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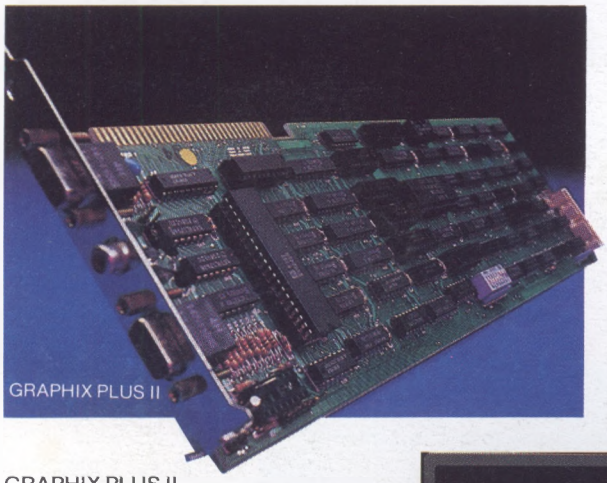
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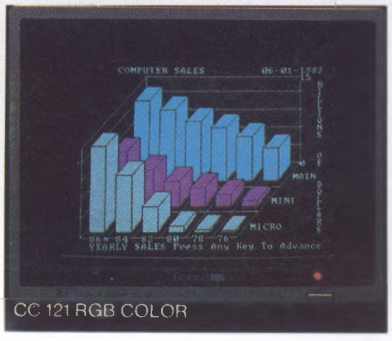

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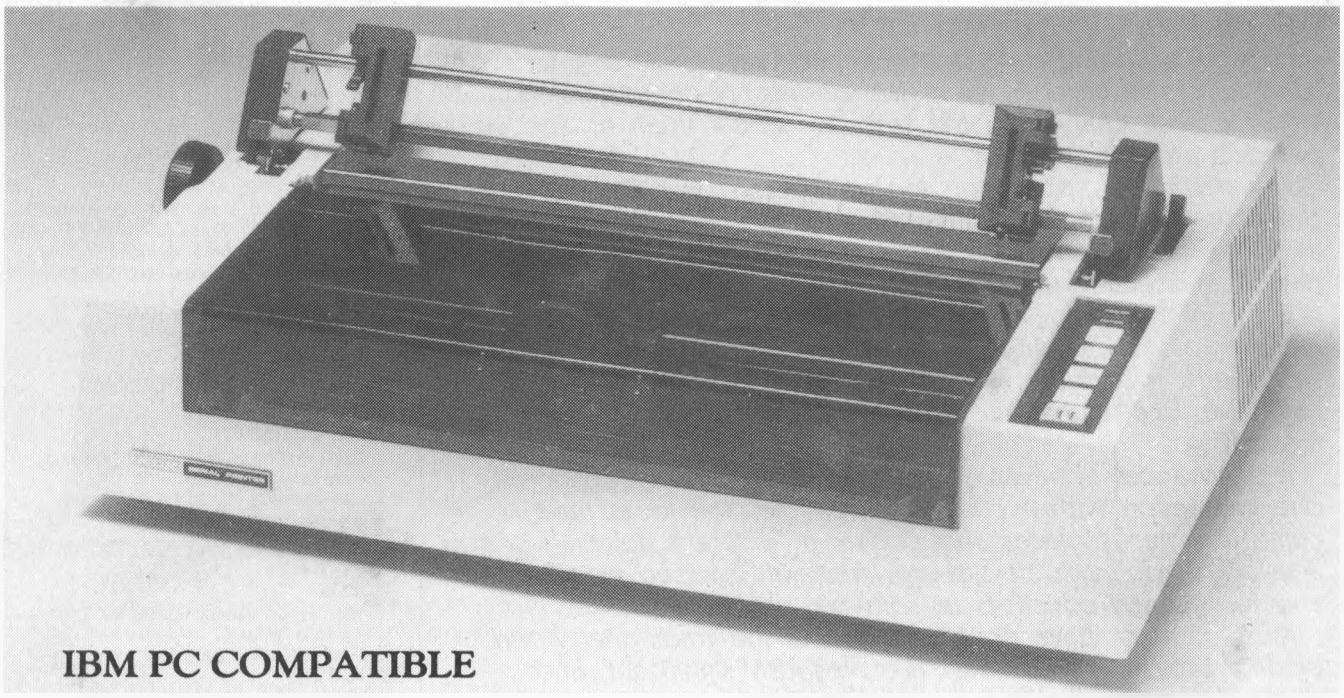

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EXCELLENCE IN ELECTRONICS

VIVE LA DIFFÉRENCE!

As the microcomputer market changes, we are starting to see some fundamental changes in the designs of computers, together with changes in the tasks we apply them to and in people's attitude to them.

The traditional application for computers has been data processing, working with large files, all in the same format, and all to be processed in the same way. For example, invoicing, payroll, statistical analysis and so on.

Software technology has progressed beyond that era, as we are progressively finding out. Already, in the everyday office situation, it is sensible to apply a computer to tasks of a non-repetitive, one-off nature: producing reports, budgeting, sales forecasting.

It is advances in several key areas that have made one-on-one interaction with a computer possible. The ideas have come from many places and appear in different guises: Smalltalk, Prolog, expert systems, mice, bit-mapped graphics and the general concepts of software engineering.

Most of these have no application in the traditional world of data processing, but they are obviously significant, and obviously finding practical application today. Where? In office automation, that's where.

Many of us have not yet grasped the fundamental differences between these two areas of computing. They require radically different hardware and software approaches, as well as different management perspectives. Data processing tends to put most emphasis on throughput and machine efficiency; office automation tends to stress the user interface and executive support, for example.

It's also important to realise that some machines – like the Macintosh, for example – are pure office automation machines, and are not intended for traditional DP roles. Others (and here I'm thinking of the CompuPro and similar big boxes) are really oriented towards traditional DP and database applications. Another group is somewhere in between.

Keep this in mind, and you'll see why the great Macintosh v IBM debate is largely irrelevant – they are different machines, intended for different purposes, and they barely compete. However, I suspect that in years to come, we'll look back at the IBM as a machine in transition, while the Macintosh is a machine that is definitely designed for its target market.

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Gourmet Takeaway Menu

From the master chef • Digital Research • a selection of dishes to titillate the imagination of even the most jaded palate.

Entree

Assembler Plus Tools 06MP
This simple dish will delight the most discerning software developer. It includes an assembler, linker, librarian, cross reference utility and powerful symbolic instruction debugger. ☐

Personal Basic 6
This is for those who desire good plain food. It is an excellent and straightforward interpreter. ☐

Main Course

PL/1 06MP
The knowledgeable will enjoy this concoction. It is based on Subset G, the standard for tens of thousands of professional programmers. When you need maximum performance, power and functionality — this is the answer. ☐

CBasic
Despite its name, no effort has been spared in creating this popular dish. ☐
Businessmen may prefer the **CBasic Compiler** 06MP it has a fast native code compiler and special file management techniques. ☐
A more austere version is the **CBasic Language** 06.
As an intermediate code compiler, it is ideal for people on a budget. ☐

C Compiler 6MP
Our Cuisine nouvelle. Lean, sparse and fast, an ideal choice for those torn between UNIX and the PC operating systems. ☐

Fortran 77 6MP
A traditional dish revitalised for the modern 16-bit micro. Strong & robust, it will appeal to those people needing compatibility with the big mainframe. ☐

Pascal MT+ 06MP
For the intellectual; it is a direct compiling dialect of the full ISO Standard Pascal, and is superior to traditional p-code compilers. ☐

Speed Programming Package 06
This piquant sauce will greatly enhance the pleasure of Pascal MT+; it includes an editor and syntax checker. ☐

Dessert

Display Manager 06MP
To complement your meal, consider this dish. It provides program developers with an interactive full-screen editor that works as a stand-alone system. It is compatible with all the main courses. ☐

Access Manager 06MP
Of quite different flavour to the previous dish, this is an advanced multi-keyed file access system that saves valuable time in program development. Fully compatible with any main dish. ☐

The code shows the range of operating systems the product will work under.
0 = CP/M 6 = CP/M 86 M = MS-DOS P = PC DOS

We enjoyed writing this ad. We'd like to tell you more about the "dishes". So why not mark those which interest you and send this page to us at **FreePost 2, ARCOM Pacific, P.O. Box 13, CLAYFIELD, 4011.** We'll return copies of the Digital Research Product Briefs to you.

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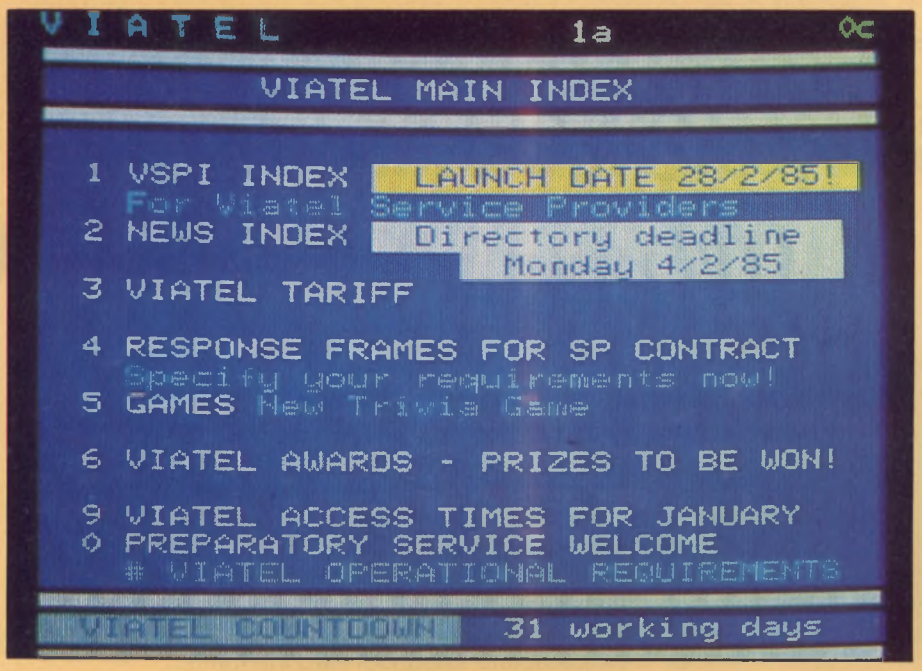

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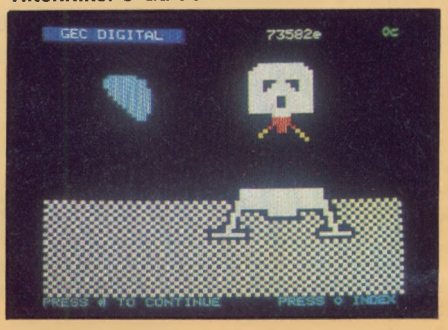

SPECIALS

REVIEWS

COLUMNS

DEPARTMENTS

MARCH 1985

your computer

Cashflow Manager for the C64.

FEATURES

NEXT MONTH

Which computer will win our PC of the Year award? The best of the machines released on the Australian market in 1984. The best technically and ergonomically; the best in terms of user support, value for money and performance. Our careful analysis of each of the nine contestants to make the shortlist might also help you decide which machine will be best for your application.

If you're in the market for excellent software, our evaluations of last year's nine most impressive packages should put you on the right track – and the winner ...

You'll also notice some changes in ***Your Computer*** *from April on. New type styles and a new format will make the magazine more pleasant to read and the sections that interest you in particular easy to access. There'll be more* ***Your Computer****, too – more tutorials, and Business and Pocket Programs sections every month (instead of bi-monthly). We've put our feelers out, exerted all our influence, to encourage people to supply us with the latest 'news'; we've streamlined our reviews. And look for us in your newsagent's earlier – the April issue will be out on March 15, and throughout 1985 we'll be bringing you all the latest information ahead of all the rest.*

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Showdown in the Education Market

In an effort to shore up a crumbling personal computer market in the US, manufacturers and distributors are putting their big guns behind those old marketing ploys – parental guilt, heavy discounting, and hard, hard sell. Apple has weighed into the battle with a most unusual competition. Tim Hartnell, who has just returned to Melbourne from the States, reports on these developments.

ALL THE PREDICTIONS that 30 per cent growth per year in the computer market would continue forever have been turfed out the window in America. As is starting to happen here in Australia, the boom for many aspects of the microcomputer market – machines, software, peripherals, books – seems to be well and truly over. But a market spawned in an atmosphere of heady cash flows, and ever-upward growth predictions, finds it hard to settle down to the real world of business, where simple company survival becomes the dominant goal.

Education is one of the as-yet-untapped areas. The first programmers to work out how to write software which has wide, and genuine, educational applications will make a mint. The use of computers in education is inevitable, but a way of bridging the gap between the observed need and its solution is far from clear.

Force-feeding the market

The thinking in the US seems to be along these lines: If we can't bring education to the computer, we'll force kids to take their computers to education. And if their parents have been so short-sighted, and selfish as to deny their kids the 'intellectual tools of the future', we'll bludgeon and coerce them into it. "Buy little Jane a computer, or she'll be left behind in the glorious race for the future" is the slogan, and hard-sell and discounting are the weapons to slam the message home.

The *New York Times* bristles with advertisements singing this song. "Go back to school with the portable Apple IIc advantage", says Computer Era of Park Avenue South. "Discounts to students and universities", trumpets Wolff Computer on Broadway. "Back to school, back to business" is the slogan of Computerland, of White Plains Road, Scarsdale, while the Dataplace Computer Store on Sunrise Highway, Lynbrook, is offering "Back to school outfits your kids won't outgrow".

You can send your children "back to school with the ATC advantage" claims All Things Computer, just down the road from Computerland in crowded White Plains Road, Scarsdale. ATC describes the Apple IIc as "the ultimate student aid!" and offers the IIc, a 30 cm green-screen monitor, Epson RX-80F/T printer and Appleworks software for $1888 (or as low as $71 per month!)."

Activity on the Software Front

Of greater interest, perhaps, is that while the dealers are pushing the hardware, some real developments are being made in the software field.

IBM, for example, is putting its weight behind a program called 'Writing to Read', written by a Long Island school superintendent. IBM is pushing the package, which it appears to see as a way of bolstering sales of the moribund PCjr, as a "revolutionary tool for teaching five-year-olds to read and write". The programmer, Dr John Martin, points out (with remarkable perceptiveness) that: "You can't read unless someone has first written. We teach children that great intellectual feat in the history of the world, the invention of the alphabet." The program goes on from that starting point to show how words are built up from the individual letters.

Will this package do for the Junior what all of IBM's hype and weight failed to do? IBM seems enthusiastic, but Dr Martin is more realistic. He thinks it improbable that 'Writing to Read' will become as popular as blackboards in schools. "That's what IBM would like," he says, "but nothing ever ended up in every kindergarten in the country except teachers and children."

While IBM is chasing after the kiddy market, members of staff at Stanford University are supplementing their income by moonlighting as lecturers on videotape and interactive computer programs. A private company, Computer Curriculum Corporation (which is owned by Stanford's Professor Patrick Suppes), has supplied more than 500,000 students over the past decade with computers and programs written by some of the university's staff. Testing, grading, even complaints are handled by the system. Students watch videotapes of lectures, stopping and starting them as they please. Studies have shown a student typically takes 75 minutes to watch a 50-minute lecture. Then the computer takes over, with the testing, grading and the rest.

Thumping the Sales Drum

But these kinds of development are still few and far between. It's just too difficult to put in the work to write software. How much easier it is to thump the big sales drum.

And Apple itself is doing a lot of thumping at the moment: "We're willing to pay up to $50,000 for your kid" screams the two-inch-high headline in a full-page ad, which is illustrated with a picture of an Apple IIc with the word Bingo! on its screen. Wonderful, I thought, and settled down to read the ad to find out why Apple was being so beneficent. It was pretty hard to work out what was going on, but in the interests of journalistic enquiry I forged on through a sea of Americanisms and exclamation marks, looking for The Truth.

"Absolutely free. No grade points asked. Good at any institution that'll take it." I can't imagine any Australian manufacturer just throwing away money, with apparently no strings attached. "There are hundreds of other prizes, too. Including five $5,000 cash prizes." Just what is Apple up to? "You can spread that over four years at a beauty college or a couple of months at Oxford." This is getting con- ▶

fusing. Come on, Apple, what's the catch? How do I get the $50,000.

Apple is not saying, at least not at this point in the advertisement. "Or you could win the Apple IIc Personal Computer – an educational opportunity in itself ... If you're the grand prize winner, you could even take home an additional $10,000."

"Winner of what?", I yell at the newspaper. "Tell me how to get the money!"

Finally, Apple spills the beans, or doesn't as the case may be, but at least the ad tells you where the beans will be spilt. "There's no purchase necessary. And there's no reason to walk away empty-handed, because your participating Apple dealer is giving away free back-to-school bookcovers while the supply lasts ... Just pay them a visit ... for laboriously complete details on how to get fifty grand for your kid."

After all that they still haven't told me how to get my hands on all that money. I'm not going to struggle back to New York State to find out the "laboriously complete details". But wait, what's this in teensy, weensy print at the bottom of the advertisement? "If your kid's (sic) not interested in college, you can use the money any way you choose. Enrol yourself in a Club Med vacation. Buy yourself a mink raincoat. Or spend it on something frivolous."

Tim Hartnell is the Australian founder of Interface Publications, a London-based specialist computer publishing company. ❑

Wrong Distributor

In the VIC-20/C64 column of our January issue, we mentioned Turbo-DOS, which allows you to convert disks to a new format that enables programs to load around five times as fast. We associated Turbo-DOS with Cockroach Software, but in fact it is a registered trademark of US company Software 2000, and is distributed in Australia by IMS International Computers Australia Pty Ltd, 5th Floor, 23 Berry St, North Sydney 2060. ❑

Apple Education Grants

APPLICATIONS ARE now being accepted for the 1985 Apple Education Foundation Grants. In 1984, as part of the Foundation's activities in Australian education, 23 grants worth over $80,000 were awarded to researchers and developers in the field of computer-based teaching and learning systems.

In 1985 the Foundation will provide similar grants with special emphasis on projects applicable below Year 8 levels. Programs which are easily transportable across all areas of teaching and learning are also more likely to be successful.

The closing date for applications is March 30, 1985 and the successful applicants will be announced at the Australian Computers in Education Conference in Brisbane on the 3rd July. If you're interested, guidelines and application forms can be obtained by writing to the Apple Foundation, P.O. Box 371, North Ryde, 2113. ❑

Education Contract Goes to Burroughs

BURROUGHS HAS been awarded a $1.5 million contract with the Northern Territory Department of Education to supply microcomputer-based administration systems to schools and colleges throughout the territory.

The contract is for the supply of Burroughs B25 microcomputers, AP 1351 multifunction printers, Burrough's Budgetary Accounting System (BAS) and locally-developed Computer-Based Administration System for Schools (CBASS).

After a trial at two Darwin high schools, Casuarina and Dripstone, the system will be installed in 50 schools and colleges in the Darwin, Alice Springs, Katherine, Tennant Creek and Nhulunbuy areas over the next three years. It will provide schools with the facilities to perform a wide range of functions including student administration, financial administration, timetabling and word processing.

The Burroughs systems will communicate with the Northern Territory Government's IBM 3081 host computer and provide source data for the Department's management information systems servicing its head and regional offices.

Burroughs' Graham Brookfield believes the contract represents a first for Australia. According to Brookfield, "No other education authority has undertaken such an extensive and co-ordinated project for utilising advanced technology in its schools. This development complements the significant advances made in computer education. Not only will students learn about and how to use computers, but the school environment itself will become a constant reminder of modern technology in action." ❑

PostScript for Laser Printer

APPLE EXPECTS to release its high-resolution LaserWriter System here in July. The new printer is claimed to produce near typeset-quality text and 'art department quality' graphics. AppleTalk networking capability is built in, so one printer may be shared by up to 31 workstations, or the printer can emulate a Diablo 630 and be connected via an RS232 port.

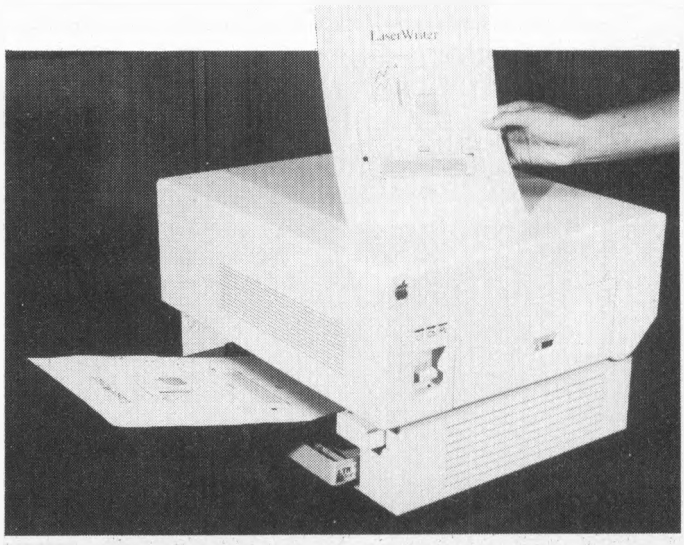
The LaserWriter is suitable for printing documents such as newsletters, overhead transparencies, business forms, memos, brochures and reports. Apple claims the printer can integrate unlimited combinations of text and graphics on a single page.

The printer is built around a Canon LBP-CX10 engine and a Motorola 68000 microprocessor operating at 12 megahertz. It has half a megabyte of ROM and one-and-a-half megabytes of RAM. Printing control is managed by the language PostScript, which was created specifically for high-resolution printers and typesetting machines.

A powerful feature of the PostScript language is the ability to store fonts as mathematical formulae, or 'outlines', rather than as a bit map for every size, style and orientation of a typeface. Using these outlines, PostScript can direct the printer to generate characters in a wide range of point sizes, from three points to more than 720 points, limited at the high end only by the size of the paper (72 points measures 2.54 cm).

The Postscript software is device-independent, so any workstation – including the IBM PC – can take advantage of the LaserWriter.

The LaserWriter System is the first personal computer



printer to be awarded a licence to use the original Helvetica and Times typefaces. Also built into the printer are Courier and a mathematical symbol font, with support for all the current Macintosh typefaces. Apple will be releasing additional fonts, selected from the typeface libraries of the International Typeface Corporation and Mergenthaler.

Apple expects the printers to sell for about $10,000 in Australia. ❑

NEWS

SPOC Comes Down to Earth

DESPITE ITS plethora of advanced technological systems, the US Space Shuttle program has had one fundamental drawback – until recently, astronauts had to resort to looking out of a window to determine where they were over the earth. NASA uses a satellite and numerous ground receiving stations to communicate with the astronauts by radio, but for 30 to 50 per cent of the time they are out of direct contact with Mission Control.

However, since the end of 1983, NASA has used Grid Systems' Compass portable computer to let the astronauts know where they are. The computer, codenamed SPOC (for Shuttle Portable On-board Computer) has been used to provide a graphic display of the Shuttle's orbit and current position and to provide operational planning information.

The initial success of the computer has lead to its uses being extended to include fuel transfer analysis, payload controller monitoring and flight deorbit (could they mean landing?) calculations.

The Grid Compass is now being released in Australia by the communications engineering firm, Vicom. Reading its specifications, it's easy to forget that this is a *portable* computer. The Compass comes with 256K RAM (expandable to 512K), 384K bubble memory, 80-character by 25-line electroluminescent display screen, an 8086 main processor with an 8087 maths co-processor, ten-year lithium battery and a variety of interfaces including RS232 and RS422 serial ports and a parallel IEEE-488 General Purpose Interface Bus, capable of supporting 15 peripherals. All this and it weighs a mere 4.5 kilograms and measures 38 by 29 by 5 cms. The Compass model II adds a further 512 kilobytes of plug-in ROM.

Operating systems available are MS-DOS and Grid-OS, so users can choose between the large library of MS-DOS software or Grid's own integrated software tools. Prices start at $5,313. For more information contact: Vicom, 57 City Road, South Melbourne, 3205; (03) 62 6931. ❑

Compact and powerful – the Grid Compass computer

Graf-X D.A.G. L1973.

Which computer:
supports 5 users
incorporates 8 & 16 bit processors
800K floppy disk drive
10 meg Winchester
Concurrent CPM
640K RAM
has dual printer capabilities
is delivered within 30 days from order
and only costs $8600*?

And it's about time!

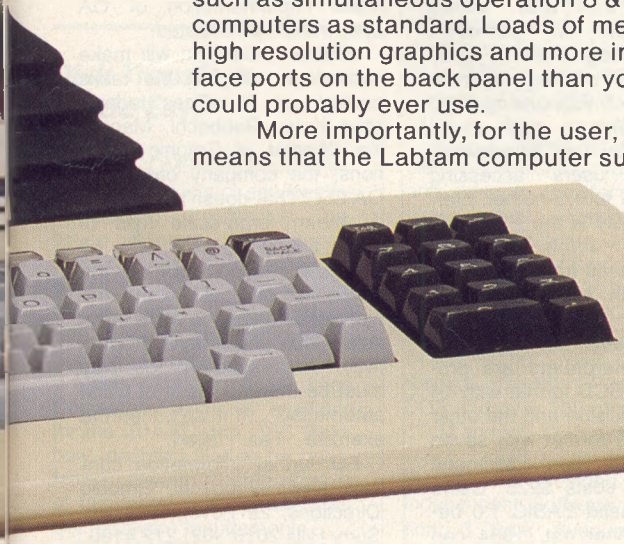
It's no secret that improved technology is becoming less expensive every day. Labtam has been designing and manufacturing Information Handling Systems for the past thirteen years. Our products have always been on the leading edge of technology.

The 3003 Desktop Computer combines all Labtam's popular technology such as simultaneous operation 8 & 16 bit computers as standard. Loads of memory, high resolution graphics and more interface ports on the back panel than you could probably ever use.

More importantly, for the user, this means that the Labtam computer supplied is a state of the art computer, ready to take one to five users as required. Another feature is that two key strokes is all that's needed to change from one terminal to a more than one terminal system. For the technically minded who also appreciate the value of the Labtam 3003, we offer a range of interesting options ie: Communications Networking, L.A.N., I.E.E.E. Interfaces, F.F.T.'s, Real Time A/D's.

Just think, for probably no more than what your current single terminal computer cost you, you can now have multiple terminals with the Labtam 3003 and more than likely be able to transfer your existing software.

Imagine word processing, commercial processing and spread sheet at the same time for a price that won't break your budget!



The Labtam 3003
desktop computer

For further information contact:
Melbourne: 587 1444, Sydney: 411 2588,
Queensland: 378 9877, Adelaide: 260 0133, Perth: 342 9721.

*One monochromatic terminal provided only.

Better MacBASIC

A NEW version of Microsoft's BASIC for the Apple Macintosh hit the streets earlier this year. BASIC 2.0 offers an improved applications development environment and interface capabilities, and support for Macintosh-style applications.

Improvements in the development environment include additional entries in the menu bar and optional line numbers. Among other features, the menu bar now displays all file-oriented and editing commands, all commands for searching a program listing (find, find next, find selected text, find label, find the cursor, replace) and all execution and window commands. Line numbers are now optional and need not be in sequential order. In addition, alphanumeric labels are supported, which makes possible a more structured and readable approach to programming.

The program entry process has been changed so that all entry and editing of program text now takes place in the List window, using MacWrite style conventions. When the Trace facility is activated, the currently executing statement is boxed in the List window. Since multiple Output and List windows can be displayed on the screen, it is possible to watch two sections of the code, in addition to the output, as the program is executing.

BASIC 2.0 also allows customisation of pull-down menus. Programmers may create ten different menus, each of which supports up to 20 choices. Menus and menu choices may be 'shadowed', preventing users accessing items out of turn. Another interface capability is the PICTURE statement, which transfers graphic images from other programs, such as MacPaint, to BASIC.

Subprograms are supported and two interpreters are provided (one BCD format with 14 digits of precision and the other Binary IEEE format with seven digits of precision). Microsoft BASIC 2.0 costs $225. Users who purchased BASIC 1.0 before November 1st, 1984 can upgrade to Version 2.0 for a cost of $75. Purchases made after November 1st will receive a free upgrade. Upgrade details can be obtained from Microsoft on (02) 452 5088. ❑

Conference Confronts Controversial Issues

REPETITIVE STRAIN injury, unemployment, invasion of privacy and productivity benefits will be among the issues discussed at Australia's largest ever symposium on office automation, to be held at the World Trade Centre, Melbourne, from 6 – 9th March.

Office Automation 85 will feature a large-scale exhibition of the latest equipment from more than 40 major office technology suppliers, and a series of Personal Computer Seminars for business people. Equipment on display will range from personal computers, word processors, minicomputers, business software and printers to telecommunications, facsimile, videotex, PABX and 'intelligent' photocopiers.

The aim of the conference is to identify and provide answers to the controversial OA issues emerging in Australia and already highlighted in overseas studies. The attitudes of governments, unions, management and equipment suppliers to the mass implementation of OA systems will be debated.

"Office automation will make redundant many of the tasks carried out in offices today," says Kevin Rebbechi, Managing Director of Graphic Directions, the company organising OA 85. "That doesn't necessarily mean large-scale loss of jobs, although there will be structural change, but more the elimination of repetitive and menial tasks, leading to more interesting jobs and greater productivity. Increased productivity must be the end result of office automation ... if it isn't, then the exercise has failed."

For further information contact: Kevin Rebbechi, Graphic Directions, 28 Foveaux Street, Surry Hills 2010; (02) 212 4199. ❑

Radio Pascal

A TWO-PART course, covering all the elements of the Pascal programming language, will be broadcast over the University of New South Wales radio station from 5 March.

Part One will concentrate on fundamental programming techniques, using illustrations to show Pascal's ability to produce simple, correct and understandable programs. Part Two describes data structures, such as arrays, lists and trees, and recursive programming techniques to show Pascal's power in handling data storage and retrieval.

The six core lectures in each part will be broadcast at 7 pm on Tuesdays and repeated at 8 pm on Thursdays. Each part also includes two video presentations/tutorials held at the university. The fee of $32.50 per part covers the lectures, comprehensive study notes, video screenings and tutorials. For an extra $10 participants may use the university's computing facilities.

The series is also available on cassette at $48 for each set of six lectures. Transistor radios modified to pick up Radio University's special frequency in the Sydney area are available for $10 plus $2 postage.

More details can be obtained from: Radio University, P.O. Box 1, Kensington 2033; (02) 697 3175. ❑

Disk Transfers Made Easy

THREE COMPANIES are offering new products or services for transferring information between different disk formats. The companies involved are Logo Computer Centre with Media Master, FBN Software with PC-Alien and Independent Software Duplication.

Media Master from Logo Computer Centre is available for the IBM-PC and DEC Rainbow, enabling files to be transferred between a large number of computers without any special hardware requirements.

The IBM-PC version of Media Master provides compatibility with about 80 foreign disk formats, and the Rainbow version with 25 formats. Versions for the Osborne and Kaypro have been released overseas and Logo will import these if there is enough demand.

In addition to reading foreign disks, Media Master lets the host computer write and format foreign disks. For example, running on the IBM-PC, Media Master lets you format a disk for the Osborne and then write the specified files to it; or you can designate each floppy disk drive as a different format, so it is possible to do tasks such as transferring files directly from Osborne to Morrow disks.

Logo will be supplying a copy of Media Master with every DEC Rainbow and NCR PC4i (IBM-PC compatible) it sells. It is also available separately for $195. For more information contact Logo: PO Box 389, Drummoyne 2047; (02)8197307.

FBN Software's PC-Alien also reads, writes and formats disks for IBM-PCs and compatibles. Over 60 disk formats are available, including a number of Australian machine formats, and with the addition of appropriate hardware, the program supports both 20 cm and 96 TPI 13 cm formats.

The company will add new disk formats on request. Purchasers who provide a sample disk in an unsupported format will receive a free update. PC-Alien costs $95 and is available from FBN at 16 Coles Place, Torrens, ACT, 2607; (062) 86 1102.

If you'd rather let someone else do the work for you, or you only need to transfer files between formats occasionally, Independent Software Duplication provides a data transfer service catering for IBM 20 cm 3740, Apricot 9 cm, IBM PC/XT and compatibles, Apple CP/M and DOS 3.3, DEC, NEC, Osborne, Kaypro, TRS-80, CP/M to MS-DOS and over 100 other 13 cm CP/M and MS-DOS systems.

For detailed information on the services provided contact: Independent Software Duplication, 3 Park Avenue, Westmead 2145; (02) 635 0704. ❑

BRIEFLY

■ *Rumour has it IBM is about to announce a new version of its PC in the US, using 256K semiconductor chips. The PC/AT has yet to make an appearance in Australia, so who knows when we'll see the new machine.*

■ *A new release of dBase – version 2.43 – is now available, providing improved indexing. Multi-user TurboDOS dBase has also been released. More info from Arcom Pacific (07) 52 9522.*

■ *British Telecom has ordered $6.3 million worth of ICL Computerphones, the same product being marketed here by Telecom Australia. In Britain the Computerphone will be known as the One Per Desk.*

■ *NEC Australia is to increase staff numbers at its Mulgrave (Vic) plant by about 150 in the next two years, despite extensive automation planned for the same period, reflecting the company's confidence in prospects for local growth.*

■ *Apple has renamed the Lisa 2/10 computer the Macintosh XL, as part of its push to enhance the company's business image. The Macintosh XL will be marketed as the hard-disk version of the Macintosh.*

■ *Brother Vin Hawley, from St. Edmund's School for the Blind and Visually Handicapped, has been awarded the first Dick Smith Electronics 'Computer Educator of the Year' award. The award, presented by NSW Premier Neville Wran, recognised Brother Hawley's contribution in supporting and developing systems to help integrate blind children into regular schools.*

■ *The Sperry PC has been chosen as the preferred computer for the Queensland Department of Education. IBM, Apple and NEC were among the losers in the hotly-contested battle for the contract. Epson gained the contract for printers in Queensland schools.*

■ *A report produced for the NSW Department of Technology has forecast a potential doubling of employment opportunities in the computer software field over the next five years. The report indicated a number of areas with major growth potential, including business vertical markets, expert systems, educational software and software designed to service new technology.*

■ *A report on the state of computer consulting in Britain has found only five per cent of consultants were free from financial ties with companies they recommended. The report, by UK magazine 'Which Computer', also described many dealers as "unscrupulous, dishonest, technically ignorant or unstable."* ❑

Twelve awkward questions that will tell you if a PC is productive.

1. Is it a 16-bit model like the AWA Corona - powerful enough to cope with all your business requirements?

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4. Is the memory expandable beyond 512 K-bytes like the AWA Corona's?

5. Has it got a much sharper screen definition than the IBM PC? The AWA Corona has.

6. Can it take hard and floppy disks, as with the AWA Corona?

7. Is there a choice of desktop or portable model like the AWA Corona?

8. Can you buy the complete system for around $5000? (The AWA Corona starts from around $4500).

9. Does 'complete' mean the screen is included in the price, as with the AWA Corona?

10. Does it include the MS-DOS,[1] GW BASIC,[2] PC Tutor[3] and MultiMate[4] professional word processing system like the AWA Corona?

11. Is it fully backed and serviced by the company that supplies it to you, like the AWA Corona?

12. How quickly could you have one? Call AWA now.

Saatchi AW66

For more information write to: Corona PC Co-ordinator, (YC).
AWA Computers, 132 Arthur Street, North Sydney, NSW 2060.

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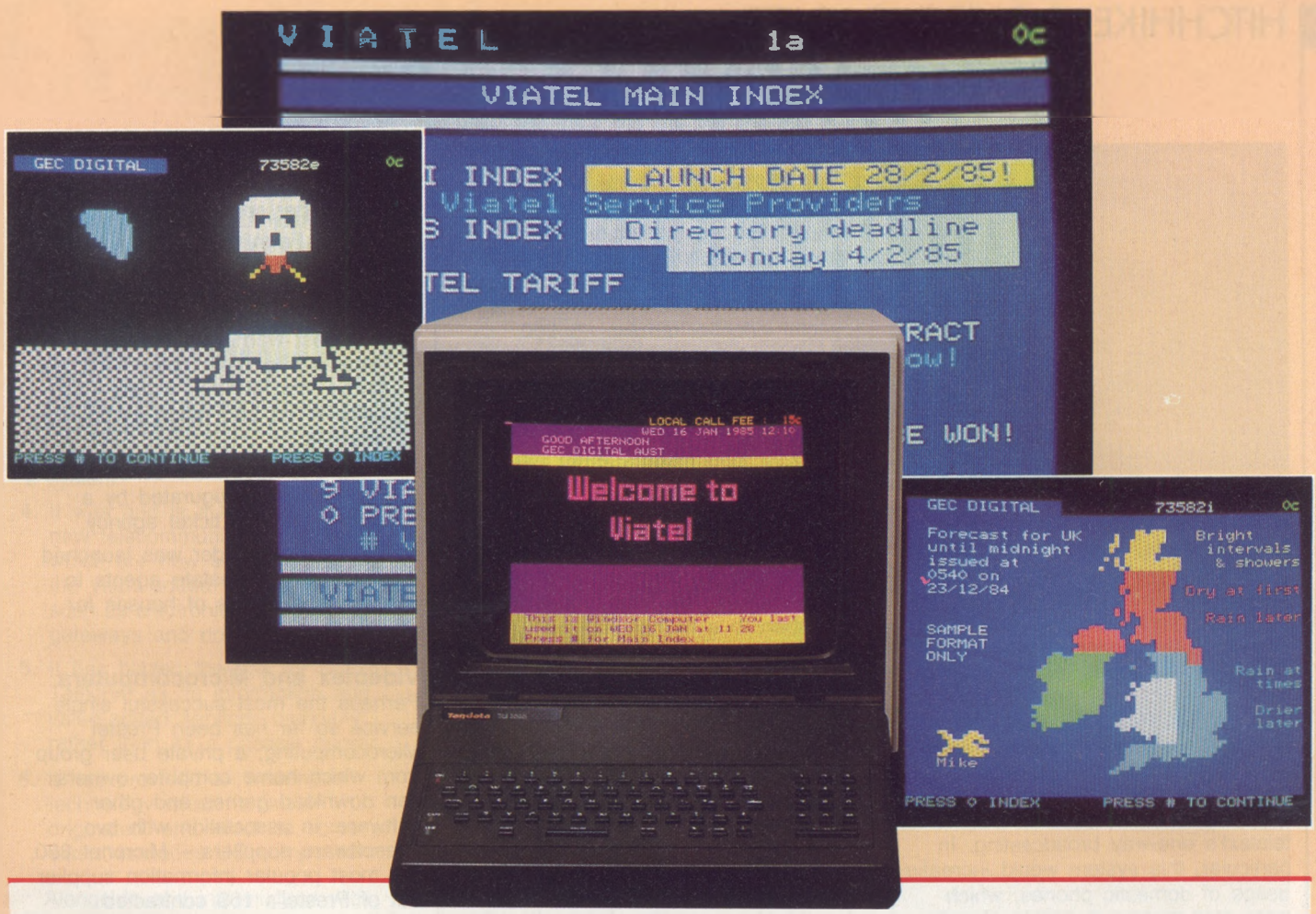


HITCHHIKER'S GUIDE TO VIATEL

Late in February, electronic communications in Australia will take a leap forward with the introduction of Viatel, Telecom Australia's new videotex service. Les Bell and Norman Kemp report ...

DURING the mid-Seventies, the domestic TV set in the UK took on a very different role from supplying daily doses of Coronation Street and Crossroads. Engineers at the BBC and the IBA (Independent Broadcasting Authority) developed a way of transmitting digital information on the unused parts of a TV picture signal, and displaying this information as a 40-character by 25-line display. Enhancements over the plain text screen include colour control and crude graphics.

The system, known as teletext, has taken off in the UK, where the BBC's service is known as Ceefax and the IBA's as Oracle. Over here, the service is run by a number of TV stations, with Sydney's Channel 7 perhaps the biggest promoter of the service.

Teletext services usually broadcast a magazine of two hundred pages,

which takes about a minute or so to transmit. Thus, requesting a particular page may involve a delay, and with only 200 pages available there's only so much information that can be placed on the system – typically news reports, sports results and the like.

At the UK Post Office Research Establishment in Martlesham, engineers were looking at a way to extend this system using two-way communication via the phone lines, rather than teletext's one-way broadcasting. In particular, this system would increase usage of domestic phones, which were only making a couple of calls per day on average – a miserable return on the capital cost of installing them.

The new service, known as videotex, uses the same display technology as teletext, but does not rely on TV signals for its information. Instead, the data is received from the central computer via a modem built into the adapter or the set itself. Because the system does not have to continually retransmit the entire contents of the database, a much bigger database is possible – in the case of Prestel, British Telecom's service, over 300,000 pages!

In 1977 the first experimental system was up and running, and in 1979 the system went public, serving the London area initially. This first videotex service, known as Prestel, took some time to build up, and in fact took quite a different direction from that anticipated.

Domestic users were slow to adopt the system, and it was the business market which provided the major impetus for growth. The dominant user category was the travel industry, which made extensive use of the service for airline timetable and fare details, resort listings and the like.

Using Prestel, and the new Telecom Australia Viatel service, is very simple. The equipment required is either an adapter for an existing TV set, which plugs into the TV and the phone (around $400 – $500), or a special videotex terminal ($1500 approx). At the press of a button the terminal dials the videotex computer's telephone number and starts the log-in procedure, which you complete by supplying your password.

You are then presented with the main menu of the system, which contains major choices like news, sport information, business information and the like. By selecting one of these choices you move to a sub-menu, and then to a further sub-menu, and so on until you arrive at the page of information you want.

Of course, if you know the page number, you can go straight to it without wasting time. Early videotex terminals and some domestic videotex adapters had simple numeric pads only, rather like remote control boxes, but later terminals all have full alphanumeric keypads – often based on membrane keypads, but adequate for videotex use. This full keyboard is essential for newer services like electronic mail.

The videotex display consists of 25 lines, each of 40 columns, with the ability to display 'chunky' colour graphics – not as good as most PCs, but adequate for weather maps and simple logos.

UK Experience

Prestel continues to grow. At the last count it had 48,000 terminals attached to its network, and a database of 329,000 frames of information on its computers. Despite the evident tribulations of its early years, it has been adding about 10,000 new subscribers a year, and there are now signs of a demand by the private as well as the business user. Of the total number of terminals, 41 per cent are now in homes, against 14 per cent in 1982. However, it is a fair assumption that the revenues are still far more biased towards the business user. Prestel had some notable innovations in 1984:

1. Its Mailbox electronic mail service went national after a trial period in London. Some 40,000 messages are now being sent each week, a figure that has been growing by twelve per cent weekly.
2. Prestel Farmlink was launched, giving both local and national information on, for example, crop problems, weather, market prices and pest warnings. Through gateways to other computers, the farmer can perform wages calculations and ration formulation analysis.
3. A nationwide theatre ticket booking service was inaugurated by a leading London ticket agency.
4. Prestel Homefinder was launched specifically for estate agents to exchange details of houses for sale.

Videotex and Microcomputers

Perhaps the most successful single service so far has been Prestel Microcomputing, a private user group from which home computer owners can download games and other software. In association with two telesoftware suppliers – Micronet 800, the most popular information supplier out of Prestel's 160 contracted 'Information Providers', and Viewfax 258 – this service attracted roughly 10,000 subscribers. This figure is still only a small fraction of the UK's three million home computer owners, and it will be a test of a recent $A30,000 television and press advertising campaign for Prestel telesoftware to see whether this customer base can be substantially enlarged.

These developments are in addition to the Homelink telebanking service, whose software has been sold to the Commonwealth Bank of Australia, which will provide a similar service on Viatel by the end of this year; the Citiservice (UK) stock exchange commodity market and other real-time price services which have been running for several years; and the extensive travel trade information service which has characterised Prestel since its inception, with 5400 British travel agencies now using the service. Prestel has found a more modest, but commercially more realistic, place than was originally intended in the British market for electronic information systems. But in assessing it, it is necessary to recognise its wide impact:

1. It has created a more variegated UK market for videotex.
2. It has produced technical standards that have made it possible for videotex as a mode of computing to move to many new areas.
3. It has triggered interest in videotex in almost all industrialised countries. Many of them, through their own national telecommunications administrations (PTTs), have adopted it as part of their own system.
4. It was and is a testbed for many new telecommunications services which are now standard parts of the value-added services business, such as electronic mail, teleordering, gateways and downloading.
5. It has blazed the trail for British Telecom as an information and value-added services company rather than as a passive carrier.
6. It has provided an information technology which is British-originated, and which to some extent excludes US competition.

Alongside and intermingled with Prestel are the private systems often operated by major trading companies. Examples are the information networks for dealers operated by two major motor manufacturers, or the stock control system operated by the Debenham department store group. Other systems are run by large computer bureaus, such as Thorn EMI's subsidiary Datasolve (available in Australia), with several teleordering services available through a Prestel gateway. Barclays Bank has its own in-house staff training scheme using videotex screens, and the Bankers' Automated Clearing Service (BACS) is using a private system supplied by Rediffusion to cope with the problem of redirecting back to its client banks queries that arise out of the millions of banking transactions processed electronically.

Other Countries

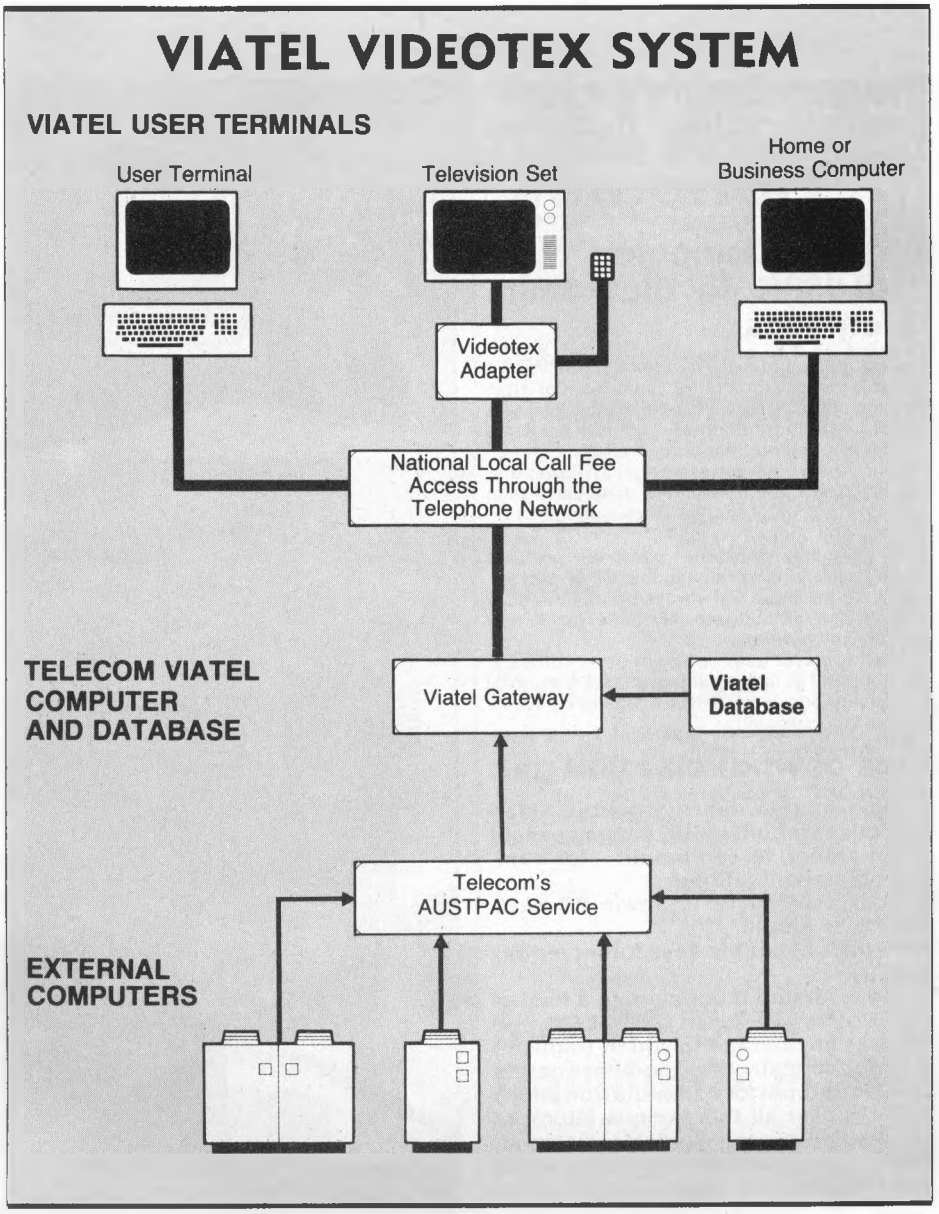
France has developed its own system for its 'Telematique' programme, which is technically incompatible with Prestel and based on small black-and-white Minitel terminals. The basic videotex network is intended as a nationwide telephone directory, replacing paper directories in homes and offices. It is heavily subsidised by the PTT. Almost 300,000 Minitels are now in use, and more than one million are on order.

West Germany has commissioned IBM to supply a nationwide videotex service called Bildschirmtext, derived originally from Prestel. Although the West German PTT, the Bundespost, is saying it will have one million customers by the end of 1986, others think it may be one fifth of that figure.

It is fair to observe that in the US, where other styles of computer networking and information dissemination have become established (for example, Telenet, Tymnet, cable TV), the European idea of videotex has not caught on. Viewtron, a service begun in Florida, had to lay off staff after a poor take-off.

It is also true that Canada has not had much commercial success with its own videotex design, known as Telidon, which is strong on graphics but very expensive (although it has had useful spin-offs such as the NAPLPS graphics scheme).

It would be false therefore to pretend that videotex or any other form of electronic information system will meet all home and business needs. The results of using such a



Continued on page 28 . . .

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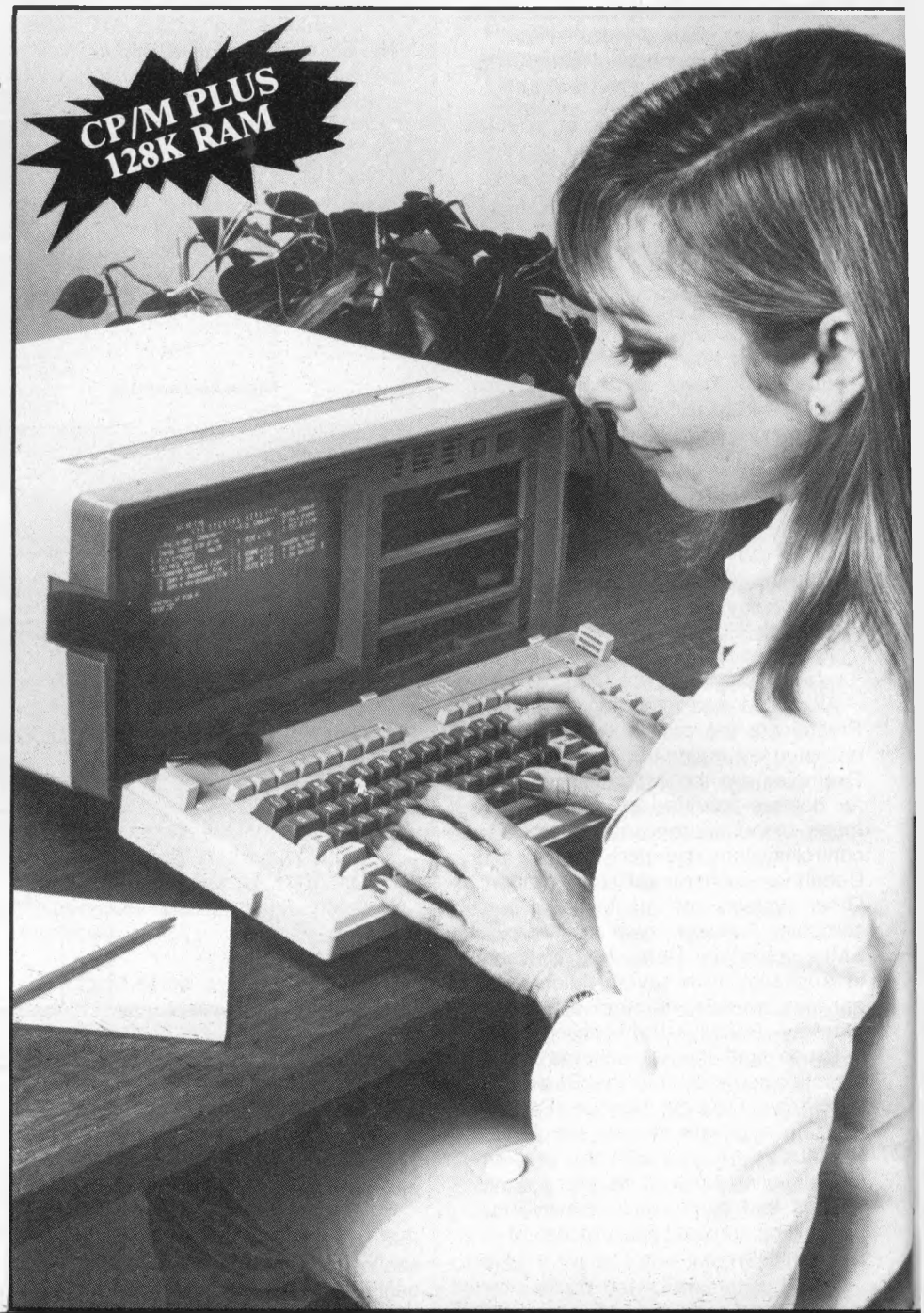

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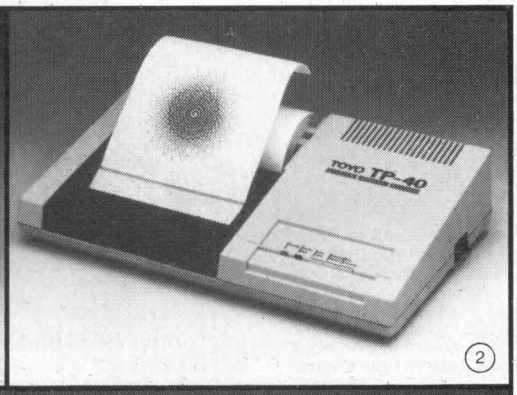

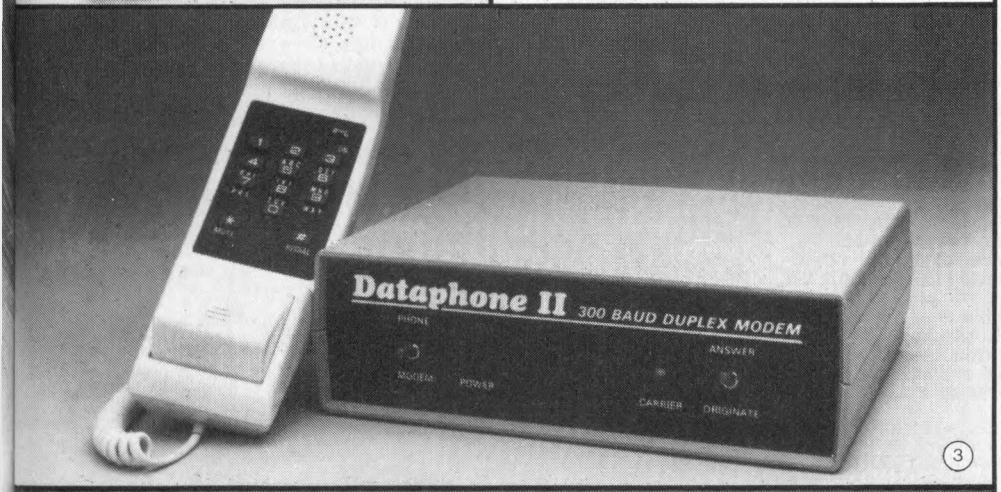

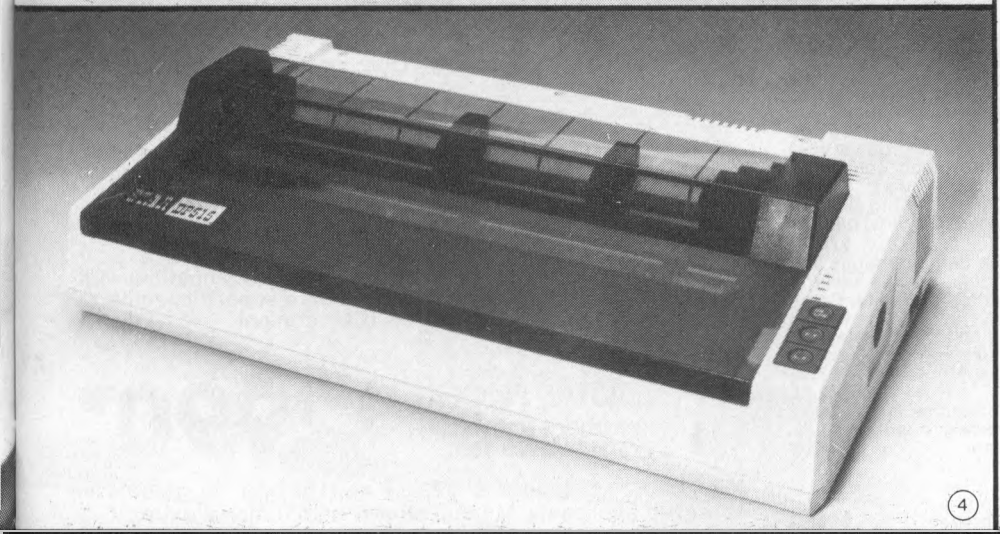

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Viatel Equipment

WHEN YOU log onto Viatel you will be connecting up with some sophisticated hardware. The combination of microcomputer and mainframe forms a major part of the effectiveness of the system, with much of the work being done by the little box at your fingers and all of the high-speed computation being done by a mainframe.

The software driving the system is a version of the British Prestel software. It will run in Australia on a number of GEC 4190 mainframes based in Melbourne. The basic configuration of these machines is 1 Mbyte of RAM, which will allow up to 750 users to access the system with a response time of one second.

The on-line storage is on a number of Control Data 80 Mbyte hard disks while the 'front end', the bit that plugs into the humble telephone lines, is a series of Case multiplexers.

At present there are three GEC 4190s involved in the Viatel system. Two are run in parallel, performing all the same commands – if one fails, the other can carry on providing the service without the users being aware of an interruption. The third machine will permit system personnel to carry out testing.

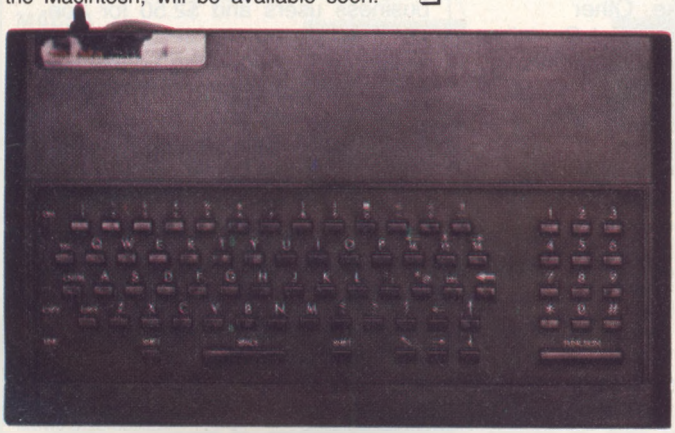
On the other end of the phone is your terminal equipment. Assuming you use Viatel equipment (a number of home micros will also be able to access Viatel), you will have a keyboard which includes a numeric keypad, and either a connection to your TV or an RGB monitor. Inside the keyboard is a microcomputer based on the 6800 processor. The amount of memory will depend on the model; there are options for up to 13 pages of memory on board. A page of memory is roughly equivalent to the size of the screen display, in this case 40 by 24.

Also in the box you will find a modem, based on the AMD chip. The

modem receives at 1200 baud and sends at 75.

The printer supplied with the Viatel equipment is a Tandata PPX thermal printer. Tandata also supplies the screens. The printer operates through the Centronics interface with a continuous roll of paper giving 40 characters.

To access the system through a standard microcomputer you will require a TM110 or 200 modem and a software micropack. These packs are available for the Apple IIe, IIc and II+, Commodore 64, VIC 20 and PET, BBC Micro and the IBM. Packs for other machines, such as the Macintosh, will be available soon. ❑

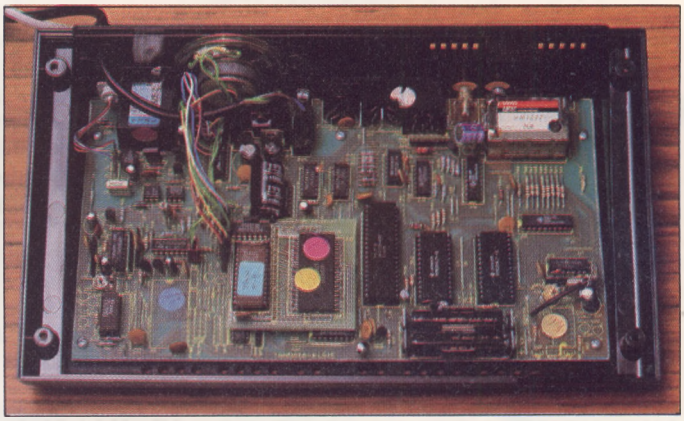


Top: The standard Viatel keyboard, good for short sessions.

Above: Expansion ports permit extraction of data by screen, cassette, or printer.

Left: GEC mainframes are at the heart of Viatel.

Right: Tandata's compact thermal printer.



Top: Typical connection to Viatel will be through the Tandata RGB monitor and the keyboard with on-board processor and modem.

Above: Options for the 6800 based machine include extra pages of memory and an infra-red keyboard for remote, cordless keyboard operation.

system will also vary from country to country. But what has been shown by Prestel and videotex generally is that it has a rightful place among the technologies of the electronic information era.

Videotex in Australia

Australian videotex activity is just emerging from the formative stages with the announcement of the first public access system, Telecom's Viatel service. Telecom has been trying to get this going for some years, with its original proposal being rejected by the Fraser government in 1981. However, an amended proposal was accepted in October 1983, and the service is due to be launched in late February.

Of course, the government did not stop the establishment of private videotex services and some of these are now active.

What's on Viatel

At the time of writing, over 25 Information Providers had been signed up by Telecom for the new Viatel service. Unfortunately, these IPs, with one or two exceptions, declined to be named, although if you dial into Viatel you'll soon find out who they are. We can only talk in general terms about the kinds of services you'll find on the system.

Obviously, a major user will be the travel industry, with TIAS (the travel industry airline reservation system) providing an umbrella service for minor information providers. Other likely users include government tourism bureaus, airlines, and wholesale travel agents.

Financial services are also expected to be a major category, with banks, finance companies, credit unions and building societies all offering services. While most will initially provide information frames such as foreign exchange rates, interest rates and so on, before long using gateways to their own computer systems, the banks will provide on-line banking services. Basically, this will provide the same services as the automatic teller machines which have cropped up in bank walls everywhere, with the exception that your TV set will not dispense cash.

Another major category is general business services. Currently many companies make use of credit and other business directories, many of which are out of date before they are printed, and these can be expected to be augmented by or transferred to Viatel before long. Other business information sources such as Chambers of Commerce, tax advisers and management consultants are expected to show interest in the system.

Government departments – particularly those with commercial orientation, such as Trade or Industry and Commerce – will probably use the system for dissemination of information about trade missions, tax incentives and the like. Other departments such as Social Security could use the system for distributing information about community services and benefits to interested bodies such as welfare agencies.

And of course, the various state TABs are looking at the system with considerable interest.

The education sector is also showing interest in the system, not for encyclopaedic storage of reference material, since such pages would be relatively infrequently accessed, but for more general information such as course details, career guidance, entrance requirements and, of course, down-line loading of software.

Finally, several media groups are expected to be involved in the system, providing the latest news updates, weather reports and sports results on a much more timely basis than any other medium.

During the first few weeks of the new service, many of the pages available will be dummies making up demonstration sequences. But after a few months many of the databases will 'go live' – for example, the Commonwealth Bank electronic banking service is expected to go live by May.

However, building up a database is not an overnight undertaking, since some databases can be tens of thousands of pages. The key to success for information providers is the quality of the database, not the quantity. Since information providers derive revenue from the number of frames accessed and pay storage charges for the number of frames they create, large databases in which each frame is accessed infrequently do not pay as well as small databases with few pages which are accessed frequently.

The first year of Viatel's operation is likely to be a critical one. No-one will use the system if it does not have enough valuable databases – but no-one will provide the databases if there are no users to pay for them.

To provide initial impetus to the snowball effect, Telecom Australia has set low rates for the first year of operation. There are three separate sets of charges for users. First, there's a yearly subscription, which is $12.50 for the first year of the service, then $12.50 per month for business users and $2.50 for non-business users.

Secondly, there's the connection charge of eight cents a minute from 8 am to 6 pm, and five cents a minute at all other times. Finally, there's the charge for the telephone call itself, which is only a local call fee from anywhere in Australia.

In addition, some frames will be chargeable, as this is how information providers cover their costs. However, the frame leading to a chargeable frame will warn the user, enabling him to decide whether to view the frame or not.

Another form of charging, which has proved popular in the UK, is the Closed User Group system. Frames in CUGs are available only to the owners of passwords, which can be obtained from the information provider, usually for a fee.

Private Systems

In addition to the Viatel service, which is operated by Telecom Australia, there are some private videotex systems operating in Australia. Some of these are general-purpose systems operated by computer companies, such as Cybertel (Control Data), CAS/Mayne Nickless and ICL's system, which offer facilities to a range of commercial users.

Another particularly interesting system to country dwellers is Agtex, operated by the Victorian Government, which offers information for farmers. A similar system is run by Elders/IXL, which of course has extensive pastoral interests.

Videotex is about to be really launched in Australia, and we can look forward to this next step in the dial-up information revolution. ❑

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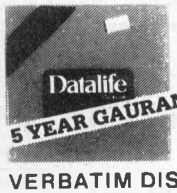

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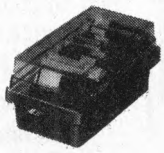

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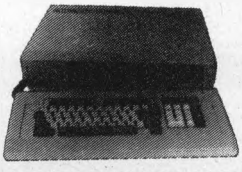

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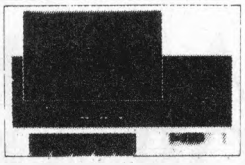

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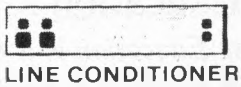

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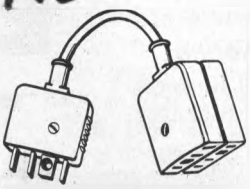

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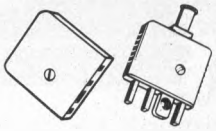

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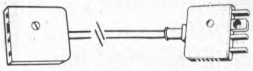

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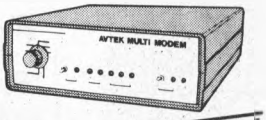

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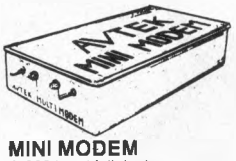

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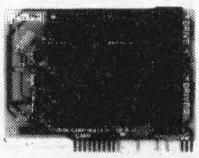

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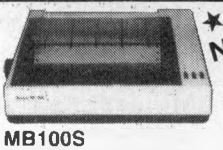

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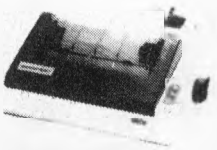

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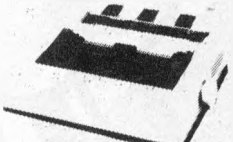

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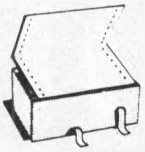

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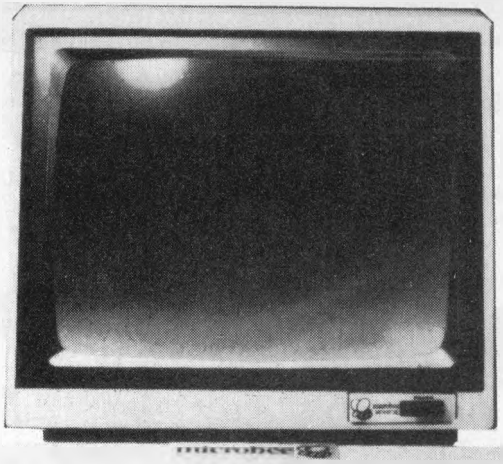

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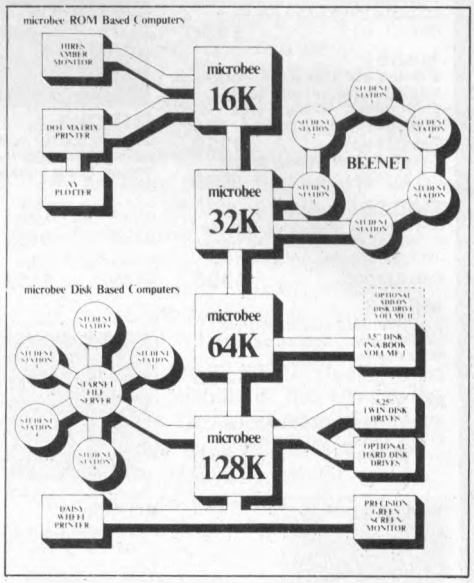

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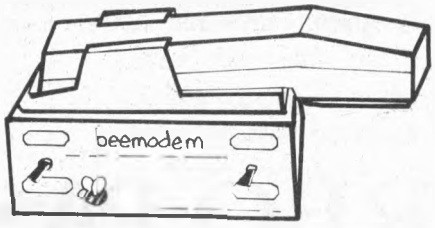

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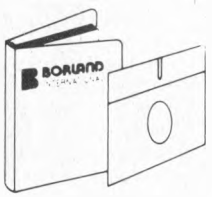

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THE HARD WORD ON DISKS

Some say Les Bell was playing with micros before disks were invented (or, at least, before they invented ones he could afford). Nowadays he has not only outgrown his cassette tapes, but also suffers megalomania as his office fills with big hard disks. In the first of a series of special product surveys we'll be conducting this year, Les looks at the hard disk market with some sound advice on why and how you should buy yours.

I CAN STILL remember the tremendous sensation of relief I felt when I finally got floppy disk drives for my system. For a couple of years prior to that I'd been using cassette tape for storage, and I had become only too aware of how slow, inconvenient and unreliable that was.

When I got my floppy drives, the whole nature of my computer changed. I had thought at first of disks as just being a faster means of loading programs, but they are really much more than that; they provide the ability to do a lot of things that are simply not possible with tape – like random access to files, for example, and loading program overlays.

It didn't take me long to realise that I could never go back to tape; it was just too crude and primitive.

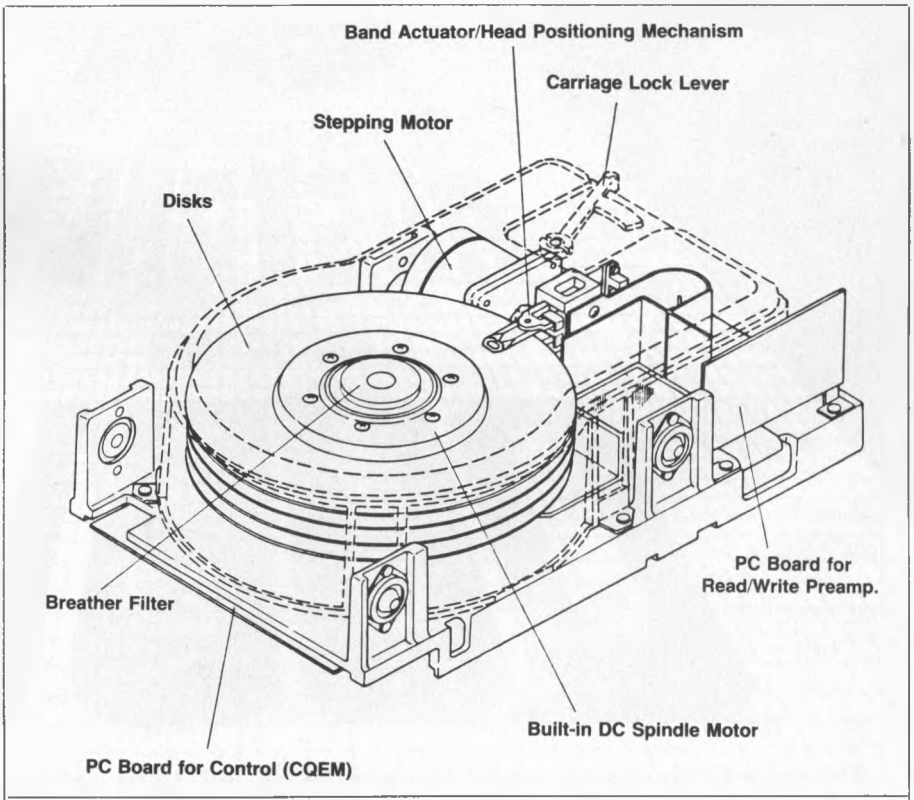
A similar experience awaits those who add a hard disk to their computers. Hard disks aren't just bigger and faster than floppy disks; there's a qualitative difference too, and it will change the way you work.

But first, what is a hard disk? Floppy disks are so named because they are thin and flexible, but with most hard disk units you can't even see the disk. However, inside the unit there is, as you might expect, one or more metal – that is, non-flexible – disk platters.

The rigidity of the disk makes possible disk head positioning with much greater precision, and this in turn enables greater recording density. While most floppy disks have 40 or 80 tracks, hard disks typically have several hundred.

Because of the thinner track laid down by the read/write head, and because the head is much smaller, hard disks are much more susceptible to damage by dust particles. For this reason, the older removable disk packs found on minis and mainframes are normally stored in dust-proof containers, and most hard disks used on micros are completely sealed and are not removable.

This technology was pioneered by IBM. The major problem with removable disk packs was that dust could enter through the hole left for the disk heads. The solution? Don't make the heads part of the drive – instead, seal the heads into the disk pack so that it is completely dust-proof, with only an electrical connection to the drive. Thus, each disk pack has its ▶



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HARD DISKS

own heads sealed inside, a technique known as Winchester technology.

Typically, a hard disk unit has two or more platters, increasing capacity at little extra expense in electronics and mechanicals. Several sizes of disk units are available, ranging from 35 cm down through 20 cm, 13 cm and 9 cm, with capacities from 5 Mbytes up to 500 Mbytes or more.

We've been relying on hard disks in our office for some time now, on several of our machines, and have been trying out a couple of hard disks on the PC. It's been an interesting experience, in several ways.

Who Needs A Hard Disk?

What are the advantages of hard disks over floppies? Why should you buy one? Here are the answers, based on our experience.

First of all, capacity. There's nothing quite like having 35 Mbytes on-line on your PC; megalomaniacs love it! It makes large databases possible, although sometimes it would be nice to have more horsepower in the processor to cope with those large files.

Under recent operating systems like DOS and Concurrent CP/M, files as large as the disk capacity are possible, opening up new applications in commercial accounting, research databases, document archiving and the like. Bear in mind, though, that no hard disk is ever big enough, and what you conservatively estimated would be twice as big as you needed for two years will fill up in two months.

Next, speed. Not all hard disks are that much faster than floppies; in fact, I have seen hard disks that are slower. However, on average, hard disks return a three- to ten-fold improvement in performance over floppy disks. As a guide, check the organisation of the disk controller. Some manufacturers package the disk controller in the disk box, with just a simple parallel port in the computer linking it to the disk controller. Others provide a higher performance disk controller in the computer itself, often utilising direct memory access for faster data transfers. The complexity of the interface card is the clue to which kind you're looking at.

Perhaps the major benefit for many users is the elimination of 'floppy swapping'. First you want to run Lotus 1-2-3, then Multimate, then dBASE – on a floppy system this involves lots of searching for and re-filing floppy disks, since the PC's disk capacity is not sufficient to keep all of these applications on a single floppy.

But with a hard disk, you can fit all of these programs and more, and have them all permanently available. This eliminates the need to shuffle floppies around, reducing the risk of accidental damage and lost files.

Copy Protection Strikes Again .

This is not always possible; many programs are copy protected and require the user to insert the master diskette into drive A: when the program is first started, which is yet another reason why I object to copy protection. Of course, you can still have all the various files which make up a complex program like Lotus 1-2-3 on the hard disk, saving some of the disk shuffling; but you still have to locate and insert the 1-2-3 master to get going.

Of course, there are ways to get working copies of 1-2-3 onto a hard disk by disabling the copy protection, ▶

Table 1. Advantages of hard disks.

Capacity
Speed
No more 'floppy swapping'
Simplified software maintenance
Reliability
Can support multi-user operation

Table 2. Disadvantages of hard disks.

Cost
Fragility
Vulnerability
Security
Backup difficulties

Table 3. Comparative features of hard disks.

Capacity
Speed
Cost
Operating systems supported
Backup support
Ability to logically partition physical disk
Internal Diagnostics

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but we won't talk about that . . . I was, incidentally, glad to see that Ashton-Tate has announced a new copy-protection scheme for dBASE III and Framework which allows their operation from a hard disk.

Another benefit of hard disks is reduced software maintenance. Some programs have a habit of finding their way onto almost all your working disks in a floppy-based system. WordStar, for example, is on my writing tools disk, plus various programming language disks and other places. If I want to upgrade to a new version of WordStar, I'll have to check all my disks to find the copies of WordStar and replace them.

With a hard disk system, everything is on the hard disk: writing tools, compilers, databases, you name it; and only one copy of WordStar is required. Upgrading is much easier.

Another major benefit is the higher reliability of hard disks. Because they are sealed units, because they can't be left lying about to fall foul of coffee spills and cigarette ash, hard disks suffer one-tenth the errors of floppy disks. This is important for many applications where data integrity is particularly important, such as accounting systems.

Finally, hard disks are essential if you wish to support multi-user operation on a microcomputer, because floppy disks just aren't fast enough, nor do they have enough capacity for two users simultaneously. As I write this (for reasons which will become clear a little later) it's on a floppy-only multi-user system from which I have evicted the other users. Without the hard disk, multi-user operation is possible but no pleasure.

Do hard disks have disadvantages? Yes, they do, and several – though not sufficient to outweigh the considerable advantages.

And Now, The Bad News

First, there's cost. There ain't no such thing as a free lunch. Hard disks cost from $2000 to $12,000 or more, depending on capacity and options such as tape backup. That's more than most PCs cost.

Next, fragility. I know there are portables with built-in hard disk drives, but I wouldn't really contemplate sending one of these as airline baggage or air freight as I do with my floppies-only PC. Hard disks are fragile, and once installed should be moved as little as possible. If they must be moved for any distance, the heads should be locked into position (there's usually a little lever to do this) and the drive re-packed in its original shipping carton. Even then it should be treated like a carton of eggs.

Associated with fragility is vulnerability. By this I mean that when a floppy falls over, you only lose 360 Kbytes or so of files, but when a hard disk goes, you've lost a lot more. It's not the disk that's vulnerable; it's you, since all your eggs are in one basket.

I mentioned above that I was writing this on a floppy-only multi-user system: Cassius, our Compupro. Actually, I'm re-writing it; the first attempt was on the hard disk when it decided to crash yesterday afternoon, and I hadn't yet backed it up. A perfect example of Murphy's Law: the disk fell over at about 5 pm, just before I would have backed it up as a matter of routine – timed to cause maximum damage. A dedicated team of surgeons is now operating on it at the CompuPro Systems Centre, Automation Statham, and it will be back before long, but probably minus the files we hadn't backed up.

Another vulnerability factor affects multi-user systems and hard disks which act as network file servers: when they crash they affect several users, causing maximum disruption. A regular backup routine is therefore essential . . . I must try to think of one for our office!

This leads me to the next major problem, backup. The simplest form of backup, which requires no additional hardware, is backing up onto floppies. However, it takes an awful lot of floppies to unload a hard disk, and it

Comparative Table of Hard Disks

Product	Sizes of Fixed Disks	Sizes of Remov. Disks	Combinations Fixed/Remov.	Hardware
ACT Hard Disk	5, 10, 15, 21 21 & 31 Mbytes (Formatted)	5 Mbytes	Any combination	Apple, NEC APC, IBM Kaypro, Osborne etc. 35 diff. machines
Tallgrass Hard Disk Systems	12, 20, 35 & 70 Mbytes	NONE	NONE	IBM PC and compatibles
Sysgen Hard Disk System	20 & 40 Mbytes	NONE	NONE	IBM PC and compatibles
Everex Hard Disk Systems	10 & 20 Mbytes	NONE	NONE	IBM PC and compats.
Corvus Hard Disk	-126 Mbyte	NONE	NONE	IBM PC and compats. Apple II/III, Mac. DEC, Olivetti M24
Davong Hard Disk System	5, 10, 15, Mbytes	5 Mbytes	N/A	Apple II/III, Osborn IBM PC and compats.
Corona Hard Disk	10 Mbytes	NONE	NONE	IBM PC and compats.

is the consummate exercise in floppy swapping, which we are trying to avoid. Backing up an IBM XT, for example, takes 30 pre-formatted disks and a free afternoon.

The problem is complicated by the fact that some files are larger than the capacity of a floppy, and will therefore have to be split up by the backup utility program. Restoration of the disk contents has to be done in the correct order and the whole thing is horribly messy.

Back To Tapes?

The best solution is the use of a tape drive. Early streaming tape drives simply copied out the complete image of the disk as one file to tape, taking about ten minutes for the job. The problem comes when one file is damaged. How do you restore the old version from the tape backup without overwriting the other files which have been correctly updated since the backup? You can't.

Recent tape units have allowed back-up on a file by file basis which, while slower, is much more versatile.

If you do have a crash when you have no recent backup, the chances are that utility programs like DU (Disk Utility, from the CP/M Users Group) and the Norton Utilities won't work on your hard disk, making disaster recovery more difficult or impossible.

You can probably guess the moral to this tale: back up frequently and live happily ever after.

One final concern with hard disks: security. If you have sensitive data on a floppy, you can always lock it away in a drawer or a safe. You can't do that with a hard disk. The problem becomes particularly severe with multi-user systems and networks. After all, if a stranger sits down at your PC, you know they're up to no good, but on a network people can browse through your files from their own terminal without occasioning suspicion. This is why operating systems like Concurrent DOS, which provide password protection on files, are a better prospect for hard disk – particularly multi-user – operation.

What should you look for when comparison shopping for a hard disk? The major things to look for are capacity, cost and then the provision of backup facilities. Does the unit include a streaming tape backup unit? What software is provided for backup purposes?

You might also want to check whether the disk can support multiple operating systems through partitioning, in the same manner as the IBM XT. This allows part of the disk to be allocated to PC DOS and part to CP/M or Concurrent, providing greater flexibility.

Another form of partitioning that can be important is splitting the one physical disk drive into multiple logical drives. For example, a Tallgrass 35 Mbyte disk is typically split into five 7.12 Mbyte logical drives. This can be very important if vulnerability is a concern: if your hard disk is just one logical drive, any directory damage will wipe out the entire disk; but if it's partitioned like the Tallgrass example above, you might only lose one-fifth of the disk contents.

Some disks have internal diagnostics; for example, the Rodime drive used in our Compupro flashes messages in a binary adaptation of Morse code to signal problems like speed variations.

Is It Worth It?

Overall, the advantages of a hard disk far outweigh the downside risks (to coin a phrase) and I would hardly consider buying a business or professional PC without one.

Footnote: by the time I'd finished rewriting this article, our CompuPro hard disk was back in working order . . . I needn't have rewritten it. I think Murphy might have been watching over me again. ❑

Operating Systems	Backup Facilities	Backup Indiv. Files Yes/No	Partitioning of disk	Pricing Rec retail	Distributor
PC-DOS MS-DOS CP/M	Floppies or Cartridge	YES	YES	From $3295 To $10,000 (inc. tax)	ACT 75 Willoughby Rd, Crows Nest 2065. Tel: (02) 439 6500
PC-DOS MS-DOS	Streaming Tape	YES	YES	From $4990 To $11,343 (inc. tax) (Disk & Tape)	Tallgrass Technologies Suite 12, 50 Great North Rd Five Dock 2046. Tel: (02) 712 2010
PC-DOS MS-DOS	Streaming Tape	YES	YES	20 Mbytes $4950 ex. tax	Imagineering 3/579 Harris St, Ultimo 2007. Tel: (02) 212 1411
MS-DOS, PC-DOS CP/M-86	Streaming Tape	YES	NO	10 Mbytes $1980 ex. tax. 20 Mbytes $2495 ex. tax	Imagineering 3/579 Harris St, Ultimo 2007. Tel: (02) 212 1411
MS-DOS, PC-DOS UCSD p-system Apple-DOS, CP/M Pro-DOS	100 Mbytes or 200 Mbytes	YES	YES	5 Mbytes $2795 ex. tax. 20 Mbytes 45 Mbytes $6950 ex. tax	Horizon Computers 7-9 Merriwa St, Gordon 2072. Tel: (02) 498 6611
PC-DOS, Davong Multi-User O/S	18 Mbyte Cart. or 5 Mbyte remov.	YES	YES	N/A	Imagineering 3/579 Harris, Ultimo 2007. Tel: (02) 212 1411
PC-DOS	Floppies Streaming Tape	YES	YES	$7595 inc. tax	AWA Data Proc. Syst. Div 132 Arthur Street North Sydney 2060. Tel: (02) 922 3300

Product	Sizes of Fixed Disks	Sizes of Remov. Disks	Combinations Fixed/Remov.	Hardware
Saturn Hard Disks	5, 10, 15, 20 32 & 40 Mbytes	5 Mbytes	Any combination	IBM PC and compats.
Genie Hard Disk	5, 10, 15, and 20 Mbytes	5 Mbytes	Any Combination	IBM PC and compats.
Sharp MZ1F10	10 Mbytes	NONE	NONE	Sharp MZ5500, MA5600
Daneva W3500 Hard Disk	10, 15, 24, 43 60 Mbytes	NONE	NONE	Daneva W3500 only
Memotech 512	5, 10, 20	NONE	NONE	Memotech MTX 512 FDX System
Challenger 10Mb Hard Disk Sub System	10, 15, 21, 33	NONE	NONE	Challenger IBM compatible board, with a hard disk ROM on it
Sunol Hard Disk Systems	10, 16, 25, 40 65, 92 & up to 368	NONE	Different combinations	IBM compatibles Apple IIc Macintosh, Lisa Apricot, Sirius, NEC, APC, Toshiba T300 Epsom, Osborne Most Z-80
IMS International Hard Disk Sub Systems	13cm, 12, 24, 40, 110, 140 20cm, 40, 85	NONE	NONE	5000 Series Compouters 13cm only 8000 Series Computers 13cm or 20cm
Microbee	13cm, 10Mb, 20Mb	T.B.A.	NONE	Microbee disk Models 13cm, 9cm
Rodime	13cm, 10, 20, 40. Formatted 9 cm, 5, 10 Formatted	NONE	NONE	All Systems using SEAGATE ST 506 compatible Drives Industry Standard
Shugart Hard Disk Drive SA 712 Slim Line	10Mb Format	NONE	NONE	IBM & compatibles
Mini Scribe 3212	10Mb Format.	NONE	NONE	IBM & compatibles
Jo Tech	5Mb Formatted 10Mb Formatted 5Mb Upgrade Due 4/85	5Mb 10Mb	5 Fixed 5 Removable 10 Fixed 10 Removable	IBM & compatibles
Quble Hard Dsk	10/20 Mb internal	NONE	NONE	IMP PC I & II, IBM Portable, COMPAQ, Olivetti M24 TAVA, LINGO, COMAX, COLUMBIA
Sysdyne! Hard Disk	10 Mb	NONE	NONE	IBM PC & compats.

Operating Systems	Backup Facilities	Backup Indiv. Files Yes/No	Partitioning of disk	Pricing Rec retail	Distributor
MS-DOS, CP/M	Cartridge	YES combination	YES	POA	Ampec Electronics 21 Bibby Street Chiswick 2046. Tel: (02) 712 2466
PC-DOS, CCP/M-86 CP/M-86 UCSD p-sys	Cartridge	YES	N/A	N/A	E.D.P. Imports 12 Garling Road Marayong 2148 Tel: (02) 671 5800
CPM-86, MS-DOS	Floppies	YES	NO	$3250 (inc. tax)	Sharp Corp. of Aust.P/L 64-72 Seville St, Fairfield 2165 Tel: (02) 728 9111
CPM	Floppies	YES	YES	$2999 to $7299 (inc. tax)	Daneva Aust. Pty. Ltd. 66 Bay Rd Sandringham 3191.Tel: (03) 598 5622
CP/M-80	Floppie Silicon Disk Tape Back-up	YES			Interfaceware PO Box 214 Lindfield 2070. Tel: (02) 46 4374
MSDOS		YES	YES	$2499 10Mb 15Mb $3290 21Mb $3990 33Mb $5250 all incl. tax	Dick Smith Electronics Cnr Waterloo & Lane Cove Roads North Ryde 2113. Tel: 888 3200
CP/M, MSDOS, PCDOS, AppleDOS PRODOS, Pascal, CP/M	21.5 Mbytes Streaming	YES	YES	10 Mb $3439 Up to $11000 for 92 Mb	Austor Micro Systems Level 1, 3 Bruce Street Crows Nest 2065. Tel: (02) 922 2022
Turbo DOS Concurrent DOS	Floppy Disk 45 Mb Streaming tape cartridge 1600 BPI 9-track 5 inch tape back-up	YES 9-track streaming tape	YES; 1-15 logical 1-15 logical part. of each physical drive	$3290 up to $13000	S.I. Microcomputers 5th floor, 23 Berry St North Sydney 2060. Tel: (02) 922 3977
CP/M MSDOS	TBA	YES	YES; Standard 4x2½ Mb. Can be Reconfigured to 1-6	$3995	Complete System Microbee Computer Centres
Industry Standard Operating Systems	Back-up tape Cassette Floppy	YES	YES	13cm models 5 Mb $845 10 Mb $930 20 Mb $1290 40 Mb $1770 sales tax not incl 9cm models 5 Mb $835 10 Mb $910	Datron P/L 79-81 Regent Street Redfern 2015 Tel: (02) 699 4824
MSDOS CP/M 86	Floppy	YES	YES	$1400 plus tax	Deker Business Machines 174 Parramatta Rd Auburn 2144. Tel: (02) 647 2744
MSDOS	Floppy	YES	YES	$1450 plus tax	Deker Business Machines 174 Parramatta Rd Auburn 2144. Tel: (02) 647 2744
IBM DOS MSDOS	Hard Disk 1 fixed 1 removable Patent on Hard Disk protection device	YES	YES	5 Mb $990 ex tax 10 Mb $1390 ex tax	Jo Tech PO Box 203 Hornsby 2077. Tel: (02) 476 4582
MS DOS PC DOS	Floppies	YES	YES	10Mb $1995 in. tax 20Mb $2650 in. tax *(1DIR File Manage ment Software incl	QUBIE 9/62 Blackshaw Ave, Mortdale 2223. Tel: (02) 579 3322
PC DOS, CP/M-86 UCSD p-system	Floppies	YES	YES	$1899	Computerland Australia (All Stores) 1-3 Rodborough Road, Frenchs Forest 2086. Tel: (02) 451 8899

Preliminary Announcement

PC 85 The Conference

Sydney 13th-15th March 1985

With previous speakers of the stature of Don Estridge of IBM and Bill Gates of Microsoft, the Australian Personal Computer Conference has become the definitive event in this field. The line-up for this year's Conference maintains the same high calibre of the people who are directing the personal computer industry. The program is literally crammed with information you simply cannot afford to miss!

Keynote Speakers include:

Benjamin M. Rosen, Chairman, Compaq Computer Corporation
Seymour Rubinstein, Chairman, Micropro International
John Shirley, President, Microsoft

who will be addressing topics such as Industry Directions for 1985; The Implications of IBM's Move into Software; PC Trends in the Corporate Market; and The Ramifications of AT&T's Entry into the Market.

Other important topics include:

Managing PC's in the Corporate Environment
Security and Protection of PCs
Selecting PCs — The Real Issues
Small User Experience
System Development Aids
Micro-Mainframe Connections
Local Area Networks
Dial-Up Networks

Registration Details

Early Bird Registration (before 14th February)	*Normal Registration (after 14th February)*
$395	**$450**

Discounts apply for ACS members and for group bookings of three or more people — contact the ACS for details.

Organised by the Australian Computer Society, NSW Branch, 1st Floor, 72 Pitt Street, Sydney NSW 2000. Telephone (02) 233 7677.

Please enrol me for PC '85 ☐ **Cheque enclosed** ☐ **Invoice my company**

Name: .....

Title: ..... **Bus. Phone:** .....

Company: .....

Address: .....

ACS

The BIT BUCKET

Evan's regular look at interesting new products on the market.

Convict Classification by Computer

By Evan McHugh

It's great to see a tertiary course where the results of students' assignments are of immediate benefit to the rest of the community. Students from the Mitchell College of Advanced Education's General Primary Course were responsible for the creation of the Historical Database, which lists details of convicts who absconded during the first three months of 1838.

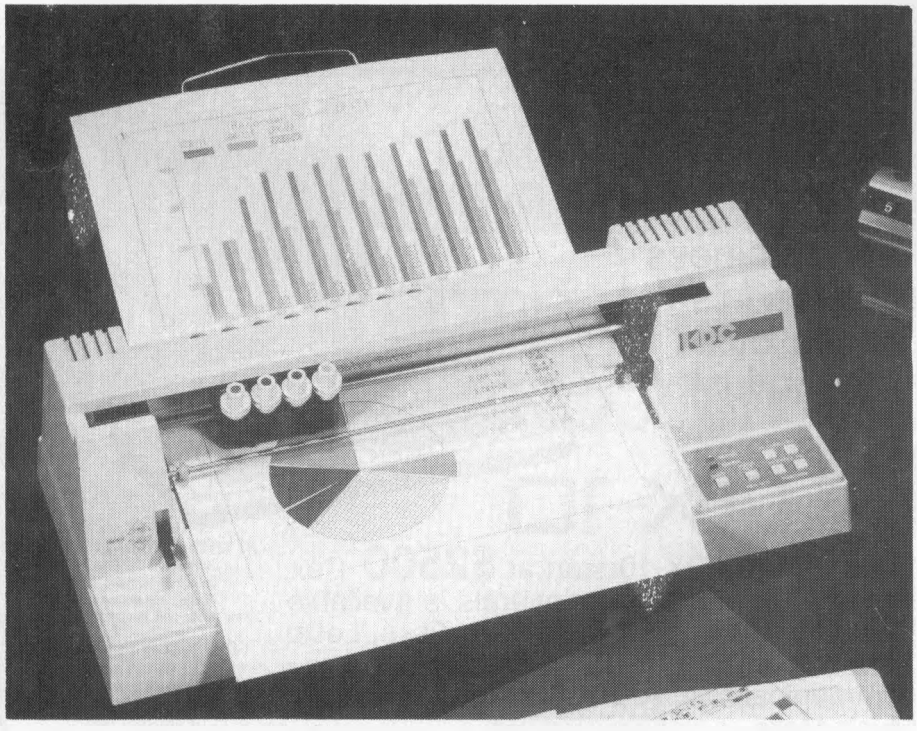
The database has been constructed with primary and secondary students in mind, so they can access the database by themselves to obtain information for research assignments.

There are actually two databases, the convicts absconded and the convicts' physical features databases. The first lists the convict's name, sex, age, year of arrival in Australia, native place, trade, from whom and from where escaped. The convict physical database lists name, age, sex, native place, height, complexion, hair colour, eye colour and trade. The information for the databases was obtained from wall charts displayed in courthouses, police stations and other public places at the time of the escapes.

Users are able to add and remove records from the database, modify details, graph values, print results, search and sort on each category. The software that lets you do this is menu-driven in most instances, with help screens available and plenty of suggestions on how to go about using the function you want.

The database comes with a handbook which gives background to the history of the convicts and their absconding, and instructions on how to use the database. It includes suggestions on what kinds of projects students might undertake using the database.

Copies of the database and documentation are available from the New South Wales Computer Education Group. Members supplying their own disk pay $3 and non-members not supplying a disk pay $9. The database is currently available for the Apple II.

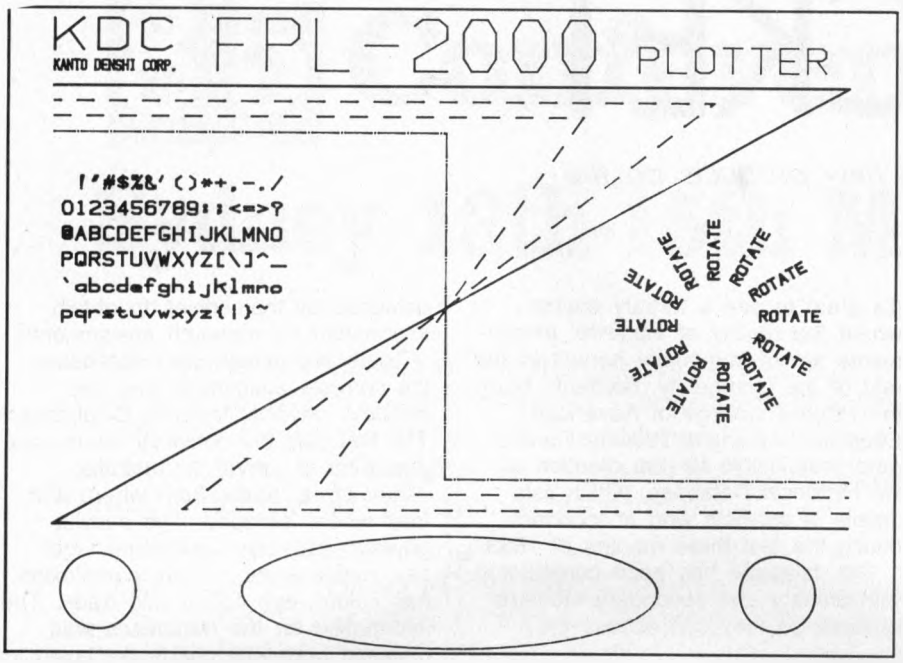


Low-Cost Plot

Plotting statistical information or drawing computer art usually involves an expensive plotter. However, costs in this area of the market are falling, to the point where it is now possible to buy a plotter which produces high-quality work for around $1000. One such plotter is the FPL-2000 from Ampec Electronics.

The FPL-2000 is a compact, single-sheet, four-colour plotter with the pens mounted on a single printhead and activated individually by a spring mechanism. Changing pens is fast because you don't have to put one pen away before starting with the next. Pens supplied are water-based blue, green, red and black.

The plotter operates by moving the printhead on one axis while two rollers move the paper on the other. The only problem with this arrangement

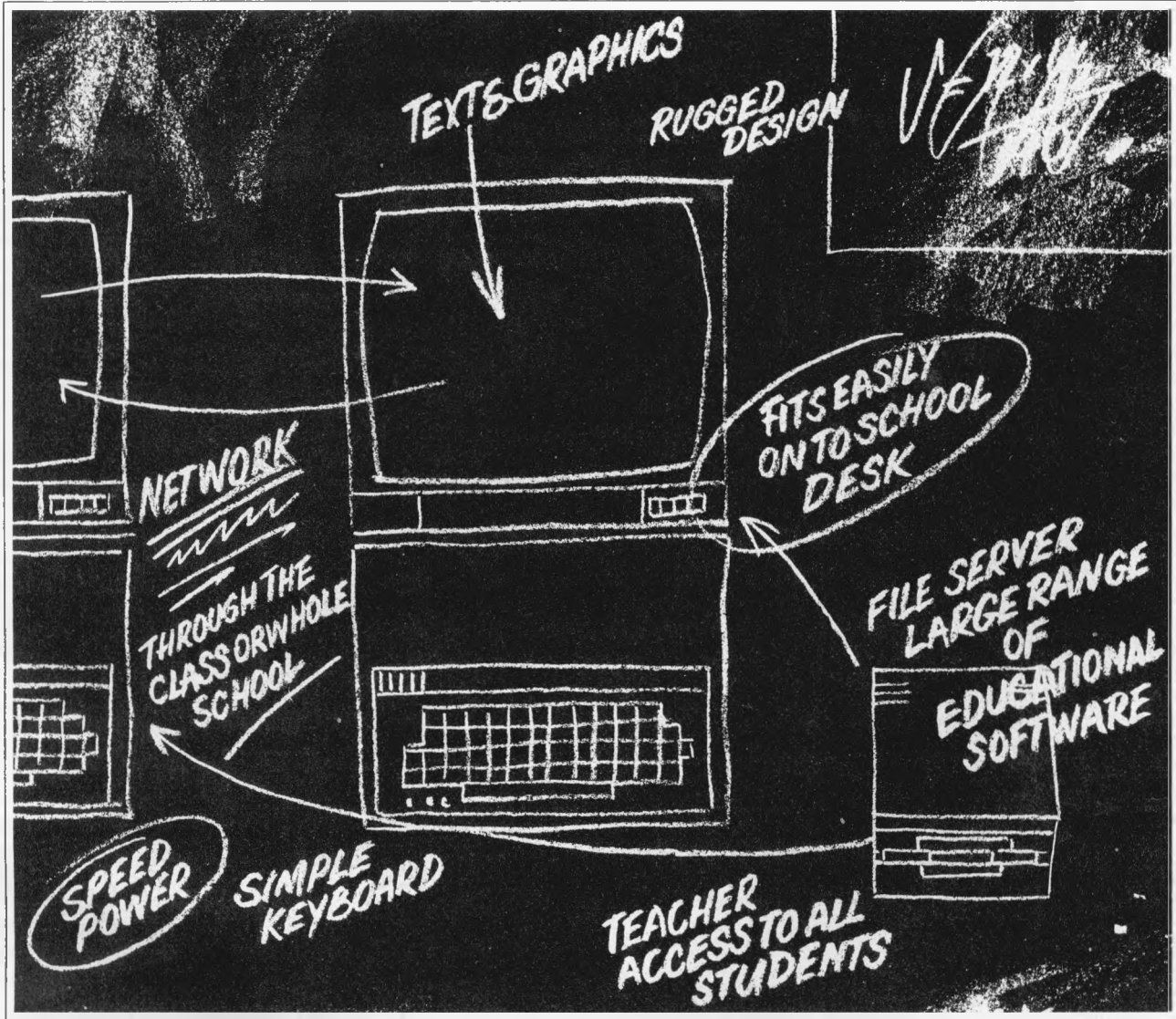


is that if the paper is too thin it may twist and get mangled in the mechanism. This won't happen if you are a bit discerning in your choice of paper.

The FPL is a compact device: the maximum paper size it will accept is A3.

The plotter comes with RS232 and parallel interfaces as standard. It has 44 drawing commands which allow you to draw circles and ellipses, continuous lines and various types of broken lines, and to print the full ASCII character set. The step size is 0.1 mm and the pens move at a speed of 200 mm/sec in the axial direction and 280 mm/sec at 45 degrees.

The FPL-2000 costs $850 plus tax, which represents good value and a comfortable entry point for people interested in plotting. It is available through Jim Bailey at Ampec Electronics, 21 Bibby Street, Chiswick 2046; phone (02) 712 2466.



The only computer that was designed in a classroom, not a factory.

If you want to find out how suitable a computer is for your school, ask where it was designed.

One brand, you'll find, was designed in a garage.

Most others came into being in factories.

Only one computer, the BBC micro, was actually created in a classroom.

The classroom, by the way, was at Cambridge University.

And leading the design team were those masters of educational television, the British Broadcasting Corporation.

Consequently, the BBC is one computer that adapts perfectly to the classroom.

Because it is one computer that doesn't have to adapt.

A whole bank of them can be linked together (up to 254 in fact) with the teacher (master station) in full command of the class.

The BBC computer is so simple to use that new students can make immediate progress.

At the same time, for advanced students, the BBC expands to encompass the most complex and esoteric realms of computer wizardry.

Understandably, the BBC is chosen by over 80% of British Schools and is already enrolled in over 1,000 Australian Schools.

In fact, it is now recommended by seven Education Departments in Australia.

After all, that's precisely what it was designed for.

The BBC school computer.

For more information on the BBC microcomputer and the new compact version, the Electron, send this coupon to: Barson Computers Pty. Ltd. 335 Johnston St., Abbotsford, Victoria 3067, or 7 West St., North Sydney 2060. Or phone Barson Melbourne on (03) 419 3033 or Sydney (02) 957 2588.

Name: .....

School: .....

Address: .....

Postcode. .....

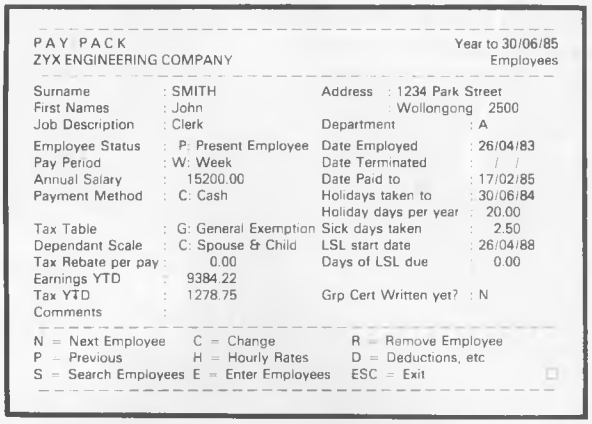
BARSON COMPUTERS

Pay-Pack Payroll

One of the major problems faced by many small Australian businesses is the lack of good-quality software to suit their specific needs.

Usually, the available products are written for larger businesses, and carry matching price tags, or they are written overseas and are not suited to Australian conditions.

Nowhere is this problem more evident than with payroll packages. There is little enough software in this category and most of that isn't tailored for the Australian market. Enter Pay-Pack from Custom-Made Software, a cost-effective package written in Australia with Australian businesses in mind.



```
PAY PACK                                        Year to 30/06/85
ZYX ENGINEERING COMPANY                          Employees

Surname              : SMITH          Address     : 1234 Park Street
First Names          : John                       : Wollongong  2500
Job Description      : Clerk          Department  : A
Employee Status      : P: Present Employee  Date Employed      : 26/04/83
Pay Period           : W: Week        Date Terminated  :  /  /
Annual Salary        :  15200.00      Date Paid to     : 17/02/85
Payment Method       : C: Cash        Holidays taken to: 30/06/84
                                      Holiday days per year : 20.00
Tax Table            : G: General Exemption  Sick days taken  :  2.50
Dependant Scale      : C: Spouse & Child     LSL start date   : 26/04/88
Tax Rebate per pay   :    0.00        Days of LSL due  :  0.00
Earnings YTD         :  9384.22
Tax YTD              :  1278.75       Grp Cert Written yet? : N
Comments             :

N = Next Employee    C = Change          R = Remove Employee
P = Previous         H = Hourly Rates    D = Deductions, etc
S = Search Employees E = Enter Employees ESC = Exit
```

Pay-Pack was written by mathematician and economist Dr Geoffrey Lewis, and is suitable for businesses with between three and 250 employees. The package lets you keep details on all employees, search and add new employees, and allows for casuals. Termination of employment can also be taken into account.

Payments can be described in terms of up to 100 hourly rates, which are updated across all employees if the rates change. Each employee can have up to twelve deductions or deposits, and one-off pay adjustments are also allowed for. Payments can be made in any combination of monthly, fortnightly and weekly pay periods. The system lets you edit each employee's information, to allow for any processing exceptions.

Pay-Pack will also let you perform a variety of pay runs, including general, individual, termination and holiday runs. Documentation for the system covers all details of the package and assumes no prior computing knowledge. The software itself supplements the documentation by providing help messages and menus of choices in the lower three lines of the screen.

For more information on Pay-Pack, contact Custom Made Software at 2 Chatham St, Randwick 2031; phone (02) 399 8520.

Good students can learn anything. As long as they know their BBC.

Obviously, every student lucky enough to have access to a BBC computer is going to learn about computers.

But that is not the only subject they will have at their fingertips.

For the BBC school computer can enhance virtually any subject on the school curriculum.

Hundreds of educational programmes have been written for the BBC by educators in the U.K.

This material, which is of a singularly high standard, was prepared to achieve a major British Government policy objective of computer literacy in schools.

In addition, a number of State Education Departments in Australia have written a range of curriculum specific software to plug any cultural gaps.

To simplify the learning process (not to mention the teaching process) the BBC system allows each student in the class to progress at his or her own pace.

Unlike the traditional classroom, no one is held back by the other students or, conversely, left behind.

Even the language of the computer, BBC Basic, is easier to operate so students can begin computer programming much earlier.

In short, the BBC is the computer for learning.

And once again, the British Broadcasting Corporation has helped make the learning process a pleasure.

The BBC school computer.

For more information on the BBC microcomputer and the new compact version, the Electron, send this coupon to: Barson Computers Pty. Ltd. 335 Johnston St., Abbotsford, Victoria 3067, or 7 West St., North Sydney 2060. Or phone Barson Melbourne on (03) 419 3033 or Sydney (02) 957 2588.

Name:

School:

Address:

Postcode:

BARSON COMPUTERS

A Chair with a View

Our regular readers will remember Richard Pakalnis. Richard used to write the Microbee column before Mike Newnham took over, and he was also famous as our advertising manager. Well, he's gone on to better things as the administration manager for Federal Publishing. One of his duties is to supervise the purchase and repair of office furniture, and make sure we're all comfy.

As it happened, my chair, at which I normally sit when churning out such entertaining copy for *Your Computer*, was broken. and I was sent to Big Richard for help.

"Fix!" I said.

"Tomorrow!" sang Richard. And the next day a repairman took my chair away.

"When do I get my chair back?"

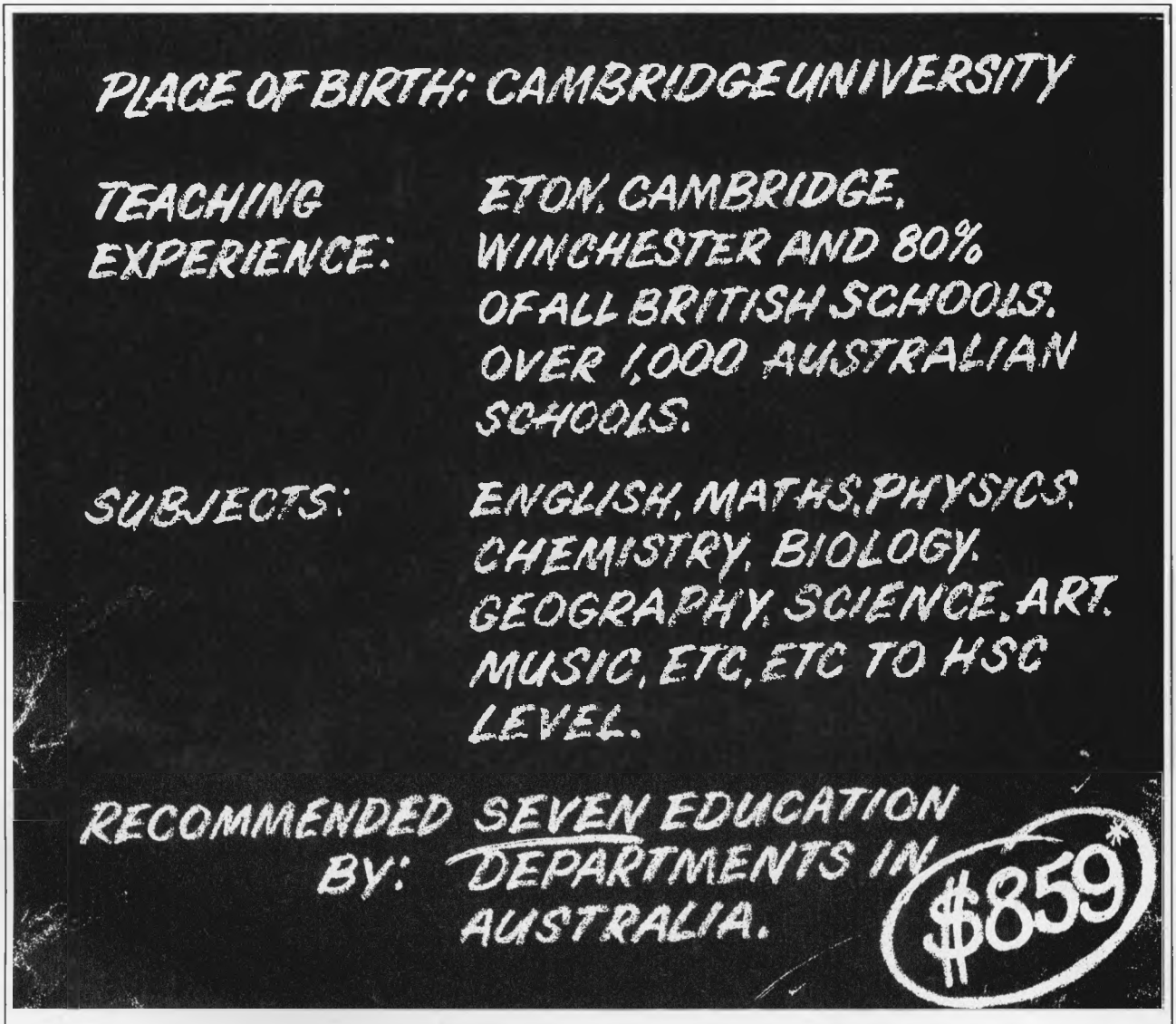
"Two weeks," Richard smiled. I was flabbergasted. Back in the *YC* part of the building I started haranguing people, "Someone get me a chair."

"No problem," says Andrea Beaty (another ad type), "how about a gas-operated ergonomic chair?" And *voila*! This gas-operated job from Sylex appeared.

It is adjustable in three ways. First, the back can be moved in and out; a manual operation requiring undoing and doing up a screw. The same applies to the up and down adjustment of the back. However, the seat and back can be raised and lowered as a unit, using the gas-operation principle. You just pull a lever on the right side and the chair descends. Take your weight off the chair, pull the lever again and it rises. It is a simple matter to adjust the chair to the required height. As a consequence you are more likely to adjust the chair to suit different people and different tasks, resulting in increased staff comfort and reduced fatigue.

If only my old chair would never return!

The Sylex chair comes in berba, brick, natural, charcoal, black and royal blue. It has a wool covering and five-star base with castors, and costs $199. Enquiries should be directed to Sylex at 1 Short St, Auburn 2144; phone (02) 647 2888.



With qualifications like these, shouldn't this teacher be at your school?

Only one teacher in the world comes with credentials such as these.

The teacher is a computer.

The BBC school computer.

You'll understand why it's such a good teacher, when you consider those responsible for its education.

The professors from the Computer Studies faculty at Cambridge, for example.

The panel of experts on educational television from the BBC, to name another.

Along with the hundreds of members of the teaching fraternity, both here and in the U.K., who developed the software.

Without doubt, there is no finer educational tool you can give to the teachers at your school.

And certainly, no other teaching system quite compares as far as the students are concerned.

There is, however, one important consideration we have yet to mention.

The price.

What other teacher offers such impeccable qualifications for just $859?

For more information on the BBC microcomputer and the new compact version, the Electron, send this coupon to the Australian distributor, Barson Computers Pty. Ltd.

The BBC school computer.

Post to: Barson Computers Pty. Ltd., 335 Johnston St., Abbotsford, Victoria 3067, or 7 West St., North Sydney 2060. Or phone Barson Melbourne on (03) 419 3033 or Sydney (02) 957 2588.

Name: _____

School: _____

Address: _____

_____ Postcode: _____

BARSON COMPUTERS

*$859 tax free price to schools. $999 recommended retail

Dow McIntosh & Kelly BAR 052 R

Competition Winner Explains

I AM WRITING concerning the article in the January issue on the 'Great Aussie Software Competition'.

I was very pleased to have been judged the winner of the competition and also very surprised, as I didn't expect my program to be picked ahead of so many other entries. I was, however, quite taken aback to see the sample reports which I submitted with the program also printed in the article, as they carried the names of students attending the college.

Let me make it quite clear the sample reports were just 'mock-ups' – they were not real reports as would be submitted to parents. The sample reports were written by me in the process of debugging the program and, as all programmers will testify, that process can be lengthy and frustrating; after doing this for several hours it becomes increasingly difficult to think of a name to be input to the computer, and the task of writing a comment even more so. Unfortunately, I used real names instead of 'Joe Bloggs' or 'Fred Nurk'.

It is my practice, and that of the school and of all the other teachers, to ensure student reports are confidential. Great care is taken to write a comment that is fair and informative.

I would hope all who read the reports realised their experimental nature from the style. However, I felt I should write in order to explain the situation; I sincerely trust no embarrassment is caused to any of the students mentioned or to the school.

SIMON HISCOX
Wantirna, Vic

MPF 2 Owner in Dire Straits

I OWN AN MPF 2 computer into which I have been trying to load printer driver software. The MPF 2 is a 64K Apple look-alike, made in Taiwan, so the documentation is, at best, sketchy.

My configuration comprises the microprocessor and a cassette drive. I bought an Olivetti Praxis 35 typewriter that has an inbuilt parallel interface. The distributor, Emona Enterprises, sold me a cable and a printer driver software cassette.

I have tried loading the cassette and it gives a syntax error on completion. I then tried using the monitor 'call' routine (in the MPF 2, 'CALL –159') to load the program. This appears to work, but when I try to print from BASIC, it seems the program has not loaded. It prints eight unrecognisable characters (1 per bit) for each character that is to be printed.

It appears the part of memory into which this software has to load is protected, and this status can be changed by accessing a particular location. When I access this location, the screen goes into reverse video and I have to reset the computer in order to continue.

The distributor is unable to help me further, so I wondered if there are any MPF 2 users or user groups using the cassette printer driver software. If there is a fee for this service, I would be happy to pay any reasonable amount.

GEORGE BRIANSKY
North Balgowlah, NSW

If anyone can help, please write to us here at *Your Computer*, or give us a ring. George – if you're still out there, could you please contact us as we've lost your address.

More Ways to Damage your Disks

CONCERNING THE article 'How Vulnerable are your Disks?' in the November '84 issue, I am surprised the author overlooked one major cause of damage to magnetic media – the home hi-fi speaker (and portable cassette players).

Speakers have a very strong magnetic field. I have had the experience of lending a pre-recorded cassette to a friend and receiving it back with one side erased. The cassette was left sitting near the speaker of a portable cassette player which was being used.

The article also overlooked the effect of a phone's bell, concentrating instead on the effect of a phone during conversation. The phone's bell is a strong electro-magnet; if a disk is left near a phone which starts ringing, it is quite possible data will be lost. Perhaps these areas need further investigation.

PAUL OLSSON
Coober Pedy, SA

Threats from a Microbee Fan

I AM VERY disappointed you continue to omit the Microbee column from your magazine. As there are thousands of Microbee owners throughout Australia I would have thought a column for the Microbee would have been a regular monthly feature.

My sole reason for subscribing to *Your Computer* was to learn as much as I could about my machine. If you continue to omit the Microbee column I will have no reason for renewing my subscription next year!

L. RILEY
Banyo, Qld

Hang in there – the Microbee Column is about to reappear as a regular feature, starting with the April issue.

Tallgrass' integrated tape backup – clearing the PC path.

Tallgrass Technologies' hard disk drives with integral cartridge tape backup. They offer serious users of PC's unmatched performance in mass storage, speed, and data integrity together with the highest capacity PC backup system available, integrated for simplicity, speed, and ease of use.

For the serious user, that's the direct path through the PC jungle.

MASS STORAGE. Tallgrass expands the capacity of your PC with hard disk drive/integral cartridge tape back systems in formatted capacities of 12-70 megabytes.

SPEED. The unique Tallgrass on-board buffer greatly increases data transfer rates in comparison to conventional systems – substantially decreasing loading and retrieval times.

DATA INTEGRITY. Tallgrass ensures data integrity with high level error checking and options including duplicate directory, 'read after write' verification, and a dedicated 'head landing' zone that precludes data loss during power downs.

BACKUP. Tallgrass' unique integral cartridge tape backup combines speed with high capacity to encourage reliable routine operator backup of your data.

COMPATIBILITY. Tallgrass systems are fully compatible with a growing list of IBM-compatible PC's including IBM PC and XT, Columbia, Corona/Wordplex, Compaq, Eagle, Olivetti, Panasonic, Pantek, Televideo, and T.I. Professional.

NETWORK READY. Fully compatible with industry standard networks such as PC Net – II and 3 Com, Tallgrass hard disk/cartridge tape systems offer the capacity, speed, data integrity, and backup essential to local area networks.

Since pioneering integral cartridge tape backup systems, Tallgrass has remained the US industry standard. For economy, ease of use, reliability, high speed loading and retrieval, and multisystem compatibility, Tallgrass is by far the best mass storage system on the market today.

Follow the Tallgrass path to your nearest Tallgrass Dealer and transform your personal computer into a powerful data processing system.

AVAILABLE FROM LEADING PERSONAL COMPUTER RETAILERS THROUGHOUT AUSTRALIA.

For further information contact
Tallgrass Technologies Australia Pty. Ltd.,
Suite 1/34 East Street, Five Dock, N.S.W. 2046.
(02) 712 2010, 712 2003.

Tallgrass Technologies
Australia

Committed to Memory.

967B/FP/Little

MEGAWORKS™ WITH APPLEWORKS™.

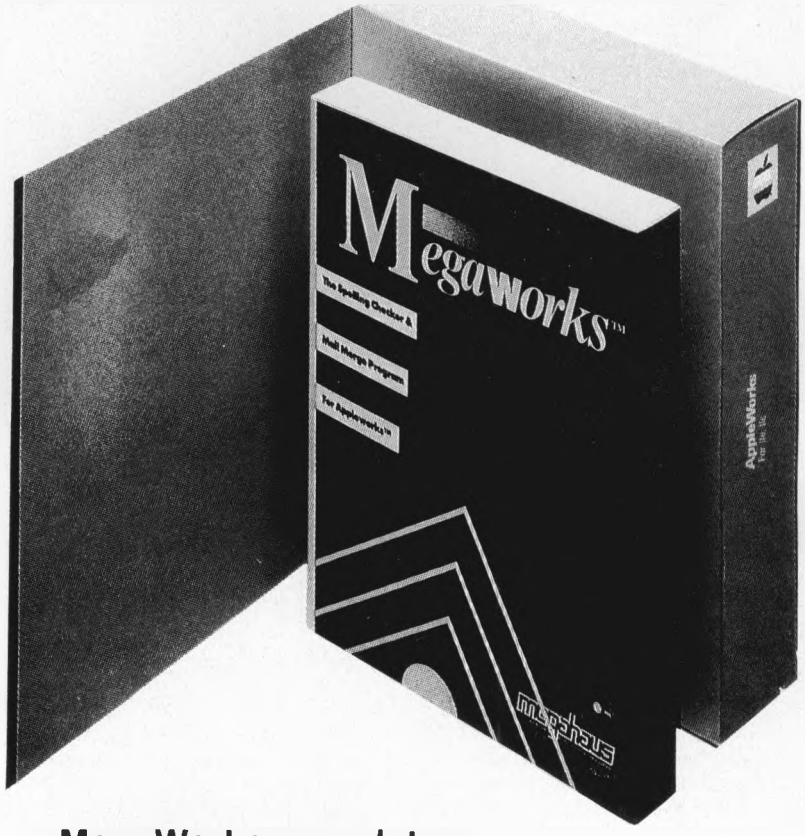
AppleWorks and Apple //e and //c are registered trademarks of Apple Computer, Inc.

You already know AppleWorks™ is the powerful program that combines the three most popular applications for your Apple //e and //c. Its only drawback is the absence of two key functions.

That's why MegaWorks with AppleWorks.

MegaWorks is the mail merge and spelling correction program designed exclusively to complete the AppleWorks package. Your knowledge of AppleWorks makes MegaWorks simple to use. Mail merge lets you print personalized form letters from a single master letter and list. The spelling checker corrects misspelled words in documents and "word wrap" retains its original format, a function unavailable in many popular programs.

The dictionary allows you to personalize your work with the addition of 10,000 words to its 40,000 word library.



MegaWorks completes AppleWorks.

See the complete works for your Apple //e and //c today at your local Apple dealer.

Software Source Pty Ltd

Software Source Pty. Ltd.
P.O. Box 311
Bondi Junction 2022
Phone: (02) 389 6388

YC/385

PROGRAMMER'S WORKBENCH

This month, Les has material of interest to dBASE users, including some special tricks for those using dBASE under MP/M or Concurrent CP/M, as well as a few tips for CP/M 86 users.

RECENTLY I HAD occasion to venture into the insides of dBASE II's index files, and I thought a description of them might help others trying to access them from outside dBASE.

The reason I was delving into the innards of the files was one that is common to a number of systems: speed of printing mailing labels. The problem is particularly acute with systems based on databases like this one:

Name	c	30
Position	c	20
Company	c	30
Suite	c	30
Street1	c	30
Street2	c	30
Town	c	20
State	c	6
Postcode	c	8
Country	c	20

where any of the fields name, position, company, suite, street2 and country can be blank. If they are blank, chances are you (or your client) don't want a blank line in the middle of an address label, so you have to detect blank fields. This is most usually done by a program like the one shown in Listing 1. Because there are 64 different ways of printing a label, there will be 64 stubs for the IF ... ELSE ... ENDIF statements, 63 of which will not apply for a given record. These will be skipped over as the unexecuted parts of IF ... ELSE ... ENDIF statements, which takes considerable time as the dBASE macro preprocessor continues to examine every line in case a macro happens to expand into an ELSE or an ENDIF (something you would never intentionally do, right?). ▶

```
IF name = ' '
  IF position = ' '
    IF company = ' '
      IF suite = ' '
        IF street2 = ' '
          IF country = ' '
            * print street1,town,state,postcode
          ELSE
            * print street1,town,state,postcode,country
          ENDIF
        ELSE
          IF country = ' '
            * print street1,street2,town,state,postcode
          ELSE
            * print street1,street2,town,state,postcode,country
          ENDIF
        ENDIF
      ELSE
```

Listing 1. Address label program with blank line deletion.

PROGRAMMER'S WORKBENCH

Byte	Contents	Meaning
0 - 1	2 bytes	Reserved
2 - 3	16 bit no.	Node number of root node
4 - 5	16 bit no.	Node number of next available node
6	8 bit no.	Length of key (LKEY)
7	8 bit no.	Length of key + pointer (LKP = LKEY + 2)
8	8 bit no.	Max. no. of keys per node
9	flag	0 for character key, non-0 if numeric
10 - 109	byte string	Key expression in ASCII (null terminated)
110 - 511	byte	Garbage

Figure 1. Structure of Node 1 of a dBASE index.

Byte	Contents	Meaning
0	8 bit no.	number of keys in this node
1 - 511	array	keys + pointers

Figure 2. Standard structure of all other dBASE nodes.

Byte	Contents	Meaning
0 - 1	16 bit no.	Pointer to lower level node
2 - 3	16 bit no.	Pointer to record in DBF file
4 - n	char	Key value

Figure 3. Structure of an array entry.

The result of this is a labeling program that can be over a thousand lines long, after you take into account the extra code required to print labels three across. And as a corollary of this, such programs are sssllloowww – we've measured one as taking 45 seconds between printing sets of three labels.

How do you speed it up? There are other ways of writing label printing programs, using macros, but they provide very little improvement. Perhaps an assembly language subroutine called from dBASE could do a better job, but that's a lot of effort to solve one particular problem.

Some time ago, I'd written a PL/I program to read the contents of a dBASE database, examine the structure of the database, and generate a program to access that database. The purpose of this program was for file conversion, but it can also read through databases and list them faster than dBASE can. The only problem is that it reads the database in record number sequence, not in index sequence, and I'd given away accessing the index files as too tricky a problem for the time being.

Here we had the germ of a solution to the label printing problem – use a PL/I program to access the database and print the labels. The form of the program would be the same – lots of nested IFs and ELSEs – but an IF in PL/I compiles to an assembly language jump statement which jumps past the unexecuted code and doesn't waste time trying to interpret it. The result has to be much faster execution speed.

Only drawback: getting at the database in index sequence. This is particularly important because most mailing lists are indexed in either postcode or National Presorting Plan sequence, and printing labels in any other sequence is unacceptable. So the time had come to wrestle with the dreaded index files. As it turned out, it's not as bad as all that.

A dBASE index file is a tree structure (see Figure 1), consisting of nodes which either point to other nodes or to the appropriate records in the database file. Each node is 512 bytes long, and the number of index entries it contains depends on the key length.

However, the first node has a special function. Its structure is as shown in Figure 2.

Byte 6, the length of key, is the length of the key plus the two-byte pointer to the associated record. Byte 7 (LKP) is this length plus the length of the pointer to lower-level node (see below).

All other nodes have the structure of Figure 3, where each entry in the array has the structure shown, which is LKP bytes long.

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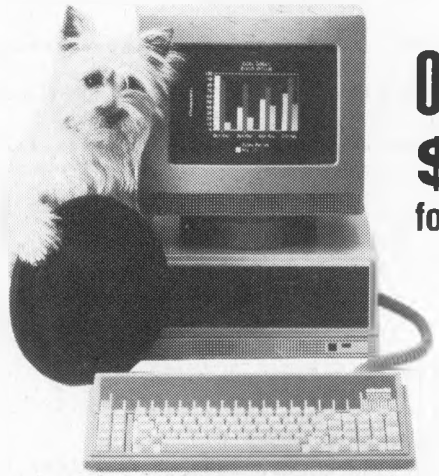

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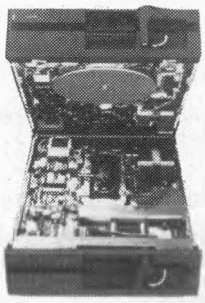

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The basic solution is to read node zero, which contains information about the key lengths, number of the root node, and so on, and then start by reading the root node. This will contain an arbitrary number of key entries, which in most cases will not be valid pointers to the DBF file, but instead will point to other nodes in the index file. If a key entry contains a non-zero pointer to a lower-level node, then the next step is to suspend processing of this node and instead traverse the lower-level node, returning to this one when finished.

If a key entry has a zero pointer to a lower-level node, then it is in fact a valid pointer to the DBF file, and the program prints this out. A node which contains pointers to the DBF file is called a leaf, since it is at the lowest level of each branch of the tree.

Listing 2 is a PL/I program which will traverse any dBASE .NDX file, listing the node numbers, pointers and key values. It was developed firstly while experimenting with this technique for getting at the .NDX files, but I suspect it may also be useful for diagnosing corrupted index files.

If you want a compiled version, the usual arrangement applies: send a blank disk and return paid envelope to Les Bell and Associates, PO Box 297, Neutral Bay Junction NSW 2089 and we'll send it back to you.

Adding CLS to CP/M

One of the nice things about MS-DOS is the number of convenience features built in, particularly for use with batch files. Quite often, in seminars, I'm using large projection TVs to display what's going on on the screen of the PC, and those at the back can't see the bottom of the screen – so I use the DOS CLS command to clear the screen.

I'm currently working on an updated CP/M course (covering CP/M Plus, Concurrent CP/M and other niceties)

```
traverse:
    proc options (main);

/*****************************************************************
*                                                                *
*   Procedure to traverse dBASE II index file extracting         *
*   record numbers                                               *
*                                                                *
*****************************************************************/

%replace
    true by '1'b,
    false by '0'b,
    CLRSCR by '^Z',
    HALF by '^[)',
    FULL by '^[(';

    dcl
        1 record_zero,
          2 reserved fixed binary (15),
          2 root_node_number fixed binary (15),
          2 next_avail_node fixed binary (15),
          2 lkey fixed binary (7),
          2 lkp fixed binary (7),
          2 max_keys_per_node fixed binary (7),
          2 flag fixed binary (7),
          2 key_expression char (100),
          2 garbage (402) char (1);

    dcl node_no fixed binary (15);
    dcl filename char (15) varying;
    dcl index_file file;

    put list (CLRSCR);
    put skip (3) list ('Name of file to traverse: ');
    get list (filename);

    open file (index_file) record input direct keyed
        environment(Fixed(512),Buff(1024)) title (filename);

    node_no = 0;
    read file (index_file) into (record_zero) key (node_no);

    /* Display details from node zero */
    put skip list ('Record zero details');
    call details;

    /* Now traverse the tree */
    call list(root_node_number);

    close file (index_file);

    details:
        proc;

        dcl exp_type  char (7);
        dcl exp_end fixed binary (7);
        dcl pr_key_expression char (100) varying;

        if record_zero.flag = 0 then
            exp_type = 'Char';
        else
            exp_type = 'Numeric';

        /* extract key expression from node */
        exp_end = index(key_expression,'^@');
        pr_key_expression = substr(key_expression,1,exp_end);

        /* Now print the details neatly */
        put skip edit ('Root node number:',root_node_number,
                       'Next available node:',next_avail_node,
                       'Length of key:',lkey,
                       'length of key plus pointer:',lkp,
                       'Max. keys per node:',max_keys_per_node,
                       'Key expression type:',exp_type,
```

Listing 2. The final PL/I version of the dBASE .NDX traverser.

```
                        'Key expression:',pr key expression)
                         (skip,a(27),x(1),f(5),skip,a(27),x(1),f(5),
                          skip,a(27),x(1),f(5),skip,a(27),x(1),f(5),
                          skip,a(27),x(1),f(5),skip,a(27),x(1),a(7),
                          skip,a(27),x(1),a(50));
end details;

list:
   procedure (node no) recursive;

   dcl node no fixed binary (15);

   dcl 1 node,
         2 no of keys fixed binary (7),
         2 stuff (511) char (1);

   dcl key ptr ptr;
   dcl 1 entry based (key ptr),
         2 down pointer fixed binary (15),
         2 record no fixed binary (15),
         2 key char (100);

   dcl (i,j,last char) fixed binary (15);
   dcl leaf bit (1);

   read file (index file) into (node) key (node no);

   /* locate end of valid data in node */
   last char = node.no of keys * record zero.lkp;
   /* extract each key */
   do i = 1 repeat i + lkp while (i <= last char);
       key ptr = addr(node.stuff(i));

       /* if there's a pointer to a lower level, don't print */
       /* the key value but instead output a message and */
       /* call list to traverse the lower node */
       if key ptr->entry.down pointer ^= 0 then do;
           put edit (HALF,'Node No: ',node no,'    Key: ')
               (skip,a(2),a(9),f(5),a(8));
           do j = i + 4 to i + lkey + 1;
               put edit (node.stuff(j))(a(1));
           end;
           put edit (' points down to node ',
               key ptr->entry.down pointer,FULL)
               (a(20),f(5),a(2));
           leaf = false;
           call list(key ptr->entry.down pointer);
       end;

       else do;
           /* print the key value and record number */
           put edit ('Node No: ',node no,'    Key: ')
               (skip,a(9),f(5),a(8));
           do j = i + 4 to i + lkey + 1;
               put edit (node.stuff(j))(a(1));
           end;
           put edit (' points to record ',key ptr->entry.record no)
               (a(20),f(5));
           leaf = true;
       end;
   end;

   /* if this node is a leaf then there's a final pointer */
   /* to the next node with higher key values */
   if ^leaf then do;        /* Catch final node */
       put skip edit ('i = ',i)(a,f(5));
       key ptr = addr(node.stuff(i));
       if key ptr->entry.down pointer ^= 0 then
           call list(key ptr->entry.down pointer);
   end;

end list;

end traverse;
```

```
; CLS.A86 -
  clear screen utility
;
finish  equ     0
conout  equ     2
clear   equ     26
bdos    equ     224

        cseg

        org     0100h

        mov     dl,clear
        mov     cl,conout
        int     bdos
        mov     cl,finish
        int     bdos

        end
```

Listing 3. Clear screen program for terminals that use Control-Z.

and wanted to avoid the problem with CP/M, which doesn't have a CLS command built in. How to get around the problem?

Users of Lear Siegler, Televideo and similar terminals may already have discovered one way around this problem. Simply type a control-Z and then RETURN. CP/M will try to interpret this as a command, decide it isn't valid, and spit it back at you. As ↑Z is the clear screen command for these terminals, the screen will clear, and you'll get a question mark at the top (the remainder of the error message), followed by the A> prompt.

Of course, this isn't terribly elegant, and a better solution would be to write a program to do the job. It's an example of the kind of simple little program that takes almost no effort at all to write yet is very useful.

Listing 3 is a version for terminals which use only a single-character clear screen command – usually ↑Z (hex 1A, decimal 26).

This shows the standard way of writing programs for CP/M-86, and of calling the CP/M-86 BDOS functions. It's so simple you can virtually type in the hex codes for it without having to create an assembly language source file.

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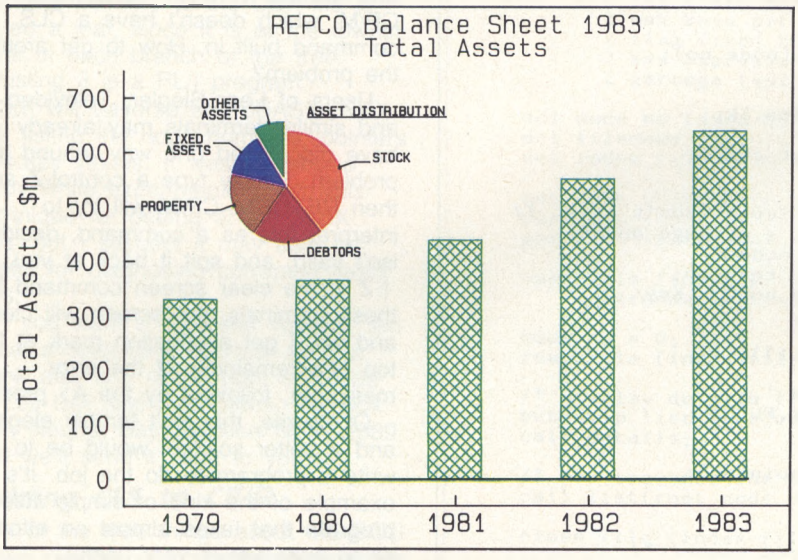

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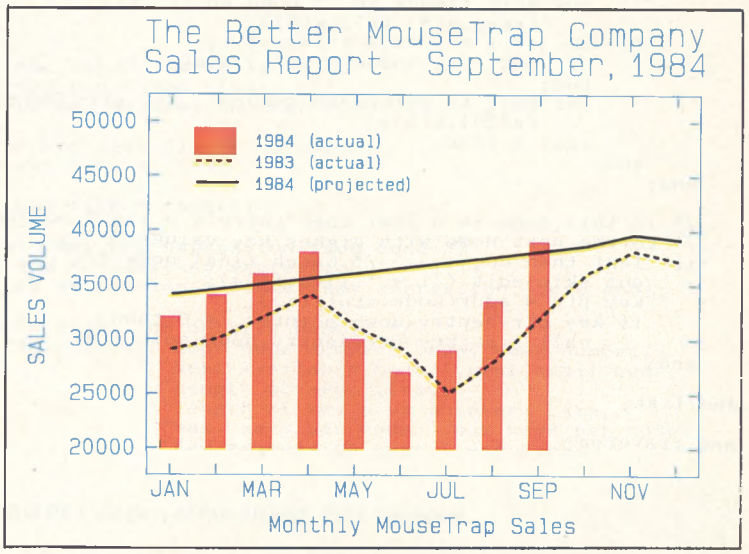

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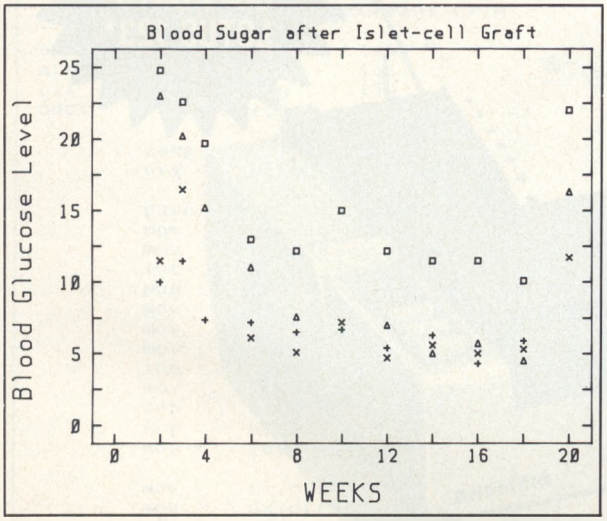

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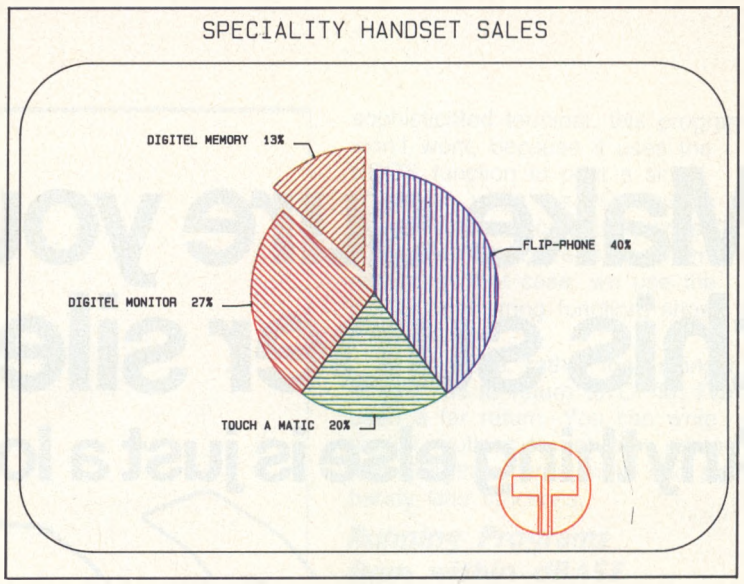

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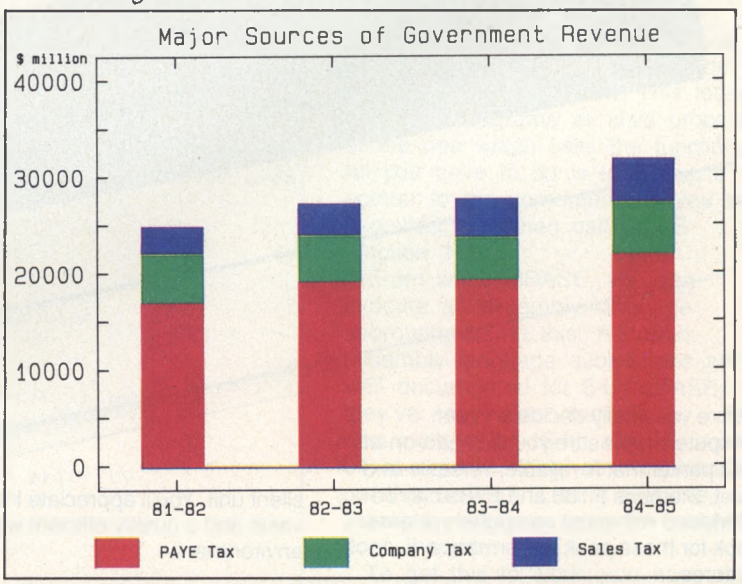

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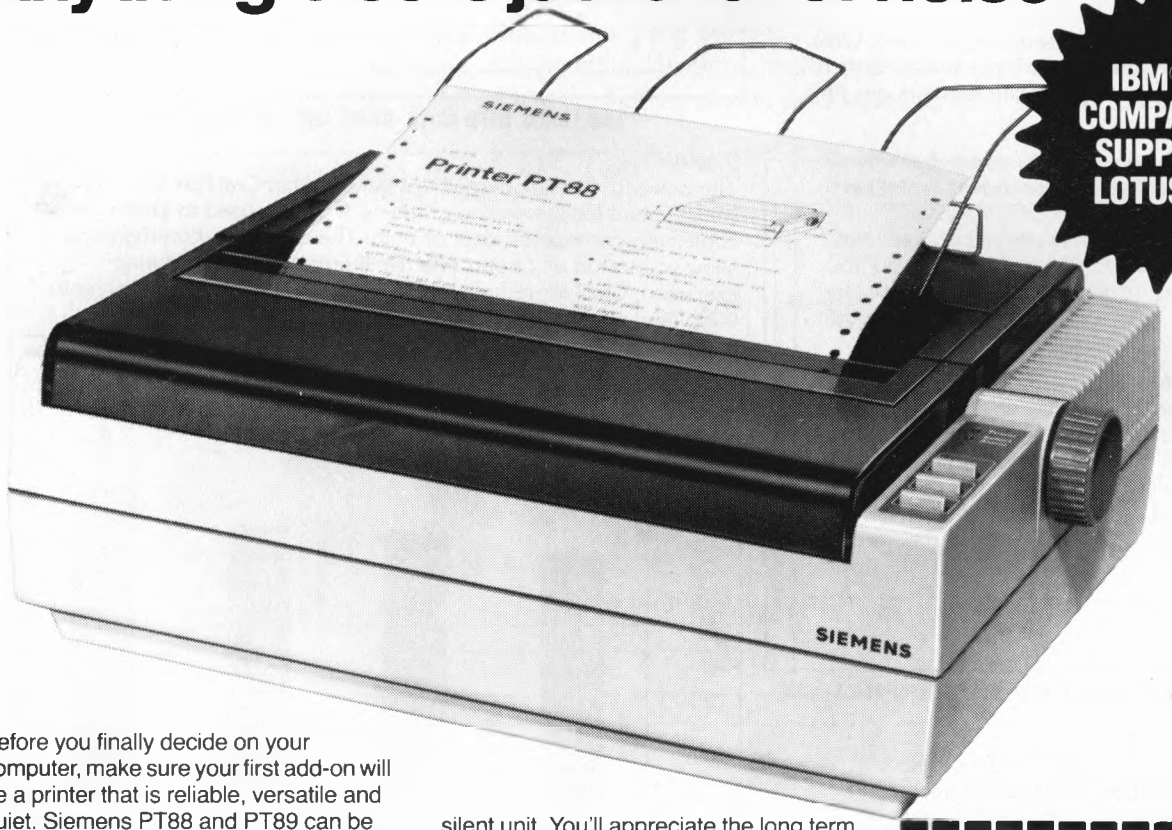

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```
; ibmcls.a86 - clear screen for IBM PC
        cseg
        org     0100h
cls:
        ; clear screen on IBM PC, Hyperion, etc.

        mov     cl,9
        mov     dx,offset msg
        int     224
        retf
endcs   equ     $

        dseg
        org     offset endcs
msg     db      1bh,'E$'
endds   equ     $
        cseg
        org     offset endds

        end
```

Listing 4. Clear screen program for the IBM PC.

```
; dbcmd.a86 - command file to run programs from within dBASE II
; under MP/M-86 and Concurrent CP/M

set priority    equ     145
attach_con      equ     146
cli             equ     150
bdos            equ     224

        cseg
        org     0ff00h

        push    bx              ; dBASE passes parameter address
        mov     cl,set priority ; in bx
        mov     dl,196          ; higher priority than normal
        int     bdos
        pop     bx
        mov     ch,0
        mov     cl,[bx]         ; get length byte
        mov     si,bx           ; copy command string to work area
        inc     cl
        mov     di,offset l byte
        rep     movs    byte [di],[si]
        xor     al,al
        mov     [di],al

        mov     cl,cli          ; call cli function
        mov     dx,offset l byte
        int     bdos

        mov     cl,attach con   ; attach console to process
        int     bdos

        mov     cl,set priority
        mov     dl,200          ; normal user priority
        int     bdos
        ret

l byte  rb      1
command rs      80

        end
```

Listing 5. Assembler program to run child processes under MP/M-86 and Concurrent CP/M.

```
* DBCMD.PRG - start child process under MP/M
poke 65280,83,177,145,178,196,205,224,91,181,0,138,15,139,
     243,254,193
poke 65296,191,43,255,243,164,50,192,136,5,177,150,186,43,
     255,205,224
poke 65312,177,146,205,224,177,145,178,200,205,224,195,0,0
set call to 65280
call command
```

Listing 6. The code from Listing 5 in decimal form in a dBASE program.

sophisticated terminal, this program won't work, because it uses the BDOS function to print a single character, while the PC requires a two-character escape sequence (ESC E) to clear the screen and home the cursor. In that case, we use the BDOS print string function, shown in Listing 4.

In this case, rather than using a BDOS call to return to CP/M, I've used a far return. You can write similar routines to set your printer form length or print width and similar handy little functions.

Running Programs from within dBASE

If you're lucky enough to be running MP/M-86 or Concurrent CP/M, you can run other programs from within dBASE II. This means that you can write menu programs in dBASE, which in turn run WordStar or BASIC or whatever programs you like, or run backup utilities from within your dBASE application.

Here's how it's done: MP/M has a function called the CLI (Command Line Interpreter) function. This loads and runs programs as child processes of the one which calls the function. All you have to do is to set up a pointer to the command line you want executed, and then call BDOS function 150.

From within dBASE, you can execute an assembly language subroutine to do this. Although assembly language subroutines are well documented for 8-bit dBASE, they've never been formally documented for 16-bit dBASE, so a bit of experimenting was required to get this to work. Listing 5 is the assembly language program which does the job.

To get this to work, you have to assemble it, and then take the generated hex code and convert it into decimal. To save you the effort, I've done it for you and put it into a dBASE program (Listing 6).

All you have to do to use this is, in your dBASE program, store your command line in the variable *command* and then DO dbcmd. Like this: STORE 'ws' TO command DO dbcmd and that will do the trick. When you quit from WordStar, the familiar dot prompt will appear or your dBASE program will continue. ❑

After using dBase for some time most programmers come to develop a style for the language, a style which keeps them out of trouble and enables them to read their own code hours after writing it. Here, Les Bell divulges some of the secrets behind his own personal dBase style (sounds intriguing doesn't it?).

GETTING dBEST FROM dBASE Part XI

IN THIS article I'll try to give you some ideas about programming style for dBase, based upon my own approach. Bear in mind, though, that this is only my way of going about it, and programming styles and methodologies are as individual as the clothes we wear. I won't insist, therefore, that this is the best or only way to use dBase (even though I'm convinced it is!).

The first point to notice is that dBase is generally pretty slow in operation, compared with similar programs written in BASIC and particularly those written in compiled languages like CB-86 or PL/I. This is primarily because dBase is an interpreted language, and also because it makes extensive use of disk files and becomes disk bound on all but the fastest hard disk systems.

Speeding it Up

There are things you can do to speed dBase up, and these fall into three categories:

1) design strategies
2) dBase-dependent optimisation techniques
3) trick coding.

Category 1) consists of techniques like minimising use of indexes and not updating indexes at data entry time, but doing batch updates instead. These are intended primarily to minimise disk activity and to shift slow procedures from time when the operator is waiting to time when he/she can be doing something else. These techniques are used at the time the system is designed, and apply not at the code level, but at the system design level – in data flow diagrams and block diagrams, for example.

Category 2) is a variety of techniques which are based on knowledge of dBase's internal operation and which speed the system up by redistribution of files between disks, optimal placement of files on disks and so on. Like category 1), these techniques do not affect the writing of the dBase code. Instead, they are applied after it has been written.

Category 3) comprises tricks like switching to secondary area in the middle of some field replaces in the primary area, just to minimise sequential scanning of the index files and speed update. These techniques, while they work, are generally version dependent, and the problems they solve are generally addressed by Ashton-Tate in new releases of dBase. Furthermore, their operation is often obscure and tends to make the source code indecipherable. For these reasons, and more reasons which will become obvious, these techniques don't form part of my dBase toolkit.

Working Harder for Less

Now, no matter how rigorously you apply these various techniques of speed optimisation, you will not be able to make dBase perform like compiled languages. Worst of all, a law of diminishing returns comes into play, as it does with all programming projects, which says that as you progressively polish your code you have to double your efforts to produce half the improvement each time.

The result is that you will spend more and more of your time producing differences of a few per cent in a program that will only be infrequently run. If you're a good programmer your time isn't cheap, but the computer's is.

The truth is that these days no-one cares if the program takes four per

cent longer to produce a report than it theoretically could, and it certainly isn't worth running up a bill of several hundred dollars of programmer time just to achieve that.

What the People Want

The real benefit of dBase is that it cuts programming time (and hence cost) down dramatically, and that's what people want. Therefore the strategy I am about to outline is based upon the following supposition: that you use dBase because you can get a working system up faster in dBase than in other languages, but that if real speed is required dBase is not the language to use.

It is possible to satisfy both requirements in the following manner:

Step 1 – Design a prototype system in pseudocode, bearing in mind category 1) optimisation techniques.

Step 2 – Implement the prototype system in dBase II, and optimise its performance using category 2) techniques.

Step 3 – Deliver the prototype to the customer. One of four things can happen: first, (and best) the user loves it and is perfectly happy; second, the user likes the way it works, but thinks it is too slow; third, the user thinks it's fast enough, but is unhappy with the design; or fourth, the user is unhappy with the design and also thinks it's too slow anyway.

Step 4 – If you get response number one above, you're finished. Responses three and four mean a redesign is necessary. In this case, revise the system in dBase – or go back to the pseudocode if necessary – and resubmit the system. If you get responses two or four, the speed problem is not worth further optimisation in dBase; the customer feels a dramatic improvement is necessary. In this case:

Step 5 – Re-implement the system in another language – usually a compiled language like Pascal, PL/I or, if you must, COBOL. This is not terribly difficult, as you already have a proven system and the pseudocode for that system, so it's simply a matter of cutting the code, testing it and shipping it.

This technique, which is generally known as prototyping, is not new, but it's certainly under-used. I first formally came across it at an IBM course I went on a couple of years ago, called the Customer Executive Program. The idea was to explain DP concepts to management types, and during the course this idea of prototyping was introduced. I had a yarn about it afterwards with the lecturer, and it subsequently bore fruit with this approach to dBase.

It has a number of major benefits. First of all, the original system design is language-independent, yet based on the structured design concepts which dBase supports really well. It deliberately avoids the programming tricks which don't produce good results and make your programs difficult to read.

It gets a working system in the user's hands far more quickly than he has any right to expect, particularly with conventional languages. This also means that the system implementor has feedback on fundamental problems at a comparatively early stage in the project, and while nothing is cast in iron.

The final implementation of the system in a higher-performance language – if necessary – can be placed in the hands of a specialist in that language, who simply has to cut the code, secure in the knowledge that the design is right. In cases where the pseudocode is ambiguous, the dBase code can be the arbiter: after all the user has that in his hands and has approved it, right?

Programming Casualties

Now, it often happens that a re-write is not necessary. An interesting statistic to emerge from that particular IBM course (the PR people at IBM were probably wondering when that particular exercise would bear fruit!) is that a survey of mainframe sites has shown that only 40 per cent of programs survive beyond the age of three months. In other words, 60 per cent of programs fall into disuse within three months of their completion.

A number of these programs are probably designed to be run once only – file conversions and the like (something dBase programmers don't have to worry about). But I have no reason to suppose that things are any worse in the microcomputer world.

The major reason for the demise of programs is that they don't meet the user's needs: either due to a miscommunication between the user and systems analyst, or because the programmer wrote what he thought the user wanted, or whatever. It's an old DP adage that the user never knows what he wants until he's got it – and often, not even then!

The prototyping technique alleviates this difficulty by getting – at the very least – a working model of the full system into the user's hands at an early stage. If he doesn't like it, he can say so early in the piece, and modifications can quickly be made.

Furthermore, if your program is destined not to survive beyond three months, for whatever reason, at least it's only a prototype that is being consigned to an early grave!

Often, however, the user will be happy with the speed of the prototype, and only a few minor changes will have to be made to the production system.

From Pseudocode, to dBase, to PL/I

My own strategy is to write first in pseudocode, translate to dBase, and then, if necessary, translate to PL/I. This turns out to be particularly easy for three reasons:

1) The flow control, arithmetic statements and functions of dBase turn out to be remarkably close to (in fact a subset of) those in PL/I.

2) The indexed file handling of dBase can be very successfully emulated using Access Manager (which links with PL/I, Pascal/MT+ and so on – see my recent review).

3) The screen handling of dBase can likewise be emulated by Display Manager, usually with enhancements.

In fact, this approach has been so successful that I am now working on a dBase II to PL/I translator program. The only pitfall is that compiled programs cannot make use of macro substitution at run-time – but it's usually not needed anyway.

Pseudocode

I've talked a lot about pseudocode above, but haven't really defined it properly. In my mind, pseudocode is the lynchpin of good programming techniques. ▶

dBASE Part XI

Pseudocode is sometimes known as structured English, because it is really just the skeleton of a program without the detail required by most programming languages and with some words given meanings less general than their everyday English usage. For example, the phrase 'do while' has the special meaning that it usually has in programming languages.

The listing below is an example of some pseudocode.

It's not important what this actually does (it's a batch update program), it's more important to get a feel for the style of the pseudocode. First, notice that it bears only a passing resemblance to dBase or any other computer language. On the other hand, some of the words do look familiar and one can expect them to have particular meanings in this context; for example 'if','replace','end'.

Notice that the code is not particularly close to dBase; for example, 'if's don't always have corresponding 'endif's, since the indentation makes clear what's happening. On the other hand, the line 'end /* machine number found */' is actually an endif. My use of 'if's, 'do's and 'end's more closely resembles PL/I than any other language.

Now, the way this pseudocode is used is as follows. First, during the design stage, it is bench tested to see if it makes sense. That is, I run through it with paper and pencil to see what the code does with various input values. That checks to see the algorithm is sound.

The pseudocode is actually written using an editor, so that indentation is always neat and straight, and so fresh copies can be printed as required. At the programming stage, the first thing we do is copy the pseudocode file into the actual program file (say UPDATE.CMD) and then turn the pseudocode into comments by putting an asterisk at the beginning of each line. Next, we duplicate these comments, so that there are two blocks of comments.

The first block is left at the top of the file to show the overall structure of the program. The lines of dBase code are now written between the comment lines in the second block, so that they serve as explanatory comments in the code. The result should be well structured and readable code.

```
open print channel and set up endpage processing
display selbatch screen and ask if user wants batch report
if yes then report = true else report = false
print headings
goto beginning of batch file
go = get next batch entry
last_key = batch record machine number
do while (go)
  if first digit of machine number ^= first digit of last_key then
    if report then
      print sub-totals
  /* get record from master file */
  look up master index for batch entry machine number
  if not found then warn user
  else do
    get corresponding machine file record
    bad_meters = false
    record.week(4).update = date
    add batch clearances to clearances in machine record
    replace meter readings
    if meters seem to have rolled backwards then
      warn user and ask if update still to be applied
    if answer = 'Y' or meters OK then do
      write machine record to machine file
      delete batch file entry and its index
      if report then print machine details
      update sub-totals for control break
    end
  end /* machine number found */
  go = get next batch entry
end /* do while */
```

An example of 'pseudocode'.

Structured Programming

dBase actually supports structured programming techniques quite well, particularly when compared with older languages like BASIC. For those who are not familiar with the term, structured programming is a philosophy which has been evolved over the years to help programmers cope with complexity to produce cheaper, more reliable and more maintainable code.

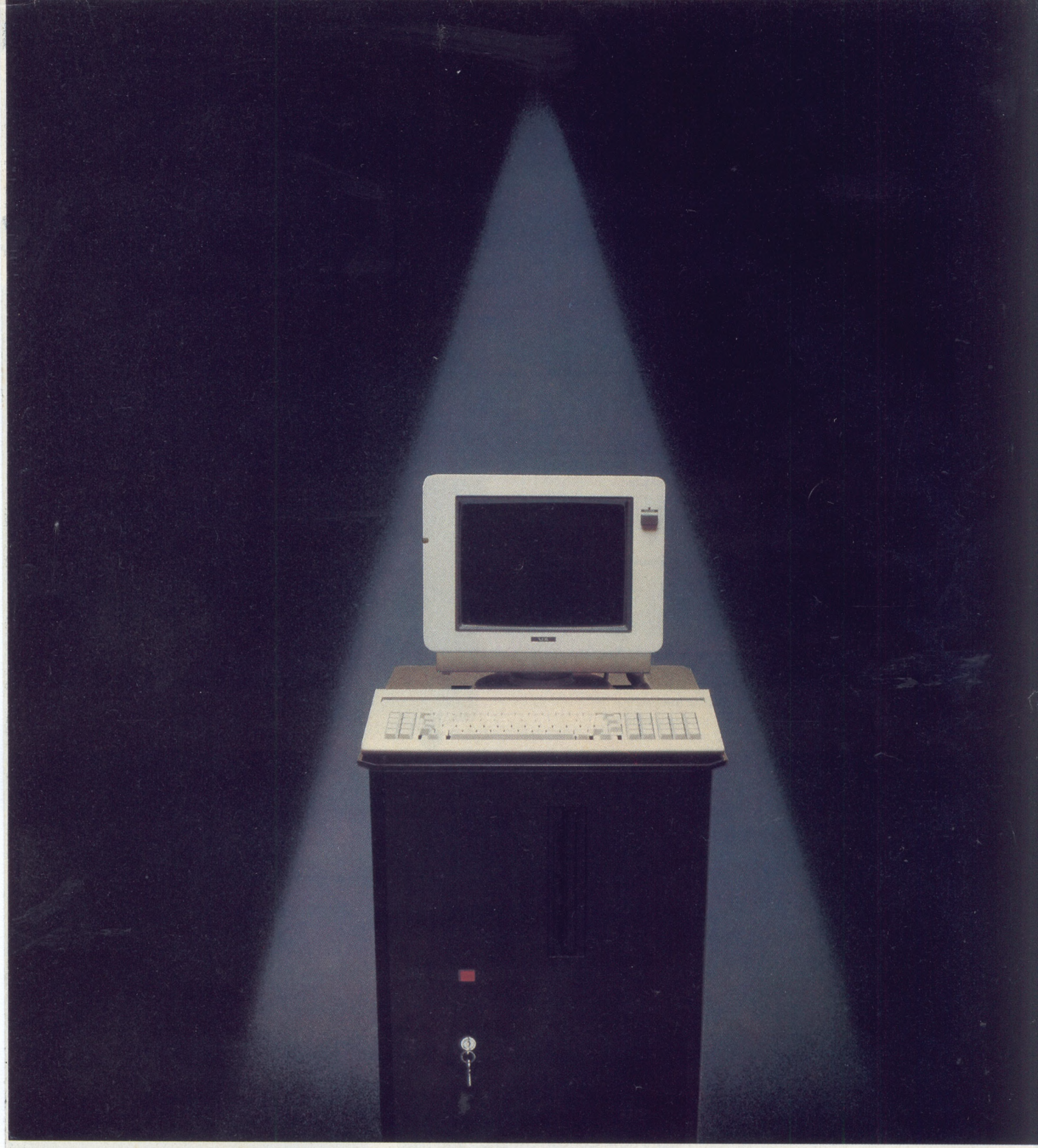
The cornerstone of structured programming is really reducing complexity. Most programmers get into difficulty and find themselves burning the midnight oil because what started off as a very simple little problem has somehow become a multi-headed Hydra, with pages and pages of code, lots of similarly-named variables and blocks of code which are well-nigh incomprehensible at 3 am.

This usually becomes evident while debugging. Several authors have pointed out that debugging is twice as difficult as programming. Therefore, *if you're as clever as you can be when you're programming, how on earth are you going to debug what you've written?*

When writing a program, you should just be coasting along at half power. Besides, that also means there's less chance of you putting bugs into your code. Bell's Fifth Law of programming says that the number of bugs is proportional to the square of the effort you put in. If a program seems twice as tough to write, it will have four times as many bugs, and hence require eight times the debugging effort.

The secret of success, then, is the KISS rule: Keep It Simple Stupid. Large, complex tasks can be split up into a series of smaller, simpler ones. That's what structured programming is about. Here are a few guidelines.

No module (read command file for dBase) should be more than one page in length. As soon as one starts to grow beyond that size, it's a sure sign you're trying to do too



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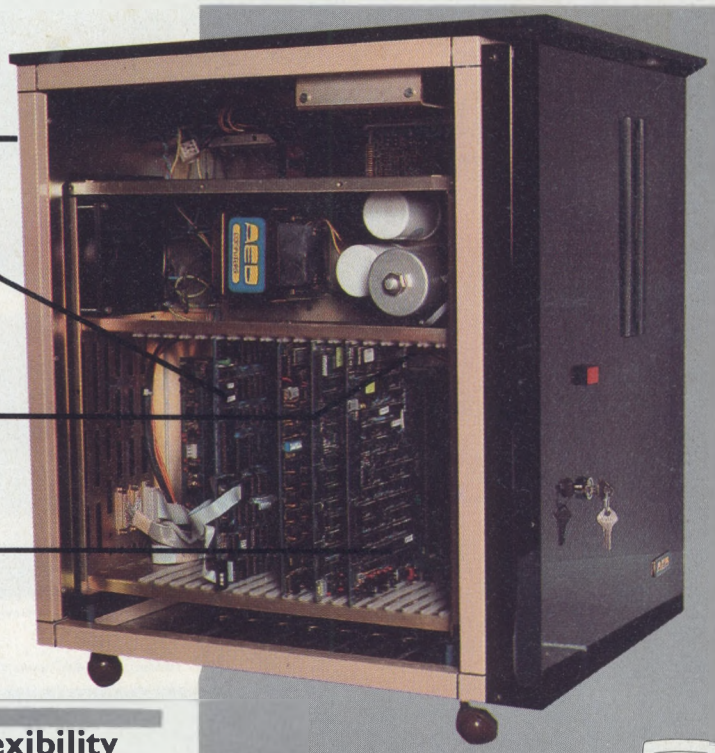

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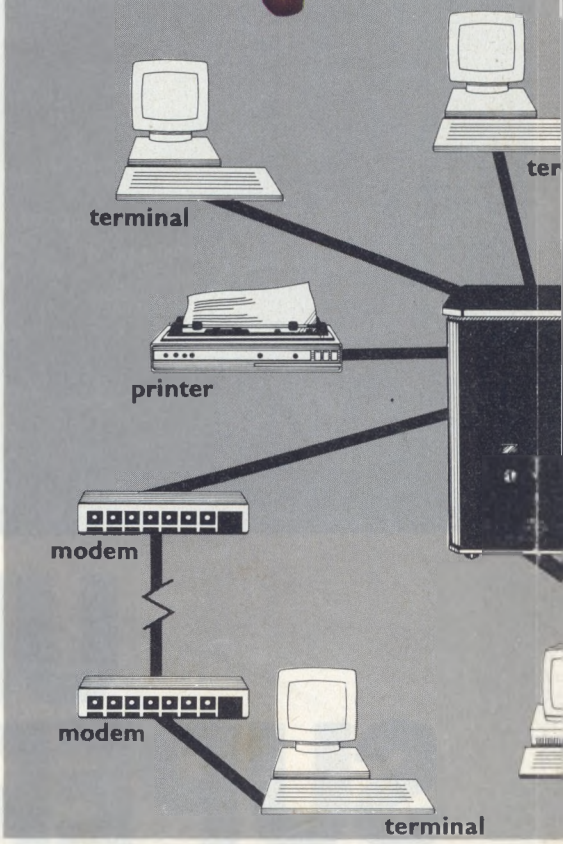

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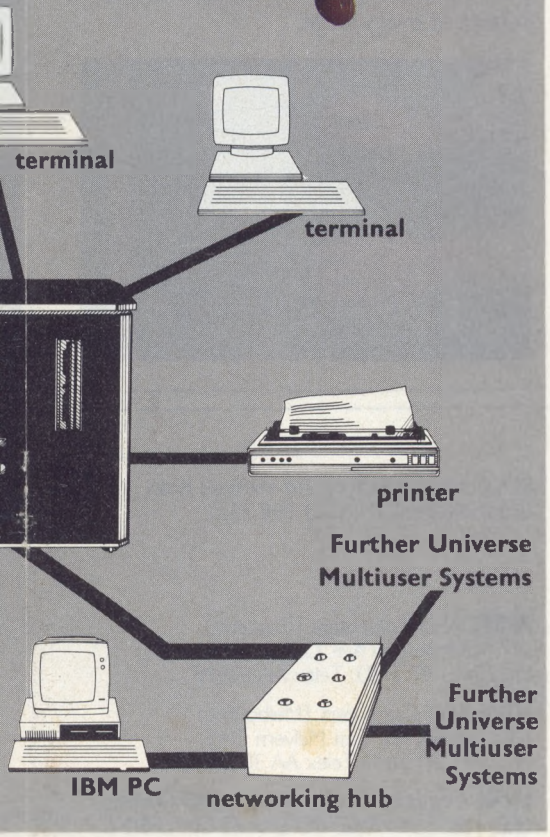

Universe shines here, with full multilevel security enhancements normally found on well engineered minicomputers. Universe is engineered from the ground up to provide facilities essential for the smooth running of a large multiuser system.

Important Security features

Encrypted login passwords. Users are restricted to specific terminals, directory areas, programs and nodes on the network.

File passwords. File and record lockout and a full password hierarchy. Your System Manager can quickly and easily configure the system so that each terminal only has access to those facilities and data its operator needs. For example:

- ☐ Option to restrict any account to specific programs or workstations
- ☐ Files may be automatically dated for future reference. Optional timestamping shows both creation and last access.
- ☐ Optional passwords on computers within a local area network.

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- ☐ Low cost serial terminals support both 16 bit (CP/M, Concurrent DOS, MP/M-86) and 8-bit (CP/M, MP/M II) software
- ☐ 200 character type-ahead buffer per terminal
- ☐ Fast 'hashed' directory searches
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- ☐ A multiuser appointment calendar
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- ☐ Inter-terminal communication. Electronic mail is here!
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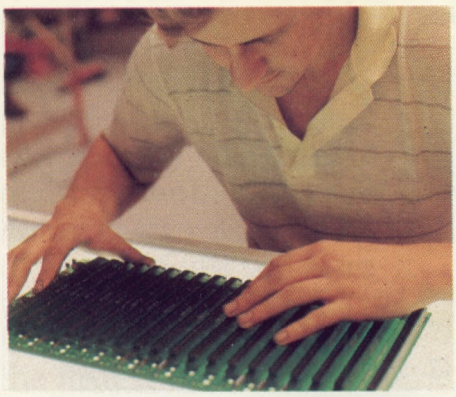

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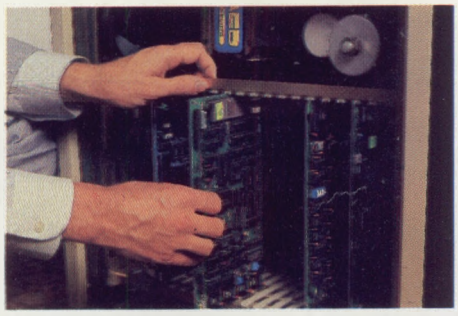

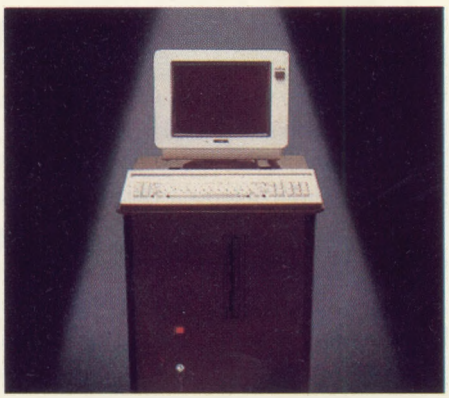

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much. You can probably identify two separate functions being performed. Isolate the code for one of them, write it out to a separate file, and replace it in this one with DO filename. That's particularly easy to do with WordStar or any decent text editor.

Of course, this is not an inviolate rule. If you're using pseudocode, it will keep you straight and you can handle much larger files. But two pages should be the limit. One simple reason for this is that when you are reduced (as we all are) to methodical debugging, you'll want to rule straight lines between every IF and its corresponding ENDIF, and every DO WHILE and its corresponding ENDDO. That's not easy with a two-metre long listing!

DO WHILE loops should certainly never be more than a page long to aid debugging, and IF..ENDIFs more than half a page apart are of questionable run-time efficiency.

Each module – in dBase that's a .CMD or .PRG file – should have one entry point and one exit point. dBase forces the first point, but supplies the RETURN statement to tempt you away from the second. In my style book the RETURN statement is a no-no, for several reasons.

First, it is just bad programming style as it complicates debugging. Second, many modules have dBase housekeeping – generally SAVEing, RESTOREing and RELEASEing of memory variables – and this should be restricted to the entry and exit points at the top and bottom of the module. RETURN statements in the middle of modules will require additional housekeeping code, which represents a potential lair of bugs.

But most importantly, RETURN statements stop you from combining command files after debugging is completed. You see, although the smartest way to write dBase code is as lots of small separate command files, it runs faster as fewer, bigger, files. So, using your text editor, you include subsidiary files into the modules that call them, replacing DO commands with the actual code they represent. (At the same time comments can be removed for extra speed).

But now, a RETURN statement in an included file does not return to the point it used to; instead it returns up the file tree one level too high (at least). For all these reasons, RETURN is a definite no-no. I have a similar ban on the LOOP statement, for similar reasons.

Use indentation to show the structure of the code. This also helps with debugging, as mentioned above. Drawing lines on listings may sound rather pedestrian, but when one of your lines veers from the perpendicular, it means you're onto something a lot faster than by trial and error debugging.

Use meaningful variable names, rather than X1 or PYWV1. dBase allows variable names up to ten characters long. Use them!

Every module should do one thing, and do it well. It should hide away its own internal variables, and make sure that you document which variables are used to pass values between modules. Incidentally, this is something that dBase III is much better at.

But most of all, keep it simple. Don't add complexities in an attempt to speed up your code; the simplest code always runs fastest, and is the fastest to write, debug and maintain.

As mentioned above, code should be written as separate, small, thoroughly documented and commented command files. Now, it's true that the comments slow the program down, and that the delay in reading lots of command files from disk further slows it down. But that's the fastest way to write your program and get it working.

Besides, you can always remove the comments later (in copies of the program) and combine the command files. This can be done automatically by a program called dUTIL, or by hand using a text editor. I prefer to strip comments out automatically but combine command files by hand, as that allows some optimisation.

In our next instalment, we'll talk about speed optimisation and hardware selection. ❑

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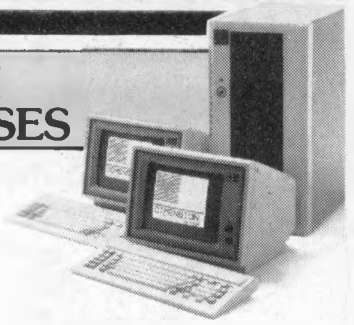

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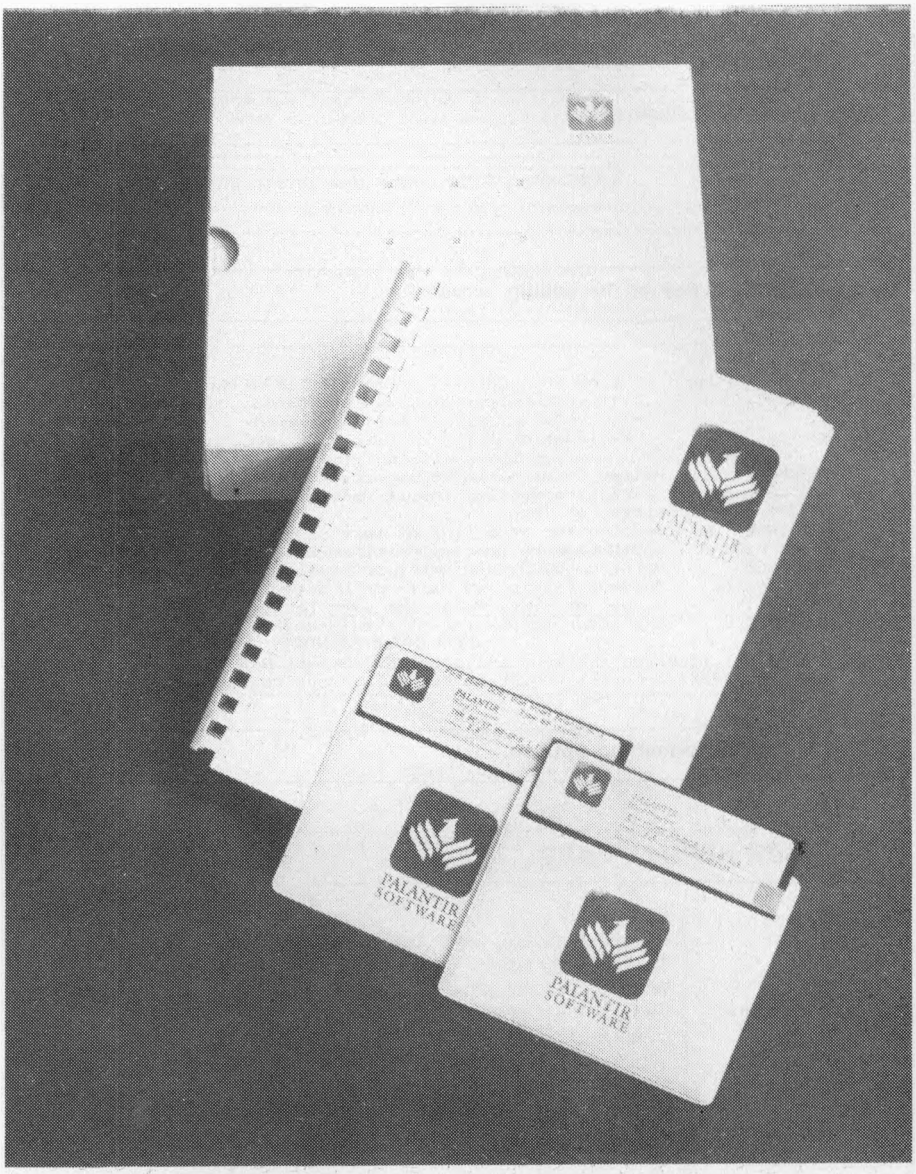
PALANTIR

By John Nicholls

Palantir: One of the Seven Seeing Stones, used by men of old to see far off, and to converse in thought with one another (Tolkien, 'The Lord of the Rings').



WORD PROCESSING programs are intensely personal things; what one person likes another may hate. Look at WordStar, a perennial favourite, poorly documented (until recently) and hard to learn. Having said that, I must say, quite simply, that Palantir is one of the best word processors I have ever used. It is easy and intuitive to learn and is also easy to use; a rare combination.

Our review copy of Palantir is described as Release 2.0 and is for the IBM PC. Palantir was originally written for CP/M but has been extensively revised to make the best use of IBM's keyboard. It is also under continuing development, as witnessed by a number of enhancements that have been made since Release 2.0 first appeared and since the documentation was prepared.

The operation of Palantir revolves around a few basic principles. First is the use of the <Return> and <Esc> keys, which work in opposite ways. <Return> acts like the return key on a typewriter but is also used to execute a command, to select an option, go ahead or continue. <Esc>, called CANCEL by Palantir, is used to stop, back out of a menu, or cancel a command.

The second principle is the use of the <F1> and <F2> function keys, called SET and CLEAR. Dedicated keys are used for the more common operations: backspace, insert, delete, find, format and cursor movement. For those commands used less often, you use a two-key sequence, the first key being either SET or CLEAR. SET is used to begin a function or attribute and CLEAR is used to end a function or attribute. Mnemonic or self-evident codes are used; for example SET H begins a header line, SET _ starts underlining and CLEAR _ ends underlining.

The even-numbered function keys select text or scroll by LINE, SCREEN, PAGE and DOCUMENT, and the odd-numbered function keys are used for DIRECTION, FIND, FORMAT and LEXICON. Cursor control keys move as expected: one character or one line at a time; and DELETE and BACKSPACE work in the standard way. DELETE removing the character at the cursor position and BACKSPACE

```
                    PALANTIR Word Processor 2.0

    Edit  Read  Save  Backup  File  Print  Type  Define  Other  Help


      Default disk B: - Programs on C: - Terminal: Monochrome

      Current File PALANTIR.WP              Size:  11k

      Current Location:  Page 8  Line 55  Column 1

              Disk B    16 % Full    295K Left
              Disk C    96 % Full     17K Left
```

Figure 1. Palantir's main menu.

```
-->       Page 1    Line 1    Col  1    Change
N...'....|....'....|....'....|....'....|....'....|....'....|....N
```

Figure 2. The top line of the editing screen.

```
-->       Page 1    Line PR   Col  1    Change   SET FORMAT
N...'....|....'....|....'....|....'....|....'....|....'....|....N

Option              Explanation                                  Current

RESUME              Return to normal display screen
CPI                 Characters Per Inch (0 if variable)           10
LPI                 Lines Per Inch                                6
SPACING             Spacing for each line of text                 2
PRINT FONT          Use Normal or Special Printer Font            Normal
BOLDFACE            Boldface by Shadow Print or Doublestrike      Double
QUARTERLINE         Sub/superscript by Half- or Quarter-lines     Half
INTENSITY           Number of times to strike each letter         1
OVERSTRIKE          Character to use for Strike-Through           -

Change any items on the menu as you wish.  Select RESUME
when finished, or press CANCEL to return without changes.
```

Figure 3. Special formatting options.

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Used for:	Word processing, mail-merging
Hardware required:	IBM PC/XT, Compaq and "most IBM PC compatible computers"; DOS 1.1 and higher; at least 128K memory; one double-sided double-density drive (single-sided available on special order)

Ratings:	**Excellent**	**Very Good**	**Good**	**Poor**
Documentation:		•		
Ease of use:		•		
Speed:	•			
Functionality:	•			
Value for money:		•		

Price:	$US395 (Check Australian price with distributor)
Distributor:	Precision Microsystems, 18 Milford St, S. Victoria Park 6101. (Since Palantir has only acquired an Australian distributor since this review was written, we're unable to give an evaluation of the level of support for the package).

removing the character to the left of the cursor position.

Those are the basics, but there are other ways to move around the text that add greatly to the program's versatility. The PAGE UP and PAGE DOWN keys scroll forward or backwards a screen at a time (one line is repeated for continuity); SHIFT those keys and you move a page forward or backwards; END takes you to the end of the current line; END shifted to the end of the document.

HOME moves firstly to the beginning of the current line, a second press to the first line on the screen, and subsequent presses toggle between the first and last lines on the screen. The scrolling commands, LINE, SCREEN, PAGE and DOCUMENT, work in conjunction with the DIRECTION key (F3), which shows an arrow indicating whether the scrolling will be forwards or backwards. TAB moves the cursor to the beginning of the next word to the right; SHIFT TAB moves it to the beginning of the next word to the left.

Some movements can be made in two ways; to go to the end of the document you can use <DIRECTION> DOCUMENT or SHIFT END, whichever is more convenient. As well, a full range of search functions is provided under the name of FIND (F5).

Working with blocks of text is quite straightforward; to start you move the cursor to either end of the block, press SET B (SET BLOCK), and move to the end of the block and press RETURN. You will then be prompted to say whether you want to move or copy the block. If you choose MOVE, your block disappears; if you choose COPY nothing appears to happen. In both cases the block is stored in memory (if less than 250 characters) or on disk. You then move the cursor to the point where you want the block to appear and press SET M. Because the block is stored, you can make as many duplicates at different locations as you like – until you define another block. Although Palantir contains a block delete function (SET DELETE), the manual suggests that it may be safer to use SET BLOCK to give you a chance to change your mind.

If you are used to other word processing programs, one thing you may miss is that Palantir makes no

use of the <Ctrl> or <Alt> keys and has no dot commands.

What You See

Once you load Palantir it displays the main menu (Figure 1). You can move the cursor to your selection and press <Return>, but more simply you can just press the initial letter of your choice. This applies to all Palantir's menus. READ recalls a document from disk, EDIT allows you to edit a file you have previously READ or to start a new document.

Selecting EDIT brings up an editing screen (Figure 2) that is remarkably uncluttered. The top line shows the scrolling arrow, the cursor position by line and column number, and whether INSERT is on (Insert) or off (Change). Any commands invoked with SET or CLEAR are also shown on this line. The second line shows the default format line, with tab stops shown as >. N indicates normal as opposed to J for justified, S for semi-justified, and M for manual (no word-wrap).

You can change the default format line for all documents or the whole of the current document, and can put in as many new format lines as you like throughout the document. As well as the common format changes – left and right margins, tab stops and justification – a whole menu of special formatting options is available (Figure 3). Obviously this gives great flexibility.

Of the other choices on the Main Menu, SAVE works as expected (Palantir automatically adds the filename suffix). BACKUP combines SAVE and READ and would be one of the most-used and easiest operations. You press CANCEL to exit the document and go to the Main Menu, press B to select BACKUP and then E (Edit) to return you to where you were in the document. Palantir saves the new files (suffix .WP), renames the old file (suffix .WPB), and then erases any previous back-up file. So you always have two generations of the file; the one you just saved and the previous version. If you try to quit the program with a document still in memory, the program displays a warning message.

Palantir has an unusually large type-ahead buffer of 80 characters, so you can press the three keys to save your document without waiting for the screen to catch up. The type-ahead buffer saves all keystrokes except CANCEL, which it recognises and acts upon immediately, discarding keystrokes that haven't been processed yet. A DISK FULL message is no problem; you can erase unwanted files or copy them to another disk before erasing them.

Two menus set the print parameters, the Define Menu (Figure 4) and the Print Menu (Figure 5). Palantir caters for virtually any printer; the distribution disk has twenty-four printer drivers for ▶

```
                    PALANTIR Word Processor 2.0

                        Document Information

Option                          Explanation                          Current

RESUME              Return to Main Menu
SIZE OF PAGE        Page size at 6 LPI (0 for no paging)              70
TOP MARGIN          Lines to skip at the top of the page              3
BOTTOM MARGIN       Lines to skip at the bottom of the page           6
PRINT FONT          Name of a special printer font                    STANDARD
OFFSET              Columns to skip before printing                   0
CHANGE FORMS        Pause to change forms at each page?               No
FIRST PAGE          First page number for the document                1

Move the cursor to the line you wish to change and press RETURN.
Select 'Resume' when finished, or press CANCEL to ignore changes.
```

Figure 4. The 'define' menu sets some print parameters ...

```
                    PALANTIR Word Processor 2.0

  Current File:                  Printer: Epson MX-80       Font: STANDARD

Option                          Explanation                          Current

BEGIN               Begin Printing
OFFSET              Columns to skip before printing                   0
RANGE               Pages to Print (First to Last)
                    Begin - First       End - Last
NUMBER OF COPIES    Number of times to print document                 1
CHANGE FORMS        Pause to change forms at each page?               No
SELECT PRINTER      Select a different printer                        EPSONMX

Move the cursor to any line to change and press RETURN.
Select 'Begin' to start printing, CANCEL to exit.
```

Figure 5. ... The 'print' menu sets the rest.

```
                    PALANTIR Word Processor 2.0

                Select any topic that interests you.

X       --      Return to the Main Menu
A       --      How to move the cursor quickly
B       --      How to use special codes and commands
C       --      How to use the Main Menu and Status Screen
D       --      How to use the EDIT screen and FORMAT menu
E       --      How to use file names
F       --      How to use READ, SAVE and BACKUP--routine document handling
G       --      How to use the FILE menu
H       --      How to move text around
I       --      How to use the PRINT menu and the DEFINE menu
J       --      Tips and Miscellany

        To speed things up, type the first letter of the item you want to
select from a menu. That's quicker than browsing through the menu with the
space bar or arrow keys and then pressing RETURN.

        For each topic, you will be shown 1 or more screens of information.
Press any key for the next screen or CANCEL if you've seen enough.  This menu
will reappear so you can select another or return to the Main Menu.
```

Figure 6. The Help (!) menu is accessed from the main menu.

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different printers and eighteen proportional print fonts. Palantir also offers special drivers in the unlikely event your printer doesn't match any of those provided, and also allows the unusual capability of being able to change printers before printing. You will notice that you can choose to print more than one copy of a document; in fact you can print up to 32,000 copies of a file, one after the other! We ran a print spooler with Palantir without any problems, although the program seems to send text to the spooler somewhat more slowly than some others.

Do Two Things at Once

One feature – now being offered by many other programs – is to run other programs while still in Palantir. The '/system' option is built in and gives you access to DOS. Up to nine other programs can be added.

Palantir's Help screens are not context-sensitive. You access the Help Menu (Figure 6) from the Main Menu and then select from this, as usual by pressing a single key. There are 25 screens in all, and if you wish you may modify these or add others. The screens are well-written and most informative.

Lexicon (F9) allows you to store commonly used words or phrases which can be brought into the text by <F9> followed by one of the alpha or numeric keys, 36 in all. Each entry can have up to 250 characters.

Mailout performs a mailmerge function for producing form letters. It is not an extra-cost option; it is included as part of the package. It is unusually complete, providing its own command language and allowing quite complicated conditional commands and arithmetic handling. To deal with this part of the program adequately would require a full review of its own.

The documentation for Palantir consists of a manual, an eight-page reference guide, and an on-line tutorial. In using the tutorial you have to follow the instructions for that lesson exactly (there are seven lessons altogether). By way of compensation, some of the lessons are extremely funny. The manual is well laid-out and well-written, although the index uses terminology that is sometimes peculiar to Palantir, making it difficult to locate some material. The reference guide is arranged by command within each menu, and I made up my own list by function to help learn the program. Once I became used to the menus, I found the reference guide more useful than my own list.

Not Quite Perfect

What does Palantir lack? Quite a bit, but then so do all other word processors. It doesn't have windows, column manipulation, an automatic table-of-contents generator, a full undelete feature (other than the block delete already referred to above), automatic placement and numbering of footnotes, and it doesn't have a spelling checker. It does save text as standard ASCII plus special characters for the normally hidden codes, so I imagine most spelling checkers would work with it.

If any of these features are vital to you then Palantir may not be for you, but if they're not essential and the relatively high price doesn't scare you off, Palantir is worth looking at. And if the price does seem high, remember that you don't have to buy a separate mailmerge program. ❑

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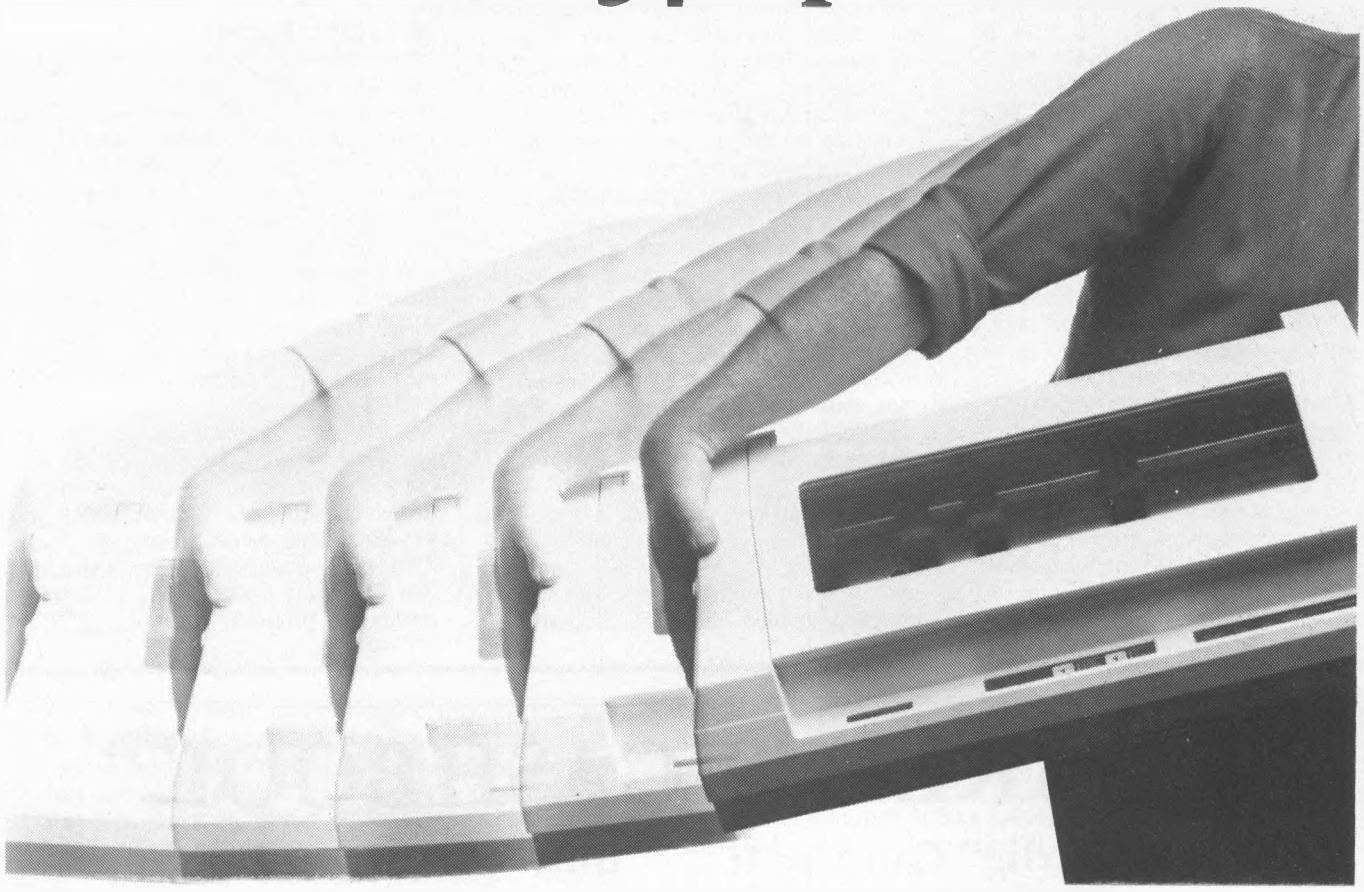

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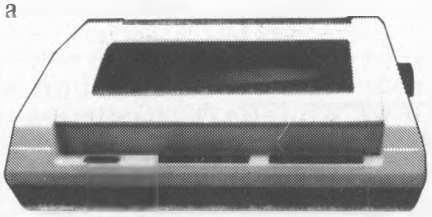

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Word processing with WORD HANDLER

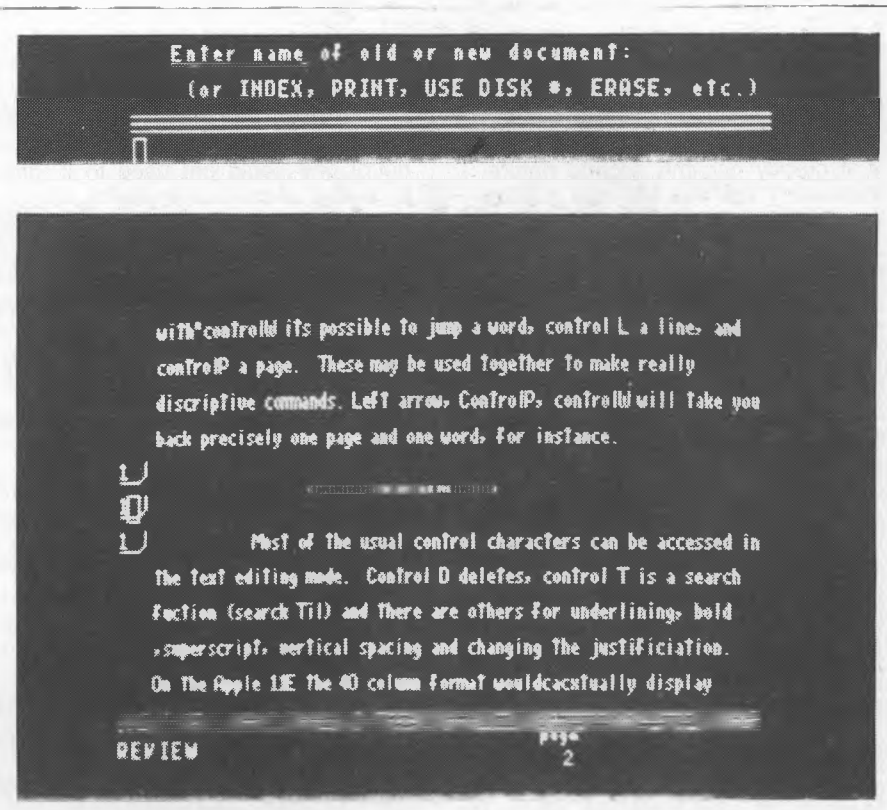
HOW DOES one assess a word processor objectively? Most of them do much the same kind of thing, albeit in a number of different ways. Is one way intrinsically better than another, or is it all just personal preference. Are you stuck for life with the method you learnt first?

At least one solution is to say that, since a word processor is designed to help you fight the paper war more efficiently, efficiency is the criterion you should use, and the best measure of efficiency is surely the number of keystrokes you need to accomplish any given task.

Other things are important, too. The manual, for instance, is of paramount importance for obvious reasons. Equally important is the speed with which you can do without it; for example, the commands used to control the cursor should quickly come to feel intuitive.

As one might expect, Word Handler does well in some areas and poorly in others. When you buy Word Handler ($85.95 from Edusoft, 582 Warringah Road, Forestville 2087; phone (02) 451 6243) you get a disk and a nice little booklet bound in pseudo-leather. this contains a double-sided floppy disk and a looseleaf manual. The edition we had came in two sections – a tutorial, which is a lengthy account of everything you were ever afraid to ask about word processing, and a short introduction which gives all the information you need to start operating the system.

I was unimpressed to read on page one of the instructions: "The manual will have you operating Word Handler like a pro in twenty minutes." This is lousy psychology. If it's that simple you don't need a manual. And there is nothing quite as humiliating as spending half the night struggling with something the manual tells you should only take a few minutes



There are many word processing packages on the market, and choosing which is the one for you is often an arbitrary procedure; usually, you don't know what's in a package until you've been working with it for some time. In this article, Jon Fairall acts as your guide around the Word Handler II for the Apple IIe. Maybe it's what you've been looking for...

Booting Problems

I was conscious of this 20-minute limit because it took me about that long to get the disk into the drive of the Apple IIe and booted correctly. The confusion was caused by the fact that one side of the disk contains 40- and 66-column formats and the other the 80-column. If you use the 80-column you need to boot with one side and then access the files on the other. It's quicker to tell the story than to actually figure it out!

Having sorted out the booting problem, I penetrated into idle mode. This is equivalent to accessing the main menu on other processors. It gives you access to an index of files ▶

WORD HANDLER

on the disk as well as the print and erase functions. You can retrieve any of the files on the disk by typing in its name. A file title can be any string up to 30 characters long. However, you can abbreviate the file name for recall purposes by using a semi-colon. So a title like 'Aunt; Fanny's letter' can be accessed just with 'Aunt'.

Calling up a file puts you into edit mode. In order to originate any text you have to type 'control I' for insert. You go back into the idle mode, and save the file with control E – for end of editing. Although this did not seem intuitive to me when I started using it, it quickly became second nature. I particularly like the fact that it's not possible to leave the file without saving.

Efficient Cursor Control

Once in the editing mode the first thing to do is find how to control the position of the cursor. Here Word Handler is excellent, and, like the manual said, it really is very simple. The two arrows can be used to make the cursor move forward or backward along the line. Used in conjunction with control W it's possible to jump a word, control L a line and control P a page. These may be used together to make highly descriptive commands: for example, <, control P and control W will take you back exactly one page and one word.

Most of these control characters can be accessed in the text editing mode. Control T is a search function (search Till), and there are others for underlining, bold, superscript, vertical spacing and changing the justification. On the Apple IIe, the 40-column format would actually display the special print functions on the screen. In the 80-column mode, however, it did the more conventional thing and just marked the affected letters with reverse video.

Text can be deleted with control D. This is used in conjunction with W, L, and P keys to give instant deletion of a character, a word, a line, or a page, as required.

When editing, the biggest problem for a beginner is the behaviour of the control I (Insert mode). In the insert mode, text can be added to the end of the text or squeezed in between existing letters. The cursor is destructive, that is, if you try running it backwards to correct a mistake it automatically deletes everything as it goes.

Using the vertical arrows to move the cursor up a line switches insert off. So does control E. Now the cursor isn't destructive, you can't add anything to the end of the file and if you type in the middle of existing text you simply cover what is already there. This can get pretty murderous if you make plenty of typing mistakes.

Normal processing procedure is to ignore typing mistakes in the first drafts of a document. Normally, you should get all the words in the right place and then worry about whether they are spelt correctly. Word Handler does this provided you only want to change existing letters. If you want to insert anything, it's necessary to switch insert on, make your addition and then switch it off again. No doubt one could get used to it, grow to love it even, but it seems unnecessarily complicated. It would be a decided improvement if it were possible to organise a genuine insert function *a la* Wordstar, which requires a toggle independent of anything else you do.

Moving Words

The other really important word processing function is the ability to move text around within a document. Word Handler does this much better than text editing. It's very simple to learn to use. With control C (Copy) and the W, L and P keys you can define an area of text. Pressing the forward arrow or some other control key records the marked area in a temporary memory store. It is inserted into the text with control I control C (Insert the Copy).

Merging text from other documents (the standard letter problem) is accomplished with control G. This is also an intuitively simple process. You are asked for the document name and the line number from within the document. Pressing 'return' transfers the required text to your current workspace. This function can be used with either one or two disks.

It's possible to achieve much the same end with the 'Fill-in' command. This allows you to compose a standard document, with certain areas of text surrounded by < and >. In the fill-in mode, Word Handler allows you to specify a new text sequence to go between the brackets. This is ideal for re-addressing letters and similar functions.

Formatting the page is done with control F. This is a straightforward menu-type operation in which you are asked to specify parameters like paper width and length, margin size, pitch and lines per centimetre.

There are a couple of other features that are always handy in a word processing package. A 'global search and replace', for example, allows you to change a word or the spelling of a word throughout the document. An alternative use is to substitute abbreviations for commonly used long words. Control L will insert an extra half-line between lines, control P will skip to the top of the next page, and any space marked by a control W will be unbroken. This is invaluable with common situations like 'Mr. Jones' or '10 MHz'.

If you want folded paper printout, Word Handler can do that, too. This amounts to printing out pages in some order other than one ... two ... three. Thus, to create four small pages in a booklet form, it would print page one and page four on one side of a sheet, and then page two and page three on the other. It's even possible to specify that all the even pages should have a different format to all the odd ones (to allow for page numbering or folio lines on one side rather than the other).

Consistency is the Key

One of the things I liked about Word Handler is the number of similarities in the way the different functions operate. This makes them a lot easier to remember and seems to give the program its own special kind of logic. For instance, the cursor, delete, copy and move functions all use the same format of arrow keys followed by the W, L and P keys.

Movement into and out of the insert and editing mode has similar effects on a number of other controls. For instance, control K performs a caps lock function. Control V controls line spacing. In the insert mode both continue to affect the subsequent copy until cancelled. In the editing mode both only affect the paragraph under the cursor.

Word Handler is now also available as part of a package which includes List Handler (usually $79.95) and Spell Handler (usually $89.95) – all for $219.

I quite liked Word Handler. There is a problem with the insert function, but after a while I found it possible to live with it. The merge, copy and delete functions are a delight to use, and the manual, occasional blunders aside, is very good. You should be able to work through it in half an hour. ❑

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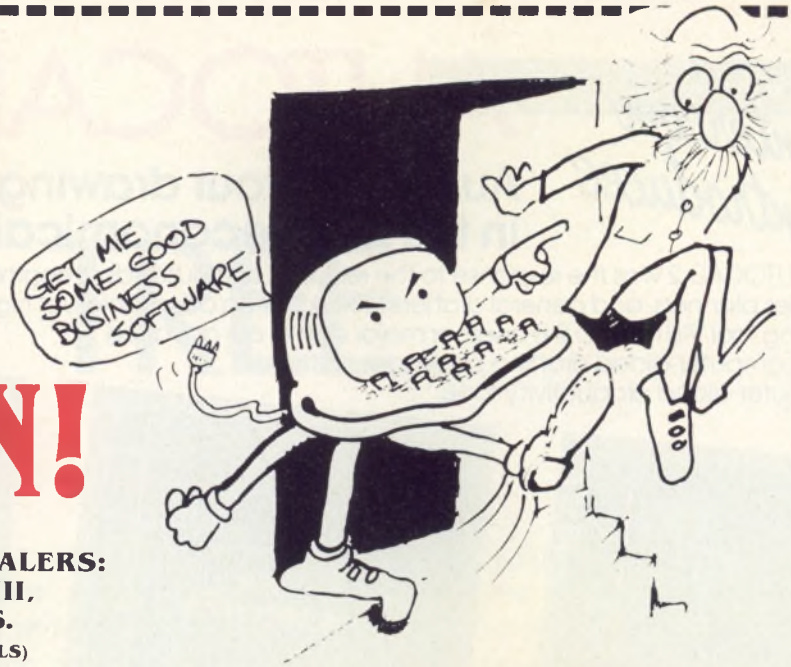

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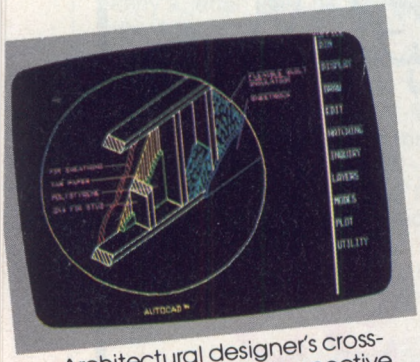

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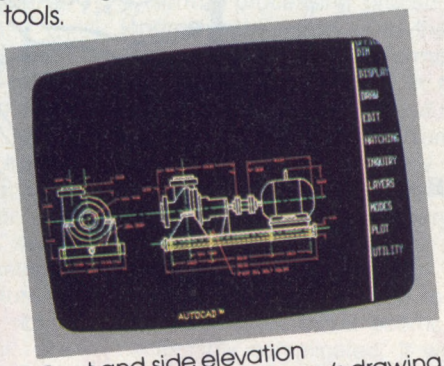

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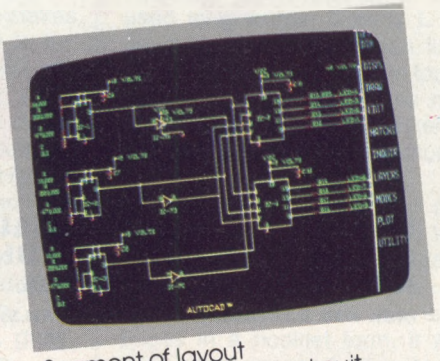

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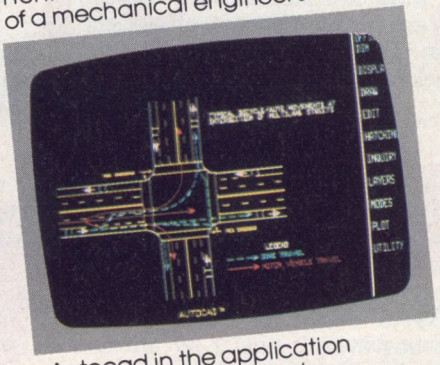

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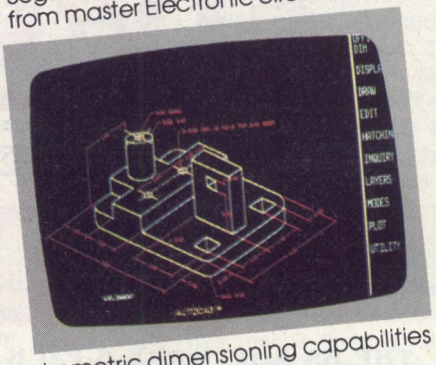

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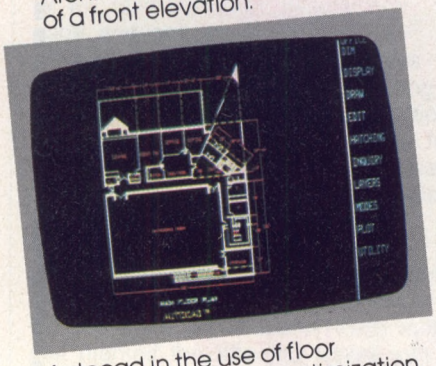

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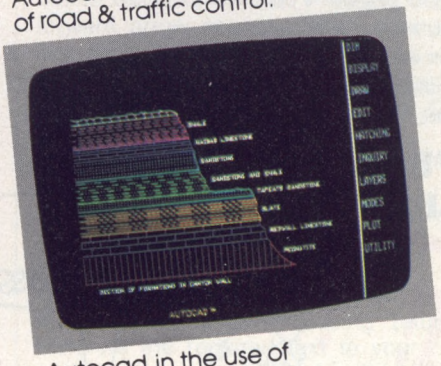

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FAMILY TREE

When we ran our feature on computers and genealogy in May 1984, we remarked that all the software available for genealogical research originated outside Australia, which made it less than ideal for specifically Australian conditions. Since then one of the winners of our Great Aussie Software Competition (announced in January) has produced an Australian genealogical program, and now Jan Worthington, chairwoman of the computer group of the Society of Australian Genealogists, has made us aware of another.

AT LAST we have a locally written and easy-to-use genealogical computer program. 'Family Tree and Family History', from Projectree, has been written by Wendy Mesley of Sydney for the Apple computer. I am unaware of any other genealogical programs written in Australia; the United States currently dominates the genealogical software market with at least 55 packages.

The attractively packaged Family Tree and Family History software comes with a well-documented manual and one program disk. A little practice with 'Example Family', the sample family tree included in the package, will give the computer novice – or the experienced user unfamiliar with genealogy – an opportunity to experiment before starting to store real family material.

All family information is stored on data disks separate from the program disk, and, as the family files get larger, files can be transferred to other data disks. The maximum number of individuals stored under one family name and on one disk is 900.

Choices

Different functions of Family Tree and Family History are accessed easily through a main menu and several sub-menus. Screen prompting throughout the program helps the operator achieve the desired results.

The 'Personal Details' option in the main menu allows individual records to be displayed, added, changed or deleted in a family. Identification numbers can be assigned to each individual in any combination.

The 'Family Links' menu establishes the family connections, which can be entered and removed at any time. The only constraints are a maximum of three marriages per individual and a maximum of twenty children per marriage. The program does a lot of useful date checking, ensuring that marriage dates check with birth dates and children are in correct order by date within a family. Messages of 'Warning, inconsistent dates' and 'Dates out of sequence' can be overridden and ignored. Children can be repositioned in a family.

The 'Personal History' menu allows entry, editing and deletion of historical or source notes for each individual. Notation can be in a choice of two formats described as 'Who's Who' (25 characters by ten lines per 'page'), and 'Narrative' (50 characters by five lines per 'page'). Unlimited pages can be linked to each other, but deleting a page means deleting the entire history file for a person. This can be overcome by typing over any changes that are necessary, as long as the history notes to be deleted are not lengthy.

The 'Printed Charts' option in the main menu gives plenty of choice for display of family data. Typing the current date when the program is loaded automatically causes the date to be printed on all charts and reports.

The choice of display includes the Family Group Sheet, Ancestor Chart of Birth Brief, and the Descendants Chart, which lists five generations of a family. Chart numbers assigned by the operator link a chart to other charts as you print them.

The 'Printed Reports' menu can produce reports on your family tree, sorted either by ID number or surname, first name. Other reports produce birthday, Christmas and other family tree lists. Blank forms for collecting family data can be printed ready for use.

Easy to Use

All these and other features make Family Tree and Family History ideal for both inexperienced and advanced Apple II, IIe and IIc users. The original Apple II will need a language card, and a minimum of 48K RAM is necessary. The program will run with one disk drive but two are preferable.

Family Tree and Family History was created using standard Apple files, and Zardax word processing should be compatible. An 80-column printer completes one of the most exciting genealogical software configurations to date. All upgrades are planned to be passed on to the purchaser at minimal cost. Retail price is approximately $70; for more information on availability, contact Wendy Mesley on (02) 411 7619. ❑

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YC 3/85

If your graphics utilities are gobbling more than their share of bytes, or if you'd like to be able to switch low-bit colours to high-bit colours on your screen, and similar tricks, without taking up too much space – this program by Ian Chia is for you.

Apple 5-in-1 High-Resolution Graphics

BIT MUNCHER

I GAVE UP. Slumped in a chair, my table stacked high with magazines and manuals, I hadn't been able to find one program on merging the high-res screens. Glancing at the computer, I found the cursor blinking merrily, taunting me. As I sighed over the wasted afternoon, it occurred to me to write my own graphics merger.

That was a couple of years ago. I wrote the graphics merger, and a few other graphic colour manipulators, too. But about a month ago, as I tried to save another graphics program on the disk, the drive gave a tired shudder and burped the dreaded message "Disk Full" onto the screen. Cataloguing the disk, I discovered that with the Lisa assembler and all my other graphic utilities on it as well, I simply couldn't fit one more program in.

Not having a spectacular income, I couldn't afford another disk. (Pocket money is on the way down!) So I decided to write all my graphic utilities into one main package, thus shrinking the storage space by a factor of five.

The No Wockas Solution
And here it is. Presenting the Five-In-One Hi-Res Graphics Bit Muncher!

(No relation to the little round-headed guy who runs around in a maze going Wocka-Wocka-Wocka.)

Listing 1. The original bit-munching program.

```
0800                    1           PAG
0800                    2  ********************************************
0800                    3  *                                          *
0800                    4  *  HIRES GRAPHICS BIT-MANIPULATION EDITOR  *
0800                    5  *                                          *
0800                    6  *  Author: Ian Chia                        *
0800                    7  *  Date: 8th October, 1983                 *
0800                    8  *  Apple ][, ][+, //e Computer             *
0800                    9  *                                          *
0800                   10  *  ENTRY POINT = 768 ($300)                 *
0800                   11  *  CALLING PARAMETERS : CALL 768,X,Y        *
0800                   12  *                                          *
0800                   13  *  X = 1 or 2 (Specifying page number)     *
0800                   14  *  Y = 1 to 5 (Specifying function)        *
0800                   15  *                                          *
0800                   16  *  Y = 1 : Flips Bit 7 of every byte.      *
0800                   17  *  Y = 2 : Clears Bit 7 of every byte.     *
0800                   18  *  Y = 3 : Sets Bit 7 of every byte.       *
0800                   19  *  Y = 4 : Complement every byte (Inverse) *
0800                   20  *  Y = 5 : Merge page 2 onto page 1.       *
0800                   21  *                                          *
0800                   22  ********************************************
0800                   23  ;
0300                   24           ORG $300
0300                   25           OBJ $800
0300                   26  ;
0300                   27  ;
00FB                   28  HIRESL   EPZ $FB
00FC                   29  HIRESH   EPZ $FC
00FD                   30  HIRESL2  EPZ $FD
00FE                   31  HIRESH2  EPZ $FE
00FF                   32  PAGE.END EPZ $FF
0300                   33  ;
E74C                   34  COMBYTE  EQU $E74C
0300                   35  ;
0300 A9 EA             36  START    LDA #$EA       ; Put "NOP" instruction in
0302 8D 94 03          37           STA LINE2      ; first to save memory later.
0305                   38  ;
0305 20 4C E7          39           JSR COMBYTE    ; Get first parameter.
0308 E0 01             40           CPX #$01       ; Make sure it's between 0
030A B0 02             41           BGE >1         ; and 3.
030C A2 01             42           LDX #$01
030E E0 03             43  ^1       CPX #$03
0310 90 02             44           BLT >1
0312 A2 01             45           LDX #$01
0314 8A                46  ^1       TXA
0315 0A                47           ASL            ; Shift it five times to
0316 0A                48           ASL            ; get right address.
0317 0A                49           ASL
0318 0A                50           ASL
0319 0A                51           ASL
031A 85 FC             52           STA HIRESH
031C 18                53           CLC
031D 69 20             54           ADC #$20
031F 85 FF             55           STA PAGE.END
0321                   56  ;
0321 20 4C E7          57           JSR COMBYTE    ; Get function parameter.
0324 E0 01             58           CPX #$01       ; Make sure it's between 0
0326 B0 02             59           BGE >1         ; and 6.
0328 A2 01             60           LDX #$01
032A E0 06             61  ^1       CPX #$06
032C 90 02             62           BLT >1
032E A2 01             63           LDX #$01
0330 E0 01             64  ^1       CPX #$01
0332 F0 0F             65           BEQ FLIP
0334 E0 02             66           CPX #$02
0336 F0 20             67           BEQ B7.CLR
0338 E0 03             68           CPX #$03
033A F0 2C             69           BEQ B7.SET
033C E0 04             70           CPX #$04
033E F0 38             71           BEQ COMPLMNT
0340 4C A5 03          72           JMP MERGE
0343                   73  ;
0343 20 C5 03          74  FLIP     JSR F.C.S      ; Flip bit 7 preparation.
0346 A9 69             75           LDA #$69
0348 8D 95 03          76           STA LINE3
034B A9 80             77           LDA #$80
034D 8D 96 03          78           STA LINE3+$1
0350 A9 18             79           LDA #$18
0352 8D 94 03          80           STA LINE2
0355 4C BC 03          81           JMP LOOP1
0358                   82  ;
0358 20 C5 03          83  B7.CLR   JSR F.C.S      ; Clear bit 7 preparation.
035B A9 29             84           LDA #$29
035D 8D 95 03          85           STA LINE3
0360 A9 7F             86           LDA #$7F
0362 8D 96 03          87           STA LINE3+$1
0365 4C BC 03          88           JMP LOOP1
0368                   89  ;
0368 20 C5 03          90  B7.SET   JSR F.C.S      ; Set bit 7 preparation.
036B A9 09             91           LDA #$09
036D 8D 95 03          92           STA LINE3
0370 A9 80             93           LDA #$80
0372 8D 96 03          94           STA LINE3+$1
0375 4C BC 03          95           JMP LOOP1
0378                   96  ;
0378 A9 A9             97  COMPLMNT LDA #$A9       ; Complement screen
037A 8D 92 03          98           STA LINE1      ; preparation.
037D A9 7F             99           LDA #$7F
037F 8D 93 03         100           STA LINE1+$1
0382 A9 51            101           LDA #$51
0384 8D 95 03         102           STA LINE3
0387 A9 FB            103           LDA #HIRESL
0389 8D 96 03         104           STA LINE3+$1
038C                  105  ;
038C A9 00            106  LOOP1    LDA #$00       ; Main all-purpose loop.
038E 85 FB            107           STA HIRESL
0390 A0 00            108  ^1       LDY #$00
0392 00 00            109  LINE1    HEX 0000
0394 00               110  LINE2    HEX 00         ; Usually a "NOP."
0395 00 00            111  LINE3    HEX 0000
0397 91 FB            112           STA (HIRESL),Y
0399 C8               113           INY
039A D0 F6            114           BNE LINE1
039C E6 FC            115           INC HIRESH
039E A5 FC            116           LDA HIRESH
03A0 C5 FF            117           CMP PAGE.END
03A2 90 EC            118           BCC <1
03A4 60               119           RTS
03A5                  120  ;
03A5 A9 00            121  MERGE    LDA #$00       ; Merge function.
03A7 A8               122           TAY
03A8 85 FD            123           STA HIRESL2
03AA A9 20            124           LDA #$20
03AC 85 FC            125           STA HIRESH
03AE A9 40            126           LDA #$40
03B0 85 FE            127           STA HIRESH2
03B2 B1 FD            128  ^1       LDA (HIRESL2),Y
03B4 11 FB            129           ORA (HIRESL),Y
03B6 91 FB            130           STA (HIRESL),Y
03B8 C8               131           INY
03B9 D0 F7            132           BNE <1
03BB E6 FC            133           INC HIRESH
03BD E6 FE            134           INC HIRESH2
03BF A5 FC            135           LDA HIRESH
03C1 C9 40            136           CMP #$40
03C3 D0 ED            137           BNE <1
03C5 A9 B1            138  F.C.S    LDA #$B1       ; General purpose pointers
03C7 8D 92 03         139           STA LINE1      ; executed here to save
03CA A9 FB            140           LDA #HIRESL    ; memory.
03CC 8D 93 03         141           STA LINE1+$1
03CF 60               142           RTS
03D0                  143           END

##### END OF ASSEMBLY
```

The entire program is written in machine code and fits into Apple memory page three, so it's co-resident with BASIC programs. You can call it from a BASIC program, or directly. The program uses every possible available byte in page three ($300-$3CF), and just leaves enough room for the DOS vectors.

The program can operate on either page one or two of high-res graphics; and can flip, clear or set bit-7 of every byte; or complement every byte; or simply merge page two onto page one. Therefore, you can turn low bit colours (green and violet) into high bit colours (blue and orange), or vice versa, permanently or temporarily; or turn a white-on-black screen into a black-on-white screen; or merge page two onto page one. Of course, if you have a green screen the first three functions aren't going to be very useful to you unless you do commercial programming. But even so, the last two can help you a lot.

It's All In The Colours

The program does all these nifty things by taking advantage of the relatively simple way the Apple represents colours in memory. In every byte, bit-7 (the high bit) is used to indicate whether the byte represents green or blue, (or violet as opposed to orange). That's why you have two whites and two blacks. One has the high bit off, while the other has the high bit on. (In theory, it's possible to plot half a dot using these methods,

and achieve 560 x 192 resolution – but that's another story).

Now if the program flipped that high bit to its opposite state – that is, from high to low or low to high – you could change the colours. And if you set every byte on the screen, you either get a screen full of royal blue and ornamental orange, or institutional green and vivid violet. To flip the entire screen from white-on-black to black-on-white, the 6502 processor inside the Apple has a handy command called EOR (exclusive or). This function can find the opposite of a byte in less time than it takes you to say Retupmoc Elppa, and does the entire screen in about one second. Finally, the merge function is taken care of by a command called ORA (logical or). This is a relative of EOR, and its job is to merge two bytes into one. If you do that to every byte within the two pages of high-res graphics, you get a merged picture.

Calling The Program

The program is called by the command "CALL 768,X,Y". X is the parameter specifying page number and can be either '1' or '2'. Y is the parameter specifying function. '1' flips bit-7, '2' clears bit-7, '3' sets bit-7, '4' complements the whole screen, and '5' merges page two onto page one. (Sorry, but you can't specify which page to merge to and from for that function because there simply isn't enough memory to fit it all in!)

The program only runs in Applesoft BASIC because it calls a specific routine in the interpreter to convert the variables. So I apologise to all those Integer BASIC fans out there.

Listed in this article are two ways to enter the program. One is an Applesoft program, and the other is the hex dump. To enter the Graphics Muncher via BASIC, just run the program and then type BSAVE GRAPHICS MUNCHER,A$300,L$DO to save it. To enter the hex dump, type CALL-151; then type the rest of the dump as it is indicated. For example:

$300: A9 EA 8D 94 03 20 4C (RETURN)
$308: E7 E0 01 B0 02 A2 01 (RETURN)

Then type BSAVE GRAPHICS MUNCHER,A$300,L$DO to save that. And use {CTRL-C}, then {RETURN} to return to BASIC.

The original program has been included to show exactly how the program works. If the programming style looks a bit weird, that's because several structural sacrifices had to be made to fit the program into the 208 bytes available.

All This And More

Finally, a small BASIC graphics editor has been included as an example of how to interface the Graphics Muncher with an Applesoft program. ❑

Listing 2. Two ways to enter the program – Applesoft and hex dump.

The Applesoft listing

```
10  DATA 169,234,141,148,3,32,76,
    231,224,1,176,2,162,1,224,3,
    144,2,162,1,138,10,10,10,10,
    10,133,252,24,105,32,133,255
    ,32,76,231,224,1,176,2,162,1
    ,224,6,144,2,162,1,224,1,240
    ,15,224,2,240,32,224,3,240,4
    4,224,4,240,56,76,165,3,32,1
    97,3,169,105
20  DATA 141,149,3,169,128,141,15
    0,3,169,24,141,148,3,76,140,
    3,32,197,3,169,41,141,149,3,
    169,127,141,150,3,76,140,3,3
    2,197,3,169,9,141,149,3,169,
    128,141,150,3,76,140,3,169,1
    69,141,146,3,169,127,141,147
    ,3,169,81,141,149,3,169,251,
    141
30  DATA 150,3,169,0,133,251,160
    ,0,0,0,0,0,0,145,251,200,208
    ,246,230,252,165,252,197,255
    ,144,236,96,169,0,168,133,25
    3,169,32,133,252,169,64,133,
    254,177,253,17,251,145,251,2
    00,208,247,230,252,230,254,1
    65,252,201,64,208,237,169,17
    7,141,146,3
40  DATA 169,251,141,147,3,96
50  FOR I = 768 TO 975
60  READ J: POKE I,J
70  NEXT
80  PRINT  CHR$ (4);"BP"
```

The HEX dump

```
0300: A9 EA 8D 94 03 20 4C E7
0308: E0 01 B0 02 A2 01 E0 03
0310: 90 02 A2 01 8A 0A 0A 0A
0318: 0A 0A 85 FC 18 69 20 85
0320: FF 20 4C E7 E0 01 B0 02
0328: A2 01 E0 06 90 02 A2 01
0330: E0 01 F0 0F E0 02 F0 20
0338: E0 03 F0 2C E0 04 F0 38
0340: 4C A5 03 20 C5 03 A9 69
0348: 8D 95 03 A9 80 8D 96 03
0350: A9 18 8D 94 03 4C BC 03
0358: 20 C5 03 A9 29 8D 95 03
0360: A9 7F 8D 96 03 4C BC 03
0368: 20 C5 03 A9 09 8D 95 03
0370: A9 80 8D 96 03 4C BC 03
0378: A9 A9 8D 92 03 A9 7F 8D
0380: 93 03 A9 51 8D 95 03 A9
0388: FB 8D 96 03 A9 00 85 FB
0390: A0 00 00 00 00 00 00 91
0398: FB C8 D0 F6 E6 FC A5 FC
03A0: C5 FF 90 EC 60 A9 00 A8
03A8: 85 FD A9 20 85 FC A9 40
03B0: 85 FE B1 FD 11 FB 91 FB
03B8: C8 D0 F7 E6 FC E6 FE A5
03C0: FC C9 40 D0 ED A9 B1 8D
03C8: 92 03 A9 FB 8D 93 03 60
```

Listing 3. BASIC graphics editor.

```
10  REM ************************
15  REM *                      *
20  REM * SAMPLE HIRES EDITOR  *
25  REM * USING GRAPHICS       *
30  REM * MUNCHER.             *
35  REM *                      *
40  REM * BY IAN CHIA.24/11/83 *
45  REM *                      *
50  REM ************************
55  REM
56  REM
57  REM *** LOAD GRAPHICS MUNCHER

60  PRINT  CHR$ (4);"BLOAD GRAPHI
    CS MUNCHER,A$300"
65  REM
70  REM
100  TEXT : HOME : VTAB 7
110  PRINT "DO YOU WANT TO CLEAR"

120  PRINT "THE SCREEN? (Y/N) ";
130  GET A$
140  IF A$ <  > "Y" AND A$ <  > "
    N" THEN 100
150  PRINT A$: PRINT
160  IF A$ = "Y" THEN CLR = 1
170  VTAB 14
180  PRINT "DO YOU WANT TO LOAD I
    N"
190  PRINT "A PICTURE? (Y/N) ";
200  GET A$: PRINT A$
210  IF A$ <  > "Y" AND A$ <  > "
    N" THEN 170
220  IF A$ = "Y" THEN  GOSUB 500
230  IF CLR = 1 THEN  HGR
240  VTAB 21: POKE  - 16304,0: POKE
     - 16297,0: POKE  - 16301,0:
     REM DISPLAY HIRES GRAPHICS,
     PAGE 1, WITH TEXT WINDOW
250  PRINT "1 - FLIP BIT-7      2
    - CLEAR BIT-7"
260  PRINT "3 - SET BIT 7       4
    - COMPLEMENT SCREEN5 - MERGE
     PAGE 2 TO 1   ";
270  INVERSE : INPUT "ENTER #";Y
280  NORMAL
290  HOME : VTAB 21: INPUT "PAGE
    NUMBER 1 OR 2? ";X
300  IF X = 2 THEN  POKE  - 16302
    ,0: POKE  - 16299,0: REM
     FLIP TO PAGE 2 WITH NO TEXT
     WINDOW
310  CALL 768,X,Y
320  GET A$
330  POKE  - 16300,0: POKE  - 163
    01,0: REM FLIP BACK TO PAGE
    1 WITH TEXT WINDOW
340  HOME : VTAB 21: PRINT "(Q)UI
    T OR (G)O ON? ";
350  GET A$
360  IF A$ = "Q" THEN  TEXT : HOME
     : VTAB 5: END
370  IF A$ <  > "Q" AND A$ <  > "
    G" THEN 340
380  HOME : GOTO 240
500  REM *** DISK ROUTINE
510  HOME : PRINT "CATALOG? (Y/N)
     ";
520  GET A$: IF A$ <  > "Y" AND A
    $ <  > "N" THEN 510
530  PRINT A$
540  IF A$ = "Y" THEN  PRINT  CHR$
    (13) +  CHR$ (4);"CATALOG"
550  PRINT : PRINT "FILE NAME OF
    PICTURE TO BE LOADED:"
560  PRINT : INPUT PIC$
570  PRINT : PRINT "OK? (Y/N) ";
580  GET A$
590  IF A$ <  > "Y" AND A$ <  > "
    N" THEN 570
600  IF A$ = "N" THEN  PRINT : GOTO
    550
605  PRINT A$
610  PRINT : PRINT "LOAD INTO PAG
    E 1 OR 2? (1/2) ";
620  GET A$
630  IF A$ <  > "1" AND A$ <  > "
    2" THEN  PRINT : GOTO 610
635  PRINT A$
640  IF A$ = "1" THEN  PRINT  CHR$
    (4);"BLOAD";PIC$;",A$2000"
650  IF A$ = "2" THEN  PRINT  CHR$
    (4);"BLOAD";PIC$;",A$4000"
660  RETURN
```

BASICs AIN'T BASIC

Part 1.

BASIC stands for Beginners' All-purpose Symbolic Instruction Code, and was first developed at Dartmouth College about 25 years ago. Though the language has long been scorned by professional programmers, much has happened since the first versions of BASIC were released and today more people use it than any other language – because of its universal availability on microcomputers. In this series, Dom Swinkels takes a look at recent versions of BASIC developed for micros based on the Motorola 68000 CPU.

ONE VERSION of BASIC developed for micros based on the Motorola 68000 CPU is SVS BASIC-PLUS. SVS stands for Silicon Valley Software, and the version reviewed is Version 2.1 on the Sord M68 machine. Another version of what seems to be the same BASIC is called Computer System BASIC, which is available on the IBM 9000 produced by the instrument division of IBM. But first a few words about the hardware.

The Sord M68 Computer

When I reviewed the Sord M23 machine (*YC* September 1983) I felt it was a good machine for scientists and engineers, and this feeling is reinforced by the new M68 series. It is solidly built and has all the features one could want for interfacing it to the real world. Since Les Bell reviewed the M68 in the May issue of *YC*, I won't go into any detail about it. Figures 1 and 2 show what it looks like and the range of interface connections available at the rear of the machine.

The machine, as tested, had two built-in 13 cm floppy disk drives (1 Mbyte each), but there are connectors for additional external floppy disk drives and for a hard disk. The monitor was a green screen showing 25 lines by 80 characters of text and four pages of 640 by 400 graphics resolution. Clearly, all the hardware power one could require is there, and at $6800 the M68 is very reasonably priced.

There are three operating systems for the M68. These are CP/M 80 and Sord's proprietary OS for the Z80 processor, and CP/M 68K for the 68000 processor. The system senses which operating system is present at boot time and activates the appropriate processor. CP/M 68K comes with several well laid out and indexed manuals, including the *Operating System User's Guide*, the *Operating System Programmer's Guide* and the *C Language Programming Guide* – all written by Digital Research and printed in the USA. In addition, there are the more machine specific *Reference Guide for M68 Users* and the *GP-IB Programmer's Guide for M68 Users*, written by Sord. These two manuals are quite readable, but not indexed.

The languages available are FORTRAN, Pascal and of course BASIC – all from Silicon Valley Software.

SVS BASIC-PLUS

SVS BASIC-PLUS is clearly modelled on BASIC-PLUS for the Digital Equipment PDP 11 series minicomputers. Variable names can have up to 30 characters, so that meaningful names can be assigned. Numeric variables can be either integer or real, and the real variables cover the range +/-10E+/-308 with a precision of about 15 digits. This is the same as double precision on most other

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Z80 BENCHMARK (2Mhz Z80)

Program: Primes (Eratosthene's sieve)

Compiler	Execution Time	Compilation Time	Program Size
HI-TECH C	40	100	4153
Whitesmiths	60	420	15745
C/80	63	140	3584
Aztec	78	144	9168

8086 BENCHMARK (IBM PC under MS-DOS)

Program: Eight Queens

Compiler	Execution Time	Compilation Time	Program Size
HI-TECH C	14	105	4500
Lattice C	17	111	14000

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systems, yet the speed of calculation is greater than most other systems manage using single precision. For example, it calculates EXP(10) 10,000 times in about 55 seconds. In comparison, an IBM-PC using Microsoft BASIC takes about 75 seconds in single precision. The Apple Macintosh, which also uses the 68000 processor, took about 310 secs using Microsoft BASIC. However, using MacBASIC which is written specifically for the Macintosh is a different story – as we will see later in this series.

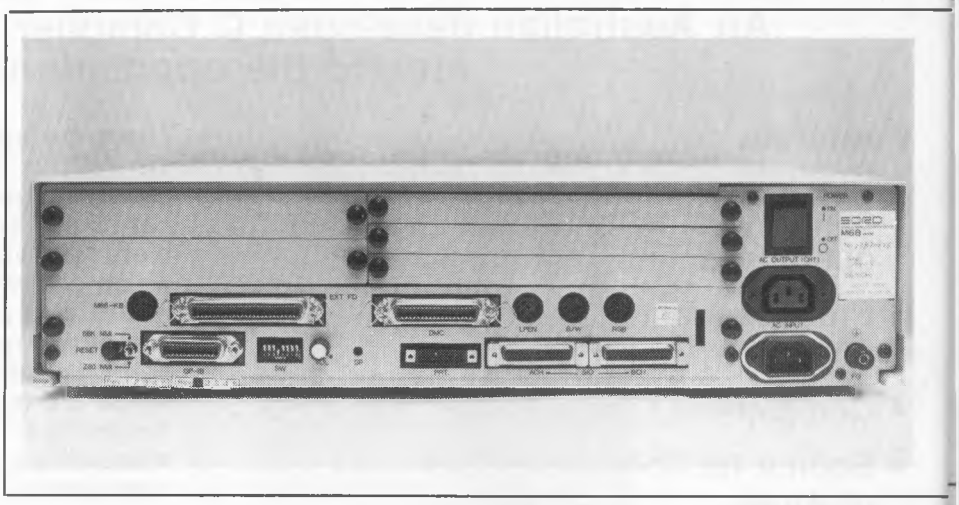
The result of the EXP(10) calculation in SVS BASIC-PLUS is 22026.4657948067, but a normal PRINT command will only print 22026.5, though all significant figures are carried in memory for further calculations. To print all 15 digits you must use the PRINT USING command and the 15th digit will not necessarily be correct.

I checked precision by printing 2 ↑ J for J = 1 TO 50 with 15 = digit precision, since errors are easy to spot in this series. All is well up to J = 48 where the result is high by 1 in the 15th digit.

On the other hand, the system variable PI is only correct to seven figures. The value given by SVS BASIC-PLUS is 3.14159257908399, while the correct value is 3.14159265358979. The difference may be trivial in most situations, but it costs no more to have it right to 15 places. I checked the precision of the trig functions (SIN, COS, TAN and ATN) and these seem to be accurate to about 15 places. So if you need an accurate value of PI, calculate your own; for example, MYPI = 4*ATN(1). By the way, the double-density version of BASIC-PLUS on the PDP 11 is correct to 15 decimal places.

Numeric Strings

If for some reason 15 digits are not enough, there are the numeric string operations which allow you to go to 55 significant digits. These are limited to the four basic operations of addition, subtraction, multiplication and division. To use them, you define your numbers as numeric strings such as A$ = "1234.56789" and B$ = "987.654321". New numeric strings are then formed using the functions:



```
C$ = SUM$(A$,B$)
D$ = DIF$(A$,B$)
E$ = PROD$(A$,B$,P)
F$ = QUO$(A$,B$,P)
```

to form the sum, the difference (A-B), the product and the quotient (A/B). The parameter P in the last two functions determines the number of decimal places retained in the result. Most everyday computations do not require this level of precision, but anyone working in number theory would probably find it very useful.

It reminds me of the story of the young soldier, who wanted to win the hand of the king's daughter. He performed many brave deeds in the service of the king. After one particularly valuable service the king offered him any reward he wished and the soldier asked for the king's daughter. The king refused, but promised him anything else instead. The king also declared that if he was unable or unwilling to grant his new request, the soldier could marry his daughter. The soldier went away to think about it and came back with his new request: he asked for a grain of wheat on the first square of a chess board and requested that the amount be doubled on each subsequent square until all 64 squares had been accounted for. The king readily agreed and sent his mathematicians away to work out how much grain he owed the soldier. The soldier got to marry the king's daughter, but your problem is to calculate exactly how many grains of wheat the soldier asked for. When you have thought about it you will see it's easy using the above functions but quite a problem otherwise.

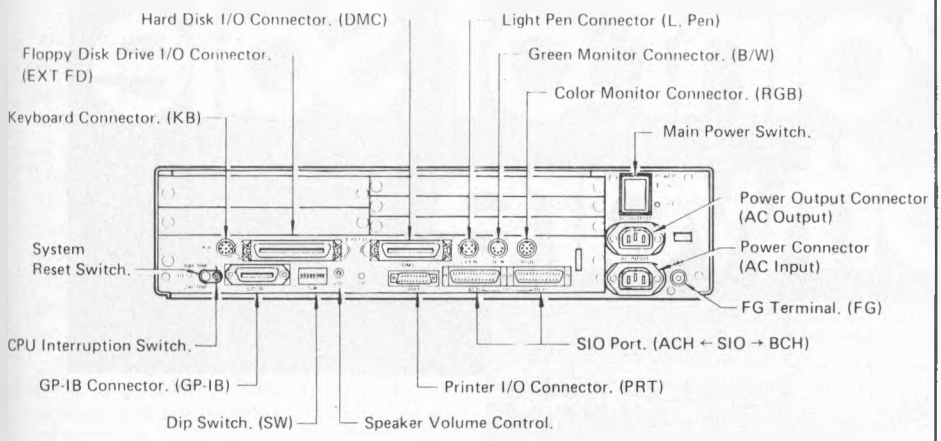
Matrix Commands

The attractions of SVS BASIC-PLUS are however not limited to its high speed and high precision features. It also provides a powerful set of matrix commands. Matrix commands are not often found in BASIC. They are of the form MAT <variable name> = ... or MAT <command> <variable name> where the variable name is the name of an array and the command is one of a number of simpler commands such as READ, INPUT and PRINT. Using these commands, entire arrays can be manipulated without FOR/NEXT loops. Some examples are:

```
MAT A = B + C
MAT X = (5) * X
MAT Y = X * Z
```

There are some requirements which must be met. Matrix addition or subtraction means that the corresponding elements of the two arrays are added or subtracted. This of course only makes sense if the two arrays are of the same shape, that is, they have the same number of columns and the same number of rows. Matrix multiplication requires that the number of columns in the first matrix (X in the above example) is the same as the number of rows in the second matrix (Z above). Finally, there are the three functions unique to matrix operations. These are:

TRN – Take the transpose of a matrix.



INV – Invert a matrix.
DET – Find the determinant of a matrix.

If you are mathematically oriented you will know the power these functions provide for solving simultaneous equations and for doing statistics or 3D graphics. All of them can be simulated using a number of FOR/NEXT loops, but these commands make computations requiring such operations a lot simpler to program and a lot faster to execute.

Matrix inversion is another good test of the speed of a machine/language combination. Inversion of a 40 by 40 matrix took 55 secs. This means that we could solve a set of 40 equatjons with 40 unknowns in less than a minute.

Program and Data Size

The Sord M68 tested had 256K of RAM. After loading the operating system and BASIC, about 85K was left for programs and data. This meant the biggest array which could be defined was about 100 by 100, since this requires 100 x 100 x 8 bytes in double precision. However, there seems to be no limit to the size of the program and its variables, other than the physical memory limitation. Even that is no limit to the size and number of arrays, as we can define virtual arrays which reside on disk. The only size limit for arrays, both in memory and on disk, seems to be that the total number of values in the array must be less than 32767. The largest square matrix possible is therefore 180 by 180, as this represents 181 x 181 = 32761 values. Some additional restrictions apply to string arrays but the ability to define virtual arrays on disk certainly provides a great deal of new power for BASIC, particularly with a hard disk. Using floppy disks is fairly slow, and operations such as inversion of a virtual array are impractical because of this. However, virtual string arrays provide a convenient alternative to random access files for storing and retrieving string data.

Another method of increasing the effective program size is through the use of COMMON and CHAIN commands. CHAIN "PART2" runs a program named PART2.BAS on the default disk. Normally the use of the CHAIN command resets all variables to zero and to null strings. But if some variables have been declared in COMMON, these variables are retained in memory and are immediately available in the new program.

Structured Programming

One criticism often levelled at BASIC is that it does not readily allow structured programming. Well, SVS BASIC-PLUS has more forms of conditional statements than most other languages, and allows the use of multi-line functions. A multi-line function has the form

```
DEF* FN<variable name>
(argument/s)
<statements>
FNEND
```

The statements within the function definition can use the optional arguments after the variable name, and when the function is used later these are replaced by the values used in the FN call.

The control statements available for structuring your program are:

```
IF-THEN-ELSE
WHILE-NEXT
UNTIL-NEXT
FOR-NEXT
FOR-WHILE
FOR-UNTIL
```

These can generally be used in two ways best shown by a couple of examples:

```
FOR J=1 TO 10:PRINT J:NEXT J
or PRINT J FOR J=1 TO 10
IF T>5 THEN PRINT "Time to go"
or PRINT "Time to go" IF T>5
```

It should be noted that in FOR/NEXT loops the loop counter must be used with NEXT (for example, NEXT J), to distinguish this from the NEXT without a loop counter used with WHILE or UNTIL. While testing the behaviour of the various control statements I got myself into several infinite loops, such as PRINT A UNTIL A>10. To get out of it I automatically hit Control C. This got me out of the loop but also dropped me out of BASIC and back to the operating system, with the result that I lost my BASIC program. There seems to be no way to interrupt a BASIC program from the keyboard without losing BASIC and your program. A few other facilities I have become used to are RENUMber, and the system variables TIME and DATE (or TIME$ and DATE$). None of these seem to be available in SVS BASIC-PLUS on the Sord M68.

Other Features

SVS BASIC-PLUS has all the usual mathematical functions (LOG, EXP, trigonometric functions, RND, SQR, INT, FIX, ABS and so on). String functions include LEFT, RIGHT, MID, LEN, INSTR and STRING$. There are no graphics commands in SVS BASIC-PLUS, but Sord has its own powerful graphics language (SGL), which is accessible from any language capable of printing ESC sequences. This is very useful as the same graphics routines can be used from BASIC, FORTRAN or Pascal. For some details of SGL see my article ▶

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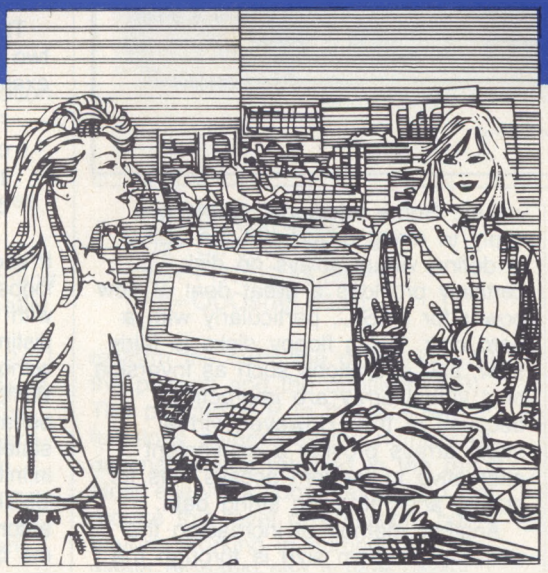

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in the September 1983 issue of *YC*. The M68 can use most SGL commands and all commands are clearly described with examples in the 220-page SGL manual.

BASIC programs are SAVEd on disk in text format, so they can be TYPEd from the operating system and can be edited using any text editor. Syntax is checked as each line is entered from the keyboard or loaded from disk. An error message is printed and the offending line is listed on the screen up to and including the character which the interpreter rejected. This does not stop you from entering additional lines. Subsequent LISTing of the program will start all lines containing an error with a question mark.

I found editing in SVS BASIC-PLUS quite a problem. There is no full screen editing capability. There is an EDIT <line number> command, but it is not described in the manual, which leaves a great deal to be desired. It consists of a 163-page reference manual, not a user manual or tutorial. It is assumed that the user has a basic grasp of the language, or that he will obtain that from one of the many books on BASIC. That is fair enough, but the manual does not have an index or an alphabetical listing of all the commands. This makes it difficult to find things in it. The IBM manual for Computer System BASIC, on the other hand, has about 450 pages including a 20-page index and a 192-page alphabetical listing of all commands with examples.

SVS BASIC-PLUS can be compiled to produce a file with the extension .BAC instead of .BAS. The compiled program can still be LISTed and all line numbers are shown, but instead of the original BASIC statements the message "Compiled Code" is displayed. You can add new lines of source code and RUN the combination of normal BASIC lines and compiled code, but such a combination program cannot be compiled again or loaded from disk. The compiled program does not run faster, so compilation only serves to hide your code from observation.

Another unusual feature of SVS BASIC-PLUS is that variables are not reset when you RUN or when you modify the program. This can be very useful during debugging, but it means you must define the initial values of all variables. Multiple assignment statements such as A,B,C = 0 are allowed, to make this easier.

Conclusions

BASIC for Motorola 68000-based machines has clearly come of age in SVS BASIC-PLUS. It has all the power and speed one could wish for. It provides high precision and has a wide range of conditional statements and function definitions to allow well structured programming. There are almost no limitations on program size and data size other than the physical limits of the machine.

There are some features to get used to, such as the need to initialise all variables in the program. The SVS version on the Sord M68 has some limitations, such as the lack of a RENUMber command, and the TIME and DATE functions. The manual could be significantly better, and you can't interrupt a BASIC program from the Sord keyboard without dropping out of BASIC altogether and going back to the operating system.

All in all, SVS BASIC represents a significant development of BASIC for microcomputers. ❑

Getting More From COMMODORE BASIC

BASIC is a great language for beginners, but we don't all stay beginners forever. Sooner or later you'll discover BASIC is just a bit too slow for some applications. There must be a way – should you learn assembly language? You don't have the time. What you can do is make an effort to improve your programming in BASIC; there are a thousand and one short cuts to learn – Andrew Farrell offers a few here.

WHAT THE BASIC manuals always fail to point out is that a few minor considerations before you start a program plus some changes in the way you structure or organise your code can result in significant speed improvements.

As well as this there is a fair collection of statements rarely used as few people understand how they really work. Take the WAIT statement, for example. In a games environment, where the player must move an object around the screen or aliens must be moved according to a little simplified logic, the use of Boolean Arithmetic can greatly decrease the amount of code needed while increasing the speed.

Before I explain how we can use some of the above ideas, let's have a look at a few principles worth sticking to. To fully understand why they work you'll need a bit of an insight into how the BASIC Interpreter operates.

Program Storage

We all know that BASIC programs are stored in order of their line numbers. The text is compacted into an abbreviated form by replacing commands with a single value. For example, the keyword 'THEN' is stored as the number 167. These codes are known as tokens. This compressing process saves space in memory and when you store your programs on disk or cassette.

Between each compacted line is a link address which tells BASIC where the next line starts. This link is followed by our line number, the line itself and then a zero to signify the line has ended.

The very end of our program is flagged by three zeros at the end of the last line. If these are missing, when you type 'LIST' the display will contain a lot of rubbish after the last line. This may also happen if the links are upset or part of the program corrupts. Why would that happen?

Well, you don't have to worry about your program just falling to bits, but if you accidentally POKE the wrong location or LOAD some sprites or characters in the wrong place, things may get a little messy.

Run Time

Now we have a bit of an idea how it's all stored, let's see what happens when you type 'RUN'. First BASIC executes the CLR statement to ensure all our variable pointers are pointing to the right place and all our variables are zero. A variable pointer tells the operating system where a certain type of variable is stored; there's a special area for arrays, another for strings and another for plain old numbers.

Next it grabs the first character from the first line and starts trying to make sense of it all. If it runs into a GOTO statement the operating system scans your program from start to finish, searching for the line number. As you can imagine, the higher the line number is in relation to the rest of your program, the longer BASIC has to scan for it.

So we come to our first two tips:

- Always place routines which are

often called upon close to the start of your program.

■ Place routines which are only used once or twice at the end of your program along with any DATA statements.

I often start programs with the line '1 GOTO 1000'. This leaves plenty of space for placing all those time-critical operations at the start of your program.

IF condition THEN statement

Program direction or flow often changes with the use of an 'IF-THEN' statement. It is this statement which, when modified a little, can often make a great speed difference. This is especially true if it is part of a FOR – NEXT loop. So to tips three and four:

■ The most common path of program flow should be via the most direct route – that is, the part after the THEN statement should be the last executed section.

■ Do not do wasteful testing. If a condition has already been established, avoid double testing it. This is especially true in large programs.

The 'IF-THEN' statement can often be removed by use of 'ON n GOTO' or 'ON n GOSUB'. Perhaps an example is required here:

```
10 IF X=1 THEN 100
20 IF X=2 THEN 200
30 IF X=3 THEN 300
40 IF X=..etc
```

This may be condensed to:

```
10 ON X GOTO 100,200,300,400...
```

Far tidier and much faster. Once you have mastered the use of a statement don't assume that is the only way to do things. Always look for short cuts, and most of all put into practice any you discover.

Variables

Numbers may be stored as integers or floating point variables. The crazy part is no matter which way you do it they are converted back to floating point when involved in an expression. This takes time and in an often-executed expression will be quite significant. So the next tip is:

■ Unless you really need the space saved, use floating point variables.

This next tip is very interesting, as it is perhaps the least obvious or least expected of the improvements that could be made to your program. Conversion from one form of variable to another takes time, as we have already established. However, so does the conversion required to change an ASCII value to a decimal value. When does that occur? Look at the following example.

```
POKE 1024,5
```

Stored in a program the 'POKE' command would be tokenised. When run, the 1024 and the five must be converted to integers and then to floating point, in case they are to be operated on, then back to an integer, a time-consuming process. This next tip can sometimes double the speed of operation.

■ Use variables, not constants, in place of ASCII numbers.

In the above example we could define the value C=1024 and P=5 to be used later as:

```
POKE C,P
```

The result is easier to read if you use meaningful variables, not to mention a little faster. This rule can be carried to its greatest extreme by replacing all constants, even a '1', with variables. That way you've already done the job of converting ASCII to integer and integer to floating point before that value is ever used.

A Dot Ahead of the Rest

We often have to use the value zero in a 'FOR-NEXT' loop or in an 'IF-THEN' statement. Clearing an area of memory may also call for the use of POKE n,0. Next time you do that, try replacing the zero with a '.'. Simple. BASIC interprets the decimal point as equalling zero faster than anything else around. I can think of several hundred uses straightaway.

Logical Operators

You'll often see them in the IF-THEN statement. Used properly they can save a lot of space and execution time. A complex decision based on several variables can be made without too much fuss. Here's an example.

```
10 INPUT "Start ";s
20 INPUT "End ";e
30 IF (S>E) OR (S<1) OR (E>100)
   THEN STOP
40 PRINT "The rest of the
   program.."
```

Nice and simple. We collect two variables 'S' and 'E'. Then in line 30 we make sure that 'S' and 'E' do not exceed the limitations placed on them and that 'S' is not greater than 'E'. A typical use for the above statement may be in a database when you're asking for the range of records to Delete or Copy. We wouldn't want a value higher than the last record or lower than the first. Also, the start of the range would have to be less than the end.

In the above case use of the 'OR' function within an IF-THEN statement was fine. Now let's have a look at another example.

```
10 GET R$: IF R$=" " THEN 10
20 IF R$="(csr left)" THEN
   X=X+1
30 IF R$="(csr right)" THEN
   X=X-1
40 IF R$="(csr down)" THEN
   Y=Y+1
50 IF R$="(csr up)" THEN Y=Y-1
60 IF X>20 THEN X=1
70 IF X<1 THEN X=20
80 IF Y>23 THEN Y=1
90 IF Y<1 THEN Y=23
100 POKE SC=X=(Y*40),81
110 GOTO 10
```

Very messy, not to mention frightfully slow. There must be another way. With a bit of knowledge about the AND, OR and NOT statements you could probably narrow things down a bit, but there's an even better way. Have a close look at the next program – it does exactly the same as the previous example.

```
10 POKE 198,0: WAIT 198,1: GET
   R$
20 X=X+(R$="(csr left)")-(R$="csr
   right)")
30 Y=Y+(R$="(csr up)")-
   (R$="(csr down)")
40 X=X+(20*(X<1))+(20*(X>20))
50 Y=Y+(23*(Y<1))+(23*(Y>23))
60 POKE SC+X+(Y*40),81
70 GOTO 10
```

As you can see, it's a whole lot shorter than our first attempt at – well, it should move a ball around the screen. Of course, we would have to add another line to make sure our ball was visible, but let's not worry about that.

Line 10 is different. POKE 198,0 says make sure there are no characters in the keyboard buffer. This stops any nasty accidental keypresses slipping through; WAIT 198,1 means wait until location 198 contains the value one. Remember, location 198 is the place where our computer stores the number of characters in the keyboard buffer waiting to be processed by your program or the operating system.

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★ **Onboard battery backed calendar clock** can time and initiate calls or keep an activity log. The clock is ProDos compatible and is automatically recognised. It is also accessible for other uses.

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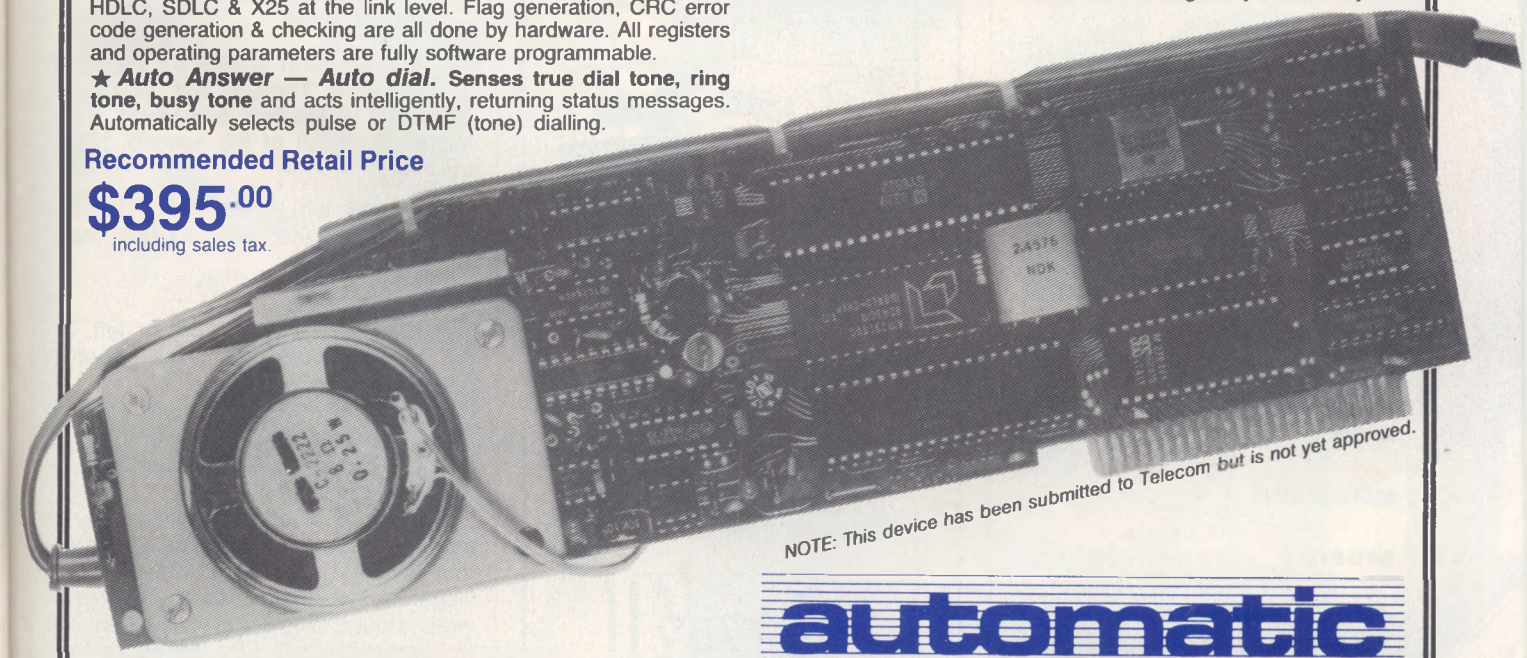
★ Has socket for installation of DES data cypher chip for security, identification & EFT applications. *Permission is required from the American State Dept. for purchase of cypher chip.*

★ The modem contains three very sophisticated software programmable integrated circuits connected to all aspects of the hardware and a large amount of unused EPROM space. It is envisaged that additional features will be added to the firmware in future. The documentation is presently limited but the full operation of the hardware and firmware will eventually be documented.

★ **A mini word processor** in EPROM allows pre-composition of memos which can then be sent with a single keystroke entry.

Recommended Retail Price

$395.00
including sales tax.



NOTE: This device has been submitted to Telecom but is not yet approved.

THE FOLLOWING UNITS WILL BE AVAILABLE LATE JANUARY 1985:

★ A plug-in card modem as above to suit the IBM PC — $445.00 including sales tax.

★ RS232 Intelligent stand-alone modem for the Apple IIc, Commodore, Macintosh and all terminals with an RS232 port — $295.00 including sales tax.

automatic ice company

10 Smith Street, Charlestown. 2290. N.S.W.
Tel: (049) 63 3188

COMMODORE BASIC

Next we grab a character, just as you normally do with GET R$. Now's where the fun begins. I've scrapped all those IF statements and replaced them with a much faster statement which uses the results of relationship tests to decide what to do.

Any given comparison, whether it is performed by a relationship operator such as '<','>','=' or a Boolean operator such as 'AND' or 'OR', produces an arithmetic true/false result. Try the following:

```
PRINT (2=2)
```

A minus one will appear. This means the expression was evaluated as being true. Now try:

```
PRINT (2=3)
```

A zero will appear. This means the expression is false. We can use this evaluation in programs. In fact the above example uses plenty of them, which is why we are all so confused at this very moment. The evaluation may also take place in string comparisons such as in line 20. Try this:

```
PRINT (R$="FRED")
(R$="FRED")
```

The expression is true so the result is minus one. Thus, in line 10,X=X+ the result of the first expression minus the result of the second. Now try this:

```
R$="(csr left)" X=5
X=X-(R$="(csr left)")+(R$="(csr
right)")
PRINT X
```

Since R$ is equal to cursor left, X will be equal to X-(-1). Don't forget a positive minus a negative is a positive. So X=X+1. If none of that makes sense one of us is failing miserably – and since it's probably me I'll keep trying.

Line 30 modifies the Y value in much the same way as line 20 does the X value. Lines 40-50 check for illegal values and cause the ball to wrap around if it does exceed any of the limitations set. Line 60 sticks the ball on the screen. Now for line 65:

```
65 POKE 55296+X+(Y*40),1
```

And line 5:

```
5 X=1:Y=1
```

Now you've got the whole program, type it in and try it out. For a fair comparison of the speed differences run the first program just for fun. ❑

TV Star

ONLY 80c

8 DAYS OF TV PROGRAMS

It's fast becoming the magazine everyone needs as their guide to the best television . . . TV Star is the showbiz specialist! The big stories, the best pix both at home and Hollywood: It's here first!

PROGRAMMED FOR ENTERTAINMENT

Reactor Chase

The aim of this game is to de-activate all the reactors on the screen by entering them at the base and exiting at the top.

Caution: If you touch the border or your own trail (both coloured light green) you will die, and also condemn about another 100,000 people to a lingering death for every reactor you leave active.

If you are successful in clearing the first screen, you will be sent to screen 2 which has five reactors, and then to screen 3 which has seven.

If you manage to de-activate all 15 reactors you will be awarded the 'Gold Star', and enjoy the immense gratitude of the populace.

Warning: Choose your level carefully – 'Expert' is very fast indeed.

R. Woodhouse
Tullamarine, VIC

```
1  REM   ******************
2  REM   *                *
3  REM   * REACTOR CHASE *
4  REM   *                *
5  REM   * APPLE ][ 48K  *
6  REM   *  R.WOODHOUSE  *
7  REM   *                *
8  REM   ******************
9  HOME
10  VTAB 12: HTAB 12: PRINT "* RE
     ACTOR CHASE *"
11  FOR W = 1 TO 3000: NEXT W
12  HOME
13  VTAB 12: PRINT "  DO YOU WANT
      INSTRUCTIONS? (Y/N)
14  PRINT : INPUT " > ":A$
15  IF A$ <  > "Y" THEN 17
16  GOSUB 6000
17  GOSUB 6500
20 LEVEL = 1
30  GR :P = 3:SC = 0: HOME
35 Q =  RND (1)
40 A = 0:B = 20
50  GOSUB 5000
60  VTAB 22: HTAB 22: PRINT "SCOR
     E :"
70  VTAB 22: HTAB 5: PRINT "LEVEL
      : ":LEVEL
90  COLOR= 12
100  HLIN 0,39 AT 0
110  HLIN 0,39 AT 39
120  VLIN 0,39 AT 0
130  VLIN 0,39 AT 39
140  HLIN 7,12 AT 20
150  HLIN 27,32 AT 20
160  HLIN 17,21 AT 14
170  HLIN 17,21 AT 24
1000 X =  PEEK ( - 16384)
1010  POKE  - 16368,0
1020  IF X = 193 THEN 3000
1030  IF X = 218 THEN 4000
1040  PLOT A,B
1050 A = A + 1
1060  FOR T = 1 TO 2: NEXT
1070  IF  SCRN( A,B) = 12 THEN  GOTO
     10000
1075  IF SC = P THEN  GOTO 7000
1085  HTAB 30: VTAB 22: PRINT SC
1090  GOTO 1000
2000 X =  PEEK ( - 16384)
2010  POKE 16368,0
2020  IF X = 193 THEN 3000
2030  IF X = 218 THEN 4000
2040  PLOT A,B
2050 A = A - 1
2060  FOR T = 1 TO 2: NEXT
2070  IF  SCRN( A,B) = 12 THEN  GOTO
     10000
2075  IF SC = P THEN 7000
2085  HTAB 30: VTAB 22: PRINT SC
2090  GOTO 2000
3000 X =  PEEK ( - 16384)
3010  POKE  - 16368,0
3020  IF X = 149 THEN 1000
3030  IF X = 136 THEN 2000
3040  PLOT A,B
3050 B = B - 1
3060  FOR T = 1 TO 2: NEXT
3070  IF  SCRN( A,B) = 12 THEN 10
     000
3075  IF SC = P THEN  GOTO 7000
3080  IF  SCRN( A,B) = 13 AND  SCRN(
     A,B - 1) = 9 THEN SC = SC +
     1: PRINT  CHR$ (7)
3085  HTAB 30: VTAB 22: PRINT SC
3090  GOTO 3000
4000 X =  PEEK ( - 16384)
4010  POKE  - 16368,0
4020  IF X = 149 THEN 1000
4030  IF X = 136 THEN 2000
4040  PLOT A,B
4050 B = B + 1
4060  FOR T = 1 TO 2: NEXT
4065  IF  SCRN( A,B) = 12 THEN 10
     000
4070  IF  SCRN( A,B) = 12 THEN 10
     000
4075  IF SC = P THEN 7000
4085  HTAB 30: VTAB 22: PRINT SC
4090  GOTO 4000
5000  COLOR= 1
5010 D = 7:E = 32:F = 17:G = 10:H
      = 27:I = 32
5020 J = 7:K = 10:L = 27:M = 10
5030 N = 17:O = 32:S = 17:T = 21
5040  VLIN E - 3,E AT D + 1
5050  VLIN E - 3,E AT D + 3
5060  VLIN E - 4,E - 3 AT D + 2
5070  PLOT D,E: PLOT D + 4,E
5080  COLOR= 13: PLOT D + 2,E - 2
     : COLOR= 9: PLOT D + 2,E - 3

5090  COLOR= 1
5100  VLIN G - 3,G AT F + 1
5110  VLIN G - 3,G AT F + 3
5120  VLIN G - 4,G - 3 AT F + 2
5130  PLOT F,G: PLOT F + 4,G
5140  COLOR= 13: PLOT F + 2,G - 2
     : COLOR= 9: PLOT F + 2,G - 3

5190  COLOR= 1
5200  VLIN I - 3,I AT H + 1
5210  VLIN I - 3,I AT H + 3
5220  VLIN I - 4,I - 3 AT H + 2
5230  PLOT H,I: PLOT H + 4,I
5240  COLOR= 13: PLOT H + 2,I - 2
     : COLOR= 9: PLOT H + 2,I - 3

5280  IF SC > 2 THEN 5290
5285  RETURN
5290  COLOR= 1
```

```
5300  VLIN K - 3,K AT J + 1
5310  VLIN K - 3,K AT J + 3
5320  VLIN K - 4,K - 3 AT J + 2
5330  PLOT J,K: PLOT J + 4,K
5340  COLOR= 13: PLOT J + 2,K - 2
     : COLOR= 9: PLOT J + 2,K - 3

5390  COLOR= 1
5400  VLIN M - 3,M AT L + 1
5410  VLIN M - 3,M AT L + 3
5420  VLIN M - 4,M - 3 AT L + 2
5430  PLOT L,M: PLOT L + 4,M
5440  COLOR= 13: PLOT L + 2,M - 2
     : COLOR= 9: PLOT L + 2,M - 3

5480  IF SC > 7 THEN 5490
5485  RETURN
5490  COLOR= 1
5500  VLIN O - 3,O AT N + 1
5510  VLIN O - 3,O AT N + 3
5520  VLIN O - 4,O - 3 AT N + 2
5530  PLOT N,O: PLOT N + 4,O
5540  COLOR= 13: PLOT N + 2,O - 2
     : COLOR= 9: PLOT N + 2,O - 3

5590  COLOR= 1
5600  VLIN T - 3,T AT S + 1
5610  VLIN T - 3,T AT S + 3
5620  VLIN T - 4,T - 3 AT S + 2
5630  PLOT S,T: PLOT S + 4,T
5640  COLOR= 13: PLOT S + 2,T - 2
     : COLOR= 9: PLOT S + 2,T - 3

5999  RETURN
6000  HOME : VTAB 3: PRINT "THE O
     BJECT OF THIS GAME IS TO
            DE-ACTIVATE ALL THE A
     TOMIC REACTORS ON"
6010  PRINT "THE SCREEN BY ENTERI
     NG THEM AT THE       BOTTOM A
     ND LEAVING THEM AT THE TOP,
         BEFORE THEY EXPLODE."
6015  PRINT
6020  PRINT "YOU MUST NOT TOUCH T
     HE BORDER,THE        BARRIERS
      OR YOU OWN TRAIL (ALL COLOU
     RED LIGHT GREEN) OR YOU WILL
      DIE OF          RADIATION PO
     ISONING AND THE REACTORS
     WILL MELT DOWN, KILLING THOU
     SANDS OF     PEOPLE!!!!!"
6030  PRINT : PRINT "IF YOU CLEAR
      ALL REACTORS ON THE FIRST
     SCREEN YOU WILL BE TAKEN TO
     THE NEXT     LEVEL WHICH IS H
     ARDER"
6040  PRINT : PRINT "USE THE 'A'
     AND 'Z' KEYS FOR UP AND
     DOWN MOVEMENT AND THE '<-' A
     ND '->'      KEYS FOR LEFT AN
     D RIGHT."
6050  PRINT : PRINT : PRINT "
     PRESS <SPACE> WHEN READY TO
     START"
6060  GET A$
6070  RETURN
6500  HOME : VTAB 12: HTAB 3: PRINT
     "ENTER YOUR RATING"
6510  HTAB 22: PRINT "(B)EGINNER
6520  HTAB 22: PRINT "(A)VERAGE
6530  HTAB 22: PRINT "(E)XPERT
6540  GET A$
6550  IF A$ = "B" THEN Z = 400
6560  IF A$ = "A" THEN Z = 200
6570  IF A$ = "E" THEN Z = 100
6580  RETURN
7000  TEXT : HOME
7010  IF SC >  = 8 THEN 7100
7020 P = 8:LEVEL = 2
7030  VTAB 12: HTAB 15: PRINT "PL
     EASE WAIT"
7040  FOR R = 1 TO 1500: NEXT R: HOME

7050  GR
7060  GOTO 40
7100  TEXT : HOME
7110  IF SC > 14 THEN 8000
7120 P = 15:LEVEL = 3
7130  VTAB 12: HTAB 15: PRINT "PL
     EASE WAIT"
7140  FOR R = 1 TO 2000: NEXT R: HOME

7150  GR
7160  GOTO 40
8000  TEXT : HOME : VTAB 12: HTAB
     12: PRINT "CONGRATULATIONS"
8010  PRINT : PRINT " YOU HAVE SA
     VED ": INT ((15 + Q) * 10000
     );" PEOPLE"
8020  PRINT : PRINT "YOU WILL BE
     AWARDED THE GOLD STAR"
8030  PRINT : HTAB 10: PRINT "FOR
      EXCELLENCE"
8040  GOTO 8040
10000  FOR A = 1 TO 5
10001  HGR : HCOLOR= 5: POKE 28, PEEK
     (228): CALL 62454
10002  FOR X = 1 TO 30: NEXT X: PRINT
      CHR$ (7)
10003  HGR2
10004  NEXT A
10005  TEXT : HOME : PRINT : PRINT
     "    YOU BLEW IT!!!!!"
10010  PRINT : PRINT "BECAUSE OF
     YOU ": INT (((15 - SC) + Q) *
     100000);" PEOPLE DIED"
10020  PRINT : PRINT "DO YOU WISH
     TO TRY AND DO BETTER"
10030  PRINT : PRINT "         NEX
     T TIME"
10040  PRINT : INPUT " > ":A$
10050  IF A$ = "Y" THEN 20
```

Computer Cricket

This game originated during the cricket season last year, after I watched so many games get washed out by rain. The computer game can be played by two people or two teams. The program allows you to use the names in the data statements, or to select your own teams.

About the only significant feature not included here is sundries, which I found slowed down the game too much.

Key 'W' bowls the ball.

Key 'A' moves the batsman left.

Key 'D' moves the batsman right.

Key 'S' swings the bat.

It takes a lot of practice, but it is possible to obtain scores in excess of 300 for a team and the odd century for an individual player.

Line 2000 must use abbreviated commands for 'POKE' to remain within the maximum number of characters allowed for a line.

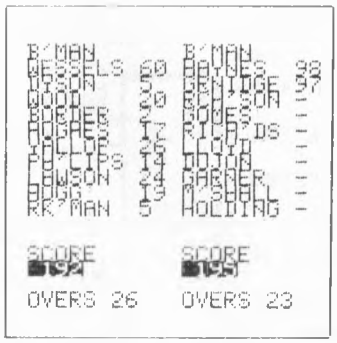
To obtain a printout of the final scores hit key 'P' at the end of the game. The game ends automatically if Team 2's score exceeds that of Team 1.

Programmer's Note: When this program was first completed it ran too slowly to be very exciting or challenging. By substituting variables for real numbers the speed of the program was increased dramatically, as variables are stored in binary and the time required to convert real numbers to binary is eliminated. Also, the most used variables were stated first.

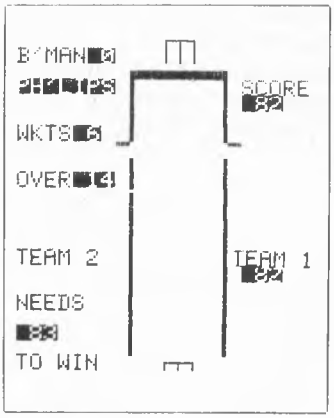
K. A. Vonhoff
Toowoomba, QLD

```
1 FORI=828TO889:READA:POKEI,A:NEXT
2 DATA173,232,3,174,230,3,157,139,30,166,197,224,17
3 DATA240,19,224,18,240,29,173,231,3,174,230,3
4 DATA157,139,30,169,2,157,139,38,96
5 DATA174,230,3,224,3,240,4,202,142,230,3,76,79,3
6 DATA174,230,3,224,5,240,4,232,142,230,3,76,79,3
7 BL=RND(-TI)
9 BL=8129:BT=0
10 PRINT"":K=0:K1=0:K2=1:S1=0:S2=0:K3=8:K4=81:K6=197:K7=9:K8=41:CO=30720:K5=2
11 K9=93:SC=7702:BD=-22:K0=87
16 P2=32:S3=0:P1=32:O=0:P=32:B0=77:B1=64:B2=78:B3=21:B4=22:B5=23
20 RS=1:BS=0:W=0:G=0:G1=0
21 POKE998,5:POKE999,87:POKE1000,32
25 DIMA$(19),A(19),TS(2)
26 TS(0)=0:TS(1)=0
27 NZ=0
30 FORI=0TO19:A(I)=0:NEXT
31 PRINT"DO YOU WISH TO ENTER  NAMES FOR YOUR TEAMS? TYPE 'Y'OR'N'
32 GETN$:IFN$=""THEN32
33 IFN$="N"THENGOSUB8100:GOTO46
34 PRINT"YOUR TEAM - KEEP NAMESLESS THAN 7 LETTERS":FORI=1TO2000:NEXT
35 FORI=0TO9:INPUT"PLAYER";A$(I):NEXT
37 PRINT"OPPOSITION TEAM -      7 LETTERS MAXIMUM:":FORI=1TO2000:NEXT
40 FORI=10TO19:INPUT"PLAYER";A$(I):NEXT
46 POKE36879,95
50 PRINT""
55 PRINT"|||"
56 PRINT""
60 FORI=1TO4:PRINT"         ":NEXT
65 PRINT"             "
70 FORI=1TO13:PRINT"         ":NEXT
75 PRINT""
80 RS=1:CK=0
90 PRINT"B'MAN";"";BS:PRINT"";A$(NZ)
91 PRINT"SCORE";"";"";TS(G1)
92 PRINT"WKTS";"";W
94 PRINT"OVER";"";OV:RQ=TS(0)-TS(1)+1
95 PRINT"TEAM 1";"";TS(0)
96 PRINT"TEAM 2"
97 PRINT"NEEDS";RQ
98 PRINT"TO WIN"
100 K=PEEK(K6)
150 IFK=K7ANDS1=K1THENS1=S1+K2:O=O+K2:IFO=7THENO=K2:OV=OV+K2:PRINT"";OV
155 IFS1<>K1THENGOSUB2000
160 IFK=K8ANDS2=K1THENS2=S2+K2
165 IFS2<>K1THENCK=K2:GOSUB3000
180 ONCKGOTO900
190 SYS(828)
900 ONRSGOTO100
1000 GOTO50
2000 IFS1=K2THENPOKEBL+CO,K5:POKEBL,K4:S1=K5:R1=INT(RND(1)*5)+12:R2=INT(RND(1)*4)+K2:RETURN
2020 POKEBL,P2:POKEBL+CO,K2
2030 IFS1=R1THENGOSUB2500
2050 BL=BL+BD:S1=S1+K2:P2=PEEK(BL)
2054 IFBT=BLTHENS1=0:POKEBL+CO,1:POKEBL,42:P2=32:P1=32:BD=-22:BT=0:N=N+1:GOTO400
2055 IFBL<SCTHENS1=0:BD=-22:BL=8128+INT(RND(1)*5)+1:P2=32:CK=0:RETURN
2056 IFP2=K9THENS1=0:POKEBL,78:BD=-22:P2=32:BL=8128+INT(RND(1)*5)+1:S2=0:RS=0:GOTO5000
2057 IFP2=K0ANDBD=-22THENPOKEBL,42:GOSUB2100:GOTO5100
2060 POKEBL+CO,K5:POKEBL,K4
2070 RETURN
2100 S1=0:BD=-22:P2=32:BL=8128+INT(RND(1)*5)+1:S2=0:RS=0
2110 PRINT"L.B.W"
2120 RETURN
2500 ONR2GOTO2510,2515,2520,2525
2510 BD=-22:RETURN
2515 BD=-45:RETURN
2520 BD=-43:RETURN
2525 BD=-44:RETURN
3000 IFS2=K2THENPK=PEEK(998):BM=7819+PK:BT=BM-22:POKEBT+CO,K2:POKEBT,K9:S2=K5:RETURN
3005 POKEBT,P1
3007 IFS2=K3THENS2=0:POKEBT,P1:P1=32:BT=0:CK=0:RETURN
3008 N=S2-K2:ONNGOTO3010,3011,3012,3013,3014,3015
3010 SB=B0:BT=BM-B5:GOTO3026
```

```
3011 SB=B1:BT=BM-K2:GOTO3026
3012 SB=B2:BT=BM+B3:GOTO3026
3013 SB=K9:BT=BM+B4:GOTO3026
3014 SB=B0:BT=BM+B5:GOTO3026
3015 SB=B1:BT=BM+K2
3026 IFBT=BLTHENS1=0:POKEBL+CO,1:POKEBL,42:P2=32:P1=32:BD=-22:BT=0:GOTO4000
3030 S2=S2+K2
3035 P1=PEEK(BT)
3040 POKEBT+CO,K2:POKEBT,SB
3050 RETURN
4000 POKE36878,15:FORI=1TO3:POKE36875,235:NEXT:POKE36875,0:POKEBL,32:CK=0:S2=0:K
=64
4010 BL=8129+INT(RND(1)*5):PRINT"□"
4015 ONNGOTO4020,4025,4030,4035,4040,4045
4020 FORI=8119TO8185STEP22:POKEI,160:NEXT:FB=8118:GOTO4100
4025 FORI=7723TO8185STEP22:POKEI,160:NEXT:FB=7722:GOTO4100
4030 FORI=7687TO7694:POKEI,160:NEXT:FB=7713:GOTO4100
4035 FORI=7680TO8142STEP22:POKEI,160:NEXT:FB=7703:GOTO4100
4040 FORI=7900TO8164STEP22:POKEI,160:NEXT:FB=7901:GOTO4100
4045 FORI=8098TO8164STEP22:POKEI,160:NEXT:FB=8143
4100 IFOV<15THENR7=INT(RND(1)*2)+1:GOTO4110
4105 R7=INT(RND(1)*2)+2
4110 FORI=1TOR7:POKE7749+INT(RND(1)*15)+INT(RND(1)*16)*22,87:NEXT
4210 IFS3=K1THENS3=S3+K2
4220 IFS3<>K1THENGOSUB6000
4225 IFTS(1)>TS(0)THENG1=2:GOTO7000
4265 IFS3=K1THENRS=0:PRINT"□":RETURN
4270 GOTO4210
4500 RETURN
5000 POKE36878,15:FORI=1TO50:POKE36877,245:NEXT:POKE36877,0:CK=0:NZ=NZ+1:S2=0:K=
64
5004 BS=00:W=W+1
5015 G=G+1:IFW=10THENW=0:O=0:G1=G1+1:GOTO7000
5020 RETURN
5100 POKE36878,15:POKE36874,175:FORX=1TO20:NEXT:POKE36874,0:CK=0:NZ=NZ+1:S2=0:K=
64
5104 W=W+1
5110 BS=00:G=G+1:IFW=10THENW=0:O=0:G1=G1+1:GOTO7000
5115 FORX=1TO1500:NEXT
5120 RETURN
6000 IFS3=K2THENPOKEFB,K4:S3=K5:R4=INT(RND(1)*3)+K2:R5=INT(RND(1)*17)+4:RETURN
6010 POKEFB,P
6015 IFS3=R5THENGOTO7200
6025 ONNGOTO6029,6034,6039,6044,6049,6054
6029 ONR4GOTO6030,6031,6032
6030 FB=FB-B4:GOTO6060
6031 FB=FB-K2:GOTO6060
6032 FB=FB-B5:GOTO6060
6034 ONR4GOTO6035,6036,6037
6035 FB=FB+B4:GOTO6060
6036 FB=FB-K2:GOTO6060
6037 FB=FB+B3:GOTO6060
6039 ONR4GOTO6040,6041,6042
6040 FB=FB+B4:GOTO6060
6041 FB=FB+B3:GOTO6060
6042 FB=FB+B5:GOTO6060
6044 ONR4GOTO6045,6046,6047
6045 FB=FB+B4:GOTO6060
6046 FB=FB+K2:GOTO6060
6047 FB=FB+B5:GOTO6060
6049 ONR4GOTO6050,6051,6052
6050 FB=FB-B3:GOTO6060
6051 FB=FB+K2:GOTO6060
6052 FB=FB+B5:GOTO6060
6054 ONR4GOTO6055,6056,6057
6055 FB=FB-B4:GOTO6060
6056 FB=FB+K2:GOTO6060
6057 FB=FB-B3:GOTO6060
6060 S3=S3+K2
6065 IFPEEK(FB)=K0ANDINT(RND(1)*K3)<>5THENPOKEFB,42:S3=0:BS=00:PRINT"CAUGHT":GOT
05000
6066 IFFB>8163ORFB<SCTHENS3=R5:GOTO6015
6069 P=PEEK(FB)
6070 POKEFB+CO,K5:POKEFB,K4
6080 RETURN
7000 PRINT"□":PRINT"■B'MAN";TAB(11);"B'MAN"
7010 FORI=0TO9:PRINTA$(I);TAB(7);STR$(A(I));TAB(11)A$(I+10);TAB(18);
```

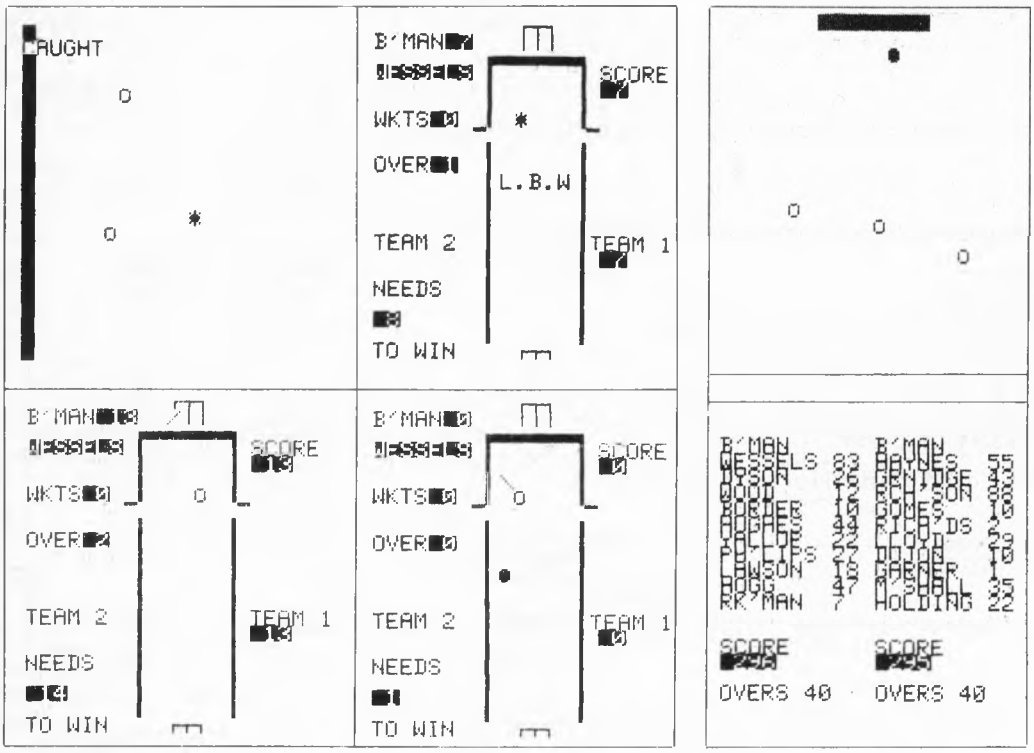


Two final score boards.



Initial screen display

Continued over . . .



COMPUTER CRICKET CONTINUED

◄ **After the ball has been hit the screen changes to display the field and fielders.**

◄ **Final score at the end of the game.**

Top left: Caught out.
Top right: LBW.
Above left: Bowled.
Above right: Batsman preparing to hit the ball.

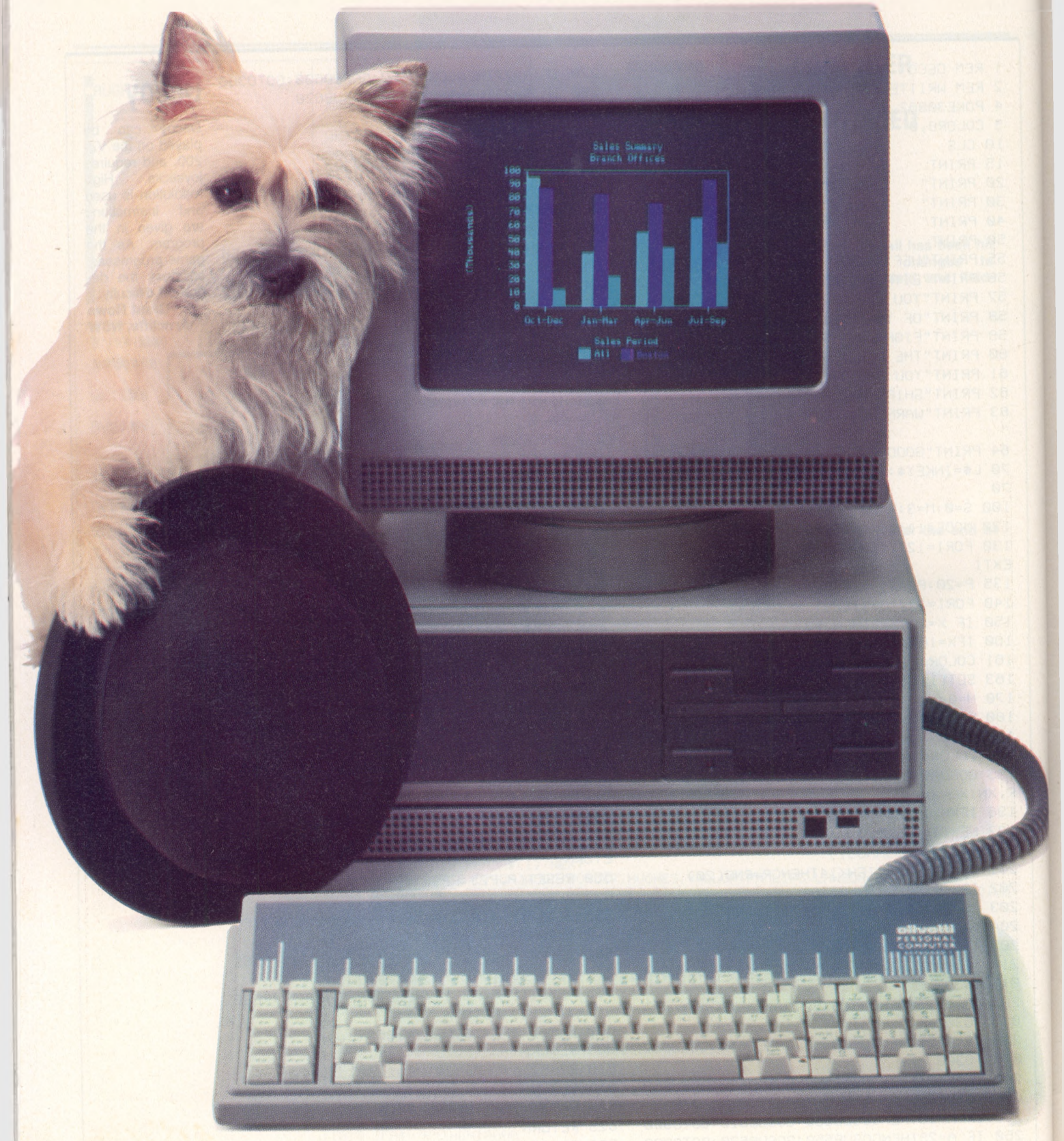
```
7012 IFI+10>GANDA(I+10)=0THENPRINT" -";:GOTO7015
7013 IFI+10=GTHENPRINT"■";STR$(A(I+10));"■":GOTO7015
7014 PRINTSTR$(A(I+10))
7015 NEXT
7020 PRINT"■■SCORE";TAB(11);"SCORE"
7030 PRINT"■";TS(0);TAB(11);TS(1)
7040 IFG1=1THENVO=OV
7060 PRINT"■OVERS";VO;
7070 PRINTTAB(11)"OVERS";OV
7071 AO=0:AW=0
7075 IFG1=2THENGOSUB11000
7080 IFG=20THENFORI=0TO19:A(I)=0:NEXT:G=0
7100 FORI=1TO20000:NEXT:OV=0:RETURN
7200 R6=INT(R5/5):IFR6=4ANDINT(RND(1)*15)=9THENR6=6
7210 PRINT"■"R6:FORI=1TO750:NEXT
7220 S3=0 BS=BS+R6:A(G)=A(G)+R6:TS(G1)=TS(G1)+R6:P=32
7225 IFOV=0ORW=0THEN7290
7230 AO=INT(TS(G1)/OV):AW=INT(TS(G1)/(W+1))
7290 RETURN
8000 GOTO8000
8100 FORI=0TO19:READA$(I):NEXT
8110 DATAWESSELS,DYSON,WOOD,BORDER,HUGHES,YALLOP,PH'LIPS,LAWSON,HOGG,RK'MAN
8120 DATAHAYNES,GRNIDGE,RCH'SON,GOMES,RICH'DS,LLOYD,DUJON,GARNER,M'SHALL,HOLDING
8130 RETURN
9000 PRINT"■":T=TI
9001 FORI=1TO1000:PRINTS3;:NEXT
9002 PRINT:PRINTTI-T
10000 REM SCREEN COPY
10010 R$=CHR$(145):V$=CHR$(146):OPEN4,4:PRINT#4:G=PEEK(648)*256:PRINT#4,R$:FORP=
GTOG+505
10020 C=PEEK(P):C$="":IF(P-G)/22=INT((P-G)/22)THENPRINT#4,CHR$(8)+CHR$(13)+CHR$(
15);
10030 IFC>128THENC=C-128:C$=CHR$(18)
10040 IFC<32ORC>95THENC=C+64:GOTO10060
10050 IFC>63ANDC<96THENC=C+128
10060 C$=C$+CHR$(C):IFLEN(C$)>1THENC$=C$+V$+R$
10070 PRINT#4,C$;:NEXT:PRINT#4:CLOSE4:END
11000 GETA$:IFA$=""THEN11000
11005 IFA$="W"ORA$="A"ORA$="S"ORA$="D"THEN11000
11010 IFA$="P"THEN10000
11020 GOTO8000
```

Decoy

Decoy can be played on the VZ-200, and requires joysticks. High resolution is used and instructions are given in the program. As the game progresses, so does the degree of difficulty.

Grant Rowe
Arncliffe, NSW

```
1 REM DECOY GAME FOR VZ-200
2 REM WRITTEN BY GRANT ROWE
4 POKE30862,80:POKE30863,52
5 COLOR8,0
10 CLS
15 PRINT
20 PRINT"      ▚ ▛ ▛ ▛ ▚ ▌▌"
30 PRINT"      ▌▌ ▛ ▌ ▌▌ ▐▌"
40 PRINT"      ▚ ▚ ▚ ▚ ▞ ▞"
50 PRINT
55 PRINT"LEFT JOYSTICK TO MOVE SHUTTLE,"
56 PRINT"EITHER BUTTON TO FIRE."
57 PRINT"YOU ARE TO HOVER OVER A PART"
58 PRINT"OF THE PLANET,ZELTA.WHILE OUR"
59 PRINT"FIGHTERS ARE TO ATTACK ON"
60 PRINT"THE OTHER SIDE OF THE PLANET,"
61 PRINT"YOU ARE THE DECOY FOR ZELTA"
62 PRINT"SHIPS AND GROUND FIRE..."
63 PRINT"WARNING:DON'T LEAVE ATMOSPHERE.
"
64 PRINT"GOOD LUCK..PRESS S TO START."
70 L$=INKEY$:IFL$="S"THENGOTO100ELSEGOTO
70
100 S=0:M=3:H=20
120 MODE(1):COLOR,0
130 FORI=127TO0STEP-1:COLOR3:SET(I,62):N
EXTI
135 P=20:P2=31
140 FORI=127TO0STEP-1:X=RND(4)
150 IF X=2ORX=3THENJ=3
160 IFX=1ORX=4THENJ=2
161 COLORJ:IFX=3THENSET(I,60)
163 SET(I,61):NEXTI
170 N=0
180 K=0:Z=0:KY=0:GZ=0:KZ=0:JR=15
190 BN=0
194 COLOR4:XN=0
195 GOSUB500:FORI=1TO100:UX=USR(UX):COLO
R,XN:XN=XN+1
196 IFXN>1THENXN=0
197 NEXTI:COLOR,0
200 A=(INP(43)AND31)
201 CR=RND(10):IFH<14THENCR=RND(20)
202 IFH<6THENCR=RND(28)
203 COLOR4:R=RND(126):SET(R,CR)
204 IFCR>JRTHENJR=CR
205 IF A=31THENGOTO300
210 IF A=26THENGOSUB550:GOSUB600:GOSUB61
0:GOTO300
220 IF A=25THENGOSUB550:GOSUB600:GOSUB63
0:GOTO300
230 IF A=22THENGOSUB550:GOSUB610:GOSUB62
0:GOTO300
240 IF A=21THENGOSUB550:GOSUB620:GOSUB63
0:GOTO300
250 IF A=30THENGOSUB550:GOSUB610:GOTO300
260 IF A=29THENGOSUB550:GOSUB630:GOTO300
270 IF A=27THENGOSUB550:GOSUB600:GOTO300
280 IF A=23THENGOSUB550:GOSUB620
300 GOSUB500
305 AZ=(INP(39)AND31)
310 IF A=15ORAZ=15THENGOSUB900
315 IFN=1THENGOSUB990:GOTO330
320 N=RND(H):IFN=1THENC=P-3:C2=60:IFS>25
00THENKY=1
330 IFK=1THENGOSUB750:GOTO340
335 K=RND(H):IFK=1THENE=30+RND(75):EN=58
340 IFZ=1THENGOSUB800:GOTO346
345 IFK=1THENZ=RND(H):IF Z=1THENL=E+2:L2
=EN+3
346 XG=RND(2):IFGZ=1THENGOSUB400:GOTO370
347 IFK=1ANDEN>P2-5ANDEN<P2+2ANDXG=1THEN
VZ=E-3:VY=EN:GZ=1
370 IFKZ=1THENGOTO380
371 IFK=1THENKZ=RND(H):IF KZ=1THENYZ=E+3
:YY=EN-3
372 GOTO200
380 RESET(YZ,YY):RESET(YZ+1,YY):YY=YY-2:
IFYY<12THENKZ=0:GOTO200
381 IFYZ>P-8ANDYZ<P+1ANDYY>P2-2ANDYY<P2+
2THEN1000
382 COLOR4:SET(YZ,YY):SET(YZ+1,YY):GOTO2
00
400 RESET(VZ,VY):RESET(VZ+1,VY):RESET(VZ
+2,VY)
410 VZ=VZ-3:IFVZ<1THENGZ=0:RETURN
420 COLOR4:SET(VZ,VY):SET(VZ+1,VY):SET(V
Z+2,VY)
430 IF VY>P2-3ANDVY<P2+2ANDVZ>P-8ANDVZ<P
+1THEN1000
440 RETURN
500 COLOR8:SET(P,P2):SET(P-1,P2):SET(P-2
,P2):SET(P-3,P2)
505 SET(P-4,P2):SET(P-5,P2):SET(P-6,P2):
SET(P-3,P2+1)
510 SET(P-4,P2+1):SET(P-5,P2+1):SET(P-4,
P2-1):SET(P-5,P2-1)
515 SET(P-5,P2-2):COLOR6:SET(P-3,P2-1):R
ETURN
550 RESET(P,P2):RESET(P-1,P2):RESET(P-2,
P2):RESET(P-3,P2)
555 RESET(P-4,P2):RESET(P-5,P2):RESET(P-
6,P2):RESET(P-3,P2+1)
560 RESET(P-4,P2+1):RESET(P-5,P2+1):RESE
T(P-4,P2-1)
565 RESET(P-5,P2-1):RESET(P-5,P2-2):RESE
T(P-3,P2-1):RETURN
600 P=P-5:IFP<10THENP=106
605 RETURN
610 P2=P2-4:IFP2<JRTHEN2000
615 RETURN
620 P=P+5:IFP>106THENP=10
625 RETURN
630 P2=P2+4:IFP2>55THENP2=55
```


Sales Summary
Branch Offices
Oct-Dec
Jan-Mar
Apr-Jun
Jul-Sep
Sales Period
All
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PERSONAL
COMPUTER

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It's a fast, flexible, reliable personal computer that is more than just a superior piece of hardware. Behind it is a commitment to a better way of managing information and communications. One that can pay off handsomely in increased productivity and profits. Because our PC is designed to be flexible enough to meet all your business needs — today and in the future.

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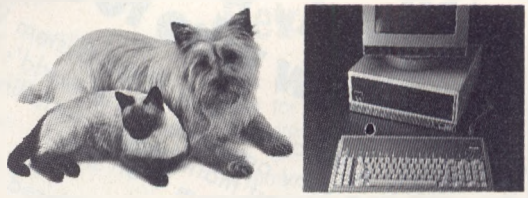

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```
635 RETURN
700 COLOR2:SET(E,EN):SET(E+1,EN):SET(E+2
,EN-1):SET(E+3,EN-1)
705 SET(E+4,EN):SET(E+5,EN):SET(E+2,EN+1
)
710 SET(E+3,EN+1):RETURN
720 RESET(E,EN):RESET(E+1,EN):RESET(E+2,
EN-1):RESET(E+3,EN-1)
730 RESET(E+4,EN):RESET(E+5,EN)
735 RESET(E+2,EN+1):RESET(E+3,EN+1):RETU
RN
750 GOSUB720
751 IFE>P-8ANDE-3>1THENE=E-3:GOTO753
752 IF E<PANDE+8<120THENE=E+3:GOTO753
753 IF EN+5>P2ANDEN-4>10THENEN=EN-2:GOTO
760
754 IF EN+7<P2ANDEN+4<60THENEN=EN+2:GOTO
760
760 GOSUB700:IFE>P-13ANDE<P+1ANDEN>P2-4A
NDEN<P2+2THEN1000
770 RETURN
800 RESET(L,L2):RESET(L+1,L2):L2=L2+2:IF
L2>60THENZ=0:RETURN
805 IF L>P-8ANDL<P+1ANDL2>P2-2ANDL2<P2+2
THEN1000ELSECOLOR4
810 SET(L,L2):SET(L+1,L2):RETURN
900 FORI=P+2TOP+20:COLORRND(8):SET(I,P2)
:NEXTI:X6=USR(X6)
910 IFK=1ANDE>P+1ANDE<P+21ANDEN>P2-2ANDE
N<P2+2THENSOUND4,1:BN=1
920 IF BN=1THENS=S+RND(300):K=0:GOSUB720
:H=H-1:IFH<2THENH=2
930 BN=0
945 FORI=P+2TOP+20:RESET(I,P2):NEXTI
950 RETURN
990 IFKY=1THENRESET(C+7,C2):RESET(C+7,C2
-1)
991 IF C>P-8ANDC<P+1ANDC2>P2-3ANDC2<P2+2
THEN1000
992 RESET(C,C2):RESET(C,C2-1):C2=C2-2:IF
C2<P2-5THENN=0:RETURN
993 IFKY<>1THEN998ELSE COLOR3:SET(C+7,C2
):SET(C+7,C2-1)
994 IFC+7>P-8ANDC+7<P+1ANDC2>P2-3ANDC2<P
2+2THEN1000
998 COLOR3:SET(C,C2):SET(C,C2-1):RETURN
1000 FORI=1TO10:MODE(0):COLOR,1:SOUND15,
1:COLOR,0:SOUND30,1
1010 MODE(1):GOSUB500:FORF=1TO20:NEXTF:N
EXTI
1020 CLS
1025 M=M-1:IF M=0THEN2000
1030 PRINT@165,"CURRENT SCORE "S;
1040 PRINT@229,"SHUTTLES LEFT "M;
1050 FORI=1TO5000:NEXTI
1100 MODE(1):GOTO130
2000 CLS:PRINT@266,"GAME OVER"
2010 FORI=1TO10000:NEXTI:CLS
2020 PRINT@165,"FINAL SCORE "S;
2025 IF S>HSTHENHS=S
2030 PRINT@229," HIGH SCORE "HS;
2040 FORI=1TO5000:NEXTI
2100 GOTO5
```

```
5    CLS
10   REM* 4/4 & 2/4 METRONOME *
20   REM
30   GOSUB4000
60   POKE219,209
70   POKE218,6
80   FORX=1TO8
90   PRINT",,,,,,,,   00000000"
100  NEXT
120  COLOR6,9,9
125  COLOR7,2,2
130  FORC=245TO255STEP2
140  POKE4110,C
150  NEXT
160  FORG=1TOX
170  NEXT
180  IFPEEK(18)>0THENX=X-1
190  IFPEEK(20)>0THENX=X+1
192  IFX<1THENX=1
195  COLOR7,9,9
198  COLOR6,2,2
200  FORC=251TO255STEP2
210  POKE4110,C
220  NEXT
222  FORG=1TOX+10
224  NEXT
230  GOTO120
4000 PRINT"  4/4 & 2/4 METRONOME."
4010 PRINT"  ====================="
4020 PRINT
4030 PRINT
4040 PRINT" I WILL GIVE YOU A BEAT FOR"
4050 PRINT
4060 PRINT"4/4 AND 2/4 MUSIC."
4070 PRINT
4080 PRINT" TO MAKE ME GO FASTER PRESS"
4090 PRINT
4100 PRINT"A KEY ON THE LEFT HAND SIDE"
4110 PRINT
4120 PRINT"OF THE KEYBOARD,SLOWER,THE"
4125 PRINT
4130 PRINT"RIGHT HAND SIDE OF THE"
4140 PRINT
4150 PRINT"KEYBOARD."
4152 PRINT
4154 PRINT
4160 PRINT"(PRESS A LETTER TO GO ON)"
4170 IFPEEK(18)=0ANDPEEK(20)=0THEN4170
4180 CLS
4190 POKE219,208
4200 POKE218,10
4210 PRINT",0,0,0,0,0,"
4220 PRINT"0METRONOME0"
4230 PRINT",0,0,0,0,0,"
5000 COLOR0,16
5010 COLOR6,2,2
5020 COLOR7,2,2
5030 POKE4110,228
5100 RETURN
```

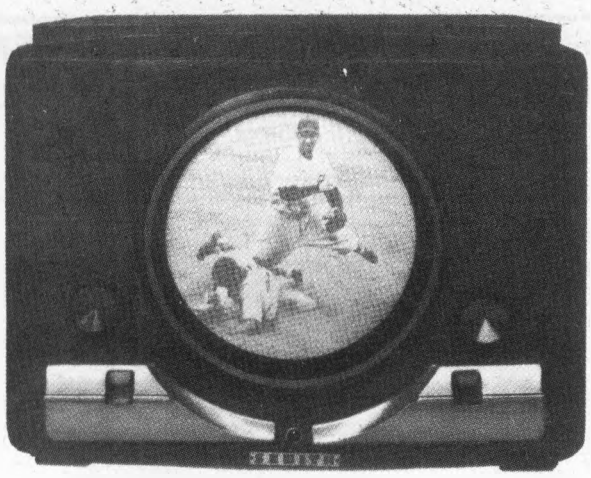
WIZZARD

Metronome

This program will give you a beat for any 2/4 or 4/4 music. To increase the speed press a key on the left side of the keyboard. To decrease the speed press a key on the right side of the keyboard.

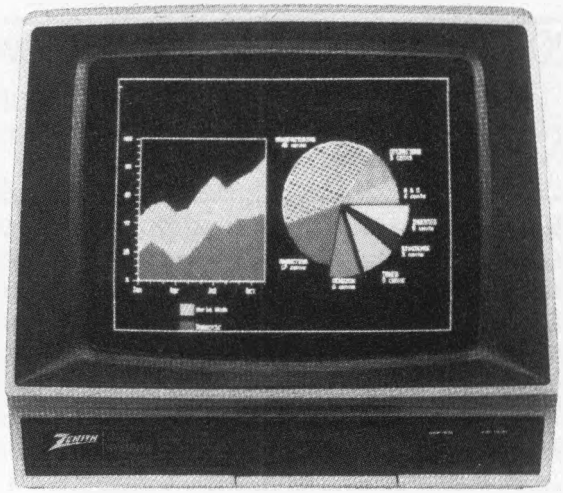
Gregory Shapley
Matraville, NSW

1948



One of the first Zenith television receivers.

1984



ZVM-133:80 column display. High resolotion colour. RGB Input. Ideal for IBM PC and compatibles.

Only a company with 36 years of TV smarts could make monitors this good.

Zenith introduced its first television receiver to a delighted America in 1948. It had single-knob tuning and an 11-inch porthole screen.

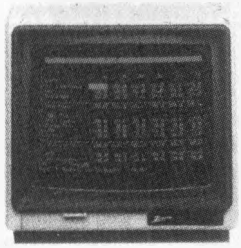
Earlier this year, Zenith made its sixty millionth television set. And every one has been built according to this credo: "The Quality Goes In Before The Name Goes On."

Zenith continues this tradition of video excellence with its extensive line of monitors. Monitors that will first dazzle you with their graphic display, then earn your admiration over time with their reliability. And surprise you with their very competitive prices.

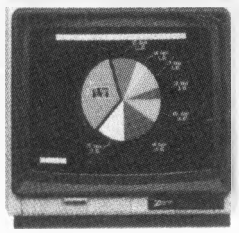
There's a Zenith monitor for just about any personal computer, including IBM and Apple, with four models offering everything from monochrome green or amber to high-resolution colour.

Nobody understands video like Zenith. To find out more about their fine monitors, contact your local Zenith dealer or Warburton Franki.

ZENITH | data systems

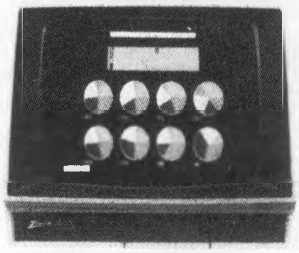


ZVM-122A: Non-glare amber screen. Compatible with most microcomputers.



ZVM-123A: Non-glare green screen. Composite video input.

ZVM-124: Super resolution non-glare amber screen for IBM PC with monochrome adapter.



ZVM-133: 80 column colour display.

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Commodore 64

CASHFLOW MANAGER

For those of you who have purchased a Commodore 64, connected it to an MPS801 (or equivalent) printer and a single disk drive, and wish to purchase a spreadsheet program for it, look very closely at the extent of your needs before buying. This article by D.J. Higgins might help, too.

THE PRICES for spreadsheets vary greatly. 'Super' programs such as Easy Calc cost around $100, while more simplified and less capable programs like Abracalc retail for around $44. The smaller programs at cheaper prices are not necessarily a waste of time.

I recently purchased a small spreadsheet called Abracalc, distributed in Australia by Ozisoft (Suite 35, 8-24 Kippax Street, Surry Hills 2010; phone (02) 211 1266), and was very impressed with its capabilities. Admittedly it has only one page of 26 columns by 40 rows, but if you are looking for a spreadsheet that can handle several applications, it will, for example, display a budget, produce a small inventory and purchase ledger, or produce a cashflow report.

It has all the functions of the larger programs, such as replication, windows and arithmetic calculations, and can also display Commodore's graphic characters for business-style printouts.

In this article I will cover a cash (CR) system, which will hopefully open your imagination to the use of spreadsheets in other applications as well.

With this one-sheet monthly cash report, you'll find ways to control and conserve your cash and to make the monthly bill-paying chore seem almost a pleasure.

The cash report, based on simple and practical ideas, requires only the most ordinary arithmetic:

- In any month, income less expense equals cashflow; cashflow can be positive or negative in any month.
- Cash assets at the end of any month equal cash assets at the beginning of the month plus (or minus) cashflow for that month.

Cash assets include cash in your pocket or under the mattress, money on deposit in ordinary savings accounts, your cheque account balance, and any investments you might have which are quickly (a couple of days) converted to cash. Monies tied up in term deposits, loans or other relatively long-term investments should not be considered as part of your cash assets.

Table 1 displays a cash report for one year for a typical family. Monthly expense lines are grouped separately from the lines for non-monthly expense. One advantage here, for convenience in building initial forecast data, is that all entries from your first month can be repeated through to the final month, in this case January to December. If you are working in financial years, your first column/month will be July and your last June.

Another advantage is that the ▶

Table 1. Cash report for one year for a typical family.

Y1983/84	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Monthly													
RENT	560.00	560.00	560.00	560.00	560.00	560.00	560.00	560.00	560.00	560.00	560.00	560.00	6720.00
ELEC/CITY											138.00		138.00
TELEPHONE													0.00
CAR PAY1	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	2112.00
CAR PAY2	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	2160.00
AGC C/L	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	600.00
BANKCARD1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	1200.00
BANKCARD2	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	1200.00
RANPTEL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	1200.00
FOOD	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	1152.00
PETROL	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	480.00
LIFE INS	39.84	39.84	39.84	39.84	39.84	39.84	39.84	39.84	39.84	39.84	39.84	39.84	478.08
MISC'OUS												300.00	300.00
NON-MONTH													
AUTO INSU						303.00						303.00	606.00
AUTO REGI			230.00										230.00
													0.00
													0.00
													0.00
TOTAL EXP	1441.84	1441.84	1671.84	1441.84	1441.84	1744.84	1441.84	1441.84	1441.84	1441.84	1579.84	2044.84	18576.08
INCOME													
SALARY 1	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	11760.00
SALARY 2	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	1220.00	14640.00
INTEREST													0.00
TOTAL INC	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	26400.00
NETT CASH	758.16	758.16	528.16	758.16	758.16	455.16	758.16	758.16	758.16	758.16	620.16	155.16	7823.92
CUML CASH	758.16	1516.32	2044.48	2802.64	3560.80	4015.96	4774.12	5532.28	6290.44	7048.60	7668.76	7823.92	7823.92

pattern of non-monthly expense becomes obvious; redistribution of these expenses to avoid low (or negative) cashflow can easily be planned in advance.

The income statement group can (and does in this case) provide for more than one wage or salary source, for investment income and miscellaneous income sources.

The CR lines are simple. In any month, net cashflow is total income less total expense; cumulative cash flow is the sum of the NCF for each month from the beginning of the year.

Setting Up Your Cash Report

If you have Abracalc (or any other spreadsheet) in your software library and an inexpensive printer (minimum of 80 columns), you can set up your CR system immediately using the following steps as a guide. Sixteen columns will be used; this means that on an 80-column printer two pages will be printed.

1. Enter the report title and column headings; see Table 1 for a typical format.

2. Compose and enter a set of row titles to suit your monthly expense items. If you are buying your home, use mortgage for a line instead of rent. If you use gas at home, incorporate a row for gas. Remember to keep your monthly expense lines in separate groups. Be careful, since you have only 40 lines to play with on Abracalc.

3. Enter a group of non-monthly expense line titles to suit your known requirements.

4. Enter the income statement line titles to provide appropriate salary and other income lines.

5. Enter the formulas needed to calculate the totals required. The summation and replication functions come in very handy here.

Table 2 gives you the formulas that were used in the example cashflow report. Because of the small size of the viewable page, I found it handy to include the row titles as the last column of the report – right next to the totals. To make this job simple, type the row titles into columns a and b (either type directly or replicate), then use the insert column function to insert the required 14 columns in between (the second last column should be blank for readability).

Forecasting the Full Year

To build up the full year's cash forecast, use the following steps:

1. In your cash report template, enter your best estimate in each row of the monthly expense group for your first month only.

2. Use the replicate function of your spreadsheet to replicate this month's data through to the last month.

3. Where required, through the full year, enter your best estimate for each item of the non-monthly expense group.

4. In the income statement group, enter the start month salary data and replicate it through to the last month. Now enter your best estimate for investment and miscellaneous income you anticipate for each month.

Save this file to your spreadsheet date file diskette; replacing the existing master template (if previously stored) if you wish. At this point you have a complete cash forecast template for a full calendar year on your diskette. You can easily 'fine tune' it by modifying selected entries. For example, if you expect to pay more for electricity in winter than in summer, look through last year's electricity bills and modify the electricity line to reflect a realistic trend for the new year; if you expect a salary rise in July, enter the modification in July and replicate from there to the end of the year.

When you have made the forecast entries as reasonable as you can, save the file again. Then print a hard copy for review and any further editing. Keep a valid copy for future reference.

The Monthly Report And Corrected Forecast

Each month you only need to survey your cheque book, salary stubs or pay packet, and one or two other records to get the real expense and income data for that month. The monthly CR, with the year and forecast numbers automatically corrected with new data entries, is easy to produce with the following

procedures (using the prior month's report as a worksheet):

1. Remove the parentheses from the current month column heading.
2. Enter the actual payment amounts made for the month line by line. If planned payment is not made, delete any existing entry; reschedule the payment, if necessary, by entering it in a future month or by adding it to an existing entry for a future month.
3. Enter actual income dollars as received.
4. Make appropriate modifications to future months' payments and income data.
5. Save the current month's report to your spreadsheet data file diskette, using a unique file name so that it will overwrite your last month's template.
6. Print the current month's report. Edit it, make necessary corrections, then save it again.

This six-step monthly effort should take less than an hour to complete. Keep each final monthly report for comparison with future reports. At year's end, the January and December report comparison will provide marvellous guidance for even more cash reporting and conservation in the new year. You will have made yourself something of an expert in personal accounting and personal finance management, which is no small accomplishment.

Some Practical Tips

1. Pocket cash. Once or twice a month, write a cheque for pocket cash; include those cheques in miscellaneous monthly expense or provide a separate monthly line for pocket cash to keep it more visible and under better control.
2. Don't build column or line numbers into the printed template. They are shown here only for convenience.
3. Save each printed monthly report, and save the latest version of the CR on your spreadsheet data file diskette. Be sure to keep an up-to-date back-up copy of the data file diskette.
4. You can modify your report format at any time by inserting or deleting expense and income lines anywhere. If you insert a line, remember to use the summation function to get the total into the total column at the right.
5. Don't fret over items that you find hard to predict, such as medical or auto repair expense. If you know there's an expense coming up, estimate it as best you can or ignore it, being sure that you enter it when you pay the bill.

Your computer system, along with this practical cash reporting method, will help you conserve and build your cash stash. The monthly cash report will provide: an excellent record of expenses and income to date; a useful document for planning and scheduling future expense and income; advance warning of months where cash resources are likely to be low or non-existent, often avoiding the embarrassment of having to borrow money unexpectedly or at short notice; and peace of mind, especially when the cash outlook is good.

Some have remarked that personal accounting software isn't worth the time and effort required to maintain it every month. The spreadsheet-based system defined here solves that problem. You'll probably agree that an hour or less each month is well worth the effort. ❑

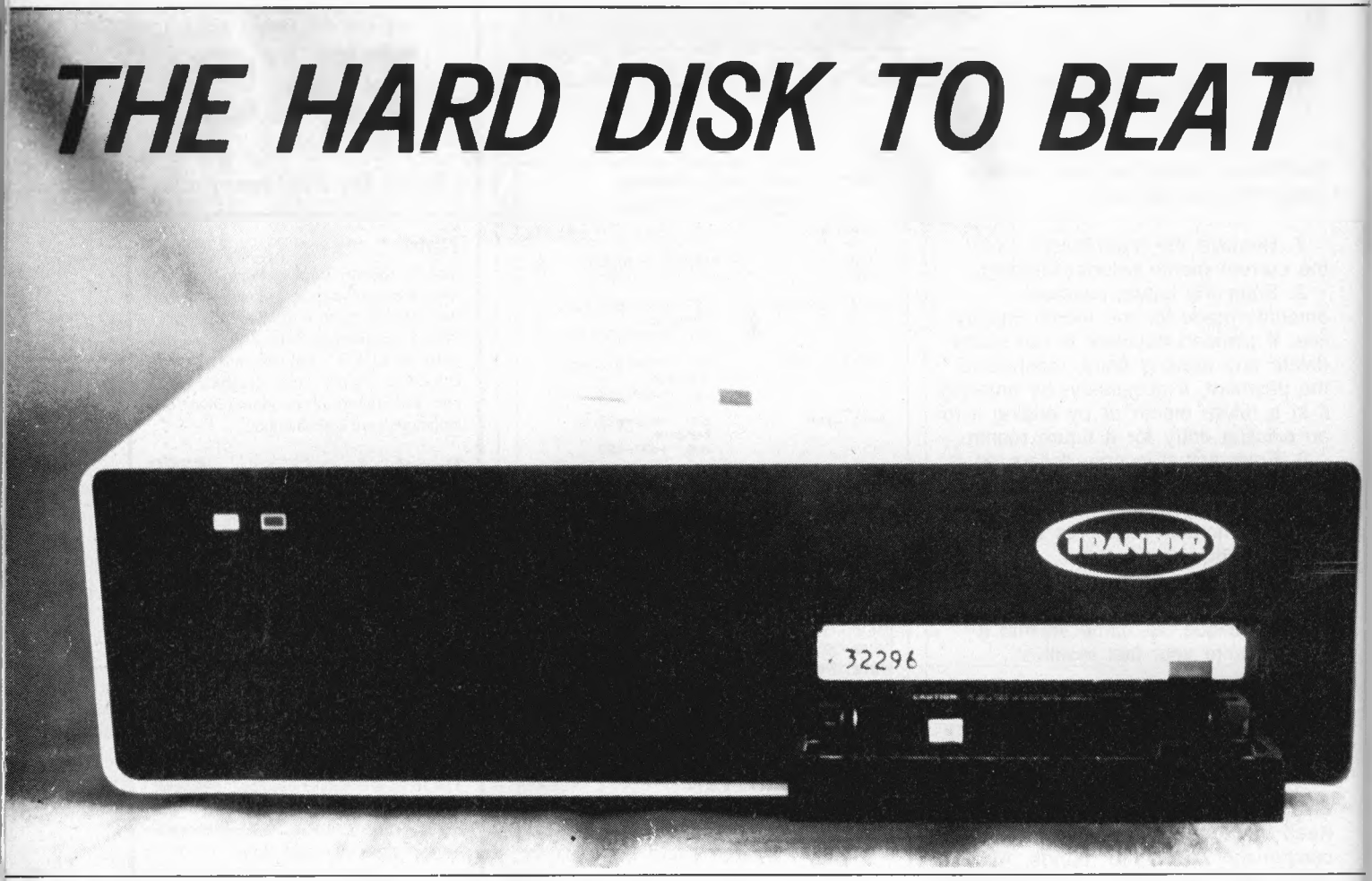
Table 2. Cash report template ABRACALC formula.

ITEM	LOCATION	FORMULA
Total Expense	b29 through n29	@SUM(b5..b27) @SUM(n5..n27)
Total Income	b37 through n37	@SUM(b33..b35) @SUM(n33..n35)
Nett Cash	b38 through n38	+b37-b29 +n37-n29
Cumulative Cash	b39 c39 through m39	+0+b38 +b39+c38 +l39+m38
Column N Totals	n5 through n38	@SUM(b5..m5) @SUM(b38..m38)

Note: Leave out lines that are made up from LABELS or LINES; i.e. those that have no numeric data inserted.
Note: Printout sheet had column A as a blank column. To achieve this format, all the above calculations should be moved one column to the right.

E.g. Total expense:
C29 @SUM(C5..C27)
through
M29 @SUM(M5..M27) etc.

THE HARD DISK TO BEAT



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"THE HARD DISK THAT TURNS THE OTHERS SOFT!"

By Lloyd Borrett

I'VE ALWAYS freely revealed my background and interests to those who ask, and recent major changes make it seem appropriate to once again expose myself to the readers of this column. So here goes.

After nine years with BHP, the last two years of which were spent as PC Co-ordinator in Melbourne, I've left to take up an exciting new position with HiSoft Australia. This new job involves working with a team of accomplished people responsible for the support/maintenance of microcomputer hardware and software products. HiSoft Australia is one of the few IBM dealers selling only IBM and third-party hardware and software.

At HiSoft I'll be coming into contact with a greater cross-section of PC users, and an expanded range of hardware and software products. That should have positive benefits for readers of this column.

You may remember I started a mail order business supplying hardware and software for IBM and compatible personal computers late in 1983. Quite simply, I was never able to devote enough time to it, and PC Connection Australia never really got under way. As one who believes that if you can't do it properly then you shouldn't be doing it, I stopped taking orders late in 1984.

About the same time it became obvious my bulletin board operating costs were more than I could afford to support unaided. As a result, users of the BBS now have to pay an annual subscription, and the accounts system of PC Connection Australia is used to keep track of the finances. More about that later.

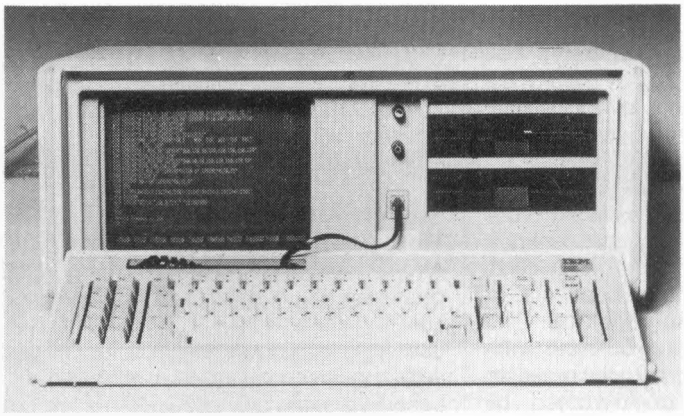
The Melbourne PC User Group is still going from strength to strength, and I hope to continue to contribute what services I can.

Now you have the facts to decide if I have a vested interest in any issue.

Bulletin Boards Close

Closed, but not shut down. What do I mean? Well the three bulletin boards operating in Melbourne which support IBM systems have switched to running in closed mode. That means you now have to register for full access to the system. No longer can you just phone up, give your name, and gain access to all facilities.

This change was brought upon us all by the inconsiderate and unsociable people who were causing problems.



The IBM Portable Computer – following the trend towards portables.

When a person takes the time and effort to establish and run a BBS, it's a little hard to tolerate it all being put at risk by idiots leaving offensive messages or uploading copyright software. The only way to keep such vermin off, and thus ensure that the service can continue to be available to the majority of considerate and appreciative users, is to switch to a closed mode.

When you connect with the closed BBS, unless you are registered for access, you will only be given visitor status. Details of how to register will be given, and you'll be able to look at the bulletins, messages, and list of files available for downloading. You will not be able to download or upload files, or enter messages to anyone except the system operator.

A review of the operating costs involved has meant that the PC Connection BBS (03) 528-3750 and the Computers Galore BBS (03) 561-8497 now both charge an annual subscription fee. These fees have been set to cover ongoing expenses. I can assure you there is no likelihood that the money being asked for would cover the costs of establishing a BBS, let alone put money in the pockets of the operators.

The HiSoft BBS (03) 799-2001 is able to continue without charging a subscription fee thanks to the sponsorship of HiSoft Australia and Imagineering.

That's the bad news on the bulletin board front, now for some good news. There is every chance that some more systems will come on line soon. It is also likely some of the existing systems will be changed to support more than one caller at a time. This will represent a major leap forward for the users of the systems, since it greatly enhances the ability to share information. Currently all systems only support one caller at a time.

Even more promising are the moves being made towards establishing a bulletin board network which allows messages and files left on one system to be transferred automatically to another BBS. This could be a significant year for bulletin board systems in Australia.

Lotus Development Announces its own Magazine

In November 1984 Lotus Development announced the publication, beginning in May 1985, of its own monthly magazine for Lotus customers. The magazine will be distributed free to all registered Lotus users for six months, after which subscriptions will cost US$18 per year.

We'll have to wait and see if Imagineering, Lotus Development's representative in Australia, passes on this offer to the local users.

Software User's Bill of Rights

The Capital PC User Group in the US has been actively seeking out software vendors and expressing its concern about copy protection, software quality, licensing agreements, and other aspects of user-vendor relations. The group is now working on the development of a 'User Bill of Rights' which will be used to communicate the users' needs to software vendors. A preliminary version is presented below.

Think about these points when next you purchase a software product. Surely it's fair that our attitudes and expectations concerning the quality of other products we purchase should carry over into microcomputer software. I for one will look forward to reading the comments exchanged as Capital PC members work towards a final version. ▶

Preliminary Software User's Bill of Rights

1. Right to Product Quality: The user has the right to expect a software product to perform with a level of quality consistent with industry specified or implied standards.

2. Right of Functionality: The user has the right to expect a software product to perform basic functions common to the generic program type, regardless of advertising, disclaimers or caveats.

3. Right of Program Back-up: The user has the right to have on hand sufficient back-up of program packages to continue operations uninterrupted by loss of/damage to the primary package. age.

4. Right to Program Support: The user has the right to obtain information from the manufacturer concerning the software product and known errors in the related versions, including fixes or temporary workarounds.

5. Right of System Integration: The user has the right to integrate software products into his system environment, in conjunction with other products, without undue constraint.

6. Right of Non-Interference: Execution of one software product shall not interfere with the user's ability to use other products.

Software Unprotection Mechanisms

As you are no doubt aware, many programs are supplied with various 'protection' mechanisms, which prevent the user from making back-up copies and/or installing the programs on a hard-disk-based system. Thankfully, the more technically minded users are able to figure out these systems almost as fast as they are dreamed up by the software manufacturers.

A comprehensive range of 'unprotection' mechanisms are available for downloading from my PC Connection BBS, (03) 528-3750. They will not be published in this magazine, nor will they be supplied on diskette, and I won't take any phone calls about them. If you want them, join the BBS community, or make friends with someone who has.

Public Domain Software

Since December '84 I've had a chance to look through the Boston User Group disks volumes 1 to 54. There are more up-to-date versions of PC-FILE III and PC-WRITE in this collection.

A much heralded new find was the Ultra-Utilities. This collection of programs allows the recovery of deleted files and other diskette file editing functions, in a similar fashion to the commercial products Disk Mechanic and Norton Utilities. I've not had a chance to use them myself as yet, but reports from those that have are complimentary.

By the time you read this the Sydney PC User Group should have copies of all the public domain diskettes currently held by the Melbourne PC Group. Call Vince Sweeney or Chris Szanto on (02) 221 2311 for more details. ❑

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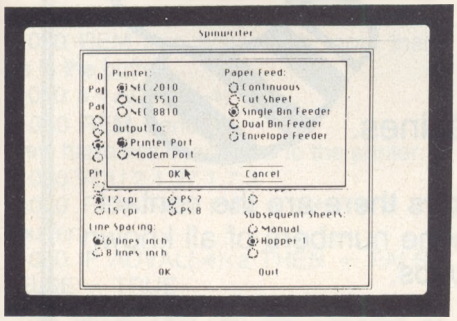

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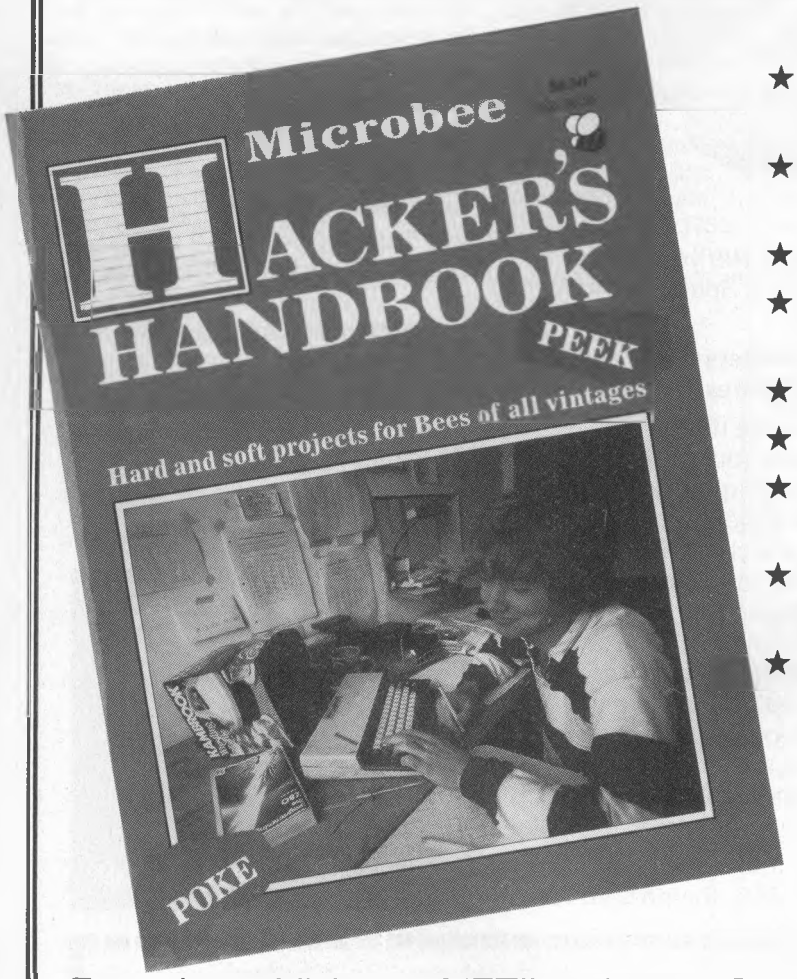

- ★ get more from the Bee's graphics capabilities,
- ★ set up for telecommunications on the Bee,
- ★ play music on the Bee,
- ★ build a joystick and a light pen for the Bee,
- ★ get hard copy — cheaply,
- ★ expand your 16K Bee to 32K,
- ★ make the Bee a better games machine,
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- ★ solve equations on the Bee

. . . and much more!

From the publishers of 'ETI' and 'Your Computer' magazines.

We've also included listings of the Bee's BASIC scratch area and machine language locations — to make the Hacker's pursuits easier.

For sociable Hackers there are the contact addresses and phone numbers of all known Microbee user groups.

$6.50 Aust. ($6.95 NZ) at your local newsagent.

By Bruce Mitchell

ON PAGES 203-4 of that most indispensable of tomes, the *BBC User Guide*, there is a list of negative numbers to use with the ADVAL function. If everyone normally uses ADVAL(n) (with n between 0 and 4) to find out where their joysticks are pointing or how many volts from The Outside World are hanging across the analogue-digital converters, perhaps the use of negative numbers implies something introspective?

Right again! Using values between –1 and –9, the ADVAL function can supply a wealth of information about the Beeb's digestive system. How many bytes of the keyboard has it taken? ADVAL(-1) returns the number of characters typed into the keyboard buffer. At the other end of things, ADVAL(-3) will tell how much free space is left on the RS423 output buffer. Values between –5 and -8 return the free space in each of the sound buffers, and so on.

It seems pertinent to go peering into internal mysteries like sound channel buffers – and I've never had the slightest urge to do so – but the day I bought a printer I certainly found a use for the ADVAL(-4) function. Being absent-minded (a polite term for incompetent), I kept forgetting to turn it on, resulting in many perplexing long waits. Even more distressing were several programs asking "Is a printer connected?", or telling me to "Press any key" when it was pressed. There's no need for such unimaginative programming on this machine, thanks to ADVAL. Try the following function, which returns TRUE when a printer is connected to the parallel port (and on line) and FALSE when one isn't:

```
1000 DEF FNprinter
1010 LOCAL a : REM First flush the printer buffer.
1020 *FX21,3
1030 REM See how much room there is in the buffer:
1040 a=ADVAL(-4)
1050 REM Send a
few harmless characters to the printer:
1060 VDU 2,1,27,1,7,3
1070 REM Now look at what's in the buffer:
1080 IF ADVAL(-4)<a THEN = FALSE ELSE = TRUE
```

This simple loop can use FNprinter to test for the existence of a printer:

```
200 REPEAT
210 PRINT TAB(0,0); "Turn on printer.";
220 UNTIL FNprinter = TRUE
230 CLS
```

Bigger Beebs

Second processors are turning up everywhere these days; I even saw one lying around the *Your Computer* office. The 6502 3 MHz model costs around $500 and the Z80 unit comes with CP/M software for around $900. Both have 654K of RAM. With Acorn's acquisition of Torch Computers there's now the vision of a 68000 with 256K of memory, UNIX and 20M hard disk to dream about. At around 2900 pounds in the UK that's about all most BBC owners will be able to do.

EVAL Can do More Than Evaluate

Did you know EVAL can recognise predefined variables? If particular responses are expected when entering numerical values, you might choose to allow users to enter words like 'zero', 'Tuesday' or 'Fred', as long as you've already defined each word as a number. Try this:

```
10 REM Using EVAL to look intelligent:
20 one=1:two=2:three=3
30 FOR N=1 TO 3
40 PRINT "How do you spell ";N;
50 INPUT number$ 60 IF EVAL(number$)=N THEN PRINT "Correct."" ELSE PRINT "Wrong."" 70
```

I hasten to point out that this is not an educational program! An error trap for ERR number 26 "No such variable" would be essential when using the function in this way.

Books

Being of the belief that imitation and adaptation are reasonably effective ways of learning programming, I was pleased to see that *BBC Programs Volume 1* by Carl Graham and Nick Hampshire (published by Duckworth) contained a couple of dozen games, utilities and applications that were suitable for modification and simple changes.

While not specifically written for this purpose, several of the programs use more advanced techniques like recursion and operating system calls, so the examples are there for those who have progressed beyond introductory programming yet are still awed by the many mysteries of the Beeb. I just wish the authors had known about the LISTO command when they were printing the programs; unindented listings are unforgivable in this kind of book.

Word Processors for Writing BASIC

Although the cursor-based editor on the Beeb is very easy to use when writing BASIC programs, I've often wanted to do global alterations of variable names in long programs, or to search for this or that. One solution is to buy one of the utility ROMs which allow this sort of activity. Another is to use a word processor to type the program as a text file with no line numbers and no formatting details apart from carriage returns.

Make the first line of this text file AUTO, so that after saving this file you can switch to BASIC and *EXEC the file. The result is a BASIC program which can then be saved (under a different name from the text file, of course). When you wish to make changes, alter the text file and *EXEC it again; this way you retain the ability to make use of the word processor's features. Figure 1 is a simple example.

Structured programming zealots should be delirious with joy over this technique. Thanks to the complexity of the method the interpreter uses to code line numbers, you can't use GOTO or GOSUB. ❑

Text file:	AUTO	After *EXEC TEST you will have:
	MODE 3	10 MODE 3
	FOR N%=1 TO 10	20 FOR N%=1 TO 10
	PRINT N%	30 PRINT N%
	NEXT	40 NEXT
Save this file as "TEST".		Save this file as "TEST.B".

Figure 1.

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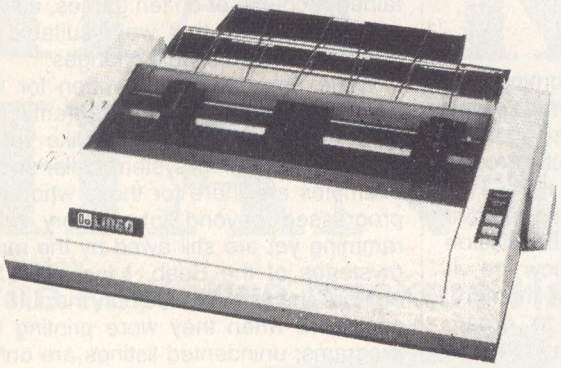

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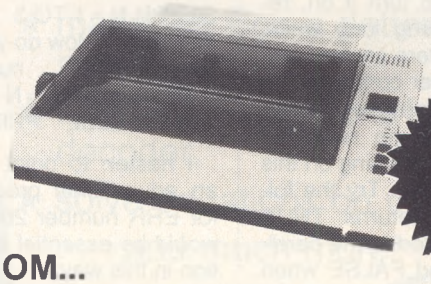

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By Bill Bolton

ONE OF the problems with powerful software tools is learning how to use them. The BATCH command in PCDOS has many powerful features which are unfortunately not well documented. There is quite a bit written about them in the PCDOS manual, but it doesn't really tell you what they are useful for.

The AUTOEXEC function in PCDOS allows you to execute a batch file automatically when the system is booted. Listed below is the AUTOEXEC.BAT file I use on my IBM PC-XT.

```
echo off
if exist c:ccpm.sys c:loadccpm ask
echo on
echo off
astclock
if not errorlevel 1 goto finish
date
time
:finish
path C:\
prompt $p$g
shell C:\COMMAND.COM
set comspec=
set comspec=c:\command.com
echo on
```

Let's go through this from the top.

Line 1: The 'echo off' line turns off the console display of the batch file commands executing, so I don't get unnecessary text displayed.

Line 2: The 'if exist c:ccpm.sys c:loadccpm ask' line checks to see if the file CCPM.SYS exists in the file system on the root directory of the C: drive. If CCPM.SYS exists, it then executes the command LOADCCPM with the argument ASK. If CCPM.SYS did not exist in the root directory of the C: drive, the rest of this line would be ignored.

The LOADCCPM program is a utility to load Concurrent PCDOS if you have booted in a PCDOS environment, rather than having your system set up to boot directly into Concurrent PCDOS. If you give LOADCCPM the argument of ASK, it will ask whether you want to load Concurrent PCDOS or not. This means I can decide at boot time which operating system I want to use.

Lines 3 and 4: If I answer N (for no) to the LOADCCPM prompt about loading Concurrent PCDOS, LOADCCPM returns command to PCDOS, which continues to execute the AUTOEXEC.BAT file. LOADCCPM is set up to accept a single character Y/N response and respond immediately without needing a carriage return. Now ECHO has already been set off in line 1, so unless I force a carriage return in the batch file the next screen prompt will display the "N" I entered for LOADCCPM response, which is very messy. To fix this problem I set echo on again and then set it off.

Line 5: I have an AST Six-Pack multifunction board in my IBM PC, so this command is for the AST-supplied utility which will set the PCDOS time and date from the battery-backed clock on the Six-Pack board.

Line 6: I have modified the ASTCLOCK program (see details later) to return a testable PCDOS 'error level' if it cannot locate the AST Six-Pack board in the system. The batch file processor in PCDOS has the ability to test for 'error level' returns and act accordingly. The modified ASTCLOCK program returns an error level of 1 if it cannot find the clock, and an error level of 0 if it can.

If the clock is located and an error level of 0 is reported by ASTCLOCK, the batch processor will continue processing the batch file from the label 'finish:'. If an error level of 1 is reported by ASTCLOCK, batch processing will continue from the next line.

Lines 7 and 8: These two lines issue the traditional PCDOS date and time setting prompts, and in my AUTOEXEC.BAT file are only ever executed if there is not an AST clock in the system.

Line 9: This is a 'label' line used as the target for the conditional goto instruction in line 6. It does not do anything in itself.

Line 10: The PATH command sets up a directory search path for commands. PCDOS will search the root directory of my C: drive for a command file if it cannot locate it in the current working directory I am using. The 'C:' sets the drive and the '\' sets the root directory.

I put all my commonly used utilities in the root directory on the C: drive so I can use them from whichever drive or directory I am in.

The PATH command is very powerful and probably deserves more discussion at another time.

Line 11: The PROMPT command allows me to change the PCDOS prompt from the typical C> to almost whatever I want. The 'pg' argument to PROMPT gives me a PCDOS prompt showing the current directory path. On a hard disk system with hierarchical directories it's easy to forget which directory you are in, so it's very convenient to be reminded each time PCDOS prompts you at command level. When I am in the root directory of a drive my prompt now reads 'C:\>'. If I were in a hierarchical directory, say two levels down in the DRAW sub-directory of my GRAPHICS sub-directory, my PCDOS prompt would read:

'C:\GRAPHICS\DRAW>'.

The '$p' part of the argument sets the directory path display while the '$g' part of the argument issues the '>' part of the prompt. The PCDOS manual describes other arguments you might use to the PROMPT command.

Lines 12, 13 and 14: PCDOS is supposed to allow you to use whatever command processor you want. This means you can replace the normal PCDOS command processor with your own. This doesn't appear to work in all cases, though the PCDOS documentation suggests it should.

COMSPEC is part of the PCDOS 'environment' data. The environment data area is used by PCDOS to determine what to do about certain aspects of its operating environment, and for storing some other testable (by programs) data. The COMSPEC data item should tell PCDOS which command processor to use.

The COMSPEC command allows you to change the name of the command processor you want to use from the default PCDOS COMMAND.COM located in the root directory of the boot disk. The line 'comspec=' cancels whatever the current COMSPEC environment parameter is. The line 'comspec=C:\COMMAND.COM' changes the COMSPEC environment parameter to make PCDOS use the copy of COMMAND.COM located in the root directory of the C: drive, irrespective of what drive the system was booted from.

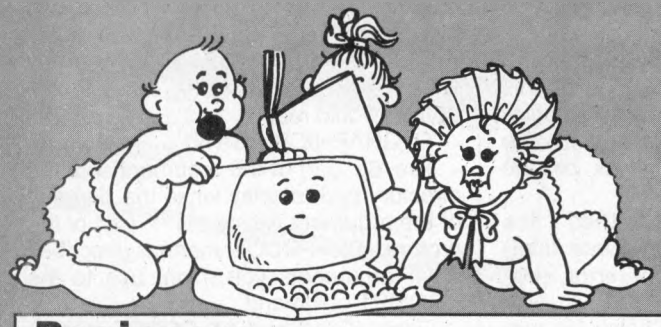
To overcome the minor problem of the COMSPEC mechanism not working exactly as documented, I use a public domain utility called SHELL to place the changed COMSPEC information into loaded PCDOS internally.

Line 15: Finally, having processed the batch file to completion, command line processing is turned on again.

ASTCLOCK

The modifications to the ASTCLOCK program I mentioned above were described in the September 1984 issue of ▶

Electronics Today BOOK SALES



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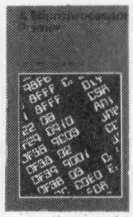

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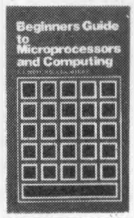

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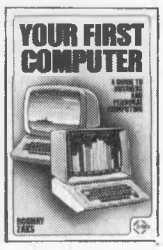

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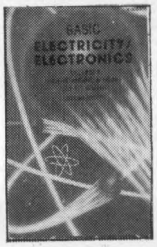

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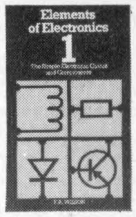

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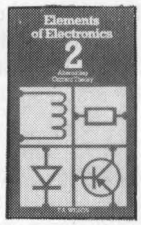

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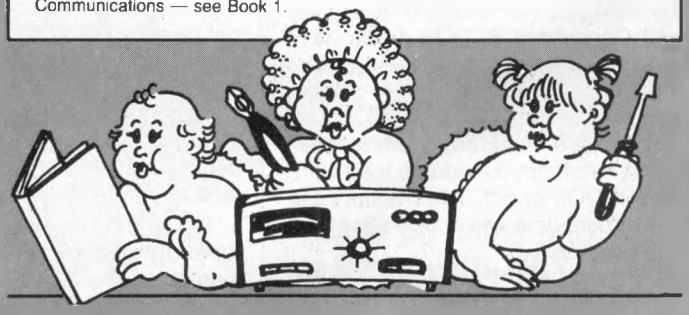

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US *PC World* magazine, on pages 302 and 303. As a printed work they are copyright, so unfortunately I can't reproduce them here.

The ASTCLOCK program also works correctly for setting the system date and time under Concurrent PCDOS, and I would think most of the similar clock setting programs that come with multifunction boards for the IBM PC would also work under Concurrent PCDOS.

Public Domain News

SIG/M public domain software volumes 206 to 217 were released in December and January, and should now be available through most of the RCPM systems. These volumes have several 16-bit programs for CP/M-86 and Concurrent DOS. Among these are a version of MODEM CP/M-86, MP/M-816, and Gifford Concurrent DOS, which has some excellent examples of managing queues and the like in Concurrent environments. There are also a number of 8-bit programs in these volumes.

For fans of the Regular Expression Compiler (REC), there are more utilities from the REC people.

Here is a list of where the various public domain collections are up to in Australia as at mid January:

- CP/M User group – volume 93
- SIG/M User Group – volume 217
- C User Group – volume 50
- PC/BLUE User Group – volume 71

The MISC collection, available only from the Software Tools RCPM, is up to volume 69. The PC Connection system in Melbourne has quite a lot of Capitol PC User Group material (and stuff from other PC User Groups), but the numbering scheme is so chaotic I can't tell you what is available.

PAMS News

Tomorrowland has opened a DIRECT system in Sydney (SYD-TLD), which is associated with the Brisbane Tomorrowland DIRECT System (BRIS-TLD). The Tomorrowland DIRECT system software is still undergoing development (it has been changing daily). Subscription to the Tomorrowland systems originally cost $15 a year, but they may now be used for free. You still need to register with Tomorrowland to use the system (to satisfy a Telecom requirement), but there is no charge for the registration. The Tomorrowland DIRECT systems are aimed at users of PC and MSDOS computers. By the time you read this they should be allowing the use of three modem standards: V.21 300 bps full duplex, V.22 1200 bps full duplex and V.23 1200/75 bps. You will probably have to send a few carriage returns to the system when you log in, to enable it to determine which modem standard you are using before it displays anything to you.

Phil Sampson's Outback RCPM in Darwin has been offering dual modem standards for some time now. Phil uses a Modem Technology UDM1200 modem and you can use either V.21 300 bps or V.23 1200/75 bps standards on his system. He has also promised to provide some technical details of how he controls the modem.

The Brisbane Experimental RCPM (BEX-RCPM) is now on line. This system is aimed at encouraging experimentation in the development of microcomputer software. Mark Little put the system up with four single-density 20 cm drives, though by the time you read this he should have two double-density 20 cm drives installed.

The Tesseract RCPM in Sydney, mentioned last month, went on line at the start of January and is already reported as being hard to access due to the volume of calls.

If you are a sysop will you please send me your *correct* contact address and voice phone number (not for publication). Several times recently I've had information about telecommunications matters affecting sysops, which would have been usefully distributed if I had accurate records of where to contact system operators.

If you are planning to put a public access message system of some sort on line, please let me have the details when you start operation so I can keep the PAMS listing below and the AUSTPAMS on-line files up to date.

PAMS Numbers

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Software Tools RCPM (ST-RCPM), (07) 378 9530 24 hours EST
BEX RCPM (BEX-RCPM), (07) 393 3151 24 hours EST
Tomorrowland DIRECT (BRIS-TLD), (07) 286 2438 24 hours EST
Mi-Computer Club BBS (MiCC-BBS), (02) 662 1686 24 hours EST
Micro Design Lab RCPM (MDL-RCPM), (02) 663 0151 24 hours EST
Sydney Public Access RCPM (SPA-RCPM), (02) 808 3536 24 hours EST
Sydney Osborne UG (AUSBD-RCPM), (02) 95 5377 24 hours EST
Tesseract RCPM (TES-RCPM), (02) 651 1404 24 hours EST
Sorcerer UG (SUG-RCPM) 'Ring Back', (02) 387 4439 1800-0800 weekdays, 0800-2400 weekends EST
Omen RTRS (OM-RTRS), (02) 498 2495 1630-0900, 24 hours weekends
Sydney TRS-80 UG RTRS (STRUG-RTRS), (02) 332 2494 24 hours EST
Prophet BBS (PROPHET-BBS), (02) 628 7030 24 hours EST
Dick Smith Electronics (DSE-BBS), (02) 887 2276 24 hours EST
Tomorrowland DIRECT (SYD-TLD), (02) 411 2053 24 hours EST
Sydney Apple UG (AUG-BBS), (02) 451 6575 24 hours EST
Texas Instruments UG (TISHUG-BBS), (02) 560 0926 restricted hours
Oracle RTRS (ORACLE-RTRS), (02) 960 3641 0-1800 weekdays, 0-0800 weekends EST
Newcastle Micro RCPM (NMC-RCPM), (049) 68 5385 1700-0830, 24 hours weekends EST
Melbourne CBBS (MICOM-CBBS), (03) 762 5088 24 hours EST
TARDIS RCPM (TARDIS-RCPM), (03) 67 7760 1800-0800, 24 hours weekends EST
Sorcerer CUA RCPM (SCUA-RCPM), (03) 434 3529 24 hours EST
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HiSoft IBBS (HISOFT-IBBS), (03) 799 2001 24 hours EST
Computers Galore IBBS (CG-IBBS), (03) 561 8479 24 hours EST
OMEN IV RTRS (OM4-RTRS), (03) 846 4034 24 hours EST
Gippsland RCPM (GL-RCPM), (051) 34 1563 24 hours EST
Gippsland MAIL BUS (GL-MBUS), (051) 27 7245 24 hours EST
Mike Scott's BBS (MS-BBS), (003) 34 9411 24 hours EST
Adelaide Micro UG BBS (AMUG-BBS), (08) 271 2043 1000-2200 CST
Computer Ventures BBS (CV-BBS), (08) 255 9146 24 hours CST
Outback RCPM (OUTB-RCPM), (089) 27 7111 24 hours CST
OMEN II RTRS (OM2-RTRS), (089) 27 4454 24 hours CST
OMEN III RTRS (OM3-RTRS), (09) 279 8555 0800-2400, 24 hours weekends

New Zealand

Attache RBBS (ATT-RBBS), ISD: 64 9 78 9084 24 hours NZT; Domestic (09) 76 9084

❑

By David Brudenall

THE SINCLAIR ZX Spectrum is a marvellous little machine; colour, sound, graphics, an awful keyboard – the works. Its meteoric rise in England has attracted what can only be described as a horde of add-ons – little boxes and things which plug into the rear of the machine. These little boxes have naturally been designed to perform all sorts of weird and wonderful functions, and are in many cases supposed to make up for deficiencies in Sir Clive's basic Spectrum architecture.

This month I am going to review several of these little boxes, including one which (horror of horrors!) does not even plug into the edge connector of the Spectrum at all.

The Spectrum Speaks

The first is a Currah MicroSpeech – a neat little unit, which against Sinclair add-on tradition, sits horizontally rather than vertically against the Spectrum's edge connector. On the rear of the unit are two plugs – one for the Spectrum's microphone socket, and the other for the Spectrum's TV connection. The cable from the TV plugs directly into the MicroSpeech.

When the Spectrum with MicroSpeech is switched on nothing particularly unusual happens – apart from a Currah sign-on message on the top of the screen – until you press ENTER. When you do that, your television squawks 'Enter' (that is, if you have the volume on your telly turned up a bit). Pressing the Spectrum's other keys – including all symbols and functions – produces similar vocalisation. It's hard to describe the accent of the MicroSpeech. It certainly doesn't have a 'midwestern' American female voice like some American units are supposed to; it is more 'artificial' than that (is that possible?). Anyway, the sound of it is quite amusing – although bordering on the incomprehensible at times.

Once you have become bored with pressing the '(C)' character and hearing the computer say 'Copyright' and so on, you can enter LET KEYS = 0 which will switch off the key-voicing. LET KEYS = 1 will switch it back on again.

The MicroSpeech uses phonemes to represent speech. These consist of most of the letters in the alphabet plus a few special sounds, like 'dth' to represent the 'th' of 'the'. To program your own sentences to be spoken, you use the string 'S$'. For instance, to program the MicroSpeech to say 'speak no evil', you would use LET S$ = 'sp(ee)k n(oo) (ee)vil'. It looks rather strange but you quickly become accustomed to the system, and virtually any sentence can be reproduced reasonably faithfully, although the limited number of phonemes is somewhat restricting.

The command: LET S$ = '(dth) (ee) (eh)str(aa)lian zedekz (ou)s(ers)z as (oo) (sh) (ee) (ay)shun' produced what I thought was a pretty close approximation of 'The Australian ZX Users' Association'. Pity almost nobody else could understand what it was saying! It was my first try at making the MicroSpeech say something, so perhaps with experience I could have improved upon it somewhat.

Thankfully the MicroSpeech stores its S$ command strings in a buffer before saying them, which means the Spectrum can go on doing something else while the MicroSpeech continues to process the speech commands. Another handy function of the MicroSpeech is to direct the Spectrum's puny sound output through the television speaker, thus serving as a valuable amplifier. The tiny speaker in the Spectrum is next to useless and the Currah is nearly worth its price just as an amplifier. The only problem with sending the sound and speech to the television is that it can interfere with the television picture at times. It doesn't appear noticeable on a black and white set (which I use), but a friend reported a few problems with a colour set.

The MicroSpeech comes attractively boxed (unlike many add-ons), with a neat instruction booklet covering just about everything you need to know, and a sample cassette to show off the MicroSpeech. The 'B' side of the cassette contains a fairly good (although slow) graphics adventure game which uses the MicroSpeech to good effect.

The Currah MicroSpeech certainly does have some benefits, especially for education, but the home hacker would be limited to the amplifier and the novelty. It is great fun, and at $62 is much better value than the similar Votrax Type-n-Talk (for non-Sinclair micros) which used to cost somewhere around $500.

Standard Joystick Interfacing

Next up is the Stonechip Electronics Joystick Interface. This is quite a handsome little unit which looks a bit like the old 16K ZX81 RAM pack, and costs $29.95. It plugs into the Spectrum's edge connector, and has a joystick nine-way (Atari standard) socket, a three-position switch and a small LED to indicate power-on set in the front of the interface.

This interface is designed to remove all joystick interface problems with game programs by being programmable. Instead of having one built-in configuration, the Stonechip Interface has no built-in configuration, and you program it yourself.

Programming the unit is fairly simple: move the switch on the interface to 'PROGRAM' and, while pressing down a key on the Spectrum's keyboard, move the joystick in the corresponding direction. If your game has a 'fire' capability you must program the joystick the same way again, except this time by holding the keyboard's appropriate 'fire' and movement keys simultaneously. If programmed correctly (changes are no trouble, because switching back to 'PROGRAM' after 'PLAY' does not erase current settings), the Interface works excellently. We were supplied with a SureShot joystick together with the Interface for review. This joystick worked well, providing a positive 'click' action when moving the stick. The only problem with the SureShot was that it had one of those plastic knobs which are constantly unscrewing while you play your game, and getting it tight on the shaft seemed impossible without dismantling it. In any case, any Atari-type joystick will work with the Stonechip Interface.

The main problem with the Stonechip Interface was that the joystick settings are erased once you remove the Spectrum's power. This means that every time you turn the power off to change games (which you need to do with most machine code games on the Spectrum, it would appear) you need to re-program the joystick. This might get to be a nuisance after a while, so I wonder how useful this interface really is.

Alternatively, you might get used to programming the interface and thus find it no nuisance at all. In any case, I think they should have programmed the interface with one setting at least (while still allowing the user to program an additional 'keyboard' set) – that of the Kempston joystick. The Kempston seems to be the standard interface most Spectrum software manufacturers have

adopted, so to provide compatibility with it would have ensured the Stonechip's success. Without it, I am not so sure the Interface will be a winner.

Making More Noise

The Stonechip Echo Amplifier, like the Currah MicroSpeech, amplifies the Spectrum's almost inaudible sound. Unlike the Currah, amplifying sound is the principal function of this add-on.

The Echo Amplifier does not plug into the Spectrum's edge connector. Instead, it intercepts the Spectrum's power supply and cassette recorder cables, and provides short jumper cables to plug into the Spectrum. These cables are too short to have the unit any further away than almost touching the Spectrum, which might be a problem in some circumstances.

The Amplifier *looks* very smart. Finished in moulded black plastic, it looks like a part of the Spectrum sitting next to the computer. Three knobs on top control the volume, tone and save/load/beep functions respectively, a small cue button is situated to the right of these, and a small LED indicates power on/off.

The Echo Amplifier has two main purposes – to amplify the Spectrum's sound (by switching the Echo to 'beep') and to make cable swapping unnecessary when saving or loading a cassette. The cue function enables the user to record his/her own voice before the start of the program, supposedly to make it easier to find and identify programs on tape.

Stonechip claims to have incorporated filters in the design of the Echo Amplifier to make saving and loading more reliable. From what I've found, saving and loading are pretty reliable normally if I'm using good-quality cassettes, so I can't verify any improvement in performance in this regard.

As a Spectrum 'beep' amplifier, the Echo unit works faultlessly. The volume control gives a reasonable range and is just the thing where background noise interferes with the normal Spectrum sound. The tone control is probably unnecessary, but it's there should you require it. (It doesn't come in handy for saving or loading because the Echo's manual specifies that tone and volume have to be set to maximum before saving or loading anyway.)

A surprising omission is an ON/OFF switch. Sinclair computers have never had any sort of on/off switch (you've always had to pull the plug and even the new QL is no exception). As the Echo Amplifier intercepts the power before it reaches the Spectrum, it would be a perfect opportunity to provide an on/off switch. But no, they either didn't think of it or couldn't be bothered. Shame! (although it's really Sinclair's fault for not providing one in the first place.)

At $42 the Echo Amplifier is quite a nice unit, but sound amplifiers are probably available for less and the Currah is better value for money at $20 more. Still, I liked the Stonechip Echo Amplifier, and if a sound amplifier which looks great and has a couple of other bells and whistles is what you're after, you probably can't go past it. (Incidentally, the Stonechip doesn't tie up the edge connector, unlike the Currah ...)

Our thanks go to Dolphin Computers, which supplied all the above products for review. If you want more information on any of these items, contact Dolphin at 99 Reserve Road, Artarmon 2064; phone (02) 438 4933. ❑

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VIC-20 Program Library: High-quality games, utilities and miscellaneous programs available. Send SAE to Chris Groenhout, 25 Kerferd Street, Watson 2602, for list.

Microbee Appendix Software: *Maze* – A very large maze for you to escape from. High-resolution three-dimensional graphics. Find food to live and maps, compasses and magic crosses to help you get out alive. *Appmon* – An advanced, easier to use monitor. Scroll through memory. Displays address and contents in binary, octal, decimal, hexadecimal and ASCII. You may also input numbers in all these bases. The top eight lines of the screen show a direct dump of memory, that is, ASCII. To call the monitor from basic just type TAB. To escape from the monitor type BREAK and you will be returned to exactly where you were even if it was halfway through a running program! So now you never need to lose an adventure game again! Mail order. Maze $18. Appmon $16. 18/69 Lynwood Avenue, Dee Why 2099.

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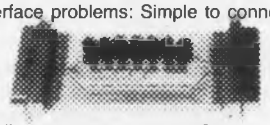

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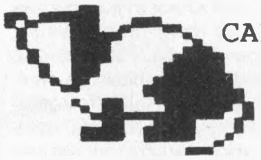

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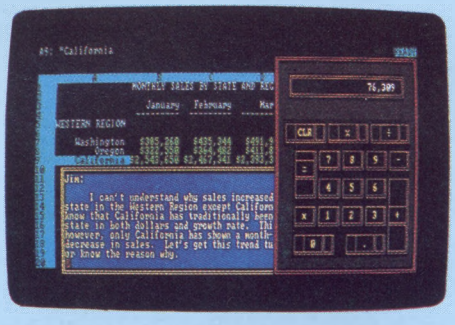
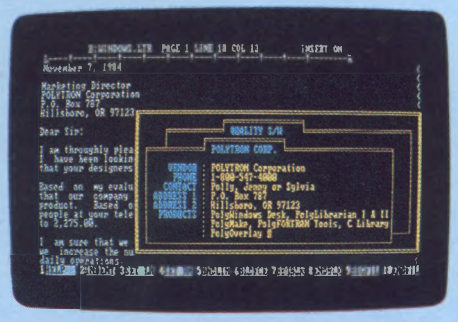


Calculator, Memo Window Over 1-2-3

Alarm Clock, Calendar, Appt. Book



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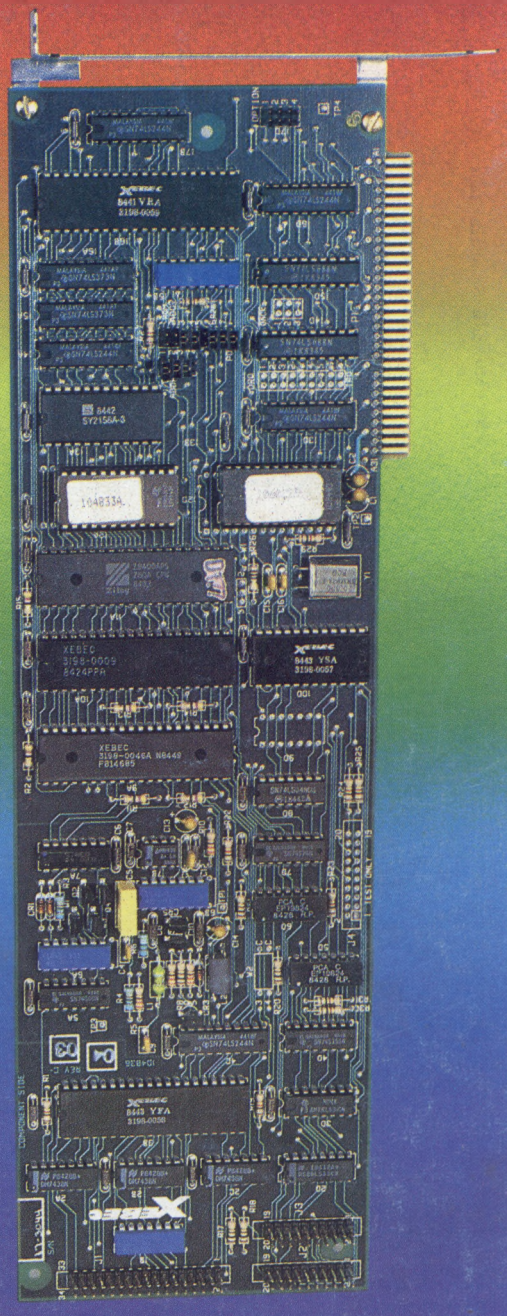

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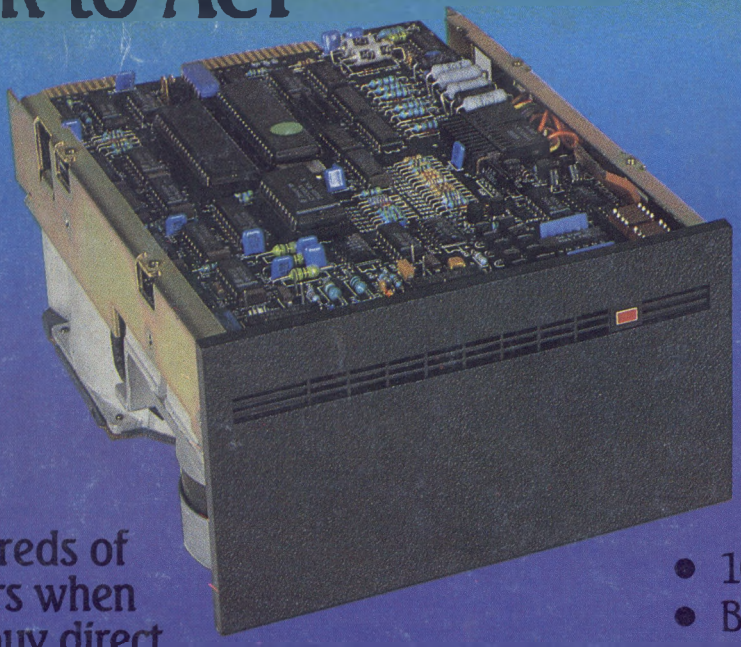

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