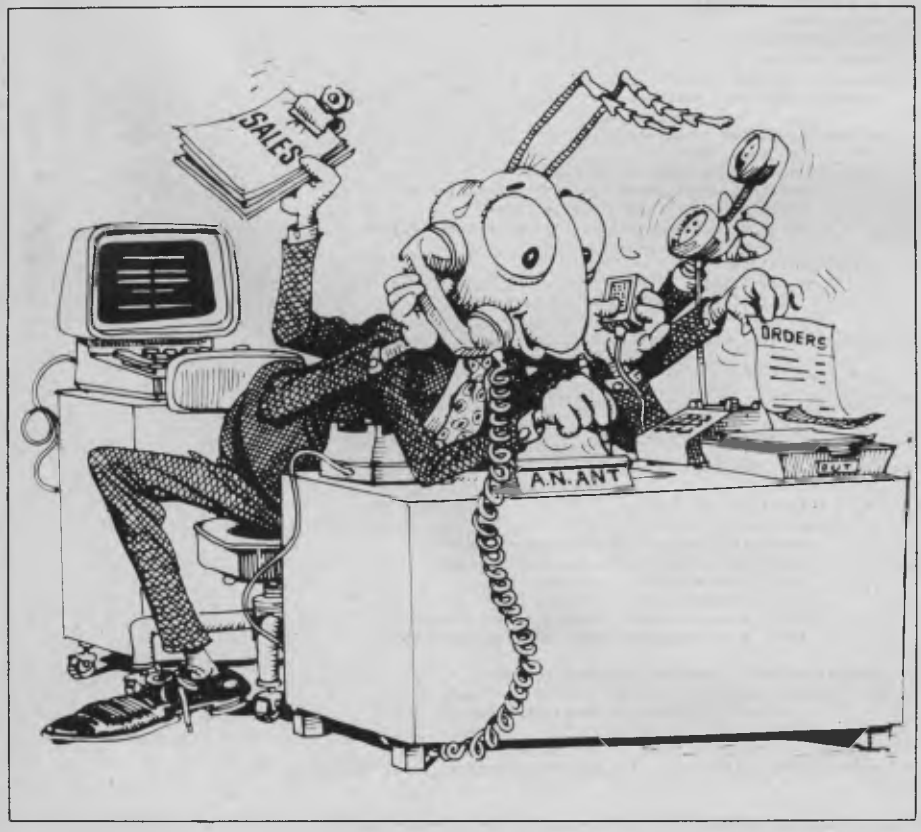
lprint(nentries)
int nentries;
{
        int i;
        long total_size = 0, total_k = 0;

        for (i = 0; i < nentries; i++) {
                if (flags.lflag) {
                        print_attributes(finfo[i]->attributes);
                        printf("    %6U   ",finfo[i]->file_size);
                        print_date16(finfo[i]->date);
                        print_time16(finfo[i]->time);
                        total_size += finfo[i]->file_size;
                        total_k += round_up(finfo[i]->file_size,1024);
                }
                printf("%-13s\n",lower(finfo[i]->filename));
                if (flags.pauseflag)
                        if((i+1)%(SCRDEPTH-1) == 0) pause();
        }
        if (flags.lflag)
                printf("Total Size %6lu - %lu Kbytes on floppy",total_size,total_k/10
}
```

PCs IN MARKETING — Part 7

***Since nothing is constant in business except change, it is obvious that complete corporate information systems are not available as an off-the-shelf item, but instead must be designed from the ground up to meet the needs of a particular company.* (Les Bell is getting serious as he looks how marketing activity relates to other information resources in the organization).**

IN THE EARLIER parts of this series, we looked at marketing as though it were a standalone function, with little need to communicate information with other parts of the business. Needless to say, that's not the case. Marketing feeds on information and cannot function without it; and while some of that information comes from outside the organisation, a great deal of it is generated internally.



It has been estimated (by one of the big United States management consulting groups, I forget which one) that over 80 per cent of information generated within any department of a large organisation stays within that department. Now, in organisations which do not have computerised information systems, this makes sense; there is simply no way of distributing that information on paper, nor of interpreting it. But for those companies which have implemented computerised systems correctly and with capacity for growth, it is possible to take full advantage of this valuable resource.

Figure 1 shows the design of a typical corporate information system for a manufacturing company, with the major modules shown as rectangles and separate applications as ovals. At the heart of the system, and driven by the major transaction-processing modules, is the General Ledger. This is the main set of accounts for the enterprise, and contains the primary financial data for the system. It produces a variety of reports, but the main ones are, of course, the balance sheet and the profit-and-loss statement.

For many businesses — particularly small businesses — the next major application is the accounts receivable or debtors module. The accounts receivable system processes orders from customers and issues invoices and statements, as well as receipts for payments. The reports from a well-designed accounts receivable system can provide a wealth of information to marketers: identities of major customers and fast-growing customers and their industrial classifications, changes in the debtors' ratio (which gives an indication of the current economic climate), and the performance of different distribution channels and sales representatives.

The materials management system (or, in a distribution business, the inventory

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module) also contains useful information. First, it contains current sales information allowing identification of rapidly moving and sluggish stock items, as well as current stock levels, so excessive inventory can be quit as soon as identified. For manufacturing companies, a well-designed system based on MRP (Materials Requirements Planning) allows accurate costing of products, enabling the marketer to identify those products with high and low margins and distribute or apportion marketing resources accordingly.

The materials management system links back through the general ledger to the accounts payable module, which controls payment of invoices and writes cheques. The accounts payable module is of little interest to the marketer, and the same applies to the payroll or the capital assets modules. These are primarily of value to general or financial management.

However, the financial-analysis subsystems do provide useful information for marketers. By extracting data from the other modules, this subsystem allows 'what-if'-type analysis. For example, new product introduction decisions will draw heavily on cost-accounting data drawn from the materials management and accounts payable systems, together with cash-flow projections and budgets all placed in a spreadsheet or similar model created using a financial-analysis modelling language such as EPS-FCS or IFPS.

Such systems primarily run on mainframe computers, but it is conceivable that one day they will run on a distributed network of minicomputers or supermicrocomputers, with personal computers used for the management reporting and analysis functions. Whatever the physical computer hardware used to run the programs, the overall design of the corporate management information system remains similar.

The major difficulty facing implementers of such sophisticated systems is that the design of the system inevitably casts management styles and decisions in concrete. For example, the method of apportioning administrative costs over products will (at least with the current level of technology) be designed into the programs with no flexibility, other than the provision of a duplicate manual system to repeat the calculations.

Now, since nothing is constant in business except change, it is obvious that complete corporate information systems

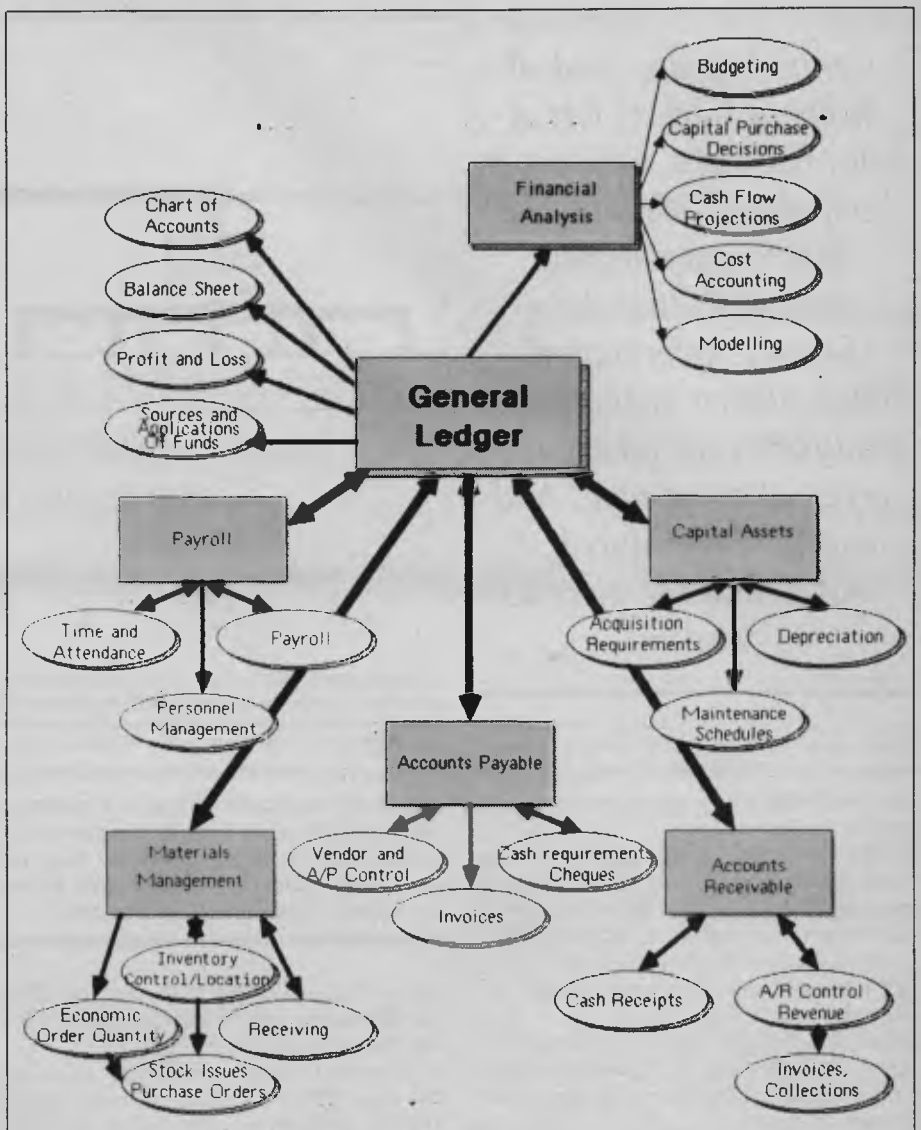


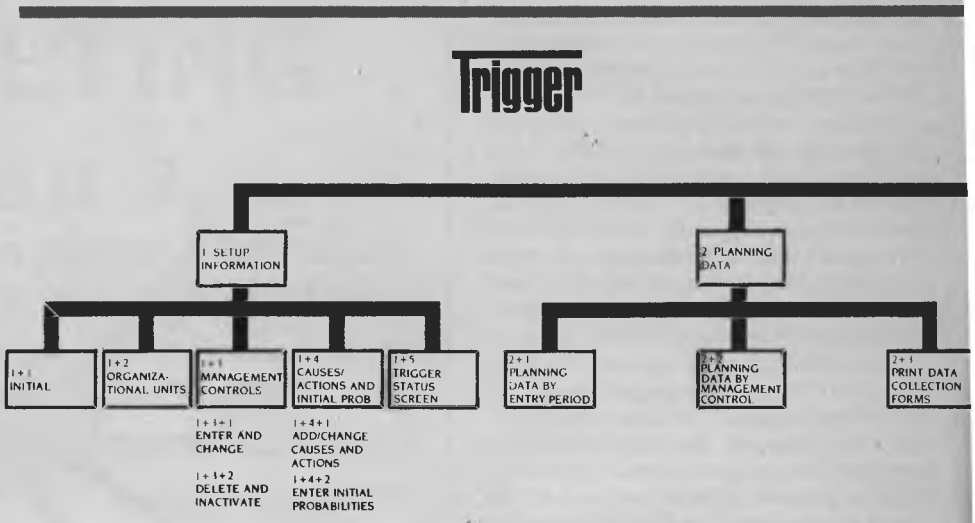
Figure 1. *A typical corporate information system for a manufacturing company. Major modules are shown as rectangles, applications as ovals.*

are not available as an off-the-shelf item, but instead must be designed from the ground up to meet the needs of a particular company. This demands many man-hours of programming work, making the creation of such systems viable for only large organisations, or those with simple, extremely homogeneous businesses.

For most organisations, the accounts receivable, general ledger, payroll and accounts payable have already been computerised (primarily as a way to reduce the cost of a tedious and time-consuming clerical operation by automating it) with the provision of more timely accounting data as a secondary benefit. Most existing accounting systems have not been designed with the aim of providing marketing or other general management information, even as a secondary goal.

Where a number of separate applications have been set up on a mainframe computer, it is still possible to pull out useful information — but a number of difficulties stand in the way. First, since departments tend to hang on to their own information, other users may not even know the information exists. Second, it may be in an indigestible format, or may require considerable processing before it

Computers are good at keeping track of lots of data, raw data, which is in itself almost meaningless. When appropriately processed, that data becomes information. When further reduced and analysed, that information gives us knowledge. And when further reduced ... that knowledge gives us wisdom.



1. SETUP INFORMATION tailors Trigger to the individual organization, its departments or divisions, its key management controls, and common causes of off-plan conditions as well as the actions taken in response to these conditions.

2. PLANNING DATA: Enter the daily, weekly or monthly planned value for each management control, then determine the acceptable range for monitoring.

Figure 2. *Thoughtware's Trigger, a Management by Exception* (MBE) *monitoring and reporting system, assists the user in formulating a plan, identifying problems and monitoring the effectiveness of corrective action. The diagram shows the options available from the main Trigger menu, with explanations given below. Applications are given across the bottom of the diagram; the numbers* (1+1, 3+2 *and so on, indicate where the data is drawn from*).

can be loaded into a spreadsheet, say, for forecasting use.

This is a management problem which must be treated at two levels. General business managers must become aware of the importance and value of information, particularly to marketing managers, product managers and others responsible for strategic or tactical management. They must also become aware of the capabilities of computers in transferring and reformatting information in corporate information systems.

Only when this has been achieved will corporate data-processing managers (now restyled 'information systems managers') be given the budgets and the organisational capabilities they need to implement the management support infrastructure required to support an information-rich company. For example, much work still needs to be done on the use of personal-computer networks in large organisations and, in particular, on the implementation of organisation-wide standards for databases and file structures, to allow easy transfer of data in standard formats. Currently, all users of, for example, dBase III Plus in an organisation create their own data file structures for names and addresses, making the databases incompatible and complicating tasks such as compiling mailing lists of customers for market research purposes.

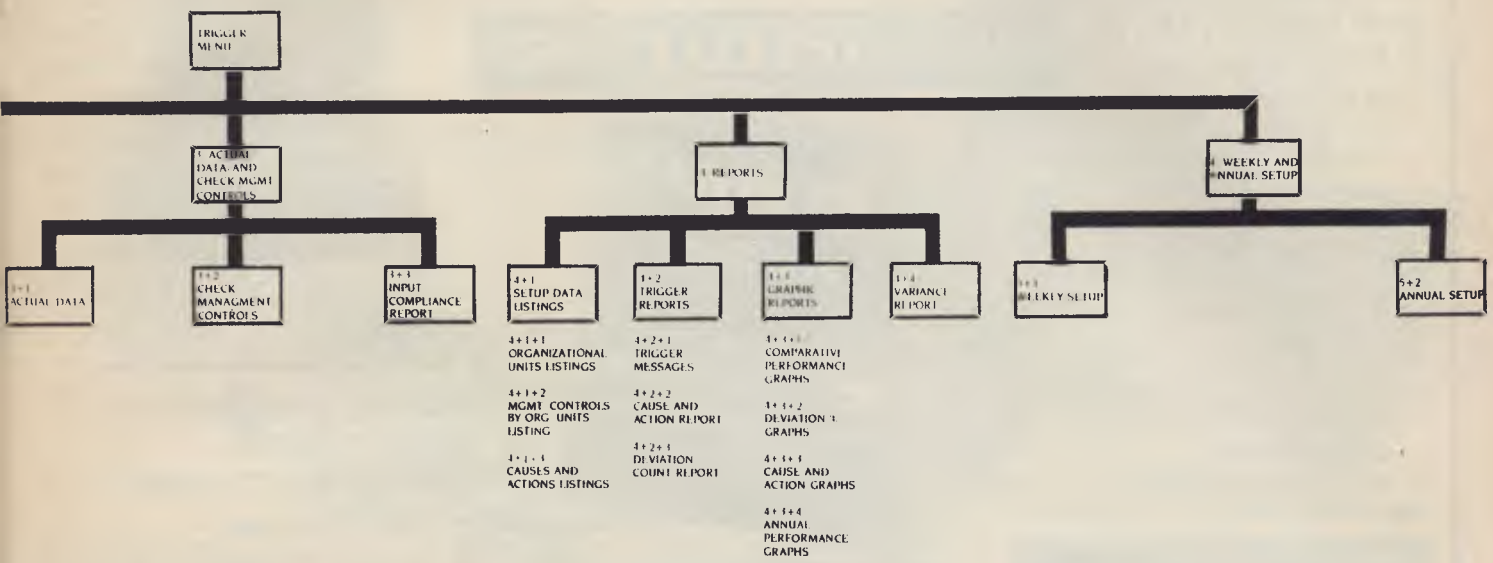
Another problem which may stand in the way of those wishing to make use of the vast amount of information available from such a system is just that — the vast amount of information. One major criticism which has been levelled against computerised information systems is they produce lots and lots of information and little knowledge — and there is some truth in this.

Computers are good at keeping track of lots of data, raw data, which is in itself almost meaningless. When appropriately processed, that data becomes information. When further reduced and analysed, that information gives us knowledge. And when further reduced, and with the benefit of experience, that knowledge gives us wisdom.

With vast arrays of figures passing through the information system, it is difficult to pick out the data that is most significant. Personal computers can certainly help — and existing software packages such as graphing programs make it easy to spot trends, for example.

However, the next few years should see the introduction of even better solutions to this problem. Many organisations are already practising Management By Objectives (and I mean practising it *properly*), and know what the appropriate values of performance should be. Computer systems can be set up to monitor these performance indicators, and produce reports whenever they fall outside preset limits. Programs which do this are available today, and are not terribly difficult to write, using either a conventional programming language (BASIC, COBOL, C) or a spreadsheet.

More sophisticated programs, which are not only able to indicate problems but are also able to assist in diagnosing the problem, are available. For example, Trigger, by



3. ACTUAL DATA AND CHECK MANAGEMENT CONTROLS: Enter actual daily, weekly or monthly data. The program calaculates all derived management controls, checks the actual data against the plan, and checks to ensure all data has been reported.

4. REPORTS are used to increase management control through a Trigger-generated memo. Access reports and graphs which summarize the performance of the management controls previously identified.

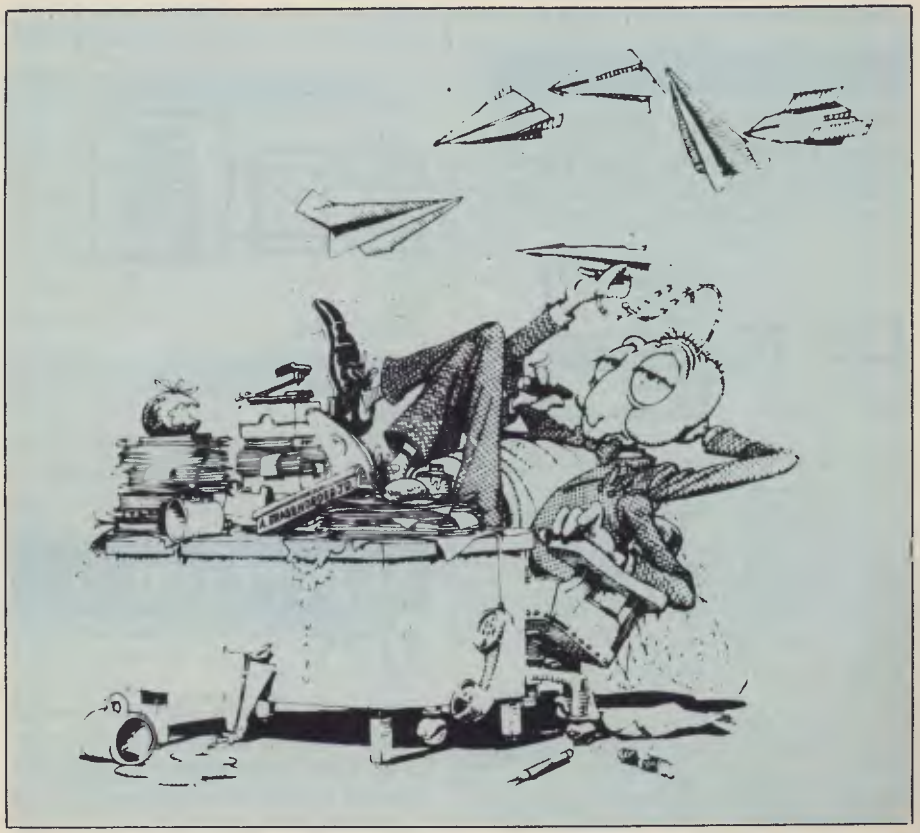
5. WEEKLY AND ANNUAL SETUP advances to the next time period for monitoring by clearing the current data entry period.

Thoughtware, is a program which implements a complete management by exception (MBE) monitoring and reporting system. However, it goes beyond this point, in assisting the user to formulate a plan, identify problem situations and monitor the effectiveness of corrective action.

Trigger is able to monitor performance of up to 50 organisational units and 200 management controls, and initiates action when exceptions occur through the use of preformatted reports. In fact, when an exception is identified, Trigger will automatically fire off a memo to the appropriate person, suggesting corrective action!

As it operates, Trigger builds a knowledge base of up to 700 causes and solutions, and will automatically suggest what its experience tells it will be the most effective action.

While Trigger uses some elementary principles of decision theory and management theory, new programs are starting to appear which are based on recent research in expert systems and artificial intelligence. Such programs are extremely flexible and exhibit characteristics of learning; as they gradually acquire data, they seem to treat it as information, build a knowledge base and eventually come to display something very like wisdom. □



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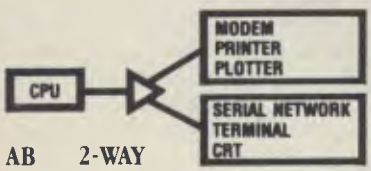

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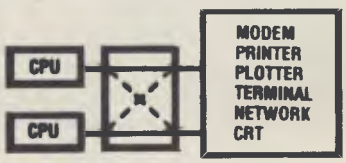

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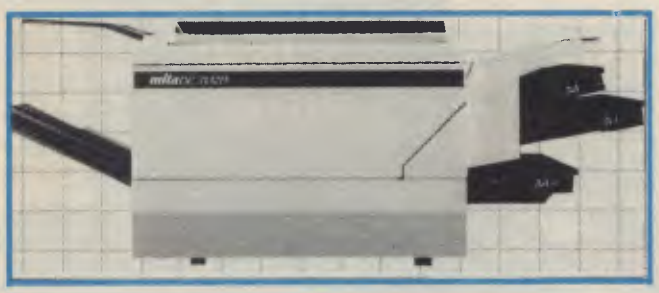

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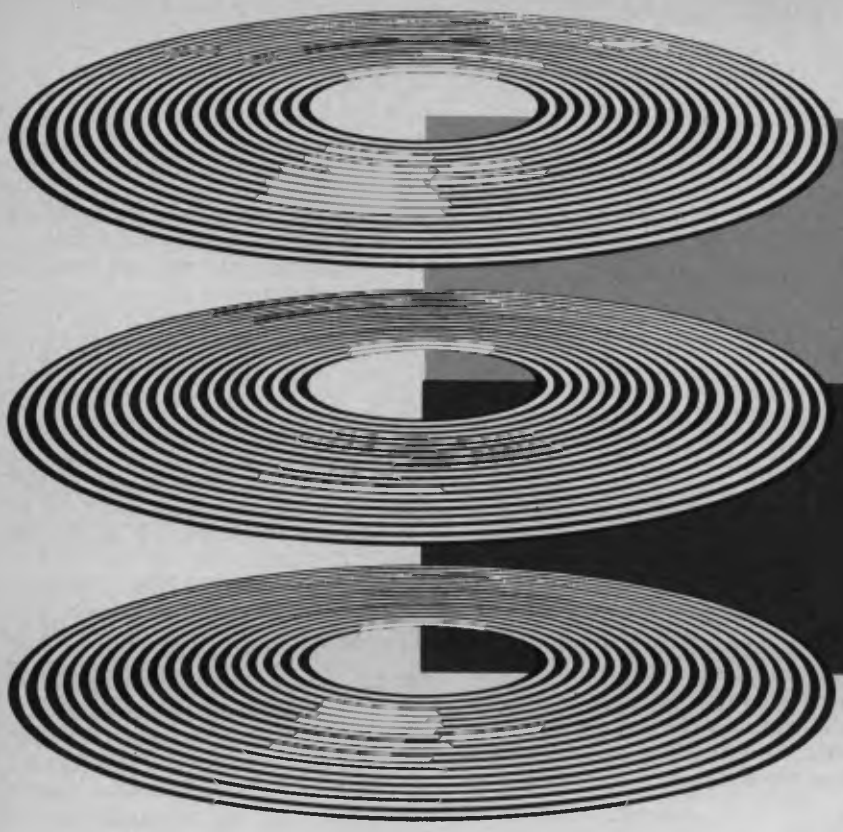


TWENTY TURBO TIPS — Part 2

The speed, power and price of Turbo Pascal have given it a base of over 400,000 users who have discovered its revolutionary approach to programming. 'But, it's not perfect,' says turbo travellin' Peter Hill, and here he shares 12 more tips to make life more fun for turbo programmers.

IN PART 1 I wrote about disk directories, speeding up screen displays, redirecting input/output, buffering input/output, minimising the use of space-gobbling global variables, and the advantages of using libraries and consistent syntax and indentation. In Part 2 I've tipped the scales with the other 'half' of the info

Part 1?

PART 1 of Twenty Turbo Tips appeared in the December 1986 issue of *Your Computer*. If you missed it, refer to the Services page to obtain a copy.

Tip 9. Natural Structures

The RECORD data structure provided in Turbo Pascal (and other Pascals) tends to be overlooked by newcomers from other languages, but is in fact one of the most natural constructions available in any language. Essentially, it allows an item or record to be represented as a group of features (fields or attributes). The ability to refer to this record only once and then to deal with all its features simultaneously is one of the strengths of Pascal. To give a trivial example, consider the way in which a screenful of space invaders could be addressed:

```
PROGRAM Invaders;
CONST
     Red          =1;
     Blue         =2;
     Yellow       =3;
     InvaderRows=5;
     InvaderCols=5;
TYPE
     ValueType    =1..200;
     ColourType   =Red,Blue,Yellow;
     InvaderType  =RECORD
                     Alive    :BOOLEAN;
                     Column   :INTEGER;
                     Row      :INTEGER;
                     Value    :ValueType;
                   END;
VAR
 Invaders :ARRAY[1..InvadersRows,1..InvaderCols] OF InvaderType;
```

Although setting this type of structure up takes a few lines, the beauty of being able to address each record of the array as a whole outweighs this initial effort. The short story is this where it is possible to use a natural representation of real-world (or outer space!) data, do so in preference to using fancy constructs. The results will be much more manageable when you are deeper into the program.

Tip 10. Error Handling

With the advent of Turbo Pascal 3.0, the facility for users to write their own error-handling procedures was introduced. In ▷

early versions of the manual, this was not included, but was referred to in the READ.ME notes on disk. The procedure is simply to:

- Assign the value of the Offset of the error to the standard variable ErrorPtr; that is, include a statement early in the main body of the code thus ErrorPtr:=Ofs(Error)
- Set up a procedure as follows:

```
PROCEDURE Error(ErrNo, ErrAddr: Integer);
BEGIN
     (error handling code)
END;
```

Unfortunately, it is essential that the last thing the error-handling procedure does is to Halt execution of the program. Any attempt to ignore the error and return to the main body of the program, or indeed any error in the error-handling routine itself, will cause Turbo Pascal to take control of the error and halt itself. This, however suggests a structure for user-written error-handlers along the following lines:

1. Give a suitable message to the user.
2. Show the Error type and Error Number for the programmer's benefit.
3. Ascertain as far as possible the nature of the problem.
4. Close files you know to be open.
5. Attempt to close files which might be open.
6. Halt.

This hierarchy tends to maximise the protection against data loss, while minimising the risk of a premature halt by Turbo Pascal.

The procedure in Figure 1 (which assumes the user has defined a file assigned to the variable InFile, and a file assigned to the variable OutFile) shows a typical error-handling procedure, which follows the above hierarchy.

```
PROCEDURE Error(ErrNo, ErrAddr: Integer);
VAR
InFileProb,OutFileProb  :BOOLEAN;
BEGIN
     Clrscr;
     InFileProb:=False;
     OutFileProb:=False;
     Write(Chr(7)); (ring the bell)
     GotoXY(5,5);
     CASE Hi(ErrNo) OF
          1:Write('User Break..Bye. ');
          2:BEGIN
               Write(' A fatal Error has occurred !');
               WriteLn('[Type I/O, Nr. ',Lo(ErrNo),']');
               CASE Lo(ErrNo) OF
                    2,145,153:InFileProb:=True;
                    3,242,240:OuFileProb:=True;
               END; (Case)
            END;
          3:BEGIN
             Write(' A fatal Error has occurred !');
             WriteLn('[Type Runtime, Nr. ',Lo(ErrNo),']');
          END;
     END; (Case)
    (close most probable suspect file)
     IF InFileProb THEN Close(InFile);
     IF OutFileProb THEN Close(OutFile);
     (attempt to close less probable suspect files; this
     may crash, but that is going to happen anyway!)
     IF InFileProb THEN Close(OutFile);
     IF OutFileProb THEN Close(InFile);
     Halt;
END;
```

Figure 1.

Tip 11.
Plan for Overflow

The Turbo Pascal editor is limited to handling a maximum of 64 Kbytes of source code. Having written a number of large (greater than 60 Kbytes of source code) Turbo Pascal programs, I have now learned to better anticipate the problems that arise with large amounts of code.

Nothing is more pathetic than the spectacle of a programmer attempting to decide which bits of code to write out to Include files when there are only 500 bytes of space left in the editor. If there is a chance that your source code will approach 64 Kbytes, plan to develop some parts of your code as separate modules prior to the point where you are already pressed for space. The modules to be treated separately ought to be straightforward, of reasonable size and, most importantly, independent in their operation from the other modules in the main body of the program.

Tip 12.
Organised Back-up

Although Turbo Pascal creates .BAK files after each edit of source code, this is not a truly reliable method of back-up, since it is very easy to fall into the situation where you perform one major edit, then a small syntactical error causes the need to re-edit and save again. At this stage the old version of the structure is gone. Since Turbo Pascal is so compact, it is easy to have a disk in drive A: with Turbo Pascal and your work files, and a disk in drive B: with a copy of drive A: which is created prior to each major edit. This disk (the copy) should then be archived separately at the end of each day's work, and the previous day's disk brought out as the next day's back-up.

If this seems like a somewhat paranoid approach to back-up, believe me, it's better than the sinking feeling you get when

a) The cat eats your work disk (.BAK files and all).

b) You realise your last major edit was misdirected.

A suitable batch file on your A: drive to handle the housekeeping is SAVEIT.BAT, which reads as follows:

```
B:
COPY A:*.*
A:
DIR/W
TURBO
```

Tip 13.
Use Productivity Tools

Professional programmers in large organisations use a vast toolbox of productivity tools; typically these are expensive and powerful. For the more modest budget, there are still a number of approaches▷

which can be fruitful. The next three suggestions are productivity tools for the shoestring budget.

a) *Keyboard Enhancers*
A number of keyboard enhancers are available in the public domain. An example of these is Frank Bell's 'Newkey', which is simple, reliable and robust. Since Borland have only defined F7 and F8 on the PC's keyboard, there is a lot of scope for using Newkey to simplify coding, and also to avoid spelling errors. Pressing F1 could, for example, generate the following code –

```
WHILE       DO
    BEGIN

    END;
```

and leave the cursor between WHILE and DO.

b) ASCII *Table*
A clear,single-sheet ASCII table showing Decimal, Hex, Character and control functions visible from your keyboard is indispensable.

c) DECIMAL *to* HEXADECIMAL *Chart*
This can be very handy, especially since the Borland manual is prone to referring to such items as Error codes in Hex.

All the above are also available from Borland in more convenient form (for example, Superkey plus Sidekick).

Tip 14.
Compile to RAM

Source code can either be compiled directly to a .COM file on disk, or first to RAM and then to disk.

The second method is somewhat faster, especially for large files which may have a bug on line 2000. As soon as the program is successfully compiled to RAM, it can then be trialled in direct mode; if this is successful, it is time to compile to disk using the C option of the Compiler Options menu.

Tip 15.
Maximum Free Dynamic Memory

At the end of execution of a .COM file produced by Turbo Pascal, the program will seek to reload COMMAND.COM. If this is temporarily unavailable (for example, if it's not on the current default disk), DOS will request that a COMMAND.COM disk be inserted. This inconvenience can be avoided by setting the maximum free dynamic memory to the same value as the mInimum free dynamic memory in the Compiler Options menu.

Nothing is more pathetic than the spectacle of a programmer attempting to decide which bits of code to write out to Include files when there are only 500 bytes of space left in the editor.

Tip 16.
Give Me a Break!

The default value of the compiler directive U is {$U-}. In this state, Ctrl-C will allow interruption of a program by a user only when the program is waiting for input. While developing software, it is better to set this state to {$U+}, which will allow user interruption via Ctrl-C at any time, and to accept the deterioration in speed of operation this causes. This compiler directive should be removed from the source prior to compiling for the last time, after all bugs have been eliminated.

Tip 17.
Be Liberal with Comments

Programmers who are familiar with compilers will find this an unnecessary note, but many people are more familiar with interpreters, especially BASIC, where comments actually slow execution. This is not the case in Turbo Pascal, where the compiler completely ignores any comments. Consequently, comments and notes can be sprinkled throughout the text {like this} at no cost in terms of execution time. If these comments are well chosen, they will assist you in maintaining the program or modifying it many months later.

Tip 18.
Use Both Types of Parentheses

Turbo Pascal allows comments to be surrounded by comment marks, either of { this type } or (* this type *). This raises the possibility of using each for a different purpose. Where I wish to make a comment in the source code, I do so using { this type of parentheses }. When I have suspect code, or wish to make a major change I comment it out (* thus *). Using this convention allows me to search for (* in the text, and either re-instate the commented code or eliminate it after testing.

Tip 19.
Avoid Text Searches

In longer source documents, it can take up to one minute for the Turbo Pascal editor to locate a particular string. If you are in a cycle of editing-testing-editing a section of code this, lag is unwelcome. If, however, you mark a part of your code to which you are returning frequently as the start of a block (^KB or F7), then any time you issue the command ^QB the Turbo Pascal editor will find that point immediately. This is true even if you leave the editor and compile and run a program.

Tip 20.
Read All Input as Strings

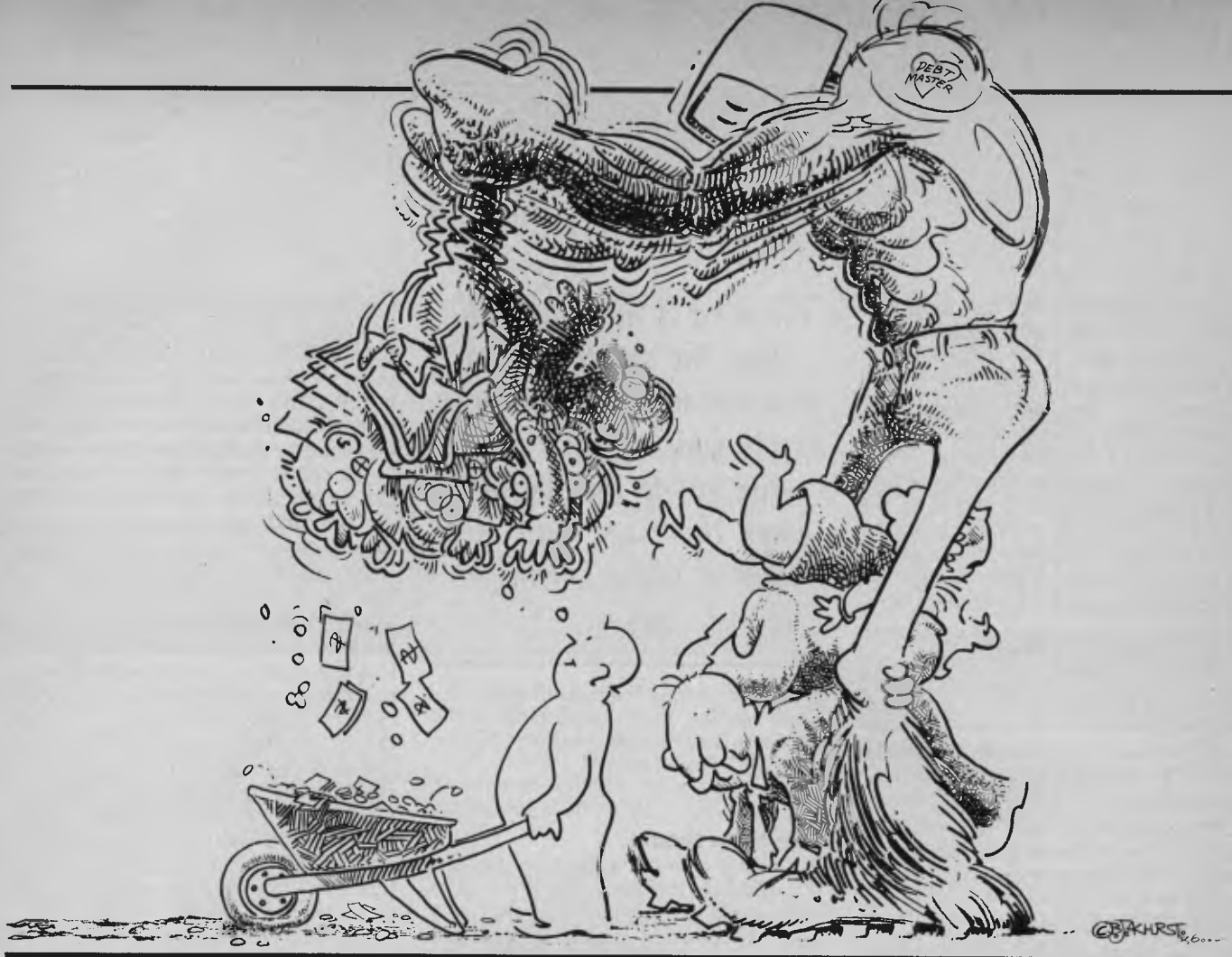
At first it may seem strange to accept the input to a real number as a string, but you only need to consider what might happen if you accept it as a real first to make sense of this tip.

The strategy is as follows (assuming we are after a positive integer) –

- Read the input as a string.
- Parse the string.
- Does it contain alpha characters?
- Does it contain a minus sign?
- Does it contain a decimal point?
- If any of the above is true, then reject, ask the user again, and repeat parsing.
- Otherwise, accept the string, and convert its type to integer.

I hope my collection of Twenty Tips above will save users of Turbo Pascal as much time as it took me to discover them; in the case of Turbo Pascal, however, the pleasure is often in the journey.

Reader's who have picked up their own tips to make life easier with Turbo Pascal are invited to share them — send them to Your Computer *and we'll pass them on to Peter Hill for comment and publication later in the year.* □



DEBTMASTER — Part 4

This instalment of Lindsay Ford's ultimate debt-recovery program tells you how to print debtor records so you can start sending out the hard copy evidence and get some hard cash returns.

BY NOW you're probably itching to get some of the accounts you've entered into Debtmaster down on paper, so this month we'll cover the Print facility (key 'X' from the Menu). Name the program PRI.MWB and stick to the program entry rules discussed in Part I of this series.

Printing with Debtmaster

When you select this option, a sub-menu will appear that will offer you either two or three options:

```
00001 REM ------- PRI --------
00002 POKE 140,1: GOSUB 88: CURS 0: CLEAR: STRS(23000): DIM A0(250),
      A1(250),A2(9),A3(13),A4(9),B(9): H=0
00003 OPEN "I",6,"DATE.DBT": IN#6ON: OUT#0: OUT#0OFF:
      INPUT K3$,K4$,J,D,U: IN#0: OUT#0: CLOSE 6
00004 OPEN "I",6,"BASE.DBT": IN#6ON: OUT#0: OUT#0OFF: FOR X=1 TO 9:
      INPUT B(X), A4$(X): NEXT X: IN#0: OUT#0: CLOSE 6: P=B(9)
00005 R=0: FOR X=1 TO 5: IF B(X)>0 THEN LET R=R+1
00006 NEXT X: REM Count Reminders
00007 FOR X=3 TO 14: CURS 1,X: PRINT [A63 32]: NEXT X: CURS 1,8:
      PRINT [A63 45]: REM Clear Screen Panel
00008 GOSUB 88: CURS 22,16: PRINT "Press <RETURN>'to Abort";
00009 CURS 26,3: PRINT "<<< PRINT >>>"\\ "Print what?"; SPC(9);
      "Overdue Accounts"; SPC(5); "<O>"\ SPC(20); "Statistics";
      SPC(11); "<S>";
00010 IF U>0 THEN PRINT\ SPC(20); "Paid Accounts Ledger <P>";
00011 PRINT "@@@@*"; CHR(8);

Get User's selection and set L=0 if Overdue, L=1 if Statistics or
L=2 if Paid Bills Ledger. Abort if <RETURN>.

00012 GOSUB 81: IF X=13 THEN 78 ELSE IF X=80 AND U>0 THEN LET L=2
      ELSE IF X=79 THEN LET L=0 ELSE IF X=83 THEN LET L=1 ELSE 12
00013 PRINT " ": CURS 42,L+5: INVERSE: PRINT "<"; CHR(X); ">":
      NORMAL: REM Highlight chosen option on menu display

Set appropriate print characteristics

00014 IF L<>1 THEN 16 ELSE GOSUB 88:
      PRINT "Screen <S> or Printer <P>? *"; CHR(8);: REM Statistics
00015 GOSUB 81: IF X=83 THEN LET P=0: GOTO 34 ELSE IF X<>80 THEN 2
00016 IF L>0 THEN 18 ELSE GOSUB 88: PRINT "Fan-Fold paper <F> or@
      Single sheets <S>? *"; CHR(8);: REM Only Overdue bills printout
```

■ **Overdue Accounts** — (Figure 1) This will run through all bills on the system and print out the appropriate reminders for those that are overdue. Use this option regularly (at least once a week), as the time period for each reminder is measured from the date at which the last reminder on that account was printed. The date you last printed reminders is displayed on the menu page.

As the printing of a reminder modifies the disk account, it's a good idea when you first try it to use a back-up disk on which you've put a few dummy accounts that exceed your account terms. This allows you to adjust the print formatting variables in the BASE to suit your stationery, without losing the first few real reminders.

■ **Statistics** — (Figure 2) This gives you an overview of your business, listing the number of bills and amount due for each reminder.

■ **Paid Bills Ledger** — (Figure 3) You can only access this option if a Paid Bills Ledger exists on the disk. It will print a page (up to 52 entries), and if the ledger contains more than that it will allow you to erase the entries you printed from the disk. This prevents the ledger from consuming too much disk space, and allows entry to the PAYMENTS option if the ledger became too full (see Part 3).

Please also bear in mind the following points –

Printer Type: Debtmaster requires an 80-column (or more) printer. This should not be a problem, as printers with page widths less than that are rare these days. The output mode (that is, parallel, serial 300 baud or serial 1200 baud) is taken from the Base (see Part 1).

Stationery: The Paid-Bills Ledger and Statistics printouts both require standard A4 paper, however the Overdue Accounts (Reminders) can be printed on non-standard stationery if the print parameters in the Base have been set. The program will let you choose either fan-fold (continuous) stationery or single sheets for Reminders, but this choice isn't available with the Statistics or the Paid Bills Ledger as they only need a single page.

On-Screen: The Statistics can be listed to the screen, but the other print options require a printer. There is no reason to list Reminders to the screen and the Paid Bills Ledger can be listed with the CP/M "TYPE" command, so this should not be a limitation.

```
00017 G=0: GOSUB 81: IF X=83 THEN LET G=1 ELSE IF X<>70 THEN 2
00018 GOSUB 88: PRINT "Press any key when Printer ready *"; CHR(8);:
      GOSUB 81: IF X=13 THEN 2

PAID BILLS LEDGER PRINT ROUTINE

00019 IF L<2 THEN 34 ELSE GOSUB 86: OPEN "I",6,"PAID.DBT": IN#6ON:
      OUT#0: OUT#0OFF: FOR X=1 TO U+2: INPUT A1$(X): NEXT X: IN#0:
      OUT#0: CLOSE 6: REM Load Ledger
00020 OUT#0: OUT#0OFF: OUT#PON: Y=U: IF Y>52 THEN LET Y=52: REM Y is
      number of entries to be printed (Max.=52)
00021 F1=0: F2=0: FOR X=1 TO Y+2: K0$=A1$(X): PRINT SPC(4); K0$: IF
      X=2 THEN PRINT: REM Print the Entry
00022 IF X<3 THEN 25: REM When X=1 & 2 heading lines are printed.
      Strings following that are "Entries" and this routine adds up
      money received and written-off (etc.) in F1 & F2
00023 Z=SEARCH(K0$,"$"): IF Z>0 THEN LET K0$=K0$(;Z+1): GOTO 23: REM
      Find out where money entry begins and extract it
00024 Z=LEN(K0$)-1: K1$=K0$(;Z,Z): F0=VAL(K0$): ON ERROR GOTO 25:
      IF K1$="C" OR K1$="S" OR K1$="W" THEN LET F2=F2+F0 ELSE
      LET F1=F1+F0: REM Add to correct category
00025 ON ERROR GOTO 0: F0=FRE($): NEXT X: K1$="": IF F2=0 THEN 27
      ELSE LET F0=F1: GOSUB 89: K1$="Received $"+K0$
00026 F0=F2: GOSUB 89: K1$=K1$+"@@@@Not Received $"+K0$
00027 F0=F1+F2: GOSUB 89: K1$=K1$+"@@@@TOTAL $"+K0$:
      PRINT\ SPC(73-LEN(K1$)); K1$\\: REM Print text right justified
00028 IN#0: OUT#0: IF U<52 THEN 78

Erase Ledger Page (only operates if 52+ entries)

00029 GOSUB 88: PRINT "Erase this page of Paid Bills Ledger (Y/N)? *";
      CHR(8);
00030 GOSUB 81: IF X=78 THEN 78 ELSE IF X<>89 THEN 30
00031 GOSUB 86: IF U=52 THEN KILL "PAID.DBT": U=0:, GOTO 33: REM Erase
      ledger if it's empty (was 52 entries)
00032 OPEN "O",6,"PAID.DBT": OUT#6: PRINT "'"; A1$(1); "'":
      PRINT "'"; A1$(2); "'": FOR X=55 TO U+2: PRINT "'"; A1$(X);
      "'": NEXT X: OUT#0: CLOSE 6: U=U-52: REM Otherwise print
      heading and remaining entries
00033 GOSUB 92: GOTO 79

STATISTICS/REMINDERS PRINT ROUTINE

00034 GOSUB 87: N=0
00035 CURS 25,12: PRINT "Checking File *": CURS 0: FOR E=65 TO 90:
      S=0: Z=0
00036 ON ERROR GOTO 38: OPEN "I",6,CHR(E)+".DBT": CURS 39,12:
      PRINT CHR(E): CURS 0: IN#6ON: OUT#0: OUT#0OFF: REM Load
      files A.DBT to Z.DBT in succession
00037 INPUT C: FOR X=1 TO C: INPUT A0(X),A1$(X): NEXT X: Z=1: N=N+C
00038 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: IF Z=0 THEN 62: REM
      Bypass this routine if no such file on disk
00039 V=1: REM Else check each entry on file

Statistics analysis

00040 K0$=A1$(V): Y=INT(VAL(K0$)): IF L=0 THEN 43 ELSE LET Y=Y+1:
      A3(Y)=A3(Y)+1: K0$=K0$(;LEN(K0$)-12): REM Increment counter
      according to which Reminder it is (Number is at start of
      Account string)
00041 X=SEARCH(K0$,CHR(124)): IF X>0 THEN LET K0$=K0$(;X+1): GOTO 41:
      REM Isolate Amount (at end of Account string)
00042 Y=Y+6: F0=VAL(K0$): F1=A3(13): ON ERROR GOTO 60: A3(Y)=A3(Y)+F0:
      F1=F1+F0: A3(13)=F1: GOTO 60: REM Add Amount to the appropriate
      total and omit the Print routine

Reminder Print Routine

00043 IF Y=>R THEN 60: REM Skip this if last Reminder done
00044 F2=FLT(J-B(Y+1)): IF A0(V)>F2 OR F2<0 THEN 60: REM Skip this if
      not overdue or illegal (<0) reminder period.
```

▷

DEBTMASTER

```
00045 FOR X=1 TO 9: Z=SEARCH(K0$,CHR(124)): A2$(X)=K0$(;1,Z-1):
      K0$=K0$(;Z+1): NEXT X: K2$=K0$: F1=FRE($): REM Put each element
      of the account string into A2$ array. FRE($) prevents crashes.
00046 OUT#0: OUT#0OFF: OUT#PON: Z=0: FOR X=6 TO 9: K0$=A4$(X):
      IF K0$<>"" THEN PRINT SPC(B(7)+30-LEN(K0$)/2); K0$: Z=Z+1: REM
      Turn on printer. If Business name (etc.) details in BASE are
      set the print them central to page
00047 NEXT X: M=Z+B(6): IF B(6)>0 THEN FOR X=1 TO B(6): PRINT: NEXT X:
      REM Implement "Address Lines Down" in BASE if set.
00048 FOR X=3 TO 6: IF A2$(X)<>"" THEN PRINT SPC(B(7)); A2$(X): M=M+1:
      REM Print Client's Name and Address
00049 NEXT X: PRINT SPC(B(7)+48); K3$: IF A2$(9)<>"" THEN PRINT
      SPC(B(7)+48); "Ref: "; A2$(9): M=M+1: H=1: REM Print todays date
      and your reference (if any) at right of page
00050 PRINT\\\\\ SPC(B(7)+5); "Dear Sir/Madam,"
00051 PRINT\ SPC(B(7)+18) "Re: Overdue Account ("; A2$(2); ")"\
00052 FOR X=7 TO 8: K0$=A2$(X): IF K0$<>"" THEN PRINT
      SPC(B(7)+33-LEN(K0$)/2); K0$: M=M+1: REM Print "Re" (Category)
      central to page
00053 NEXT X: PRINT\: K0$=A4$(Y+1): FOR X=0 TO 3: K1$="":
      Z=SEARCH(K0$,CHR(124)): IF Z>0 THEN LET K1$=K0$(;1,Z-1):
      K0$=K0$(;Z+1): REM Print Reminder text
00054 PRINT SPC(B(7)+16); K1$: M=M+1: NEXT X:
      PRINT\ SPC(B(7)+43); [A10 45]
00055 PRINT SPC(B(7)+32); "Balance Due $"; K2$\ SPC(B(7)+43); [A10 45]
00056 K0$=A1$(V): A1$(V)=CHR(Y+49)+K0$(;2): A0(V)=F2: REM Increment
      Reminder number in Account string
00057 M=M+16: IF M<B(8) AND G=0 THEN FOR X=M TO B(8): PRINT: NEXT X:
      REM If Fan-fold paper then print rest of page (M=Lines so far)
00058 IN#0: OUT#0: S=1: IF G=0 OR (E=90 AND V=C) THEN 60: REM Printer
      off. Skip next line if all accounts done or fan-fold paper.
00059 GOSUB 88: PRINT "LOAD PRINTER: Press <R> to re-print or any@
      key to continue *"; CHR(8);: GOSUB 81: GOSUB 87: IF X=82
      THEN 40: REM If Single sheets then let user check if
      printout is O.K. (May be unreliable in some BASICs)

Balance of File check routine

00060 ON ERROR GOTO 0: V=V+1: GOSUB 84: IF X=65 OR X=97 THEN 78 ELSE
      IF V<C+1 THEN 40: REM Abort if key "A", else check next
      account on this file
00061 IF L=0 AND S=1 THEN OPEN "O",6,CHR(E)+".DBT": OUT#6: PRINT C:
      FOR X=1 TO C: PRINT A0(X); ",''"; A1$(X); "'''": NEXT X: OUT#0:
      CLOSE 6: REM If "Reminders" and an account has been printed
      then save amended file
00062 F1=FRE($): GOSUB 84: IF X=65 OR X=97 THEN 78 ELSE NEXT E: REM
      Abort if key <A> or done, else load next file

End File Check

00063 CURS 24,12: PRINT [A20 32]: CURS 0: IF L>0 THEN 65 ELSE IF H=0
      THEN CURS 18,16: PRINT "<<< NO OVERDUE ACCOUNTS FOUND >>>";:
      CURS 0: PLAY 22,1; 0,20
00064 K4$=K3$: GOSUB 92: GOTO 79: REM If "Reminders" then set "Last
      Date" (K4$) = "Today's Date" (K3$) and End.

Print the Statistics

00065 IF P=0 THEN CURS 1,9 ELSE OUT#0: OUT#0OFF: OUT#PON: PRINT\\\:
      REM Printer Off if not listing to screen
00066 F0=A3(13): GOSUB 89: PRINT SPC(21-LEN(K3$)/2);
      "<<< STATISTICS - "; K3$; " >>>"\ SPC(16); N; " Bills";
      SPC(14-LEN(K0$)); "Total $"; K0$
00067 Z=6-R: X=Z-2: IF X>0 THEN LET Z=Z+X*4 ELSE IF Z=2 THEN LET Z=3:
      REM Z=Spacing between columns. Depends on number of Reminders.
00068 PRINT "No."; SPC(Z+7); "0"; SPC(8);: FOR X=1 TO R: PRINT X;:
      IF X<R THEN PRINT SPC(8);: REM 1st Line: Reminder Numbers
00069 NEXT X: PRINT\ "Bills"; SPC(Z+2);: FOR X=1 TO R+1: K0$="--":
      IF A3(X)>0 THEN LET K0$=STR(INT(A3(X))): K0$=K0$(;2)
00070 PRINT SPC(4-LEN(K0$)); K0$;: IF X<R+1 THEN PRINT SPC(6);: REM
      2nd Line: Number of bills per Reminder period
00071 NEXT X: PRINT\ "Days"; SPC(Z+5); "--"; SPC(7): FOR X=1 TO R:
```

```
      KØ$=STR(B(X)): KØ$=KØ$(;2): PRINT SPC(3-LEN(KØ$));KØ$;:
      IF X<R THEN PRINT SPC(7);: REM 3rd Line: Days to Reminder
00072 NEXT X: FØ=A3(7): GOSUB 89: PRINT\ "$"; SPC(Z+10-LEN(KØ$));
      KØ$;: FOR Z=1 TO R: FØ=A3(7+Z): GOSUB 89: IF VAL(KØ$)=Ø THEN
      LET KØ$="--": REM 4th Line: Amount per Reminder
00073 PRINT SPC(10-LEN(KØ$));KØ$;: NEXT Z
00074 IF P=Ø THEN GOSUB 80 ELSE PRINT\\\: IN#Ø: OUT#Ø
00075 GOTO 78

End Routine

00076 OUT#Ø: OUT#ØOFF: OUT#PON: IF T-Ø THEN PRINT SPC(27); KØ$ ELSE
      PRINT SPC(57-LEN(K1$)); "Total $"; K1$(;2)\\ SPC(33);
      "<<< END >>>"
00077 PRINT\\\\\\\\: IN#Ø: OUT#Ø
00078 GOSUB 86
00079 RUN "DEBT"

MISCELLANEOUS SUBROUTINES

00080 GOSUB 88: PRINT "Key to continue *"; CHR(8);

00081 X=ASC(KEY$): REM Clear Key buffer
00082 GOSUB 84: IF X>96 AND X<123 THEN LET X=X-32
00083 IF X=124 OR X=128 THEN 82 ELSE RETURN

00084 FOR Y=1 TO 5: X=ASC(KEY$): IF X<>128 THEN NEXT*Y 85 ELSE NEXT Y
00085 RETURN: REM This routine overcomes a port switching delay error
      in MicroWorld BASIC (keyboard hangs briefly after disk access)

00086 GOSUB 88: CURS 30,16: PRINT "-Wait-";: CURS Ø: RETURN

00087 GOSUB 88: CURS 24,16: PRINT "Hold <A> to Abort";: CURS Ø: RETURN

00088 CURS 1,16: PRINT [A63 32];: CURS 1,16: RETURN

Convert FØ to a string adjusted to 2 decimals
00089 IF FØ=>1000000 THEN LET KØ$="1M+": RETURN
00090 KØ$=STR(FØ): KØ$=KØ$(;2): X=SEARCH(KØ$,".")
00091 IF X>LEN(KØ$)-2 THEN LET KØ$=KØ$+"Ø": GOTO 91 ELSE RETURN

Save Date File
00092 GOSUB 86: OPEN "O",6,"DATE.DBT": OUT#6: PRINT "'"; K3$; "',";
      K4$; "',"; J; ","; D; ","; U: OUT#Ø: CLOSE 6: RETURN
```

Debtmaster Addendum

There have been a few minor variations since the first part (see YC November '86) of Debtmaster was written.

a) Amend lines 14 and 16 of the DEBT program (Part 1) by adding the underlined code:

```
00014 Z=7: GOSUB 122: IF X=13 AND R>0 AND R<32 THEN 20
00016 Z=8: GOSUB 122: IF X=13 AND S>0 AND S<13 THEN 21
```

This gives added security to the error-trapping routines in the DAY and MONTH entry parts of the date routine. It is also a worthwhile modification to make to lines 89 and 91 of my Ledgermaster II program (YC March '86). Use F1 instead of R and F2 instead of S.

b) There was a minor omission in line 100 of the DEBT program (Part 1). Please insert the expression NEXT X: at the start of that line, so that the text entered into a reminder that is later cancelled is wiped off the disk file.

c) Add the underlined code near the end of line 59 of the PRI program (Part 4):

```
00059 .....  IF X=82 THEN LET K0$=A1$(V): X=ASC(K0$)-1
      A1$(V)=CHR(X)+K0$(;2): GOTO 40
```

This corrects a minor bug that stopped the <R> key (Re-Print) from working reliably.

d) I can now copy the program onto either 9 cm or 13 cm disks (you supply the disk — Microbee computers only), but the new sales tax means the price has risen to $54. Add $2 for packaging and postage, and send your disk to Dreamcards, 8 Highland Court, Eltham North 3095.

Printing Debtors: In programs of this type it is useful to be able to print out all debtors on the system (or those within specified classes). This can be done with the SEARCH option (given in Part 5).

I have not given a step-by-step description of how the print option works, as it is quite straightforward and fully explained by on-screen prompts. Note that this subprogram cannot handle amounts of $1,000,000 — it won't crash, but the particular total may be shown as '$1M+', or as some figure less than a million.

Part 5

In the next part of this series we'll fill in the final part of the Menu by discussing the Search option. □

```
                                ACHMED BIN ACHMED
                            Freelance Freedom Fighter
                        243 Revolution St., Tehran, Iran 30342
                                Tel (008) 21-9674


     MR. JOE BLOGGS
     44 ABLUTION CRES.,
     BULLAMAKANKY 3043


          Dear Sir/Madam,

                        Re: Overdue Account (12/11/86)

                            WARFARE: DECLARING IT ON
                                PRESIDENT REAGAN

                     Your account has been outstanding for
                     a long time. Unless you settle it
                     immediately you will be shot.


                                                  --------------
                                      Balance Due $60000.00
                                                  --------------
```

Figure 1. *Sample reminder letter for overdue accounts.*

```
                    <<< STATISTICS - 12/11/86 >>>
                    112 Bills   Total = $72145.63
          No.           0         1         2         3
          Bills        61        39        10         2
          Days         --        30        60        90
          $       37547.80  25113.50   9112.03    373.10


     "No." indicates the Reminder number ("0" means that no reminder
     has been sent), "Bills" tells you how many bills fall within each
     reminder period, "Days" is the number of days from rendering the
     account to the particular reminder and "$" is the amount of money
     outstanding in each reminder period.
```

Figure 2. *Sample statistics printout.*


```
                                PAID BILLS LEDGER
     CODES: C=Cancelled; D=Discharged; P=Part Paid; S=Summons; W=Written Off

     30/12/86  COL. A. GADDAFI          MAYHEM                    $10000.00
     2/1/87    JOE BLOGGS               WARFARE                   $60000.00 (W)
     3/1/87    POL POT                  RAPE & PILLAGE              $400.00

          Received $10400.00     Not Received $60000.00     TOTAL $70400.00


     NB:  In  this sample Bloggs was a bad payer and his account was "Written
     Off". The other two debtors paid.
```

Figure 3. *Sample paid bills ledger.*

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Select draft/letter quality	N	Y	Y
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Construct DOS directories	N	N	Y
Instant word count	N	N	Y
True microjustification	N	Y	Y
Graphics on screen and printing	N	Y	Y
Upper/lower case conversion	N	N	Y
Print multiple copies	N	Y	Y
Whole program in memory for fast response	N	N	Y
Bold, underline onscreen	N	Y	Y

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Signature: _____ Expiry date _____

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Macintosh

MacDATES

I know, I know. It has all been done before, and probably better, but probably not for the Macintosh. Here are some date routines that were specifically written for the Macintosh. They take full advantage of the features of Microsoft BASIC, such as subprograms, functions and so on.

I wanted a standard set of subroutines, which I could incorporate into any program that required date processing. I also wanted them to be flexible enough to allow all sorts of date calculations, if necessary. Subprograms provide a convenient method of developing standard subroutines.

I started by trying Julian dates, and in fact there is a routine for getting a Julian date listed here, as I use the Julian date to determine the day of the week. I then decided to abandon the idea of Julian dates in favour of a system that allows the programmer to establish a base year. All date values were to be the number of days since January 1st of the base year. I also wanted to be able to store dates in files in a shorter format than the nine bytes it takes to store a date string such as 24 Jul 86. By using the MKSS() and CVS() functions of BASIC, you can convert a date value into four bytes before storing it in a file. Obviously a method of recreating the date string is necessary.

```
PRINT"1=Test Dates or 2=Manual Test Entry"
INPUT choice
ON choice GOTO testdates,testentry
testdates:
RANDOMIZE
GOSUB dateinit
ON MOUSE GOSUB mouseevent
MOUSE ON
OPEN "Date Tests" FOR OUTPUT AS #1
baseyear=1900:maxyear=2099
WHILE INKEY$<>""
y=INT(baseyear+(maxyear-baseyear)*RND(1))
m=1+INT(RND(1)*12):IF m=2 AND FNleapyear(y) THEN ly=1 ELSE ly=0
d=1+INT(RND(1)*monthlen(m)+ly)
sd$=MID$(STR$(d),2)+" "+LEFT$(month$(m),3)+" "+RIGHT$(STR$(y),2)
datetodays sd$,d,m,y,days,errs
daystodate ed$,d,m,y,days
dates=dates+1
IF sd$<>ed$ THEN GOSUB dateerror
WEND
PRINT #1,:PRINT #1,"Results:";dates;"dates tested with";errors;"errors =",100-INT(errors*100/dat
es);"% (leap year errors =";lyerrors;"or";INT(lyerrors*100/errors);"%"
CLOSE #1
MOUSE STOP
END
dateerror:
PRINT #1,"Date Error: First Date=",sd$," Second=",ed$;
errors=errors+1
IF FNleapyear(y) THEN PRINT#1," <<<Leap Year>>>";:lyerrors=lyerrors+1
PRINT#1,
RETURN
mouseevent:
PRINT"Processed:";dates;"and",errors,"errors =",100-INT(errors*100/dates),"%"
RETURN
testentry:
GOSUB dateinit
finished=false
WHILE NOT finished
INPUT "Enter a date e.g. 23 Mar 87 ";d$
IF UCASE$(d$)="STOP" OR UCASE$(d$)="QUIT" THEN finished=true:GOTO whileend
datetodays d$,d,m,y,days,errors
IF errors=1 THEN PRINT:PRINT"Month Incorrect":GOTO whileend
IF errors=2 THEN PRINT:PRINT"There aren't that many days in ";month$(m):GOTO whileend
PRINT "Day, Month & Year ";d;"/";m;"/";y;:IF FNleapyear(y) THEN PRINT "  <<< LEAP YEAR >>>" ELSE
PRINT
julian d,m,y,jd
PRINT"Julian date=";jd
weekday jd,wd
PRINT "Day of Week = ";wd;day$(wd)
PRINT "Number of days since 1st January,";baseyear;"= ";days
daystodate d$,d,m,y,days
```

Microbee

METRONOME

This program produces regular 'ticks' at a specified number of beats per minute, interspersed with 'beeps' to mark the end of each bar as defined by line 00140. The metronome may be temporarily interrupted, reset, or finally stopped by following the instructions in lines 00160 to 00180.

Inputting an unrealistically high value for the number of beats per minute (line 00120) can force an error, as it may result in a negative value for 'T' in line 00240. The limits imposed by line 00130 cover the full range of conventional music without producing an error.

I have found that setting the number of for-next loops at 760 per second (line 00190) produces an accurately timed beat, but this may vary on different models of Microbee. Adjustments to the timing can be made by changing the figure 760 in lines 00190 and 00240.

The variation in the delay loop (line 00240) is necessary because the 'beep' takes appreciably longer to play than the 'tick'.

John Blockley,
ARDROSS 6153.

```
00100 CLS
00110 PRINT TAB(28);"METRONOME"
00120 PRINT\\:INPUT"How many beats per m
inute? ";S0
00130 IF S0<10 OR S0>300 THEN 120
00140 INPUT"How many beats per bar? ";B
00150 IF B<1 THEN 140
00160 PRINT\"Press <P> to Pause"
00170 PRINT"Press <R> to Reset"
00180 PRINT"Press <S> to Stop"
00190 N=0:K = INT(760*60/S0)
00200 Z7$=KEY$
00210 IF Z7$="p" OR Z7$="P" THEN GOTO 33
0
00220 IF Z7$="r" OR Z7$="R" THEN CLS:GOT
O 120
00230 IF Z7$="s" OR Z7$="S" THEN CLS:END
00240 IF N=0 THEN LET T =K-(INT(760/8))
ELSE LET T = K
00250 FOR I = 1 TO T
00260 NEXT I
00270 N=N+1
00280 IF N=B THEN GOSUB 300 ELSE OUT 2,0
:OUT 2,255
00290 GOTO 200
00300 PLAY 24,1
00310 N=0
00320 RETURN
00330 PRINT\"Press <C> to Continue"
00340 Z6$=KEY$
00350 IF Z6$ ="c" OR Z6$ ="C" THEN 240 E
LSE 340
```

TRS-80 AND MC-10

CANON

I originally designed CANON on the MC-10. I then ran it through a conversion program (PO to CO by Bob Schecter) and voila, I had a Coco version!

The only alteration that needed to be made is to cater for the fact that the MC-10 can cope with something like
PRINT@0,:
but the Coco needs
PRINT@0,"":

The program is great for getting an intuitive feeling for projectile motion (chucking things into the air).

You must fire your canon to

```
CLEAR200
GOTO10
FORSV=1TO3:FORT=1TO2000:NEXTT:
CSAVE"CANON":PRINTSV:NEXTSV:END
GOSUB1100:GOSUB1200
G=.2:FD=2
FORT=1TO32:BL$=BL$+CHR$(143+4
8):NEXTT
REM MAKING THE MOUNTAIN
A=8+RND(16):B=8+RND(16)
CLS0
C=10+RND(5):D=53-RND(5):E=15+
RND(30)
H=31-A
FORT=ATOC
FORL=3TOHSTEP-1
SET(T,L,4)
NEXTL
IFP<CORP>DTHEN130
90 DR=RND(4)
100 IFP<ETHENH=H-DR
105 IFP>ETHENH=H+DR
110 IFH<10THENH=H+DR
120 IFH>26THENH=H-DR
125 IFH>31-BTHENH=31-B
130 NEXTP
200 REM SETTING CANONS
210 X1=2+RND(C-2)
220 FORY1=7TO31
230 IFPOINT(X1,Y1)>0THENPRINT@(3
2*INT((Y1-1)/2)+INT(X1/2)),"▌";
GOTO250
240 NEXTY1
250 X2=D+RND(61-D)
260 FORY2=7TO31
270 IFPOINT(X2,Y2)>0THENPRINT@(3
2*INT((Y2-1)/2)+INT(X2/2)),"▐";
GOTO290
280 NEXTY2
```

TRS-80 AND MC-10

knock out your opponent's canon before he gets you. You can play alone if you just want to practice.

The two canons are positioned randomly on either side of a randomly shaped mountain. You need to control both the angle and the force of your canonball, in order to clear the mountain and bomb the other canon. I suggest angles between 3 and 8. Use the period (full stop) for decimal values if you wish.

Each time a canon is bombed, the score is shown and a new screen is drawn. This should give a few hours of fun for both Coco and MC-10 users.

Grahame Pollock,
MINTO 2566.

```
290 REM INPUTTING ANGLES & FORCE
295 IFNP=1THEN320
300 I=RND(2)
310 IFI=2THEN500
320 REM LEFT PLAYER
330 PRINT@416,"ANGLE";:INPUTA1
335 PRINT@428,BL$;
340 PRINT@448,"FORCE";:INPUTF1
341 PRINT@460,BL$;
342 F1=F1/FD
343 A1=A1/57.29577951
345 T=0
347 X5=X1:Y5=Y1
350 X3=X1+(T*F1*COS(A1))
360 Y3=Y1-3-(T*F1*SIN(A1)-(.5*G*
T^2))
362 IFY3>31THENY3=31
365 XL=INT(X3):YL=INT(Y3)
370 IFX3>630RX3<0THENGOSUB700:GO
TO500
375 IFY3<0THEN410
378 IFY5=>YLTHEN398
380 FORY=Y5TOYL
382 FORX=X5TOXL
384 IFPOINT(X,Y)=-1THEN800
390 IFPOINT(X,Y)=4THENRESET(X,Y)
:GOSUB700:GOTO500
394 NEXTX
395 NEXTY
398 IFPOINT(XL,YL)=4THENRESET(XL
,YL):GOSUB700:GOTO500
400 SET(XL,YL,4)
410 S3=5*(31-Y3)
420 IFS3>255THENGOSUB700:GOTO500
430 SOUNDINT(S3),1
440 T=T+1
445 IFY3<0THEN460
450 RESET(XL,YL)
455 X5=XL:Y5=YL
460 GOTO350
500 REM RIGHT PLAYER
505 IFNP=1THEN320
510 PRINT@435,"ANGLE";:INPUTA2
520 PRINT@467,"FORCE";:INPUTF2
522 F2=F2/FD
523 A2=A2/57.29577951
525 T=0
527 X6=X2:Y6=Y2
530 X4=X2-(T*F2*COS(A2))
540 Y4=Y2-3-(T*F2*SIN(A2)-(.5*G*
T^2))
545 XR=INT(X4):YR=INT(Y4)
550 IFX4>630RX4<0THENGOSUB700:GO
TO320
560 IFY4<0THEN600
567 IFY6=>YRTHEN588
570 FORY=Y6TOYR
572 FORX=X6TOXRSTEP-1
574 IFPOINT(X,Y)=-1THEN900
580 IFPOINT(X,Y)=4THENRESET(X,Y)
:GOSUB700:GOTO320
584 NEXTX
585 NEXTY
588 IFPOINT(XR,YR)=4THENRESET(XR
,YR):GOSUB700:GOTO320
590 SET(XR,YR,4)
600 S4=5*(31-Y4)
610 IFS4>255THENGOSUB700:GOTO320
620 SOUNDINT(S4),1
630 T=T+1
640 IFY4<0THEN660
650 RESET(XR,YR)
655 X6=XR:Y6=YR
660 GOTO530
700 REM BLANK OUT WRITING
710 PRINT@416,BL$;
720 PRINT@448,BL$;
730 RETURN
800 REM LEFT HITS RIGHT
810 SOUND1,5
820 SET(XL,YL,1)
830 SOUND10,5
840 SET(XL-1,YL,1):SET(XL,YL-1,.
):SET(XL+1,YL,1):SET(XL,YL+1,1)
850 SOUND50,5
860 SET(XL,YL-2,1):SET(XL,YL-3,1
):SET(XL-1,YL-3,1):SET(XL+1,YL-3
,1)
870 IFXL<17THEN940
880 SL=SL+1:GOTO1000
900 REM RIGHT HITS LEFT
910 SOUND1,5:SET(XR,YR,1)
920 SOUND10,5:SET(XR-1,YR,1):SET
(XR,YR-1,1):SET(XR+1,YR,1):SET(
R,YR+1,1)
930 SOUND50,5:SET(XR,YR-2,1):SET
(XR,YR-3,1):SET(XR-1,YR-3,1):SET
(XR+1,YR-3,1)
935 IFXR>46THEN880
940 SR=SR+1:GOTO1000
1000 REM SCORE
1010 GOSUB700
1020 PRINT@448,SL;
1030 PRINT@470,SR;
1040 FORT=1TO3000:NEXTT
1050 GOTO15
1100 REM INSTRUCTIONS
1110 CLS0:PRINT@192,"THE AIM IS
TO SHOOT THE OTHER   CANON"
1120 PRINT"TO DO THIS, YOU MUST
ENTER THE  ANGLE BETWEEN THE HOR
IZONTAL    AND YOUR CANON"
1130 FORI=4TO10:SET(5,I,2):NEXTI
:FORI=5TO15:SET(I,10,2):NEXTI
1140 FORI=1TO6:SET(5+I,10-I,2):N
EXTI
1150 PRINT@132,"ANGLE";
1160 FORI=48TO58:SET(I,10,2):NEX
TI
1170 FORI=4TO9:SET(58,I,2):NEXTI
1180 FORI=1TO6:SET(58-I,10-I,2):
NEXTI
1190 PRINT@151,"ANGLE";
1196 RETURN
1200 REM NO OF PLAYERS
1210 PRINT@448,""
1220 PRINT"<1> OR <2> PLAYERS"
1225 NP$=INKEY$:IFNP$=""THEN1225
1226 NP=VAL(NP$)
1230 IFNP<1ORNP>2THEN1220
1240 RETURN
```

Microbee

VIPER

Imagine yourself sitting in the cockpit of a Cylon Fighter. You have just had a Galactic Viper zoom in on your screen. Study it for your plan of action. This program produces a graphics representation of a Viper from Battlestar Galactica for Microbee Premium users.

Craig Kerwin,
REDBANK PLAINS 4300.

```
00100 rem <<<VIPER by C. Kerwin. 27 Harris Street. >>>
00110 rem <<<Redbank Plains 4300. June 15, 1986.   >>>
00120 COLORB 11: COLOR 0
00130 cls:hires2
00140 plot 123,172to123,176to110,176to120,214to197,214to216,182to245,163to245,15
6to258,156to258,147to235,147to235,150to232,150to232,153
00150 plotH 123,172to123,176to110,176to120,214to197,214to216,182to245,163to245,1
56to258,156to258,147to235,147to235,150to232,150to232,153
00160 plot 232,153to235,153to235,156to229,156to229,163to206,176to168,176to168,17
3
00170 plotH 232,153to235,153to235,156to229,156to229,163to206,176to168,176to168,1
73
00180 plot 107,172to174,172to174,153to120,147to120,172to107,172to107,134
00190 plotH 107,172to174,172to174,153to120,147to120,172to107,172to107,134
00200 plot 174,172to174,175to187,175to187,155to174,153:plot 187,155to187,128:plo
t 174,153to174,128:plot 107,128to107,147to120,147to120,128
00210 plotH 174,172to174,175to187,175to187,155to174,153:plotH 187,155to187,128:p
lotH 174,153to174,128:plotH 107,128to107,147to120,147to120,128
00220 plot 107,140to187,140:plotH 107,140to187,140
00230 plot 107,129to187,129:plotR 108,128to186,128
00240 plotH 107,129to187,129:plotR 108,127to186,127
00250 plot 161,128to161,127
00260 plot 136,112to169,112to169,106to136,109to136,112
00270 plotH 136,112to169,112to169,106to136,109to136,112
00280 plot 187,173to206,173to216,167to216,147to206,141to216,135to216,128:plot 20
6,141to187,141
00290 plotH 187,173to206,173to216,167to216,147to206,141to216,135to216,128:plotH
206,141to187,141
00300 plot 219,144to219,128:plot 206,141to219,144to232,144to232,128
00310 plotH 219,144to219,128:plotH 206,141to219,144to232,144to232,128
00320 plot 232,144to238,146to264,146to438,141to454,138to454,128
00330 plotH 232,144to238,146to264,146to438,141to454,138to454,128
00340 plot 232,144to264,144to264,128:plot 261,144to261,128
00350 plotH 232,144to264,144to264,128:plotH 261,144to261,128
00360 plot 264,144to309,134to309,128:plot 310,134to310,128
00370 plotH 264,144to309,134to309,128:plotH 310,134to310,128
00380 plot 309,134to264,134to219,131to219,128to264,131to309,131
00390 plotH 309,134to264,134to219,131to219,128to264,131to309,131
00400 plot 257,151to280,151to280,153to257,153
00410 plotH 257,151to280,151to280,153to257,153
00420 plot 311,134to438,131to438,128
00430 plotH 311,134to438,131to438,128
00440 forY=170to146step-6:plot 107,Yto120,Yto120,Y-1to107,Y-1to107,Y-2to120,Y-2:
nextY
00450 forY=170to146step-6:plotH 107,Yto120,Yto120,Y-1to107,Y-1to107,Y-2to120,Y-2
:nextY
00460 forY=171to159step-6:plot 174,Yto187,Yto187,Y-1to174,Y-1to174,Y-2to187,Y-2:
nextY
00470 forY=171to159step-6:plotH 174,Yto187,Yto187,Y-1to174,Y-1to174,Y-2to187,Y-2
:nextY
00480 COLOR 5:plot 300,64to300,48to310,48to310,32to320,32to320,48to330,48to330,6
4
00490 plot 335,48to335,32to340,32:plot 335,54to335,52
00500 plot 345,16to345,48to365,48to365,32to345,32
00510 plot 390,32to370,32to370,48to390,48to390,40to370,40
00520 plot 395,32to395,48to415,48to415,44
00530 COLOR 4:plot 2,2to509,2to509,253to2,253to2,2
00540 COLOR 0
```

and pigs fly backwards...

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Megafax

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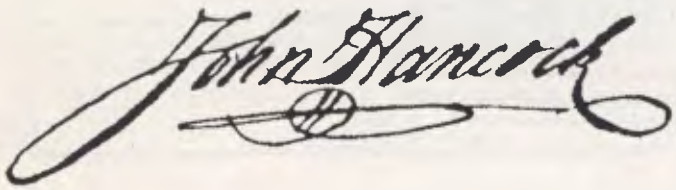
*Mouse driven user interface



Macintosh

While I was developing the routines, I had many problems with them handling various dates. To assist in testing them I developed a procedure which randomly created a date string, passed it through the conversion sub-programs and back again, and wrote any errors to a file. If you are thinking of converting the date routines for another PC you may also wish to include the testing routines, to be sure that the conversion works.

To use the test routines, run the program and select either 1 or 2; 1 is the option to test random dates, while 2 allows you to input dates to see how they convert. Option 1 will ask you to enter the randomise seed, and then it will start the checking process. It will continue until you press the decimal point/full stop key. You can see the progress by clicking the mouse. When completed, any errors will be stored in the file called Date Tests. Use MockWrite or a similar desk accessory to see the file's contents, or load it directly into BASIC.

Option 2 asks you to enter a date. It will then give a list of various values returned from the sub-programs. Click the mouse to enter new values. Enter QUIT or STOP as the date to finish.

To use the date subprograms you must first establish a GOSUB to the routine name DATEINIT. This sets up the variables and arrays. Also, set the variable BASEYEAR to the value most suited to your application. Remember, the routines do not support negative values, so you cannot have a date prior to January 1 of the base year. If the year specified is less than the base year, it is assumed to be in the next century. For example, suppose you enter 12 Jan 44, and the base year is set to 1980; the date will be assumed to be 12 January, 2044.

You must ensure you don't use the variable names defined in DATEINIT for any other reason, and that you leave in the data

```
PRINT"Converted back = ";d$
PRINT"d,m,y = ";d;m;y
WHILE MOUSE(0)=0
WEND
whileend:PRINT
WEND
END
'<<<<< END OF TEST ROUTINES >>>>>

'<<<<< START OF ACTUAL DATE SUBPROGRAMS >>>>>
SUB datetodays(d$,d,m,y,days,errors) STATIC
splitdate d$,d,m,y,errors
IF errors<>0 THEN EXIT SUB
getdays d,m,y,days
END SUB
SUB daystodate(d$,d,m,y,days) STATIC
getdmy days,d,m,y
makedate d,m,y,d$
END SUB
SUB splitdate(d$,d,m,y,errors) STATIC
'splits dmy from a date string
SHARED month$(),monthlen(),baseyear
IF LEN(d$)<9 THEN d$="0"+d$
d=VAL(LEFT$(d$,2)):m$=MID$(d$,4,3):y=VAL(RIGHT$(d$,2))+INT(baseyear/100)*100
IF y<baseyear THEN y=y+100
m=0:errors=0
FOR i=1 TO 12:IF UCASE$(LEFT$(month$(i),3))=UCASE$(m$) THEN m=i:i=12
NEXT i
IF FNleapyear(y) AND m=2 THEN ly=1 ELSE ly=0
IF d>monthlen(m)+ly THEN errors=2
IF m=0 THEN errors=1
END SUB
SUB getdays(d,m,y,days) STATIC
SHARED baseyear
'gets a day value for a given dmy
SHARED month()
days=((y-baseyear)*365.25)+month(m-1)+d
IF FNleapyear(y) AND m>2 THEN days=days+1
END SUB
SUB getdmy(numberofdays,d,m,y) STATIC
'returns dmy for a given day value
SHARED month(),baseyear,checkmonth()
FOR i=1 TO 12:checkmonth(i)=month(i):NEXT i
days=numberofdays
y=INT(days/365.25)
days=days-y*365.25
IF days<1 THEN days=366:y=y-1
y=y+baseyear
IF FNleapyear(y) THEN FOR i=2 TO 12:checkmonth(i)=checkmonth(i)+1:NEXT
m=0
FOR i=1 TO 12:IF checkmonth(i)>=days THEN m=i:i=12
```

Macintosh

statements containing the month details. You can use any variables which appear in sub-programs that do not have an associated SHARED statement, as these are local to the sub-program.

There are two main sub-programs which call the smaller sub-programs. The following list gives the name of the sub-program, its function and an example call.

DATETODAYS — converts a string date into a date value and checks for errors (datetodays d$,d,m,y,days,errs).

DAYSTODATE — converts a date value into a string date and into d,m,y (daystodate d$,d,m,y,days).

JULIAN — converts a day,month and year into a Julian date (julian d,m,y,jd).

WEEKDAY — calculates the day of the week from a Julian date where Sunday=1,Monday=2 (weekday jd,wd).

The date string should be in the form of day, space, first three letters of the month, space, last two digits of the year. Valid dates include 29 Feb 84, 5 Dec 72 and 08 Jul 09. When your program calls the DATETODAYS sub-program, it should check the ERRORS parameter. If it is not zero, an error in the date string format has occurred. If the value is 1, the month is not valid, and if the value is 2, the number of days is too large for the specified month.

You can call the sub-program either directly or by prefixing it with the CALL statement. The following example gives read and write subroutines for use with a file buffer variable of FILEDATE$, and demonstrates the use of the CVS and MKS$ BASIC functions.

```
NEXT i
IF m=0 THEN ok=false
d=INT(days-checkmonth(m-1))
END SUB

SUB makedate(d,m,y,d$) STATIC
SHARED month$()
'makes a string out of dmy
d$=MID$(STR$(d),2)+" "+LEFT$(month$(m),3)+" "+RIGHT$(STR$(y),2)
IF LEN(d$)<9 THEN d$="0"+d$
END SUB

SUB weekday(jd,wd) STATIC
'returns weekday from a julian date
c=(jd+5)/7
wd=INT(7*(c-INT(c)+.00004))
wd=wd+1' wd sun=1,mon=2,tue=3 etc
END SUB

SUB julian(day,month,year,jd) STATIC
'calculates julian date
d=day:m=month:y=year

IF m=1 OR m=2 THEN y=y-1:m=month+13
IF m>2 THEN m=month+1
jd=INT(y*365.25)+INT(m*30.6001)+d
END SUB
dateinit:
'initialise global variables
RESTORE months
DIM month$(12),month(12),day$(7),checkmonth(12),monthlen(12)
FOR i=1 TO 12:READ month$(i),month(i):NEXT
FOR i=1 TO 7:READ day$(i):NEXT
FOR i=1 TO 12:READ monthlen(i):NEXT
baseyear=1980
DEF FNleapyear(y)=(y MOD 4=0 AND y MOD 100 <> 0)
true=-1:false=0
RETURN
months:
DATA January,31,February,59,March,90,April,120,May,151,June,181,July,212
DATA August,243,September,273,October,304,November,334,December,365
days:
DATA Sunday,Monday,Tuesday,Wednesday,Thursday,Friday,Saturday
monthlengths:
DATA 31,28,31,30,31,30,31,30,30,31,30,31
```

```
<<< convert d$ and write to file >>>

datetodays d$,d,m,y,days,errors

IF errors THEN enter date

filedate$=MKS$(days)

GOSUB writefile
```

```
<<< Read file and recreate d$ >>>

GOSUB readfile

days=CVS(filedate$)

daystodate d$,d,m,y,days
```

There is also a function to determine whether a year is a leap year or not: it is called leap year (what else!), and to use it you type FNleapyear(year). It returns –1 (true) if it is a leap year and 0 (false) if not. Thus you can use a line like IF leapyear(year0 THEN do something ELSE do something else.

Happy dating!

Rohan Cook,
BORONIA VIC.

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Apple II

THE REST OF INVOICE SYSTEM

Dear Natalie,
I was most pleased to see my *Invoice System* in the *Pocket Program* section of the November issue. However, I couldn't help but notice that half of it wasn't there! (Well, a little bit, anyway.) the SYSTM1 file, the main body of the program is there intact, but the SECSYST file, the machine language security system, wasn't printed.

Thanks for a great mag. Keep up the good work. (Maybe you could organise some sort of competition with Apple, and get one of those new-fangled Apple II GS beasties as a prize, huh? Maybe?)

Glen Thornley,
Malvern 5061

(*Huh? Maybe? Check out page 130, Glen.*)

SECSYST file

```
0300-  A9 01     LDA  #$01
0302-  85 06     STA  $06
0304-  A9 00     LDA  #$00
0306-  85 09     STA  $09
0308-  A9 01     LDA  #$01
030A-  85 08     STA  $08
030C-  20 15 03  JSR  $0315
030F-  C6 09     DEC  $09
0311-  D0 F5     BNE  $0308
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0317-  85 07     STA  $07
0319-  A0 00     LDY  #$00
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031E-  A6 09     LDX  $09
0320-  C8        INY
0321-  D0 0C     BNE  $032F
0323-  C6 07     DEC  $07
0325-  D0 08     BNE  $032F
0327-  A5 06     LDA  $06
0329-  85 07     STA  $07
032B-  C6 08     DEC  $08
032D-  F0 05     BEQ  $0334
032F-  CA        DEX
0330-  D0 EE     BNE  $0320
0332-  F0 E7     BEQ  $031B
0334-  60        RTS
0335-  D0 0E     BNE  $0345
0337-  A5 06     LDA  $06
0339-  85 07     STA  $07
033B-  E6 08     INC  $08
033D-  AD 00 C0  LDA  $C000
0340-  8D 10 C0  STA  $C010
0343-  10 05     BPL  $034A
0345-  CA        DEX
0346-  D0 E8     BNE  $0330
0348-  F0 E1     BEQ  $032B
034A-  60        RTS
034B-  20 58 FC  JSR  $FC58
034E-  A2 F9     LDX  #$F9
0350-  20 4A F9  JSR  $F94A
0353-  BD 5E 03  LDA  $035E,X
0356-  F0 A8     BEQ  $0300
0358-  20 F0 FD  JSR  $FDF0
035B-  E8        INX
035C-  D0 F5     BNE  $0353
035E-  50 52     BVC  $03B2
0360-  49 56     EOR  #$56
0362-  49 4C     EOR  #$4C
0364-  45 47     EOR  $47
0366-  45 A0     EOR  $A0
0368-  56 49     LSR  $49,X
036A-  4F        ???
036B-  4C 41 54  JMP  $5441
036E-  49 4F     EOR  #$4F
0370-  4E 00 00  LSR  $0000
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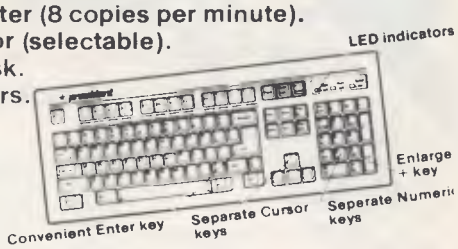

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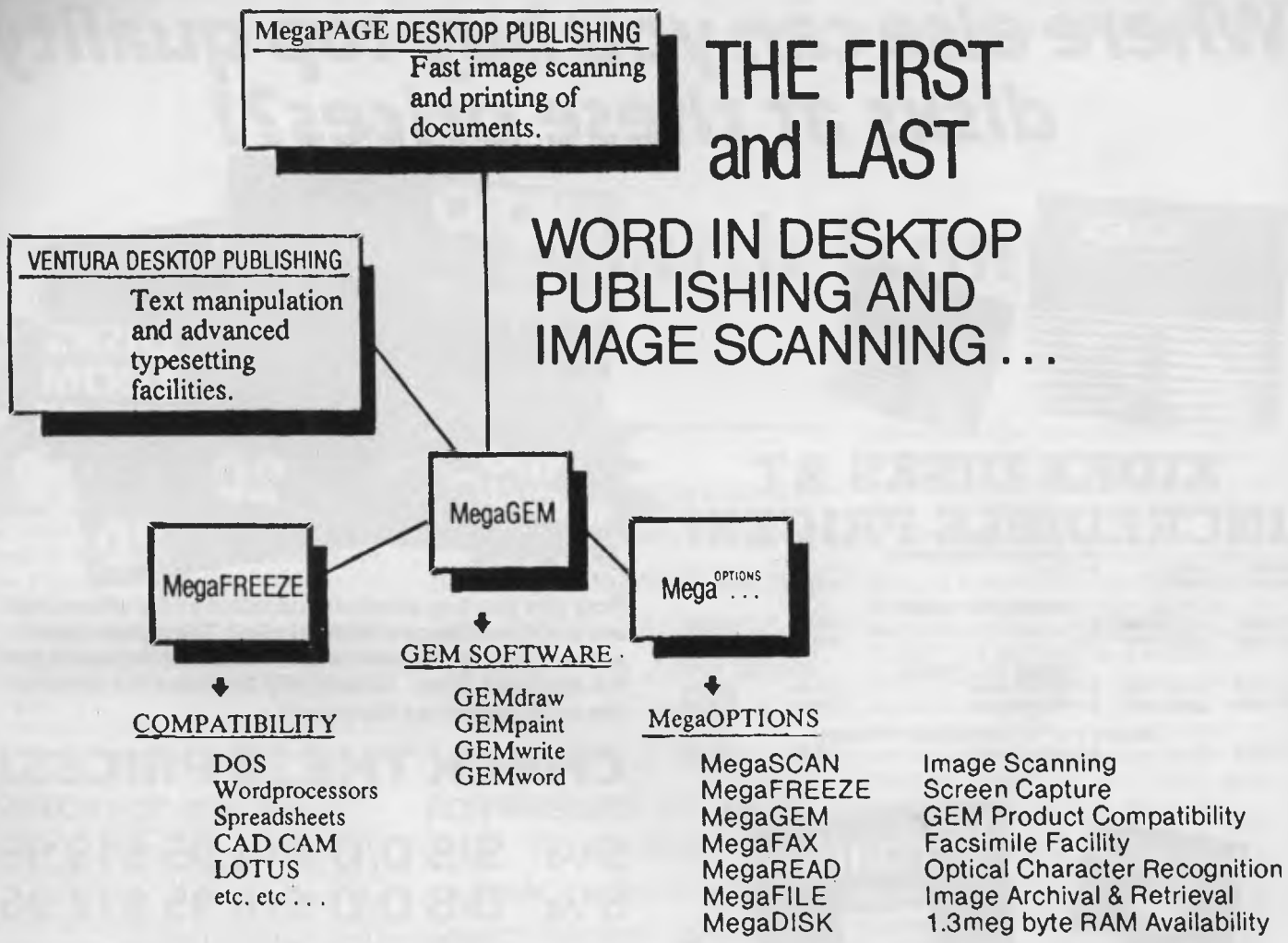

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On The Battlefront

LAST NIGHT THE GERMAN Second Panzer Division defied history. It relived its 1944 surprise attack upon the French city of Bastogne, an attack that represented the last Axis hope of victory on the Western front. The way history tells it, they were defeated by US forces under General Patton, but this time the Germans had an ace up their sleeve. They had a different commander, General Von Allen, and this time they got to win.

I've been playing (er, reviewing) the latest computer game from the Strategic Studies Group, and I'm becoming rather addicted to it. The game, called Battlefront, is a simulation/re-creation of four famous land battles of World War Two.

Battlefront is a strategy game (there is no joystick). You are the commander of a couple of regiments of soldiers, and you are giving the orders and taking the consequences. And, just like in a real army, there is a chain of command. You are a general, not a captain, so you don't directly control your units. A general gives orders, the orders filter down the chain, and people try to carry them out as best they can.

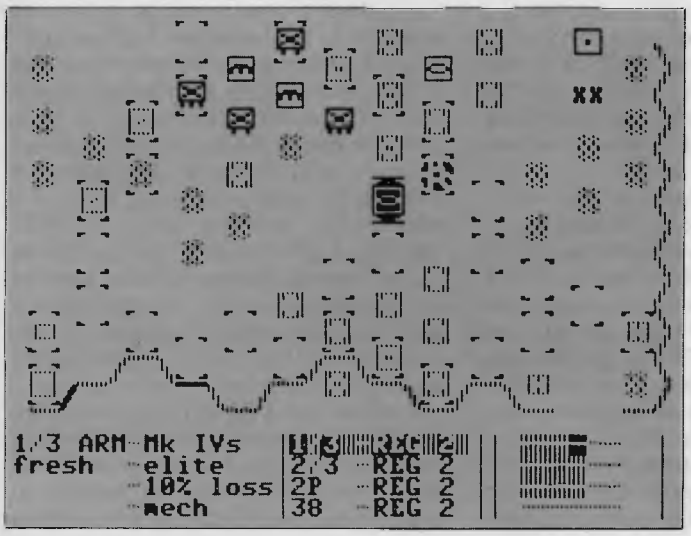
You may order Division One to attack, but if its component battalions have been routed or are pinned down, they may not be able to. Your local commanders don't have the big strategic picture and can easily become more concerned with pressing local problems.

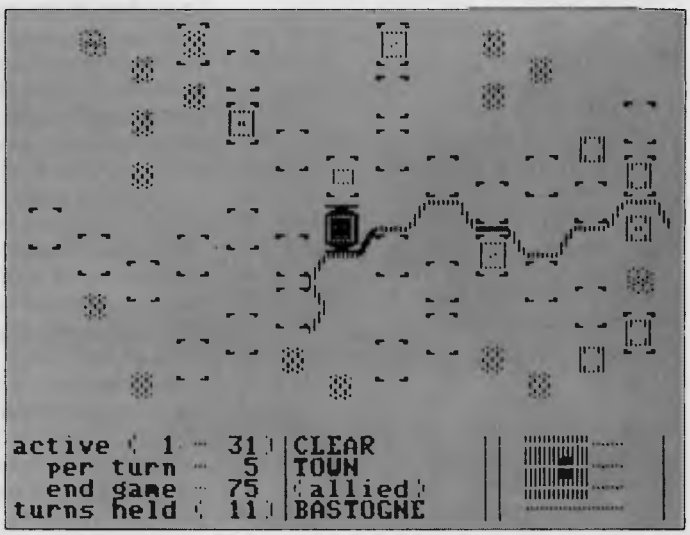
Battlefront's programmers have got the computer to do all the boring stuff, leaving you free to concentrate on strategy. Ian Allen found they've also added the dimensions of historical realism and the 'fog of battle.' It's developer's have made extensive use of 'expert system' software to handle the decisions made by your subordinates, and they have done a brilliant job.

That's what makes Battlefront so interesting. It's developers have made extensive use of 'expert system' software to handle the decisions made by your subordinates, and they've done a brilliant job. Game designer Ian Trout believes there is no point in replaying or simulating military battles unless the simulation is realistic and accurate enough to give the player an insight into why battles were fought and why they were won or lost.

This 'realism' has nothing to do with battlefield pyrotechnics — it's more about cutting enemy lines of supply or protecting your own. In a real war, you are not concerned with destroying the enemy so much as neutralising their ability to fight. Why waste your forces on frontal attacks when a bit of strategy can minimise your losses? Even the toughest enemy units need to have fuel and ammunition.

Of course, the enemy is trying to do the same to you. That's why certain positions become strategically important, and one of the reasons battles are fought where and when they are. It's a difficult concept





to design because it requires the incorporation of an incredible amount of detail. How do you do that while still making the game playable?

If you've ever come across any of the Avalon Hill board games that use little cardboard pieces you will appreciate the problems. Those games take great pride in their historical accuracy, but they are just about impossible to play for anybody but an enthusiast. There are too many details to keep track of — the housekeeping of logistics and supply are more work than fun, and there are so many pieces and units that you often forget whether you've moved them or not!

Battlefront's programmers have got the computer to do all the boring stuff and leave you free to concentrate on the strategy, but at the same time they've added the dimensions of historical realism and of the 'fog of battle'.

For example, you have limited information about adjacent enemy units and practically none about uncontacted ones. When you are planning your moves you know how many casualties you've taken, and how exhausted your units may be, but you have to guess on the state of the opposition. This applies whether you are playing against the computer, against another human, or even when you let the computer play both sides!

The latter is an interesting exercise to watch. The game has an 'observe' mode where you can watch it play itself, and at any time press the F1 key (C-64) or Escape key (Apple) and take a detailed look at the status and orders of all of the different units on both sides. (This keystroke is not documented in the manual but using it is a good way to find out what you should be doing).

Although each scenario starts from a set position, no two games are alike, even when the computer plays itself. You can't find a particular strategy which will work every time, so you have to be prepared to respond to particular developments on the battlefield. I've played the game quite extensively, yet I'm still not prepared to play the computer with the handicap option set in it's favour. (In other words, I'm still losing as often as I win!)

Battlefront has four scenarios: The Battle of the Bulge, Create, Stalingrad and the invasion of Saipan.

In keeping with the design of SSG's previous games *Carriers at War* and *Europe Ablaze*, there is a system whereby you can design new games or modify existing ones. It's a nice feature, but one I suspect is rarely used. I put this to Roger Keating, the chief programmer at SSG, and he told me about an in-house SSG magazine called *Run5*, which regularly provides the information for new scenarios for all SSG games — and, if you're not inclined to type all the data in, you can subscribe for

NAME	MOVEMENT (0 31) MECH	NON MECH	COMBAT (0 7) ARM	ART	INF
OCEAN					
CULTIVATED	4	2	7	7	7
MIX JUNGLE	4	2	6	4	7
ROUGH JUNG	6	3	5	3	6
HVY JUNGLE	[illegible]	4	4	1	4
MOUNTAIN	12	4	4	3	4
BEACH HEX	2	2	7	7	7
AIRFIELD	2	2	7	7	7
MOUNT PEAK		6	1	1	2

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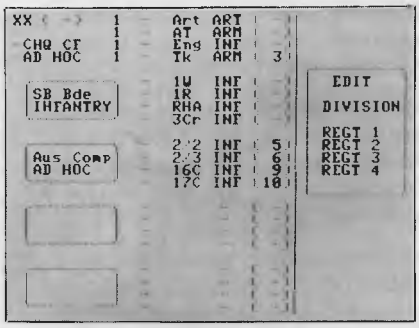
- ENGINEER
- ANTI-AIR
- ANTI-TANK
- TANK DESTROYER
- ARMOUR
- ASSAULT GUN
- ARTILLERY
- H DIV HQ (AX/AL)

GENERAL BATTALION ICONS

(VISIBLE TO BOTH PLAYERS)

- ALLIED INFANTRY
- ALLIED ARMOUR
- ALLIED ARTILLERY
- ALLIED ROUTED
- PARACHUTE MODE
- AXIS INFANTRY
- AXIS ARMOUR
- AXIS ARTILLERY
- AXIS ROUTED
- AIR LANDING MODE
- AMPHIBIOUS MODE



a disk as well. Information about how to subscribe is included inside the jacket of each game. He showed me two additional scenarios for Battlefront — Gallipoli and the Falklands War!

The graphics and sound in the game are adequate, but nothing to write home about. The various units and terrain layout are represented by icons on the screen, which is itself a window on a much larger battlefield map. The sound effects are limited to beeps when pieces move, plus a start-up and end-of-game musical tune. Control-S will turn off the sound and make the game slightly faster to play.

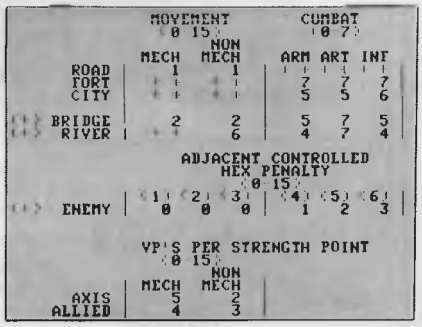
Strategy games are games to make you think, and their appeal is not in their graphics and sound — but, as strategy games go, Battlefront's graphics compare very favourable with the competition. They are certainly much better than in SSG's previous efforts.

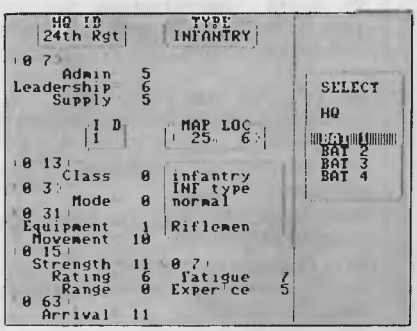
For all of it's merits, Battlefront is not a game that is easy to get into. The hardest part is getting used to the 'chain of command' concept which prevents you from positioning individual units, but it is well worth taking the trouble to learn. It's a game for the more serious player and you can expect to spend anything from one-and-a-half to four hours on a typical game (there is provision to save unfinished games).

It's a game with what people in the movie business call *legs* — enduring appeal. And if you get really hooked you can subscribe to SSG's *Run5* magazine and disk and find a whole new world of variations and scenarios. I'm very impressed with the concept of extending the life expectancy of games by having the ability to load infinite variations and new scenarios off disk!

Until I came across Battlefront, my most frequently played strategy games was SSG's first effort, *Reach for the Stars*. (I purchased it two years ago, so I have to admit I've had my money's worth). Since I've had Battlefront, RFTS hasn't left it's disk sleeve.

Battlefront is availabe for both Apple II and Commodore 64/128 (owners of the latter will appreciate the fact that, like RFTS, Battlefront requires no disk access once it's loaded). In my view SSG has exceeded even itself. □





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M16: MOVIE DATABASE. Contains details of nearly 2000 movies which are available on videotape. Search by title, rating, cast members, writer, director, etc.

M17: PINBALL GAMES. Contains three fascinating games of varying degrees of difficulty. Engrossing.

M18: SOLUTIONS TO ADVENTURE GAMES. Special collection of hints to solve games such as ZORK I, II, III, Hitchhikers, Starcross, Deadline, Witness, Mask of the Sun. Serpents Star, Dark Crystal, Planetfall, The Enchanters, Death in the Carribean, Infidel, and Seastalker

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.

M23: UTILITIES. Make life easier for yourself with programmes like Util, Z, Vtype, ST, Protect, Unprotect.

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.

M26: UTILITIES FOR PERSONAL MANAGEMENT. Similar to side-kick, these are background utilities that provide calculator, notepad/editor, phone index, alarm clock, calendar, printer controls, typewriter-simulator, window access to directory, display/remove/copy/rename files, etc.

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M34: MULTI-TASKING SHELL. On this disk we have two excellent DOS Shells which allow you to operate and execute from a menu system — Dosamatic and Still River Shell. Interrupt tasks and switch to other programmes. Enjoy a superior work environment.

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M61: GRAPHICS. A selection of some of the best programmes in the public domain, including an extensive picture-graphics set of commercial standard.

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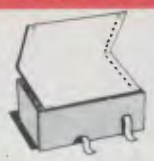

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- Spaed and code transparent
- Two/Four position rotary switch on front panel
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- Switch comes standard with female connector
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High quality IBM* compatible monitors, great with VCR's too!

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Video: Positive
Sync.: Positive
Input Level: TTL Level
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Vertical: 60Hz
Display Size: 245(H) x 182(V)mm
Resolution:
Horizontal: 640 dots
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Size: 343(H) x 362(W) x 421(D)mm
Weight: 11.6kg

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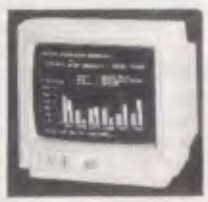

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Display Format: 80 x 25 characters
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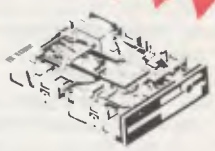
(Monitor not included)



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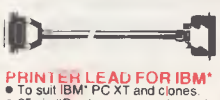

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- 25 pin "D" plug on computar end to Centronics 36 pin plug
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Phosphor: Green (P39)
Mode: TTL
TTL Input Signal:
Polarity: TTL Positive
Level: 4V p-p +−1.5V
Impedance: 75ohm
Active Video Period:
Horizontal: 44.25 uS maximum
Vertical: 18.98 mS maximum
Video Band Width: 16 MHz (−3dB)
Scanning Frequency:
Horizontal: 18.432 +−0.1KHz
Vertical: 50 HZ +−0.5%
Active Display Area:
216(H) x 160(V)mm
Display Characters: 80 characters x 25 lines
input Connector: 9 pin connector
Controls:
Front; Power ON/OFF, Contrast.
Rear; V-Hold, V-Size, Brightness
Internal; Vertical Linearity, Horizontal Linearity, Horizontal Width, Focus.

Description	Cat.No.	1-9	10+
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Amber	X14518	$199	$189

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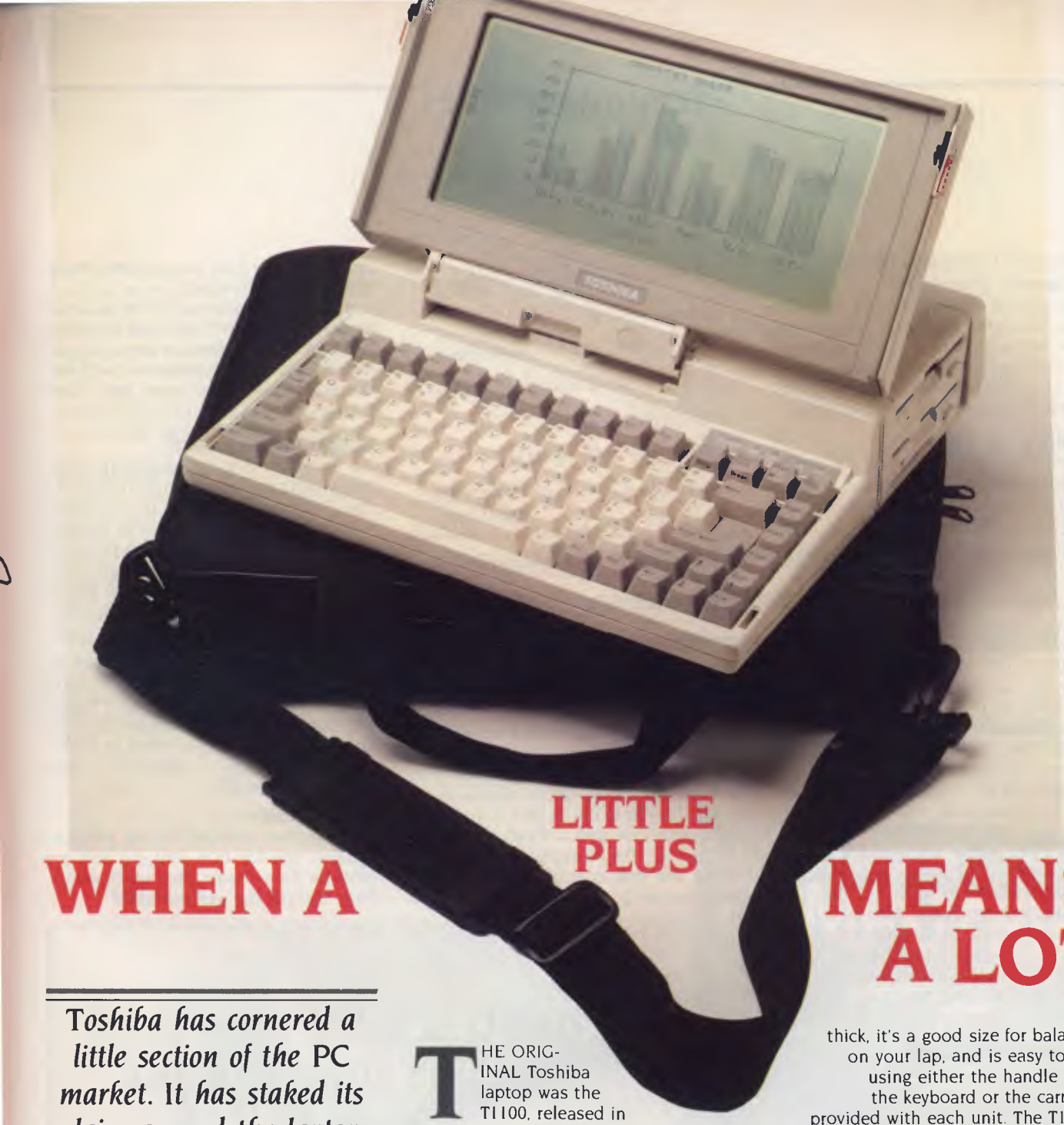


WHEN A LITTLE PLUS MEANS A LOT

Toshiba has cornered a little section of the PC market. It has staked its claim around the laptop PC, offering a range with different processors, memory sizes, displays and drives. The latest in the line is the Toshiba T1100+. As John Hepworth discovered, never before has a little plus sign meant so much.

THE ORIGINAL Toshiba laptop was the T1100, released in mid-1985 with one internal 9 cm drive and a liquid-crystal display. In mid-1986 came the T2100 and T3100, with 8086 and 80286 processors (respectively), plasma screens and various drive combinations, including hard disks. The T1100+ is a new machine, though closely patterned on the T1100. The LCD has been retained, a second 9 cm drive has been added, and the 8088 has been replaced with an 8086. To really soup things up, the T1100+ has also been endowed with a two-speed clock; the settings, 4.77 and 7.16 MHz, are user-selectable.

It's Purty

The compact, attractively presented T1100+ is easy to carry and use. At 310 mm wide, 310 mm deep and 65 mm thick, it's a good size for balancing on your lap, and is easy to carry using either the handle under the keyboard or the carry bag provided with each unit. The T1100+ is moulded from beige plastic of the sort which marks a little if touched by fingers which have recently turned the pages of a newspaper. Fortunately, it is easy to clean with a soft dry cloth.

Input/Output

The machine's rear panel sports the DC input socket, power switch, serial port, parallel port, RGB connector and composite video port. The serial port uses the same 9-pin connector as the AT. The parallel port does double duty, being used to drive printers, or to connect external 13 cm or 9 cm disk drives. The T1100+ is powered by an internal rechargeable battery with an eight-hour life. A plug pack connected to the DC input socket is used for recharging, or an optional car adaptor ▷

can be used to recharge the battery from car cigarette lighter sockets.

An internal modem will be available soon. Machines released in the United States already have a Bell-compatible unit; and Toshiba have undertaken adaptation to CCITT standards and are in the process of obtaining Telecom approval.

Admiring the View

Two convenient latches allow the screen to be opened from its storage position over the keyboard. Pivoting through a full 180 degrees, until it lies flat on top of the machine, the screen can be adjusted to any position to suit available light and the user. Contrast is controlled by a knob on the left of the main unit. The LCD is one of the best I have seen, with good contrast, excellent sharpness and good character shape.

Though the machine's LCD only displays one colour, applications software intended for RGB monitors can be run to greater effect using the supplied utility program, CHAD.COM. This allows the user to determine the shadings and intensities used to represent the colours.

Near the hinge of the T1100, a number of indicator lights show which disk is being accessed, processor speed High or Low (selected by Ctrl-Alt-PgUp for 7.16 MHz and –PgDn for 4.77), and internal/external monitor (Ctrl-Alt-Home for LCD, Ctrl-Alt-End for external RGB or composite video). A low-battery warning light comes on when the charge will only run the machine for another 20 minutes.

Keyboard Compliment

The 81-key keyboard has no separate numeric keypad. Ctrl-Alt-backspace toggles some keys on alpha pad to exactly emulate the numeric/cursor/grey +/- keys, while otherwise the numlock uses some alpha keys as a numeric keypad. The keyboard has an excellent feel, and I found it easy to adapt to the variations in layout from the IBM standard. Some software uses particular key combinations on the IBM keyboard; an example is Microsoft Word 3.0 when in outlining mode. The T1100+ keyboard conveniently emulates the 'missing' keys even though they're not really there.

The Driving Force

The T1100+ has twin internal 720 Kbyte floppy drives. One external 9 cm or 13 cm drive can be connected to the same parallel port otherwise used by the printer. An external switch selects if the parallel port is to be used for a printer, an external A drive or external B drive. A floppy drive within a desktop PC can be used as an external drive from the T1100+ if you make the connection with a Floppy Link card plugged into the PC and daisy-chained between the disk controller and a floppy drive. Naturally, a serial cable can be used to transfer files from a desktop to the laptop at even lower cost!

Though the machine's LCD only displays one colour, applications software intended for RGB monitors can be run to greater effect using the supplied utility program, CHAD.COM. This allows the user to determine the shadings and intensities used to represent the colours.

A 10 Mbyte hard disk will be available as an option to the T1100 some time early this year, though with 720 Kbyte floppies it is far less essential than it is with machines which have only 360 Kbyte floppies.

Does it Fit the Mould?

The Toshiba's IBM compatibility is excellent. I didn't find any software which didn't run. The disk hardware is also extremely compatible. I used a copy utility program to transfer a couple of copy-protected games from an external 13 cm drive to the Toshiba's internal 9 cm drive with perfect results.

How Much Does it Hold?

Standard memory is 256 Kbytes, with an optional upgrade to 640 Kbytes. Early in 1987 the limit will be raised to 1 Mbyte, with 640 Kbytes for DOS and the other 360 Kbytes for RAM drives, spoolers or the extended memory standard from Lotus/Intel/Microsoft.

Documentation

Two excellent manuals come with the T1100+, one for DOS and the and the other for the hardware. They are thorough, clear, concise and well-presented.

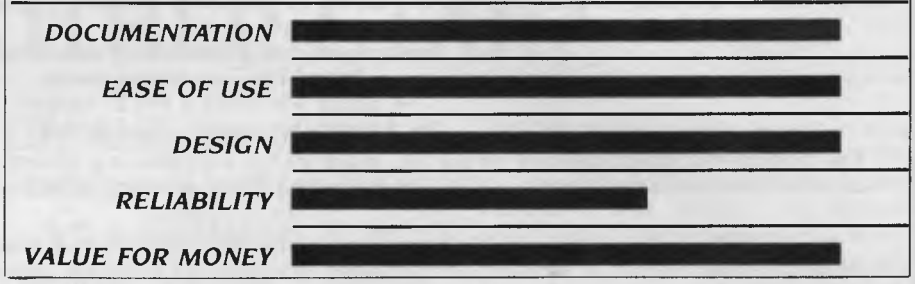
How Fast?
I used the well-known Peter Norton Sysinfo program to test processor speed. With the fast clock speed selected, the T1100+ gave a speed index of 1.7, while the slow clock gave 1.3 — these are indications of processor speed relative to a standard IBM PC (index 1.0). They seemed to be typical for 9 cm floppy drives.

Overall Impressions
If I didn't already have a desktop and a laptop I would be first in the queue for a T1100+. It is better than either of the machines I already have, giving the right combination of speed and portability. When you're on the move, the LCD is more than adequate, and the ease of connection to an external monitor on return to base takes care of the rest. Compatibility is as good as one could hope for, and the availability of external drives allows fast transfer of software and data to 9 cm disks. □

Product Details

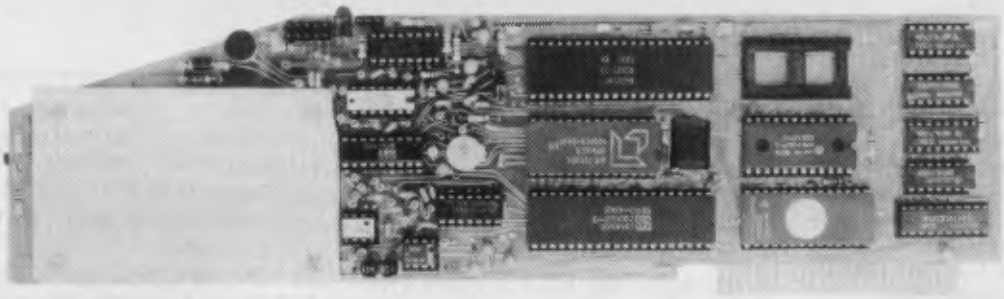
Product:	Toshiba T1100+
Distributor:	Toshiba (Australia), 84-92 Talavera Road, Nth Ryde 2113.
Prices (inc tax):	T1100+ (256 kB) $3890 Floppy Link $280, 640k Expansion $626, External 5.25 floppy drive $864, External 3.5 $700, Internal modem (see text) about $700 Car power adaptor $110

Ratings



MODEM FOR APPLE II & IIE

NOW IN STOCK WITH FULLY OPERATIONAL FIRMWARE & NEW FEATURES



* Super intelligent direct connect MODEM/VIATEL terminal for APPLE II, IIE & compatibles fully contained on a single card — plugs into slot#2 — does not require separate serial card or software. All software is permanently resident in an onboard 128K EPROM. It is hidden in the slot#2 card space, leaving the whole of memory completely free for other programs unlike disk based comms software which must occupy the main memory excluding other programs. It is menu driven and automatically senses for ProDos or DOS 3.3 operation. Received files are appropriately converted before saving and can be used.

Sending/receiving files is very simple:—
— Press "ESC" to display menu.
— Select "(S) END A FILE" option
— Answer the prompt "FILENAME?:"

The modem will search the disk for the file, make all the decisions (e.g. binary, basic, textfile, DOS 3.3 or ProDos) and transmit it in the correct format. <CR> transmits the file in memory. Similarly to receive a file select "(R) ECEIVE A FILE" option.

* AUTO ANSWER — AUTO DIAL. Senses true dial tone, ring tone, busy tone and acts intelligently, returning status messages. Characters can be included in the phone number to set baudrate, pause, "await dialtone" and multiple redial on busy. On answer, it selects the incoming baudrate by precision frequency measurement. This is much more reliable than the normal autosearch using carrier detect which is often confused by voice and phone tones. A reliable autosearch is a must for bulletin board operation.

* 300 Baud full duplex or 1200/75 and 75/1200 with fast automatic line turnaround. An upgrade kit to add V22 (1200/1200 baud) and V22 Bis (2400/2400 baud) will be available later.

*Main menu option "(V)IDEOTEXT" shows the VIATEL menu. It becomes a full graphics VIATEL terminal, automatically dialling and transmitting the user ID stored in the battery backed ram. When online, a keypress will immediately save pictures to memory. These can be reviewed later and selectively saved to disk or printed (requires a graphics printer card). Pictures can be loaded from disk and printed out. The modem can act as a videotext host and can be programmed to act on frame information. e.g. — use the clock to ring "MONEYWATCH" hurly and dial you at the office if your shares move outside a given range.

* TELESOFTWARE DOWNLOAD facility to purchase programs over VIATEL from suppliers such as MICROTEX 666 and TANGO.

* A full wordprocessor in EPROM for pre-composition of text before transmission. It can also be used to edit or print received files as well as for general wordprocessing.

* Onboard battery backed calendar clock can time and initiate calls or keep an activity log. ProDos uses it to time and date disk files and it is accessible from Basic.

* 2Kx8 battery powered CMOS RAM stores default parameters, phone numbers, ID, password, logon strings, search codes and setup parameters (e.g. baud rate, parity, printer ON) for each number, allowing single keystroke call establishment to specific areas of complex databases. Main menu option "(T)ELELIST" displays the list of 23 names and one is selected.

* Incorporates XON/XOFF and CHRISTENSEN error correcting protocol. Textfiles are not so fussy but error correction is a must when transferring program files. A debug function can display normally invisible control characters sent by the host.

* Can output directly to printer even when online at 1200 Baud — a fast printer is not required as the printer is spooled out of the receive buffer. A "FILTER" function is available to remove screen control characters from textfiles (these can drive a printer crazy). Special scroll routines print to 80 column screen and printer at 1200 Baud without any lost characters.

* Unique "PHANTOM MODEM MODE" function allows the modem to be permanently connected with the normal phone. When answering, if it doesn't immediately detect a calling modem it generates ringing tone back to the calling party and sounds the APPLE bell, giving you 60 seconds to answer the phone.

* If you have previously purchased this modem and have not yet received an updated EPROM VERSION V2.18 and a manual, contact AUTOMATIC ICE CO. — there is no charge for these.

AUTOMATIC ICE COMPANY

Mastercard & Bankcard

10 SMITH STREET, CHARLESTOWN, 2290.
PHONE (049) 63 3188 — (049) 63 1386

Price $299 *(incl S/T)*

WORDSTAR 2000 Plus

ANOTHER STAR?

Like many first versions of software, Wordstar 2000 left a few things to be desired. Version 2 fills in many of the gaps, and, of course, adds a thing or two. John Nicholls looks at it from a daily-user's point of view.

SOMEONE SAID TO ME recently, "Never buy release one of any software." Good advice: release one of anything usually has a lot of faults, sometimes major ones, that have slipped through the testing process. It often takes a second release to get a program working reasonably.

I liked Wordstar 2000 when it was released last year (see my review in *Your Computer* November 1985). Many critics panned it, especially those under the misguided impression that it was intended to replace Wordstar 3.3. Micropro has tried to position Wordstar 2000 as a corporate package offering ease of learning and an impressive list of features. Its competitors in this area include Samna, Multimate, Wordperfect, Displaywrite and Microsoft Word.

Feature for feature it compared favourably with any of these programs, and Release 2 has added a few more features. Last year it was mandatory for word processing programs to have spelling checkers; this year they have to be able to arrange print in columns, as in this article. Wordstar 2000 allows you to print text in one, two or three columns — after you've printed your first newsletter in two columns you'll never want to go back to a single column.

Columns are said to be 'snaking' when you add text to one column and the following columns adjust automatically. On the screen the first column appears as it will print; the second (and third) appear below the first, but with the correct left and right margins. I didn't find this a problem, especially now that Release 2 gives us on-screen justification.

The main criticism of Release 1 was that it was too slow, and here Micropro has made significant improvements. The snail's pace was most noticeable when you wanted to move from one end of a long document to another; it is still somewhat slow going from the beginning to the end, but going from end to beginning only requires as long as it takes to rewrite the screen. You can now scroll through text with the up and down arrows, and the screen display will keep up with you (though strangely enough it won't keep up if you use ^W or ^Z to scroll. The program now offers satisfactory speed on a hard disk computer, especially on an 80286 computer like the AT, but I still wouldn't recommend running it on a floppy disk system.

Wordstar 2000 uses overlay files and calls them up from disk, just like Wordstar. Micropro specifies a minimum of 256 Kbytes for DOS 2.0 and 2.1, and 320 Kbytes for DOS 3.0 and 3.1 (shades of 64 Kbytes for the original Wordstar!). However if you have more than 385 Kbytes of free memory (as determined by the DOS CHKDSK command) you can obtain a so-called 'RAM Version' from Micropro. This is a version of the program that loads completely into memory and delivers faster performance because it doesn't need to call up overlays. You don't get this disk automatically; you purchase the ordinary version and return the registration card to get the RAM version.

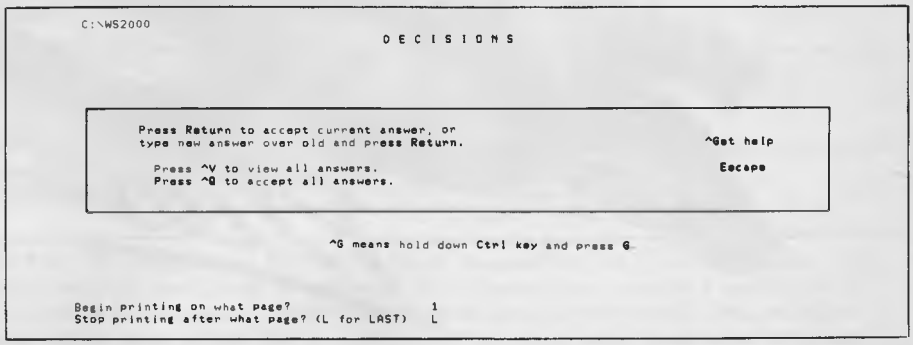
Micropro has been listening to its customers, and has corrected many of the shortcomings of the original program. Tabs and margins are set in inches rather than columns (I guess we still have another step to go to get to centimetres), and you can set or clear more than one tab stop at a time. The ruler line is also in inches as well as columns, and expands or contracts for different font sizes. You can use footnotes as well as end notes, and backwards wordwrap is now automatic.

New features include a Document History screen, Lotus- 1-2-3 worksheets can be loaded, either partly or in full, hanging indents and paragraph indents are provided, and files can be converted to and from Wordstar and IBM's DCA (Document Content Architecture), another mandatory option this year. Screen colours have been changed, and now all screens have a black background. Ordinary text now appears in amber (brown), which is quite attractive and easy on the eyes. You can still change any of the colours if you want to.

The change in tab settings means you can now set tabs only in multiples of 0.1 of an inch. With 12-pitch and proportional fonts you can use either tabs or spaces to line up columns, but not both, otherwise they won't line up correctly. Micropro may provide 1/12 inch spacing in 12 pitch formats in a future release.

Print features deserve a paragraph of

WORDSTAR 2000



sionally, I've had messages saying I couldn't edit a document because the disk is write-protected or the document is marked read only. When you use PgUp to page backwards through a document, the cursor always stays in the same place on the screen, so when you reach the first screen the text may start halfway down the screen; this speeds up the process. Page breaks don't appear on the screen during scrolling, but they do as soon as you stop. This allows faster scrolling than would be possible if the program had to calculate where the page breaks should occur.

As for actual bugs, we've managed to find only one: the print driver for the Laserjet 'F' font doesn't support manual paper feed.

I should add that these comments are not made as a result of working with the program for only a short time. They are the result of heavy use of the program for quite some time, and I'm satisfied we've really wrung it out.

Micropro provides dealers with a "Sampler". This includes a 'demonstration disk' which is well worth looking at. It runs for about 15 minutes. A number of sub-distributors and training companies offer two-day courses on Wordstar 2000.

An extra $150 or so will buy you Wordstar 2000 Plus, which includes Maillist, Telemerge and Starindex. This is a bargain, even if only because Maillist contains sample documents to allow you to print labels, phone lists, envelopes and the like, without having to come to grips with all the Mailmerge commands.

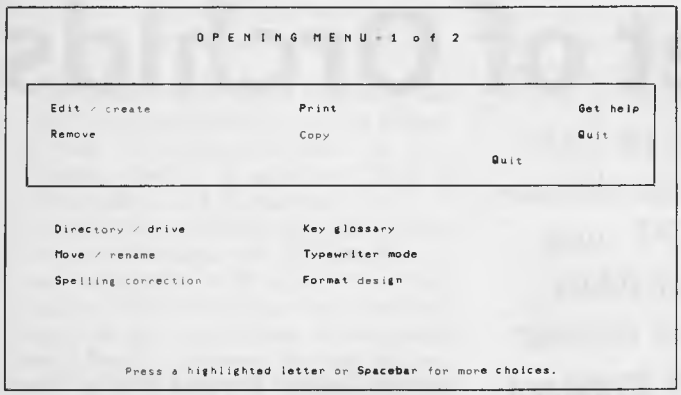
My conclusion? Wordstar 2000 Release 2 is my favourite word processor, and I use it daily. □

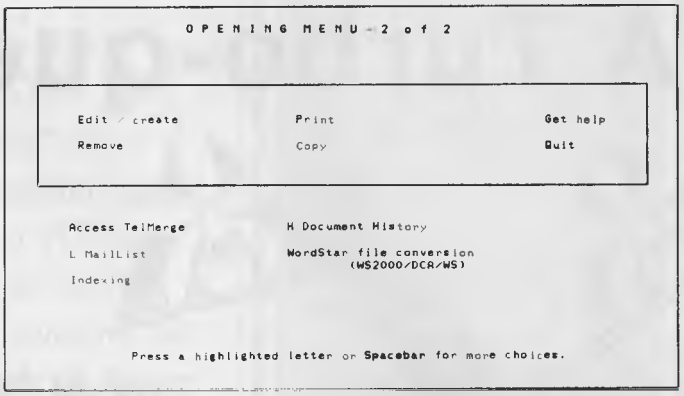
Product Details

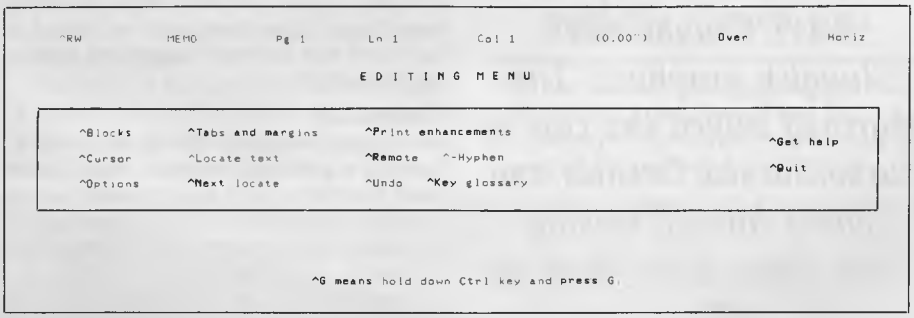
Product:	Wordstar 2000
Manufacturer:	Micropro International Corp San Rafael, California
Distributor:	Micropro Australia, Suite 44, Chatswood Village, Chatswood 2067 (02) 411 7255
Price:	Wordstar 2000 $775 untaxed 2000 Plus $925 untaxed

Ratings

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



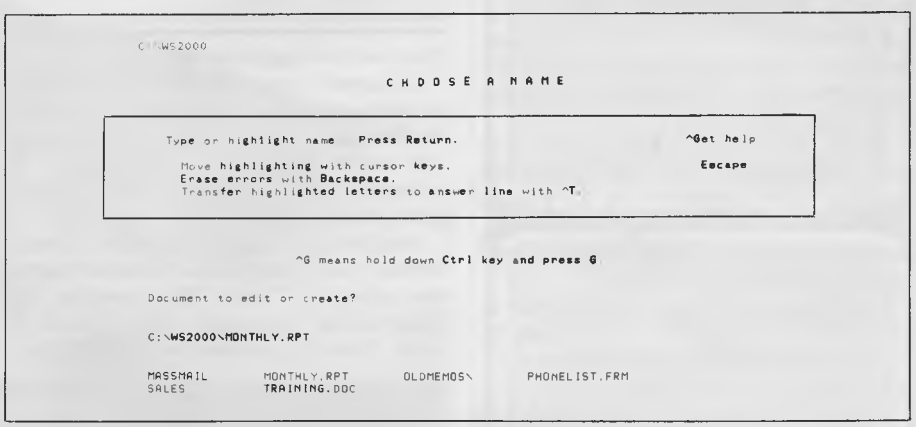


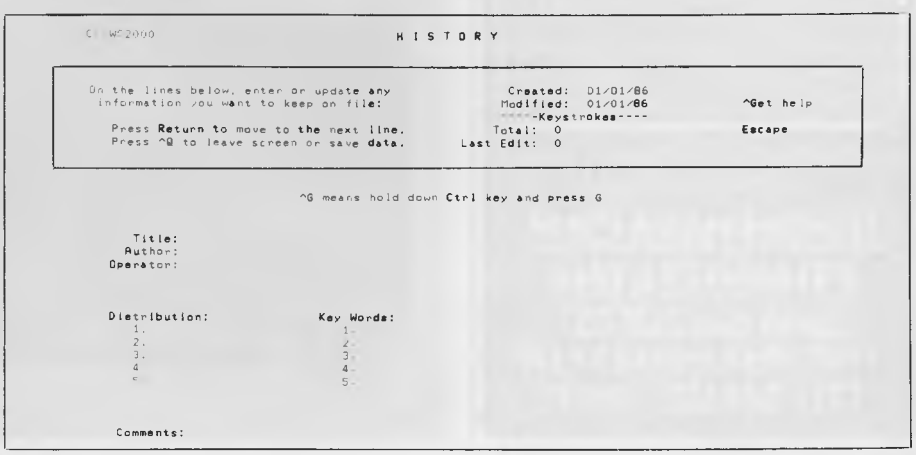


The program has some quirks. Printing multiple copies of a multi- page document with alternating page numbers for odd and even pages sometimes messes up page numbering (on a Laserjet). Putting in a manual page break where the program would insert one automatically may produce a blank page when printing. Sometimes the spelling checker claims it has run out of memory, and won't accept any new words; sometimes it doesn't add words to your personal dictionary. Occa-

their own. Over 200 printers are now supported (can you name 100 printers? 50? 25?), and several new print commands have been added: ^PI (Print Italics), and ^PX (Print Extra) which allows you to add up to eight custom features. The print support is unusually complete. For the Hewlett Packard Laserjet there are separate printer drivers for B cartridge, for F and other cartridges and for Release 1.01 files; and for Laserjet+ printers, downloaded Roman 8 fonts and downloaded USASCII fonts. Default ^PX commands for the same printer are Portrait mode, landscape mode, USASCII, Roman 8, Math 8, Math 7, PI font and Print 5 times. The end result of a document printed on a Laserjet using two columns, different fonts, proportional spacing and right justification is truly impressive,

If you expect any word processing program to be free of flaws, you're living in a dream world. Wordstar 2000 Release 2 offers improvements over Release 1, but still has some minor shortcomings. Some deficiencies are: there is no adjustment for widow and orphan lines; when printing part of a multi-page document you have to wait while the program pages through the document from page 1; and you can't readily line up text on the right margin. For such a large and comprehensive program, it has a very short list of complaints!





A Turbo-quet of Orchids

ORCHID

Tired old PC? Cramped slots? Gluggy rice? Sluggish graphics? Tim Hartnell sniffed the cure of turbocharged Orchids and found himself moving three times faster than an AT . . .

AT THE DAWNING of the age of Aquarius, we were mightily impressed with the speed of the IBM PC. For those of us nurtured in the creepily-slow fields of the Texas TI 99/4A or the Sinclair ZX81, the speed of the old PC was a wonder to behold. But then we tasted the speed of the IBM AT, and suddenly the PC was revealed for the slow old dodderer it was.

Voila! Enter the accelerator board. "Slip one of these into your PC or XT," went the promise, "and suddenly your PC will go into overdrive, your kids will start smiling, your dog will stop snarling, and even your rice won't be gluggy any more."

And it's true! With a suitable accelerator board, your PC or XT can suddenly be in the running for winning the speed trials at the Adelaide Grand Prix.

One of the world's most-respected names in accelerator and other add-on boards for PCs is Orchid, in Fremont, California. Melbourne company Porchester Computers is the Aussie agent for Orchid, and they're going all out to show how good the product is.

Jet 386

Porchester's big boss, Michael Neistat, is most excited about a product called the 'Jet 386', the industry's first 16 MHz accelerator board, designed to run three times faster than an AT. Available here at around $3000.00, the Jet board replaces the AT's microprocessor, which then plugs into an adapter for the accelerator board. This allows you to switch between the two of them with a toggle switch.

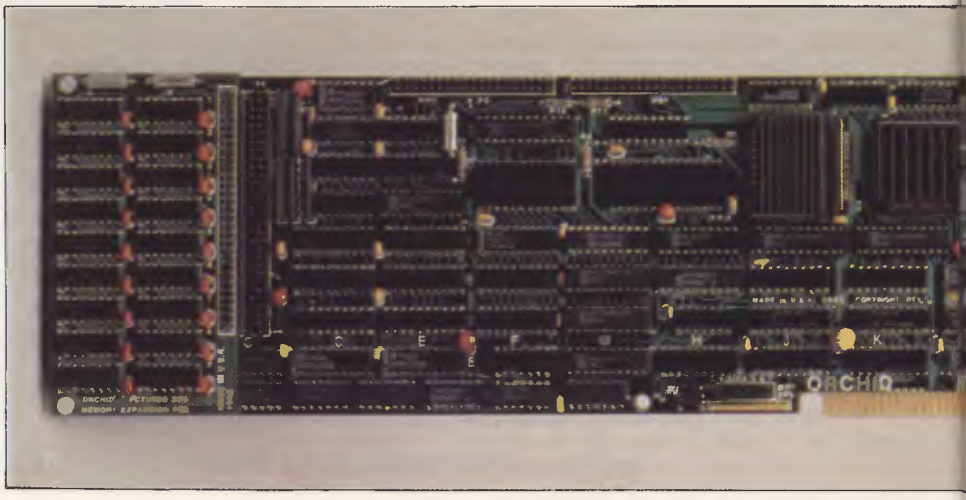
Designed using the 80386 chip, the Jet supports both the 80287 and the 80387 maths coprocessors. It's also compatible with most other add-on boards, such as networks, disk controllers, CAD applications and the like.

And the Jet is only the latest in a bewilderingly large range of accelerator boards developed by Orchid. The American PC *Magazine* for September 1986, looked at more than 25 accelerator boards. They praised Orchids boards highly ('a clever and innovative marketing idea', 'an ideal board' and 'I like this board — I like it a lot'), and one of them caught my eye — the TurboEGA.

TurboEGA

As its name suggests, this is an accelarator, and a graphics enhancer. Orchid took their TinyTurbo 286 (an accelerator which takes up only half a slot, and allows an XT to deliver performance which is close to — and in some cases, better than — an AT; and is available in Australia for just under $1400.00), and their Enhanced Graphics Adapter card, and combined the two. The TurboEGA also includes a socket for the optional 80287 maths coprocessor.

The TurboEGA, which costs around $1880.00, gives a PC or XT better-than-AT speed. The board effectively gives you four video boards in one, and is fully compatible with the IBM EGA, CGA, MDA and the Hercules Graphics card. This means you get the newest standard — 640 by 350 resolution, with 16 colours chosen from a palette of 64 — along with full-colour text using an 8 by 14 character cell on the IBM



Orchids

Enhanced Color Display, or monochrome text on the slightly-better 9 by 14 character cell.

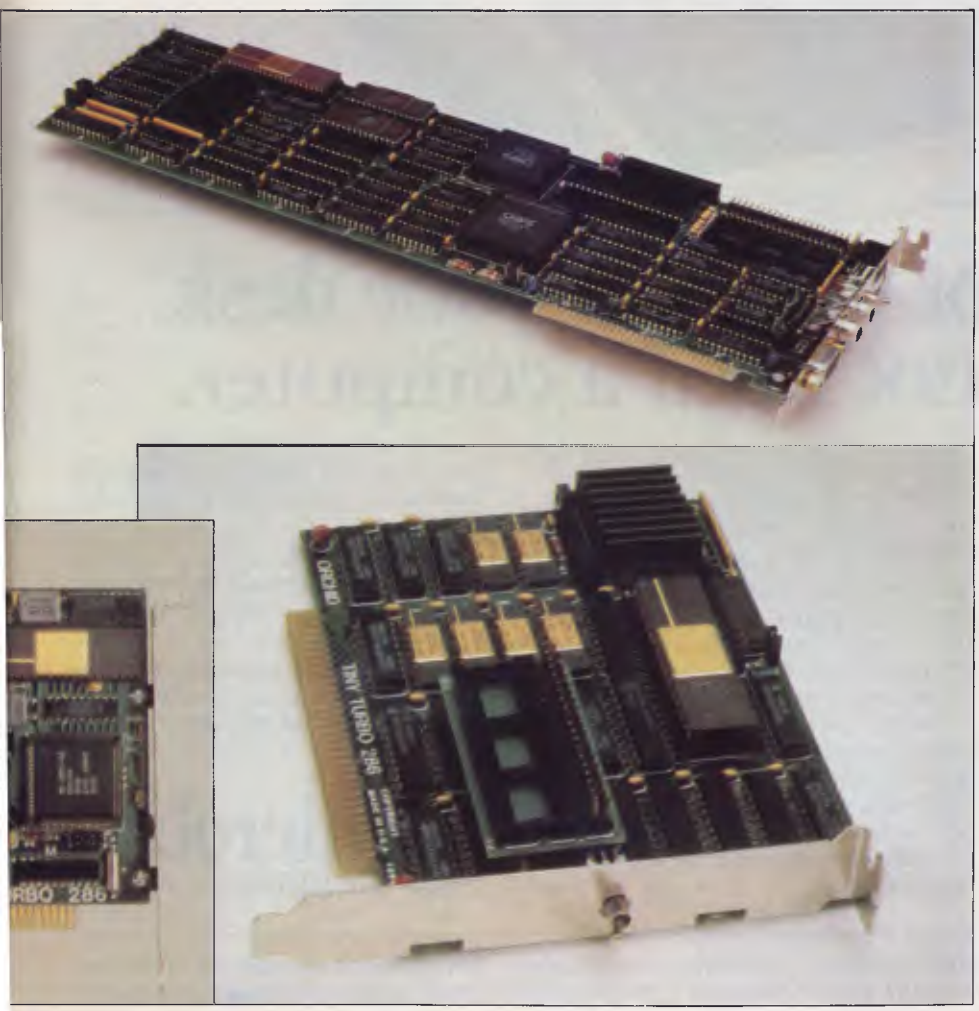
The board uses an 80286 processor, but the PC's original 8088 stays in the system to retain full compatibility with all your software. There is an additional 256K of RAM on the board as standard.

Connecting the board is pretty simple. A ribbon cable runs from the TurboEGA to your computer's 8088 socket. You then plug the original 8088 into the socket provided on the board, and a rear-panel switch toggles between the two processors. With the switch in Turbo mode, the TurboEGA's 80286 'turbocharges' your old 8-bit PC or XT with with the high-speed 16-bit processor.

If speed (or the lack of it) is becoming a problem, and you're interested in getting the highest possible standard graphics on your PC or XT, the TurboEGA is a board well worth considering. If you just want speed alone, and your computer's slots are getting a little cramped, the TinyTurbo 286 may be the board you're looking for.

And it's true! With a suitable accelerator board, your PC or XT can suddenly be in the running for winning the speed trials at the Adelaide Grand Prix.

They are just two of a range of accelerator and graphics boards developed by Orchid Technology, and handled in Australia by Porchester Computers (03 537 2722). □



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).

Best of all, it's designed and made by Australians, specifically for Australian conditions.

By the way, we'll let you into a little secret: the TeleTerm is really a dedicated computer. But it's so friendly, you'd never guess.

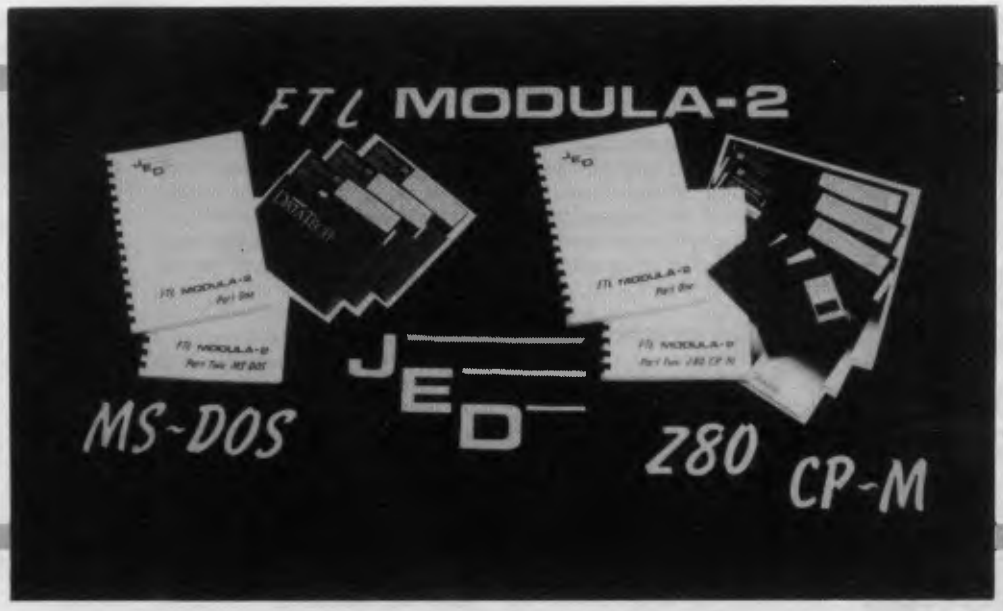
You can try one for yourself at any of our Computer Centres. Or ring us, to arrange a demonstration in your office.

microbee computer

Sydney: Ryde (02) 886 4444
Waitara (02) 487 2711
Melbourne (03) 817 1371
Canberra (062) 51 5883
Newcastle (049) 61 1090
Gosford (043) 24 2711
Brisbane (07) 394 3688
Adelaide (08) 212 3299
Perth (09) 386 8289
New Zealand: Auckland (09) 88 1138

Prices quoted are subject to change without notice.

SITTING IN JEDMENT



Modula-2, the latest Pascal to be created by the man who brought us the purity of Pascal, Nicklaus Wirth, has found a home in Queensland and according to Tim Hartnell it could prove to be a winner at a cheap $100.

NOTHING THAT HAPPENS in Queensland particularly surprises those unfortunate enough not to be living in the Sunshine State. So, it is no surprise to find that the first major implementation of Modula-2 to be written in Australia originates from Dave Moore, of Cerenkof Computing in Queensland.

With it retailing around $100, JED Microprocessors 'FTL Modula-2' compiler could prove very appealing in the local market.

Modula-2 is the latest language to be created by Niklaus Wirth, the man who brought us the straight-laced purity of Pascal. With Modula-2, Wirth has fixed many of Pascal's omissions, and made a language which is somewhat easier to use. This is especially evident when the language is used in control applications, or when data in memory areas or I/O needs to be directly addressed. In this way, Modula-2 is suitable for systems programming, or process control applications. It has many of the advantages of C, and is more readable than Pascal.

As Moore's Modula-2 compiler is inexpensive you get a lot for your money. The package provides over a megabyte of software, as all of the source code is included. The compiler has a full-screen text editor with windowing, cursor controls, a macro-definition facility, and key-replacement (using -ALT keys) for fast code entry of Modula-2 key words. The full editor source is included.

The compiler can be used in a command line mode (for example M2 TEST.MOD) or can be called from an editor menu. If an error occurs in compilation, the user is given the option of halting, continuing, or jumping directly into the editor. Once in the editor, the cursor will be seen to be at the error point in the file, and a fairly clear description of the suspected problem will be printed on the bottom line of the screen. Because modules tend to be relatively small in Modula-2 (typically only a few hundred lines), the turn-around time for edit-compile-edit is generally faster than for systems like Pascal, where programs are monolithic blocks of code.

Moore's linker in the package pulls together the separately-compiled modules, producing compact, PROM-able run-time code. Error checking (for such things as range) can be turned on or off, and code and data areas can be defined to suit single-card computer systems when used for data logging and process control. Several other utilities, including LIST, XREF, COMPARE, SORT, GREP, and SOLVE are provided in source form.

The 'FTL Modula-2' closely follows Wirth's definition of the language, as covered by his book *Programming in Modula-2*. Versions are available for MS-DOS machines (such as the ubiquitous IBM PC and its clones) and for Z80 CP/M systems. It comes in many formats (3.5 inch, 5.25 inch and 8 inch) to suit systems from AMPRO to Zenith, with special support (full screen editors) for IBM PCs, Osbornes and Microbees.

JED also manufacture a wide range of CMOS single-board computers and I/O boards on the STD bus, with many systems installed around Australia. These boards can be programmed in basic, forth or (naturally enought) Modula-2. JED Microprocessors can be contacted on (03) 762 3588. □

Software

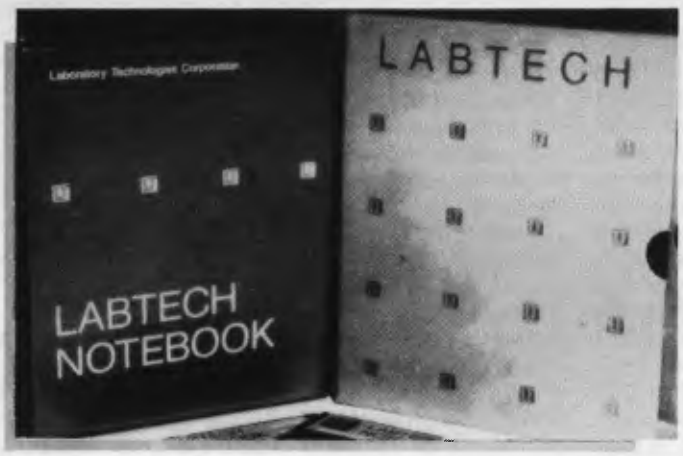
Advanced Netware 286 Operating System
Data Peripherals
Phone: (02) 888 5733
Price: $3945
This new version of the Netware 286 operating system allows the 286A and 286B file servers to operate concurrently with ATalikes as both file server and workstation (the previous version was dedicated to Netware's own file servers only). All file server processes take place in extended memory, which allows a full 640K for applications. The software can support up to 100 users per file server.

Gateway Videotex Communications Software
Arcom Pacific
Phone: (07) 52 9522
Price: ????
Developed in Oz by Cybersoft Systems, Gateway opens the world of videotex to PCompatibles. The software offers more than just screen display: there are features that allow storing, retrieving and manipulation of data. For example, information captured from the online service can be transferred to spread sheets or word processors. All screens and options have help available and the package comes with a comprehensive manual.

HELP!
PC *Plus*
Phone: (03) 529 8976
Price: ????
The Help! Pack (designed "to improve business communications and maximise efficiency") is a combination of a "high reputation" auto dial Hayes-type modem and Carbon Copy, a program that interlinks PCompats. The package supports dial back, password protection and encryption. Help! can be used as an activity log to monitor chargeable time, and it supports screen capturing, a chat mode, and IBM graphics and color. Since Carbon Copy links screens, keyboards, printers and disks, it has applications for both training and problem solving.

Labtech Real Time Access
Novatech Controls
Phone: (03) 645 2377
Price: $196
Laboratory Technologies, well-known developer of scientific and engineering software for the PC, have released a software package that enables standard PC/MS-DOS application programs and languages to access, analyse and display real-time data sampled from external processes (in a laboratory or factory, for example) — and called it Real Time Access. It's actually an optional addon to Labtech Notebook, the widely-used data acquisition language and controller from the same company. One of the suggested applications for Real Time Access is converting programs to real time operation without having to write special routines. That means you can watch values in Lotus 1-2-3 or Symphony being updated in real time while an external process in the factory is running. This allow the implementation of real time statistical quality control. Other applications include physiological monitoring, security systems, and energy monitoring. At least 512K of RAM is needed to do the package justice.

MacPlus, MacSave, MacRAM and MaxPrint
Imagineering
Phone: (02) 697 8666
Price: See below
MacPlus is an updated modular memory for the Macintosh Plus which provides two Mbytes of additional memory without modification and allows expansion to the Mac's full four Mbyte potential. At $1190 it is relatively cheap to get memory capacity unheard of not long ago. For a recoverable RAM, Apple have come out with MaxSave which combines software and hardware to give the speed of a RAM disk and the reliability of an external drive. It retails at $334 but that also includes MaxRAM and MaxPrint. MaxRAM and MaxPrint are a RAM disk and print spooler package which improves productivity of 512K and larger machines. MaxPrint spools any text or graphics as well as multiple documents to the Apple ImageWriter printers. The two packages are available for a low retail price of $139.



Micro Payroll Module
Micropay Pty Ltd
Phone: (02) 411 8363
Price: ????
This integrated payroll, labor costing and personnel system can handle pays of any frequency and method and includes a comprehensive reporting system. Developed locally to run on IBM PCompats, the module can print out payslips almost immediately after details are entered — a giant saving over systems where it's necessary to do a 'payroll' run first.

OPAL PC/XT ADD ON
ADE *Computers*
Phone: (03) 568 7877
Price: ????
The OPAL spectrum is a series of cards comprising color and monochrome Graphics cards (Hercules compatible), 384K multifunction cards, RAM cards, floppy and hard disk controllers, RS-232 Serial, parallel printer and multi I/O cards including clock and calendar. The OPAL range, which is aimed at IBM users, is fully compatible with PC/XT and AT systems.

PTS Problem Tracking System
Fletcher DP Services
Phone: (03) 537 2811
Price: $25 Demo
PTS is a suite of programs desinged to be used online for problem solving and tracking. As particular problems are defined they are categorised according to priority, call type and product and each call for help can be assigned to a particular consultant with expertise in the relevant area. Each action taken to resolve the problem is noted with the total time spent on it. In most cases, users can enter information using simple, custom-written codes. the system will print problem forms, follow up reports, various forms of statistical reports on problems occuring over the previous 12 months and other analyses. PTS grew from Fletcher's own inhouse problem

tracking system and now supports some 300 users there. It's written in TAS and will run with MS-DOS, CP/M and a variety of others. The minimum RAM requirement is 128K. The single-user version is $600 taxed and the multi-user is $800 taxed.

Realworld for the PC
Hytech Computer Solutions
Phone: (07) 378 0700
Price: ????
Realworld is a powerful multi-user accounting system designed for large companies. The Brisbane-based distributor has just released a single-user version that's available as two separate, fully integratable packages. The Basic Accounting Package ('4 in 1') has the usual range of accounting features, including cheque writing, as well as loan calculation and amortisation scheduling modules. The second package, Inventory Management ('Plus 4-pac'), includes order entry, invoicing, inventory control and sales analysis by customer, salesman and product groups. The system can be expanded to accomodate multi-users without the need to re-enter data — and Hytech can even supply a plugin 32-bit co-processor for your single-user PC enabling up to 15 additional terminals to run Realworld, Lotus 1-2-3 and dBase III all at the same time.

Sendataguard
Sendata
Phone: (02) 438 4255
Price: ????
Foiling hackers will be easier with new access software which will phone back to the user after the correct password has been entered. Based on security systems in the US which have proved popular, Sendataguard rings back to the 'legal' user who has just called up. For hackers who have 'acquired' the right password, they will be waiting a long time for the phone to ring. Any unauthorised tampering will now be easier to monitor and the software has the added advantage of excellent compatibility.

Tokenterm PC-DOS Terminal Emulator
Network Solutions
Phone: (02) 957 2655
Price: Ask
Developed by Bridge Communications, Tokenterm is a PC-DOS terminal emulator and file transfer program that lets PCompats talk to a variety of vendors' equipment over IBM's Token Ring. The software (claimed to be able to emulate virtually any type of CRT terminal) can communicate with any PC fitted with IBM's Token Ring Adapter Card. There is a built in emulator for DEC VT100 and VT52 terminals and a program interface to support the other emulations that may be required. Tokenterm consists of the XNS protocol set with the emulator menu driven and the file transfer applicatons residing above the protocols. Repetitive operations and frequently used connections are simplified with the Scripts feature which allows macro programming. Hardware requirements: an IBM Token Ring Adapter Card, 80-col display, 384 Kbytes and PC-DOS 3.2. And coming soon — an Ethernet/Token Ring internetwork bridge.

TOPS MacIntosh to PC LAN
Imagineering
Phone: (02) 697 8666
Price: See below
Not only is TOPS one of the few file servers available for the Mac, it's one of the very few that can network Macs to PC/AT/XTs and compatibles. Used with the Mac, a TOPS network allows a number of users to share, say, a database file — a feature not available with most disk-server networks. The network, using Appletalk as the link, can join Macs to Macs, Macs to PCs, or PCs to PCs. It's compatible with DOS 3.1 and will support multiuser applications like dBase III Plus. It's available as software for the Mac ($340 taxed) and for PCs at $890 taxed (an interface board to connect PCs to Appletalk is included). One of the interesting features of the network is that remote files are given the same format as local ones: a Lotus 1-2-3 file on a PC will appear as an icon on a Mac, for example.

TSM The Service Manager
Thinking Systems
Phone: (02) 560 0666
Price: $2995 untaxed
The Service Manager is designed to log incoming work and keep track of its progress, say from receipt of goods for repair to their return to the owner. The program is designed around the special needs of service companies and provides facilities for a client's service history, special invoices for the warrantor, reporting on outstanding jobs, job service cards, technician's time-logging and a range of management reports. The software comes with a full accounts receivable program. It needs MS-DOS with 384K RAM.

Unix System V for PCs
Unitronics Pty Ltd
Phone: (09) 470 1443
Price: $6180 taxed
The multiuser, multitasking power of Unix can now run on your PC. The necessary additional processing power is provided by a Definicon 32-bit co-processor using a National 32032 CPU and a 32081 FPU running at 10 MHz. The software is a full implementation of Unix System V Release 2 including the Bourne shell, upgraded C and FORTRAN compilers, file and record locking, electronic mail and networking support. The DSI-32 coprocessor needs 20 watts of power and the system requires a minimum of 15 Mbyte of free disk space. The coprocessor is available without Unix but still supported by the optimising compilers for Fortran, Pascal and C which can be run from MS/PC-DOS ($3990 taxed) — the supplied version of the DSI-32 comes with two Mbyte of RAM. Using the PC as the system console, up to three users can be supported via serial ports.

Upstart Pop-up Communications Software
Arcom Pacific
Phone: (07) 52 9522
Price: ????
Also from Oz company Cybersoft, Upstart is a communications package with desktop features: a calendar, appointments reminder, clock, alarm, calculator, business card file and a telephone dialler are included. Once installed, the software is memory resident and supports help and terminal windows, save session, send text, xmodem, import, export, autodial, print, and sort. It's Hayes compatible and can be run from disk. Vouchers are available on purchase to allow the user to upgrade to Cybersoft's Gateway videotex software.

Viasoft
Viatel
Phone: (02) 889 228
Price: $150
Users of Telecom's Viatel database will be relieved to discover a new eight bit communications program called Viasoft, written in an effort to better utilise Viatel. The program splits the screen to display information received from Viatel on the left and a combined menu and status display on the right. There are versions for several CP/M computers including the Amust 816, Bondwell 14, Kaypro 2, 4 and 10, Munro OC 8820, NEC PC 8001 and Osborne 1 and Executive.

New Machines

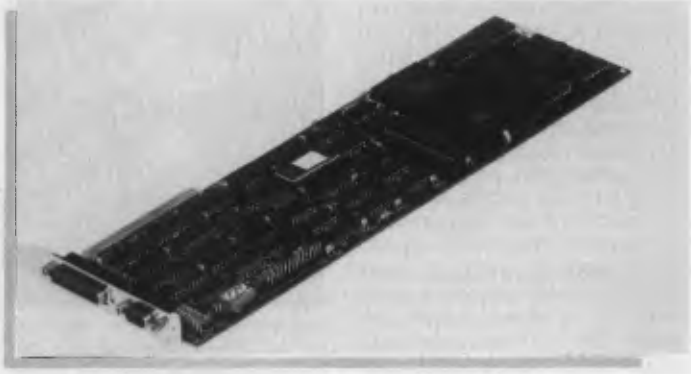
Chendai AT
Chendai (Australia)
Phone: (03) 663 3030
Price: ????
The Chendai AT is the first of a new range of computers with an emphasis on speed, performnce and networking in what seems to be an attempt to capture the business user market and supersede standard PC's. An attractive feature is the full compatibility with IBM and a capacity to accommodate growth for networking and multi-user applications. The unit has a 640 Kbyte RAM and 32 Kbyte ROM.

Peripherals and Extensions

Beta 8200C
Triumph-Adler
Phone: (02) 888 7644
Price: $799
The Beta 8200C takes a new look at interfaceability, providing letter quality output for almost any pc with the simple provision of a computer interface cable. Features include Diablo 630 compatibility, IBM 164 extended character set and a two Kbyte buffer to facilitate word processing. It also offers triple printing pitch, automatic centering, decimal tabulation, printwheels offering mathe- ▷

matical and legal symbols in addition to frequently used business symbols, a two line correction memory and various typewriter features which will now be available to computers.

EGA board (UN-1629B)
Uni-x
Phone: (07) 356 7866
Price: $499
Featuring three emulations, the latest enhanced graphics adaptor from Uni-x will provide the standard EGA, color graphics adaptor and a mono mode. We are now getting the benefit of increased competition in the EGA market and improved technology has seen more usefull updates on this type of equipment.



OPAL EGA △
ADE *Computers*
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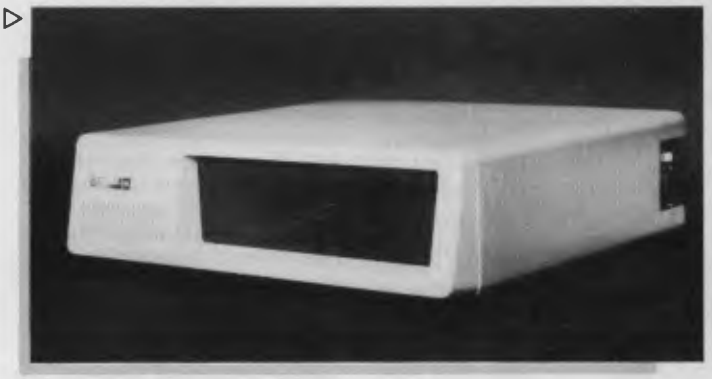
Price: $695
The OPAL EGA will prove to be strong competition with its advantage of being fully compatible with all IBM and popular video standards for IBM PC's. The OPAL EGA includes a monochrome display adaptor and color graphics adaptor. It has a 256 Kbyte graphics memory, advanced Cmos VLSI technology and a RAM based character generator which allows up to four sets of 256 different characters or multiple character fonts.

Pulsar 7000 Copy-all
Pulsar Electronics
Phone: (03) 429 2977
Price: $5900
Designed to assist organizations with two or more different types of personal computers, the Copy-all will translate files from more than 130 disk formats. It will copy over from such disks as an IBM ▷ single or double sided format over to a double density format used by other MS-DOS systems or to the various other sized disks. The unit is aimed at commercial operations such as typesetting and even accounting offices, although it was initially produced for tertiary and secondary institutions. It incorporates two 5.25 inch floppy disk drives, one 40 track and one 80 track and one 3.5 inch drive. An external 8 inch drive can be added or bought with the system. Disk formats supported include: IBM, DEC Rainbow, NEC APCIII, Tandy, Olivetti, Sanyo, Toshiba, NEC APC 8 inch and Pulsar formats.

SAM Modem
Pulsar Electronics
Phone: (03) 330 2555
Price: $862 taxed
After field testing at more than 1000 sites, Pulsar's new Smart Automatic Modem incorporates a variety of functions and features suggested during the field trials. SAM supports 300bps (full duplex), 1200/1200, and 1200/75 for Viatel users. The modem offers automatic dialling with error detection and handling as well as automatic answering of incoming calls with a feature that automatically cuts off and resets after 30 seconds if there is a connection error or crash. Particular attention has been given to the problem of security: Users logging on to a system with SAM have their name and password checked against a file of registered phone numbers, SAM then disconnects and calls back. This eliminates the problem of unauthorised access from third-party



phones. Other features include auto sensing of pulse or tone dialling, baud-rate conversion, full Hayes compatibility, a built in power supply and 32000 characters of memory.

Slimline Membrane Keyboard
Pulsar Electronics
Phone: (03) 330 2555
Price: ????
A major breakthrough in keyboard technology is being heralded with Pulsar Electronics Slimline Membrane 2mm thick keyboard which is resistant to moisture and abrasion. The keyboard is claimed to have a life expectancy 10 times of conventional types and can be affixed to any flat surfaces such as desks or walls. Cigarette machines, food dispensers and electronic bank tellers could be the benifactors to this new technology with the product being versatile enough to be manufactured in virtually any size or shape. ▽

The 'Bi-Turbo' dual-tasker
Alloy
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Services

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ACI *Computer Services*
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ACI Computer Services are offering very popular business packs comprising IBM PC/XT or AT systems, a range of hardware options and ACI's own application Manager software is proving popular for clients looking for high end PC systems. The packs

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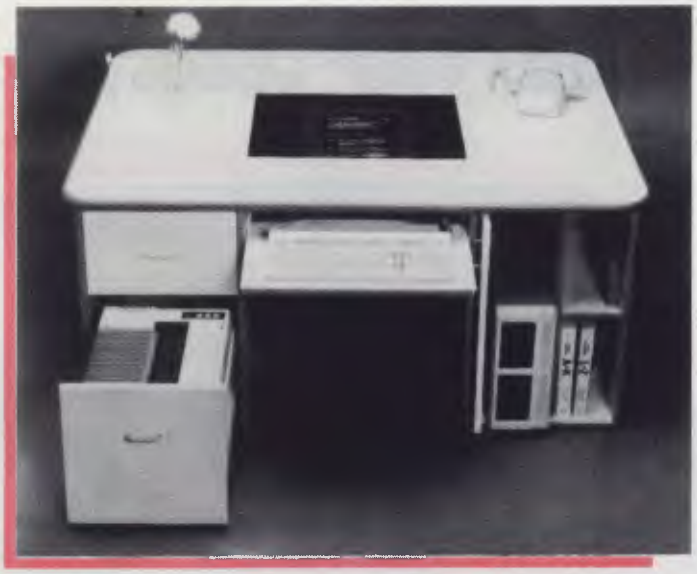

SYNCHROLIFT chair ▷
Sylex
Phone: (02) 647 2888
Price: $445
For those who like to sit comfortably Sylex have released the latest in ergonomic chairs. The Synchrolift chair not only features the standard pad and backrest adjustability but also the Synchron action which links together the movements of seat tilt with back- rest tilt to ensure that they are in the correct position, relative to each other. Remaining features include a large backrest, the wedge contoured seat, height adjustability by top activated gas lift cylinder and wool fabric which does not generate static.

Miscellaneous

Anti-static liner
Verbatim
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Price: ????
Data will now be protected from mysterious loss through static attack with the latest anti static liner. Treated with Datahold, a new chemical produced by Verbatim, the liner will virtually eliminate static on 5.25 inch and DataLife disks. While not totally eliminating the static attack, it is claimed that the liner disperses static charge quickly, painlessly and quietly.

MST 16/32-bit Microprocessor Tester
Emona Instruments
Phone: (02) 212 4599
Price: ????
Designed for trouble shooting complex microprocessor boards, the MST 16/32 tester provides a number of predefined tests for ROM, RAM and I/O as well as the facility to custom-design tests in Basic or pseudo-assembler which can then be stored in the battery-backed 64K of RAM. The compact unit can be used by unskilled operators as a simple go/no-go tester or as a diagnostic tool by technicians. Ports are provided for a PC host, terminal and printer. Pods for the 8086, 8088 and 68000 are now available with others to follow.

Relax-a-wrist
DSC *Management*
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Surge Suppressor
Computer Products Network
Phone: (02) 290 3100
Price: $199
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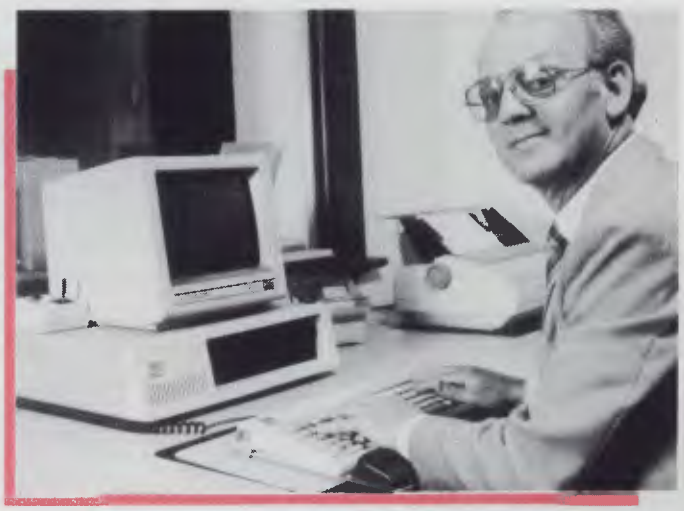
The Toy Shop
Imagineering
Phone: (02) 697 8666
Price: $145
The Toy Shop may prove to be a fantasy come true as you can now create personalized patterns and designs for machanical toys and models and then construct them. The program draws on a store of 20 designs which can be changed around to create a steam engine that puffs away on balloon power or you can launch a jelly bean! Full documentation is provided as well as equipment to build your way out designs. It is best suited for children aged 12 to 85 and is great to enjoy exercising creative powers and imagination.

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- Mailing labels with 4 different sorts
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BY IAN ALLEN

Waiting on the 64

I WAS LOGGED ONTOthe RCOM bulletin board the other day, and saw a message from someone enquiring about the CBM BASIC's WAIT statement. What is it for? How does it work? I thought it was a particularly interesting question — in other words, I didn't know the answer. It's one command that I had never actually used. Of course, the great thing about Bulletin Boards is that someone usually does have the answer, and in this case I am indebted to Frank Bunton, who provided some much needed illumination. The Programmer's Reference Guide does have an explanation, but WAIT is one case where we could have done with a little more clarity.

Essentially, the WAIT statement causes your program to stop executing until some specified condition is met. At first sight, you may think that is a little silly. After all, how can any conditions change if the program is not executing? The answer, and the real purpose of WAIT, lies in the fact that it only halts the BASIC program; it does not affect the 64's normal interrupt cycle. This interrupt happens 60 times a second; the computer temporarily stops whatever it is doing and goes into a special Kernal machine-language routine, which handles specific housekeeping chores. It scans the keyboard for new keypresses, updates the jiffy clock, checks the joystick, updates the sprites and so on.

Essentially, the IRQ is handling Input/-Output requirements, and it can and does change the status or condition of various memory locations. It is changes in these memory locations that the WAIT statement is designed to check for. The simplest application I can think of is to test for a keypress. The normal approach to this would be to write code something like this:

```
10 GET A$: IF A$ = ""THEN 10
20 GOTO ..... (Condition satisfied)
```

This routine simply loops in line 10 until a keypress makes A$ not equal to a null. It is quite effective, but it can use up a lot of string memory because each time it loops, A$ is redefined, and the byte of memory which held the old value is discarded. If you have a large program it may eventually run out of spare memory and perform a garbage collection. Garbage collection is a process where the computer frees up the parts of string memory which are no longer being used. It's not something which happens often, but when it does it can be quite frustrating — taking anything from one second to 20 minutes depending on how many strings you are using.

Essentially, the WAIT statement causes your program to stop executing until some specified condition is met. At first sight, you may think that is a little silly. After all, how can any conditions change if the program is not executing?

Instead, we could use the WAIT statement. There are a couple of variations which will do the trick:

```
10 WAIT 197, 191
```

or

```
10 WAIT 203, 63
20 GET A$
```

Location 197 in the first example contains the matrix co-ordinate of the last key pressed. You don't need to worry too much about what it contains, except, if it equals 64, no key was pressed. What WAIT does is perform a logical AND between the memory location being tested (197) and the mask value (191). If the result is zero, the condition has not been satisfied, and we will keep on WAITing. You have to think in binary to work out which values to put in the mask, because any mask bits that are set to zero will result in a zero. In this case we want to mask out bit 5, (2^5 = 64). 191 is the figure obtained when all the bits except bit five are turned on. In other words, if no key is pressed we end up with a zero, but if any key is pressed we get a one or more.

The second example waits for location 203, the matrix co-ordinate of the current key pressed. This time the mask accepts every value less than 64, which is the no-keypress condition. In both cases you could then read the character from the keyboard buffer, and you have effectively removed one source of garbage collection.

Shift/CBM/Control Keys

Another example is when you want the user to press one of the above keys. A flag for these keys is at location 653. Normally you would PEEK(653), compare it to the desired value and loop back if not correct. With WAIT there is no need for a loop.

```
10 WAIT 653,2
```

Will cause the machine to wait for the CBM key to be pressed. Changing the mask value to 1 waits for the SHIFT key, changing it to 4 waits for the Control key.

Joysticks

WAIT can be used with two masks instead of one. In this case the second mask does an exclusive OR with the results of the first one. In simple language, an Exclusive OR means that if either of the corresponding bits, but NOT BOTH are a one, the result will be a one. Otherwise the result is a zero (false).

With the joystick in port one, the location to test is 56321. Normally this is set to 255, but if the joystick is being used, the value of the lower nibble will vary. If the fire button has been pressed, it will set bit 4 to zero. Let's say we have a program in which we want the user to press the fire button when they have done something (for example, when they've placed a new disk in the drive). By using WAIT we could mask for bit 4 (2^4=16):

```
WAIT 56321, 16
```

But this isn't much help. Bit 4 is always set, *unless* the fire button is pressed. The above statement gives a true result when the fire button is not being pressed. But WAIT allows us to test for a bit that is off. By inserting the second mask we can test for the off condition.

```
WAIT 56321, 16, 16
```

How does this work? The first mask is an AND which strips out everything except bit 4, which is passed exactly as is. The second mask performs the Exclusive OR, which means if the first result was a one (that is, if the joystick were not pressed), the end result becomes a zero or false condition. On the other hand, if our first result was a zero (joystick was pressed), the EOR converts it to a one (or true).

We've just found a means of testing for a bit that is off, in a way that gives us an accurate 'true' condition. □

BY STEWART FIST

IT IS SOME measure of the collapse of the home computer revolution when I write a column about a great product, with enormous potential, selling at a good price — but then report that it probably won't ever become popular.

That's my feeling about the Cauzin Softstrip system. I've been playing around with one now for a few months, and I am totally enthusiastic. If only it had arrived on the market a couple of years earlier we would all have bought one, and by now Softstrips would be a world standard for data and program exchange.

For those of you who haven't stumbled across the Softstrip system, it consists of a small optical scanner, which looks like a large metal pencil box (7.5 cm x 6 cm x 40 cm) with a power cord. There's also a disk of software for your Apple (also for Mac and IBM).

The scanner connects to the serial or cassette port on your Apple, and reads Softstrips which are published in some American magazines. You just position it over the Softstrip, align it with a couple of marks, and go and have a coffee. It takes about five minutes to read a good-sized file.

These Softstrips are conceptually similar to bar codes, except that Cauzin has refined its system to pack more information into each strip. One standard piece of A4 typing paper can hold up to 44 Kbytes of information, depending on the printing method.

The Softstrips themselves are usually about 16 mm wide by 24 cm long, and there might be eight to a page. The data in the strips is organised in lines (about four to a millimetre, across the strip) which contain between two and six bytes of data per line, and the strips are of a standard size, except for shorter strips at the end of a listing.

If you think about the problems of storing, handling, exchanging and reproducing data and programs, you can see paper is actually one of the best mediums — at least in this transitionary stage in our Information Society. Paper is virtually the lowest common denominator for communications . . .

The real value of the Cauzin system is that the line widths and height, and therefore the amount of data recorded in a given strip, can vary. This allows for differences in paper quality and in the printing system used.

Your data strips can be printed with a dot matrix printer, a laser printer, printing press or photocopier, so the system is very versatile. With dot matrix printer you can get about 8 Kbytes on a page, while with good magazine reproduction on glossy paper the system can handle about 44 Kbytes.

If you think about the problems of storing, handling, exchanging and reproducing data and programs, you can see paper is actually one of the best mediums — at least in this transitionary stage in our Information Society. Paper is virtually the lowest common denominator for communications: it is cheap to copy, hardware independent, more durable than magnetic media, and it can be posted anywhere for the price of a stamp.

To produce your own strips you need a cheap Softstrip software package ($20 in the United States), which will run the Apple Imagewriter and the Epson FX, RX and MX dot matrix printers. The laser-printer package will be available shortly. It takes about four minutes to print a strip — so it's no speed demon.

The Cauzin system encodes the data by using a series of black and white blocks which the company calls 'di-bits'. It doesn't use the black = 1, white = 0 simple code you'd expect, but rather a system more akin to that used by CD-ROM — and probably for much the same reasons.

A sequence consisting of white followed by black is interpreted as a 1, while black followed by white is 0. Parity bits are found at the beginning and end of each line, and a checksums are regularly used for error correction.

Fortunately, the system has a rather high reliability, because reading Softstrips is an all-or-none process. You can't recover any of the file unless the system is able to read everything. So if one strip in a sequence is damaged, you can't read the remainder either.

Thunderscan is another digitising system (designed to reproduce images) with many similarities to Cauzin's Softstrip. It is also a very clever innovation with enormous potential, but which doesn't seem to be going anywhere.

Thunderscan replaces your printer ribbon cartridge with a small light-beam and photo-electric cell, and this, together with some special software, converts the printer into an image digitiser.

It's not difficult to see that if Thunderscan and Cauzin could get their acts together, we might witness the development of some simple devices which, with some innovative software, might easily take the Apple II a quantum leap ahead — especially if these two functions could be combined with simple facsimile transmission for small-business and home use. □

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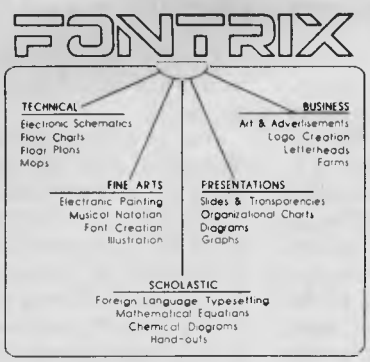
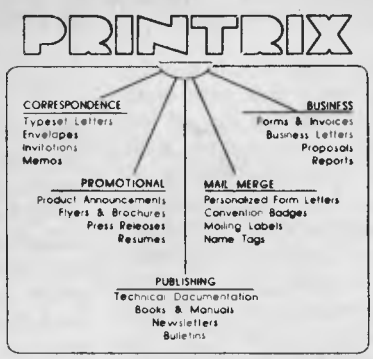


$425



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BY BRUCE MITCHELL

SIDEWAYS RAM is one feature of the Master series that doesn't seem all that important when you're reading a review or a spec sheet, but becomes vital once you start actually doing things that matter.

On my model B (remember them?) I use a Viglen cartridge system to overcome the eternal problem of not having enough ROM sockets. While rather flimsy at the ROM plug end of things, the Viglen system is reliable and easy to use once installed. Each ROM is safely tucked away in a little plastic case that is strong enough to be hurled into the depths of the average hacker's workbench without fear of any peril, except that it might become lost. The system saves any amount of wear and worry on the ROMs, as well as the various bolts and screws that would otherwise have to be twiddled each time you change them over.

I haven't felt very happy about stuffing the inside of the BBC's case with extra boards, ever since I saw the size of the heatsink on one of the chips in there. Adding more seemed a bit like stoking an overheated furnace in a heatwave. (This feeling was frequently vindicated in summer: whenever my classroom's atmosphere topped 40 degrees the poor little thing just gave up trying to be good and joined the humans in a state of torpor.) Not being tied to a board, the Viglen system has the advantage of being infinitely expandable — assuming one's wallet holds out.

Having opted for the cartridge approach, I was pleased to see the Master's two built-in cartridge slots. I even ordered a brace of empty cartridges, but I've survived better than ever — thanks to the flexibility of the Master's sideways RAM facilities.

Having copied each of my ROMs onto a disk, I can now *SRLOAD them whenever necessary into 'sockets' 4, 5, 6, and 7. Each morning it's a simple matter to slip in a disk with an EXEC file that looks something like this:

```
*BASIC
*SRLOAD COMSTAR 8000 W Q
*SRLOAD AMXART  8000 X Q
*SRLOAD SPEECH  8000 Y Q
*SRLOAD DOCTOR  8000 Z Q
FOR A=&2A5 TO &2AI:?A=194:NEXT
```

I haven't felt very happy about stuffing the inside of the BBC's case with extra boards, ever since I saw the size of the heatsink on one of the chips in there. Adding more seemed a bit like stoking an overheated furnace in a heatwave.

The effect of this burst of activity is to load copies of my most frequently used utilities (and toys) from the disk into sockets 4,5,6 and 7, then to tell the MOS that they exist. The last line does this initialisation, saving me the gruelling physical effort of simultaneously pressing CTRL and BREAK to achieve the same feat.

Actually it's a neat way of initialising ROMs if you know what you're doing. Locations &2A1 to &2B0 contain a byte that tells the OS what type of ROM is in each socket, from 0 to 15. You can determine the appropriate byte to poke by looking into location &06 (that is, the seventh byte) and copying it into the appropriate location &2A1+x, where x is the socket number (0 to 15). If you aren't sure, you can try poking 194. If this upsets things, try 130. Also remember that Commstar needs 194 to be in byte &06 in order to work properly on the Master. While it's quite possible to cobble together your own 'ROM' of useful bits and pieces under the rules laid down by Acorn (see Chapter 15 in the *Advanced User Guide*), you can also use these areas as RAM disk. While memory limitations aren't a big problem on the Master series, it should be possible to alter BASIC programs that use overlays to stow the overlays in various 'ROM' pages and copy them down to the main memory area using *SPREAD commands, instead of continually accessing the disk.

If you're writing software to run on both systems, one way (I'm sure it isn't the easiest) to check the type of machine in use is to do an *FXO call equivalent —

```
DEF FNos: A%=0:X%=1: =(USR(&FFF4) AND &FF00) DIV 256
```

FNos returns 0 to 1 if it's a model B, or 3 on a Master 128. I haven't had the chance to try it on a Compact yet.

Using a test like this, a program would then be able to decide whether to *LOAD overlays from disk or *SPREAD them from sideways RAM pages.

Concept Keyboard

While the QWERTY keyboard has its advantages, there are times when it becomes a bit inflexible or intimidating. Anyone who has watched young children painfully running their fingers over every one of the 93 keys each time they try to find a letter would be all too aware of the inadequacies of this traditional interface. The Concept keyboard offers a way out.

The keyboard comes in A4 and A3 sizes, though if you're into really big things there's even an A2 version. It connects to the user port by a single ribbon cable. There were no problems at all getting it connected, once I'd found the cable in all the packing!

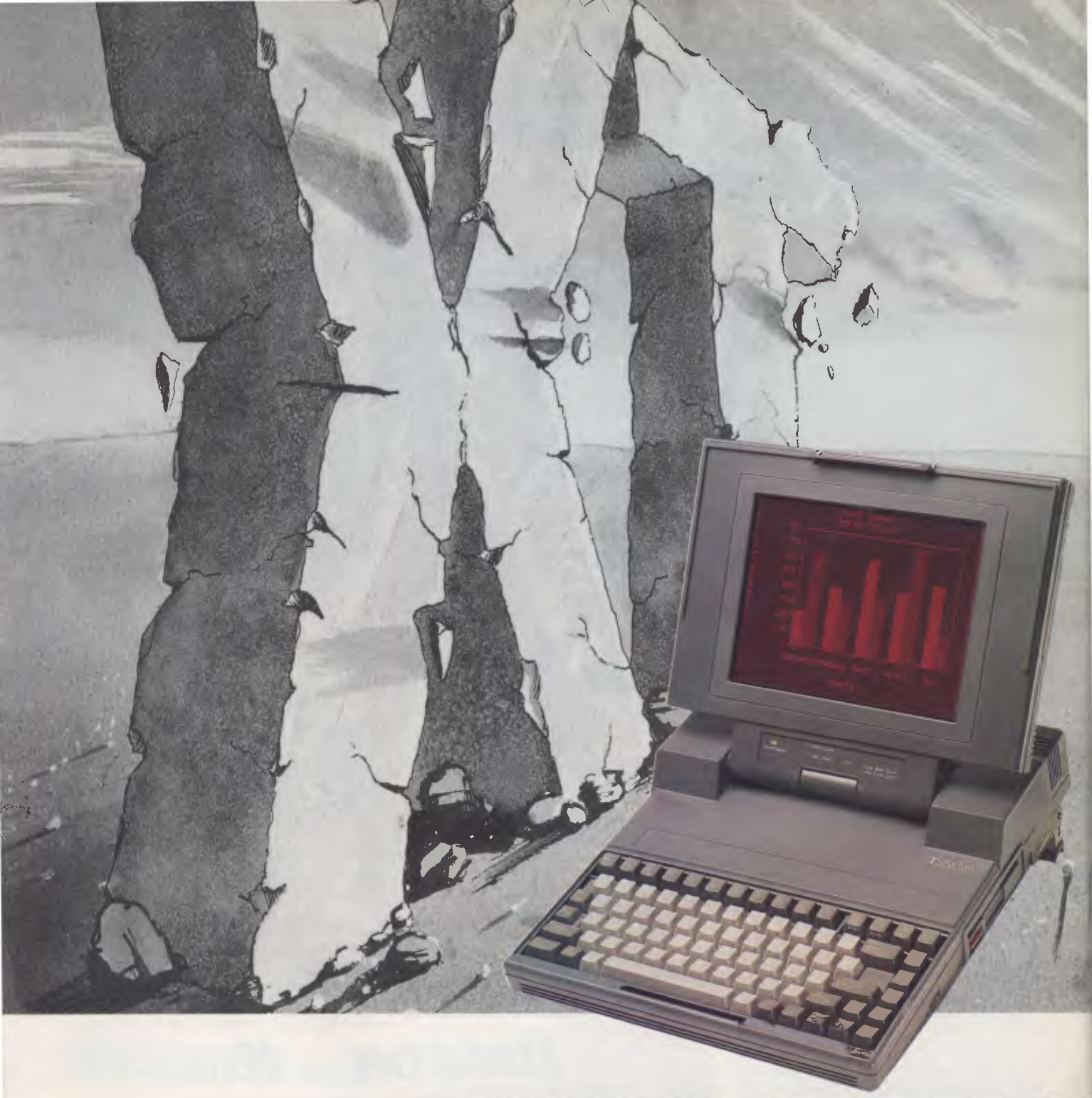
The board is very strongly built and has a washable surface, a feature I found most worthwhile after a short period of use in our family.

The top of the board is divided into 128 rectangles, each of which can be designated as the equivalent of any key on the standard keyboard (including the function keys). This is done either by the designers of commercial software, who decide on the layout and print paper overlays to match, or by the individual user, using the Starset program available with the keyboard. Since a large collection of rectangles can be made to return the same value, 'keys' of enormous size can be created.

Starset effectively prepares a wedge, which is placed between the program and the operating system so that the Concept keyboard becomes an alternative input stream. It is a very easy program to use and allows the most suitable layout for each child to be prepared. Layouts can use pictures, colours or even whole sentences as 'keys'. Some layouts I've seen use only two large areas, equivalent to the space bar and the return key. This gives a person with motor control problems a target area the size of an A4 page, instead of a few square centimetres.

At around $300 for the A3 size (less for the A4) it is an excellent interface for children with special needs, as well as those in the early years of school. The Australian distributor of the Concept keyboard is W J Moncrieff, 176 Wittenoom Street, East Perth 6000, (09) 325 5722. □

WHEN ONLY THE BEST WILL DO.



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BY LARRY LEWIS

THERE ARE PLENTY of PAMS List changes this month — the registry is becoming more and more effective as more systems make use of the lists.

I thought I would mention two new programs which have been added to my toolbox for C development. One is the new version of the Microsoft compiler (Version 4). If you have ever written C programs or wrestled with an assembler program, you would have,at some stage, found a bug. Up until now you had to use a very basic debugger (for an assembler program), or just put debugging code into your program. Those days are gone!

With Version 4 Microsoft C, not only do you get a very good compiler, but there is a facility called 'Codeview', which allows you to see actual lines of code in C or assembler, and lets you enter breakpoints by source code line, or whenever a variable changes . . and all sorts of stuff. This has to be one of the best thought-out debuggers ever. If you have Microsoft C (pre Version 4), upgrade — it's really worth it!

Another useful tool I've found is a thing called 'Bricks', which maintains all the programs you develop. It's like the Unix Source Code Management system, in that you can ask Bricks to give you any version of a program from its stored source file.

Please remember, Freecom is not on the number advised in PAMS lists before 8610a; this includes the majority of other PAMS lists maintained by other systems.

PAMS List Updates

ACT

Corrections:

■ FatCat Remote TRS BBS; phone (062) 41 4395; access Mem/LVA; sysop, Ross Boys.

New South Wales

New Systems:

■ Aus Talc Fido-Net: phone (02) 438 3479; 24 hours daily; V21/22.

■ Datacom KBBS: phone (02) 643 1220; 24 hours; sysop, James Butler.

■ Dingo's Den Fido BBS: phone (02) 888 2203; 24 hours; access Reg/VA; V21/22/23; sysop, David Harvey.

■ Fido Australia: phone (02) 959 3712; 24 hours daily; V21/22/22bis; sysops, Brian and Lorraine Gatenby.

■ Manly BBS: phone (02) 977 6820; 24 hours daily; access, Reg/VA; V21; C-64 owners need Rterm or Ultraterm to access this board.

Corrections:

■ Apple Users Group BBS: phone (02) 498 7084.

■ Bee-Hive BBS: Friday to Monday, 2100 — 0600.

■ Books BBS is no longer a ring-back system.

■ Information Connection is now called Club Mac, and supports V21/22/23/22bis; phone (02) 542 3291; sysop, Ray King.

■ Sci-Fi BBS is now online 24 hours daily.

■ Sentry Fido-Net is now online 24 hours daily.

Off-line:

■ Bounty C-64 BBS — status unknown.

■ Scorpio BBS — status unknown.

■ Syntax's Error — status unknown.

Victoria

New Systems:

■ Profit Fido BBS: phone (03) 529 8749; 24 hours daily; V21/22/23/22bis; sysop, Andrew Hooper.

■ Osborne Australia Bulletin Board: phone (03) 529 3519; 24 hours; access, Reg/LVA; sysop, Craig Orr.

■ Sam's Fido-Net: phone: (03) 563 1117.

Queensland

New Systems:

■ Frontier Systems Gold Coast Fido-Net: phone (075) 96 3045; 24 hours daily; access, Reg/LVA; sysop, John Stanton.

■ Mackay High School BBS: phone (079) 51 4815; weekdays 1600 — 0730, weekends 24 hours; public access; sysop, Bob Chalmers.

Off-line:

■ Competron IBBS — status unknown.

■ Midnight Express — status unknown.

■ Texas Instruments BBS — status unknown.

South Australia

New Systems:

■ Adelaide Microbee BBS: phone (08) 212 6569; Monday to Thursday 1800 — 0800, and Friday 2100 to Mon 0830; sysops, Ron Carson and Mark Hammond.

Corrections:

■ Multiple System BBS now caters for V21/22/23/22bis.

Western Australia

New Systems:

■ Mouse Exchange BBS: phone (09) 339 6890; 24 hours; V/23; public access; sysop, Leonard Hollings.

■ Student Access Message Service: phone (09) 321 9721; 24 hours; access, Reg/Public; sysops, Peter Walton and John Bramley.

Where to Look

The information shown here (and complete lists when published) is always prepared with care, and is presented in good faith from information provided by various sources. The latest listings are always available from the following points:

Australian Capital Territory — PC Exchange RIBM, (062) 58 1406.

New South Wales — Prophet BBS, (02) 628 7030; AED-Prophet, (02) 628 5222.

Victoria — National BBS, (03) 819 5582.

Queensland — Ampak RCP/M, (07) 263 2001; Hi-Tech BBS, (07) 38 6872.

South Australia — The Electronic Oracle, (08) 260 6222.

Western Australia - Nemo Multiple BBS, (09) 370 1855.

Tasmania — Tassie Bread Board System, (003) 26 4248. □

BY JAN ROBERTS

FOLLOWING UP on the 'expansive' information I offered last month, about upgrading the 128 Kbyte Microbee to 512 Kbytes, there are now rumours that a one megabyte upgrade will soon be possible. This will provide the machine with a vast RAMdisk of over 800 Kbytes! However, although enthusiasts around the Melbourne Microbee user's group are working on this, it's not yet a reality. Peter Broughton and Mike Kruse are the people involved, and the user's group is contactable either via PO Box 157, Nunawading 3131, or via its bulletin board, on (03) 882 1571. Keep your ears open for further developments.

The Melbourne group is currently working on a version with programmable function keys, adjustable key clicks and clock functions (if one has a clock).

I have also heard talk of successful upgrades to the clock speed of the Microbee. People who have had both the memory transplant (to their *machines*) and the clock-speed upgrade say they can scarcely see their machines for dust! The person to contact for this modification is David Beveridge on (08) 278 6202. He installs a 6.75 Mhz speed, and you can toggle back and forth to the old speed if needed.

The way things are going, one megabyte memories will be commonplace within a year or two. The speed and power this will add to your computer will be quite amazing, by current standards. I am still dazzled by the speed at which my Bee moves with its 414 Kbyte RAM-disk upgrade from Peter Broughton.

These RAM-disk upgrades give you enough memory to store your commonly used programs permanently in the computer, even without a hard disk. For this to be feasible, you have to keep your computer switched on permanently (just switching your screen off and on), which would not be possible if Microbee had not solved the problems of overheating. And, in my experience, any such problems have been licked, except in heatwave conditions. If readers up north have still got problems, please let me know.

I've had both a 128 Kbyte machine and the new Mitac 16-bit Microbee running for days on end. Neither machine has a fan — and neither machine shows any sign of needing one. The Mitac is particularly cool, despite having a full memory of 640 Kbytes. (Friends with noisy IBMs and clones are jealous of my quiet machines.)

Vitch Version?

The Mitac comes with MS-DOS Version 3, which has networking capabilities — but you may wish to hunt up a Version 2. Some useful public domain programs, such as Vfiler.com, do not seem to work quite as well with the latest MS-DOS. Vfiler is a useful shell-like interface, which displays the directory in a menu format that allows typing, mass tagging and copying, execution of programs, and more, with great ease. 'X' for eXecute seems to be the function missing in MS-DOS 3?

Prising Open the Shell

On the subject of shells, the 128 Kbyte Microbee has a few undocumented commands hidden in the depths of its programming. Typing X allows you to soft boot a new disk; just change the disk and press RETURN twice. There is a small flaw in this utility — if you use it from M:drive (the RAM disk), it will tell you to change disks in the M:drive when it really means the b:drive.

The other commands are CCP, which is easier than typing 0 and then Y for yes. It takes you out, not to the standard CP/M, but to ZCPR2 - an upgraded version, almost flawless on the 128 Kbyte Bee, but with some problems on the discontinued Chook (Computer-in-a-Book).

ERA erases files defined by wildcards — risky, but very fast. And 'REN oldname newname' renames files without needing to boot up Transfer.com.

I don't know if everyone with a 128 Kbyte machine realises it's possible to stack user commands for automatic operation using Usr.com. You write out your batch files in the Usr.com menu, listing all the programs you want to use and what you want them to do. Experiment with this. You can bulk-copy files, bulk erase, call up *Wordstar* and save files on the memory drive — all automatically.

Stacking your command lines helps when it comes to editing them. You write smaller command lines, work out what combinations of command lines you want to put together and in what order, then write a stack line like this:

USR 2;USR 5;USR 8;USR 1;

This will run the command lines in the order given — all automatically. If you want to change disks at any point; just issue the x command, that is 'USR 2;X; USR 5;', which allows the disk to be changed between USR 2 and USR 5 command lines — great for mass-copying of disks!

If the last command is the same as the first — for example, if the last command above had been USR 2 — the computer will continue repeating operations until it is reset. □

TEXTFILE

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An Addition to the Encyclopedia of Batch File Programming

Quite often in batch files one is required to 'remember' what the current directory is, to change it to process something and then restore the original directory. This can be done using various utilities and small programs, but there is another method using standard DOS features.

Create a file with only the change-directory command in it:

```
c:\bin>COPY CON \BIN\CD.DAT
CD ^Z                  <--- note three characters, no carriage
                            return and function key F6 to end
        1 File(s) copied

c:\bin>
```

In the batch file, place the following commands:

```
CD > \BIN\MYDIR.DAT
COPY \BIN\CD.DAT + \BIN\MYDIR.DAT \BIN\MYDIR.BAT
.
.    whatever processing you require,
.    changing directories at will
.
COMMAND /CMYDIR
...  other commands, not changing directory
```

Please note, BIN (or whichever path you decide to use) must be included in your path setting. Also, the 'COMMAND /C' in the batch file guarantees that control will return to this first batch file. It can be removed, but if it is not the last command in the file, subsequent commands will not be processed.

Peter Taylor
PAGE 2614

More Singapore Sling

I wish to add to the comments made by Glen Thornley in the November edition of *Your Computer* (letter titled 'Singapore Sling'). I saw an advertisement for a Taiwanese company called 'Algol Enterprise' in your magazine about six months ago. I rang them and asked for a price list, and on receipt of the list, I couldn't believe the prices. An Apple IIe copy cost A$300!! So I decided this was the way to go. But fortunately I decided to test the company first. I ordered a 128 Kbyte card for A$80. It should have been delivered within 10 weeks, but I have received nothing. My (polite) letters have been ignored, and my attempts to get my money back have failed. I know the cheque has been cashed, because I got the bank to check.

I feel this is a very poor way to do business, and I am glad that I didn't order a computer right away. I'm a student, so I can't afford to laugh at having lost any amount of money. Other people thinking of buying things from overseas should stick with the big names.

Incomplete Communique

Your recent 'Soft Talking Communications' made no mention of the most popular comprehensive and sought-after IBM public domain programs, 'Procomm'.

Everyone who has downloaded it from my system (Ampak PBBS/RCPM) has nothing but praise for it. In fact, many people comment they have to come to terms with the fact that Crosstalk has 'bug' problems.

The latest versions and updates of Procomm are available on AMPAK (PO Box 108, Chermside 4032).

Brian Wendt,
Ampak Sysop

More Technical Content?

Just a short note to indicate my support of, and interest in your magazine — excellent stuff, keep up the good work!

In particular, the tutorial articles and series are (in my opinion) top class — maybe some of the completed series could be published as a separate entity.

My job involves scientific electronics, so perhaps I am biased, but a little more on the hardware/electronics side of the story would be of value and interest to many readers (and more potential readers, perhaps), I would think.

Anyway, as I said above, keep up the good work — keep on keying . . . !

Stuart M.
HOBART 7008

FREE READERS' CLASSIFIEDS

Microbee Upgrades
Memory upgrades for dynamic-RAM Microbees. Can convert 64 Kbyte CIAB to 256 Kbyte; and 128 Kbyte to 512 Kbyte. Developed by Peter Broughton in Melbourne. Costs $40 for software and instructions only, $120 for 256 Kbytes installed, and $185 for 512 Kbytes installed — plus freight. Also selling joysticks for Microbees. Ring Fix 'N' Chips on (048) 711 956, day or evening.

Tandy Color Computer
A 64 Kbyte machine, with manuals, cables and software, including Pooyan and more — $299 ono. Phone (02) 631 6325.

Disk Drives
New 360 Kbyte Toshiba drives — $150 each. Would suit IBM or compatible. Phone (02) 974 1937.

VIC-20 Bi-monthly Magazine
Many interesting programs and articles. February issue — $2. One year's subscription — $12. Write to Chris Groenhout, 25 Kerferd Street, Watson 2602.

VIC-20 Software Library
Games, utilities, educational and miscellaneous programs available. Discount tapes. Send SAE to Chris Groenhout, 25 Kerferd Street, Watson 2602, for a list.

VZ300 Software
Many titles. Write for free, comprehensive list. We also run a user group. Contact Scott Le Brun, 5 Cameron Court, Wantirna 3152.

Antarctic Challenge
A three-level simulation game, with full instructions for the IBM PC (disk), Sharp MZ-700 (cassette), Dick Smith VZ300 (disk or cassette) and Oki IF800 (disk or cass) — $15 disk for disk versions, $12 on cassette. Write to S. Molloy, 'Renwick', Mittagong 2575.

For Sale
Oki IF800 Model 10, with built-in printer (80 cps) and green monitor (or can be used with colour TV), plus a range of software. High-speed Z80A CPU; 64 Kbyte RAM; 10 programmable function keys; RS232c interface; QWERTY keypad, plus numeric and edit keys. $750 ono. Write to S. Molloy, 'Renwick', Mittagong 2575.

C-64 Software to Swap
Over 300 titles (disk only). Send lists to Peter Newland, 207 Toogood Road, Cairns 4870.

Into RS232/DB-25 Interfacing?
Save money and make your own mini-testers, breakout boxes, two-way gender benders and so on. Plated-through boards, $5 each; four-way gender-bender boards, $16; 256 Kbyte printer buffer short-form kits, from $39; computer and printer switches, $12; serial board for buffer, $18. For more information, send SAE to Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043.

Commodore 16 Users
Are we numerous enough to form a specialist club? Contact Robin Patterson, City Council, Private Bag, Porirua, New Zealand.

Wanted
Music software for C64. Also MIDI interface wanted. Ring Graham (02) 909 8625. □

FREE CLASSIFIEDS are for readers only, not commercial organisations. The first 20 words are accepted free of charge with a charge of 20 cents for each additional word. Good quality black-and-white prints may be included for a charge of $10 each. Multiple classifieds in one issue are treated and charged as singles.
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PRINT OR TYPE your ad clearly and legibly, double-spaced, and separately include your name, address and phone number for checking purposes, even if these are not to be included in the ad.
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All Parts of Tutorials published within the last 2 years are available as photocopies for a charge of $0.50 per Part plus $4.00 for postage and handling within Australia (overseas postage additional). Please identify the Tutorial by its complete name and specify the Parts by number or the issue of publication. All but the latest of our Tutorials are listed in our 5-Year Index, published with our July 1986 issue.

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Contributions to *Your Computer* are welcomed and will be given every consideration. Although the greatest care will be exercised with contributions, no responsibility can be accepted for the safety or return of any letters, manuscripts, photographs or other materials supplied to *Your Computer* magazine. If return is desired, you should include a stamped, self-addressed envelope. If return is critical — say it's something you can't afford to lose — then don't send it; we *are* careful, but we're not perfect. Please read these notes carefully to get an idea of the style and format we prefer.

All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould — see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

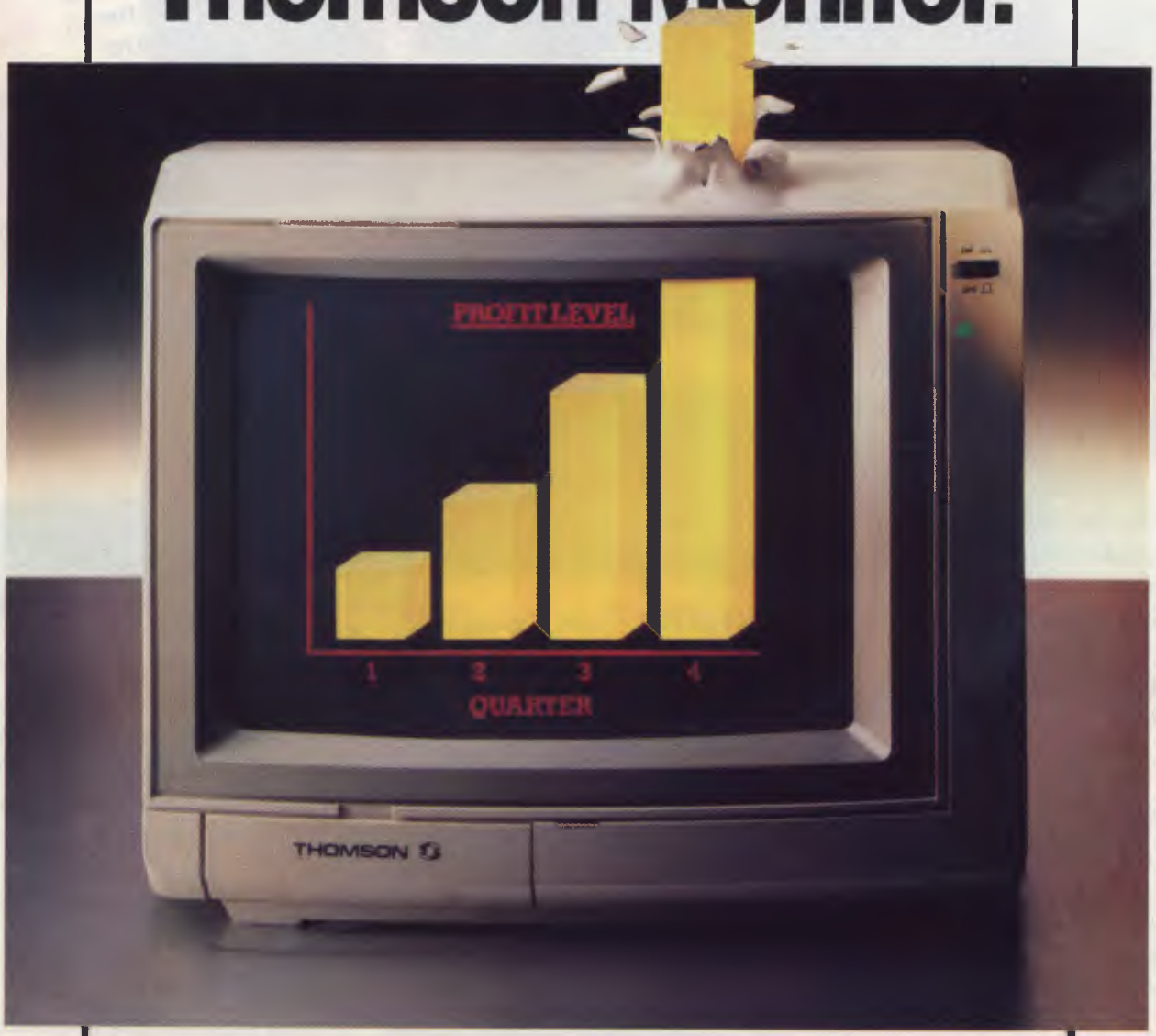
Contributions on Disk: Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13 cm disks, thanks to PC-Alien — so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error — if the computer typed it, the computer probably accepted it. Print listings with a dark — preferably new — ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter — hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies — no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum. □

AD INDEX

You get more out of a Thomson Monitor.



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Win an APPLE IIGS!

Subscribe (or Renew) Before 28 Feb 1987 and You could win this APPLE IIGS!

What Can You Make of – APPLE II GRAPHICS AND SOUND?

Your Computer magazine has an Apple IIGS that we are going to give away to a new (or renewing) subscriber — and you could be the winner! All you have to do is rearrange (all or part) of the letters in the phrase APPLE II GRAPHICS AND SOUND to make another phrase or a sentence, like this –

GIRL ECHIDNAS PUN

HORSES RUNNING I LAUGH ON SHIPS

USE AN APPLE IN GRAPHS

LAUGHING SAND PIES

HIC, SAID THE REAL PIG

get the idea? We want a phrase or a sentence that uses only the letters in APPLE II GRAPHICS AND SOUND, and uses each letter only once in each different phrase or sentence (forward as many entries as you like.) Entries will be judged for originality, sense and imagery — and a bit of humor won't hurt. Make the phrases (or sentences) as long as you can — tie breaking will be on the basis of the number of letters used.

Too Simple ★ ★ ★

That sounds too simple, so let's have some rules –

1) Use only the letters in APPLE II GRAPHICS AND SOUND to make a new phrase or sentence.

2) Use each letter only once in each of your phrases (or sentences).

3) To be counted, the words must be listed in the Macquarie Dictionary; proper names and acronyms are not allowed.

4) All entries must be accompanied by a valid Subscription Coupon to *Your Computer*; the competition is open to both new subscribers and renewals — so don't miss out! The Subscription Coupon is on page 131 of this issue.

7) Valid entries will automatically be eligible for any other current subscription offer (so you've got a chance to win the Charade, too!).

8) Everyone who likes a good computer magazine is eligible to enter — unless an employee of The Federal Publishing Co Pty Ltd or Apple Australia Pty Ltd.

9) There is no cash alternative to the prize (you're supposed to be a computer buff, right?).

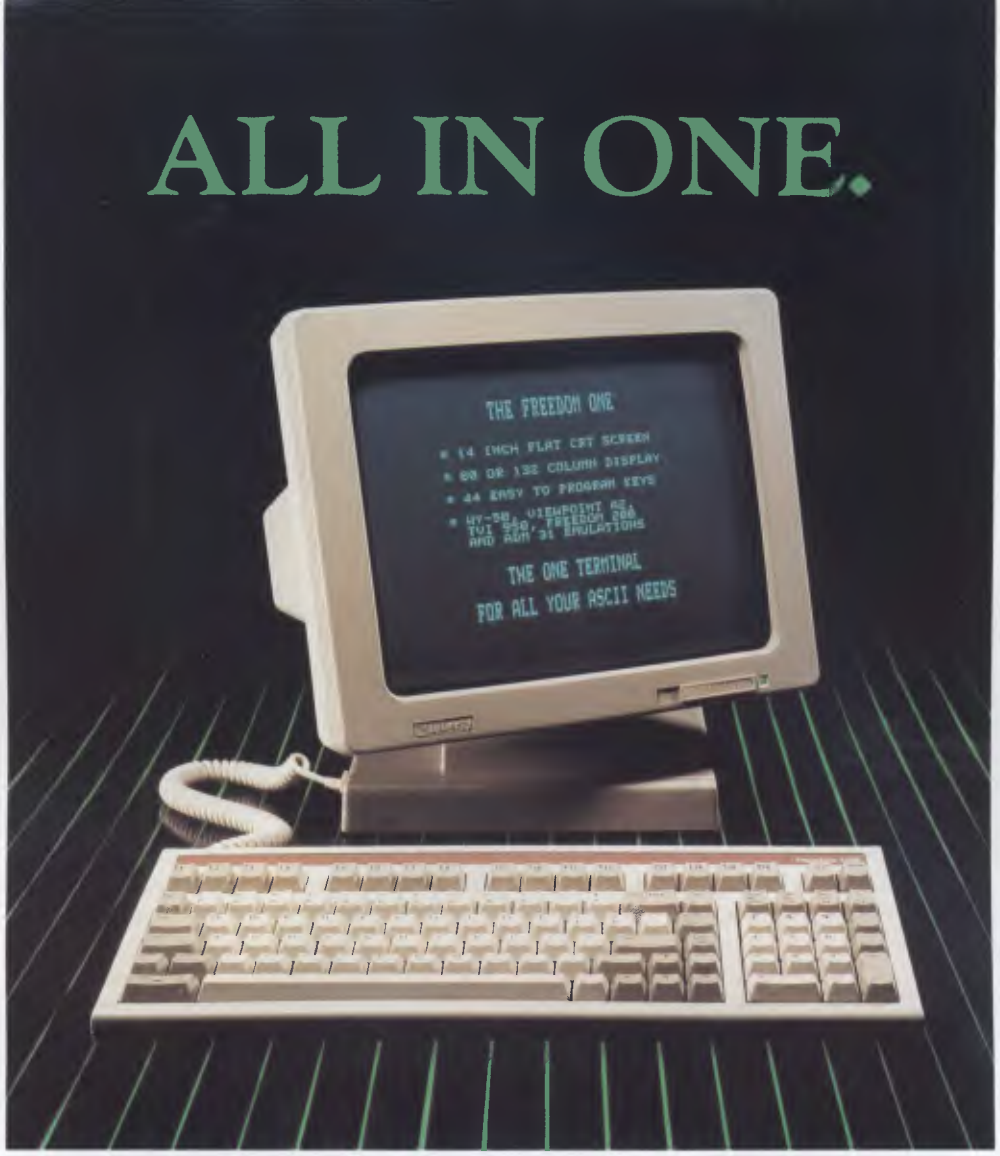
10) To be eligible for judging, entries must be received before 28 February 1987.

11) ***Don't forget to put your name, address and phone number on your entry in addition to filling out the subscription coupon.***

'nuff Said

Right? Now, write! Use that holiday time to win that APPLE IIGS and you've got the rest of the year for Graphics and Sound (and *Your Computer, too!*) □

ALL IN ONE.



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The Freedom ONE is the one terminal for all of your ASCII needs. With the Freedom ONE you don't pay more for advanced features. With the Freedom ONE you don't sacrifice features just because you pay less. The Freedom ONE gives you the best of all worlds — in one terminal.

The Freedom ONE is designed to be there with all the features you need whatever your application. A 14-inch flat screen gives you the ultimate in crisp, clear characters in either 80 or 132 column display formats. Popular emulations like Freedom 200, WY-50, Viewpoint A2, TeleVideo 950, and ADM 31 let you fully utilize all your existing applications programs.

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For more information call Moncrieff, toll free today (008) 999 254,or (09) 325 5722, and ask for it all. Ask for the ONE.

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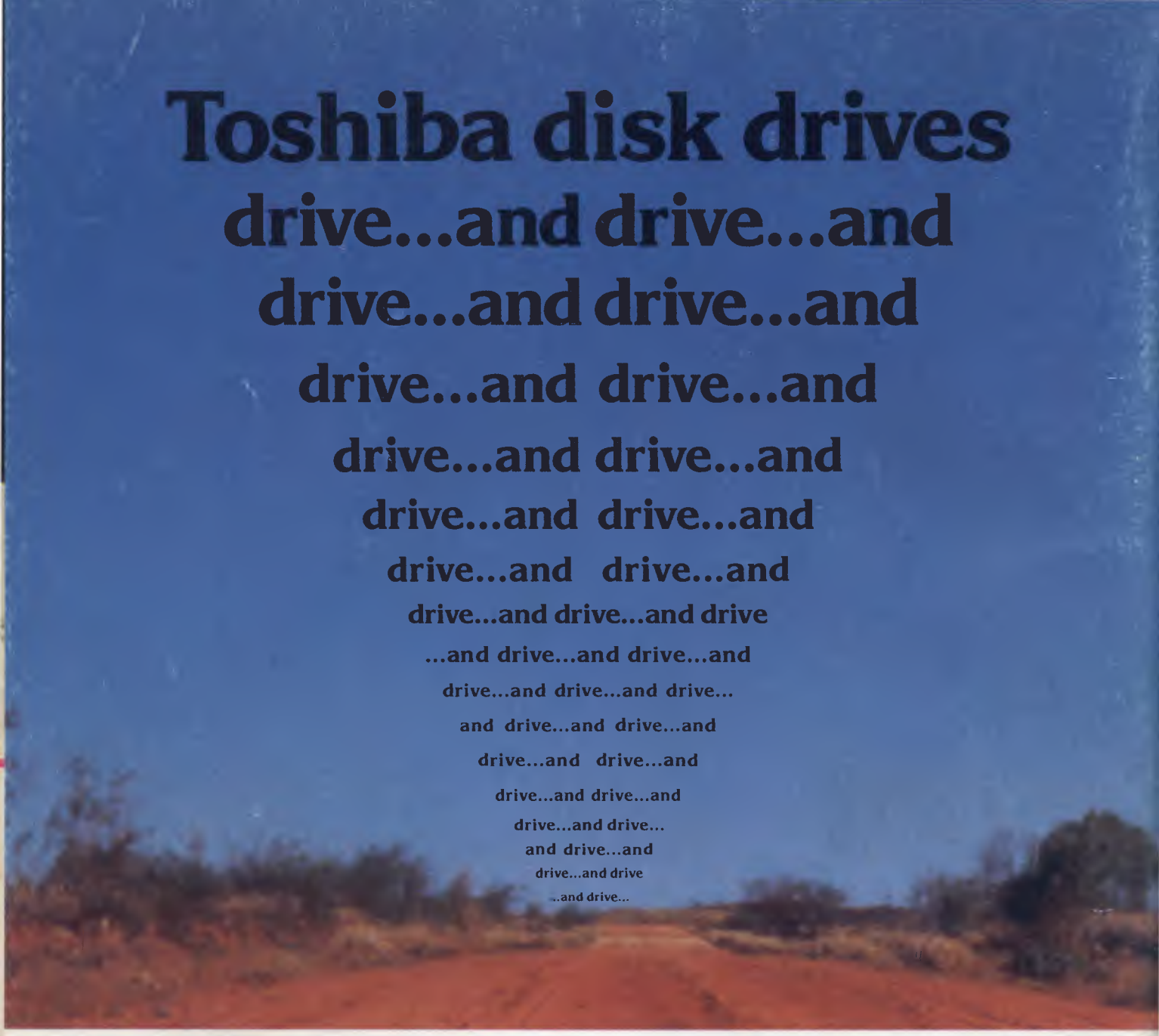

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MK-280 SERIES 8-inch Fixed Disk Drives:
Compact design, 374 or 510 Mbytes capacity. 2.4 Mbyte/sec Data Transfer Rate (HSMD). 18 ms Average Access Time. Maximum reliability with VLSI Implementation. Automatic Spindle Brake and Carriage Lock. Power sequence capability. Built-in diagnostics.

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