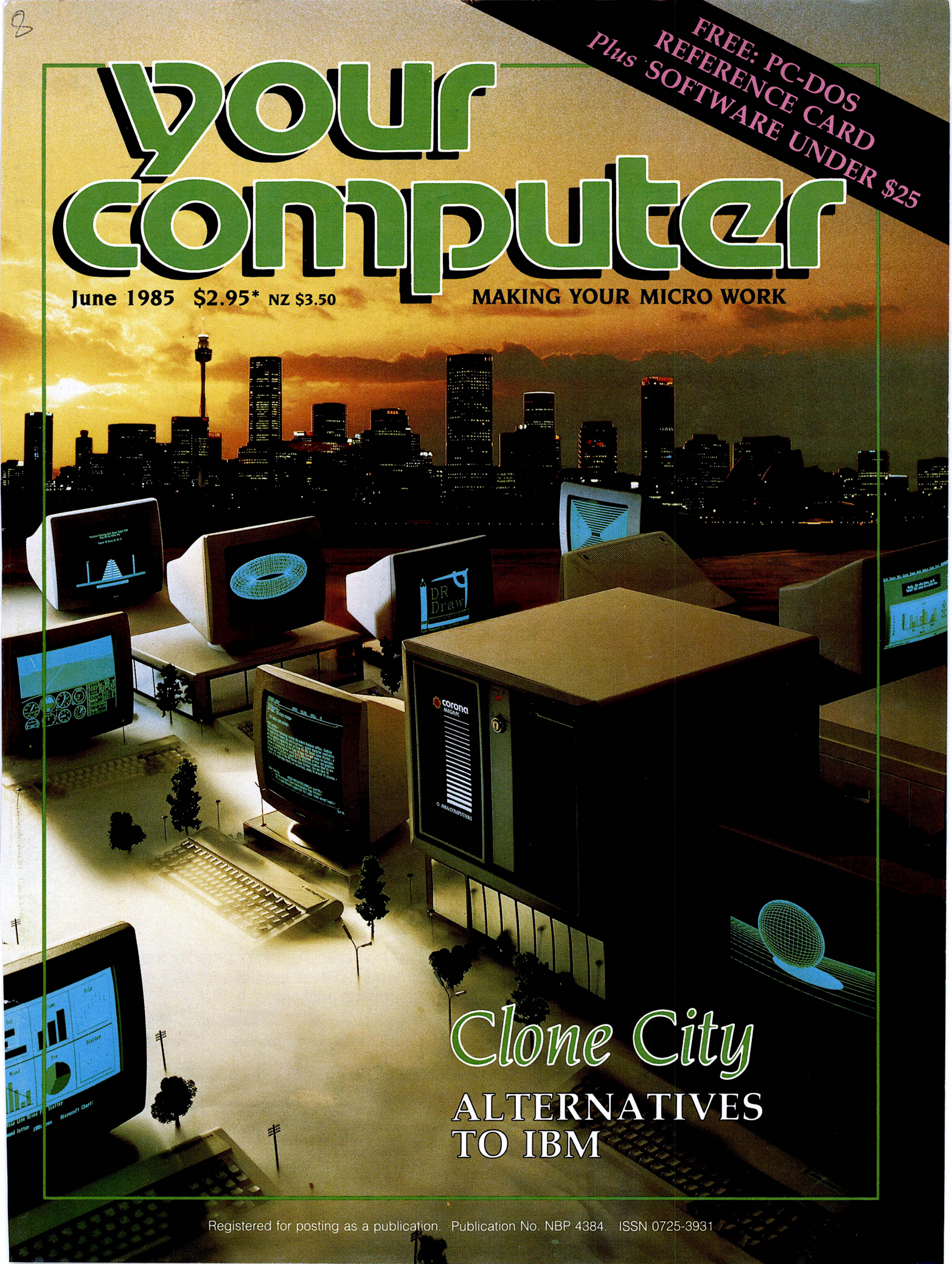
your computer

FREE: PC-DOS REFERENCE CARD
Plus SOFTWARE UNDER $25

June 1985 $2.95* NZ $3.50

MAKING YOUR MICRO WORK



Clone City

ALTERNATIVES TO IBM

Registered for posting as a publication. Publication No. NBP 4384. ISSN 0725-3931

A TOTAL SOLUTION TO AUTOMATE YOUR DRAWING OFFICE



Mainframe CAD Capability at 5% of the Price

The IBM PC with AUTOCAD 2, GTCO digitizer and ROLAND plotter, provide a total CAD solution; responding to the requests of thousands of engineers, architects, facilities planners and general drafters.

The best names in the microcomputer industry support this most successful computer-aided design drafting package.

apricot · Data General · DIGITEN · FUJITSU · hp HEWLETT PACKARD · IBM
NEC · NCR · sirius · The Tandy 2000 · TEXAS INSTRUMENTS · WANG · ZENITH

For further information or demonstration, contact your nearest trained AUTOCAD Dealer nearest you through...

For the IBM version of AUTOCAD contact:

COMPRADOR BUSINESS SYSTEMS PTY LTD

CONSULTANTS TO BUSINESS IN THE IMPLEMENTATION AND SUPPORT OF ADVANCED COMPUTER APPLICATIONS.

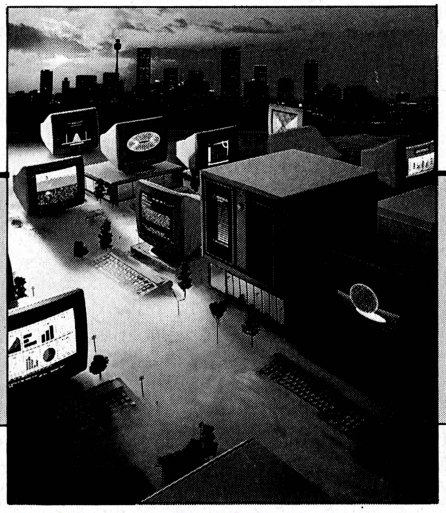
90-94 WARREN ROAD, SMITHFIELD N.S.W. 2164.
P.O. BOX 191. TELEX: AA 27193.
TELEPHONE: 681 4000.

ENTERCOM COMPUTER CO.

SPECIALISING IN COMPUTER-AIDED DESIGN, HARD DISKS & NETWORKING SYSTEMS.
For further details & the location of your nearest trained dealer contact ENTERCOM COMPUTER CO.
136 BRIDGE RD. RICHMOND 3121 MELBOURNE, AUSTRALIA. PHONE: (03) 429 9888. TELEX: 30625 ME1400.

CONTENTS

Software Under $25



IBM Clones

NEWS 7

FEATURES 20

Why True Blue? 20
Extra Blue Bits 32
Programmer's Workbench 45

INSTRUCTION SET 49

Structured Programming 50
BASICs Ain't Basic 56
Viatel Grapevine 62

POCKET PROGRAMS 67

SOFTWARE ON THE CHEAP 74

REVIEWS 99

Crossdata 100
Samna III 104
Epson QX-10† 109
Commodore 16 114
Bit Bucket 118

PUBLIC DOMAIN 124

New Products 125
IBM Underground 128
Your IBM 132
Your Microbee 134
Your Appletosh 136
Lotus Hotline 138
Your BBC 141
Your OS 142
PAMS News 144
Book Reviews 146
Club File 149
Classifieds 154
Glossary 157
Services and Ad Index 161
Next Month 162

EDITOR
Natalie Filatoff
CONSULTING EDITOR
Les Bell
NEWS EDITOR
Rose Vines
ART & DESIGN
Steve Pickells
ART PRODUCTION
Sharon Hill
ADVERTISING PRODUCTION
Danny Hooper
EDITOR-IN-CHIEF
Jane Mackenzie
MANAGING EDITOR
Matt Whelan
PUBLISHER
Michael Hannan
CONTRIBUTORS
Australia: Brendan Akhurst, Bill Bolton, Annette Brown, Andrew Farrell, Phil Grouse, John Hepworth, Norman Kemp,Frank Lee, Peter Lynden, Bruce Mitchell, John Nicholls, Jeff Richards, Rod Stevenson, Dom Swinkels, Colin Tringham.
United States: Howard Karten
The UK: Martin Hayman
OFFICE SERVICES
Felicity Skinner
SUBSCRIPTION ENQUIRIES
Julie Plummer
ADVERTISING
Damien Prins, Andrea Beaty (NSW Advertising)David Farrington (Victorian Advertising)
OFFICES
NSW
140 Joynton Ave, Waterloo 2017.
(02) 663-9999
Telex: FEDPUB AA74488
Victoria
150 Lonsdale St, Melbourne 3000.(03) 662-1222
Telex: FEDPUB AA34340
Western Australia
Ian Greenacre, Gordon & Gotch Adv't,134-144 Parry St, Perth 6000.
(09) 328-8044
Queensland
Craig Santilla, Media Services,4 Adelaide Terrace, Brisbane 4000.
(07) 229-6033
South Australia
Steve Birbeck, Admedia Group,24 Kensington Rd, Rose Park 5067.
(08) 332-8144
New Zealand
Chris Horsley, 4A Symonds Court,Symonds St, Auckland, NZ.
Telex: TEXTURE 260753
Bulletin Board: (02) 662-1686 — Les Bell 1085, Matt Whelan 1, or leave a message in comments.
YOUR COMPUTER is published monthly by the Federal Publishing Company Pty Ltd. Printed by ESN — The Litho Centre, Waterloo 2017, phone (02) 662-8888.
Editorial and NSW Advertising: 140 Joynton Avenue, Waterloo 2017.
Telex: FEDPUB AA74488.
Typeset by Frontier Technology, Spit Junction NSW;
phone (02) 960-2788.
Distributed nationally by Gordon & Gotch. registered for posting as a publication — Publication No. NBP4384. See 'Public Domain' section for information on copyright, contributions, reader services and subscriptions.
*Recommended and maximum price.
ISSN 0725-3931.

EDITORIAL

What's Going on in the Marketplace?

Personal computer companies must be asking themselves a few hard questions following a recent rash of product withdrawals. Not only hardware is affected; software products are also in a state of turmoil, as exemplified by the recent withdrawal of support for CP/M languages by Digital Research.

The first casualty in recent months was IBM's PC Junior. Admittedly, the jr was a flawed design when first released; limited expansion capabilities coupled with a tacky keyboard ensured that industry derision, tinged with bemusement, was poured on the product from day one. When sales failed to take off, other vendors breathed a sigh of relief. The IBM name was at last proved not to guarantee success for any old product.

But then IBM started working to put things right. More and more software appeared for the jr, including Lotus 1-2-3 in a pair of ROM cartridges, and a vastly improved keyboard — in fact, better than the PC's — was released, together with more memory capability and other fixes. The price was dropped, and an aggressive marketing campaign was mounted. The industry watched with interest; IBM was at least proving a willingness to fix mistakes and make the product work, but would this business strategy pay off?

The answer, as we now know, was no. Despite aggressive pricing — towards the end a fully optioned jr with disk drive, a beautiful colour RGB monitor and a swag of software was just $US800 — no more jrs are to be made. IBM has promised support for the jrs sold to date.

More recently, Apple became a casualty. Here the problem was not with the product itself; the Lisa was one of the most, if not *the* most, sophisticated computers on the market. But after selling 60,000 of these flagship machines, Apple called it a day, to concentrate on the Macintosh.

At a recent post-mortem held by a group of Lisa owners (we were actually crying into our beers) the blame was laid squarely on Apple's marketing policies. Information on the operation of the Lisa was notoriously hard to come by. Users are still discovering more and more features of the machine that are not mentioned in the manuals. Even after signing up as a software developer, I have found it incredibly difficult to obtain software and hardware upgrades.

In part, the problem was, ironically, that Apple's software for the Lisa was too complete. It left few gaps for outside software developers, and with no advertising for third-party software, onlookers were left with the impression that the Lisa was inadequately serviced with software — whereas in truth, most users' needs were completely satisfied. Nonetheless, several decisions at Apple, including Jobs's decision to take key staff off the Lisa team to work on the Macintosh, did the real damage.

The real victims are not the Lisa owners, who still feel they have a personal computer *par excellence*. The fact that it is no longer in production does not really affect them, particularly since Apple support was minimal in any case. As one user said at our meeting, "They haven't made a 1927 Rolls Royce for a long time either."

The real damage is to Apple, which has compromised its strategy for getting Macintosh into corporate accounts. One week before the withdrawal of the Lisa, Apple was taking large ads to promote the Macintosh Office, with Lisa featured prominently. Lisa will now play little or no part in the Mac networks, and the corporate DP consultants who recommended Apple over the last two years and pushed the Lisa technology are left disillusioned and with their credibility to senior management virtually in tatters. In these circumstances, after all the delays and broken promises, Apple has seriously reduced its chances of getting any hardware at all into major corporate accounts.

This is further compounded by problems with the Macintosh. Slow sales forced Apple to close its Macintosh factories for a week recently, and problems continue to surface in Mac software: strange behaviour, unexplained crashes, limited disk storage and copy-protected software which cannot be run from hard disks. Contrast this with the Lisa software, which is incredibly reliable. If only Apple had made the Mac Lisa-compatible, instead of the reverse.

Two major product withdrawals, by the two major personal computer companies. In one case, a weak product never really got off the ground despite a lot of good marketing support. In the other case, an excellent product failed, primarily because of poor management and marketing decisions.

Commenting recently on the new recipe for Coca-Cola, a Pepsi executive said, "We've been staring each other in the eyes for 70 years, and the other guy just blinked". In the case of Apple and IBM, they both blinked. But I think one of them has something in his eye.

LES BELL

Cover Photo: AWA Corona Mega PC range. Photographer — Peter Freeman.

Labtam
.... Leading the Field.

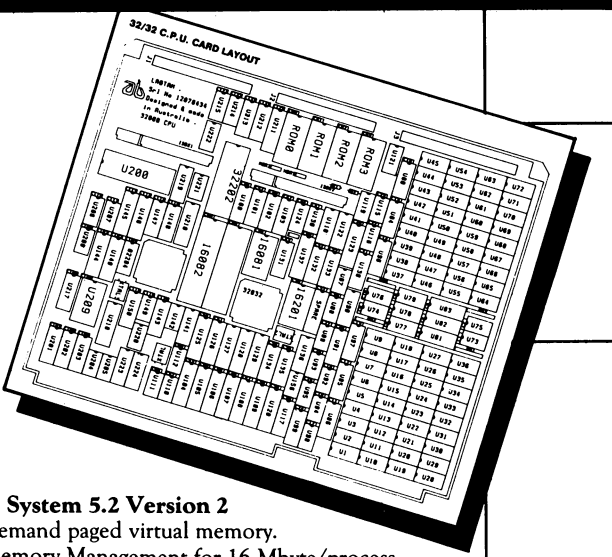
Australia's most successful manufacturer

of high performance computers is now delivering its world leading Unix™ 32-bit super micro.

If you have a professional responsibility to further your expertise at the leading edge of time-shared computing, then the Labtam 3015/V32 must be your choice.

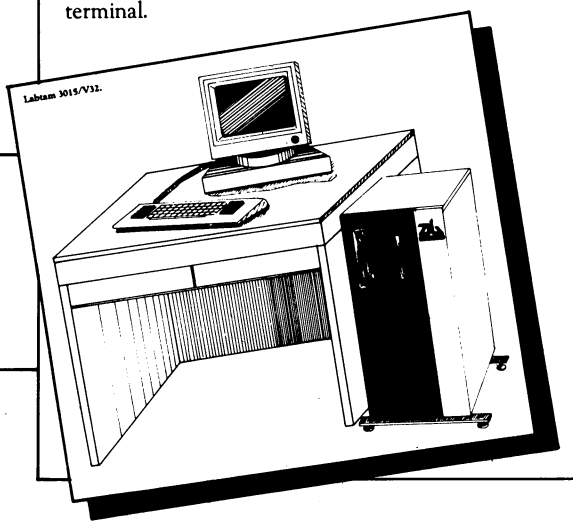
Labtam's new true 32-bit range builds on the company's solid foundation of expertise in design, manufacturing and international marketing of high performance business computers and leading edge scientific instruments.

- ☐ **NatSemi's 32032 microprocessor**
- ☐ **Bell Labs's Unix System 5.2 Version 2**
- ☐ **Labtam's 3015/V32 multi-user floor unit**



Labtam 3015/V32

- ☐ 15 slot IEEE-796 (Multibus) floor mounted unit.
- ☐ 2 Mbyte RAM expandable to 12 Mbyte via Labtam's "X"-Bus 32 bit memory connector. (52 M BYTE/SEC.)
- ☐ 56 Mbyte Winchester disk, 45 Mbyte streaming tape, 1.2 Mbyte 8" floppy disk.
- ☐ 8 RS232C serial channels, 800x600 pixel graphics terminal.



Unix System 5.2 Version 2

- ☐ Demand paged virtual memory.
- ☐ Memory Management for 16 Mbyte/process.
- ☐ File and record locking for multi-user access.
- ☐ File system hardening (protection).
- ☐ Fortran 77 enhancements.
- ☐ All standard utilities & C language.

Natsemi 32032

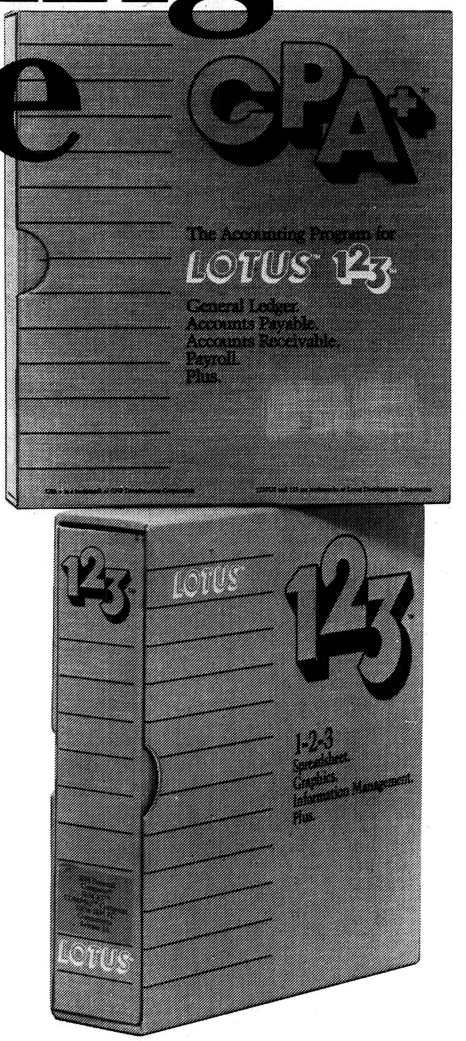
- ☐ The first commercially available full 32-bit microprocessor.
- ☐ NS 32081 64 bit double precision floating point mathematics processor.
- ☐ NS 32082 demand paged virtual memory management.

For further information regarding the **Labtam 3015/V32,** contact **Labtam** on:-

Victoria:- (03) 587 1444
Queensland:- (07) 387 9877
Canberra:- (062) 73 1955
South Australia:- (08) 42 0031
Western Australia:- (09) 382 3622
N.S.W.:- (02) 411 2588
New Zealand (Auckland):- (09) 451 305

Graf-X-D.A.G. 2299

Accounting Software



If you already use Lotus 1.2.3.

Presenting C.P.A.+, the small business accounting program for Lotus 1.2.3. Fully featured, fully integrated and all on the one disk! Starting right now, your accounting problems may be solved forever . . . By You! Say hello to C.P.A.+, the most ingenious accounting program ever created for the I.B.M. P.C. For the first time the power of Lotus 1.2.3. is utilized in a full accounting package, one diskette integrates all modules, all files are updated automatically and reports can be custom designed. That's C.P.A.+ at $795.00 R.R.P.

And if you don't.

The completely configured, ready-to-run System 4 and System 7 includes a full set of test data files for operator training. These systems offer Accounts Receivable, Accounts Payable, General Ledger, Invoicing or Order Billing, Order Entry, Inventory Control and powerful sales analysis. Totally menu driven with step-by-step documentation. Each module includes a beginner's introduction, and System 4 has a built-in help feature for instant answers to those puzzling questions. Works with all printers. These powerful accountancy packages will give you the information and control that you need to run a better, more profitable business. Manufactured and supported throughout Australia, System 4 and System 7 are competitively priced from $795.00 R.R.P. At Dealers around Australia.

All modified and approved to comply with accountancy procedures in Australia by Busiware

Lotus 1.2.3 is the trademark of the Lotus Development Corporation.

CPA+ is the trademark of G.N.P. Development Corporation.

B·U·S·I·W·A·R·E
A DIVISION OF OZI SOFT PTY. LTD.

For further details complete this coupon and send it to Busiware, Suite 33, 8-24 Kippax Street, Surry Hills, N.S.W. 2010.

Send me more information on the **SYSTEM 4/SYSTEM 7**_____**C.P.A.+**_____

NAME:_____ COMPANY NAME:_____

ADDRESS:_____ PHONE NO.:_____

_____ POST CODE:_____

COMPUTER TYPE:_____

AWA RELEASES MULTI-USER IBM COMPATIBLE

While the IBM-compatible market appears to be almost saturated at the portable and standalone desktop levels, those looking for solutions to multi-user applications have fewer choices. Viable network technology is still mostly in the 'promises, promises' stage, with performance of currently available networks rarely approaching anything more than a fraction of the touted potential. AWA has entered this market with the release of a multi-processor system with impressive specifications.



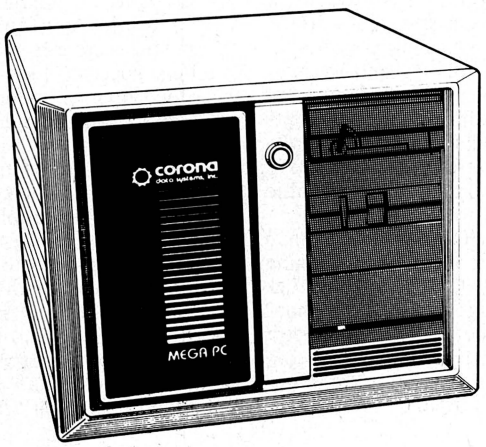
AUSTRALIAN MANUFACTURER AWA has jumped into the IBM-compatible dogfight with a muscly multi-user system from Corona. The Mega PC offers both IBM PC/XT-compatible standalone processing and shared integrated system processing, with support for eight terminals.

Cost effectiveness is achieved by sharing work among processors and including a single 300 watt power supply. The central system unit is based on the Intel 8088 processor operating at 4.77 MHz, providing compatibility with the IBM PC. The applications processor cards (APCs) to which the workstations are attached each have an 8088-2 processor operating at 8 MHz. This multi-processor design means there is little operating speed degradation of the system with the addition of extra terminals. In fact, because of the higher clock speed of the 8088-2, the Mega PC works appreciably faster than the IBM PC.

The Big Black Box

The file server unit encloses most of the brawn of the system (it's certainly not the prettiest component). On the inside is the main file server board, with the 8088 and 256 Kbytes of RAM — with room for a further 256 Kbytes. This master processor is dedicated to performing all the system housekeeping, such as disk drive or printer accesses. It is this point which could conceivably be a bottleneck if all eight terminals try to make accesses at the same time.

The file server unit also has an XT-compatible hard disk controller, clock/calendar, 16 Kbyte ROM BIOS which allows booting from the hard disk, a 360 Kbyte floppy disk drive, one RS232 and one Centronics parallel port and a socket for a diagnostic terminal.



The applications processor cards are contained on a board with 11 IBM-compatible expansion slots. The board will accept eight APCs, each with 256 Kbytes of RAM expandable to 512 Kbytes and its own serial port. A variety of peripherals such as printers and modems can be plugged into the other slots. At the right-hand side of the unit is the hefty 300 watt power unit.

From the outside, the file server is very box-like, with the mass storage devices slotted on top of each other on one side of the unit. A variety of options is available, ranging from a single 360 Kbyte 13 cm floppy plus 10 Mbyte Winchester configuration, through dual floppies plus 20 Mbyte hard disk to a single floppy, 40 Mbyte hard disk and 45 or 60 Mbyte streaming tape backup.

The workstations have the 'improved IBM standard' qwerty keyboard (with improved enter and shift key positioning and caps and num lock lights) and 36 cm green phosphor screen with 640 by 400 pixels. Their stylish design is quite a contrast to the server unit!

Processing Options

The Mega PC can handle standalone processing or integrated system requirements in a variety of combinations. In one mode, each terminal accommodates any IBM PC-compatible system, including application systems written to the IBM PC standard, and will function as a standalone XT.

A second multi-function, multi-terminal mode allows sharing of data and system resources. However, AWA is careful to point out that under MS-DOS 2.11 (supplied with the system) there is only a limited number of software products which supply the necessary file and record locking facilities required for multi-user access. DOS 3.1 with MS-NET will provide these facilities, and AWA is offering a free upgrade to this system as soon as it is released.

Software with multi-user facilities inbuilt *will* work properly on the Mega PC, with AWA currently testing products as they come to hand. A local product which has been tested is the Sybiz accounting package, which works well. Single-user software allows the sharing of files for *enquiry* but not for *update*.

Pricing of the Mega PC has been designed to make a three-terminal system competitive with a comparable network, with additional terminals providing marked savings. A Mega PC with 10 Mbyte hard disk, one 360 Kbyte floppy disk drive, 256 Kbytes RAM and one workstation with APC containing 256 Kbytes RAM will cost $13,112 including sales tax. Each additional workstation will set you back $3144.

For more information contact: AWA Computers Division, 8th Floor, 132 Arthur Street, North Sydney 2060; (02) 922 3300. □

KAYPRO DOWN UNDER

Kaypro Corporation of America has set up operations in Australia. A wholly owned subsidiary company, Vizden Pty Ltd, will market the Kaypro range of five personal computers, including the latest Kaypro 16, through a dealer network.

Kaypro currently ranks fourth in the US personal business computer market after IBM, Apple and Tandy. The company has over three decades of manufacturing experience in electronics and computers.

In February this year it introduced the Kaypro 16 in the US. This machine, now available in Australia, will compete in the highly competitive portable IBM compatible market. It has 256 Kbytes RAM as standard, expandable to 512 Kbytes or 640 Kbytes with a factory upgrade. It has a 23 cm green phosphor screen, with RGB and composite video output, one parallel port and one serial port. Mass storage consists of an internal 10 Mbyte hard disk and a single floppy disk drive (the model 16/2 has two floppy drives and no hard disk).

The price of $6140 for the hard disk system also includes bundled software — a package consisting of MS-DOS 2.11, GW-BASIC, WordStar and Mailmerge, CalcStar, InfoStar, Mite Communications and a tutorial.

Managing Director of Vizden, Mr Bill Greta, believes the Australian market offers exceptional opportunities for Kaypro's products and services. "Australia is fast becoming a major market for personal business computers. Sales have risen very rapidly over the past five years. Our products are very competitive and we expect to do well in this market".

Vizden may be contacted at Unit 2, 9-11 Ethell Road, Kirrawee 2232; (02) 542 3866. □



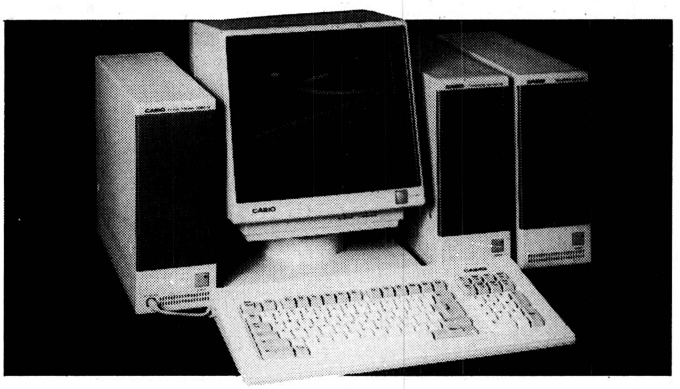
TECHNICAL AID TO THE DISABLED SEMINAR

Technical Aid to the Disabled (TAD) is organising a seminar on 'Devices for Expressive Communication and Environmental Control', to be held in Sydney on September 21 and 22. Topics will include: computer interfaces, hardware and software; speech synthesis; symbol selection techniques; and low-tech devices

Anyone wishing to submit papers, display posters, show films, arrange demonstrations or exhibit devices or related equipment should contact the TAD office for special conditions relating to presentations. The final date for requests to present papers is June 21, with final submission date on July 5.

The keynote speaker at the seminar will be Dr Morris Milner, Director of Rehabilitation Engineering and Research at the Ontario Crippled Children's Centre, and past president of the Rehabilitation Engineering Society of North America.

For more information on the seminar, contact TAD: PO Box 108, Ryde 2112; (02) 808 2022. □



CASIO MOVES INTO COMPUTERS

Casio, a household name in calculators and digital watches, has announced it will market computers in Australia. The Japanese company released its snappily named FP6000 at the end of April.

With this product, Casio hopes to grab a slice of the business market and to attract customers from the scientific crowd already familiar with its calculators. Mobex is the Australian distributor for the Casio PC and according to its marketing director, Les Brown, the machine offers features not normally found in computers in its price bracket.

What is the machine? It's a 16-bit MS-DOS computer, with a distinctive angular appearance. The 'Intel-equivalent' processor runs at a speedy 8 MHz (as compared with the IBM PC's 4.77 MHz). It features decimal-based arithmetic functions, making it useful for scientific, statistical and accounting functions; extended precision can handle figures up to 29 digits and numbers of up to 24 digits can be displayed. An 8087-2 numerical processor is available as an add-on.

The FP6000 is available in a variety of configurations, ranging from single 320 Kbyte floppy disk drive through to a 40 Mbyte hard disk capability. The basic system will set you back $3960. For more information contact Neil Kennedy, (02) 516 4055. □

APPLE'S PROFITS AND SALES UP

In the second fiscal quarter for 1985, Apple Computer's worldwide sales increased 45 per cent and profits were up nine per cent over the figures for the same quarter in the previous fiscal year. Sales for the first two quarters were up 84 per cent and profit had increased almost fourfold.

In Australia, Apple announced local revenues had more than trebled in the first six months of the financial year compared with the same period of the previous year. According to the managing director of Apple Australia, David Strong, the increases were due to the huge success of the Apple IIc over the Christmas period, and a strengthening of demand for the Apple IIe.

Australian sales of the Apple Macintosh personal computer have more than doubled since the launch of the 'Test drive a Macintosh' promotion. "Test drive sales have been almost exclusively within the business market and illustrate fast-growing acceptance of Macintosh within the Australian business community," said Mr Strong. □

MICROBEE UPGRADES INCREASE VIATEL VIABILITY

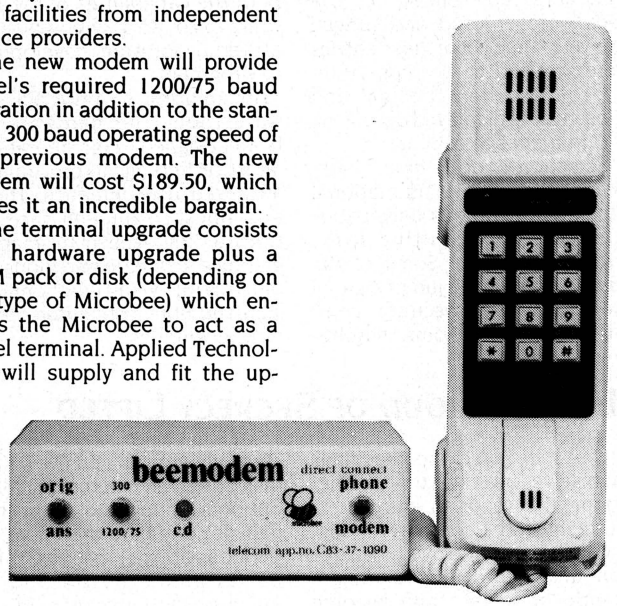
Microbee manufacturer Applied Technology has introduced upgrades to the Microbee's terminal and modem to encourage owners to use Viatel facilities. Viatel is a national videotex service developed by Telecom which offers a variety of information and service facilities from independent service providers.

The new modem will provide Viatel's required 1200/75 baud operation in addition to the standard 300 baud operating speed of the previous modem. The new modem will cost $189.50, which makes it an incredible bargain.

The terminal upgrade consists of a hardware upgrade plus a ROM pack or disk (depending on the type of Microbee) which enables the Microbee to act as a Viatel terminal. Applied Technology will supply and fit the upgrade for $49.50. If you want to install it yourself, the upgrade is available in kit form for the same price.

By providing these upgrades at such reasonable prices, Applied Technology hopes to get as many people as possible to use Viatel. This will generate support for further services for Microbee users on Viatel, such as program downloading.

For more information contact: Applied Technology, (043) 24 2711. □



INTERFACEWARE TO MARKET SINCLAIR QL

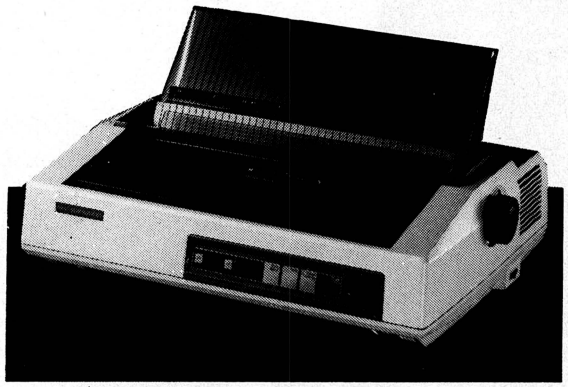
Interfaceware, a company which has grown from the traditional computer industry start in a garage to a $3 million dollar business, has gained the Australian distributorship for the Sinclair QL.

The QL (Quantum Leap) is a mixture of useful and quirky innovation. It is designed around a 32-bit Motorola 68008 processor with an 8-bit data bus; an Intel 8094 controls the keyboard and sound output. Mass storage is provided by two in-built 100 Kbyte microdrives (not disk drives at all, but continuous tape cartridges) and there is 128 Kbytes standard RAM (expandable to 640 Kbytes).

A souped-up version of BASIC and the operating system QDOS are held in ROM. QDOS is described as a single-user, multitasking, time-sliced system. In addition, four applications packages from Psion are included with the machine: Quill word processing, Abacus spreadsheet, Easel business graphics and Archive database. A variety of expansion ports is included, and the QL plugs into a colour or monochrome monitor or TV.

With its hardware expansion potential and the capabilities of the bundled software, the QL is obviously aimed at a higher market than the previous Sinclair offerings. Serious home users or business users with a restricted budget will probably be the chief targets for the QL, which will sell here for $1095. For more information contact: Interfaceware, PO Box 214, Lindfield 2073; (02) 46 4374. □

THE PRINTER NEC's NEW FAST 8800



Ask *datatel* for a demonstration

ELEGANT CORRESPONDENCE—NEC's new 8800 series spin-writers provide you with superb typewriter quality, solid impact, printing at a truly remarkable speed. Throughput for average text is a real 50cps. Burst speed is 55cps.

PAPER-HANDLING FACILITIES—Including single/dual bin sheet feeders; envelope feeder; unidirectional/bidirectional tractors, front sheet inserter; friction feed; push tractor—to allow immediate access to form just printed.

EASY TO USE AND QUIET—Controls have been kept to a minimum. An automatic print thimble sensor sets pitch without operator intervention. Ribbon change is simple and does not require thimble removal. Specific noise reduction methods allow for unobtrusive operation.

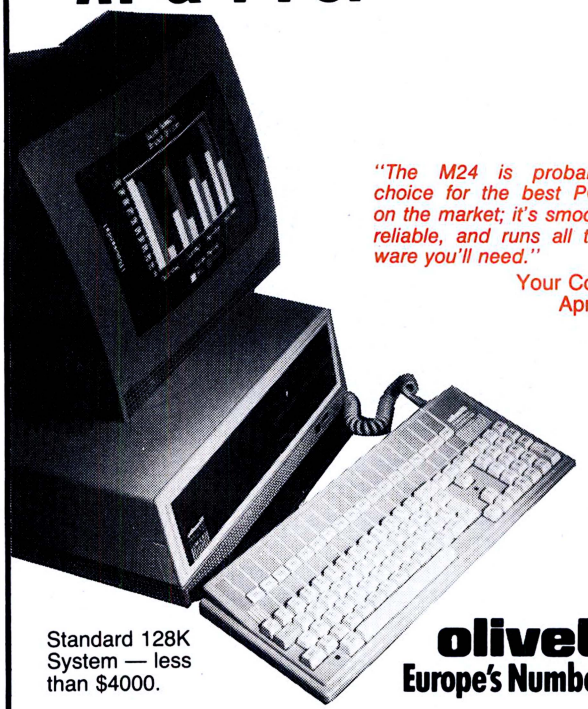
COMPUTER INTERFACING—*datatel* will assist you to correctly interface the 8800 with your system. Interfaces include IBM PC; Serial RS232; Centronics Parallel; Diablo Compatible.

RANGE OF TYPE STYLES—Low cost thimbles have up to 128 characters. Large range includes Scientific and Math Symbols. 10/12/15 pitch or proportional spacing.

***datatel* pty ltd**
19 Raglan Street, South Melbourne 3205 (03) 690 4000
80 Chandos Street, St. Leonards 2065 (02) 439 4211
SA—Applied Data Control (08) 79 9211
WA—Computer Communications (09) 458 9752
QLD—Computer Comms Services (07) 368 1641

datatel

INTRODUCING A REAL ALTERNATIVE THE OLIVETTI AT & T PC.



"The M24 is probably our choice for the best PC clone on the market; it's smooth, fast, reliable, and runs all the software you'll need."

Your Computer
April, 1985

Standard 128K System — less than $4000.

olivetti
Europe's Number One.

WE AGREE

In our search for an innovative, value for money, top quality P.C. which could stand up to any industry standard testing, we finally chose the **Olivetti M24**. It's designed to be flexible enough to meet all your business needs — today, and into the future. See what we mean, have a demonstration today.

We've got all the expertise and software you'll need
PLUS THESE EXTRAS:

- **FINANCE FACILITIES**
- **LOWEST PRICES**
- **AFTER-SALES CARE**
- **PRACTICAL ADVICE**

the Computer Spot

Shop C4
MLC Centre
SYDNEY
Tel: (02) 235-2455

Shop21A
Greenway Arcade
PARRAMATTA
Tel: (02) 635-6115

TI WINS DESIGN EXCELLENCE AWARD

Texas Instrument's artificial intelligence workstation, Explorer, has been selected as an example of excellent design in the industrial design competition of the 1985 Hanover Trade Fair in West Germany.

The design competition is an integral part of the Hanover Fair and has a world-wide reputation. It is run by a non-profit organisation and products from nearly 300 companies representing 14 countries were entered and judged this year. The best of these entries were selected to be representative of 'excellent design' and chosen to be displayed during the Fair in a special exhibit.

Selection is done by an independent panel of 12 international experts from various universities and design consulting firms around the world. Some of the criteria used by the judging panel are: practicality, security, compliance with ergonomic requirements, originality in concept and implementation and stimulation of both the senses and the intellect.

The TI Explorer is a high-performance symbolic processing system (LISP machine) which targets a specialised segment of the overall engineering workstation market. The Explorer hardware architecture has been designed specifically to support both the capabilities of the LISP language and the system's powerful software development environment.

In addition to powerful software tools, the hardware has been designed to incorporate the latest technology in providing an advanced user interface. This is accomplished through such features as high-speed bit-mapped graphics, keyboard and mouse input, careful overall ergonomic design and fibre optic interconnection techniques. □

IBM'S SHROUD OF SECRECY LIFTED

Perhaps because the machines themselves are sometimes rather boring, IBM tends to whip up excitement in the computer industry *prior* to a new product announcement by maintaining a mantle of secrecy and keeping observers guessing as to release dates.

Much of the interest is created by the enormous influence a new IBM machine has on various sectors of the computer world. Because of its solidity and dominant position in the market, what IBM does affects how many other companies will fare: will the new IBM PC 2 use 13 cm or 9 cm (or non-standard 7.6 cm) floppy disk drives? What about the operating system? And how about the processor? It doesn't matter if the new PC is as mediocre as the original, the answers to these questions will mean downfall or windfall to dozens of other companies.

Despite IBM's tight security net, some indications of what to expect for the follow-up to the PC have leaked out — and it seems the new machine will have more going for it than its predecessor. Our unimpeachable sources tell us to expect the PC 2 to surface by early July, sporting 9 cm 360 Kbyte disk drives, an external 1.2 Mbyte optional floppy and room internally for one hard disk drive. The processor will be the high-performance 80286 and the machine will use the AT bus structure.

All we have to do now is wait. □

SPELLBINDER USERS' GROUP FORMED

An Australian Spellbinder Users' Group has been formed in Sydney, and hopes to help all users get the most from their Spellbinder software.

The first meeting will be held at 7.30 pm on June 26 at 1st Floor, North Sydney Leagues Club, 20 Abbott Street, Cammeray. Both novice and advanced users will be able to discuss ways of improving their use of the system, and a demonstration will be given of Spellbinder driving a laser printer.

Further details are available from Kath Hanson, PO Box 171, Matraville 2036; (02) 694 1523. □

HI-TECH C

An Australian developed C Compiler that runs rings around the opposition.

Features:

- Compiles Full V7 C — including enums and structure operations
- Produces fast, compact code — outperforms all competitors.
- Complete I/O library
- Source for libraries included — no royalties
- Easy to use — one command compiles, assembles and links
- Powerful debugging tool included
- Command line I/O redirection
- FAST floating point
- Locally developed and supported
- Supports ROM-based software
- Includes MACRO assembler, linker and librarian



Version	Price
Z80 CP/M	$250.00
MS-DOS 2.xx	$300.00
CP/M-86	$300.00
Z80 and 8086	$475.00
Manual only	$ 25.00
Delivery	$ 8.00

MasterCard bankcard VISA

Also available: 8085 and 6809 cross-assemblers

There are many C compilers now available for the Z80 and 8086 (or 8088) processors; the quality ranges from terrible to quite good, and not all are available for both processors. Now there is a wholly Australian-developed compiler which outperforms all the others in all areas. HI-TECH C produces smaller, faster code than any other compiler for these processors, has a better user interface and provides features which are optional extras with the others. Furthermore, HI-TECH C delivers what we promise; although there is no such thing as bug-free software, we do not release unreliable products.

This is a solid production-quality compiler now being used by government departments, major Australian companies and many small companies and individuals. It is available for the Z80 and 8086/8088 processors, running under CP/M-80, CP/M-86 and MS-DOS (or PC-DOS).

Whether you are a commercial software developer or a hobbyist wanting to learn the most popular small-system language today, HI-TECH C can provide the answers to your needs.

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

HI-TECH SOFTWARE

The leading edge of Software Technology

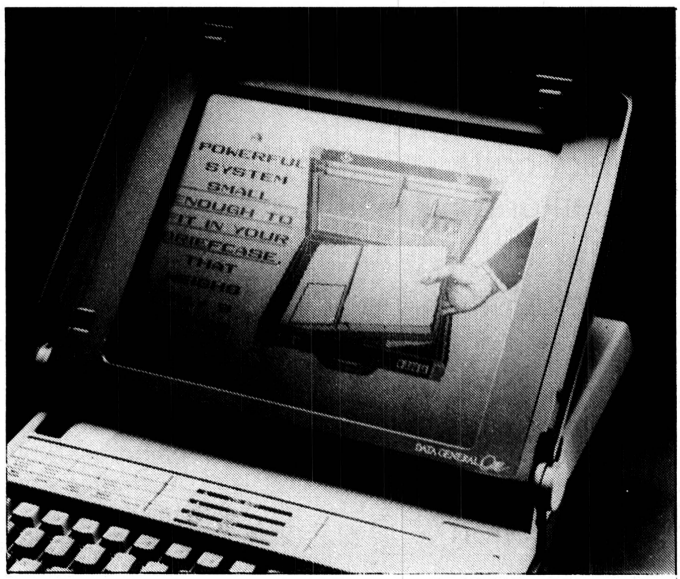
PO BOX 103, ALDERLEY, 4051, QLD.
PHONE: (07) 38 3852
Bulletin Board (07) 38 6872

THE ONE ARRIVES

Proclaimed as the first laptop computer to provide full desktop functionality, the Data General/One has now been released in Australia. It was designed in Japan by Nippon Data General using a variety of state-of-the-art techniques.

The DG/One is among the first computers to use the CMOS version of Intel's 8088 processor, the 80C88. CMOS (complementary metal oxide semiconductor) components are noted for their low power consumption and low heat production. The 80C88 provides basic compatibility with the industry standard, and the DG/One is software-compatible with the IBM PC.

The screen of the DG/One is a full-size liquid crystal display with 25 lines by 80 characters, or 256 by 640 pixels for bit-mapped graphics. Producing an LCD screen of these proportions was another breakthrough for Data General, but LCD technology of any level seems inadequate for anything but brief computer usage.



Other features include RAM expandable to 512 Kbytes, a full-size, full-function keyboard, a rechargeable battery providing eight hours of continuous operation, and one built-in 9 cm 720 Kbyte floppy disk drive. While Data General boasts full compatibility with the IBM PC, it's obvious the PC's 13 cm disks are not going to squeeze into the DG's drives — for direct transfer of information you'll have to fork out extra (and add to the basic 4.5 kg weight of the unit) for an expansion chassis and 13 cm drive.

Data General expects initial users to include on-the-road executives, engineers working at home, sales people and project managers working on-site. A basic machine with 128 Kbytes of RAM and a single disk drive will cost a little over $4000. More information may be obtained from: Data General, 30-32 Ellingworth Parade, Box Hill 3128; (03) 895 8311. □

COMPUTER
MAINTENANCE
Prompt service on all
Microcomputers and peripherals.
Service agent Anadex,
NDK, NEC, printers.
All ribbons and diskettes
in stock.
Computer and peripheral
Hiring Service.
1st Fl., 202 Blackburn Road,
Mt. Waverley, 3149.
Phone (03) 232 6733
NUCLEUS
Computer Services Pty. Ltd.

DTOOLKIT FOR DBASE

An Australian designer has developed a package which extends the power of dBase II. dToolkit features utilities for recovering corrupt data files and encrypting and decrypting data. It also has a library of object code routines which provide an additional 256 memory variables, arrays, date validation and arithmetic, random numbers, soundex codes, bit operations, compression, text justification and conversion and assorted other goodies.

Using the incorporated CB80 and CB86 functions it is possible to create compiled code for processing data and index files, and a program of menus which offer hierarchical and maintenance facilities plus eight levels of security.

The package is claimed to have many of the features of dBase III plus some special features of its own. It is suitable for all 8-bit and 16-bit computers running MS-DOS, PC-DOS, CP/M or CP/M-86. A future version is planned for dBase III. Computer Trader (a newly established company) is the distributor, and the cost of dToolkit is $99. For more information contact: Computer Trader, 3 Bowen Crescent, South Melbourne 3205; (03) 267 4477. □

TESTING HOLDS UP JAZZ RELEASE

Jazz, the much-heralded integrated package for the Macintosh, is now scheduled for release in Australia in the middle of this month. Lotus Development Corporation, developer of Jazz, Lotus 1-2-3 and Symphony, was due to start shipping Jazz in the US at the end of May after much delay.

Apart from suffering from an initial lack of software, and a *continuing* lack of heavy-duty business software, one of the Macintosh's problems has been the pre-announcement of much of the software written for it. You could be forgiven for thinking Jazz and many other yet-to-be-seen Mac programs have been around for months, considering the amount of trumpeting preceding these products.

And why has Jazz been tardy in making its appearance? "To develop a software product with powerful business capabilities has required rigorous testing," says Lotus Chairman Mitch Kapor. "That is the only reason for the delay."

Gee, you'd think Lotus might have known that *before* it announced the product's 'imminent' arrival. □

THE 200 C.P.S. LETTER-QUALITY PRINTER.

The EPSON® LQ-1500 letter-quality dot-matrix printer.

- 200 c.p.s. in draft mode.
- 67 c.p.s. in letter-quality.
- 132 column.
- Up to 200 different typefaces possible.
- Prints graphics with a crispness and definition you've probably never seen before.

® Registered Trademark of Epson Corporation, Japan.



EPSON AUSTRALIA PTY LTD
The Secret of Success.

See it for yourself at **HI-TRON SYSTEMS PTY. LTD.**
55 HERBERT STREET,
ARTARMON, N.S.W. 2064

438-4200

EPS 0030

Computer breakdown? Take it to Hills and save 25% on repairs

Your micro computer was made to be portable. So when a breakdown occurs, take it to your Hills Computer Service drive-in workshop. You get fast expert service and save around 25% of the service labour cost. We also carry a large range of parts and are service agents for Sharp, Hitachi, Osborne, Kaypro, Challenger, President and Commodore. Because Hills have a service workshop in every mainland capital, no time is lost sending your unit interstate.

Hills service contracts protect you from costly breakdown.

Workshop Service and Field Service contracts are available for business computers which include a free preventative maintenance service call. We also give a 20% No Claim Bonus, and extra discounts for more than one computer.



Hills COMPUTER SERVICE DRIVE-IN WORKSHOP

NSW	QLD	SA	WA	VIC
148 Miller Rd, Villawood 2163. Ph: 645 2355	115 Merivale St, Sth Brisbane 4101. Ph: 44 0180	7 Ackland St, Edwardstown 5039. Ph: 297 9040	506 Guildford Rd., Bayswater 6053. Ph: 279 5133	Hills Industries. 407 Plenty Rd, Preston 3072. Ph: 470 5430



MAGNABIZ
TOTAL MONEY MANAGER

FOR THE FIRST TIME —

a computerised accounting system which is easy to learn and use — but has enough features and facilities to satisfy all the accounting and money-management needs of most small to medium-sized businesses.
NOT just another elementary cashbook program. This is a completely automated bookkeeping system.
Keeps track of **EVERY CENT** you spend and receive in running your business.
Keeps track of **EVERY CENT** that you owe or is owing to you.
Holds over 11,000 entries on-line — for your main accounts . . . Holds 2,500 entries for your Petty Cash expenditure . . . all immediately available for your inspection at the press of a key!

Recommended Retail Price — $775.00 (carriage included)

SPECIAL SOFTWARE-OF-THE-YEAR OFFER! Valid until 30 June, 1985.

Only **$695.00** *for the complete User System or* **$25.00** *DEMONSTRATION PACK complete with introductory notes — contains the COMPLETE SYSTEM — but restricted to 25 entries each for the main accounts and the Petty Cash system.*

Try some of your own company information on it — see if it is the system for you!
Fully refundable against the special purchase price of the complete system.

What do the most respected reviewers say about it?

"I felt I actually learned something from the manual . . .
In fact I'm contemplating buying the system for myself "Les Bell, *YOUR COMPUTER*

"*MAGNABIZ* is in effect a perfect money management system for small and medium-sized businesses".
Phil Ward's *BUSINESS NEWSLETTER.*

"Eric Akroyd set out to produce a program for the businessman which is as easy to use as a vacuum cleaner — and as useful to him as a vacuum cleaner is to his wife . . . judging by the ***MAGNABIZ*** program I tested — he has succeeded".
Sue Robinson, the *AUSTRALIAN.*

CURRENTLY RUNS ON:—

IBM-PC, XT & PORTABLE	**EAGLE-PC, XT.**	**COMPAQ,**	**SANYO MBC-555**
Dick Smith CHALLENGER	**WORDPLEX,**	**AWA-CORONA**	**STEARNS,**
EPSON (with 16-bit card).	**SPERRY,**	**COLOMBIA,**	**FOX 16-bit.**
TANDY Model 2000,	**HYPERION,**	**OLIVETTI M24**	**NEC APC 3 version**
SHARP PC-5000 (a specially reduced version — no petty cash).			**NOW AVAILABLE!**

To: ***MAGNABIZ*** **P.O. Box 510, Chatswood, NSW 2067**

☐ Please send me a DEMONSTRATION disk of the complete ***MAGNABIZ*** Total Money Manager **$25**

☐ Please send me a complete ***MAGNABIZ*** User System at the special offer price of only **$695**

I wish to pay by: ☐ Cheque ☐ Bankcard ☐ Mastercard ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature: ..... Expiry Date ..... Please print name & address clearly.

Name: ..... Company Name (encoded into system) .....

Address: .....

..... Postcode: ..... Phone: .....

My computer system is .....

.....

Please identify your system clearly — i.e. Make, Model No., No. of drives, details of hard disk, Memory, etc.
Demonstration packs sent by Australia Post Priority Paid Parcel. User packs despatched by Overnight carrier to any address in Australia.

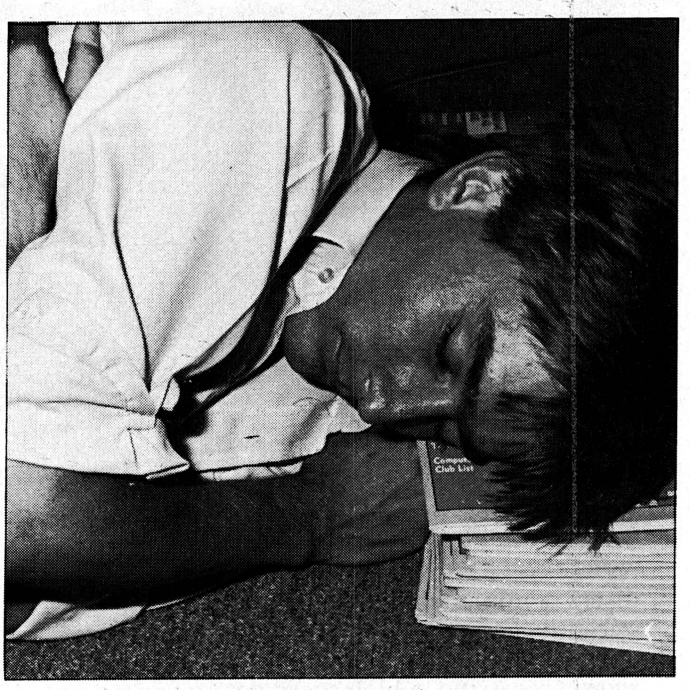
Please phone (02) 412-3470 for further information.

GONE, BUT NOT FORGIVEN

Regular readers of *Your Computer* will notice the absence of a familiar style from the pages of the magazine. Evan McHugh, of Bit Bucket and Books in Brief fame, has left our merry band to seek his fortunes with another magazine.

During some 18 months with *Your Computer*, Evan's talents have not been restricted to the pages of the magazine. He also gained notoriety as the sysop of our bulletin board, and has spent many hours, in his capacity as manager of McHugh's Twisted Cabling Service, crawling around Federal Publishing's ceiling connecting far-flung computer terminals and printers. No-one is likely to forget his cheery willingness to help those in need ("Gimme some chocolate truffles or your printer can hang forever").

We wish Evan success in his future endeavours. The office will never be the same without him. □



SYNERGISTIC BEER DRINKING

Each month the cast and crew of *Your Computer* retire to the Clock Hotel in Surry Hills for a chat and a drink with our readers. We're keen to hear what *you* think of the magazine so we can make it even better in the future.

If you'd like to come along and share ideas, debate the latest hot topics, unveil your new program (which will sell *twice* as well as Lotus) or rustle up rumours, join us any first Wednesday of the month at 6 pm(ish). The Clock is at 470 Crown Street, Surry Hills (enter from the Crown Street side). Just look for the table with the computer magazines and characters resembling a Brendan Akhurst cartoon — that's us. □

IT IS NO LONGER DIFFICULT TO LEARN TO TOUCH TYPE BECAUSE OF THE INSTANT FEEDBACK AND INTELLIGENT ANALYSIS OF A MICROCOMPUTER — IT LEARNS YOUR NEEDS AND YOU LEARN IN LESS THAN 15 HOURS BUT CHOOSE THE PROGRAM CAREFULLY AS YOU WANT TO SUCCEED

WINNER
AUSTRALIAN SOFTWARE DIVISION
Personal Computer of the Year Awards

TYPEQUICK™

ON MS DOS, PC DOS, APPLE DOS, CP/M.

IS THE ONLY PROFESSIONAL COURSE WORTHY OF YOUR TIME & EFFORT
LOOK AT THIS LIST OF MULTI USERS WHO HAVE CHOSEN CAREFULLY

BARCLAYS AUST	*MIM HOLDINGS*	*METRO BUS COLLEGE*	*DEPT OF AGRICULTURE*
GREATER UNION THEATRES	*SHELL*	*SYDNEY TAFE*	*LANDS DEPARTMENT*
FACOM	*BRISBANE CAE*	*WODEN TAFE*	*RPA HOSPITAL*
ICL	*BRUCE TAFE*	*CSIRO*	*SYDNEY CC*
JOHNSON & JOHNSON	*HOBART TAFE*	*GOVERNMENT PRINTER*	

PLUS THOUSANDS OF INDIVIDUALS

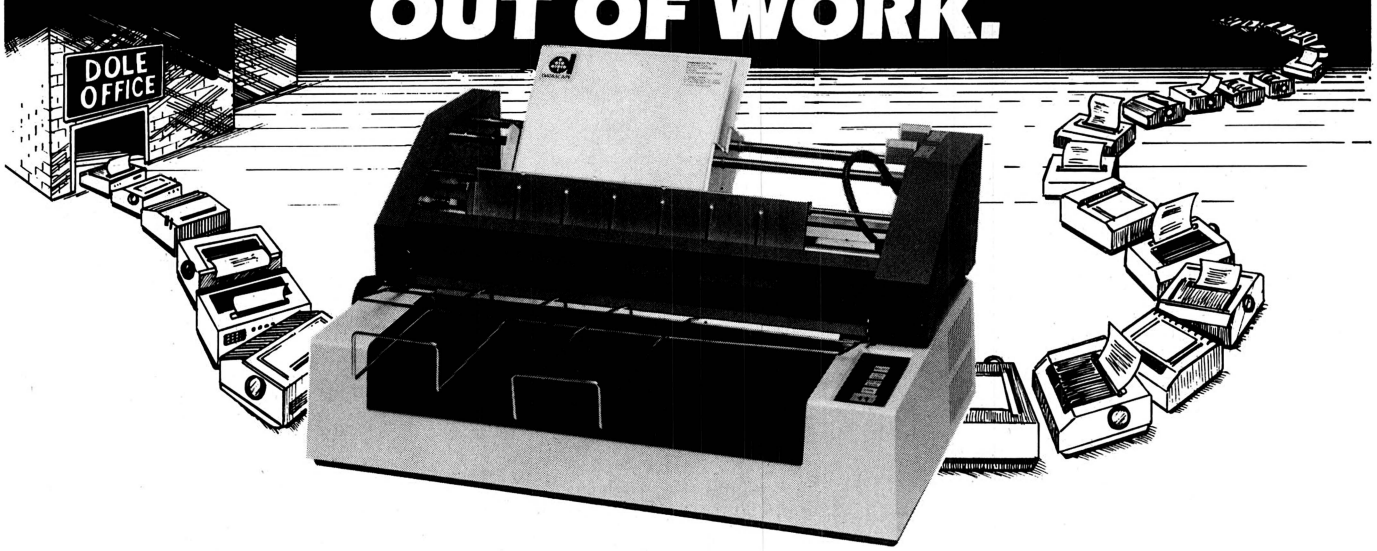
IT IS WITHIN YOUR GRASP TO TOUCH TYPE FASTER THAN WRITE AND KEEP BOTH EYES ON THE SCREEN OR COPY! ITS FUN BECAUSE YOU TYPE MOSTLY ENGLISH TEXT

TYPEQUICK IS FAR BETTER ORDER TODAY
OR
SEND FOR A BROCHURE

YC.6
YOUR NAME
ADDRESS
COMPUTER TYPE
OPERATING SYSTEM
DISK FORMAT
INCLUDE $77 WITH ORDER
Post to AID SYSTEMS 14 CECIL ST. GORDON 2072
NOW

MS DOS Microsoft Trademark, CP/M Digital Research Trademark

THE NDK 5025. PUTTING OTHER PRINTERS OUT OF WORK.



You may not have realised it, but there is a quiet revolution going on in printers.

Users of mini, micro's, PC's etc. have, until recently, been forced to buy unique printers for their differing applications; a daisy wheel for word processing, a high speed dot matrix for EDP and, perhaps, a specialised printer for graphics.

Now, one type of printer can do the lot!

They are known as multimode dot matrix printers. And, of these, the NDK 5025 leads the field.

But, will it work with my system and do all my work?

Firstly, the NDK 5025 copies or emulates several well-known printers, enabling you to use it with your existing software. For word processing it looks like, and does everything that the popular Qume Sprint 5 daisy wheel can do. But at 90 cps – nearly three times as fast! For draft work it "burns along" at 180 cps. If you are using an IBM-PC then, with the flick of a switch, your NDK 5025 will emulate the standard IBM dot matrix printer. But, again, at much higher speed and quality. If you're into graphics such as Lotus 1-2-3, the NDK 5025 will emulate either IBM, Epson or Toshiba P1351.

What's its print quality like?

The NDK 5025 uses a 24 pin head to form the characters, which look as good as a daisy wheel! It also has built-in fonts (just like changing daisy wheels) including Courier 10, Prestige 12, Bold P.S., Draft, Italic, Sub Super Script, Compressed and Scientific. Special customer generated fonts can be down-loaded, too.

Is it flexible?

The NDK 5025 is a full-width printer with friction roller and tractor as standard. A dual bin sheet feeder and cut sheet guide are available as options to make your printing life easier.

If you are still not convinced, look at the names behind the printer. NDK is a famous Japanese company specialising in the high quality end of the printer market – more than 3500 units are installed throughout this country – while Datascape is Australia's leading independent specialised printer company with a nation-wide support system.

Price?

That's another reason why the NDK 5025 is putting all other printers out of work.

To find out more – mail your coupon NOW!

Mail coupon to:
DATASCAPE. The printer specialists.
Sydney office: 44 Avenue Rd., Mosman.
Tel. (02) 969 2699
Melbourne office: 27 Raglan St.,
South Melbourne. Tel. (03) 690 3622

DATASCAPE

YES. I would like to know more about the NDK 5025

Please ☐ Send brochure ☐ Have a rep. call

Name .....

Title .....

Company .....

Address .....

..... Phone .....

The type of computer we use is: .....

AMERICAN GRAFFITI

BY HOWARD KARTEN

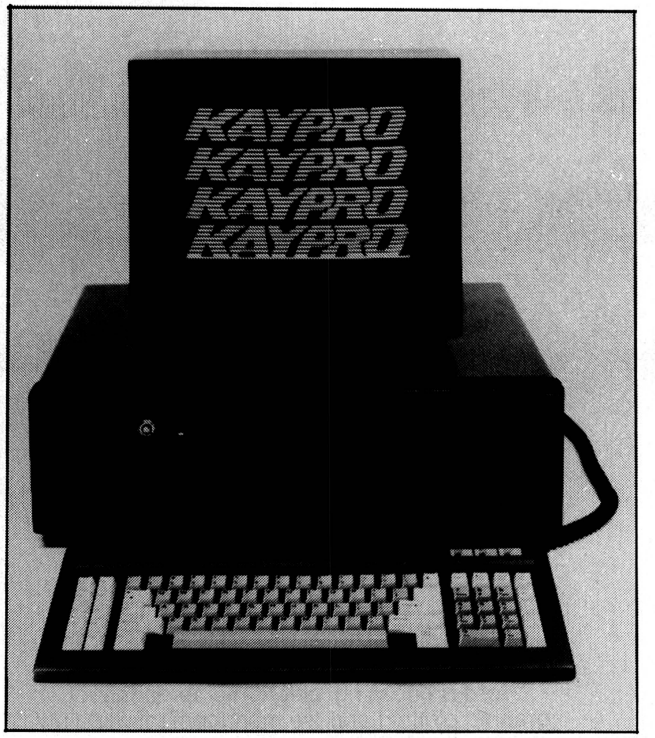
AT GIVES IBM THE BLUES

The IBM PC-AT is widely believed to have some significant problems. Almost since the first shipments, both owners and dealers have reported problems with lost data on the AT's fixed disk, particularly with sectors on the disk going bad. Recently, it was learned here that a California firm, Computer Memories Inc, is working with IBM in Florida to rehabilitate some 20 Mbyte hard disks.

Several related factors have compounded the problem. For example, IBM, as is its customary practice, is being close-mouthed about possible problems, defect rates and related matters, and is declining to answer most press inquiries. The company is reported by users to be rigorously honouring the warranty, but not saying much to them about the problems. Additionally, Microsoft, which wrote the DOS 3.0 operating system, has admitted the software does not always identify and mark bad disk sectors, and some users have reported problems with floppy disk drives.

Moreover, demand for the AT is apparently very high. IBM may have once again underestimated this: 1984 production was reportedly sold out by October; in December, IBM began quoting delivery delays as long as nine months, and put dealers on allocation.

The result has been, predictably, business opportunities for others. Ads in computer publications now shout about the availability of 1.2 Mbyte drives and third-party versions of the 20 Mbyte fixed disk; several retailers are offering upgrade kits. And Kaypro recently announced its own version of an AT-compatible machine — without, however, the 20 Mbyte fixed disk. Other US manufacturers — apparently having forgotten the lessons learned recently about the difficulties of competing with IBM on its own turf — are reportedly readying their clones. □



Kaypro's challenger to the troubled IBM AT — *the* 286*i*.

COMPUTERS PRESENT NEW CHALLENGES FOR LAWMAKERS

The microcomputer tidal wave of the past five years has been causing some rough sailing for the US legal system, which is presently unequipped to deal with the challenges posed by microcomputers. As this tidal wave crests in other countries, they too can expect to experience problems unanticipated or unaddressed by the current body of law.

One recent example here centres around the proliferation of computer bulletin boards. Around May 1984, Los Angeles police arrested bulletin board sysop (system operator) Tom Tcimpidis, a young engineer, and confiscated his hardware. It seems someone had posted a purloined AT&T credit card number on Tcimpidis's bulletin board. Any malefactors using the number would have been able to fraudulently charge calls to the rightful owner of the number.

Security officials for Pacific Bell Telephone (who, like their counterparts at other local telephone companies, are widely respected and equally widely believed to engage in close monitoring of bulletin boards for potential crimes such as this) learned the number was available on the board. They alerted local authorities, who obtained a warrant and arrested Tcimpidis.

Tcimpidis's attorney, Charles Lindner, argued that his client was innocent and could not reasonably be expected to police everything posted on his board. The situation was further muddied when youthful advocates of the bulletin board argued passionately against "choking off this new medium of communication". (The First Amendment to the US Constitution, which plays a key role in this controversy, states, "The Congress shall make no law abridging the freedom of speech ...", and has generally been interpreted in a fairly broad fashion so as to protect all forms of communication. Some legal observers, however, pointed out Tcimpidis was in effect acting as a publisher, which meant he had responsibility for information 'published' on his system.)

The case was dropped when it reached court in early February, authorities deciding they lacked sufficient evidence to support the charge of telephone fraud.

Another touchy area concerns illegal break-ins and penetrations of computer systems by hackers and others. Although there are federal and state laws concerning theft of services, wire fraud (frauds committed with the use or assistance of interstate telecommunications facilities) and related crimes, computer break-ins and data vandalism appear to be uncovered by existing law.

These developments have raised some troubling issues here. Legislators at both the state and federal level have only recently begun considering the best form of legislation. The problem is undoubtedly further compounded by the fact that few legislators anywhere have a strong background in science and technology; despite large staffs, legislators have often stumbled in dealing with technological developments.

□

Plus/4

Introducing Software That Comes With Its Own Built-In Computer



Word processing, electronic spreadsheet, graphic plotting and file management certainly need no introduction.

But a computer that has them all built-in certainly does.

Especially for under $600*.

You could easily say the built-in software alone is worth a lot more than the price.

But then again you could easily say the Commodore PLUS/4 computer alone is worth a lot more than the price. With 64K of memory, 60K fully usable, full size typewriter keyboard, four separate cursor keys, high resolution colour graphics, extended BASIC, split screen and windowing capabilities.

Turn on the power and judge for yourself. Write and edit letters, reports, papers and novels with the built-in wordprocessor. Do the books, the budgets, the projections, profit/loss statements with the built-in spreadsheet. Draw circles, boxes, complex shapes, images and combine them with text with the graphics program. Collect, store, organize and retrieve information such as mailing lists, inventories, personal files, business files and recipes with the file management program.

Go from one program to another at the touch of a key. For not only are they built into the computer, they're built into each other. So, for example, in one document, you can go from words to numbers to graphs to names and addresses. In just a matter of moments.

The Commodore PLUS/4. The first new computer that doesn't have one new thing about it. It has four.

For further information contact your nearest Commodore Dealer.

*Recommended retail price

commodore COMPUTER

Keeping up with you.

Commodore Business Machines Pty. Ltd. New South Wales: (02) 427 4888
Victoria/Tasmania/South Australia: (03) 429 9855 Western Australia: (09) 389 1266 Queensland/Northern Territory: (07) 393 0300

BMS/CC365

HARD DISK MICRO DECISIONS: MD11



The MD11 offers a carefully selected group of business application software including word processing, forecasting, data base management and accounting functions — the MD11 speeds you through them all, even if you've never used a computer before. The Micro Decision's straight-forward component design insures continued reliability.

MORROW BUSINESS SYSTEMS COME WITH:
2x400K FLOPPIES, OR
1x400K FLOPPY AND 5, 11,16 OR 34 MB HARD DISK.

THE BUSINESS ACCOUNTING PACKAGE INCLUDES:

GENERAL LEDGER SYSTEM
SYSTEM OBJECTIVES

1. To control:
   - A. Company
   - B. Partnerships
   - C. Sole Trader
2. To compare results with budget and last year.
3. To produce the financial reports.
   1. Manufacturing
   2. Trading
   3. Profit and Loss
   4. Balance Sheet
4. To transfer the totals from the various ledgers, Debtors, Creditors sales etc.

DEBTORS SYSTEM
SYSTEM OBJECTIVES

1. Integrated with Invoicing/Stock.
2. Automatic Production of Statements.
3. Debtors Control by Aged Trial Balance.
4. Analysis of Sales Monthly & Yearly.
5. Analysis of Sales by Area/Salesman.
6. Calculate Salesman's Commission.
7. Uses Standard Stationery.

INVOICING/STOCK SYSTEM
SYSTEM OBJECTIVES

1. To maintain and control stock inventory levels.
2. To produce a detailed invoice or Credit No. on-line.
3. To analyse the sales and profitability of all stock lines.
4. To produce a complete sales tax analysis.
5. To integrate with the Debtors system and update account balances at invoice stage.
6. To produce salesman and area figures including a commission statement.

CREDITORS SYSTEM
SYSTEM OBJECTIVES

1. To produce a creditors system which can operate: Integrated with the Stock System.
2. To maintain and control the Accounts Payable section of a company.
3. To control discount available.
4. To make payments to selected creditors by the use of the aged Trial Balance.
5. To produce cheques automatically.
6. To analyse purchases from creditors month and year to date.
7. To produce the necessary totals to transfer to the General Ledger.

LEASE FROM $25 WEEKLY.

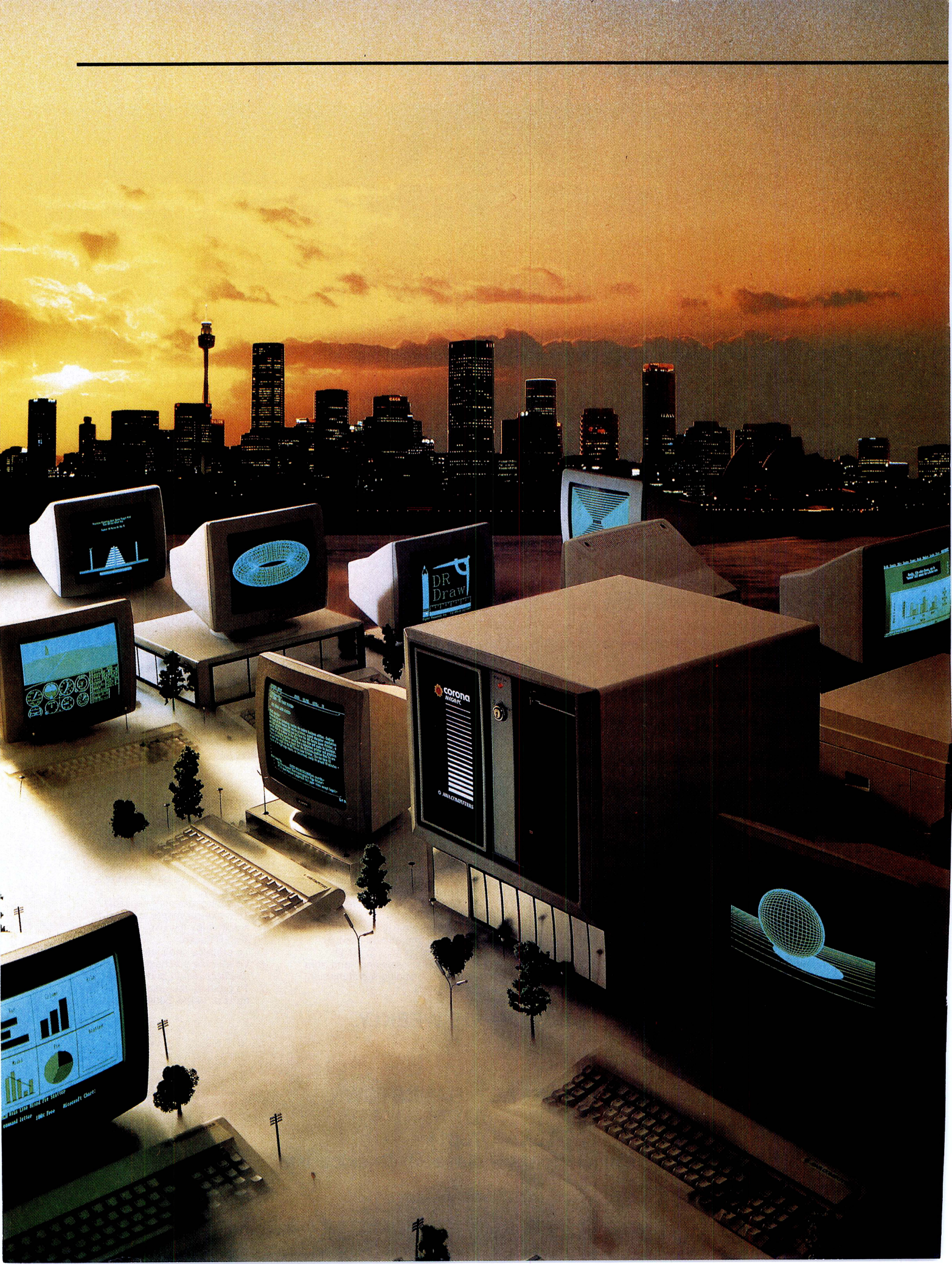
AUTOMATION STATHAM Pty Ltd

47 BIRCH STREET, BANKSTOWN,
NSW, 2200. (02)709-4144
TLXAA 73316

A FULL SERVICE MORROW DISTRIBUTOR SINCE 1976

COMPETRON
252 Abbotsford Rd,
Mayne, QLD 4006
(07)52-9522

ASSCO Pty Ltd
17 Heatherdale Rd,
Ringwood, VIC 3134
(03) 873-2266


DR Draw
corona
MicroPC
© 1984 COMPUTERS

WHY TRUE BLUE?

If IBM is the only manufacturer who can be 100 per cent compatible with IBM, why do people buy other brands? Les Bell gives some reasons.

The decision to buy IBM, or not to buy IBM, is one fairly loaded with emotional connotations. This is particularly true in the mainframe and mini area, where you're not just buying the machine, you're also buying IBM's service and support. You'll be dealing continuously with IBM's systems engineers and support people; in short you're virtually getting married to the company.

While this is not true in the same way at the personal computer level, some of this emotionalism has still transferred downwards. The market seems to split naturally into IBM and the rest. Yet the rest still seem to sell machines. Why, and who buys them? Can you risk buying non-IBM gear?

The answer is that you can, though you'll have to know the risks and the benefits and weigh them up.



Sigma Data's Elite PC comes very close being an IBM PC. It's main difference — a different keyboard layout.

THE CLONES

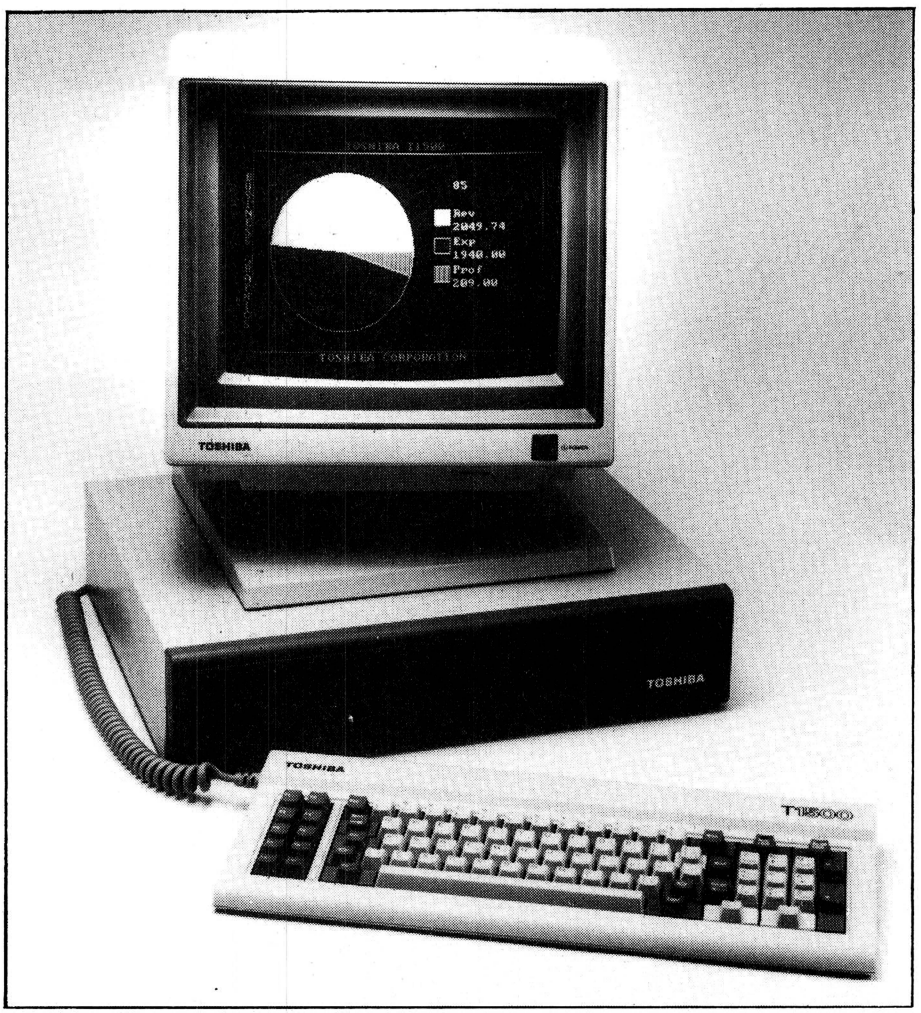
Machine	Standard Configuration	MS-DOS Compatible	Media Compatible	Hardware Compatible	ROM BIOS Compatible	Internal Hard Disk	Standard PC Software known to run on machine#	Pricing for the following configuration: 256K, dual drives, colour graphics adaptor, 1 serial port, 1 parallel port, colour screen	Distributor
SIGMA ELITE	35.5 cm colour screen, colour card, 128K RAM, 2 disk drives or 1 drive and internal hard disk, 1 parallel port and 1 serial port, MS-DOS, CCP/M and Open Access	Yes	Yes	Different Keyboard Layout	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3	$4199 retail inc. tax and software $5999 retail inc. tax and software for hard disk version	Sigma Data 1 Waltham Street Artarmon NSW 2064 (02) 439 6211
CORONA PC	35.5 cm tilt and swivel screen, 256K RAM, 1 parallel port and 1 serial port, 2 disk drives, 4 expansion slots	Yes	Yes	Yes	Yes	Yes	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	$5359.85 inc. tax	AWA Computers 132 Arthur Street North Sydney NSW 2060 (02) 922 3300
SPERRY PC	2 disk drives, 256K RAM, 1 serial port, 7 expansion slots, colour screen, dual processor	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	$4882 inc. tax and software	Sperry Computers 115-117 Wicks Road North Ryde NSW 2113 (02) 887 6777
DEKER	1 floppy drive, 64K RAM, monochrome screen, colour board, parallel port	Yes	Yes	Yes	Yes	Yes — 33 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	$2795 retail inc. tax	Deker Business Machines 174 Parammatta Road Auburn NSW 2144 (02) 647 2744
BI XT-88	Multi-function card with 256K RAM, colour graphics card, 2 disk drives, 1 parallel port and 1 serial port	Yes	Yes	Yes	Yes	5 MB to 30 MB	Flight Simulator Lotus 1-2-3 DR Logo Framework	$3300 retail inc. tax	Bi Computers Pty Ltd Suite 23, 2A Bayswater Road Kings Cross NSW 2011 (02) 356 2388
LOGITEC	256K RAM, two disk drives, 2 serial ports, 1 parallel port, colour graphics	Yes	Yes	Yes	Yes	Yes — 10 MB and two disk drives	Flight Simulator Lotus 1-2-3 DR Logo Framework	$4621 retail inc. tax	Porchester Computers 169 Victoria Parade Fitzroy Vic 3065 (03) 417 6999
MORROW PIVOT	Two disk drives, 256K RAM, monochrome screen, 1 serial port and 1 parallel	Yes	Yes	Different Keyboard Layout	Yes	Not available	Lotus 1-2-3 Framework	$3600 inc. tax and software	Automation Statham 47 Birch Street Bankstown NSW 2200 (02) 709 4144
ZENITH Z-150 PC	320K RAM, two disk drives, 30 cm monochrome screen, or one disk drive and 10 MB hard disk	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS	$5694 retail inc. tax (configuration is 320 Kbytes RAM, amber screen)	Warburton Franki 9 Birnie Avenue Lidcombe NSW 2141 (02) 647 2266
ZENITH Z-160 PORTABLE	128K RAM, one disk drive, 23 cm monochrome screen, or 320K RAM and 11 MB hard disk	Yes	Yes	Yes	Yes	Yes — 11 MB	Flight Simulator Lotus 1-2-3	$5095 retail inc. tax (configuration is 320 Kbytes RAM, amber screen)	Warburton Franki 9 Birnie Avenue Lidcombe NSW 2141 (02) 647 2266
EMTEK PC/640	640K RAM, two disk drives, 1 serial port, 1 parallel port, floppy disk interface card, 6 expansion slots colour graphics adaptor or monochrome card, no monitor	Yes	Yes	Yes	Yes	Yes	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS	$2499 retail inc. tax but no monitor, and 640K of RAM	Emona Computers 2nd Floor 661 George Street Sydney NSW 2000 (02) 212 4815
OLIVETTI M21	128K RAM, 2 disk drives, 23 cm monochrome display, 1 serial port and 1 parallel port	Yes	Yes	Yes	Yes	Not available	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$6689 retail inc. tax — screen is external	Olivetti Australia Pty Ltd 140 William Street Sydney NSW 2000 (02) 358 2655
OLIVETTI M24	128K RAM, 2 disk drives or 1 disk drive and a 10 MB hard disk, 1 serial port and 1 parallel port, 1 expansion slot	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$5988 retail inc. tax	Olivetti Australia Pty Ltd 140 William Street Sydney NSW 2000 (02) 358 2655
OSBORNE 2100	256K RAM, two disk drives, colour graphics adaptor, 1 serial port and 1 parallel port, no screen	Yes	Yes	Yes	Yes	Yes — 10 and 20 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	$3850 retail inc. tax	Osborne Australia Pty Ltd 3rd floor 93 York Street Sydney NSW 2000 (02) 290 1122

TELEVIDEO TPC-II PORTABLE	23 cm non-glare screen, 256K RAM, 1 parallel port and 1 serial port, 2 disk drives, graphics display, RGB outlet, internal expansion slot.	Yes	Yes	Yes	Yes	Not available	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$5140 retail inc. tax and with internal monitor	Data Peripherals 9 Avon Road North Ryde NSW 2113 (02) 888 5733
DICK SMITH CHALLENGER	256K RAM, two disk drives, 1 serial port and 1 parallel port, no screen	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3	$3628 retail inc. tax and software	Dick Smith Electronics Corner Lane Cove and Waterloo Rds North Ryde NSW 2113 (02) 888 3200
NORTHSTAR DIMENSION	Two-user system, 128K RAM per user, 256 cache RAM, one disk drive, 15 MB Winchester, monochrome screen, serial and parallel ports.	Yes	Yes	Yes	Yes	Yes — 15 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$16,000 retail for standard system	New Dimension Computers P/L (03) 544 4233
TELE-PC	256K RAM, 1 serial port and 1 parallel port, monochrome screen, 2 disk drives or 1 disk drive and 10 or 20 MB hard disk, graphics display	Yes	Yes	Yes	Yes	Yes — 10 or 20 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	Monochrome-screen PC — $5710 inc. tax Colour-screen PC — $6520 inc. tax Monochrome-screen XT, 10 MB — $7870 inc. tax Colour-screen XT, 21.2 MB — $9300 inc. tax	Data Peripherals 9 Avon Road North Ryde NSW 2113 (02) 888 5733
PRESIDENT 2010	512K RAM on a multi-function board, 1 parallel, 1 serial and 1 games port, graphics, monochrome screen, two disk drives, 10 MB internal hard disk	Yes	Yes	Yes	Yes	Yes — 10 or 20 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	512K RAM — $4928 retail inc. tax	President Computers 100 George Street Hornsby NSW 2077 (02) 476 2700
TAVA PC	256K RAM, two disk drives, colour and graphics board, 1 parallel and 1 serial port	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$3750 inc. tax for above config. $4295 for Turbo version of Tava (higher clock speed — 8 MHz and the standard speed of 4 MHz) $5545 for hard disk version	Compushack 1/303 Pacific Highway Lindfield NSW 2070 (02) 467 1933
COMPAQ PORTABLE	256K RAM, two disk drives, one parallel port and monochrome screen	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo Framework	$4953 inc. tax and $8113 for hard disk version	Computerland Stores (02) 929-4499
SANYO MBC 775	256K RAM, two disk drives, 1 parallel, 1 serial port, colour screen, graphics adaptor	Yes	Yes	Yes	Yes	Yes — 10 or 20 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS DR Logo	$3995 inc. tax	Sanyo Office Machines 127 Walker Street North Sydney NSW 2060 (02) 929 4644
SANYO MBC 555	128K RAM, one parallel port, one disk drive, colour graphics card, composite port	Yes	Yes	Yes	No	Yes — 10 or 20 MB	Flight Simulator Lotus 1-2-3 DR Logo	$3372 inc. tax and MicroPro software	Sanyo Office Machines 127 Walker Street North Sydney NSW 2060 (02) 929 4644
KAYPRO 16	256K RAM, one 10 MB hard disk, one floppy disk drive, colour graphics card, internal 23 cm green phosphor screen with RGB and composite video output, one serial port, one parallel port, four expansion slots; bundled software — MS-DOS 2.11, Wordstar, Mailmerge, Infostar, Calcstar, Mite, Tutorial, GW-BASIC.	Yes	Yes	Yes	Yes	Yes — 10 MB	Flight Simulator Lotus 1-2-3 Concurrent PC-DOS Framework	$6140 inc. tax, bundled software and 10 MB hard disk Price for the dual floppy System 16/2 is unavailable as yet	Vizden Unit 2, 9-11 Ethell Road, Kirrawee NSW 2232 (02) 542 3866
T1500	128K RAM, dual 13 cm drives, green screen monitor, MS DOS, a printer port and colour and graphics capabilities.	Yes	Yes	Yes	Yes	No	Flight Simulator Lotus 1-2-3 Concurrent PC DOS DR Logo Framework	$4826	Distributor information is available from Sanyo Australia. Phone (02) 428 0822.
T1100	256K RAM, an integrated 720 Kbyte 9 cm disk drive, a tilting 80- character x 25-line LCD, a printer port, and colour and graphics capabilities.	Yes	No	Yes	Yes	No	Flight Simulator Lotus 1-2-3	$4745	

#Standard packages tested were Flight Simulator, Lotus 1-2-3, Concurrent PC-DOS, DR Logo and Framework.

Why True Blue?

The decision to buy IBM *or not is loaded with emotional connotations — you're not just buying the machine, you're also buying* IBM's *service and support, dealing continuously with its systems engineers and support people — you're virtually getting married to the company.*



The Toshiba IBM-*compatible* T1500.

Taiwanese Clones

PC clones, or close compatibles, can be broken into several categories, depending on the particular features offered, such as more powerful processors, lower cost, portability or other facilities. Perhaps the largest group is the Taiwanese machines. There are scores of these machines on the market under different names, but in fact they come out of less than a dozen factories.

Electronically, many are well-nigh identical to the IBM PC, although they may differ slightly in physical construction. The reason for this is simple: IBM published a PC Technical Reference Manual which contains virtually the entire circuit diagrams of the PC — the only part missing is the power supply circuit. It even contains the circuit diagram of the Epson printer IBM sells!

Following this manual, it is very simple to construct a machine which is completely compatible — at the hardware level — with the IBM PC. What is more difficult is making a machine which is compatible at the software level. Ironically, this is because of the same Technical Reference Manual.

A key part of the PC is the ROM BIOS — the Basic Input/Output System programs stored in ROM chips on the PC system board. These programs are responsible for driving the PC screen, keyboard, printer, disk drives, interrupt circuitry and generally interfacing the operating system to the hardware.

Now because the programs' source code was printed and published in the Technical Reference Manual there is no question that they are copyright. Therefore an identical ROM BIOS in another machine would be a clear breach of copyright and would result in prosecution by IBM. The wisest ▷

A LOT OF LEARNING IS A VERY GOOD THING. ESPECIALLY IF IT'S FREE!



MORE THAN A BRILLIANT COMPUTER. A COMPLETE EDUCATION COURSE IS PART OF YOUR PURCHASE.

One reason why the John Sands Sega SC3000H is the computer which never finds its way into the spare room cupboard is because Sega owners learn how to make the very best use of what they've got!

When you buy your John Sands Sega you'll be invited to attend our free, 5 hour, hands-on Education Courses. You'll learn how to get started properly, how to use the dozens of existing Sega programs, how to create your own programs, and how to use this incredible computer for education, personal business, fun and games and much, much more!

The more you get to know your Sega, the more it will do for you.

THE SUCCESS STORY OF PERSONAL COMPUTERS.

Irrespective of anything else in its price field, just look what your John Sands Sega SC3000H has to offer:

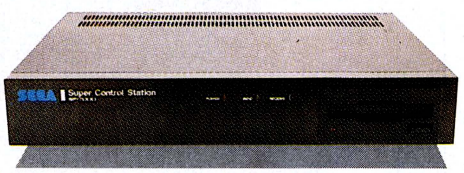
- Typewriter style hard keyboard.
- 48K total RAM.
- 32K ROM.
- Expandable to 80K total RAM.

At your fingertips you've got high level BASIC language, high resolution graphics, 32 graphic sprites, multi-function keyboard, full screen editing, 48 single-keystroke commands, 16 colors and a 3 channel 1/5 octave sound range. Connects to your television set and standard cassette recorder. It's the best in its class of home computers for the whole family.

ADD THE SUPER CONTROL STATION FOR TREMENDOUS POWER AND PERFORMANCE.

The John Sands Sega SF7000 Super Control Station offers you all these features – and lots more!

- 3 inch micro disk drive.
- 156K bytes working capacity.



- 312K bytes storage capacity.
- High speed (250K) Baud transfer rate.
- RAM memory expansion 80K bytes total RAM.
- Both Centronics and RS232C interfaces.
- Extended BASIC language.
- Great flexibility. Incredible speed.
- Interfaces with existing printers and many other peripherals.

John Sands SEGA®

NATURALLY, THE BEST OF THE SOFTWARE IS AVAILABLE TOO.

We've got the product and the programs too! **Educational Series** including Sega LOGO – a must for every school child. **Programming Series** – including BASIC Programming Tutorials and the new Sega Touch Typing Tutorial. **Personal Business Series** – including Spreadsheet, Database and Word Processing. **Recreational Games** plus a new arcade-style Joystick and Steering Wheel Controller, **Music** and many more. With our total software range and the ability to create an infinite number of programs yourself, make sure that you settle for nothing less than the Sega SC3000H – the total technology home computer system from John Sands Sega.

The John Sands Sega SC3000H Computer – including the FREE Education Course – is now available for the recommended retail price of just $349! At leading retailers throughout Australia.

Prices, product specifications and performances are subject to change without notice.

I'm interested in knowing more. Please send me complete literature and copies of reviews on the John Sands Sega Total Technology Home Computer System.

My name_____

Address_____

_____ Postcode_____

Please mail to: Computer Information Department, John Sands Electronics, 6 Bay Street, Port Melbourne, Victoria 3207. (Telephone (03) 645 3333) JSE 4

WE SET THE PACE IN NATIONWIDE COMPUTER SERVICING

The Customer Engineering Division of PACE Computer Services operates as a Third-Party Service and Support Organisation to the computer industry in Australia.

We provide national support facilities on a range of minicomputers, microcomputers, terminals, printers and microfiche readers from our Service Centres in each mainland state.

QUALITY SERVICE

Many of our engineers have more than 10 years computer industry experience. In fact all engineers receive continual training both locally and overseas.

You are assured of prompt response when you call as the best service is fast service.

Each Service Centre is strategically located so that local management can best respond to your needs.

SERVICE OPTIONS

PACE's Technical Support Specialists are able to identify the needs of each customer's system with regard to maintenance and specify accordingly.

Service can be provided by preventative maintenance under contract or on time and materials as required.

Call your nearest Service Centre now for professional advice and support.

SYDNEY	35 Moore Street, LEICHHARDT NSW 2040 (02) 692 7900 Telex: AA71706
MELBOURNE	39 Wellington Street WINDSOR VIC 3181 (03) 529 2522
BRISBANE	Suite 45, 2 Benson Street TOOWONG QLD 4066 (07) 371 6211
CANBERRA	29 Altree Court PHILLIP ACT 2606 (062) 82 3281
ADELAIDE	68 North Terrace KENT TOWN SA 5067 (08) 42 4271 Voice Call: (08) 271 1066 user: 226
PERTH	15th floor, Nat West House 251 Adelaide Terrace PERTH WA 6000 (09) 325 9053

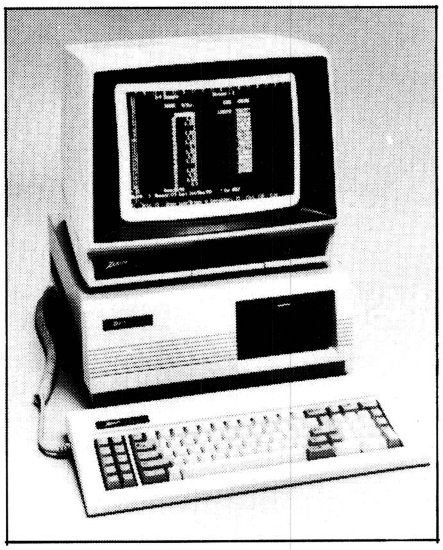
PACE
COMPUTER SERVICES

CED093R

Why True Blue?

course of action in that case seems to be to cave in and settle out of court, since IBM has not only the right but also the might. Its legal counsel has had years of experience at wearing down the US Government in anti-trust cases, so what chance would you stand?

In practice, therefore, most ROM BIOSs are slightly different from IBM's. In most cases, this makes very little difference.



Above: *The Zenith Z-150 PC desktop system.* Below: *The Z-160 portable.*

Only occasionally will you come across a program which cannot cope because of BIOS differences.

Many of the Taiwanese machines use a BIOS which was developed in conjunction with ERSO, which is the Taiwanese Government's micro-electronics research laboratory. The story goes that after developing this BIOS, ERSO struck a deal with IBM in which they gave IBM rights to certain ideographic character set display technologies in exchange for IBM examining the ERSO BIOS code, giving it a clean bill of health and indemnifying the manufacturers using it against prosecution. So the story goes, as I say.

Levels of Compatibility

It might be as well to discuss this topic of compatibility in more detail. There are basically four levels of compatibility with the IBM PC, which other manufacturers simply refer to as 'compatibility' or 'industry-standard compatibility'. They really mean compatibility with the IBM PC, but it doesn't do to name your major competitor in your advertising. The four levels are:

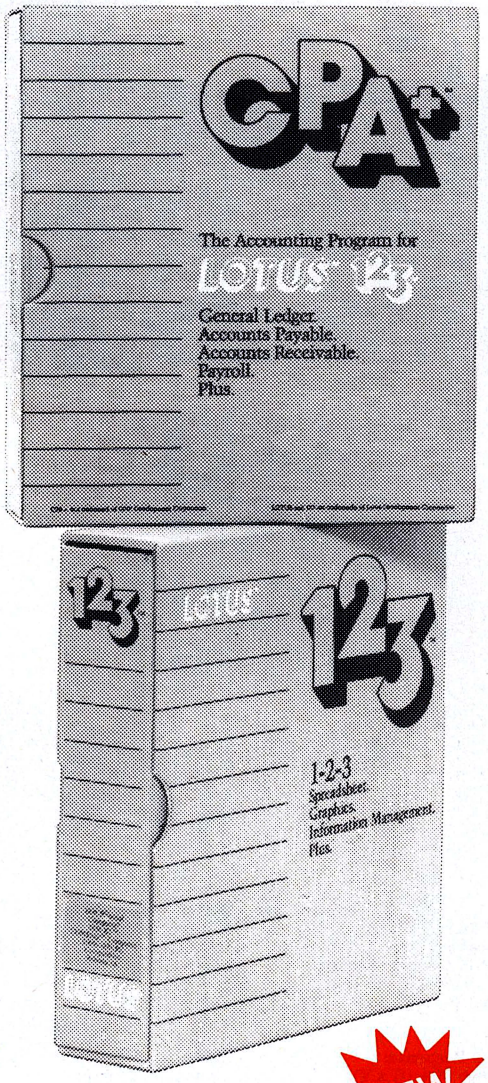
1. MS-DOS compatibility. This means the machine can run MS-DOS programs, but that's all. Examples of this would include the NEC APC and the Compupro systems running MS-PRO; both of these are running MS-DOS, but you cannot take a 13 cm disk from an IBM PC, plug it into these



CompuShack MICROMAIL

For IBM + Compatibles

INTEGRATED ACCOUNTING WITH LOTUS 1,2,3



NEW

CPA+
General Ledger
Accounts Payable
Accounts Receivable
Payroll
includes Tutorial
Only **$695** complete, why spend thousands:
CPA+ + Lotus 1,2,3 = total financial control

For Apple "Specials"

Wordstar/Starcard includes Z-80, cpm, 6.5MHz wordstar 3.3	**$225**
Business set/Starcard includes Z-80, CPM, 6.5MHz Wordstar, Mailmerge, Spellstar, Infostar, Calcstar.	**$395**
Infostar the database on CPM	**$175**
Calcstar the spreadsheet CPM	**$79**
Flight Simulator II	**$69**
Micro Softcard	**$369**
Dollars + Sense	**$119**

FOR IBM

Everex 10 megabyte hard disk inc controller	**$1495**
Tava PC inc 256K, colour 2 drives, parallel, serial, 1 yr warranty	**$2995**
10 megabyte tape stream back-up (internal -slimline)	**$1995**
10 megabyte removable hard disk (internal-slimline)	**$2995**
40 megabyte hard disk inc controller	**$2995**
Multimate the wordprocessor	**$499**
Lotus 1,2,3	**$595**
Infostar	**$175**
Calcstar	**$79**

Available from Compushack, 1/303 Pacific Highway, Lindfield NSW

If you wish to order these products — Mail order is handled by Micromail on 02-4671933 (B/C, M/C, Visa, Amex). These products are available in limited quantity.

Prices subject to change without notice.

INTRODUCING IBM Compatible Hi-Res Monitors from QUBIE

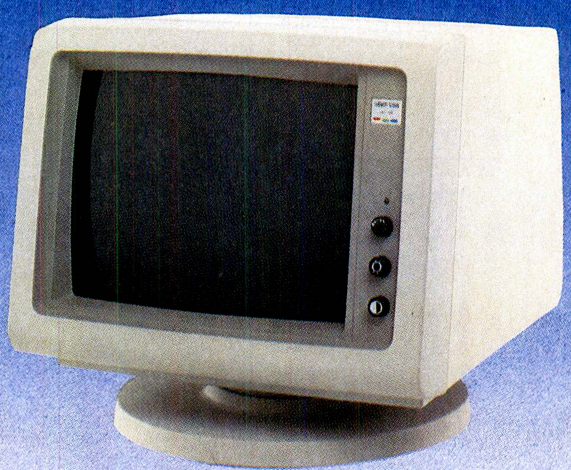
The HR 39 and HR 134 Monochrome Monitors are direct replacements for the IBM Model 5151 Monochrome Display. The HR 39 features a GREEN phosphor screen, while the HR 134 an AMBER screen. Both monitors plug into the IBM Monochrome Display and Printer Adaptor (or compatible) card.

The HR31 200 Colour Monitor is a direct replacement for the IBM Colour Display. It plugs into the IBM Colour/Graphics Adaptor (or compatible) card. The HR31 200 features **0.31mm dot pitch and a black matrix picture tube.** This special tube reduces glare and enhances RGB colour to ensure superb picture quality.

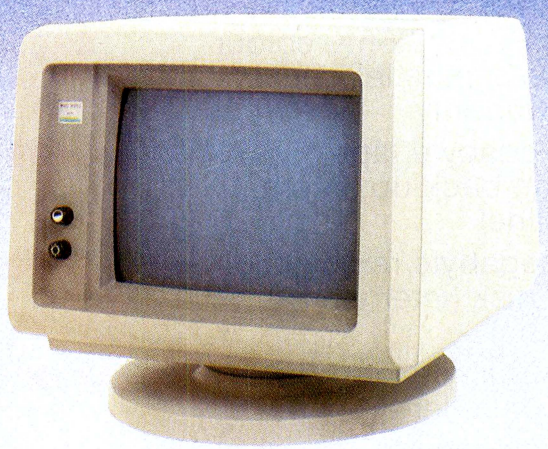
All three monitors include a tilt and swivel base. Use your Qubie' monitor as you would the IBM ; it will in no way affect the normal use or function of your Personal Computer.

Technical Data - HR31 200

CRT Size:	14" Diagonal (34cm)
Tube:	Black Matrix
Sync-H. Scan Frequency:	15.7kHz
V. Scan Frequency:	60Hz
Signal Type:	RGB I: TTL Level Positive Sync H/V: TTL Level Positive
Display Size (H x V):	245mm x 170mm
Retrace Time (H x V):	0.5Ms x 0.4msec
Resolution:	640 x 200 lines
Input Terminals:	9 pin "D" type connector
Dimensions:	11"(H) x 15"(W) x 13"(D) 266(H) x 367(W) x 318(D)mm
Shipping Weight:	15.9kg



Model HR31 200



Models HR 39 & HR 134

Technical Data - HR 39 & HR 134

CRT Size:	12" Diagonal (29cm)
Phosphor:	HR 39 (Green); HR 134 (Amber)
Sync-H. Scan Frequency:	18.432kHz
V. Scan Frequency:	50/60Hz
Signal Input:	Video - TTL Level Positive Sync. H - TTL Level Positive Sync. V - TTL Level Negative
Video Response:	20MHz
Display Size (H x V):	203mm x 135mm
Display Time (H x V):	44Ms x 18.99msec
Resolution:	Centre 1,000 lines Corner 800 lines
Display Formats:	9 x 14 matrix, 2000 characters in 80 x 25 format
Input Terminals:	9 pin "D" type connector
Dimensions:	10.5"(H) x 15"(W) x 12"(D) 257(H) x 367(W) x 294(D)mm
Shipping Weight:	11.36kg

All models: 240V AC/50Hz

DEALER ENQUIRIES:

QUBIE

9/62 Blackshaw Avenue, Mortdale, 2223 - Phone: (02) 579 3322

America's leading distributor of IBM PC accessories is now supplying your IBM dealer locally. . .

Also available: IBM key boards, multifunction memory boards and modems.

IBM is a registered trademark of the International Business Machines Corporation

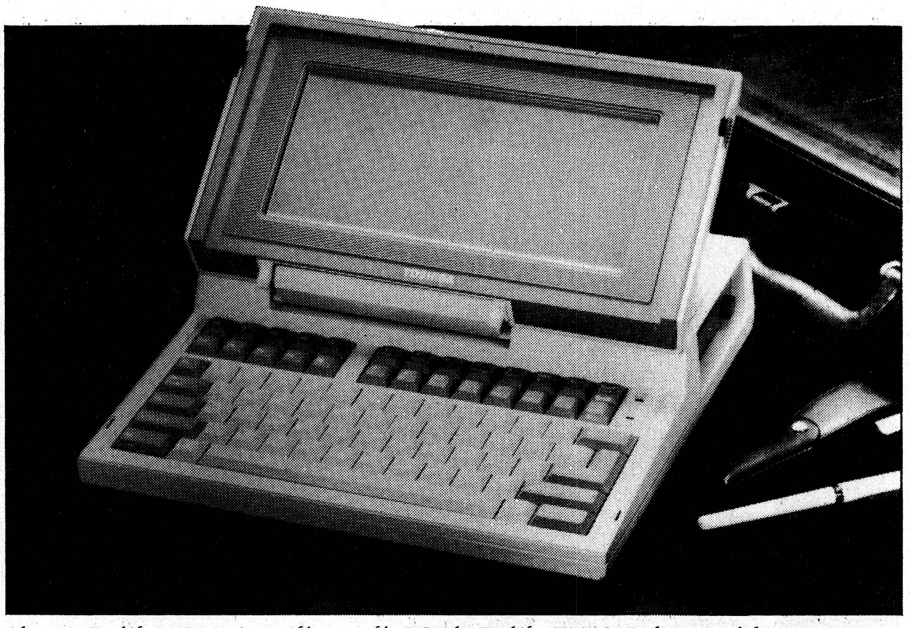
systems' 20 cm drives and expect anything to happen.

2. Media compatibility. Here the computer runs MS-DOS and can read and write IBM PC disks, but its hardware is still different from that of the PC, so many programs which do direct hardware access cannot run. Generic MS-DOS programs like WordStar and dBase will generally run, however — as they will for level 1 above.

3. Hardware compatibility. This applies to machines which have identical hardware to the PC, so that programs which write directly to the screen, or access the printer port directly, for example, will run. The clones usually have no trouble reaching this level.

4. ROM BIOS compatibility. This is the tough one; it is difficult to achieve and not many make it unless they are using the ERSO BIOS, and even then there is no guarantee of future compatibility. Nobody has tested all the IBM PC programs on their machine, so no-one can claim 100 per cent compatibility; there might always be one (badly written) program out there which uses a peculiarity of the IBM ROM.

It is possible for manufacturers to achieve level 4; there are two or three BIOSs on the market, for sale to manufacturers, which are guaranteed IBM PC-compatible. One software house even indemnifies its customers against successful prosecution by IBM! The price of these programs is generally around the US$100,000 mark. If you want to save some cash and write your own IBM-compatible BIOS, then for $US40,000 you can buy a suite of test programs which will validate it.



Above: *Toshiba's* IBM-*compatible portable* PC, *the* Toshiba T1100. **Below:** *Toshiba's* IBM-*compatible desktop* PC, *the* T1500, *can be used with an optional* LCD *screen.*

Testing for Compatibility

An easier way to test the BIOS of your PC for IBM compatibility is to use a few well-known programs which exercise the hardware and the ROM heavily.

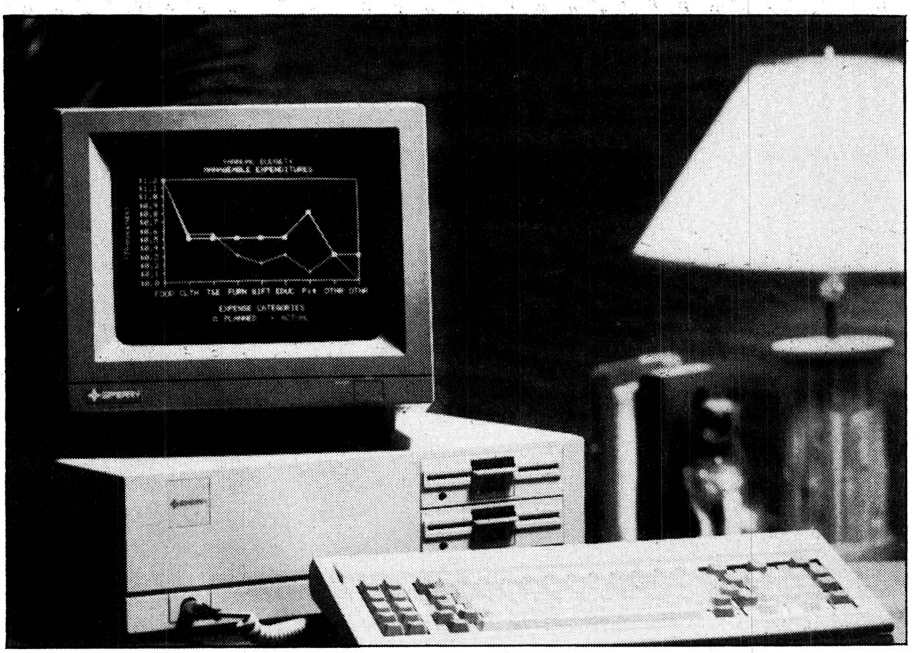
The first test is usually to try running Lotus 1-2-3 on the machine. It's surprising how many will fail that test, and if it passes, many users are satisfied with that level of compatibility, since all they ever expect to run is Lotus 1-2-3.

Next, Microsoft Flight Simulator is a good test of the BIOS and keyboard hardware compatibility of a machine. It's also a handy program to have around to while away some time!

A good third test is Digital Research's Concurrent CP/M or Concurrent PC-DOS. As an operating system in its own right,



There are two or three BIOSs *on the market, for sale to manufacturers, which are guaranteed* IBM PC-*compatible. One software house even indemnifies its customers against successful prosecution by* IBM! ▷



The Sperry PC has two disk drives, 256 Kbytes of RAM, one serial port, seven expansion slots, a colour screen and a dual processor.

If you want the higher performance of the 80186 you will generally have to abandon IBM compatibility, as in the case of the Tandy Model 2000.

Concurrent heavily exercises the ROM BIOS and the hardware. If that runs, then your PC is pretty much in the clear.

Under some circumstances, you might accept a PC that does not pass these tests. Perhaps the most prevalent is that you are not concerned with IBM compatibility because you simply want to run one program, typically a vertical market applications package, such as a vehicle fleet management program or a video cassette rental

WORKING WITH

'Have PC — Will Travel' is now the motto of the fastest growing P.R. Company in the west, and now one of the largest in Australia, Ward Holt Public Relations in Perth.

Working with the EXECUTIVE COMPUTER
★ Word processing — WORDSTAR 3.3
★ Financial Analysis — SUPERCALC
★ DataBASE — PERSONAL PEARL
★ Large 80 Col Amber Screen — Inbuilt
★ 2 x Double Density Floppy Drives
★ 128k RAM ★ CP/M Plus
★ IBM Selectric Style Keyboard
★ Telecommunications Port

OSBORNE

Over $1400 worth of powerful software FREE

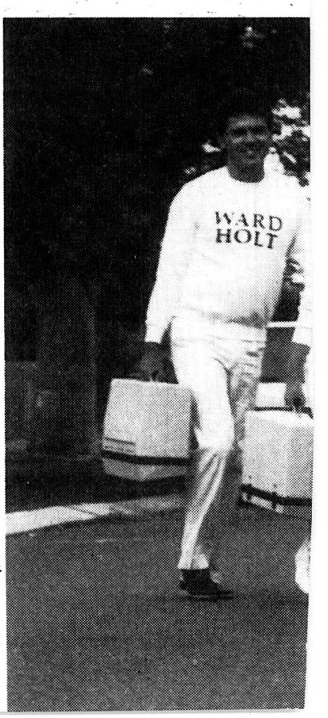
$2695.00

Limited offer to July **31**
or until stocks sold out.

OSBORNE AUSTRALIA
93 York St., Sydney
(02) 290-1122

Available Australia-wide. Call NOW for the name of your nearest dealer.

Full 6 Month Warranty



★ BEST FOR VALUE ★ BEST FOR QUALITY ★ BEST FOR SERVICE ★

system. In this case a low price is more important than IBM compatibility.

Other reasons you might trade off IBM compatibility include performance. The 80186 processor is software-compatible with the 8088 in the IBM PC, but generally the designs it goes into are not completely compatible. If you want the higher performance of the 80186 you will generally have to abandon IBM compatibility, as in the case of the Tandy Model 2000.

Then there are other capabilities like multi-user or networking support. Here the problem is that a multi-user operating system has to be different from a single-user one, and a variety of techniques has to be employed to provide a minimum level of compatibility. North Star's multi-user Dimension computer, for example, has to simulate rebooting in software to run some programs like Microsoft Flight Simulator.

Other Considerations

Apart from the issue of compatibility, there are other things to consider, such as hardware reliability, the provision of maintenance and support. In general, based on reports from users, most clones are as reliable as, if not more reliable than, the IBM PC. In particular, the Taiwanese machines, which had a terrible reputation in the days of the Apple clones, appear to be excellently made.

Most important, perhaps, is the ability of the dealer from whom you buy the product to supply appropriate training if necessary and technical support when required. One cannot generalise about this. While IBM requires a certain degree of financial commitment and support staff from its dealers, the compatible distributors do not. On the other hand, the effectiveness of a support person depends much more on his or her personal ability than the amount of money the employer has invested, and the IBM dealers are like all others in this respect - a mixture of good and bad.

Finally, you might well ask what we use at Les Bell and Associates — an IBM, or a clone, and which clone? The answer is — both. For testing software, we use only true blue hardware, since we have to be sure any problems are caused by the software and not compatibility problems. On the other hand, we have a Hyperion, which for portability is far superior to the IBM Portable, despite some minor compatibility problems which we can always work around.

The trick, as always, is to know exactly what trade-offs you are making. A little research before buying will always pay off. □

Apart from the issue of compatibility, there are other things to consider, such as hardware reliability, the provision of maintenance and support.

THE OSBORNE

"Buying the OSBORNE was the best thing I ever did, we couldn't have grown at the pace we did and stayed viable if it hadn't been for our OSBORNES".

Jim Ward — WARD HOLT Public Relations, PERTH

Hi Ho! Hi Ho! The staff of Ward Holt, armed with their OSBORNE PC's.



EXTRA BLUE BITS

Not long after most people buy their 'complete' IBM or compatible PC, they start to feel a terrible itch. This itch is the result of the bite of the dread add-on bug, and is accompanied by a hankering for a colour display, or 'just a little' more memory, or perhaps a dose of 3270 terminal emulation. To assist such sufferers, and as a follow-up to last month's Big Blue special, we offer a guide to hardware add-ons for the PC.

ACA-PC Asynchronous Communications Adaptor
Distributor: Emona Computers
Price: $79.80 retail incl. tax
Multitech's ACA-PC asynchronous communications adaptor supports a wide variety of serial devices, including popular serial printers, plotters, modems and mice. It also supports many user-defined devices including voice recognition and electronic keyboards. Two EIA RS232C serial interfaces for PC-to-mainframe or PC-to-PC communications are standard, and a fully programmable baud generator allows operation at 50 to 9600 baud rates.

Ampec DM-14 Monitor
Distributor: Ampec Electronics
Price: green $339, amber $349
The distinguishing features of the DM-14 are a 36 cm screen housed in a compact case, a non-glare, flicker-free, high contrast image, and a tilt-swivel base.

AST-5251/11
Distributor: Sourceware
Price: $2128 incl. tax
The AST-5251/11 is a hardware and software package that allows the PC/AT/XT and compatibles to attach locally through twinax cable to an IBM System 34/36/38. The PC can emulate an IBM Model 11 display terminal and a 5256 printer without changes in the host operating system. AST'S Hot-Key support enables the user to conduct concurrent sessions, working with DOS in the foreground and communicating to the host in the background. In addition you can offload work from the host to the PC. The AST-551/11 supports IBM PC-compatible printers as an IBM 5256 printer.

AST Advantage
Distributor: Sourceware
Price: $1298 incl. tax (128 Kbytes)
Advantage is a multi-function expansion board for the IBM PC-AT. Compatible with either 64 Kbyte or 256 Kbyte RAM chips, the board's user-upgradable memory expansion capability allows both types of chips to be mixed on the same board. Using 256 Kbyte chips the Advantage main board provides up to 1.5 Mbytes of parity-checked memory. An additional 1.5 Mbytes may be added by installing the Advantage-Pak board, for a total memory expansion of 3 Mbytes. The board's split memory addressing allows a portion of the memory to be used to round out the first 640 Kbytes of AT memory, and the remaining portion to continue memory expansion, starting from 1 Mbyte. Minimum configuration includes 128 Kbytes of parity-checked memory, a serial port and a parallel port. Extra memory and I/O ports may be added at any time.

AST PC-Net II
Distributor: Sourceware
Price: Starter kit to link two PCs — $2850
With AST PC-Net II anything from two to 160 PCs, as well as peripherals such as disk drives and printers, can be interconnected at distances of up to 760 metres. Easy-to-use software that automatically manages network functions is also available with PC-Net II. PC-Net II's disk file and record lock-out facilities prevent two users from modifying the same information at the same time. Users are able to queue and print jobs according to priority for sending to the network's shared printers. Standard PC-DOS commands are used to access remote devices and dedicated file servers are not required.

AST SixPakPlus
Distributor: Sourceware
Price: $759 incl. tax (64 Kbytes)
The SixPakPlus from AST Research is a single-board solution for higher PC performance. The six features that give the board its name include 64 Kbytes to 384 Kbytes of RAM, one serial communications board, one parallel printer port, a clock-calendar, optional IBM-compatible game adaptor port and an AST SuperPak utility diskette.

AST Preview
Distributor: Sourceware
Price: $799 incl. tax
AST's Preview board gives high-resolution Hercules-compatible bit-mapped graphics and high-quality text to the IBM monochrome screen. Also available is a parallel printer port and the SuperPak utilities disk.

AST-SNA/Cluster
Distributor: Sourceware
Price: $1679 incl. tax
AST-SNA/Cluster is a complete hardware and software solution providing IBM 3270 terminal emulation and cost-effective communications line-sharing capabilities for IBM PC/XT/AT/Portables and compatibles in an SNA/SDLC communications protocol environment. Installing one AST communications card in an IBM micro or compatible designated as the Master PC allows the Master PC and up to four attached PCs to share one SNA/SDLC communications line to IBM (or compatible) mainframe host computers. Communications cards do not need to be installed in all the PCs. Each of the four attached PCs maintains personal computing ▷

Pay $1290 for the Apple IIe



capabilities and functions as a 3278/3279 Display Station. In addition the Master PC user is able to exit emulation mode to DOS and return without transmission interruption, independently of attached displays.

CGA-PC/I Colour Graphics Adaptor
Distributor: *Emona Computers*
Price: $312 retail incl. tax
The CGA-PC/I colour graphics monitor adaptor provides a powerful video display interface with the IBM PC or PC compatibles. It supports two levels of graphics and text in black and white or colour. Interfaces include NTSC composite video signal, RGB output and light pen interface.

Emtek Trans-Net
Distributor: *Emona Computers*
Price: POA
Trans-Net is a comprehensive, high-performance, and easy-to-use local area network for the IBM PC, XT and compatibles. The system provides data sharing, peripheral sharing and inter-computer communications. Other features include no need for a dedicated file server, enhanced networking DOS commands, Trans-Net Mail (electronic mail software) and Trans-Net Spool (printer file spooling).

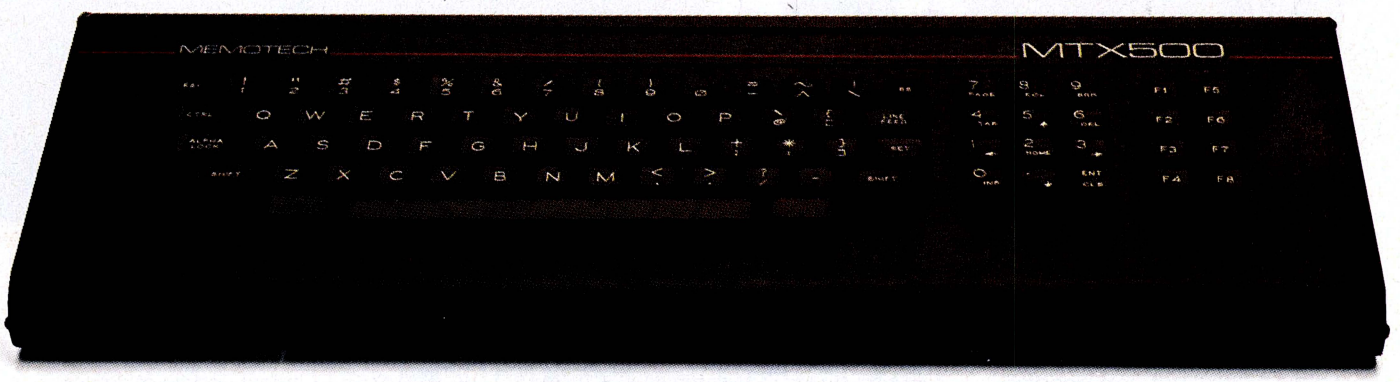
Hercules Colour Card
Distributor: *Imagineering*
Price: $445 retail ex. tax
The Hercules colour card replaces the IBM colour graphics adaptor. It is compatible with IBM colour graphics and text mode software and fits in the standard PC long slot or the XT's short slot. It includes a parallel printer interface and supports text mode video attributes of blink, reverse, highlight and blank. Graphics resolution is 320 by 200 with four colours or 640 by 200 monochrome; text mode character size is 5 by 7 in an 8 by 8 box, and the text mode screen size is 80 columns by 25 rows or 40 columns by 25 rows.
Requirements: Minimum IBM PC configuration, IBM-compatible RGB monitor or a television with RF modulator.

Hercules Graphics Card
Distributor: *Imagineering*
Price: $950 retail ex. tax
The Hercules graphics card replaces the IBM monochrome card; it is plugged into the IBM backplane and connects to the PC display. The card produces a display indistinguishable from that of the standard monochrome board and includes a printer port to allow replacement of the monochrome card. It has both 80 by 25 character display and 720 by 348 point graphics display. Options include Graph X, a set of 15 graphics primitives which can be called from BASIC, assembly language and other high-level languages. Using these primitives as a starting point enables the

Professional Wordprocessing System
including
☆ Professional Wordstar
☆ Mailmerge
☆ Spellstar
EPSON
FREE! RX80 F/T Plus Printer
OR
DX100 Daisywheel Printer
(same as Brother HR-15)
Sheet Feeders Optional
QX-10 Computer Reads & Writes to 71 different disk formats.

EPSON QX-10
$2900
(inc. tax)
RS 232C Port: Light pen interface. Centromics parallel port. Colour option available. 5 slot expansion bus. Fast voice coil motor disk drives.
256K RAM: 2 x 320K drives. 640 x 400 dot graphics. Real-time clock and calendar. 2 x RAM drives. Battery backup. 16 character fonts.
ALL STATES COMPUTERS
73 Dumaresq Street, Campbelltown 2560 Telephone (046) 27 1302
VISA

or pay $499 for the Memotech MTX 500.



You decide.

You know about Apple.

Here's our story.

In 1984 MTX 500 was voted the U.K.'s Computer of the Year.

It was picked from a distinguished field of competitors. Apples. Apricots. Commodores. Even IBM's.

The British judged the MTX 500 the best for one very good reason: it is simply an incredible value for money.

The MTX 500 does everything the expensive personal computers do. From banking to baking, from studying to Star Wars.

But the MTX 500 does it for about a third of the price.

And it can grow! In fact, there is no other personal computer on the market that has the expansion capabilities of the MTX 500. None.

What's more, the MTX 500 is solid. So solid we guarantee it for twice as long as Apple guarantee theirs.

Still can't decide? Then take the MTX 500 home for 14 days and try it out. If you're not sure it's a better deal bring it back and we'll replace it – free.

This just may be one of the easiest decisions you'll ever make.

The MTX 500 personal computer, $499 and worth a lot more.

For information on your nearest dealer contact Interface Pty. Ltd. (02) 46 4374

MEMOTECH MTX 500.
Less dollars, more sense.

MCM 2002

The Breeze Retail Point of Sale Software...



The 'Breeze' sophisticated micro-computer replaces the humble cash register, right at the Point Of Sale — and not only handles normal cash register functions faster and more efficiently, but also operates C.O.D.'s, Laybys, Account Sales and Payments, at the touch of a button.

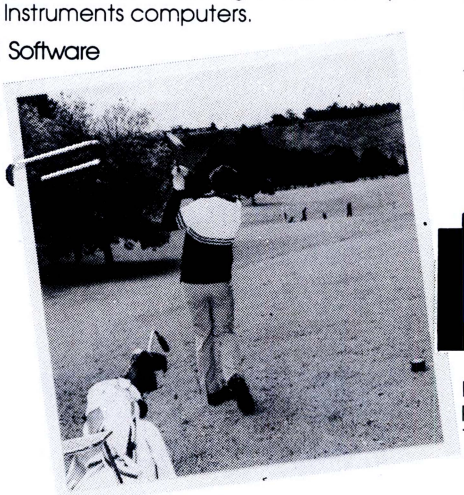
The 'Breeze' is a breath of fresh air through your entire Point Of Sale operations — from the Point Of Sale flows the complete management functions of any business, including Stock Control, Sales Analysis, Accounts, Invoices, Statements, Sales Tax, Debtors Aged Balances, Sales Representative Commissions, even Banking Slips.

improves your profitability as well as your lifestyle

Your most junior cashier will find it a breeze to use, with the Credit Card and Bar Code Reader— because Breeze is specifically designed for fast customer service and accurate collection of data.

The 'Breeze' Software is available on the IBM PC & XT, IBM compatibles, Sirius, Apricot, Ericsson, Wang, Olivetti, Sanyo, Nec, Logitec, Texas Instruments computers.

The 'Breeze' Retail Software System places all this vital information right at your very fingertips.



The 'Breeze' features:

☐ Cash, C.O.D., Layby and Account Sales ☐ Instant update of debtors accounts, inventory records, sales statistics, and sales tax as the sale is entered ☐ Full perpetual stock recording and reporting including stock reorder, stock status, and stock taking report ☐ Product sales analysis reports including margins ☐ Price lists ☐ Debtors aged trial balance ☐ Debtors statements ☐ C.O.D. deliveries listing ☐ Layby customer aged trial balance ☐ Overdue charges report ☐ Bank deposit report ☐ Magnetic credit card option ☐ Bar code reader option ☐ Inter computer communication option

The Breeze Benefits Summary:

☐ Easy installation ☐ Fast efficient operation ☐ 'User friendly' and easy to use ☐ Provides flexible and comprehensive management reporting ☐ Designed for future growth from diskettes to hard disk ☐ State of the art programming provides 'user selectable' systems options ☐ Thoroughly tested Software ☐ Comprehensive communication options ☐ Additional options — including bar code and magnetic stripe card readers ☐ Specifically designed for the Retail Point Of Sale environment.

The Breeeze — a breath of fresh air for your business and your lifestyle.

BREEZE SOFTWARE

Breeze Software (Aust.) Pty. Ltd.
P.O. Box 1220, Geelong 3220.
Telephone (052) 21 6144

WOOD 3805 BSA

user to write sophisticated software to manipulate screen images. Also available with the card is HBASIC (Hercules BASIC), needed to run BASICA.
Requirements: IBM monochrome video display; cannot be used in conjunction with a colour display.

I/O Mini
Distributor: Sourceware
Price: $499
The I/O Mini is a single-slot half-card expansion board offering up to two serial ports, a parallel printer port and a battery-backed clock-calendar that maintains accurate time and date. Also included is the SuperPak utility diskette.
Requirements: One 12.7 cm expansion slot.

I/O Plus II
Distributor: Sourceware
Price: $389 incl. tax
The I/O Plus II expansion card has a minimum configuration of a clock calendar with battery backup and one standard serial (asynchronous) port. Optional features include a second serial port, an IBM-compatible game control port and a parallel printer port. Also available are the SuperPak system utility programs, including SuperDrive and SuperSpool.

IRMAcom
Distributor: Sourceware
Price: $2169 incl. tax
IRMAcom allows the IBM PC and compatible machines to attach to networks using synchronous protocols over leased or switched lines. IRMAcom is intended for use with IRMAcom SNA and BSC communications software products. Features include line speeds to 19.2 Kbits per second, modem control, DMA data transfer under program control, fields installable and replaceable by the user, two fully independent communications channels, and error status reporting.

IRMAcom/3270IRMAcom/3270B
Distributor: Sourceware
Price: $2169 incl. tax
IRMAcom/3270 and IRMAcom/3270B software packages enable the IBM PC and compatible machines to communicate with host systems in an SNA/SDLC or BSC network environment by emulating 3270 controllers. IRMAcom/3270 and IRMAcom/3270B support IRMAcom while maintaining the communications link.

IRMAcom/3770IRMAcom/3770B
Distributor: Sourceware
Price: $2169 incl. tax
IRMAcom/3770 and IRMAcom/3770B software packages enable the IBM PC and compatible machines to communicate with host systems in an SNA/SDLC or BSC network environment by emulating 3770 remote job entry stations. Emulation features include ASCII or EBCDIC line transmission support, compression from the host computer, data transparency, multiple selectable devices and multiple job file support.

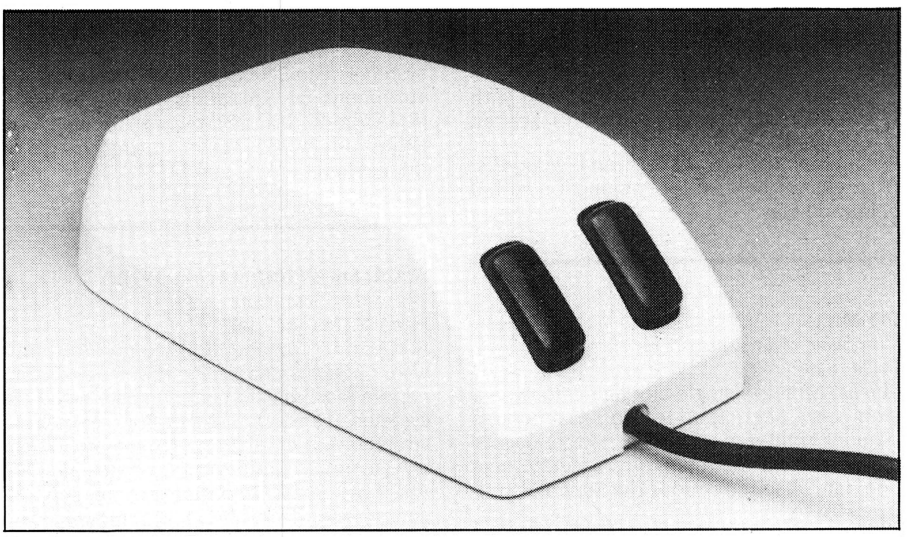
IRMAcom/RJE
Distributor: Sourceware
Price: $2169 incl. tax
IRMAcom/RJE and IRMAcom enable the IBM PC and compatible machines to communicate with host systems in a binary-synchronous network environment by emulating the 2780/3780 remote job entry workstations. Some of its features include BSC point-to-point support, command file feature for unattended operations, data transparency, data compression/decompression (3780), printer forms control, operator selectable I/O devices (printer, disk), and RJE console support.

IRMAkey/3270
Distributor: Sourceware
Price: $849
IRMAkey/3270 is plug-compatible with the IBM PC or PC-compatible computers. The keyboard places all the functions of a 3270 terminal and a PC computer at the user's fingertips. All the software needed to drive the keyboard is contained on the diskette supplied with IRMAkey/3270, and the diskette also contains software that allows the user to redefine the keys. This standard software allows the user to quickly save and reload key definitions on disk. Another feature that makes IRMAkey/3270 unique is the addition of four keys allowing the user to perform IRMA functions such as 3278 emulation and DCA (Digital Communications Associates Inc) utilities such as file transfer with a single keystroke.

IRMAline
Distributor: Sourceware
Price: $2599
IRMAline provides an economical link between personal computers or asynchronous terminals and IBM 3270 controllers. This decision support interface also includes an onboard 3278/79 emulation program that converts the ASCII data into the 3270 protocol. Other features include 3278 or 3279 terminal emulation, operation with any 3274, 3276 or integral terminal controller with Type 'A' adaptors, support for 3278 Mod 2, 3 and 4 and 3279 Mod 2A and 3A screen formats, an RS232C port, two coaxial ports, and dual processors — IRMAline's on-board high-speed microprocessor handles the 3270 coaxial protocol, while a second microprocessor handles the RS232 protocol independently. The simple menu-driven configuration system provides ease of use, and to aid in the security of the network multi-level password selection is provided in the configuration process.

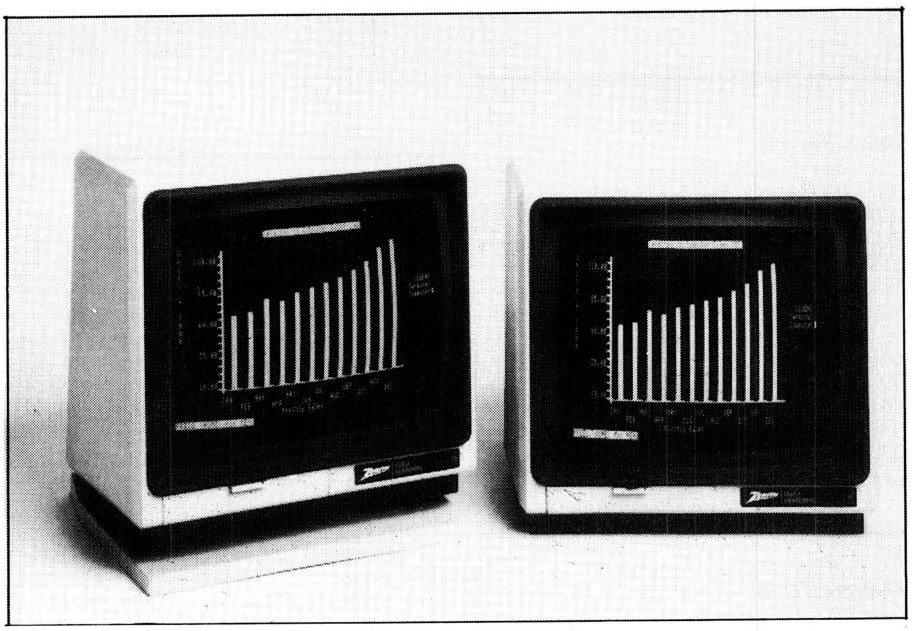
IRMAlink/TSO
Distributor: Sourceware
Price: tape $125, disk $75
IRMAlink/TSO file transfer application permits the transfer of files between IBM mainframes and microcomputers in a 3270 communications network. IRMAlink/TSO supports mainframes running under MVS/TSO and microcomputers running under MS-DOS 2.0 or PC-DOS 2.0 or higher. Main features include fast and efficient transfer of data through a 3270 communications network, the provision of an easy method of initiating file transfers for the inexperienced user, automatic definition of transfer characteristics based on file type, and online help features. IRMAlink can be configured to the mainframe environment, it transfers both text and binary files, supports sequential and partitioned data sets with fixed and variable record formats, uses data compression for efficient transmission of data through the network and also supports international character sets.

IRMAprint
Distributor: Sourceware
Price: $2395
IRMAprint, a member of Digital Communications Associates' Decision Support Interface family, allows asynchronous ASCII output devices such as an IBM PC printer to operate as output peripherals within IBM 3270 net- ▷



Right: *The Microsoft Mouse has blue blood.*

Below: *The* ZVM-124 *monochromatic display monitor is housed in a cabinet less than 33 cm wide and is designed to be used with the* IBM PC XT.



works. IRMAprint is compatible with all IBM 3274, 3276 and 43XX Integral terminal controllers with Type 'A' adaptors, whether in SNA/SDLC or BSC environments. Features include 3287 emulation, coaxial interface, conversion of 3270/EBCDIC to ASCII, RS232C interface, parallel interface, hex translation mode, menu-driven configuration, print test mode, internal self-test and front panel status indicators.

Kaleidocard
Distributor: IMS *International Pty Ltd*
Price: $800 incl. tax
Kaleidocard from IMS International is a colour card that blends high-resolution alphanumeric text with high-resolution colour graphics. The card is fully compatible with other PC software including Flight Simulator, Word, Lotus 1-2-3, Symphony and Framework. With a resolution of 640 by 400, the system offers twice the resolution of the IBM colour graphics system. There are 16 clear, flicker-free colours, and the screen displays a 12 by 11-dot character in a 16 by 16-dot grid, as compared to the IBM monochrome display which uses a 5 by 7-dot character in a 8 by 8-dot grid. Standard with the Kaleidocard colour card are downloadable character sets, including software and a lightpen interface. Kaleidocard is compatible with most high-resolution monitors.

MDA-PC Monochrome Display Adaptor
Distributor: E*mona Computers*
Price: $216 retail incl. tax
The MDA-PC monochrome display adaptor provides a sharp, high-resolution signal for crisp, clear text display on monochrome monitors for the IBM PC and compatibles. The adaptor features a data rate of 1.8 Mbits per second, and supports an extended 256 ASCII character set code. It has a built-in parallel printer interface, direct drive output, and 2 Kbytes or 4 Kbytes of static memory used for buffering.

MEB-PC Memory Expansion Card *Distributor*: E*mona Computers*
Price: $379.20 retail incl. tax (64 Kbytes)
The MEB-PC memory expansion card from Multitech allows users to add to their 256 Kbyte PCs and compatibles a total system memory capacity of 640 Kbytes of RAM. The total memory of the card itself is 384 Kbytes, and from a minimum of 64 Kbytes the user can expand by 64 Kbyte increments to suit his or her requirements. Features include full parity checking, no wait states and a wide RAM address range.

MegaPlus II
Distributor: *Sourceware*
Price: $759 incl. tax (64 Kbytes)
MegaPlus II from AST Research is a multifunction add-on card for the IBM PC/XT. Key features include 64 Kbytes to 512 Kbytes of parity-checked memory, a maximum of two serial (asynchronous) ports (one standard and one optional), one IBM-compatible para- ▷

If you've just spent a packet on a letter-quality printer, get your hanky out.

You're about to discover an extraordinary new range of dot-matrix, near letter-quality printers that cost only a fraction of what you would have expected to have to pay in the past.

It's the EPSON® "Plus" series. The EPSON FX-100+ and the FX-80+.

Their print quality is superb. They will print near letter-quality pages, quick drafts, even complex graphics, with a definition that's seldom equalled in any price range. And you can vary between different typestyles.

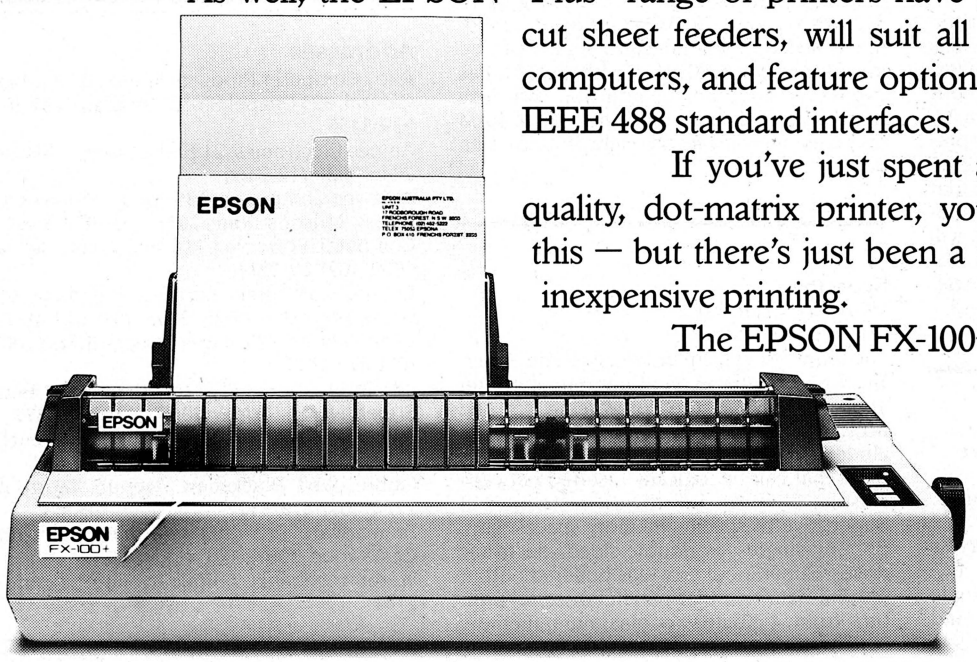
Their speed has been enhanced, not by increasing the number of characters per second (in this case, up to 160 cps), but by speeding the rate of paper throughput.

The result is an effective overall speed which rivals that of printers costing much more.

As well, the EPSON "Plus" range of printers have provision for optional cut sheet feeders, will suit all popular brands of computers, and feature optional serial and intelligent IEEE 488 standard interfaces.

If you've just spent a packet on a letter-quality, dot-matrix printer, you won't want to read this — but there's just been a new standard set in inexpensive printing.

The EPSON FX-100+ and the FX-80+.



EPSON AUSTRALIA PTY LTD

The Secret of Success.

® Registered Trademark of Epson Corporation, Japan.

Epson Australia Unit 3, 17 Rodborough Road, Frenchs Forest, NSW 452 5222. Suite 30, 101 Wickham Terrace, Brisbane, QLD 832 5400. Level 3, 541 Blackburn Road, Waverley Square, Mount Waverley, VIC 543 6455.

llel printer port, one IBM PC-DOS compatible clock calendar with battery backup for automatic loading of time and date when the computer is turned on, and a clock utility program.

Microsoft Mouse
Distributor: Microsoft
Price: $250
The Microsoft Mouse lets your IBM PC receive input in the same way as Apple's Macintosh. The mouse is a pointing device with which you can select and edit text, and operate many familiar programs with increased speed and ease. The mouse comes complete with computer interface, control software and practice applications.

MP Expansion Memory
Distributor: Sourceware
Price: $699 incl. tax (64 Kbytes)
The MP Expansion Memory starts at 64 Kbytes and can be expanded to 256 Kbytes of parity-checked memory for your PC. Also included is SuperPak and a comprehensive User's Manual.

PC/5251 Plus
Distributor: Sourceware
Price: $2399
The PC/5251 Plus is an advanced SDLC communications adaptor designed specifically for 5251 emulation by Software Systems Inc. It enables the IBM PC, XT, AT, and PC Portable to communicate with IBM's System 34/36/38 by emulating a 5251 Model 12 Display Station. A parallel printer attached to the PC will be recognised as a 5256 or 5224 dot matrix printer. PCs equipped with colour graphics adaptors and colour monitors will emulate the IBM 5292 Model 1 Colour Display Station when the PC/5251 Plus is installed. Speed is up to 19.2 Kbits per second.

PC-Slave ME2
Distributor: Alloy Computer Products; Archives Pty Ltd
Price: $3707 rrp + tax (Alloy); $2995 (Archives)
An alternative method of networking IBM PCs developed by Alloy Computer Products, PC-Slave enables 31 users to connect to a single IBM PC through a PC-lookalike terminal and an extra card. The card has an 8088 processor, a clock speed of 8 MHz, two serial ports and 256 Kbytes of RAM, expandable to one megabyte. Software for the system is the Real-Time Network Executive (RTNX), which handles selective and total file-locking, record-locking, sharing of all peripherals, spooling, remote execution of programs and simple electronic mail facilities. Pricing includes Slave terminal and keyboard, Slave card, connecting cable and RTNX software.

Persyst DCP/88
Distributor: Imagineering
Price: $1575 retail ex. tax
The DCP/88 distributed communications processor is a dual processor expansion board that uses the Intel 8088 microprocessor chip, thus allowing the user to run two completely independent programs on the PC. It supports a wide range of IBM communications, and other features include PC-independent program execution, modem and high-speed printer support, and two- or four-channel serial communications.

Persyst Time Spectrum
Distributor: Imagineering
Price: $685 retail ex. tax
The Persyst Time Spectrum is a multi-function expansion board that combines up to 256 Kbytes of RAM, a parallel printer port, a serial asynchronous communications port, a calendar/clock and battery on one board. Time Spectrum RAM can be increased up to 512 Kbytes with a RAMPak expansion module. A second communications port can be installed on the RAMPak or with the COMPak expansion module. In addition, waitless printing print spooler and insta-drive RAM disk memory software are included with each board.

SuperPak
Distributor: Sourceware
Price: $104 incl. tax
The SuperPak system utilities include SuperDrive disk emulator and SuperSpool printer spool, as well as the software to set and access the clock calendar. Key features include: simulation of up to four electronic disks that can be logically inserted between existing physical disk drives; restriction of SuperDrive to specific memory spaces; support of single- or double-sided electronic drives. SuperSpool provides buffered output of print data to either parallel or serial printers from 4 Kbytes to maximum memory capacity.

ZVM-124 Monochromatic Display Monitor
Distributor: Warburton Franki
Price: $399 retail incl. tax
This 30 cm amber video display monitor is housed in a cabinet less than 33 cm wide and is designed to be used with the IBM PC, XT, 3270 PC and compatible machines using the monochrome display adaptor card. Machines using the Hercules monochrome graphics card or the USI graphics card (in the monochrome mode) are also able to use the ZVM-124. Features include modular chassis, convenient front panel controls, LED power-on indicator and crisp character definition on screen. The amber non-glare screen and optional tilting base provide the user with optimum viewing comfort.

ZVM 133/ZVM 136 Colour Display Monitors
Distributor: Warburton Franki
Price: $1199 retail incl. tax
The ZVM 133 and 136 both have a 25-line 33 cm video which delivers a clear 80-column display. Both video monitors offer 16 basic colours and the ZVM 136's 'long persistence' phosphor capability reduces flicker in detailed applications requiring an interlace operation. The ZVM 133 and ZVM 136 are totally compatible with digital RGB sources, including the IBM PC. Digital input circuits help deliver an extremely sharp display image.

Addresses

Alloy Computer Products, Suite 502, Prahran Central, 325 Chapel Street, Prahran 3181. (03) 529 8455.
Ampec Electronics, 21 Bibby Street, Chiswick 2046. (02) 712 2466.
Archives Computers, 13th floor, 55 Lavender Street, Milsons Point 2061. (02) 922 3188.
Computer Power, 44 Market Street, Sydney 2000. (02) 29 2211.
Emona Computers Pty Ltd, 2nd floor, 661 George Street, Sydney 2000. (02) 212 4815.
Imagineering, 579 Harris Street, Ultimo 2007. (02) 212 1411.
IMS International Pty Ltd, 5th floor, 23 Berry Street, North Sydney 2060. (02) 922 3877.
Microsoft, 1/17 Rodborough Road, Frenchs Forest 2086. (02) 452 5088.
Qubie, 9/62 Blackshaw Avenue, Mortdale 2223. (02) 579 3322.
Sourceware Pty Ltd, 4/73 Albert Avenue, Chatswood 2067. (02) 411 5711.
Warburton Franki, 7 Birnie Avenue, Lidcombe 2141.

WORKING WITH THE

OSBORNE EXECUTIVE

YOU GET THE LOT

COMPUTER—SOFTWARE—PRINTER

★ *WORD PROCESSING: WORDSTAR 3.3*
The biggest seller.
★ *FINANCIAL ANALYSIS: SuperCalc*
★ *ACCOUNTING: MULTILEDGER*
— Debtors
— General Ledger
— Creditors
★ *DATABASE: Personal Pearl*
★ *PROGRAMMING: M-basic*
C-basic
Pascal

COMPUTER
2 Double Density Disk Drives
Large 80 col Amber
Screen-inbuilt.
128K RAM CP/M Plus
IBM Selectric Style Keyboard
Telecommunications Port

PRINTER
Executive DT-100
Wordprocessing Quality

WITH NO HIDDEN EXTRAS

OVER $2000 WORTH
OF SOFTWARE FREE



$2995.00

LIMITED OFFER TO JULY 31
OR UNTIL STOCKS SOLD OUT!

THE BEST INVESTMENT YOU'll EVER MAKE

Full 6 Month Warranty

AVAILABLE AUSTRALIA-WIDE

CALL (02) 290-1122
FOR YOUR NEAREST DEALER

OSBORNE

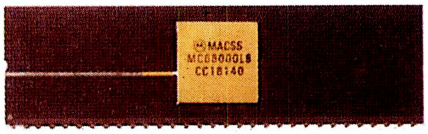
What makes Macintosh tick. And talk.

The brain of the Apple Macintosh uses a blindingly fast 32-bit MC680000 microprocessor. Far more powerful than the 16-bit 8088 found in current generation computers.



The 16-bit 8088 microprocessor.

Macintosh's 32-bit MC68000 microprocessor.



The heart is a revolutionary technology of windows, icons, pull-down menus and mouse-commands.

Which makes the 32-bit power not only more useful but easier to learn.

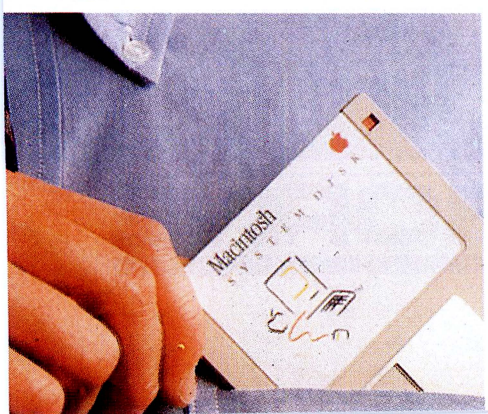
Another miracle of miniaturisation is Macintosh's built-in 90mm (3½") microfloppy disk drive. Its 90mm disks store more than conventional 135mm (5¼") floppies – 400K. So while they are big enough to hold a desk-full of work, they are small enough to fit in a shirt pocket.



Standard 135mm (5¼") floppy disk.



Macintosh's 400K 90mm (3½") disk.



And, thanks to its size, if you can't bring the problem to a Macintosh, you can always bring a Macintosh to the problem. (Macintosh actually weighs less than 9 kilos.



Small footprint. Macintosh is ⅓ the size and volume of the IBM PC.

And speaking of talking, Macintosh has a built-in polyphonic sound generator capable of producing high-quality speech or music.

All it takes to get it talking is special Macintosh speech generating software.

On the back of the machine, you'll find built-in high speed RS232 and RS422 AppleTalk/serial communication ports. Which means you can connect printers, modems and other peripherals without adding $250 cards.

It also means that Macintosh is ready to hook into a local area network. (With the AppleTalk Personal Network, you'll be able to connect up to 32 computers and peripherals.)

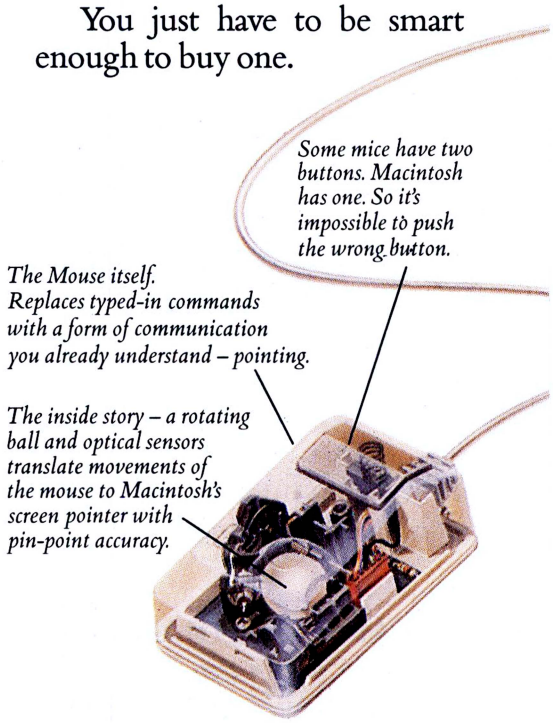
Should you wish to double Macintosh's storage with an external disk drive, you can do so without paying extra for a disk-controller card – that connector is built-in, too.

And, of course, there's a built-in connector for Macintosh's mouse, a feature that can cost up to $500 on computers that can't even run mouse-controlled software.

Of course, the real genius of Macintosh isn't its serial ports or its polyphonic sound generator.

The real genius is that you don't have to be a genius to use Macintosh.

You just have to be smart enough to buy one.



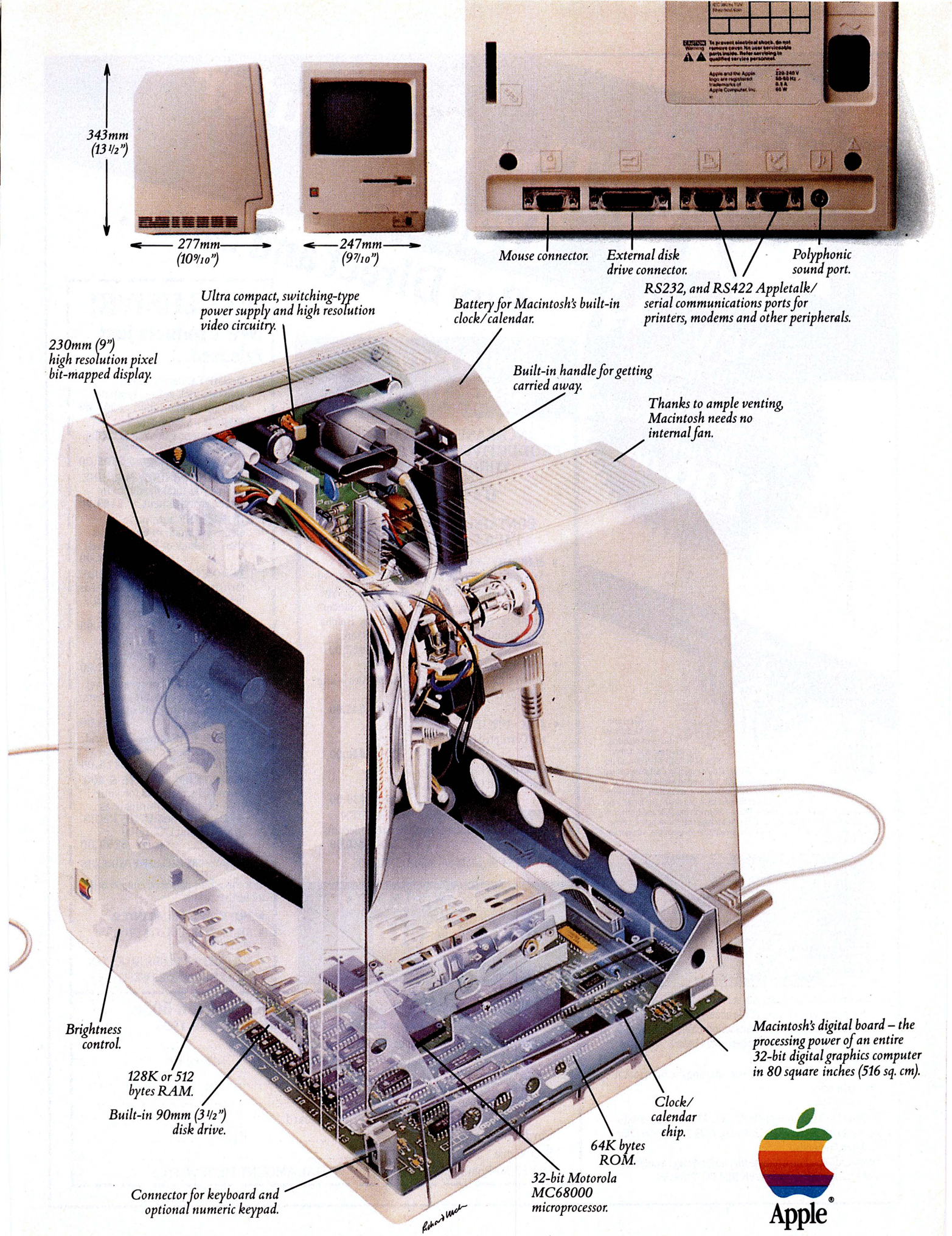
Some mice have two buttons. Macintosh has one. So it's impossible to push the wrong button.

The Mouse itself. Replaces typed-in commands with a form of communication you already understand – pointing.

The inside story – a rotating ball and optical sensors translate movements of the mouse to Macintosh's screen pointer with pin-point accuracy.

Apple credit card available at participating dealers.
For your nearest Apple dealer, outside Sydney call toll-free (008) 221555 or Sydney 908 9088.

Ap140R/Palace

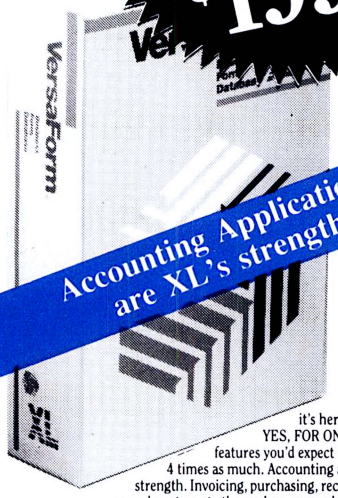

343mm (13 1/2")
277mm (10 9/10")
247mm (9 7/10")
Mouse connector.
External disk drive connector.
Polyphonic sound port.
RS232, and RS422 Appletalk/ serial communications ports for printers, modems and other peripherals.
Battery for Macintosh's built-in clock/calendar.
Ultra compact, switching-type power supply and high resolution video circuitry.
230mm (9") high resolution pixel bit-mapped display.
Built-in handle for getting carried away.
Thanks to ample venting, Macintosh needs no internal fan.
Brightness control.
128K or 512 bytes RAM.
Built-in 90mm (3 1/2") disk drive.
Connector for keyboard and optional numeric keypad.
32-bit Motorola MC68000 microprocessor.
64K bytes ROM.
Clock/ calendar chip.
Macintosh's digital board – the processing power of an entire 32-bit digital graphics computer in 80 square inches (516 sq. cm).
Apple®

The Computer Trader

Buy Direct and Save...



NEW!
A powerful multifile database with a programming language for only $199.00



Accounting Applications are XL's strength

VersaForm's new XL database isn't just promises – it's here now! And it offers – YES, FOR ONLY $199.00 – all the features you'd expect in a database costing 4 times as much. Accounting applications are XL's strength. Invoicing, purchasing, receivables, and inventory almost create themselves as you design the forms – and XL transfers data between them. There's an Invoicing, A/R and Inventory application – source code included – in the package that shows how it's done. The power's there. And unlike packaged accounting programmes, you can do them YOUR way.

	VersaForm XL	dBASE III*
PRICE	199	745
STRUCTURED LANGUAGE	Y	Y
MULTI-FILE	Y	Y
COLUMNS WITHIN DATA RECORD	Y	N
DATA ENTRY CHECKING	BUILT-IN	MUST WRITE PROGRAMME
ON-SCREEN CALC	BUILT-IN	MUST WRITE PROGRAMME
FORMS OUTPUT	BUILT-IN	MUST WRITE PROGRAMME
DATE ARITHMETIC	Y	Y
DATA TYPES	DYNAMIC	FIXED
COLUMN TOTAL OPERATOR	Y	N
QUERY BY EXAMPLE	Y	N
MAX FILE SIZE	4 MB	OPEN
MAX RECORD SIZE	4000	4000

*dBASE III is a registered trademark of Ashton-Tate.

XL's structured language can access multiple files. 48 built-in functions give control of file access, printing, and user dialogues. You'll develop transaction-based applications with an ease you've never experienced before. And all at this unheard-of low price.

Order now, and have the pleasure of using the right tool at the right price.

You can't lose!

VersaForm XL runs on IBM PC, XT, AT and compatibles. Requires 192K, two 360KB drives, DOS 2.0 or later. Hard disk recommended.

Standard VersaForm (single file, no language) available for 64K, 2-drive Apple II or 128K IBM PC. $139.00.

A MUST FOR ALL dBASE II USERS

INCREASE DEVELOPMENT PRODUCTIVITY AND PROCESSING THROUGHPUT WITH

dTOOLKIT

CONTAINING MANY dBASE III FACILITIES...AND MORE

- **dLIBRARY** – OBJECT CODE ROUTINES:
  Arrays, extra 256 Memory Variables, dBASE III Date Facilities, Amount in Words, DOS Type, Soundex Codes, Check Digits, Random Numbers, SQRT, Tolower, Capitalize, Isalpha, Encryption, compression...and Many More.
  List **$55.00**
- **dBASIC** – FUNCTIONS:
  Process dBASE II Data and Index Files using CB80 or CB86 Compiled BASIC.
  List **$45.00**
- **dFIX** – UTILITY:
  Fix Corrupted Data Files.
  List **$40.00**
- **dCRYPT** – UTILITY:
  Encrypt and Decrypt Data Files.
  List **$30.00**
- **dMENU** – dBASE RUNTIME MENU SYSTEM:
  Maintenance Routines, Menu Hierarchy, Security.
  List **$40.00**

CP/M-80, CP/M-86, MS-DOS, PC-DOS

TOTAL PACKAGE FOR $99.00

EXCLUSIVE!

New Products just released...

- ☐ **DeSMET C** development software incl. editor, symbolic debugger and profiler. **$245.00**
- ☐ **FORTH** – a complete development system incl. 210pp manual. **$195.00**
- ☐ **VSI** – THE WINDOW MACHINE to give you total flexibility in screen management. **$149.00**
- ☐ **HOMEBASE** automatic electronic mail; more features than Sidekick or Poly Windows. **$89.00**
- ☐ **XENO-COPY PLUS** for your disk formatting and file transfer needs between CP/M86 and MS DOS systems. – No extra hardware required. **$295.00**
- ☐ **80-MATE** runs your CP/M80 programmes on your MS DOS computer. **$295.00**
- ☐ **KEYSWAPPER** for spreadsheet users, touch typists, programmers, word processing and others. **$95.00**
- ☐ **DISK P.M.** diagnose hard and floppy disks, recover, repair, condense and more. **$115.00**
- ☐ **SMARTERM 100, 125 & 400** terminal emulators for your IBM PC to communicate as DEC, VT100 and VT125 ReGIS graphics and DG. D400 terminals. from **$299.00**

PLUS MANY MORE EXCLUSIVE PRODUCTS

Tick this advert plus send coupon below for further details.

- **MONEY BACK GUARANTEE.**
- STUDENT DISCOUNTS ON APPLICATION.
- ALL PRICES INCLUDE SALES TAX.
- DEALER ENQUIRIES WELCOME.

The Computer Trader. PO Box 95 Plympton 5038
Telephone Orders: Ring Our Melbourne Office (03) 266-1995

Please send me ☐ Product ..... Qty .....
more details ☐ VersaForm ☐ dTool Kit

Name .....

Address .....

I enclose ☐ cheque ☐ Bankcard ☐ Visacard

Card No ..... Expiry .....

Signature .....

add $7.50 Postage & Handling. TOTAL AMOUNT HEREWITH $ .....

YC/ 2

PROGRAMMER'S WORKBENCH

Les Bell is full of praise for Speedit, a structured programming tool; offers some tips on the Batch processing language; and tells you how to change your sloshes into slashes.

Speedit

Some years ago I met Associate Professor Phillip Grouse, of the University of New South Wales, at some function or other, and we seemed to hit it off. We were both part of a small but active minority of programmers using PL/I, and we shared an interest in programming style and techniques.

Not long after that, Phil revealed he was working on a major project called FlowGuide. In a paper presented at 10 ACC, Phil outlined the development of FlowGuide, which is a structured programming tool.

The concepts of FlowGuide are based on the work of Nassi and Shneiderman, who developed a diagram for the representation of programs based on the most common control structures. The Nassi Shneiderman Structured Flowchart technique allows the user to graphically depict the flow of control and the internal logic of a program, both as an aid to design and as a portion of the external documentation for the program.

However, Nassi Shneiderman diagrams suffer from several problems. First, they involve much pencil and rubber work as a design is 'nutted out'. This acts as a disincentive for the continued use of the technique down to the lower levels of a program — which is precisely where the logic is most likely to become confusing and could best benefit from the use of such a technique.

Secondly, the CASE statement is handled elegantly but impractically by Nassi and Shneiderman. With more than a few cases in the statement, it becomes impossible to write anything in the blocks because they are too narrow.

Thirdly, because the Nassi Shneiderman diagram uses diagonal lines, it is difficult to portray on the screen of a personal computer. Admittedly machines like the Macintosh could manage it, but in practice the diagonals limit the space available for text.

Bearing these restrictions in mind, Phil proposed a new technique, similar in form and purpose to Nassi Shneiderman diagrams. His 'flowblocks' satisfactorily resolve the difficulties above in the following way.

Firstly, pencil and rubber work is eliminated, since flowblocks are suitable for computer display — which is, of course, the purpose of FlowGuide. This is because diagonal lines are eliminated — partially a cosmetic improvement and partially the result of attention paid to the IF, IF ELSE and CASE statements.

In particular, the CASE statement has been redesigned by making each of the case stubs a separate node in a network of flowblocks.

There are three general flowblock components which express sequential flow of control, conditional execution and looping. All more complex flowblocks are constructed from these primitives, but I don't propose to enter into a comprehensive explanation of flowblocks here, since Phil is doing an excellent job of that in his series on structured programming.

However, last year Phil decided to quit the groves of academe, in order better to pursue his holy grail of a graphical programming technique: FlowGuide. FlowGuide itself is a big system, designed to meet the requirements of professional programmers, particularly those working on large mainframe projects. But along the way, Phil has been able to produce a 'stripped-down' version suitable for use by anyone turning out BASIC code on a PC.

Called Speedit, the program incorporates all essential flowblock concepts and conveys the same benefits. It runs on an IBM PC or compatible with 192 Kbytes of memory and one floppy disk drive. While a colour graphics adaptor and RGB monitor are recommended, I discovered it was quite usable (although not quite as informative) on a Hyperion with a monochrome amber display.

Keying SP <progname> loads the .SPT file which contains the flowblocks for a program and prepares to edit it. The flowblock editor is roughly based on WordStar, although (of course) the PC cursor keys will also work. Similarly, control-K commands like ↑ KR (to read a file) also work, as do the scrolling commands.

However, most important are the function keys, which control the overall shape of the flowblock. For example, pressing F2 (WHILE) inserts the word WHILE at the current cursor position and then produces a contained WHILE block below it. Other keys produce IF-THEN, IF-THEN-ELSE, ▷

The flowblock technique can be most beneficial at the lower levels of a program, which is where the logic is most likely to become confusing.


WELCOMETOPROGRAMMERSWORKBENCHANDHERE'SOURLOVELYHOSTESSNATALIEFILTEROFFTOINTRODUCEOURFIRSTGUESTS!WHOHAVEWEGOTTONIGHTNATALIE?
CLIK
THANK YOU LES, OUR FIRST GUEST HAILS FROM A VARIABLE ENVIRONMENT... PLEASE MEET
PETUNIA CHOOK WHO DOES ONLY SCRAMBLED... HER IDEAL PARTNER WOULD HAVE AN IQ OF 2.1
AND TO CHOOSE FROM, ON THE OTHER SIDE OF THE SCREEN, PLEASE MEET...
....AUTOEXEC.BAT WHO LOVES TO PROMPT PG PATH C:\;C:\TOOLS XTIME AND PARTY ALL NIGHT...
ÅIH
ALSO PLEASE MEET LINK MYFROG (MC.LIB. FOR MUDDYPOOL) WHO LIKES WELL DEVELOPED FROGRAMS
HELLO
AND LAST BUT NOT LEAST PLEASE MEET POLICE CONSTABLE DOS WHO (GOODNESS! COULD THIS BE A PERFECT MATCH?!) HAS AN IQ OF JUST 2.1!...
HI MUM
1 LP ROAD
1 PINT MORNING
1 PKT. BISS
2 KILO SPUDS
THANK YOU NATALIE AND NOW PETUNIA WILL ASK THE FIRST QUESTION... PETUNIA
...UM...HOW WOULD YOU GET A UNIX LIKE FEEL IF YOU HAD LITTLE JOY IN THIS AREA?
OK! CUT! CUT!.. AN INTERESTING EXPERIMENT, THOUGH... I'M TAKING COMMAND OF THIS SET, NOW...
NO! YOU CAN'T SLASH THE SHOW NOW!
YES I CAN! IT'S MORNING TEA TIME & WE NEED THE SET FOR TABLE TENNIS...
GOSH! DOES THIS MEAN THEY'LL HAVE TO GET A REAL-TIME COCK FOR PETUNIA? WHAT ABOUT THE SOGGY BISCUITS?
©BJAHRT85

CASE and GOSUB structures. This is done by special keys because a) the program must redraw the flowblock appropriately and b) the way the flowblock is stored internally depends upon these structures.

Using the editing keys, the user can move around inside each block, which automatically expands to contain the entered text. By default, text will become program text, but two control codes place the editor in comment mode, when it changes text colour to signify that the entered text is a comment and will be copied as such into the output program.

A series of Alt key sequences allows the user to move between flowblock modules. These modules are typically subroutines, but they may also be case stubs. A major incentive towards modular programming is the ability to decide at any time that a particular pile of blocks is becoming unwieldy and ought to be in a flowblock of its own, and to detach that pile, or an individual block, and place it on the list of detached modules.

Excellent Help System

The flowblock editor has an extensive built-in help screen system, which is reminiscent of that in Lotus. Using this help system, a programmer who is familiar with the precepts of structured programming can use the system without ever reading the manual.

At this level, we have a more than adequate replacement for paper and pencil in the design of programs. We could print out the flowblocks and use them as a guide to the actual coding of the program in virtually any language of our choice, then save them as documentation. But Speedit goes further — it actually generates the BASIC program from the stored flowblock.

The XLATE program reads the specified flowblock and translates it into BASIC. The resulting program file is saved in ASCII format, and examination reveals it to be beautifully indented and structured, commented code. It can now be immediately run using the BASIC interpreter or compiled.

The documentation includes a tutorial on structured programming which explains the benefits of this approach to structured programming, and there are three sample programs provided on the disk. Personally, I don't think Phil is selling the benefits hard enough. It is really hard to program badly using this package. It makes it easy for you to do the right thing — abstracting complex sequences of instructions into modules, using WHILE loops correctly, handling IF-THEN-ELSE loops properly and so on — while making it hard to use some unstructured statements; there is no support for FOR loops, for example.

Using the help screens, a programmer who is familiar with the precepts of structured programming can use the system without ever reading the manual.

Two versions of the package are available. A demonstration version ($19.95) allows you to sample the joys of structured programming using flowblocks, but will only handle a restricted flowblock size, while the full version ($79.95) can handle as large a program as you're likely to want.

While the current version generates BASIC code, Phil is talking about doing a more powerful version which will generate C code. The full-scale version, FlowGuide, will support a variety of mainframe languages and will have additional features.

The SET command with Batch Files

PC-DOS 2.1 provides a variety of advanced features over similar single-user operating systems, particularly those which are modelled on the Microsoft Xenix operating system. An example of these is the Batch processing language, which provides facilities similar to those of Unix shell scripts.

Batch files have a number of uses. First, the AUTOEXEC.BAT file can be used to automatically run a series of commands to establish the user's preferred working environment. For example, a series of commands can be placed in AUTOEXEC.BAT to change the system prompt, set the command file search path and set the operating system real-time clock:

```
PROMPT $P$G
PATH C:;C:TOOLS
XTIME
```

The commands in the AUTOEXEC.BAT file are executed whenever the system is rebooted.

But Batch files have a more general use. For example, compiling a program usually requires the user to execute a series of commands, such as:

```
MC1 MYPROG
MC2 MYPROG
LINK MYPROG = C+MYPROG, MYPROG,, MC.LIB
```

During program development, this sequence of commands may have to be entered repetitively, a task that would soon become tedious in the extreme.

Fortunately, there is a better way. Batch files provide the ability to reduce repetitive typing to a minimum. For example, the example above can be reduced to the single command:

```
COMP MYPROG
```

where COMP.BAT is the following Batch file:

```
MC1 %1
MC2 %1
LINK C+%1, %1,, MC.LIB
```

When the user types COMP MYPROG, the Batch file processor establishes a set of environment variables, called %0 through %9, which correspond to the arguments typed on the command line. %0 is COMP, %1 is MYPROG, and all the others are unassigned.

Each of the variables is then substituted into the lines of the Batch file, so that the first line becomes MC1 MYPROG, and so on.

That's the basic level of operation of the Batch processor, but it goes well beyond this. The Batch processor has its own special commands which control the way it operates. The first of these is ECHO, which takes three forms. ECHO OFF suppresses the appearance of each line of the Batch file as it is executed, while ECHO ON turns it on, and ECHO followed by a message prints the message. With ECHO turned off, you can hide the details of how your Batch file operates.

Another useful capability of the Batch processor is conditional processing, through the IF command. The IF command can basically test three things:

1. The error level which is returned by a program as it terminates execution, and which is stored in the environment. This is tested with a command such as:

```
IF ERRORLEVEL 1 GOTO END
```

which tests for an error level equal to or greater than 1.

2. The existence or otherwise of files, using a command like:

```
IF EXIST %1 GOTO NEXT
```

3. Comparisons between string variables

and parameters, such as:

IF %2 == DELETE ECHO Deleting file!

Notice the use of the GOTO command, which takes a label as an argument. A label is a string of the form :LABEL, so that GOTO END above would search for the line :END. As well as the straight tests above, the IF test accepts their converses using the NOT modifier, allowing commands like:

IF NOT EXIST %1 GOTO END

Particularly interesting to experiment with is the string comparison, especially if you know of the Batch processor's ability to access environment variables. These are set using the DOS 2.1 SET command, which uses the syntax:

SET [name=[parameter[m

With no name specified, SET simply lists the variables in the current environment. SET name=fred stores that entire string into memory, where it can be picked up by a program. More importantly, it can be picked up by the Batch processor. Try this simple Batch file, for example:

```
ECHO OFF
ECHO %0
ECHO %v%
```

If you just run it, it will echo back its own name, followed by v%, since there is no variable v in the environment. But if you precede this Batch file with SET v=How now brown cow, the Batch file will echo its name followed by How now brown cow. Environment variables are set using the SET command (notice no spaces around the = sign) and are referred to in Batch files as %varname%.

Many PC users have also had some exposure to Unix, and are driven to muse on the hand of fate which made Microsoft use the slash character (/) for command-line parameters.

It's a great pity this isn't mentioned anywhere in the DOS 2.1 documentation, as DOS 2.1 otherwise makes virtually no use of these environment variables.

You can also use the ERRORLEVEL variable to make Batch files interactive, provided you have a program called ASK.COM, which is in the PC/Blue public domain library. ASK prompts the user with a character string and expects a Y or N response. Depending on what the user types, it then sets the ERRORLEVEL to 0 for a Y response and to 1 for an N response.

This can be used in conjunction with the IF ERRORLEVEL Batch command to control execution of quite complex Batch files. Using this capability, particularly in conjunction with some of the more advanced pipelining capabilities of DOS 2.1, makes it possible to construct quite complex tasks without writing any programs.

Getting the Feel of Unix

Many PC users have also had some exposure to Unix, and are driven to muse on the hand of fate which made Microsoft use the slash character (/) for command-line parameters. For having used this character, they were then forced to use slosh (\) for subdirectory delimiters, while Unix uses slash for this purpose and the minus sign for parameters. Switching between the two systems can be a source of considerable aggravation.

If you want to get a Unix-like feel to your MS-DOS or PC-DOS system, place the command SWITCHCHAR in your CONFIG.SYS file. If your AUTOEXEC.BAT file changes the prompt to contain the current directory and leaves you in the root directory, then instead of logging on as C:>, it will prompt with C:/>, which is much more Unix-like.

You may now go ahead and use slashes in pathnames instead of sloshes, and whenever DOS prints a directory name it will use slash instead of slosh. For parameters on command lines, minus signs may well work, but I had little joy in this area, so eventually I went back to using the straight DOS way of doing things. It was an interesting experiment, though.

Products Mentioned

Speedit: Microshare Systems Pty Ltd, PO Box 169, Milsons Point 2061.

References: *Information Systems Design*, Brookes, Cyril HP, Phillip J Grouse, D Ross Jeffery and Michael J Lawrence, Prentice-Hall of Australia, 1982, pp 356-363. □

LOOK — ATARI OWNERS — LOOK

BASIC XL RRP $129.00
This is the BASIC Atari should have used. Long programs can run 2-4 times faster. Special commands for Player/Missiles, strings and more.

ACTION! RRP $149.00
High level, structured, compiled language for Atari. For those who have found BASIC too slow or assembler too difficult. Fast, powerful and user friendly.

MAC/65 RRP $149 cart. $129 disk
A fast, powerful macro assembler. Includes Editor, Macro assembler and debugger.

PRINTER INTERFACES
MICROPRINT & MPP-1150. Connect to std I/O port. Compatible with all software (unlike joystick interfaces) — $119.00 and $149.00. Print Buffer — 64K, for all computers $329.00

THE WRITERS TOOL RRP $149.00
Designed for writers who want to write, not spend hours learning to use a word processor. Use all your printer's capabilities when printing.

TOOL KITS & DOS XL RRP $69.95
Libraries of subroutines and macros for MAC/65 plus demo games for BASIC XL & ACTION!

R-VERTER RRP $89.00
Connect most modems to the ATARI without the 850 interface. Connects to standard I/O port. Includes RS232 handlers, smart terminal software which includes XMODEM protocol.

ANTIC & ANALOG call for availability

DEALER ENQUIRIES WELCOME

Distributed by
PROGRESSIVE COMPUTING PTY LTD
P.O. Box 243, Enfield, N.S.W. 2136. Phone: (02) 76-5615

NEW ITEMS COMING
Games and more.
*Prices subject to change without notice

Instruction Set

Structured Programming 50

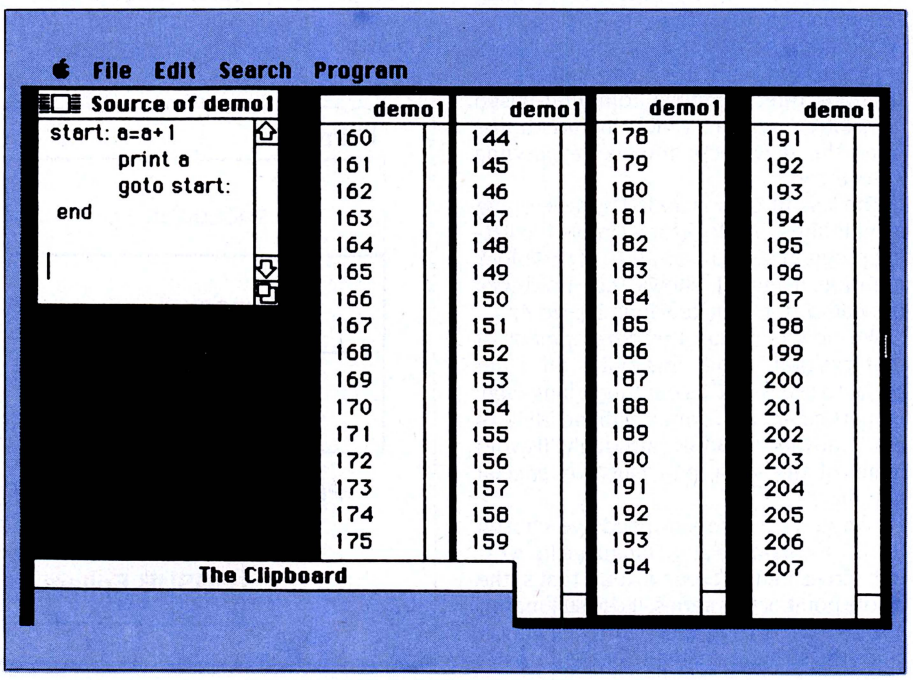
Three months into the series and many readers are clamouring for more structured programming, faster. This month, the program you met in the last episode develops, our author nominates BASIC *as his target language, and those rectangles get star billing yet again.*

By Phil Grouse

BASICs Ain't Basic — Part III 56

This final BASIC *instalment discusses two versions of the language for the Apple Macintosh —* MacBASIC *and* Microsoft BASIC *— both of which show just how refined, sophisticated and unbasic* BASIC *can be.*

By Dom Swinkels



HOW TO WRITE A STRUCTURED PROGRAM

– Part Three

Phil Grouse, our resident author of textbooks on computer programming, continues his series on structured programming with more discussion of flowblock methodology.

IN OUR SECOND article we introduced two recent modifications of conventional flowcharting methodology. These were the Nassi-Shneiderman (NS) diagram, and the flowblock. Both represent procedures in rectangular boxes where connecting lines are not required, since the boxes are piled upon each other. Control always enters a box from the top and exits from the bottom.

We also explained that flowblock representations are more suited for display screens and printers than are NS diagrams. As we shall see, this also means flowblocks can be used to input program logic specifications directly into a computer-based translation system, which in turn translates the flowblocks into corresponding source code.

The last article concluded by developing a 'mainline' flowblock for a simple file listing program as an illustration of flowblock notation. Figure 1 shows that flowblock (repeated from our previous Figure 4).

We now continue the development of that program. From this point on, I am going to use BASIC as our target language. In particular, the syntax will be that of IBM's 'advanced' BASIC, although I'll avoid many of the fancy bits (such as special graphics).

I know — you're surprised I've chosen BASIC. It's hardly a good language for writing structured programs, but that's the whole point of this series. It doesn't matter about the deficiencies of the language, since the structure is in the design (namely, the flowblocks).

As you'll soon see, we won't be using GOTO statements, or even line numbers for that matter. It's simply that we will be putting BASIC (or 'pseudo-BASIC') statements into flowblocks. Figure 2 shows the 'BASICised' version of the original mainline. We have preceded each module reference with a GOSUB to indicate that those 'subroutines' are to be called. Incidentally, the flowblock diagrams to be shown in this series have been created using Microshare Systems' 'SpeedIt' flowblock editor. More about that goodie later.

The Prologue

Most 'data processing' programs have a three-part fundamental structure. A 'prologue' initialises the various goodies, then a major processing loop is performed, followed by an 'epilogue' to clean up the mess. The mainline (Figures 1 and 2) acknowledges this structure.

We now 'move to the next level of abstraction', and consider the design of the referenced subroutines. We'll start with Prologue, although there is no rule which insists on any particular order of development. We could have started with Process, and this would have suggested things to be done in Prologue.

As it happens, this is a very simple program. We can make it a little more interesting by requiring a line number (the BASIC variable n) to precede each line in the displayed output. In addition, we want the listing to hang fire after each 20 lines are listed, allowing the user to continue the listing by pressing a key. ▷

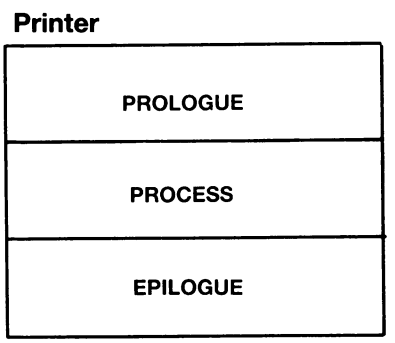


Figure 1. *The 'mainline' for a file listing program drawn as a flowblock. The three components refer to other (yet to be provided) named flowblocks.*

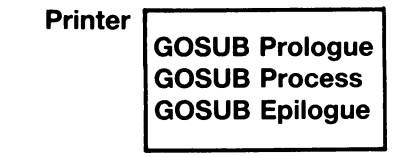
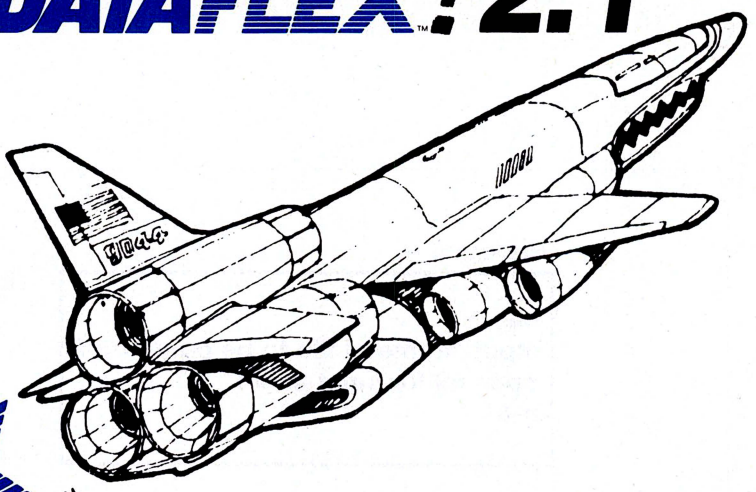
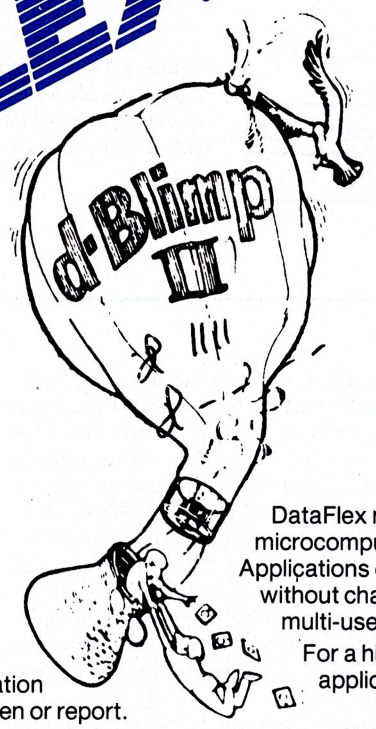


Figure 2. *This is how one would write the mainline program of* Figure 1 *if the target language were* BASIC.

Take off with DATAFLEX™ ! 2.1



DATAFLEX™



JET FAST
SINGLE USER
MULTI USER
TRANSPORTABLE
EASY TO USE
UNLIMITED POWER
WITH NEW MULTI FILE QUERY

Training courses, free seminars and programs.
Vertical market applications.
Available Australia wide.

Software turbulence??

Fly DataFlex! The best data base software in the sky!

DataFlex couples a jet fast relational data base with a powerful command language and utilities so you can build turbocharged applications. A single command gets information from your data base and displays it on a screen or report.

With DataFlex you won't have to burn extra fuel searching the skies for add-on utility packages to get the power and performance you need. From menus and multi-file data entry screens and reports to automatic file definition and an integrated text editor. DataFlex is a complete application development system.

DataFlex runs on CP/M, CP/M-86, MS-DOS, and most microcomputer multi-user operating systems and networks. Applications developed on one can be transported to another without change ... even from 8 to 16 bit and single to multi-user systems!

For a high performance system that'll keep your applications flying, get DataFlex!!...

AVAILABLE ON: CP/M, CP/M-86, MP/M-86, MS-DOS, PC-DOS, Molecular N-Star, Televideo Mmmost, Omninet, TurboDOS, Novel Share Net, PC-Net, DMS Hinet, IBM 'PC' w/Corvus, OSM Muse.

3-COM, CCP/M86, M/NET, DAVONG, X-NET
Ask us about our training courses.

SUPPLIED AND SUPPORTED BY THE EXPERTS

AMS

AUSTRALIAN MICROCOMPUTER SOLUTIONS

'Currabeg House', 248 Latrobe Tce, Geelong 3220. Ph (052) 211300

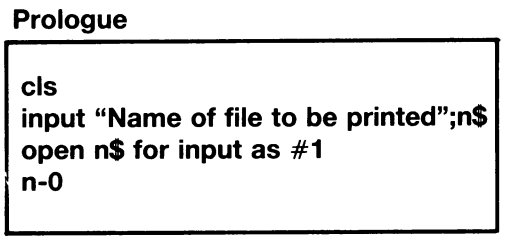


Figure 3. A *possible solution for Prologue.*

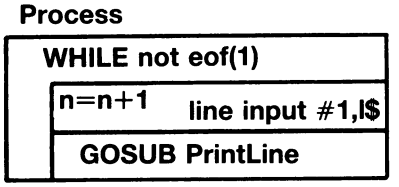


Figure 4. *The Process flowblock cycles through reading and displaying lines so long as there are any to be displayed. It references the subroutine shown in Figure 5 to do the actual display.*

Figure 3 is a possible Prologue solution. The 'cls' is the BASIC statement to clear the screen, always a good move at the start of any program.

We next find out the name of the file to be listed. The INPUT statement prompts the user for the file name which, when typed in, becomes the contents of the string variable n$.

The third line opens that file so that subsequent file handling statements can refer to it as file #1. We have made no arrangements to cope with the possibility that the file does not exist; instead, we leave it to the BASIC system to terminate the program with a suitable error message.

Finally, we set the line number variable n to zero. This means that just before the display of each line it will be necessary to increment n by 1 each time we pass through the processing loop.

The Process

The Process flowblock of Figure 4 is a simple looping operation in which the controlled block (a) increments the line counter n, (b) reads the next line from the file into the string variable l$, and (c) displays that line. You will note we have deferred the problem of just how that line is to be printed by invoking a new subroutine called PrintLine. That's something to worry about later; at this stage we simply know that this is the order in which things are to be done.

In the first article I introduced the notion of the 'data processing pump'. The idea was that one 'primes' the 'pump' with an attempt to read the first record (or 'line' in our case). This would then be followed by a WHILE loop controlled by the state of the end-of-file condition. The pump concept applies to systems in which that condition is set only after an attempt has been made to read beyond the end of the file. Unfortunately, BASIC operates differently. Let me explain.

BASIC has a built-in function (EOF) which returns a logic value of FALSE unless the last input operation read the very last item in the file. It can also be set to TRUE if an empty file has been opened. As a result, we must test EOF just after Prologue, which opens the file. Accordingly a WHILE loop is appropriate (since this tests the condition *before* the loop is executed). Hence, if the file n$ were empty, the processing loop would be bypassed, and control would be passed to Epilogue.

Now let's 'desk-check' the logic for the case when there are one or more lines in the file. If the logic can be 'proved' for these cases, we have 'proved' the flowblock. Here goes.

Firstly, what happens if there is only one line? Because there was a line in the file, the OPEN statement in Prologue will not have set the EOF function, which means EOF(1) will be FALSE the first time Process is entered. Since the WHILE condition is 'NOT EOF(1)', the loop body (the 'controlled block') will be executed. The variable n will become 1, the line will be read into l$, and l$ will be displayed preceded by the value of n (1).

If that were the only line in the file, then the LINE INPUT statement would cause the EOF(1) function to be TRUE the next time it was called. This would make the WHILE condition FALSE. Accordingly, the loop would not execute again, and control would pass to Epilogue. Process therefore works for a file with just one line.

If there is more than one line, the WHILE block will continue to loop until the condition is FALSE. It becomes FALSE only after the very last line has been read from the file, and displayed — which is exactly what we want.

Process is therefore logically correct. Isn't it nice being able to prove your logic is right before running your program?

Computer scientists refer to the condition in a WHILE block as the 'loop invariant'. In other words, the condition is always TRUE while the controlled block (loop body) is being executed. Conversely, the condition *must* be FALSE when the block terminates. In our case, we can say the EOF(1) function is TRUE when we enter ▷

ABOUT TO BUY AN INTEGRATED PACKAGE ?

STOP!!

IF YOU ARE GENUINELY GOING TO PURCHASE AN INTEGRATED PACKAGE THIS MONTH, BEFORE MAKING YOUR FINAL DECISION YOU SHOULD TRY

enable™



For the IBM®-PC and selected compatibles.

"This integrated package could be the best on the market, offering business users the power of stand-alone programs."

IBM PC UPDATE MAGAZINE, DECEMBER 1984

Return the coupon to OptSoft today and we will send you an Evaluation Copy of Enable — not a self-running Sales Demo Disk, but a three-disk complete system, which enables you to use all features except the Print and Save functions.

When you purchase Enable from OptSoft at the recommended retail price we will include either:
★ attendance at an 'Introduction to Enable' one-day course given by Price Waterhouse.
★ a copy of Microsoft's 'Flight Simulator'. ★ a copy of Borland International's 'Sidekick'.
★ a copy of Aid System's 'Typequick'. ★ three boxes of Xidex bulk DS/DD 5¼" disks.

Phone or write for a special offer on any of the above if purchased separately; or for details of our package deal on Enable and Olivetti M24 or M21, or Sanyo 775. Special offers also on Data NetComm's IN/MODEM and the Taxan Vision IV colour monitor.

OptSoft

OPTIMUM SOFTWARE SOLUTIONS

Optsoft Pty Ltd
238 Seven Hills Road, Baulkham Hills, 2153
Telephone (02) 624 8140

I will be purchasing an Integrated Package this month.
Please send me a copy of the Enable Evaluation System
to enable me to make the right decision.

Name: .....

Address: .....

..... Postcode .....

Telephone: .....

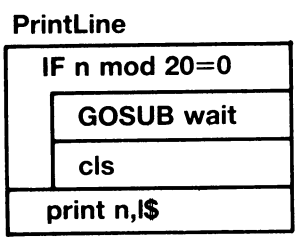


Figure 5. *The PrintLine flowblock is responsible for printing the line (in I$) with a preceding line number, and also arranges a pause when the line number is a multiple of 20. It references the subroutine Wait shown in Figure 6.*

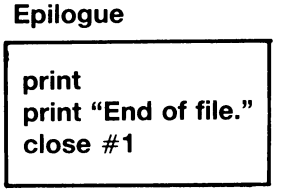


Figure 7. *Epilogue rounds off the program.*

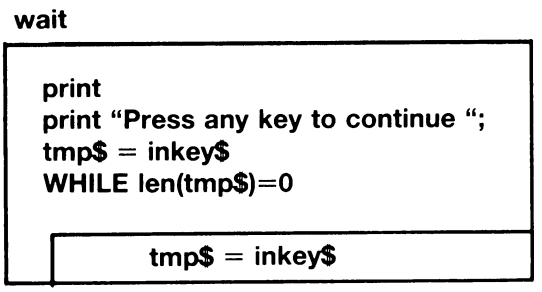


Figure 6. *Wait uses* BASIC's INKEY$ *function to sample the keyboard.*

Epilogue. This is simply an assurance that all the file has been read.

The PrintLine Module

The simplest form of this flowblock would be the statement PRINT N,L$. We decided to add a little interest by requiring the program to 'hang fire' after each 20th line — hence the flowblock shown in Figure 5. The simple PRINT statement is now preceded by a test to see if n is a multiple of 20. The conditional expression after the IF is true only when this is the case.

Consider what happens when this module is called for the first 19 times. Since the IF condition is FALSE, the module behaves just as if it were the simple PRINT statement above. It prints I$ after a preceding line number n. When n becomes 20, however, the IF condition is TRUE, causing the Wait module to be called (thus holding the 20-line display until a key is pressed), after which the screen is cleared for the next set of 20 lines. All very tidy. Note how we have again 'deferred to the next level of abstraction' the problem of waiting for the user to tell the program to continue. So far as PrintLine is concerned, the Wait should be performed at a particular point. How it does it doesn't matter to PrintLine.

The Wait Module

The Wait flowblock shown in Figure 6 is one I often use; you'll find you can build up a library of useful flowblocks. However, there are two catches. The first is that you also need to include a detailed description of *what* the module is supposed to do (a 'requirements' specification). Secondly, since BASIC doesn't support local variables, you may need to check that the variables used in your module do not conflict with variables in the rest of your program.

One solution (although cumbersome) is to prefix each variable in a module with the module's name. For example, in Wait we could have used WAIT.TMP$ instead of TMP$. Lengthening variable names tends to slow up execution of interpreted programs, and also chews up more memory.

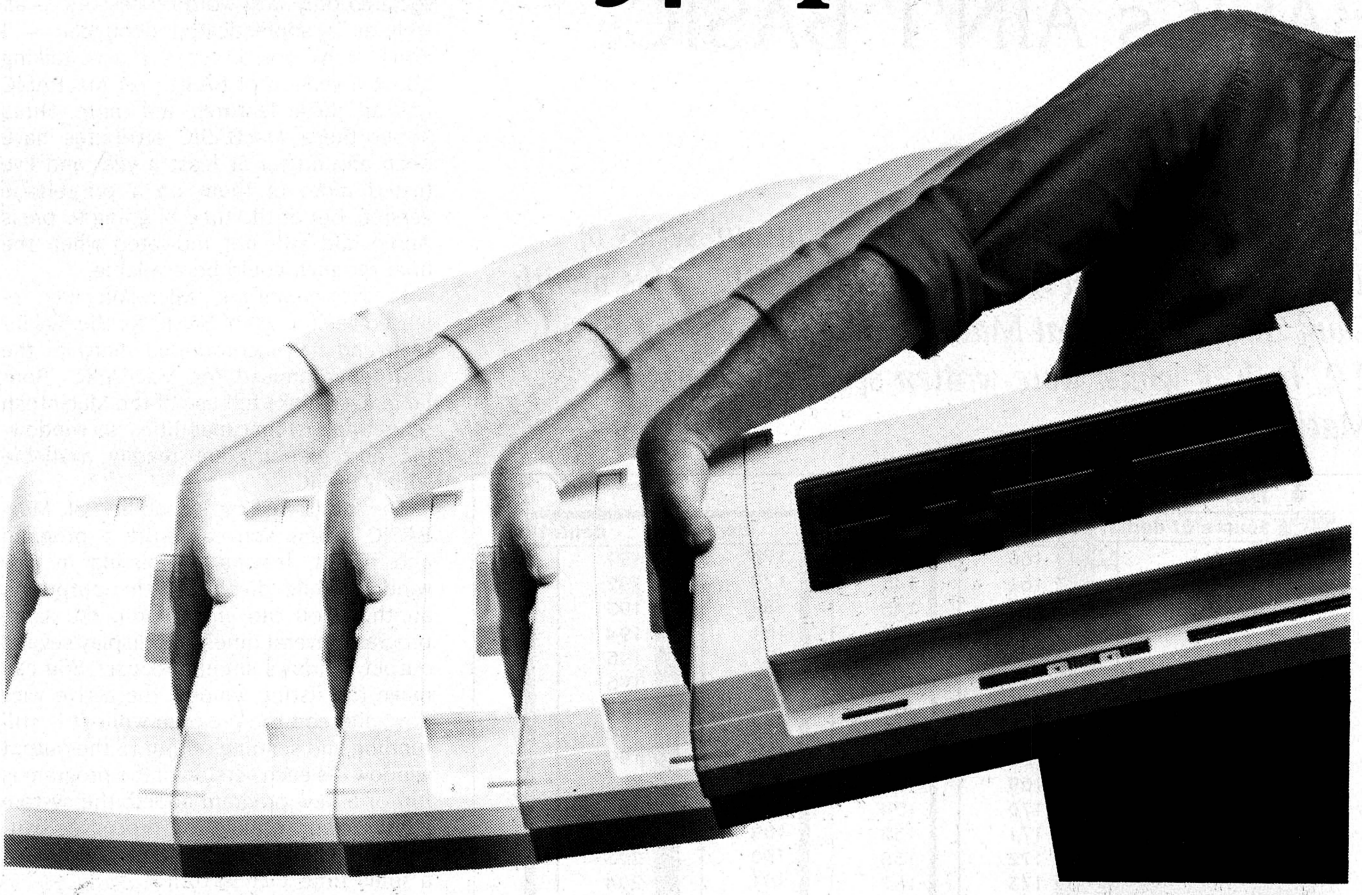
The logic of Wait is simple. It begins by prompting the user with a message (which will appear after the last displayed line). The BASIC built-in variable INKEY$ returns the state of the keyboard; if no key is pressed, its length is zero. Hence the WHILE loop says to keep on sampling the keyboard until the loop invariant is FALSE — that is, TMP$ is no longer an empty string. Note how it was necessary to 'prime' the WHILE loop with an initial setting of TMP$ so it could be tested before entering the loop.

The Epilogue

This is shown in Figure 7. It just says goodbye and closes the file.

This exercise has given examples of three simple control constructs: the sequence block, the WHILE 'looping' block, and the IF-THEN selection block. In our next article in this series, we'll show how to translate your flowblock logic specifications into 'real' BASIC. We'll also give examples of some more control constructs. □

The only thing faster than Seikosha 5420 printers...



...is how fast they sell.

High Speed and high quality N.L.Q. output.

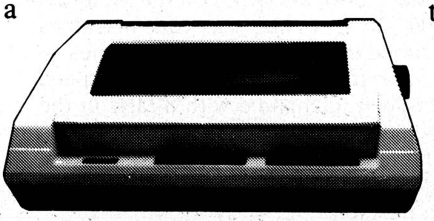
A multifunctional business printer that's been designed for large volumes of business data. At a price well below other business printers.

The 5420 offers many advantages.

- 420 CPS
- 104 CPS N.L.Q.
- Compatible with IBM PC
- Low noise (Less 60 Dba)

For only $2,850 including sales tax, it's no wonder the Seikosha 5420 printer is going fast.

Excellent OEM/Reseller margins.



Mitsui Computer

Sydney 451 7711 • Melbourne 690 6722 • Brisbane 369 7799

MIT 3272

BASICs AIN'T BASIC - Part III

Here's the third and last instalment in our series of articles on significant new versions of BASIC. *This month* Dom Swinkels *looks at* MacBASIC *and* Microsoft BASIC 2.0, *both of which were written specifically for the* Macintosh.

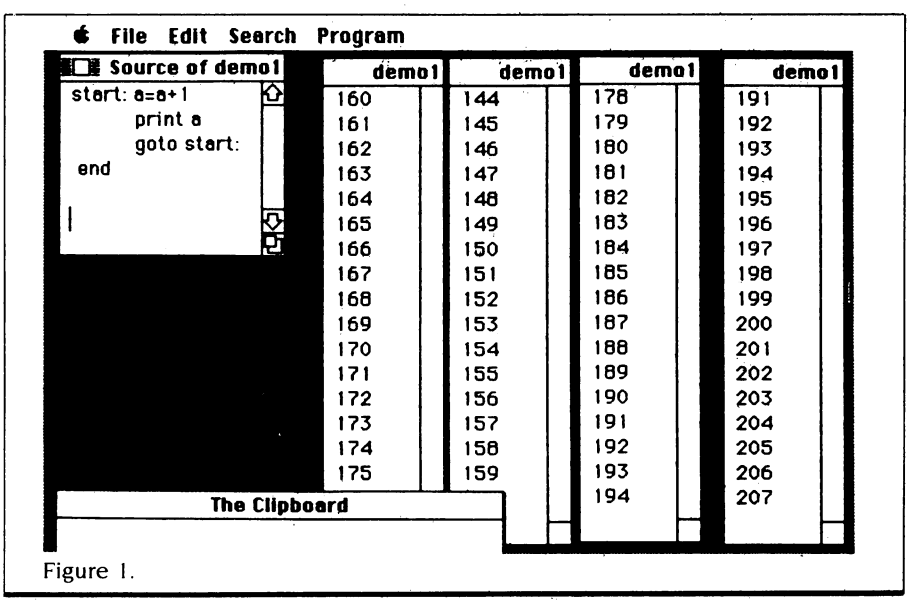


Figure 1.

PEEK and POKE *are not available in* MacBASIC, *which is a pity since it stops me from poking around in memory to see how things are done.*

THE MACINTOSH requires no introduction. It comes in two versions: with 128 Kbytes of RAM, or 512 Kbytes of RAM (the Fat Mac). Both are based on the Motorola 68000 CPU — like the two machines described in parts I and II of this series — which, in this case, runs at a clock speed of 7.8 MHz, compared with 8 MHz in the IBM 9000 and 10 MHz in the Sord 68K.

The first language we'll look at for the Mac is MacBASIC, written by Donn Denman of Apple.

Is It BASIC?

If I said I had a structured language which uses no line numbers, allows you to call named subroutines, is multi-tasking and semi-compiled, and includes a text editor with many of the features normally associated only with word processors — as well as a sophisticated debugger — I don't think you'd guess I was talking about a version of BASIC. Yet MacBASIC has all these features and more. Hints about these MacBASIC attributes have been around for at least a year and I've tested most of them on a pre-release version, but at the time of going to press Apple had still not indicated when the final product would be available.

In the meantime, Microsoft has released version 2.0 of BASIC for the Macintosh and has incorporated many of the features promised for MacBASIC. Both languages make full use of the Macintosh operating system capabilities, so windowing and graphics are readily available within BASIC.

The multi-tasking capability of MacBASIC means you can write a program and run it, leaving the listing in one window while displaying the output in another. You can, in fact, run the same program several times and display several output windows simultaneously. You can make the listing window the active window, and edit the program while it is still running and sending output to the output window. As each version of the program is run or a new program added, the system slows down because the processor switches from one task to another, giving each a small time-slice in turn.

Figure 1 shows a screen dump of the MacBASIC program listed in the top left window running several times. The listing also illustrates how a label can be used to replace line numbers with GOTO or GOSUB statements. Labels can be given some meaning; the only requirement is a text label must end with a colon. Numeric labels may be used without a colon.

In spite of these extra features the language is still essentially BASIC. Familiar commands include all the usual numeric functions (ABS, ASC, INT, SGN, SQR) and the string functions (CHR$, LEFT$, LEN, MID$, RIGHT$). You'll also find the math and trig functions (EXP, LOG, SIN, COS, TAN, ATN and so on) and the logic functions (AND, OR and NOT).

Since there are no line numbers in the conventional sense, there is of course no RENUM command. PEEK and POKE are also not available in MacBASIC, which is a pity since it stops me from poking around in memory to see how things are done.

The battery-backed clock is available through TIME$ and DATE$.

Variable names can have any length, so meaningful names can be used. Lines can also be of any length, but they do not wrap around on the screen, and because only 55 characters can be displayed at any time, variable names should generally be kept as short as possible while still retaining some meaning.

Now, let's have a look at some of the new statements available.

Structured Programming in MacBASIC.

There is an excellent set of program flow control statements in MacBASIC, to allow good program structure to be developed. Apart from the GOTO <label:> and GOSUB <label:> statements there is the normal FOR/NEXT structure including the STEP option. The IF ... THEN ... ELSE ... ENDIF structure is also available. ENDIF is required to terminate the group of statements which may follow THEN or ELSE.

Here are several more structures not normally found in BASIC; for example, there is a WHEN ... ENDWHEN structure. The lines between these are executed when the condition following WHEN is true, which is similar to the WHILE statement found in some BASICs.

Next there is a DO ... EXIT ... LOOP structure. The lines between DO and LOOP are executed repeatedly until the EXIT command is encountered, which causes the program flow to exit from the loop to the line following the LOOP statement.

Finally there is the SELECT CASE ... CASE ... CASE ... ENDSELECT structure. It replaces the ON ... GOSUB structure of many BASICs and is a great deal more flexible.

It is possible to call another program at any point, using the PERFORM command, and to pass parameters to the new program similar to the CHAIN MERGE capability of, for example, Microsoft BASIC on the IBM PC. In MacBASIC we can use PERFORM to load and run another program, and as soon as the new program is completed control returns to the next line in the original program.

Graphics Commands

Graphics are no doubt the greatest asset of the Macintosh and MacBASIC makes full use of them.

The format of one set of graphics commands is:

action shape X1,Y1;X2,Y2

where the action may be FRAME,. PAINT, INVERT or ERASE and the shape may be OVAL, RECT or ROUNDRECT. X1,Y1 is the screen location of the top left-hand corner and X2,Y2 the bottom right-hand corner of a rectangle containing the selected shape. The results of these commands are generally obvious.

FRAME RECT 10,20;100,150 draws the outline of a rectangle with corners at 10,20 and 100,150.

PAINT OVAL 10,20;100,150 paints an oval shape in black, which just fits inside the above rectangle.

ERASE changes the shape selected back to the white background of the Macintosh, while INVERT inverts the colour of everything within the shape; that is, changes black to white and white to black.

The ROUNDRECT shape differs from the other shapes in that it needs two more parameters in the form WITH X3,Y3. ROUNDRECT is a rectangle with rounded corners and X3 and Y3 are, respectively, the degrees of roundness horizontally and vertically. There is no CIRCLE command, but there are two ways of making circles. PAINT OVAL 100,100; 150,150 and PAINT ROUNDRECT 100,100; 150,150 WITH 50,50 will both paint circles of 50 pixels diameter at the same location on the screen.

As we will see, Microsoft BASIC for the Macintosh has a third way of drawing circles, using the CIRCLE command to retain compatibility with other versions of Microsoft BASIC.

CALL TEXTFONT(n) selects one of 11 fonts for text output **CALL TEXTSIZE(size)** sets the size of the font in use **CALL TEXTFACE(face)** selects one of eight styles for each font **CALL MOVETO (x,y)** moves the pen to the co-ordinates x,y, **CALL PENMODE(n)** selects one of eight pen modes **CALL PENSIZE(width,height)** defines the pen size **CALL LINETO (x,y)** draws a line from the current position to x,y.

Table 1. *Examples of calls to Macintosh ROM routines in Microsoft BASIC.*

Microsoft BASIC 2.0 for the Macintosh

Microsoft recently issued its version 2.0 of BASIC for the Macintosh. The company clearly had a problem in reaching a compromise between compatibility with versions of Microsoft BASIC for other machines on the one hand, and taking maximum advantage of the capabilities of the Macintosh on the other. Thus all commands found in Microsoft BASIC for, say, the IBM PC are retained, but added to these are commands which take advantage of special Macintosh features such as windows, mouse and button commands, and the many ROM-based graphics routines. This has resulted in some 211 reserved words in version 2.0.

Most of the new capabilities specific to the Macintosh involve calls to the Mac's ROM routines, and are implemented through a series of CALL ... commands. Some examples are shown in Table 1.

There are special graphics calls equivalent to the graphics commands listed above for MacBASIC, though these do seem a bit more awkward. For example:

```
FRAME ROUNDRECT X1,Y1; X2,Y2
WITH X3,Y3
becomes
CALL FRAMEROUNDRECT (VARPTR
(rectangle%(0)), ovalwidth, ovalheight)
```

where rectangle%(0) through rectangle%(3) define the top, left, bottom and right boundaries of the rectangle, and ovalwidth and ovalheight are equivalent to X3 and Y3 in MacBASIC.

Figure 2 shows one of the sample programs on the disk, with both the output and the list windows. It demonstrates the way in which reserved words are shown in a bold font on the screen, and the use of named subroutines. After dimensioning the integer array P and drawing and filling a black box from 0,0 to 120,120, a series of ovals of different aspect ratios is drawn in the WHILE ... WEND loop. This image is then loaded into the array P, and the program sits and monitors the mouse button (MOUSE(0)) to see if it has been pressed. When this signal is detected control is transferred to the MovePicture subroutine, and the picture is moved to the new location in the blink of an eye. This example gives you a taste of Microsoft BASIC for the Macintosh.

As in MacBASIC, the graphics routines are very fast because they call on the ▷

FMS

Tools for Professionals

Lattice C $770
The 16-bit C Compiler used by the experts. Early version sold as Microsoft C. Version 2.14 includes automatic sensing of the presence of 8087 chip, Unix-compatible maths functions, and more.

Lifeboat's Run $309.00
C Interpreter. Perfect for learning or teaching C and debugging C code. Operates like Basic. 100 common functions built in.

Halo $392
IBM PC Colour Graphics routines: a complete library of graphics primitives for Fortran, Pascal, Lattice C, Basic Compiler, Basic Interpreter, or Assembler. Halo supports the IBM PC Graphics card, the Hercules Card, some other graphics cards, mice and printers. (Price quoted covers one language/card combination.)

Panel $641
A powerful and flexible tool for designing and editing data-entry screens and keyboards. It generates program code in your favourite language for each screen.

PLink-86 ..... $716
A two-pass linkage editor allowing overlays in C, FORTRAN, PL/1, PASCAL, COBOL and Assembler. Define overlays at link time. PLink is available for CP/M-80, CP/M-86 and MS-DOS.

The Greenleaf C Functions $351
This library of functions has its main strength in DOS, string, RS232, color text, and printer functions for the IBM PC. Learn the complexities of C from the examples and source code supplied.

ES/P $467
The Entry System for Programs is the new, third generation program editor that enables programmers to write 50% faster and 100% better. Includes on-line syntax checking, formatting, structure manipulation, and more. Available now for Lattice C.

ASCOM $384
Asynchronous Communications Control Program available configured for over 80 different 8 and 16 bit micros.

Available exclusively in Australia from:

FAGAN
MICROPROCESSOR SYSTEMS
95 Canterbury Road, Middle Park, 3206
Tel: (03) 699 9899 Telex: AA31604

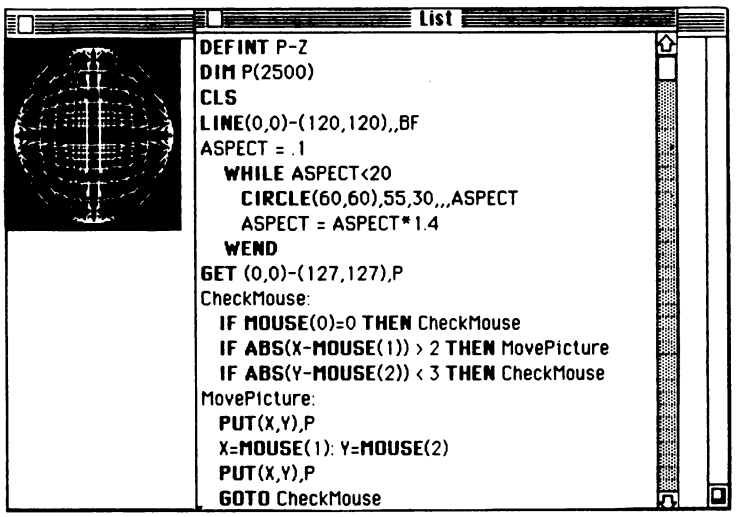


Figure 2.

highly efficient routines in ROM. Drawing a circle 50 pixels in diameter 10,000 times took about six minutes, while painting them took a little over four minutes. Try that on any other machine!

Speed and Precision

While we're on the subject of speed, there is another interesting comparison. Microsoft BASIC 2.0 comes in two versions on the same disk: a decimal arithmetic version and a binary version. The difference is the decimal version is always correct to the last digit without any rounding errors, which is important for business applications. In these applications computations are generally simple, so speed is not that critical. On the other hand, scientific and technical applications often involve quite extensive computation, where speed is important but slight errors due to conversion from binary representation in memory to decimal display are not. Thus you choose the version most suitable for the task at hand, and it is possible to convert from one to the other.

As in MacBASIC, the graphics routines are very fast because they call on the highly efficient routines in ROM. Drawing a circle 50 pixels in diameter 10,000 times took about six minutes, while painting them took a little over four minutes. Try that on any other machine!

The speed difference can be significant. Calculating EXP(10) 10,000 times took 45 seconds using the binary version and 320 seconds using the decimal one. Because this variation seemed excessively large I explored further. It turned out the default precision used in the decimal version is double precision, while the default in the binary version is single precision. This means variables not specifically designated as single or double precision will be treated as single or double precision in the binary and decimal versions respectively. So far so good.

What happens if I specifically declare variables to be single or double precision by ending them with ! and # respectively, or by using DEFSNG or DEFDBL? Unfor-

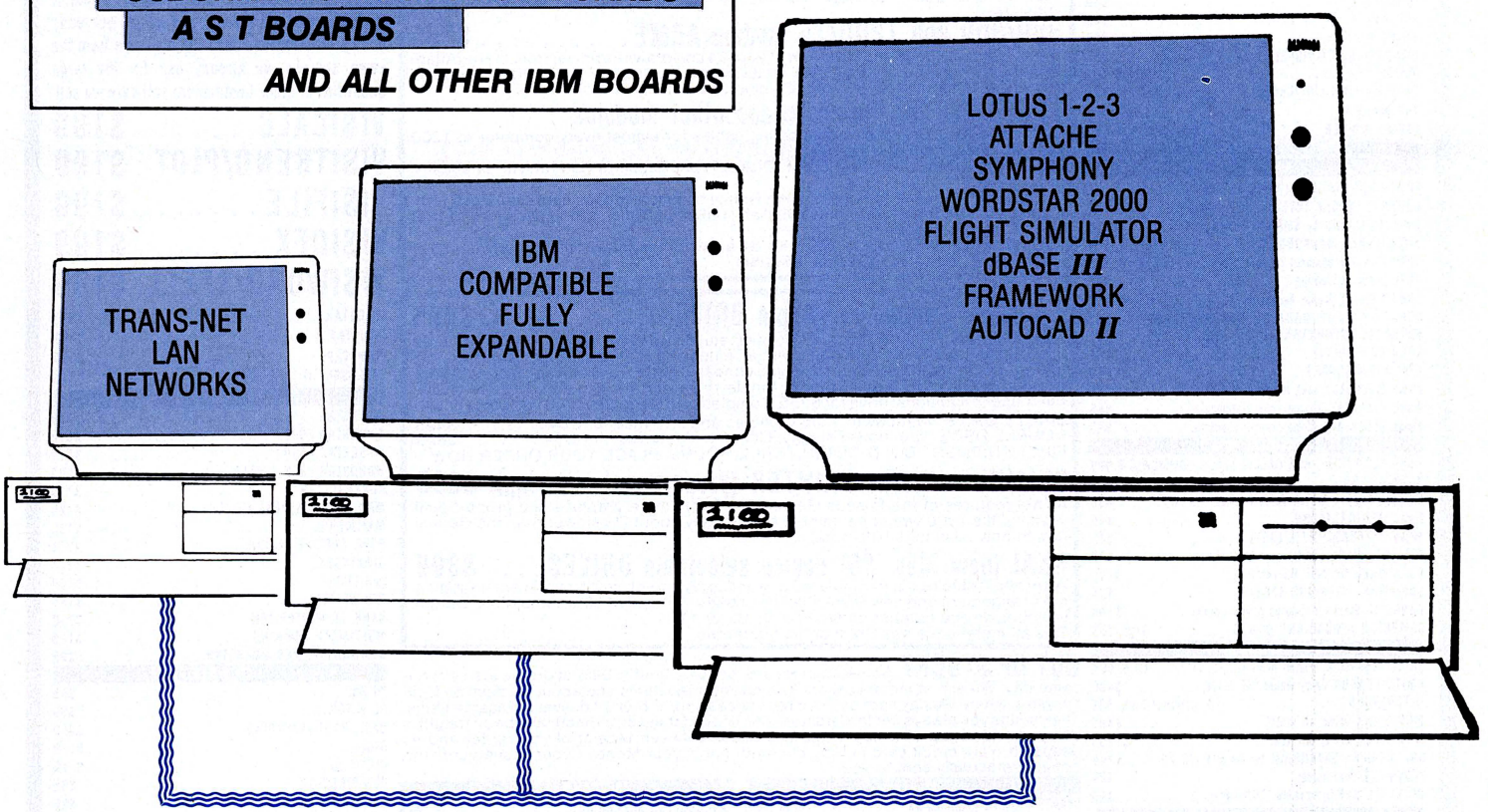
OSBORNE'S POWERFUL NEW DESKTOP 16 BIT PC

WORKS WITH

- ***TRANS-NET LAN***
- ***3-COM LAN***
- ***HERCULES BOARDS***
- ***3270 EMULATIONS***
- ***TECMAR BOARD***
- ***PERSYST MONO BOARD***
- ***PERSYST MEMORY BOARD***
- ***OSBORNE MULTIFUNCTION BOARDS***
- ***A S T BOARDS***

AND ALL OTHER IBM BOARDS

TAKE ADVANTAGE OF THE PERFECT SOFTWARE BONUS OFFER



From the company that has always had the first and last word in personal computing, Osborne introduce the 2100 MULTIFUNCTION PC.

A true 16 Bit PC that is so compatible we obtained special approval to produce it.

A PC that is so multifunctional it can stand alone or be linked to 255 other PC's with simple Hi-fi jacks and cables.

Above all, it is a PC with Osborne reliability, Australia-wide service, and a commitment to growth.

From $2950

Features:

- 256KB Main Memory (standard)
- Colour Graphics Text Adaptor
- 8088 (4.77 MHz) Processor
- MSDOS (2.11)
- Two 360K-byte 5¼"Slimline drives
- 10Mb Hard Disk Internal (optional)
- Parallel Printer Interface
- RSZ32C/Modem Interface
- 5 Expansion Slots
- Runs Concurrent CP/M 86
- Will Network with 255 other IBM, 2100, and compatibles (optional)
- Carries the famous Osbourne 6 months full warranty

OSBORNE

2100 PC

MULTIFUNCTION

OSBORNE AUSTRALIA
93 York Street, Sydney
(02) 290-1122

Telex: AA70510

COMMODORE HEAVEN

No games but everything else stocked at discount prices. We directly import 100 different lines and also deal with all the usual warehouses. Let us show you how your 64 can become a powerful business machine.

We normally have about a dozen different printers, 15 or so word processors, 20 or more spreadsheets and databases and about the same number of accounting systems, but can only list some here. Ring (03) 700 2451 at any time.

64/VIC/128

Because we have the latest versions all our C64 programs will also run on the new C128.

WORD PROCESSORS

TOTLWRITER (incl d/base, etc) $125
TOTL TEXT Enhanced. Best word proc. of all $59
TOTL SPELLER works with Easyscript, Bank Street ... $45
TOTL KEYWORD CROSS REFERENCE $45
FLEET Fast, 40, 80, cols. $135
SUPER TEXT 80 column program. $108
HESWRITER ..... Cartridge $55
INSTA WRITER ..... Cartridge $39
HOMEWORD $69
SOFTSMITH $49
EASYSCRIPT 64 ..... $89
OMNIWRITER/OMNISPELL $95
WRITE NOW! ..... Cartridge $79
TOTL MAILING LIST/LABEL ..... Disk/Tape $45
THE MAILER ..... Disk $49
LETTER WRITER ..... Tape $22, Disk $25
HOME DIARY ..... Tape $22, Disk $25

ACCOUNTING

TOTL BUSINESS (Latest Compiled Version) $159
GENERAL LEDGER TOTL's newest compiled $69
64 ACCOUNTING by Software Design Inc $125
TIME/MONEY MANAGER $69
TOTL Time Management rated 4 stars .... (VIC $45) $29
TOTL Home Accounting $69
CONTINENTAL Home Accounts $79
ABRACALC HOME MANAGER + SPREADSHEET ... $37
PERSONAL ACCOUNTANT $34
CASH CONTROLLER $24
EXPENSE MANAGER $19
dialog TRANSACT book keeping system. $45
dialog INVOSTAT invoices and statements $45
dialog STOCK-AID stock control inventory $45

BUSINESS AIDS

BUSICALC 1 $59, BUSICALC 2 $75, BUSICALC 3 $99
AUTOCALC 64 ..... $45
MAGPIE famous British database, now for C64 ..... $99
dialog DFM DATABASE $45
dialog DATABASE-MAIL LABEL $49
TOTL DATABASE "RUN" says Best Buy $79
SUPERBASE 64 Mar '85 version $199
SUPERBASE STEPPING STONES $25
CHARTIST Stocks & Shares prints graphs $149
COMPUTER STOCKS AND BONDS ..... Tape $39

HARDWARE

SG-10 new, faster Gemini printer. ..... IN STOCK
SMITH-CORONA daisy wheel (US made) $495
INTERFACES ..... 12 different from $39
MSD Single Drive, all metal. $499
MSD double drive, the best $1295
64K MEMORY EXPANSION for 64 and VIC 20 .... $299
PAGEMATE Text holder $29
DISKETTE SAFE, lockable, 100 capacity $29

UTILITIES

PRINTER GRAPHICS UTILITY ..... Disk/Tape $25
FLASH! '85 with built-in ON/OFF switch $175
FLASH! SX64 version $175
SCM 1541 Disk Align Program $79
64 DOCTOR ..... Disk $42, Tape $39
RABBIT (busts copy protect, loads tape fast) $75
ARROW (C64/VIC-20) faster still $79
1541 KWIKLOAD (3 to 6 times faster) $45
EPYX FASTLOAD Cartridge (almost as fast) $45
AUTOLOAD/DIRECTORY Cartridge $39
EDUMATE LIGHT PEN The best, says RUN $49
EDUMATE w/. Peripheral VISION. $79
RAECO Screen Dump. $45
NUMERIC KEYPADS 64/20 14 big keys $129
BANNER MACHINE makes long printouts ..... Disk $89
PRINT SHOP cards, logos, letterheads, etc. ..... Disk $65
P/SHOP LIBRARY Hundreds of designs $45
SUPERFONT Edit, save character sets ..... Tape $25
VOICE MASTER synthesises your own voice $99
SUPER VOICE MASTER Your 64 obeys you $199
CURRAH SPEECH 64 two tones $69
COMPUTER MECHANIC $19
MIND PROBER (also IBM, Apple Macintosh $69) $49
CASSETTE INTERFACE and DUPLICATOR $79
EPROM CARTRIDGE $39
C64 MOTHERBOARD (w/-reset). 3-way $85, 5-way $169
VIC-20 4-way motherboard $89
PAINT BRUSH (Disk for VIC-20) $45

VIATEL is here now!

All our modem include a VIATEL appliction form and are dual speed — Viatel and one other, either 300/300 or 1200/1200 bits per second, both types allow you to link up with databases all around the world, including USA. The 1200/1200 costs only one quarter as much in the time charges as the 300/300 does.

1200/1200 and 1200/75 acoustic coupler. $199

Works with all brands of computers. Uses four AA batteries (included). Connecting cable and software (including Viatel) for C64, BBC, Atari, Apple, Oric and most other computers is $69 extra.

SENDATA direct connect modem 300 + 1200/75 ... $299

Connects directly to your phone socket and has its own handset. Plugs straight into your 64 and does not need connecting cables. First 100 orders get FREE software.

300/300 and 1200/75 modem ACME $299

Direct connect. Plugs into User Port of your 64 and draws its power from there. (Adaptors for other computers available). Included is 3 months sub to STARS encylopedia and 6 weeks sub to MICRO 666 (Commodore database). Software is extra.

SOFTWARE for the above and other modems

DISK or TAPE $59. Includes connecting cables for almost every computer to 1200 baud acoustic couples.
ELECTRONIC MAIL SOFTWARE. $65 (Disk or Tape). Supports Viatel and all databases, including split-baud rates.
TELSTAR 64. $79 The famous Eastern House communications cartridge. Does NOT connect with split-baud rates such as Viatel but offers Timer, secret password control and lots of other features.
ELECTRONIC MAILBOX 64. $75 Your 64 answers the telephone. Use any autodial modem and have a Bulletin Board System.

TAIHAHO Commodore/Apple DRIVES $495

Just released in Australia! Top quality all metal disk drives that will run BOTH Apple and Commodore disks. Complete with all plugs and 20-line parallel cables to plug into your C64 or C128. Switches let you choose Device No. 8 or 9 and Normal, Write Protect or Override Write Protect. Single drive can be expanded to double by purchase of additional drive for $355. Complete with regulated 240 volt 50Hz power

SINGLE DRIVE, with power supply, cables and interface for C64 ..... $495
DOUBLE DRIVE, with power supply, cables and interface for C64 ..... $850
FIRST SHIPMENT SOLD OUT IN THREE HOURS. PLACE YOUR ORDER NOW

GEMINI workalike PRINTER (proportional lettering). $399

All the features of the famous Gemini PLUS lots more graphics and proportional spacing. It's 1000 words per minute but actually about 7% slower than the Gemini (which now sells for $100 more).

SKAI (new May '85) device selectable DRIVES $399

With inbuilt shielded and regulated power supply, metal bands to prevent it slipping out of alignment and new ROM chip that makes it virtually 100% compatible. Button switches device number between 8, 9, 10, or 11.
This all metal drive has SIX months guarantee.

OUT OF STOCK?

Sometimes we are, but only briefly, 92% of orders are sent the same day. We aim at monthly stock turn on imported items and about 10 days on local supplies, where we pay spot cash for best prices and/or prompt delivery of scarce items. That means you always get the latest version of everything but sometimes the air freight is delayed and a gap of a day or so may occur between receipt of your order and its despatch. Your credit card in NOT charged nor is your Money Order cashed until the goods are actually sent to you.

EDUCATION

STARTER KIT for programmers ..... Disk $25
10 Great programs, including word processor, mailing list, basic programming primer, 6502 intro, sound and sprites.
TRAINING KIT how to write programs. . Disk/Workbook $29
How to get the most from your keyboard, how to use your disk drive effectively, how to write your first BASIC program.
32 PROGRAMS ..... Disk/Book $25
The book alone retails for $29.95! 32 useful programs already on disk to save you the chore of punching them in. Book also gives you exercises in how to change them. A vitel follow on to the above or to Commodore's introduction to basic.
ALL THREE OF THE ABOVE $69
COMMODORE'S INTRO TO BASIC. . (2 Tapes & Book) $29
EDUCATION 1 ..... (Disk or Tape) $25
EDUCATION 2 ..... (Tape or Disk) $25
IVAN BERG EDUCATIONAL SOFTWARE 4th form. . Tape $29
C64 EDUCATION TAPES (All 18 for $200) $15
TOUCH TYPING TUTOR Softsmith ..... Disk $24
IDN TYPING TUTOR Australian Produced ..... D/T $25
TYPE ATTACK Learn to type while playing ..... Disk $39
TYPING TUTOR/WORD INVADERS (VIC-20) $39
SARGON CHESS 3 (IBM $75) ..... Disk $59
SARGON CHESS 2 Plays at seven levels... D $29, T $25
COLOSSUS CHESS 2.0 ..... Disk $29, Tape $25
GRANDMASTER ..... Disk $29
INCREDIBLE KEYBOARD w/. $20 Voucher $39
EPROM Cartridge Case $39

PROGRAMMER'S AIDS

INTERCEPTOR SUPABASIC $29
SPEED BASIC ..... Disk/Tape $25
ULTRA BASIC 64 ..... Disk/Tape $79
SIMON'S BASIC $69
BLITZ! Fastest Compiler of all $99
6502 PROGRAM DEVELOPMENT CASSETTE $29
SPRITEMASTER $35
MAE 64 Macro/Assembler $85
VIC-TREE for programmers ..... VIC $99, C64 $149
ZEUS Assember (19 commands) $35
OZ ASSEMBLER $22
PROGRAMMERS AID ..... T $29, D $32

IBM Compatibles

All these programs, written for the IBM Pc and AT, have been tested in the versions we sell to run on Commodore's new PC-10 and PC-20. They should also run on all other IBM compatibles, since they are the latest editions with all the early bugs removed. Because we've just opened this division, you can be sure that what you buy is brand new stock and not tired old programs that have been sitting for a year or more on a dealer's shelves, and we can get really good prices because our supplies come from the same sources we already use for the large quantities of other Commodore software we sell.

VISICALC $199
VISITREND/PLOT . $199
VISIFILE $199
VISIDEX $199
VISIWORD/SPELL. $199

CALCSTAR $175
INFOSTAR $495
PLANSTAR $595
SUPERSORT II $275

WORDPROCESSING

WORDSTAR $395
WORDSTAR 2000 ..... $575
WORDSTAR 2000+ $675
WORDSTAR PROF. C/STAR $595
CORRECTSTAR $145
MAIL LIST BUSINESS LETTERS $125
MAILMERGE $115
PROF. OPTIONS C/STAR $225
STARINDEX $115
PFS PROOF $150
PFS WRITE $185
BANK ST. WRITER IBM $110
MULTIMATE TRAINING $115
COMMAND POWER WORDSTAR $69

UTILITIES

PC PAL $65
PC TUTOR $99
BASIC PROGRAM TOOLS $350
D-UTIL $119
D-UTIL III $119
DOS DIRECTOR $65
SIDEWAYS $95
FLIGHT SIMULATOR $89
SARGON 3 CHESS $75

GRAPHICS

D-GRAPH $325
D-GRAPH III $395
R-GRAPH $325

LANGUAGES

CONCURRENT CPM/86 ..... $295
C-BASIC 86 IBM $395
CPM 86 IBM $150

AD PREPARED 3/5/85

TATTS 40 or how to win a million (64/128) $85

Detailed analysis of every Tattslotto draw, highlighting winning and losing combinations and showing how to discover the recurring patterns of three and four number series that come up more frequently than they should.

GENEALOGY PROGRAM (64/128) $85

Produces 4, 5 and 6-generation family record charts to the printer or 4-generation charts to the screen. Fully indexed and with easy screen editing, 664 names, plus notes on each person, on each disk.

ASTROLOGY PROGRAM (64/128/IBM/Apple) $85

Based on program used by professional astrologers. Provides individual horoscopes for all times and places. Much deeper than the pop-style 'sun astrology' you see in magazines. Basically geocentric but heliocentric is possible. Koch system of Houses and Tropical Zodiac but Western Siderial is an option. Student guide lets you ask the computer questions like: What does a Gemini rising sign mean?

MASTERCARD OR VISA

TO ORDER, SIMPLY PHONE

(03) 700 2451

UG 6/85

Chambers Computer Supplies

48-52 Monkhouse Drive, Endeavour Hills, Melbourne, 3802.

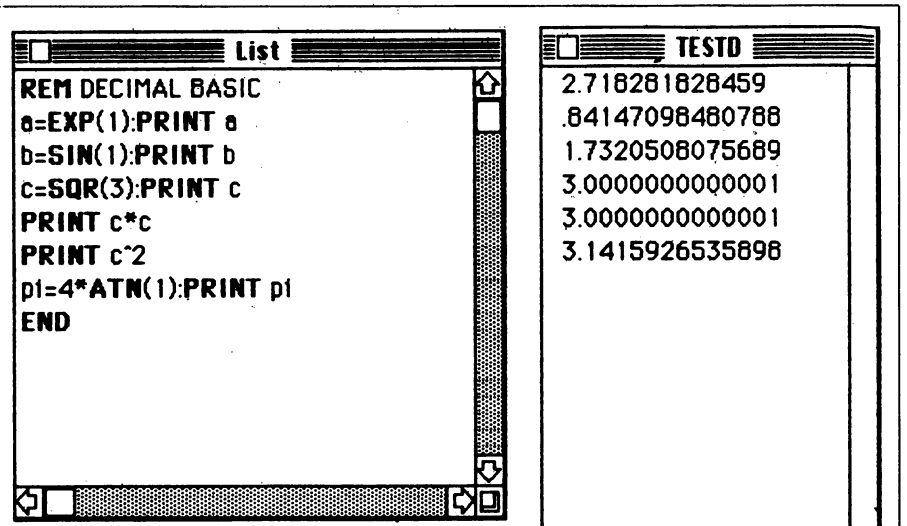


Figure 3.

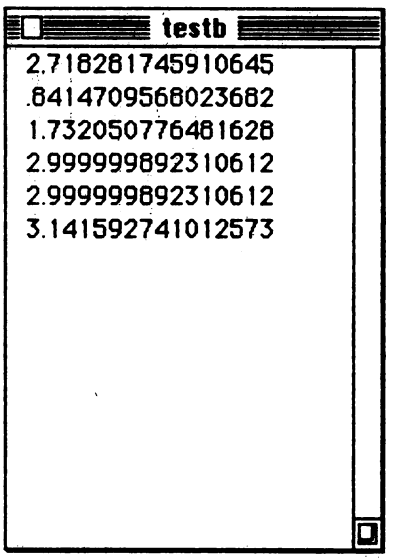


Figure 4.

From what I have read and seen in the pre-release version, MacBASIC represents the most exciting development of the BASIC language I've yet seen.

tunately, nothing much! The timing loops tested remain exactly the same, and although print statements automatically cause the appropriate number of digits to be printed (seven for single precision and 14 for double precision), the results don't change. This is not a major problem in the decimal version, where all that is lost is some speed, but in the binary version you won't get double precision accurately, even though you define variables as such, if you use any of the math functions. Figures 3 and 4 show the problem. I did not test all the trig functions, but I expect similar differences occur for all of them. So, if you have a technical application and don't require double precision functions, use the faster binary version. Otherwise, use the slower decimal version of Microsoft BASIC.

Conclusions

The Apple version of MacBASIC is unfortunately not yet available, even though a book has already been published about it — another example of the tendency in the computer industry to promise things long before they're ready for public release. However, from what I have read and seen in the pre-release version, it represents the most exciting development of the BASIC language I've yet seen.

Microsoft BASIC version 2.0 for the Macintosh has been available for several months and is clearly a significant development over version 1.0. It starts to make good use of the special features of the Macintosh. The functioning of this version of BASIC is not as elegant as Apple MacBASIC because of the allowances made for retaining compatibility with other versions of Microsoft BASIC. It also lacks some of the features of Apple MacBASIC. I've pointed out some of Microsoft BASIC's speed and precision problems, but if you need BASIC for your Macintosh now, it certainly gives plenty of scope to use the power of your Mac.

I think we've seen in this short series on recent versions of BASIC for Motorola 68000-based machines that the language is still developing. Some of the adaptations of BASIC are better than others, depending on how well each uses the hardware and software in the operating system of the computer on which it runs.

The original authors of BASIC, Thomas Kurtz and John Kemeny, are also involved in writing a new version of the language, dubbed True BASIC, which hopefully will set a new standard. If they can combine some of the best features of the many dialects of BASIC available now into a logical new system, I'm sure it will be a very attractive package indeed. I look forward with interest to the results of their efforts.

Acknowledgements

The pre-release version of MacBASIC came from Apple Australia, and the Macintosh and Microsoft BASIC used in this review were supplied by Computer Cellar, a Newcastle Apple dealer. □

BY NORMAN KEMP

VIATEL GRAPEVINE

WITH ABOUT 1000 users registered in the first three months, Telecom's Viatel is slowly but steadily shaping a new path in Australian communications. During the first weeks Viatel had little to offer, as most of the interactive applications were still being developed and tested by information providers, but the service has had an encouraging response, largely because it has been accessible to a large number of personal computer owners keen to try it out once they had fitted the appropriate 1200/75 baud modem. This is an area still causing some confusion, as many new users have not realised the need for a different device speed from most other videotex facilities.

Also, the price variation in communications software is controversial; modems generally do not differ very much internally, but software prices for additional functions such as autodialling can push the cost up $200 or $300. Industry sources believe modem prices are likely to come down sharply — but don't hold your breath. A price decrease will only happen after market saturation, and that could be two years or more away.

Searching for Keywords

Although there have been few major developments to the service since its launch, in June Telecom should be able to start a new facility using Keyword Search software, which it has bought from the Dutch PTT. In theory, this will allow users to search each level of the database using a keyword prompt, but operating the facility is complex so it will be introduced in phases as demand grows. Keyword Search will be used primarily in news bulletin and library research where key words can be found more readily than in the consumer products' sections.

Sydney consultant Paul Budde, of Paul Budde Communications, who has had experience of Prestel-type services in Europe, commented that the next couple of months will be critical for Viatel. "If the databases are not better than they have been at the start, users will be turned off."

"Videotex is a new marketing tool and not just a new computer application. It is very important to provide the right information and the right applications to the users. This information has to be easily accessed, in a good layout and with correct routings."

But on a more optimistic note he added that the service has been attracting a good response since it was launched in February, and compared more than favourably with the inauguration of Prestel in the United Kingdom and other countries. In the UK, where some 2000 new subscribers are connected each month, Prestel is now in its fifth year with almost 50,000 users, and is expected to show a profit in 1985. Telecom Australia, which has been wary about making any forecasts, has said that Viatel will be run as a profit centre, but has privately estimated it will take two to three years before there is appreciable income.

Videotex Conference

Australia will be hearing more of British Prestel and learning from its lessons in July when Mr Richard Hooper, managing director of Prestel, is to be the keynote speaker at the first international videotex conference to be organised in this country. Sponsored by the Australian Videotex Industry Users' Association, the conference will feature 37 overseas and local speakers. The AVIA has about 80 members representing about 10 different videotex systems in operation with approximately 30 individual information providers. The conference will be held at the Regent Hotel, Melbourne, from July 16 to 18, and there will be sessions for novices as well as experienced users.

British Prestel has lately been successful in expanding into the personal computing market, and Hooper is expected to elaborate on the idea that Prestel is a combination of an information service, a transaction service and a real-time computer service. He is known to believe that even if videotex were free, people still would not use the service; he says the service has to be marketed to specific groups, and the industry has to discuss what the service will entail. According to Richard Hooper, videotex involves a lot of capital, risk, nerve, timing and marketing nous.

Dallas vs Viatel

Rudi Hoess, a Sydney businessman who has the Australian distribution rights through his company Megavision to the Japanese Taxan terminals made by Kaga, recently spoke to an AVIA meeting in Melbourne on the subject of 'Reflections in a Monitor'. The gathering comprised mainly professionals, but Hoess made reference to the popular consumer selling point of videotex vendors that home television sets will be widely used for the service.

Hoess politely begged to disagree: "I don't believe people are going to switch off their Dallas or Dynasty programmes to dial up a database," he said. "The television set will not be used generally for Viatel. Most people will want much higher resolution than a television screen can offer, and they will be willing to spend the money for good-quality terminals. This demand may eventually have the effect of improving the quality of the definition of television screens."

"I don't believe people are going to switch off their Dallas or Dynasty to dial up a database ... they will be willing to spend the money for good-quality terminals."

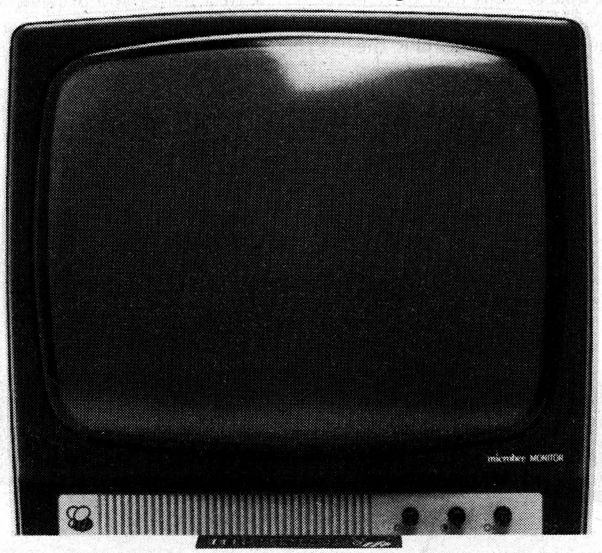
Banking from Your Abode

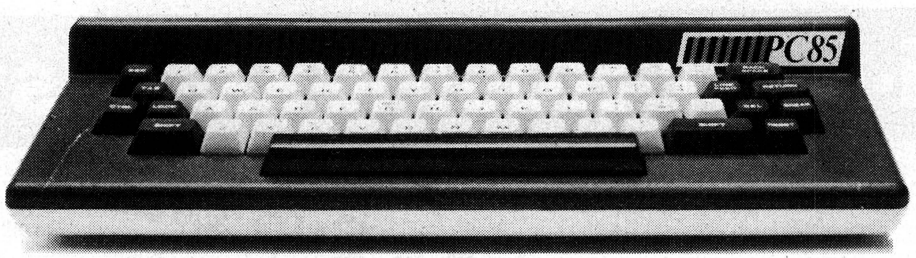
The first three months of Viatel should see the completion of several major commercial databases, of which the most extensive will be the Commonwealth Bank home and office banking service. This has been more than a year in the making, and will take a month or two from its launch in April to get fully under way. The bank has modified the proven Homelink system which it acquired from the Nottingham Building Society in the United Kingdom, and will link 1200 branches throughout Australia.

Jim O'Ryan, who is in charge of the Commonwealth Bank project, believes that in a year there will be around 3000 subscribers — mainly business firms using cash management facilities, professional people who want to handle their banking directly from their offices, farmers in remote locations and the physically handicapped who cannot easily get to a banking counter.

From the bank's head office in Martin Place, Sydney, the Viatel interactive applications will be handled by a computing centre which includes IBM, NCR and GEC machines, and the bank will rent Tandata terminals to users who do not have personal computers or other facilities. "There will not be a mass market for home and office banking, but it is a service that opens a lot of possibilities for the future," O'Ryan said. □

The microbee PC85 puts advanced computer technology in the hands of Hackers, Hobbyists and Horticulturalists at a cost below any competitors





The new microbee PC85 features a new high level of user friendliness. At the touch of a button you choose from a menu of built-in programs — Wordprocessing, Basic, A Calculator, Telecommunications and more. You can even have your own software built-in! Check out the new microbee PC85. You'll be impressed with the quality and surprised at the price.

Microbee PC85 **$499** incl. Tax
with Green Monitor **$599** incl.Tax
Ask about Printers, Modems and more.

microbee computer

Designed and manufactured in Australia by Applied Technology

PHONE ORDERS bankcard **ACCEPTED**

microbee technology centres

N.S.W.
1 Pattison Ave, Waitara 2077
Phone (02) 487 2711

VIC.
729 Glenferrie Rd, Hawthorn 3122
Phone (03) 819 5288

W.A.
141 Stirling Highway, Nedlands
Phone (09) 386 8289

S.A.
151 Unley Rd, Unley 5061,
Phone (08) 272 1384

QLD
455 Logan Rd, Stones Corner, 4120
Phone (07) 394 3688

FACTORY
Koala Crescent, West Gosford 2250
Phone (043) 24 2711

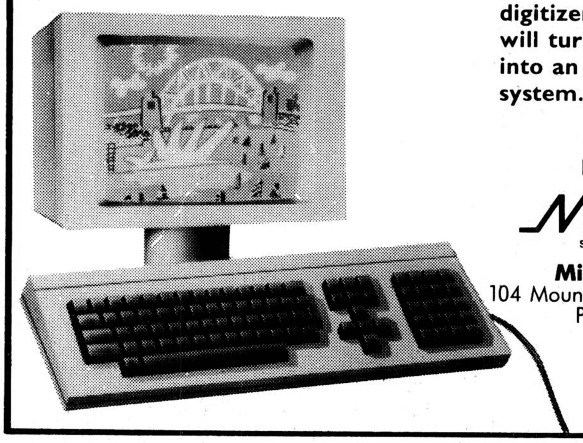
COMPUTER GRAPHICS?

DRAW ON OUR EXPERIENCE

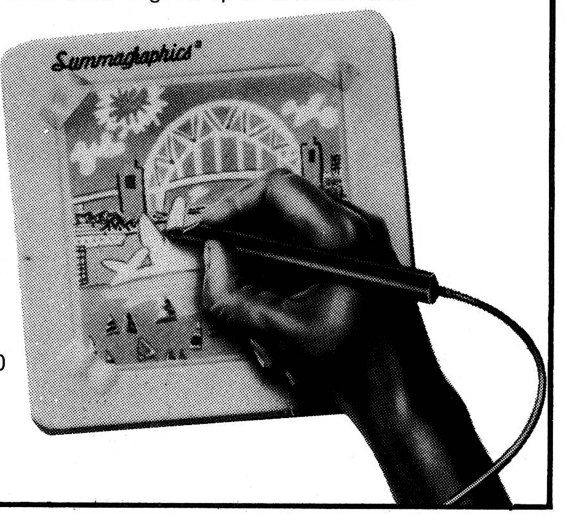
Now you can turn your computer into a graphic workstation. Whether you are into graphic art, Computer Aided Design, excellent business presentations, or just having fun — Summagraphics Digitizers from Minicomp will give you the perfect picture every time. And it is as easy as putting pen to paper!

Summagraphics' extensive range of digitizers are compatible with your machine and run with a large selection of software. AutoCAD, Dr Draw, GEM, Mirage, TopView, Macpaint, and MacWrite to name a few. All this plus the latest technology which offers resolution of up to 1000 lines per inch.

We even have a tablet designed especially for the Macintosh called MacTablet. Just plug it in and realize the full potential of your Macintosh's exceptional graphics. MacTablet's pen stylus performs all the functions of the mouse yet is far simpler to use — its like the difference between drawing with a pencil and drawing with a round of Camembert. Tracing an existing drawing into the Macintosh is easy — you can trace from originals up to 1/2 inch thick.



Ask your dealer to show you how a Summagraphics digitizer from Minicomp will turn your computer into an exciting graphics system.

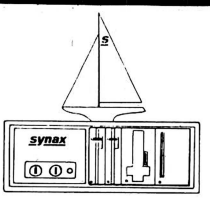


Distributed by

Minicomp
SOFTWARE & EDUCATION PTY. LTD.

Minicomp Building
104 Mount Street, Nth. Sydney 2060
Ph: (02) 957 6800

Multi-user Business Systems



Are you in the America's Cup Class?

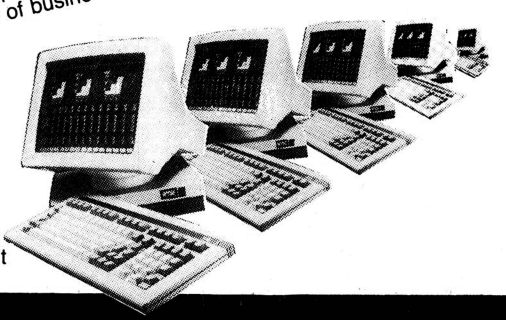
Are you really prepared to sail in the doldrums after choosing from one of the many "Personal Computers"? Or perhaps a fleet of them networked? Will you drown in your sorrows after spending too much on a minicomputer? Just for the satisfaction of a quick stiff breeze?

With Synax you can be a high flyer at a down to earth price. Our Computers are designed to GROW with your needs without holding you back.

And when it comes to customer support — we're right there to back you up.

We don't have a winged keel — but here are some of our features . . .

- ★ Industry standard TurboDOS operating system
- ★ 8 & 16 bit (80186/Z80B/Z80H) CPUs — ONE PER USER
- ★ Tape backup
- ★ Can support up to 100 users using 10Mbit/sec LAN
- ★ Hard disks up to 140 Mb per drive
- ★ Large range of business software + DBase, Wordstar, etc.



Introduce yourself to our professional-grade expandable computer systems — you haven't price/performance ratio yet!

Dealer Enquiries Welcome

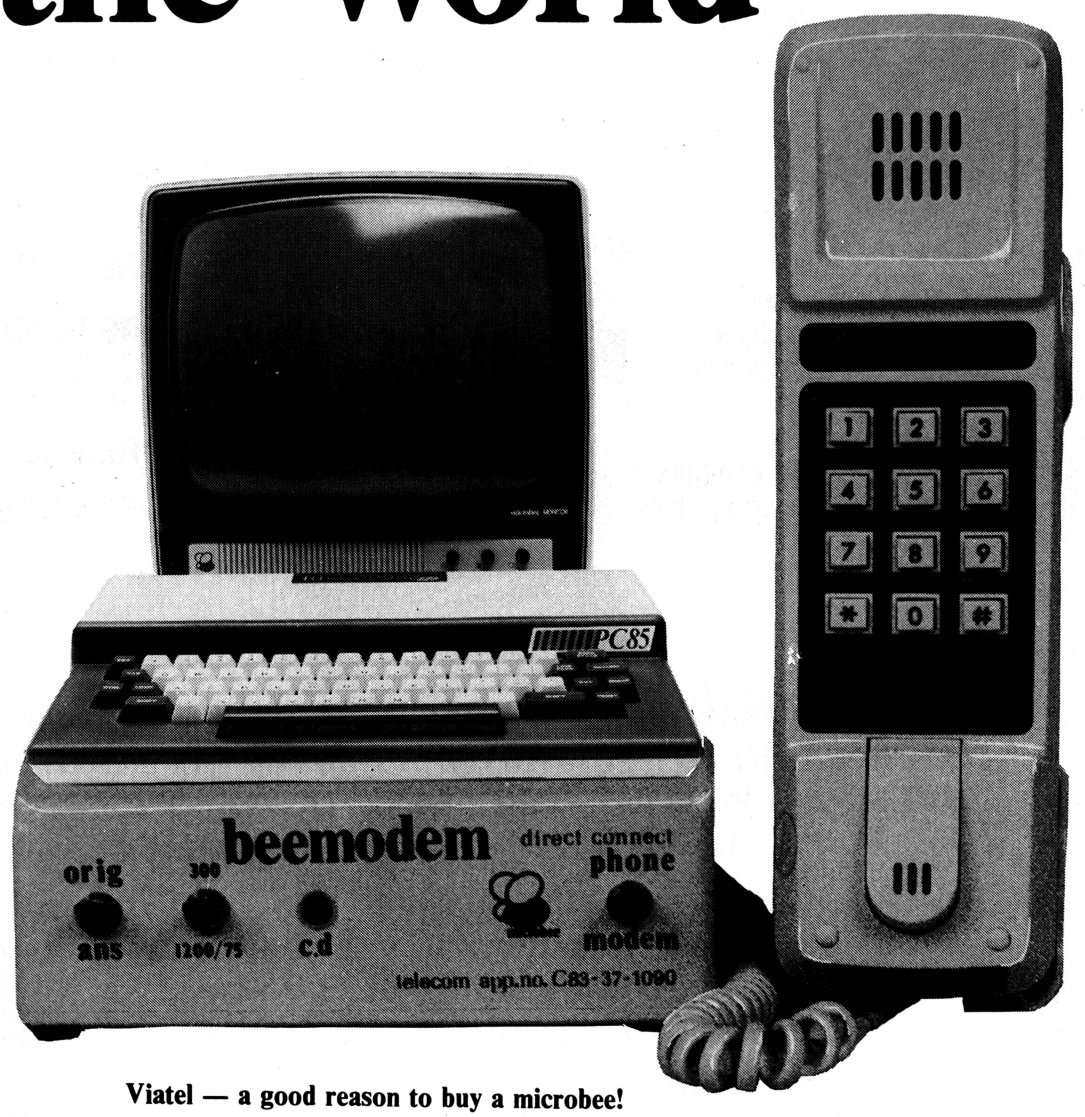
synax
THE MULTI-USER SPECIALISTS

Synax Systems Pty. Ltd.
(02) 467-1166

Wired to the world

The Microbee/Viatel Option
Viatel, Telecom's exciting new interactive teletext system is now in full operation and even more exciting, it's available on your favourite computer, the **microbee.**
The Viatel Option is a hardware/software modification for any **microbee,** that used in conjunction with a 1200/75 BAUD beemodem will bring information, banking, news, weather reports, software and much, much more into your home or business for the cost of a local phone call.

$49.50



Viatel — a good reason to buy a microbee!

BEEMODEM
Telecom Approved to connect your **microbee** to other computers using the telephone lines. Your BEEMODEM will convert your **microbee** into a complete home terminal that can become your information window to the world!! BEEMODEM operates at 300 or 1200/75 BAUD. **$189.50**

microbee computer

Designed and manufactured in Australia by Applied Technology

PHONE ORDERS bankcard ACCEPTED

microbee technology centres

N.S.W.
1 Pattison Ave, Waitara 2077
Phone (02) 487 2711

VIC.
729 Glenferrie Rd, Hawthorn 3122
Phone (03) 819 5288

W.A.
141 Stirling Highway, Nedlands
Phone (09) 386 8289

S.A.
151 Unley Rd, Unley 5061,
Phone (08) 272 1384

QLD
455 Logan Rd, Stones Corner, 4120
Phone (07) 394 3688

FACTORY
Koala Crescent, West Gosford 2250
Phone (043) 24 2711

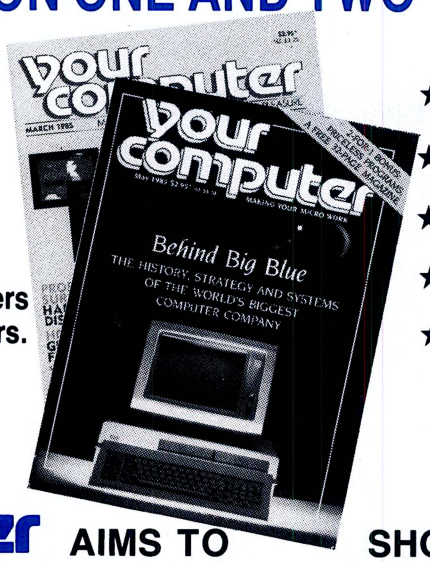
SAVE 33⅓%

your computer

NOW! is the best time to subscribe!

SAVE ⅓ ON ONE AND TWO YEAR SUBSCRIPTIONS

Subscribe today and ensure that you receive your copy of Australia's leading computer magazine reliably every month. Your Computer is written by people who use computers for people who use computers.

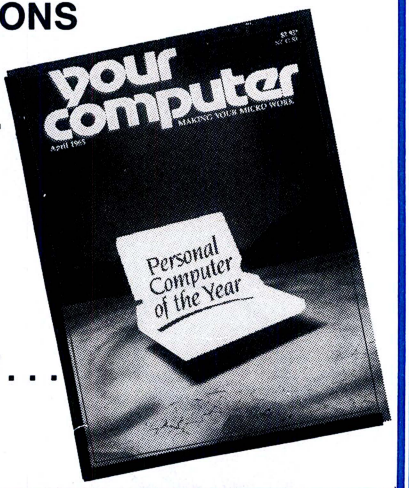


- ★ MORE POCKET PROGRAMS
- ★ MORE INTERESTING FEATURES
- ★ MORE TUTORIALS
- ★ MORE PRODUCT SURVEYS
- ★ MORE BUYERS GUIDES

your computer AIMS TO SHOW YOU HOW TO MAKE YOUR MICRO WORK — HOW TO GET IT TO DO WHAT YOU WANT WHEN YOU WANT IT, WHETHER YOU'RE INTERESTED IN GAMES, UTILITIES OR BUSINESS APPLICATIONS

To Subscribe, simply

1. Complete the card opposite . . .
2. Choose one or two years . . .
3. Mail the card free to us!



Here's how it works . . .

12 issues = $23.60 ($11.80 saved!!)

or better still, guard against price rises until 1987 . . .

2 years = $47.20 ($23.60 saved!!)

YOUR COMPUTER

Whether in business or just playing games . . .

MAKE YOUR MICRO WORK FOR YOU!

Pocket Programs

BBC

LOAN PRINT

The program will print any reducible interest loans either to the screen only or to both the screen and the printer. It has a page mode built in so that, if the loan details exceed one screen, those visible can be viewed before going on to the next page. Use the shift key to go to the next page.

If the printer being used does not auto-linefeed, line 1080 should have the following added: :*FX6 after the statement THEN VDU2.

I have found the program most useful when comparing different loans from various lending bodies, and have saved thousands of dollars in interest.

Kenneth Nicholls,
Kanahooka, NSW

```
10REM*****************************
20REM**                           **
30REM**   LOAN-PRINT              **
40REM**   By John Nicholls        **
50REM**   Version 3.3             **
60REM**   Prog subject to         **
70REM**   Copyright               **
80REM**   Mag Name 1984           **
90REM**                           **
100REM*****************************
110MODE7
120ON ERROR PROCerror
130PROCinstruct
140PROCquest
150MODE3
160PROCinit
170PROCloan
180PROCcalc
190PRINT"  The Monthly Payment is          $";amount
200PROCsheet
210PROCmain
220INPUT"  Process Another Loan ( YES/NO)";A$
230IF A$="YES" OR A$="Y" THEN 160
240VDU3
250MODE6
260END
270DEFPROCinit
290@%=&2020E
300VDU23;8202;0;0;0;
310VDU14
320COLOUR129
330COLOUR0
340CLS
350ENDPROC
360DEFPROCloan
370INPUT"  Enter Amount of the Loan          ";loan
380INPUT"  Enter the Annual Interest Rate    ";rate
390INPUT"  Enter the Term in Years           ";years
400ENDPROC
410DEFPROCcalc
420interest=rate/12
430month=years*12
440amount=(interest*loan)/((1-(interest+1)^-month))
450result=amount
460PROCroundoff
470amount=result
480ENDPROC
490DEFPROCroundoff
500result=INT(100*(result+0.005))/100
510ENDPROC
520DEFPROCsheet
530balance=loan
```

BBC

```
540total=0
550PRINTTAB(10)"MONTH";:PRINTTAB(22)"TO";:PRINTTAB(36)"TO"
560PRINTTAB(10)"NUM";:PRINTTAB(22)"INTEREST";:PRINTTAB(36)"PRINCPL";:PRINTTAB(
3)"PRIN BAL";:PRINTTAB(63)"TOT INT"
570ENDPROC
580DEFPROCinterest
590inter1=balance*interest
600result=inter1
610PROCroundoff
620ENDPROC
630DEFPROCmain
640FORline=1 TO month
650PROCinterest
660inter1=result
670print=amount-inter1
680IF line=month THEN print=balance
690balance=balance-print
700total=total+inter1
710PRINTline,inter1,print,balance,total
720NEXTline
730ENDPROC
740DEFPROCinstruct
750VDU 23;8202;0;0;0;
760PRINT CHR$(141);"            LOAN PRINTOUT"
770PRINT CHR$(141);"            LOAN PRINTOUT"
780PRINT''''
790PRINTTAB(3);CHR$(131);"This program is designed to "
800PRINTTAB(3);CHR$(131);"print out a reducible interest "
810PRINTTAB(3);CHR$(131);"loan. All the instructions are "
820PRINTTAB(3);CHR$(131);"simple to follow, but for example"
830PRINTTAB(3);CHR$(131);"when asked to enter an"
840PRINTTAB(3);CHR$(131);"interest rate of 25% or 60%"
850PRINTTAB(3);CHR$(131);"it should be entered 0.25 or 0.60"
860PRINTTAB(3);CHR$(131);"or whatever rate is appropriate."
870PRINTTAB(3);CHR$(131);"If the term of the loan is"
880PRINTTAB(3);CHR$(131);"greater than 18 months then"
890PRINTTAB(3);CHR$(131);"the program enters page mode"
900PRINTTAB(3);CHR$(131);"press shift to scroll page"
910PRINT''
920PRINTCHR$(129);"       Press any key to continue"
930K%=GET
940ENDPROC
950DEFPROCquest
960CLS
970PRINTTAB(3);CHR$(131);"I.E.enter the data as follows"
980PRINT
 990PRINTTAB(3);CHR$(131);"Enter amount of Loan ?";:PRINT CHR$(133);"1000"
1000PRINT
1010PRINTTAB(3);CHR$(131);"Enter the Annual Interest Rate?";:PRINTCHR$(133);"0.
15"
1020PRINTTAB(3);CHR$(131);"Enter the Term in Years ?";:PRINTCHR$(133);"3"
1030PRINT''''''''''
1040PRINTTAB(3);CHR$(131);"Do you wish to use a printer ?"
1050PRINTTAB(3);CHR$(131);"Enter YES or NO"
1060PRINT'
1070PRINT"    ";:INPUT P$
1080IF P$="YES"ORP$="Y" OR P$="yes" OR P$="y" THEN VDU2
1090ENDPROC
1100DEFPROCerror
1110CLS                  1140PRINT" at line "ERL
1120VDU3                 1150END
1130REPORT               1160ENDPROC
```

BBC

A sample run of the Loan Print program.

```
Enter Amount of the Loan          ?20000
Enter the Annual Interest Rate    ?0.156
Enter the Term in Years           ?4
The Monthly Payment is            $562.72

      MONTH        TO             TO

      NUM          INTEREST       PRINCPL      PRIN BAL       TOT INT
      1.00         260.00         302.72       19697.28        260.00
      2.00         256.06         306.66       19390.62        516.06
      3.00         252.08         310.64       19079.98        768.14
      4.00         248.04         314.68       18765.30       1016.18
      5.00         243.95         318.77       18446.53       1260.13
      6.00         239.80         322.92       18123.61       1499.93
      7.00         235.61         327.11       17796.50       1735.54
      8.00         231.35         331.37       17465.13       1966.89
      9.00         227.05         335.67       17129.46       2193.94
     10.00         222.68         340.04       16789.42       2416.62
     11.00         218.26         344.46       16444.96       2634.88
     12.00         213.78         348.94       16096.02       2848.66
     13.00         209.25         353.47       15742.55       3057.91
     14.00         204.65         358.07       15384.48       3262.56
     15.00         200.00         362.72       15021.76       3462.56
     16.00         195.28         367.44       14654.32       3657.84
     17.00         190.51         372.21       14282.11       3848.35
     18.00         185.67         377.05       13905.06       4034.02
     19.00         180.77         381.95       13523.11       4214.79
     20.00         175.80         386.92       13136.19       4390.59
     21.00         170.77         391.95       12744.24       4561.36
     22.00         165.68         397.04       12347.20       4727.04
     23.00         160.51         402.21       11944.99       4887.55
     24.00         155.28         407.44       11537.55       5042.83
     25.00         149.99         412.73       11124.82       5192.82
     26.00         144.62         418.10       10706.72       5337.44
     27.00         139.19         423.53       10283.19       5476.63
     28.00         133.68         429.04        9854.15       5610.31
     29.00         128.10         434.62        9419.53       5738.41
     30.00         122.45         440.27        8979.26       5860.86
     31.00         116.73         445.99        8533.27       5977.59
     32.00         110.93         451.79        8081.48       6088.52
     33.00         105.06         457.66        7623.82       6193.58
     34.00          99.11         463.61        7160.21       6292.69
     35.00          93.08         469.64        6690.57       6385.77
     36.00          86.98         475.74        6214.83       6472.75
     37.00          80.79         481.93        5732.90       6553.54
     38.00          74.53         488.19        5244.71       6628.07
     39.00          68.18         494.54        4750.17       6696.25
     40.00          61.75         500.97        4249.20       6758.00
     41.00          55.24         507.48        3741.72       6813.24
     42.00          48.64         514.08        3227.64       6861.88
     43.00          41.96         520.76        2706.88       6903.84
     44.00          35.19         527.53        2179.35       6939.03
     45.00          28.33         534.39        1644.96       6967.36
     46.00          21.38         541.34        1103.62       6988.74
     47.00          14.35         548.37         555.25       7003.09
     48.00           7.22         555.25           0.00       7010.31


Process Another Loan ( YES/NO)?N
```

VZ200

MORSE TUTOR PROGRAM

This program runs on the standard TRS80 MC10 with 4 Kbytes of memory, and should also be suitable for the TRS80 CoCo. It runs random Morse in groups of five characters. You may select the number of characters to be reproduced (up to 200), the speed (up to 15 words per minute) and to have letters, numbers or both. A delay between letters and words may also be selected.

The program starts by sounding the preset characters, and on completion they are printed on the screen. There is provision to re-run without resetting the variables, and an auto-run facility that prints the checklist on-screen, pauses, then re-runs.

When you call for 200 characters the computer is using very close to 4 Kbytes. For this reason, line numbers were kept low to take up less memory and no 'anti-crash' programming has been done. If you make an incorrect entry during the menu setup, the program may indicate an error, in which case you will have to re-run the program.

If you're using a CoCo use the word 'pause' instead of 'delay' in lines 12, 29 and 80; the CoCo doesn't seem to like the word 'delay'.

Basil Heath,
Hamilton, Qld

```
1 CLS
2 PRINT"AUTO-RUN":PRINT"YES(1)":
PRINT"NO-(2)"
4 CLEAR 500
5 DATA 63,62,60,56,48,32,33,35,3
9,47,6,17,21,9,2,20,11,16,4,30,1
3,18,7,5,15,22,27,10,8,3,12,24,1
4,25,29,19
6 INPUT R
7 DIM B$(36)
8 FOR I=1 TO 36:READ J:LET B$(I)
 CHR$(J)
9 NEXT I:CLS
10 INPUT"SPEED(WPM)(MAX 15)?";SP
EED
11 LET SPEED=7.5/SPEED
12 INPUT"DELAY(0-15)?";DELAY:DEL
AY=DELAY*50
13 INPUT"NO:-CHARACTERS(MAX 200)
";N
14 INPUT"LETTERS(1)NUMBERS(2)OR
BOTH(3)?";L
15 DIM T$(N)
16 CLS:PRINT TAB(5)"MORSE TUTOR
PROGRAM":FOR I=1 TO N
17 LET T$(I)=CHR$(RND(10*-1*(L
1)+26*-1*(L=2))+10*-1*(L=1)):NE
XT I
18 FOR I=1 TO N
19 LET X=ASC(B$(ASC(T$(I))))
20 GOSUB 65
23 IF I=INT(I/5)*5 THEN 29
25 IF I=N THEN 32
27 NEXT I
29 FOR Z=1 TO INT(200*SPEED+(DEL
AY*5)):NEXT Z
30 GOTO 25
32 FOR I=1 TO N
34 IF ASC(T$(I))=10 THEN 39
37 PRINT CHR$(ASC(T$(I))+47);
38 GOTO 40
39 PRINT CHR$(ASC(T$(I))+54);
40 IF I=INT(I/25)*25 THEN 46
41 IF I=INT(I/5)*5 THEN 44
42 IF I=N THEN 49
43 NEXT I
44 PRINT" ";
45 GOTO 42
46 PRINT
47 GOTO 42
49 IF R=2 THEN 90
50 PRINT:PRINT:PRINT
51 PRINT"PRESS KEY(1)(ENTER)TO R
E-TRY":PRINT "PRESS KEY(2)(ENTER
) TO EXIT"
52 INPUT P:IF P=2 THEN 16
53 DATA 80,82,79,71,82,65,77,32,
66,89,58,45,32,66,46,72,69,65,84
,72,32,86,75,52,65,66,72
54 CLS:PRINT:PRINT
57 FOR I=1 TO 27
59 READ A
61 PRINT CHR$(A);
63 NEXT I:END
65 LET Y=X/2:LET X=INT(Y)
67 Q=(2*SPEED*(1+(Y-X)*4))
70 SOUND 200,Q
75 IF X=1 THEN 80
77 FOR Z=1 TO INT(40*SPEED):NEXT
Z
78 GOTO 65
80 FOR Z=1 TO INT(120*SPEED+(DEL
AY*3)):NEXT Z
85 RETURN
90 PRINT:PRINT:PRINT"PRESS-'BREA
K'-TO EXIT"
95 FOR I=1 TO 10000:NEXT I:GOTO
16
```

We've got the lot, at Rod Irving Electronics!*

Monitors, Modems, Printers, Cables, Cheap Disks, Drives, Cheap IC's, Storage Boxes, full range of Connectors, Joysticks, etc etc!



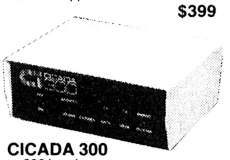
RITRON MULTI PURPOSE MODEM

Our New RITRON Multi Purpose Modem has arrived and has all the standards you require.
Just check the Ritron's features:

- CCITT V21 300 Buad Full duplex
- CCITT V23 1200/75
- Bell 103 300 Full duplex
- Bell 202 1200 Half duplex
- Auto answer, auto disconnect

Telecom Approval No. C84/37/1134

$399

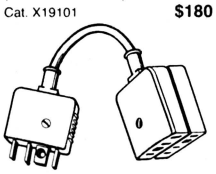


CICADA 300

- 300 baud
- Provides full 12V bipolar ouput signal
- Direct connect modem
- Full duplex operation

(Phone not included)

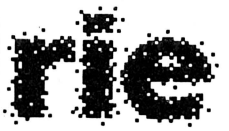
Cat. X19101 **$180**



TELECOMMUNICATION PLUG TO 2 SOCKETS.

Ideal for modem connections.

Cat. Y16014 **$12.95**



ROD IRVING ELECTRONICS
425 High Street,
NORTHCOTE, 3070
VICTORIA, AUSTRALIA
Phone (03) 489 8866
TELEX: AA 38897
48-50 A'Beckett Street,
MELBOURNE, 3000
VICTORIA, AUSTRALIA
Ph. (03) 663 6151
Mail Order and correspondance:
P.O. BOX 235
NORTHCOTE 3070

MAIL ORDER HOT LINE



(03) 481 1436

POSTAGE RATES

$1-$9.99	$2.00
$10-$24.99	$3.00
$25-$49.99	$4.00
$50-$99.99	$5.00
$100-199	$7.50
$200-$499	$10.00
$500 plus	$12.50

This is for basic postage only, Comet Road freight, bulky and fragile items will be charged at different rates.





MICROBEE ENHANCER 1

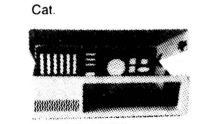
This brand new, totally amazing expansion unit for the Microbee is a must for all Microbee owners/users!

Most expansion units up to this time offered at best only one or other features; and this made it impossible to run, say, complex sound effects mingled with speech. The Enhancer 1 will do all this and much more as well. It is quite amazing how much has been shoe-horned into this compact unit. The Enhancer 1s' many powerful features inlcude;

- Two ATARI/COMMODORE/ COLECO/SEARS type joystick inputs.
- Two TRS COLOR COMPUTER type joystick inputs.
- Allows the connection of Touch Pads, Paddles, Proportional Joysticks, Trakballs, Mice, temperature senors, lights level sensors, transducers, etc, etc!!
- A 4 voice music/sound effects sythesizer.
- A real time clock.
- Unlimited vocabulary speech synthesizer (option).
- Parallel printer interface (option)
- A built-in speaker with volume control.
- Listings of all necesary routines for use.
- An impressive demonstration program package.
- Compatible to all Microbees.
- All units carry a 90 day warranty and servicing is also available.
- Digital recording and playback of speech and sound.
- An 8 channel analog to digital converter with variable voltage or variable resistance type analog inputs and also user selectable resolution from 1 to 9 bits.
- A digital to analog converter with selctable resolution from 1-8 bits.
- Allows automatic data acquisition and logging.
- 5 digital input lines, 4 digital ouput lines.
- A voice input channel.
- A 40 pin experimenter socket with all 8 analog inputs, 5 digital inputs, 4 digital ouputs, 3.58 MHz buffered clock, sound output (so that you can play the sound effects through your HI FI), 3 high resolution voltage comparators, DAC output etc.

The amazing Microbee Enhancer is available exclusively from Rod Irving Electronics.

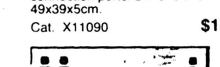
Cat. **$149**



"IBM TYPE" COMPUTER CASING

Give your kit computer a totally professional appearance with one of these "IBM type" casings, includes room for 2 5¼ inch disk drives and connection ports. Dimensions 49x39x5cm.

Cat. X11090 **$109**



MAINS MUFFLER

Sudden mains distrubances can seriously affect your computer equipment, and stored data. Why risk it, when you can have a Mains Muffler, particularly when the cost of one failure is likely to be greater than the purchase price!

Specification:
Maximum total load:
1000w 4 AMP 250v 50Hz

First Stage- Single PI Section
Attenuation - 150KHz - 40dB
500 KHz - 65dB
10 KHz - 80dB

Second Stage- Dual T Section
Attenuation - 150KHz - 20dB
500 KHz - 60dB
10 KHz - 70dB

VDR Transient Suppression
Surge capacity 2000 AMP 8x20 uS

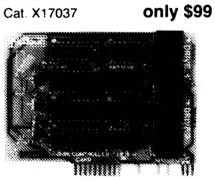
Cat. X10090 **$249**



GRAPHIC MOUSE SYSTEM

Now everybody can create superb computer graphics in minutes. Think of how much more professional your work could look with the 'Graphic Mouse'! An absolute must for Apple IIe users. Includes software and mouse.

Cat. X17037 **only $99**



APPLE* COMPATIBLE CARDS

Printer Card Cat. X17029 **$85**
Drive Card Cat. X17019 **$85**
Speech Card Cat. X17031 **$75**
80 Column Card Cat. X17025 **$95**



APPLE JOYSTICKS

Ideal for games or word processing. Fits most 6502 "compatible" computers.

Cat. C14200 **$27.95**



APPLE* COMPATIBLE SLIMLINE DISK DRIVES

Cat. X19901

1-9	10+
$225	**$220**

(*Apple is a registered trade mark.)



REPLACEMENT KEYBOARDS

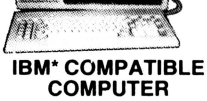
- For Apple
- 42 single key BASIC command
- One chip custom design encoder
- Made by ALPS, life time, 10 million operations
- Dimension: L340xW110xH42mm

Cat. KC2002 **$79.50**



- For Apple
- 45 built in function keys, BASIC and CP/M command.
- 45 user defined keys
- Built-in shift lock
- Made by ALPS, life time, 10 million operations
- Dimension: L340xW130xH42mm

Cat. KC2002 **$99.00**



IBM* COMPATIBLE COMPUTER

$2,450

Including Tax!

*IBM is a registered trademark.



MITSUBISHI DISK DRIVES

M2896-63
Slimline 8" Disk Drive, Double sided Density No AC power required. 3ms track to track, 1.6 Mbytes unformatted, 77 track side 10s/su10 bit soft error rate.

Cat. C11916 **$550**
Case & Power Supply to suit
Cat. X11022 **$159**

M2894
Standard size 8" drive. Double

Cat. C11914 **$630**
Case & Power Supply to suit
Cat. X11011 **$89**

M4854
Slimline 5¼" disk drive. Double sided, double density, 96 track/inch, 9621 bit/inch, 1.6Mbyte unformatted 3ms track to track access, 77 track/side.

Cat. C11904 **$350**
Case & Power Supply to suit.
Cat. X11011 **$89**

M4853
Slimline 5¼" disk drive, Double sided, double density, 1 Mbyte unformatted, 3ms track to track, 80 track/side, 5922 bits/inch.

Cat. C11903 **$260**

M4851
Slimline 5¼" disk drive. Double sided, double density 500K unformatted, 40 track/side. Steel band drive system.

Cat. C11901 **$199**
Case & Power Supply to suit
Cat. X11011 **$89**

M4855
Slimline 5¼" disk drive, double sided, double density, 96 track/inch. 2.0 Mbytes unformatted.

Cat. C11905 **$385**

MF351
3½" Standard size disk drive. Single sided, double density.

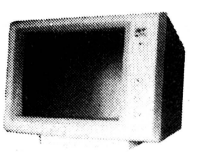
Cat. C11921 **$225**



RITRON 2

Stylish swivel base monitor, available in amber or green

1-9	10+
Green Cat. X14500	
$215	**$205**
Amber Cat. X14500	
$219	**$205**



PHOENIX 5

Suits Apple, Commodore, even your VCR!

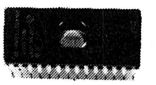
- Pal and R.G.B
- Normal Resolution
- 13" CRT Dot Pitch 0.65mm
- Horiz. Resol. 320 TV lines
- Vert. Resol. 560 TV lines
- Display Characters 1.000 Ch.(40x25)
- 16 Colours (Pal)
- Green text display

Cat. X14522 **$499**

PHOENIX 4

- R.G.B. TTL
- High Resolution
- 13" CRT Dot Pitch 0.31mm
- Horiz. Resolution 720 dots
- Vert. Resolution 240 T.V. Lines
- Display Characters 2000 Ch. (80 x 25)
- 8 Display colours and intensity
- Green text display

Cat. X14520 **$849**



IC SPECIALS!

	1-9	10+
4116	$1.80	$1.70
4164	$3.25	$2.95
2716	$5.90	$5.50
2732	$6.25	$5.95
2764	$8.25	$7.95
27128	$12.50	$11.50
6116	$5.50	$5.15
41256	$14.50	$12.50

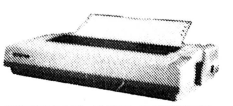




IBM ADD ON HARD DISK

- 10 Mbyte
- Seagate hard disk
- Hard disk controller by Xebec

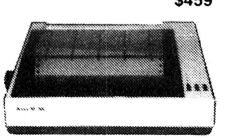
Cat. X20010 **$1,495**



RITEMAN INFO RUNNER

An exciting new printer from the experts "Riteman". This compact stylish printer performs like printers twice its price and size. 120 C.P.S. dot resolution graphics, tractor/friction feed, 10" paper.

$459



MB100S

The next generation of "80" type printers. 100 CPS, internal buffer expandable to 4K, Greek as well as italics. The print quality is the same as its forerunner. Square pins and film ribbon make it unbeatable.

1-4	5+
$349	**$329**



Juki Printer

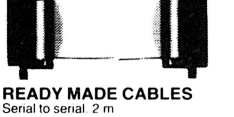
Professional daisy wheel printer 18CPS full incremental mode Diablo 630 emulation. Large range of daisy wheels. 8K internal buffer available.

WAS $790 NOW $725



FULL RANGE OF ITOH PRINTERS

8510 SP 180 C.P.S.
tax exempt **$773** incl. tax **$928**
1550 SP 180 C.P.S.
tax exempt **$1,000** incl. tax **$1,167**
8510 SC (Colour)
tax exempt **$906** incl. tax **$1,057**
1550 SC (Colour)
tax exempt **$1,132** incl. tax **$1,321**



READY MADE CABLES

Serial to serial. 2 m

Cat. P19011 **$18.95**
Parallel centronics to centronics. 2m
Cat. P19013 **$23.95**



DISKS GALORE!!

All prices for boxes of 10. Single disks 10% extra.

SPECIALS!
MD525-01 S/S D/D Cat. C12501 **$29.50**
MD550-01 D/S D/D Cat. C12504 **$39.50**

Head Cleaners
C12551 5" Head Cleaner **$10.50**
C12851 8" Head Cleaner **$11.50**

VALUELIFE
C12421 S/S D/D **$22.95**
C12425 D/S D/D **$29.95**

8" Verbatim

C12800 FD32-1000 S/S S/D	$39.50
C12801 FD32-8000 S/S D/D	$49.50
C12802 FD32-9000 S/S D/D	$49.50
C12803 FD34-1000 S/S D/D	$49.50
C12804 FD34-8000 S/S D/D	$55.50
C12805 FD10-4008 D/S S/D	$59.50
C12806 FD10-4015 D/S S/D	$64.50
C12807 FD10-4026 D/S S/D	$64.50
C12808 FF32-2000 S/D D/D	$69.00
C12809 FF34-2000 S/D D/D	$69.00
C12810 DD32-4000 D/S D/D	$52.50
C12811 DD34-4001 D/S D/D	$52.50
C12812 DD34-4008 D/S D/D	$54.50
C12813 DD34-4015 D/S D/D	$54.50
C12814 DD34-4026 D/S D/D	$54.50

5¼" Verbatim Disks
5 year Datalife guarantee

MD525-01 (S/S D/D)	$29.50 C12501
MD525-10 (S/S D/D 10 Sect. 40 Track)	$39.50 C12502
MD525-16 (S/S D/D 16 Sect 40 Track)	$39.50 C12503
MD550-01 (D/S D/D)	$39.50 C12504
MD550-01 (D/S D/D 10 Sect 40 Track)	$49.50 C12505
MD550-16 (D/S D/D 16 Sect 40 Track)	$49.50 C12506
MD577-01 (S/S D/D Soft Sect 80 Track)	$49.50 C12507
MD577-10 (S/S D/D 10 Sect 80 Track)	$59.50 C12508
MD577-16 (S/S D/D 16 Sect 80 Track)	$59.50 C12509
MD557-01 (D/S D/D Soft Sect 80 Track)	$59.50 C12510
MD557-16 (D/S D/D 16 Sect 80 Track)	$59.50 C12511



XIDEX DISKS

1-9	10+
Box of 10 S/S D/D Cat. C12401	
$34.50	**$29.50**
Box of 10 D/S D/D Cat. C12410	
$44.50	**$39.50**



DISK STORAGE BOXES

Efficient and practical, these disk storage boxes protect your disks from being damaged or lost.

50's. Features smoked plastic cover with provision for a lock. High impact ABS plastic base.

Cat. C16025 **$26.50**

50's. Features smoked plastic cover Divided into 10 sections, each fan elevates the disks for easy identification and access.

Cat. C16050 **$34.50**

***If not, then very nearly!**

Errors and ommisions excepted

Microbee

MUSICAL MICROBEE

The program assigns a note value to each key in the top row of the keyboard (excluding the black ones). Pressing the key sounds the note, and writes it to the screen as a crotchet (or crotchet rest) on the displayed staff. The range is about an octave and a half. Bar lines are displayed every four notes, and a piece can contain up to 109 notes.

Displayed note sequences may be played or edited. Pressing RETURN starts the music playing, as does LINEFEED, but at a slower speed. During play, a cursor moves along the piece.

The piece may be changed by 'overwriting' at the cursor position. The cursor may be shifted using:

< left
> right
ESC to start of piece
BACKSPACE to end of piece

In addition, a note may be deleted using the DEL key.

The limitations of Musical Microbee are that it only plays crotchets and whole tones, has limited note range and only two playing speeds. Despite this, the program held the interest of my children for a reasonable length of time. It was meant as a first exposure to musical notation.

Drew Krix,
Kaleen, ACT

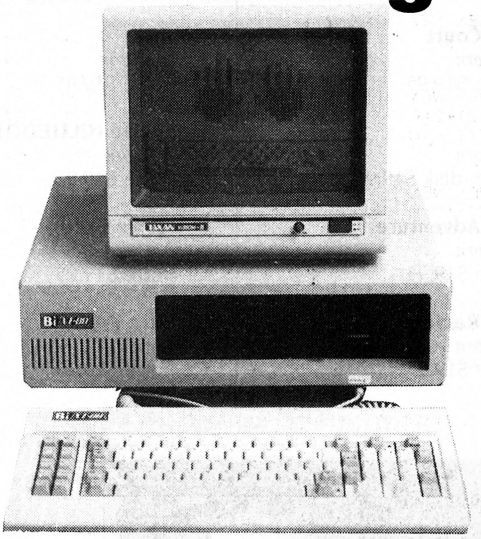
```
      M U S I C  Program
     ====================

0100 GOSUB 490:POKE 220,5:PCG
0110 CURS T(X,0),T(X,2)+2:PRINT" ";
0120 A4$=KEY:IF A4$="" THEN 120
0130 IF A4$="." THEN 280
0140 IF A4$=";" THEN 300
0150 IF ASC(A4$)=8 THEN 320
0160 IF ASC(A4$)=13 THEN 370
0170 IF ASC(A4$)=10 THEN 390
0180 IF ASC(A4$)=27 THEN 340
0190 IF ASC(A4$)=127 THEN 410
0200 REM ** put in note
0210 L=0:FOR K=1 TO 13:IF N1$(;K,K)=A4$
     THEN LET L=K
0220 NEXT K:IF L=0 THEN 110 ELSE PLAY N(
     L,0),2
0230 IF T(X,1)=100 THEN IF X<M THEN LET
     T(X+1,1)=100
0240 T(X,1)=L:CURS T(X,0),T(X,2):PRINT"8
     ";A1$(;N(L,1),N(L,1));
0250 CURS T(X,0),T(X,2)+1:PRINT"9";A1$(;
     N(L,2),N(L,2));:IF L=2 THEN CURS T(X
     ,0),T(X,2)+1:PRINT"^";
0260 X=X+1:IF X>M THEN LET X=M
0270 GOTO 110
0280 REM move cursor right
0290 IF T(X,1)=100 OR X=M THEN 110 ELSE
     LET X=X+1:GOTO 110
0300 REM move cursor left
0310 IF X=0 THEN 110 ELSE LET X=X-1:GOTO
     110
0320 REM return to 1st position
0330 X=0:GOTO 110
0340 REM go to end
0350 FOR X=0 TO M:IF T(X,1)=100 THEN NEX
     T*X 110: ELSE NEXT X
0360 GOTO 110
0370 REM play tune
0380 FOR K=0 TO M:IF T(K,1)=100 THEN NEX
     T*K 110: ELSE CURS T(K,0),T(K,2)+2:P
     RINT" ";:PLAY N(T(K,1),0),2:NEXT K:G
     OTO 110
0390 REM play slo
0400 FOR K=0 TO M:IF T(K,1)=100 THEN NEX
     T*K 110: ELSE CURS T(K,0),T(K,2)+2:P
     RINT" ";:PLAY N(T(K,1),0),3:PLAY 0,1
     :NEXT K:GOTO 110
0410 REM delete note
0420 IF T(X,1)=100 THEN 110 ELSE IF X=M
     THEN LET T(X,1)=100:K=X:GOTO 480
0430 FOR J=X TO M-1:T(J,1)=T(J+1,1):L=T(
     J,1)
0440 IF L=100 THEN LET K=J:NEXT*J 480
0450 CURS T(J,0),T(J,2):PRINT"8";A1$(;N(
     L,1),N(L,1));
0460 CURS T(J,0),T(J,2)+1:PRINT"9";A1$(;
     N(L,2),N(L,2));
0470 NEXT J:T(M,1)=100:K=M
0480 CURS T(K,0),T(K,2):PRINT"88";:CURS
     T(K,0),T(K,2)+1:PRINT"99":GOTO 110
0490 REM **** initialize ******
0500 POKE 220,20:IN#6 ON:M=108:DIM T(M,2
     ),N(13,2)
0510 CLS:CURS 21,8:PRINT"* * * M U S I C
     * * *";
0520 A1$="0123456789abcdefghijklmnopqrst
     uvwxyz:-^ "
0530 PCG:FOR K=1 TO LEN(A1$)
0540 P=63488+ASC(A1$(;K,K))*16:FOR I=P T
     O P+15:READ D:POKE I,D:NEXT I
0550 NEXT K
0560 CURS 2,1:PRINT"208468";:CURS 2,2:PR
     INT"319579";
0570 CURS 8,1:PRINT"88a";:FOR K=1 TO 6:P
     RINT"88888888a";:NEXT K
0580 CURS 8,2:PRINT"99b";:FOR K=1 TO 6:P
     RINT"99999999b";:NEXT K
0590 FOR J=4 TO 10 STEP 3:CURS 2,J:FOR K
     =1 TO 7:PRINT"88888888a";:NEXT K
0600 CURS 2,J+1:FOR K=1 TO 7:PRINT"99999
     999b";:NEXT K:NEXT J
0610 X=0:T(0,1)=100
0620 L=0:T(L,2)=1:T(L,0)=8:FOR K=1 TO 6:
     L=L+1:T(L,2)=1:T(L,0)=T(L-1,0)+3:FOR
     J=1 TO 3:L=L+1:T(L,2)=1:T(L,0)=T(L-1
     ,0)+2:NEXT J:NEXT K
0630 FOR Y=4 TO 10 STEP 3:T(L,0)=-1:FOR
     K=1 TO 7:L=L+1:T(L,2)=Y:T(L,0)=T(L-1
     ,0)+3:FOR J=1 TO 3:L=L+1:T(L,2)=Y:T(
     L,0)=T(L-1,0)+2:NEXT J:NEXT K:NEXT Y
     :T(24,0)=62:T(52,0)=62:T(80,0)=62
0640 FOR J=1 TO 13:READ N(J,0):NEXT J:FO
     R J=1 TO 13:READ N(J,1):NEXT J
0650 FOR J=1 TO 13:READ N(J,2):NEXT J
0660 REM **(above)set up n( ,1) =top cha
     r no; ,2) = bottom
0670 REM set up keys to produce the note
     s
0680 N1$="1234567890:-^"
0690 REM print prompts
0700 L=-4:FOR J=1 TO 13:L=L+5:CURS L,14:
     K=11+J*2:PCG:PRINT"8";A1$(;K,K);"8";
     :CURS L,15:PRINT"9";A1$(;K+1,K+1);"9
     ";:CURS L,16:NORMAL:PRINT"<";N1$(;J,
     J);">";:NEXT J
0710 CURS 6,15:PCG:PRINT"^";
0720 NORMAL:CURS 1,13
0730 PRINT"Move cursor: <, >, BK-SP, ESC
     Play: LN-FD, RTN    Delete: DEL"
0740 RETURN
0750 REM Chars are 0,1,2,3,4,5,6,7,8,9,a
     ,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s
     ,t,u,v,w,x,y,z,:,-,^
0760 DATA 96, 240, 208, 136, 12, 255, 12
     , 28, 56, 112, 255, 224, 160, 32, 32
     , 255
0770 DATA 254, 147, 17, 17, 255, 17, 17,
     18, 148, 255, 8, 8, 136, 200, 200, 2
     40
0780 DATA 0, 0, 0, 1, 1, 255, 1, 1, 1, 0
     , 255, 1, 3, 7, 14, 255
0790 DATA 28, 56, 113, 97, 255, 17, 8, 4
     , 2, 255, 0, 0, 3, 7, 7, 3
0800 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
     , 255, 2, 12, 24, 24, 255
0810 DATA 24, 28, 14, 3, 255, 0, 0, 0, 0
     , 255, 0, 0, 0, 0, 0, 0
0820 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
     , 255, 152, 4, 60, 60, 255
0830 DATA 0, 0, 4, 136, 255, 0, 0, 0, 0,
     255, 0, 0, 0, 0, 0, 0
0840 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
     , 255, 0, 0, 0, 0, 255
0850 DATA 0, 0, 0, 0, 255, 0, 0, 0, 0, 2
     55, 0, 0, 0, 0, 0, 0
0860 DATA 0, 0, 0, 0, 0, 255, 1, 1, 1, 1
     , 255, 1, 1, 1, 1, 255
0870 DATA 1, 1, 1, 1, 255, 1, 1, 1, 1, 2
     55, 0, 0, 0, 0, 0, 0
0880 DATA 0, 0, 0, 0, 0, 255, 0, 0, 32,
     16, 255, 4, 14, 28, 56, 255
0890 DATA 48, 16, 8, 12, 255, 50, 48, 24
     , 4, 255, 0, 0, 0, 0, 0, 0
0900 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
     , 255, 0, 0, 4, 4, 255
0910 DATA 4, 4, 4, 4, 255, 4, 4, 4, 4, 2
     55, 4, 4, 116, 252, 255, 120
0920 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
```

Microbee

```
    , 255, 4, 4, 4, 4, 255
0930 DATA 4, 4, 4, 4, 255, 4, 4, 4, 4, 2
    55, 116, 252, 252, 120, 0, 0
0940 DATA 0, 0, 0, 0, 0, 255, 0, 0, 4, 4
    , 255, 4, 4, 4, 4, 255
0950 DATA 4, 4, 4, 4, 255, 4, 4, 116, 25
    2, 255, 252, 120, 0, 0, 0, 0
0960 DATA 0, 0, 0, 0, 0, 255, 4, 4, 4, 4
    , 255, 4, 4, 4, 4, 255
0970 DATA 4, 4, 4, 4, 255, 116, 252, 252
    , 120, 255, 0, 0, 0, 0, 0, 0
0980 DATA 0, 0, 0, 4, 4, 255, 4, 4, 4, 4
    , 255, 4, 4, 4, 4, 255
0990 DATA 4, 4, 116, 252, 255, 252, 120,
    0, 0, 255, 0, 0, 0, 0, 0, 0
1000 DATA 0, 4, 4, 4, 4, 255, 4, 4, 4, 4
    , 255, 4, 4, 4, 4, 255
1010 DATA 116, 252, 252, 120, 255, 0, 0,
    0, 0, 255, 0, 0, 0, 0, 0, 0
1020 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
    , 255, 0, 0, 120, 252, 255
1030 DATA 252, 116, 4, 4, 255, 4, 4, 4,
    4, 255, 4, 4, 4, 4, 4, 4
1040 DATA 0, 0, 0, 0, 0, 255, 0, 0, 0, 0
    , 255, 120, 252, 252, 124, 255
1050 DATA 4, 4, 4, 4, 255, 4, 4, 4, 4, 2
    55, 4, 4, 4, 4, 0, 0
1060 DATA 0, 0, 0, 0, 0, 255, 0, 0, 120,
    252, 255, 252, 116, 4, 4, 255
1070 DATA 4, 4, 4, 4, 255, 4, 4, 4, 4, 2
    55, 4, 4, 0, 0, 0, 0
1080 DATA 0, 0, 0, 0, 0, 255, 120, 252,
    252, 116, 255, 4, 4, 4, 4, 255
1090 DATA 4, 4, 4, 4, 255, 4, 4, 4, 4, 2
    55, 0, 0, 0, 0, 0, 0
1100 DATA 0, 0, 0, 120, 252, 255, 252, 1
    16, 4, 4, 255, 4, 4, 4, 4, 255
1110 DATA 4, 4, 4, 4, 255, 4, 4, 0, 0, 2
    55, 0, 0, 0, 0, 0, 0
1120 DATA 0, 120, 252, 252, 116, 255, 4,
    4, 4, 4, 255, 4, 4, 4, 4, 255
1130 DATA 4, 4, 4, 4, 255, 0, 0, 0, 0, 2
    55, 0, 0, 0, 0, 0, 0
1140 DATA 0, 0, 0, 0, 255, 0, 0, 0, 0, 2
    55, 0, 0, 0, 0, 15, 0
1150 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0, 0, 0, 0, 0, 0
1160 REM ** data to set up n( , ) array
1170 DATA  0, 4, 6, 8, 9,11,13,15,16,18,
    20,21,23
1180 DATA 13,15,17,19,21,23,25,27,29,31,
    33,35,37
1190 DATA 14,16,18,20,22,24,26,28,30,32,
```


Introducing Bi-XT-88



16 bit system at an affordable price.

For: Integrated Accounting
Word Processing
Spreadsheet
Point-of-Sale —
Cash Register Hookup

- Twin Floppy Double Density Drives
- Soft disk for 3rd drive
- 256K Expandable to 640K
- Multifunction card
- Colour/Mono Graphics

OPTIONAL — 10/20 Megabyte Hard Disk

We also carry a wide range of printers, stationery, manuals, accessories, screens, etc.

In WA contact: PARADIGN BUSINESS SYSTEMS
34 Canterbury Drive, Willetton 6155. (09) 457-6336

Bi Computer Pty. Ltd.
Suite 23 — Minton House,
2A Bayswater Road,
KINGS CROSS, NSW 2011
Tel: (02) 356-2388/356-2962
All correspondence to: P.O. Box 896, Potts Point, NSW 2011

SOFTWARE ON THE CHEAP
This Month: Under $25

We all know you can spend a fortune on software, and most people expect to be attacked by several wounded bulls whenever they walk into a computer shop. We were intrigued to find out exactly what kinds of software you can purchase for modest (in computer terms) sums of money. In this first instalment of 'Software on the Cheap' we've listed all the packages we could find that come in at $25 or less. They're mostly in the games and educational categories. Have a browse.

Amstrad

GAMES

Admiral Graf Spee
AWA *Thorn*
Cassette $19.95

Alien Break-In
AWA *Thorn*
Cassette $19.95

American Football
AWA *Thorn*
Cassette $19.95

Amsgolf
AWA *Thorn*
Cassette, disk $19.95

Anirog Flight Path 737
AWA *Thorn*
Cassette $19.95

Astro Attack
AWA *Thorn*
Cassette $19.95

Atom Smasher
AWA *Thorn*
Cassette $19.95

Bird Mother
AWA *Thorn*
Cassette, disk $19.95

Blagger
AWA *Thorn*
Cassette $19.95

Bridge It
AWA *Thorn*
Cassette $19.95

Bucaneer
AWA *Thorn*
Cassette $19.95

Codename Mat
AWA *Thorn*
Cassette, disk $19.95

Combat Lynz
AWA *Thorn*
Cassette $19.95

Catastrophes
AWA *Thorn*
Disk $24.95

Centre Court
AWA *Thorn*
Cassette $19.95

Chess
AWA *Thorn*
Cassette, disk $19.95

Classic Adventure
AWA *Thorn*
Cassette $19.95

Classic Racing
AWA *Thorn*
Cassette $19.95

Crazy Golf
AWA *Thorn*
Cassette $19.95

Cubit
AWA *Thorn*
Cassette $19.95

Detective (CLUEDO)
AWA *Thorn*
Cassette $19.95

Dragon's Gold
AWA *Thorn*
Cassette $19.95

Electric Freddy
AWA *Thorn*
Cassette $19.95





Electro Freddy
AWA Thorn
Disk $24.95

5 A-Side Soccer
AWA Thorn
Cassette $19.95

Flight Simulator
AWA Thorn
Cassette $19.95

Forest At World's End
AWA Thorn
Cassette $24.95

Frank-N-Stein
AWA Thorn
Cassette $19.95

Fruit Machine
AWA Thorn
Cassette $19.95

Gems Of Stradus
AWA Thorn
Cassette $19.95

Grand Prix Driver
AWA Thorn
Cassette $19.95

Gun Dogs
AWA Thorn
Cassette, disk $19.95

Harrier Attack
AWA Thorn
Cassette $19.95

Haunted Hedges
AWA Thorn
Cassette $19.95

Heroes Of Karn
AWA Thorn
Cassette $24.95

Home Runner
AWA Thorn
Cassette $19.95

House Of Usher
AWA Thorn
Cassette $19.95

Hunchback
AWA Thorn
Cassette, disk $19.95

Hunter Killer
AWA Thorn
Cassette, disk $19.95

Jammin
AWA Thorn
Cassette $19.95

Jet Boat Jack
AWA Thorn
Cassette $19.95

Jet Set Willy
AWA Thorn
Cassette $19.95

Jewels Of Babylon
AWA Thorn
Cassette $24.95

Journey To Centre Earth
AWA Thorn
Cassette $19.95

Laser Warp
AWA Thorn
Cassette $19.95

Manic Miner
AWA Thorn
Cassette $19.95

Message From Andromeda
AWA Thorn
Cassette $24.95

Moonbuggy
AWA Thorn
Cassette $19.95

Mr Wong's Loopy Laundry
AWA Thorn
Cassette $19.95

Mutant Monty
AWA Thorn
Cassette $19.95

Oh Mummy
AWA Thorn
Cassette $19.95

Pipeline
AWA Thorn
Cassette $19.95

Poster Paster

AWA *Thorn*
Cassette $19.95

Punchy
AWA *Thorn*
Cassette, disk $19.95

Quack A Jack
AWA *Thorn*
Cassette $19.95

Roland Ahoy
AWA *Thorn*
Cassette, disk $19.95

Roland Goes Digging
AWA *Thorn*
Cassette, disk $19.95

Roland In Space
AWA *Thorn*
Cassette $19.95

Roland In The Cave
AWA *Thorn*
Cassette $19.95

Roland In The Caves
AWA *Thorn*
Disk $24.95

Roland In Time
AWA *Thorn*
Cassette, disk $19.95

Roland On The Ropes
AWA *Thorn*
Disk $24.95

Roland On The Run
AWA *Thorn*
Cassette, disk $19.95

Roland On The Slopes
AWA *Thorn*
Cassette $19.95

Roland Square Bashing
AWA *Thorn*
Cassette $19.95

Scuba Dive
AWA *Thorn*
Cassette $19.95

Search for King Solomon's Mine
AWA *Thorn*
Cassette $24.95

Secret Of Bastow Manor
AWA *Thorn*
Cassette $24.95

See-Saw
AWA *Thorn*
Cassette, disk $19.95

Sir Lancelot
AWA *Thorn*
Cassette $19.95

Snooker
AWA *Thorn*
Cassette, disk $19.95

Space Hawks
AWA *Thorn*
Cassette, disk $19.95

Spannerman
AWA *Thorn*
Cassette, disk $19.95

Splat
AWA *Thorn*
Cassette $19.95

Star Commando
AWA *Thorn*
Cassette $19.95

Star Eggs
AWA *Thorn*
Cassette, disk $19.95

Steve Davis Snooker
AWA *Thorn*
Cassette $24.95

Stockmarket
AWA *Thorn*
Cassette $19.95

Stunt Rider
AWA *Thorn*
Cassette $19.95

Sultan's Maze
AWA *Thorn*
Cassette $19.95

Survivor
AWA *Thorn*
Cassette $19.95

The Galactic Plague
AWA *Thorn*
Cassette $19.95

3D Invaders
AWA *Thorn*
Cassette $19.95

Traffic
AWA *Thorn*
Cassette, disk $19.95

Trashman
AWA *Thorn*
Cassette $19.95

Treble Trouble
AWA *Thorn*
Cassette $19.95

Zakl Wood
AWA *Thorn*
Cassette $19.95

EDUCATION

Animal, Vegetable, Mineral
AWA *Thorn*
Cassette $19.95

Happy Letters
AWA *Thorn*
Cassette $19.95

Happy Number
AWA *Thorn*
Cassette $19.95
Does anyone here remember Henry Hilo?

Happy Writing
AWA *Thorn*
Cassette $19.95

Identikit
AWA *Thorn*
Cassette $24.95

Map Rally
AWA *Thorn*
Cassette $19.95

Maths Invaders
AWA *Thorn*
Cassette $24.95

Pitman's Typing Tutor
AWA *Thorn*
Cassette $24.95

Time Man 1
AWA *Thorn*
Cassette $19.95

Time Man 2
AWA *Thorn*
Cassette $19.95

Typing Wizard
AWA *Thorn*
Cassette $24.95

Word Wise
AWA *Thorn*
Cassette $19.95

Wordhang
AWA *Thorn*
Cassette $19.95

Xanagrams
AWA *Thorn*
Cassette $19.95

Atari

GAMES

Airstrike 2
Ozisoft
ROM cartridge $19.95

Batty Builders
Ozisoft
ROM cartridge $19.95

Captain Sticky's Gold
Ozisoft
ROM cartridge $19.95

Cassette Enhancer
Ozisoft
ROM cartridge $24.95

Citadel Warrior
Ozisoft
ROM cartridge $19.95

Diamonds
Ozisoft
ROM cartridge $19.95

Don Strikes Back
Ozisoft
ROM cartridge $19.95

Duellin' Droid
Ozisoft
ROM cartridge $19.95

Firefleet
Ozisoft
ROM cartridge $19.95

Graphics Wizard
Ozisoft
ROM cartridge $24.95

Hyperblast
Ozisoft
ROM cartridge $19.95

Neptune's Daughter
Ozisoft
ROM cartridge $19.95

Robin Hood's Adventures
Ozisoft
ROM cartridge $19.95

EDUCATION

Firing Line
Ozisoft
Cassette, disk $19.95

Maelstrom
Ozisoft
Cassette, disk $19.91

Math Games
Ozisoft
Cassette $19.95

Math Tutor
Ozisoft
Cassette, disk $19.95

Pegasus Odyssey
Ozisoft
Cassette, disk $19.95

Supercuda
Ozisoft
Cassette, disk $19.95

Toddler Tutor
Ozisoft
Cassette, disk $19.95

Aquarius

GAMES

3D Battlezone
Dick Smith
Cassette $9.95

Advanced Dungeons and Dragons
Dick Smith
ROM cartridge $24.95

Astrosmash
Dick Smith
ROM cartridge $24.95

Breakout
Dick Smith
Cassette $9.95

Burgertime
Dick Smith
ROM cartridge $24.95

Chess
Dick Smith
Cassette $9.95

Chuckman
Dick Smith
Cassette $9.95

D-Fenders
Dick Smith
Cassette $9.95

Ed-On
Dick Smith
Cassette $9.95

Games Pack 1
Dick Smith
Cassette $9.95

Games Pack 3
Dick Smith
Cassette $9.95

Ghost Hunter
Dick Smith
Cassette $9.95

Invaders
Dick Smith
Cassette $9.95

Logo
Dick Smith
ROM cartridge $24.95

Melody Chase
Dick Smith
ROM cartridge $24.95

Millipede
Dick Smith
Cassette $9.95

Night Stalker
Dick Smith
ROM cartridge $24.95

Snafu
Dick Smith
ROM cartridge $24.95

Space Ram
Dick Smith
Cassette $9.95

Tron Deadly Disk
Dick Smith
ROM cartridge $24.95

Utopia
Dick Smith
ROM cartridge $24.95

EDUCATION

Maths Armada
Dick Smith
Cassette $9.95

MS Extended BASIC
Dick Smith
ROM cartridge $24.95

Read It
Dick Smith
Cassette $9.95

Space Speller
Dick Smith
ROM cartridge $24.95

Spell It
Dick Smith
Cassette $9.95

BBC

GAMES

Airline
Gametronics
$12.50

Blagger
Gametronics
Cassette $12.50

Bugblaster
Gametronics
Cassette $12.50

Classic Adventure
Melbourne House
Cassette $24.95
A BBC version of the original Adventure game.

Confrontation
Gametronics
Cassette $12.50

Cosmic Cruiser
Gametronics
Cassette $25

Drum Kit
Gametronics
Cassette $25

Fruit Machine
Gametronics
Cassette $12.50

Gatecrasher
Gametronics
Cassette $12.50

Johnny Reb
Gametronics
Cassette $12.50

Monaco
Gametronics
Cassette $12.50

Panic Planet
Gametronics
Cassette $12.50

Paras
Gametronics
Cassette $12.50

Pedro
Gametronics
Cassette $12.50

Pengwyn
Gametronics
Cassette $12.50

Roman Empire
Gametronics
Cassette $12.50

The Valley
Gametronics
Cassette $12.50

Web Runner
Gametronics
Cassette $12.50

Xanagrams
Gametronics
Cassette $12.50

EDUCATION

Animal/Vegetable/Mineral
Gametronics
Cassette $23

Happy Letters
Gametronics
Cassette $23

Happy Numbers
Gametronics
Cassette $23

Map Rally
Gametronics
Cassette $23

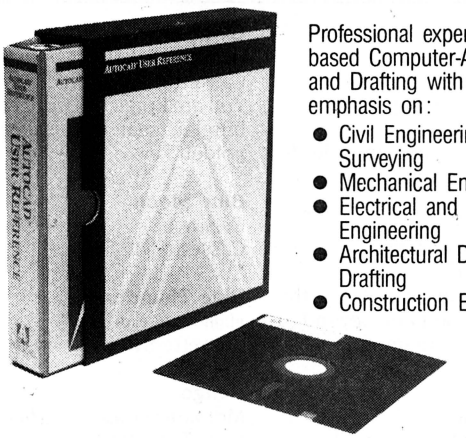
Time Man 1
Gametronics
Cassette $23

Time Man 2
Gametronics
Cassette $23

Wordhang
Gametronics
Cassette $23

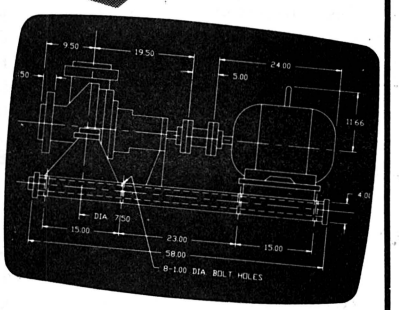
Worldwise
Gametronics
Cassette $23 ▷

ASSCO IS AUTOCAD

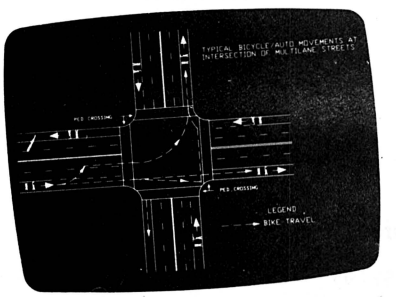


Professional expertise in micro-based Computer-Aided Design and Drafting with specific emphasis on:

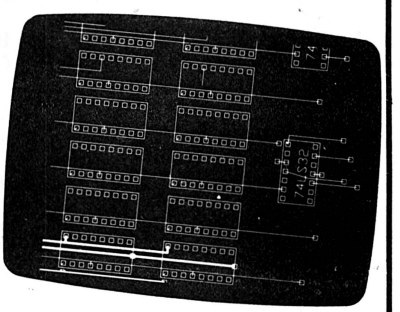
- Civil Engineering and Surveying
- Mechanical Engineering
- Electrical and Electronic Engineering
- Architectural Design and Drafting
- Construction Estimation



Front and side elevation of a mechanical engineer's drawing.



Autocad in the application of road & traffic control.



Segment of layout from master Electronic circuit.

Houston Instrument and Hewlett-Packard Plotters
NEC and Hewlett-Packard Personal Computers

VIC. 17 HEATHERDALE RD., RINGWOOD (03) 873 2266
S.A. 59 FULLARTON RD., KENT TOWN (08) 332 0122

Commodore 64

GAMES

Adventure Quest
Ozisoft, High Technology
Cassette $24.95
Explore middle earth in order to find the dark tower.

African Safari
Ozisoft, High Technology
Cassette $24.95
You are Dr Livingston facing the perils of the desert and beyond to find the Kenyan diamond.

Ankh
High Technology
Cassette $24.95

Annihilator
Gametronics
Cassette $12.50

Arcadia
Gametronics
Cassette $12.50

Astro Chase
High Technology
Cassette $24.95

Aztec
High Technology
Cassette $24.95

Aztec Challenge
High Technology
Cassette $24.95

Aztec Tomb Adventure
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Bat Attack
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Bath Time
Melbourne House, High Technology
Cassette $19.95

Bird Mother
High Technology
Cassette $22.50

Black Hawk
High Technology
Cassette $22.50

Black Pyramid
High Technology
Disk $24.95

Blagger
Ozisoft
Cassette, disk $19.95
You are Roger the Dodger, master burglar, searching safes for the golden keys.

Blue Moon
Gametronics
Cassette $12.50

Blue Thunder
High Technology
Cassette $19.95

Bongo
Melbourne House, Gametronics, High Technology
Cassette $19.95
Help Bongo escape the monsters by using trampolines and sliding down chutes.

Bonzo
High Technology
Cassette $19.95

Boulder Dash
High Technology
Cassette $24.95

Brands
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Breakdance
High Technology
Cassette $19.95

Bristles
High Technology
Cassette $24.95

Bug Blaster
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Centipede/worm style game with spiders, mushrooms, snappy scorpions and swooping dragon flies.

Burger Chase
Gametronics
Cassette $12.50

Burnin' Rubber
High Technology
Cassette $19.95

Castle of Terror
Melbourne House, High Technology
Cassette $24.95
Owoooo! A graphic adventure set in the 1880s where you are pitted against... the Count.

Cataclysm
High Technology
Cassette $19.95

Caveman
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Help the cavemen survive the baby dinosaurs as they hatch from eggs in their cave.

Caverns of Khafka
High Technology
Cassette $24.95

Classic Adventure
Melbourne House, Gametronics, High Technology
Cassette $24.95
A version of the original Adventure game.

Colossal Adventure
Ozisoft, High Technology
Cassette $24.95
The classic, original Adventure, with 70 new locations.

Concentration
Ozisoft
Disk $24.95
A contest of memory that requires you to match pairs.

Construct-a-brix
High Technology
Disk $24.95

Contract Bridge
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Cops and Robbers
Ozisoft, High Technology
Cassette $24.95
Avoid police patrols, rescue prisoners and collect diamonds.

Cosmic Capers
Gametronics
Cassette $12.50

Cosmic Commando
Gametronics, High Technology
Cassette $20

Countdown to Meltdown
High Technology
Cassette $22.50

Crackers Of Fire
Gametronics
Cassette $12.50

Crazy Caveman
Gametronics
Cassette $12.50

Crazy Kong
Gametronics
Cassette $12.50

Cricket
High Technology
Cassette $12

Crush, Crumble & Chomp
High Technology
Cassette $19.95

Cup Challenge
High Technology
Cassette $19.95

Cybotron
Gametronics, High Technology
Cassette $20

Cyclons
Gametronics
Cassette $12.50

Damsel in Distress
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Dancing Monster
Melbourne House, High Technology
Cassette $19.95
Free the Princess from the magic spell that has turned her into a demon dancer.

Danger Mouse — Black Forest
High Technology
Cassette $22.50

Danger Mouse — Double Trouble
High Technology
Cassette $22.50

Deadline
Commodore, High Technology
Disk $25
Solve the mystery of the murdered industrialist with only 12 hours in hand.

Death Star
Gametronics
Cassette $12.50

Demon Knight
Gametronics
Cassette $12.50

Depth Charge
Commodore, High Technology
Cassette $12

SOFTWARE ON THE CHEAP

Use depth charges to protect your ships from attacking submarines.

Derby Day
Gametronics
Cassette $24.95

Detective
Gametronics
Cassette $12.50

Dictator 64
High Technology
Cassette $19.95

Dungeon Adventure
Ozisoft, High Technology
Cassette $24.95
Find the magical treasures of Demon Land. A game for people with a sense of humour.

Eagle Empire
Ozisoft, Gametronics, High Technology
Cassette $24.95
Fight the menacing phoenix, battle armed eagles and destroy the mother ship.

Encounter
Gametronics
Cassette $12.50

Escape MCP
Gametronics
Cassette $12.50

Everest Ascent
Gametronics
Cassette $12.50

Evil Dead
High Technology
Cassette $19.95

Felix in the Factory
High Technology
Cassette $19.95

Flight Path
Melbourne House
Cassette $19.95
Fly a plane over the mountains and land in the valley beyond.

Flight Path 737
Gametronics, High Technology
Cassette $20

Flip & Flop
High Technology
Cassette $24.95

Forbidden Forest
High Technology
Cassette $24.95



Forest Land
Gametronics
Cassette $12.50

Frogrun
Gametronics, High Technology
Cassette $20

Galasions
High Technology
Disk $24.95

Galaxions
Ozisoft, High Technology
Cassette, disk $19.95
Wipe out the swooping galaxions before they destroy the earth.

Galaxy
Melbourne House, Gametronics, High Technology
Cassette $19.95
Battle the formations of enemy space fighters.

Games I
Commodore, High Technology
Disk $25
A catalogue of 14 fun games.

Games II
Commodore, High Technology
ROM cartridge, disk $25
A catalogue of 13 games including word guessing, logic and maths games.

Games III
Commodore, High Technology
Disk $25

Gammaron
Ozisoft, High Technology
Cassette $24.95
Attack and destroy the Gammaron missile silos while avoiding the gamma ray guns.

Ghouls
High Technology
Cassette $19.95

Grand Larceny
Melbourne House, High Technology
Cassette $24.95
Recover the secret plans from the enemy agents who will stop at nothing to escape.

Graphics Master
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Gridtrap
Ozisoft, High Technology
Cassette, disk $19.95
Help Mr Livewire cross the room to defuse the bomb. The floor is made up of squares that move.

Guardian
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Save the earth from landers, flying pods, swarmers, bombers and baiters.

Hall of Things
High Technology
Cassette $19.95

Hampstead
Melbourne House, High Technology
Cassette $24.95
Lie, cheat and steal your way to the pinnacle of social status. A game for social climbers.

Harrier Attack
High Technology
Cassette $19.95

Haunted House
Ozisoft, High Technology
Cassette $19.95, disk $24.95

Heathrow Air Traffic Control
High Technology
Cassette $19.95

Hexpert
Gametronics, High Technology
Cassette $20

Hooper
High Technology
Cassette $19.95

Horace Goes Skiing
Melbourne House, Gametronics, High Technology
Cassette $19.95
Help Horace get to the ski shop and then ski the mountain. A frogger and ski game in one.

House of Usher
Melbourne House, High Technology
Cassette $19.95
After crossing the grim landscape you reach the home of generations of deranged madmen.

Hungry Horace
Gametronics
Cassette $20

Hunter
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Avoid the robot ships that grow faster and smarter as the game progresses.

Ice Hunter
Melbourne House, Gametronics, High Technology
Cassette $19.95
Based on an Eskimo legend, you are searching for special blocks of ice to build an igloo.

Impossible Mission
High Technology
Cassette $19.95

Indian Attack
Gametronics, High Technology
Cassette $20

Invaders
High Technology
Cassette $14.95

Jackpot
Ozisoft, High Technology
Cassette $16.95, disk $21.95
Simulation of a poker machine.

Java Jim
High Technology
Cassette $22.50

Jet Set Willy
High Technology
Cassette $24.95

Johnny Reb
Gametronics
Cassette $25

Jump in Jack
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Help Jack the frog cross the road to his river home while avoiding a variety of obstacles.

Jumpman
High Technology
Cassette $19.95

Kaktus
Gametronics
Cassette $12.50

Killer Watt
Ozisoft, Gametronics
Cassette $19.95, disk $12.50
Brave killer light bulbs, flying men with bombs and carnivorous fish in a cavern adventure. ▷

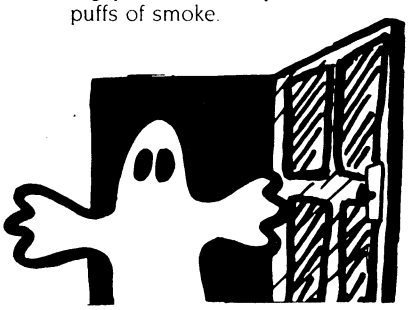
SOFTWARE ON THE CHEAP

Kokotoni Wilf
High Technology
Cassette $19.95

Kong
Melbourne House, Gametronics, High Technology
Cassette $19.95
Save Fay from the clutches of Kong and destroy his lair.

Labyrinth
Commodore, High Technology
Cassette $12
Find your way through the 3D maze taking as few steps as possible.

Loco
Ozisoft
Disk, cassette $24.95
Guide your train through attacking planes. Destroy them with puffs of smoke.



Lord Of Balrog
Gametronics
Cassette $12.50

Lords of Time
Ozisoft, High Technology
Cassette $24.95
Travel through history seeking to avert the evil future planned by the Timelords.

Magic Stone
High Technology
Cassette $24.95

Mangrove
Gametronics
Cassette $12.50

Megahawk
High Technology
Cassette $19.95

Mission 1 Project Volcano
High Technology
Cassette $24.95

Monopole
Gametronics
Cassette $12.50

Monster Munch
Gametronics
Cassette $12.50

Monty Mole
High Technology
Cassette $19.95



Moon Buggy
Gametronics, High Technology
Cassette $20

Motor Mania
High Technology
Cassette $19.95

Mr Robot
High Technology
Cassette $24.95

Munchman
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Eat the dots in the maze while avoiding the ghosts.

Music 64
Gametronics
Cassette $12.50

Mystery Of Munroe Manner
Gametronics
Cassette $12.50

Olympic Skier
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Go for maximum points in the slalom, ski jump and downhill race.

Omega Run
Gametronics
Cassette $24.95

Oracles Cave
High Technology
Cassette $19.95

Orange
Gametronics
Cassette $12.50

Orc Attack
High Technology
Cassette $22.50

Pakakunda
Gametronics
Cassette $12.50

Panic Planet
Ozisoft, Gametronics, High Technology
Cassette $19.95, disk $24.95
The aliens are coming. Save the earth with only your trusty shovel for a weapon.

Paratroopers
Gametronics
Cassette $12.50

Pedro
Gametronics
Cassette $12.50

Penetrator
Melbourne House, High Technology
Cassette $19.95
Penetrate four defence rings with your fighter aircraft and destroy the neutron bomb cache.

Petch
Melbourne House, Gametronics, High Technology
Cassette $19.95
Help save Petch the penguin from catching cold carried by the hatching Snowbows and Snowboxs.

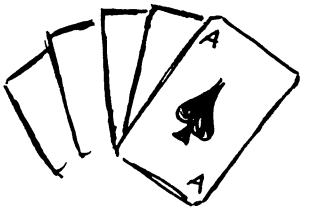
Photony
Melbourne House, High Technology
Cassette $19.95
Hunt the alien ship in an area where mirrors bounce lasers back at you.

Pingo
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Help Pingo the penguin survive the attacking snowbees by moving ice blocks around.

Pitstop
High Technology
Cassette $19.95

Pixie Pete
Gametronics
Cassette $12.50

Plumb Crazy
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Build a relief pipe through boulder-strewn terrain while avoiding your boss's ghost.



Poker
High Technology
Disk $24.95

Potty Pigeon
High Technology
Cassette $19.95

Psytron
High Technology
Cassette $19.95

Pyramid 64
High Technology
Cassette $19.95

Rattler
Gametronics
Cassette $12.50

Red Alert
Ozisoft, High Technology
Cassette $16.95, disk $21.95

Rennaissance
High Technology
Cassette $19.95

River Rescue
High Technology
Cassette $22.50

Robin to the Rescue
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Your standard Robin Hood saving Marian from the sheriff's evil clutches game.

Salvage
High Technology
Cassette $14.95

Scuba Diver
High Technology
Cassette $19.95

See-Saw
High Technology
Cassette $19.95

Seesaw
Melbourne House
Cassette $19.95
Help a Balladil save his friends from the Black Lord by getting him into the castle.

SOFTWARE ON THE CHEAP

Ski Run
Gametronics
Cassette $12.50

Skramble
Melbourne House, Gametronics, High Technology
Cassette $19.95
Destroy enemy fuel dumps while avoiding the enemy planes and missiles.

Skull
Gametronics, High Technology
Cassette $12.50

Slinky
High Technology
Cassette $24.95

Slurpy
High Technology
Cassette $22.50

Snowball
Ozisoft, High Technology
Cassette $24.95
Save the colonists in the hijacked, robot modified colony starship.

Son of Blagger
Ozisoft, High Technology
Cassette $19.95, disk $24.95
An extension to Blagger, you continue searching for the golden keys among more obstacles.

Sooper Froot
Commodore, High Technology
Cassette $12
An adaptation of the poker machine.

Space Ace 2101
Ozisoft, High Technology
Cassette $24.95
Fight the menacing phoenix and battle armed eagles to destroy the mother ship.

Space Pilot
Melbourne House, Gametronics, High Technology
Cassette $19.95
Fight planes ranging from biplanes of 1919 to fighters of 2001.

Space Raider
Gametronics
Cassette $12.50

Spatial Billiards
Melbourne House, High Technology
Cassette $19.95
Only on a computer could you hope to see a game of billiards in 3D.

Special Delivery
High Technology
Cassette $22.50

Squash
Gametronics
Cassette $12.50

Star Command
Gametronics
Cassette $12.50

Star Commando
Ozisoft, High Technology
Cassette $19.95, disk $24.95
A 3-D battle to clear mines, galactic pirates and sausonic raiders from the space lanes.

Star Trooper
High Technology
Cassette $19.95

Starbase Defense
Gametronics, High Technology
Cassette $20

Starcross
Commodore, High Technology
Disk $25
Explore the giant starship to meet the challenge set aeons ago and light-years away.

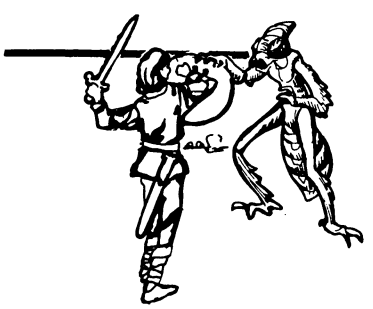
Starfire/Fireone
High Technology
Cassette $19.95

Stellar Wars
Commodore, High Technology
Cassette $12
Shoot down the aliens before your lasers overheat or your time runs out.

Stockmarket
Gametronics
Cassette $12.50

Story House
High Technology
Cassette $22.50

Styxx
Gametronics
Cassette $12.50



Super Blitz
High Technology
Cassette $12

Super Gridder
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Trace the lines of the grid while avoiding the various bities and nasties. Eight grids in all.

Super Skramble
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Avoid enemy planes and missiles as you bomb the fuel dumps through eight levels.

Super Spy
Gametronics
Cassette $12.50

Suspended
Commodore, High Technology
Disk $25
Manipulate six robots to try and save your planet.

Swoop
High Technology
Cassette $19.95

Temple of Apshai
High Technology
Cassette $19.95

The Valley
Gametronics
Cassette $12.50

3D Tanx
High Technology
Cassette $19.95

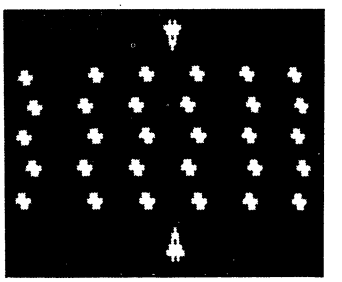
Time Travellers
High Technology
Cassette $24.95

Traffic
Melbourne House, High Technology
Cassette $19.95
Control traffic in the busy streets of London, preventing major traffic snarls.

Triad
Ozisoft, High Technology
Cassette $19.95, disk $24.95
A 3D battle to clear the Tachyon Tunnels so the transport fleet can safely pass.

Trivia Trek Data
High Technology
Cassette $14.95

Two Player Tournament
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Compete with a friend in a space race, a western shootout and an air attack at Pearl Harbour.



Underworld of Kyn
Ozisoft, High Technology
Cassette $24.95
A text adventure where you must escape the caverns of the evil wizard Kyn.

Warlock
High Technology
Cassette $19.95

Western Adventure
High Technology
Disk $24.95

Westminster
Ozisoft, High Technology
Cassette $16.95, disk $21.95

Wildfire
Gametronics
Cassette $12.50

Wing Commander
High Technology
Cassette $22.50

Xerons
Gametronics
Cassette $12.50

Zim Sala Bim
Melbourne House, High Technology
Cassette $24.95
Murder, mystery and adventure in the Sultan's kingdom.

Zodiac
Gametronics, High Technology
Cassette $20

Zork I
High Technology, Commodore
Disk $25

Zork II
High Technology, Commodore
Disk $25 ▷

Zork III
High Technology, Commodore
Disk $25

Zylogon
High Technology
Cassette $19.95

EDUCATION

Add/Subtract I
McGraw-Hill
Disk, cassette $14.95
Henry Hilo, who is busting his gut teaching maths, explains simple addition and subtraction.

Addition and Subtraction
High Technology
Cassette $19.95

Algebraic Relations
McGraw-Hill
Disk, cassette $14.95
Henry Hilo explains the use of variables and the nature of algebraic relations.

Alphabet Know-How
McGraw-Hill
Disk, cassette $14.95
Develop skills of looking up things that are indexed in alphabetical order.

Auscap And Ausquiz
High Technology, Ozisoft
Cassette $19.95
Geography quizzes on capital cities, mountains and rivers of Australia.

Balloon Game
McGraw-Hill
Disk, cassette $14.95
Enjoy hot-air ballooning while learning about the air around us and its effects on climate.

Business I
Commodore, High Technology
Cassette $25
Simulations of such operations as stock transactions and interest calculations.

Computer Science I
Commodore, High Technology
Cassette $25
Thirteen programs that teach you how to use the computer.

Concentration
Ozisoft, High Technology
Cassette $19.95, disk $24.95
A contest of memory that requires you to match pairs.

Correct Spelling I
McGraw-Hill
Disk, cassette $14.95
Suzy Spellwell guides you through vowels and consonants, the ie sound, ck and ke and endings.

Correct Spelling II
McGraw-Hill
Disk, cassette $14.95
Suzy Spellwell helps with c and k sound, ci, si, ti, digraphs and blends wh, ch, shr and spl.

Counting
McGraw-Hill
Disk, cassette $14.95
Parents help the child learn to count using the space bar and 1, 2 or 3 keys.

Decimal Fractions
McGraw-Hill
Disk, cassette $14.95
Henry Hilo demonstrates denominators, decimal points and powers of 10.

Decimals: Mult & Div
High Technology
Cassette $19.95

Dictionary Use
McGraw-Hill
Disk, cassette $14.95
A guide to the proper use of a dictionary including similar spellings and different meanings.

Division I
McGraw-Hill
Disk, cassette $14.95
Henry Hilo helps you understand that division is easy when you know how to subtract and share.

Division II
McGraw-Hill
Disk, cassette $14.95
Henry Hilo goes further into division by looking at fractions and long division.

Explorers I
McGraw-Hill
Disk, cassette $14.95
Learn about the early discoverers of Australia, from the early Dutch to Tasman and Dampier.

Explorers II
McGraw-Hill
Disk, cassette $14.95
The discovery of Australia and its colonization covers Cook, early exploration and Bass.

Explorers III
McGraw-Hill
Disk, cassette $14.95
Covers Van Diemen's land, Flinders' circumnavigation, Hume and Hovell and the Blue Mountains.

Explorers IV
McGraw-Hill
Disk, cassette $14.95
Introduces the great explorations, John Oxley, Hume and Hovell, and Allan Cunningham.

Explorers V
McGraw-Hill
Disk, cassette $14.95
Solves the riddle of the rivers, Oxley and Sturt, expanding horizons and Major Mitchell.

Explorers VI
McGraw-Hill
Disk, cassette $14.95
Exploration of the north-west coast, Gippsland and the start of the squatter's surge.

Fractions I
McGraw-Hill
Disk, cassette $14.95
Henry Hilo introduces the concepts of fractions being parts of wholes.

Fractions II
McGraw-Hill
Cassette $11.95
Henry Hilo goes into denominators, numerators, lowest common denominators and multiples.

Fractions: Additions and Subtractions
High Technology
Cassette $19.95

Fractions: Multiplication and Division
High Technology
Cassette $19.95

Fun with Facts I
High Technology
Disk $25

Fun with Facts II
High Technology
Disk $25

Geography
McGraw-Hill
Disk, cassette $14.95
Looks at the Great Artesian Basin, Great Dividing Range, Great Barrier Reef and the Shelf.

Geography I
Commodore, High Technology
Cassette $25
Quizzes on thirteen countries, their states and their capitals.

Geography Tutor
McGraw-Hill
Disk, cassette $14.95
Learn about the geography of Australia and try your hand at mapping.

Graphs I
McGraw-Hill
Disk, cassette $14.95
Henry Hilo (the mathematics whiz) introduces the fundamentals of graphs.

Graphs II
McGraw-Hill
Disk, cassette $14.95
Henry Hilo helps you to understand and produce bar and column graphs.

Hangman III
McGraw-Hill
Disk, cassette $14.95
Play the computer or a friend using your own words or the computer's year 3 level word lists.

Hangman IV
McGraw-Hill
Disk, cassette $14.95
Play the computer or a friend using your words or the computer's year 4 level word lists.

Hangman V
McGraw-Hill
Disk, cassette $14.95
Use the computer's words or your own, play the computer or a friend.

Hangman VI
McGraw-Hill
Disk, cassette $14.95
Spelling trainer with more advanced words suitable for primary Year 6.

I'm An Expert
High Technology
Disk $24.95
Ozisoft
Cassette $24.95
Children teach the computer. They learn logic and classificaiton skills as they go. ▷

NOW MOHAMMED NEED NOT GO TO THE MOUNTAIN...

Imagine! A computer that's powerful enough to run your business . . . yet small enough to take home with you. That's the Bondwell 14 Portable.

It has all you need to run a business – yet costs a fraction of the price of other computers.



Cat X-9000

That's why it's the success story of 1985!

In just a few short months, the Bondwell 14 portable has become our largest selling business computer. It offers performance and reliability far exceeding its low price tag. Even first glance will tell you that the Bondwell 14 portable is no ordinary computer!

You'll see:

- **128K RAM on board!**
- **Twin 360K disk drives!**
- **220mm amber-screen monitor!**
- **Twin RS-232 serial ports!**
- **Centronics parallel port!**
- **External video monitor port!**
- **Ergonomically designed adjustable keyboard!**
- **PLUS a package of famous Micropro 'Star' series software valued at over $1200:** Wordstar word processing, Calcstar spreadsheet, Datastar information handling and Reportstar report preparation. AND if that's not enough, a host of CP/M utilities including a speech synthesiser! Yes, this is all included FREE with your Bondwell 14 portable.

And just in case your business needs other specialised software, you have one of the biggest 'libraries' in the world at your disposal: the Bondwell 14 portable operates under the world-standard CP/M system. (And it's the latest, most powerful version - Vs 3.0.)

With the huge number of programs written for this system, you'll find the one you require. And the Bondwell 14 portable will read disk files from many other computers - including the IBM PC (& compatibles), Osborne, Kaypro and Spectravideo!

Weighing in at just 12kg and measuring just a little larger than an electric typewriter, the Bondwell 14 is truly portable. Take your Bondwell 14 to where the job is: Mohammed need no longer go to the mountain.

Your business survival depends on your making the correct decisions. Decide on the Bondwell 14 portable. And survive!

Want to know more? Call in to your nearest Dick Smith Electronics Computerstop for a test drive. Ask for a copy of the Bondwell 14 brochure. And then get your own Bondwell 14!

Bondwell Computers: exclusive to Dick Smith Electronics.

ALL THIS FOR ONLY **$2495**

Or $247 deposit and $19.85 weekly over 48 months to approved purchasers..

Dick Smith Electronics Pty Ltd

COMPUTERSTOP™

Your one stop computer shop at your nearest Dick Smith Electronics centre.

bankcard welcome here | MasterCard | VISA | Terms available to approved personal applicants through Custom Credit

A04A/A04ADTSAS

Learn With Adventure Programs
Gametronics
Cassette $20

Linear Equations
High Technology
Cassette $19.95

Map Reading I
McGraw-Hill
Disk, cassette $14.95
The world is round, the mountains high, but maps are flat. Find out how to interpret them.

Memory Trainer
McGraw-Hill
Disk, cassette $14.95
Improve your recall of numbers, words and lists with this short term memory trainer.

Multiplication and Division
High Technology
Cassette $19.95

Multiplication I
McGraw-Hill
Disk, cassette $14.95
Henry Hilo explains a variety of multiplication techniques including Cartesian products.

Multiplication II
McGraw-Hill
Disk, cassette $14.95
Henry Hilo looks at simple and long multiplication.

Number Line
High Technology
Cassette $19.95

Number Maze
High Technology
Cassette $19.95

Number Snake
High Technology
Cassette $19.95

Paddington's Early Visit
Commodore, High Technology
Cassette $25



Paddington goes shopping and children have to help him get his sums right.

Paddington's Problem Picture
Commodore, High Technology
Cassette $25
Paddington has adventures in an antique shop. Help him make things work.

Paddington, Disappearing Ink
Commodore, High Technology
Cassette $25
Paddington discovers the magic ink and children have to help him write a postcard.

People, Places, Things
High Technology
Disk $25

Phone Book Skills
McGraw-Hill
Disk, cassette $14.95
Learn what you can find in a phone book, where you find it and how you find and understand it.

Place Value
McGraw-Hill
Disk, cassette $14.95
A cast of characters explain the use of base 10 and its powers.

Prime Maze
High Technology
Cassette $19.95

Problem Solving I
McGraw-Hill
Disk, cassette $14.95
Mathematics is full of keywords which Henry Hilo explains and demonstrates.

Problem Solving II
McGraw-Hill
Disk, cassette $14.95
Henry Hilo goes into depth with his explanation of keywords.

Quadratic Equations
High Technology
Cassette $19.95

Rectangles
High Technology
Cassette $22.80

Set Theory
McGraw-Hill
Disk, cassette $14.95
Logic Lou demonstrates how to group coloured shapes into sets.

Shapes
McGraw-Hill
Disk, cassette $14.95
Parents help their children learn how to identify different shapes.

Sketch and Paint
Ozisoft, High Technology
Cassette $16.95, disk $21.95
Draw on your computer's screen using joystick control.

Skill Tester
McGraw-Hill
Disk, cassette $14.95
Henry Hilo races you to see who is fastest at doing sums.

Speed Reading
Ozisoft, High Technology
Cassette, disk $24.95
Improve speed reading to 1/128th of a second for a word or phrase.

Speedy Reader One & Two
Ozisoft, High Technology
Cassette $19.95
A speed reading course that improves the reading speed and comprehension of children.

Spell Out
Ozisoft, High Technology
Cassette, disk $19.95
Help in learning spelling lists with fill-ins, scrambled words and word searches.

Spelling Helper
Ozisoft, High Technology
Cassette $19.95
Enter words for your child or students to spell.

Spirates and Snowmen
Commodore, High Technology
Cassette $12
Do battle using multiplication, addition and subtraction.

Tables Prac/Launcher
High Technology
Cassette $19.95
Ozisoft
Cassette $19.95
Programs that take the drudgery out of learning the times tables.

Technology I
Commodore, High Technology
Cassette $25
Ten programs examining the effects of technology on our lives.

The Water Cycle
McGraw-Hill
Disk, cassette $14.95
Learn about the water cycle and man's relationship to it in a graphics game.

Tic Tac Facts
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Answer the question in the square before you can put a nought or cross in it.

Touch Typing Tutor
High Technology
Cassette $23.50

Typing Tutor
Ozisoft, High Technology
Cassette $19.95, disk $24.95
Theory, drill and practice using sprite graphics and colour. Improves speed and accuracy.

Typing Wizard
Gametronics
Cassette $12.50

Win With Words I
High Technology
Disk $25

Win With Words II
High Technology
Disk $25

Word Power
McGraw-Hill
Disk, cassette $14.95
Enhance your loquacity relative to nouns. (Trans: improve your ability to use nouns.)

You and Your World
High Technology
Disk $25

Young Explorer
High Technology
Disk $25

GENERAL BUSINESS

Mail It 64
High Technology
Cassette, disk $19.95

TOTL Label 2.6
High Technology
Cassette $22

GENERAL UTILITIES

Oz Assembler
High Technology
Cassette $19.95

Commodore 16

EDUCATION

Intro To Programming
High Technology
Cassette $20

Super Spell
High Technology
Cassette $12

Typing Tutor
High Technology
Cassette $12

Rolf Harris Picture Builder
High Technology
Cassette $12

Starter Chess
High Technology
Cassette $12

GAMES

Atomic Mission
High Technology
ROM cartridge $20

C'est la vie
High Technology
ROM cartridge $20

Exzap
High Technology
Cassette $12

Flying Horses
High Technology
Cassette $17.95

Galaxians
High Technology
Cassette $17.95

Jack Attack
High Technology
ROM cartridge $20

Maze Mania
High Technology
Cassette $12

Pirate Adventure
High Technology
ROM cartridge $20

Punchy
High Technology
Cassette $12

Strange Odessey
High Technology
ROM cartridge $20

Tooth Invaders
High Technology
ROM cartridge $20

Viduzzles
High Technology
ROM cartridge $20

Wizard of Wor
High Technology
ROM cartridge $20



Microbee

GAMES

Adventure in 3D
Applied Technology
Cassette $12.50
Escape the 3D graphics maze. Requires 32 Kbytes.

Adventure Pak
Applied Technology
Cassette, disk $12.50
A package including Eye of Min, Temple of Azragor and Sabre of Sultar. Requires 32 Kbytes.

Amazon Search
Applied Technology
Cassette $12.50
A graphics adventure — uncover the treasures of the ancient Mia civilization. Requires 32 Kbytes.

Atlantic Sea Battle
Applied Technology
Cassette $12.50
You are the captain of the battleship Bismark. Your mission, destroy all allied shipping.

Battleships
Nectar Software, Bendata Pty Ltd
Cassette $11.20, disk $10
A game to introduce coordinate geometry to students.

Bee Casino
Applied Technology
Cassette, disk $12.50
Play roulette, blackjack, poker, reels, poker machine, yahtzee and slide.

Bill the Barman
Applied Technology
Cassette $12.50
Recipes for 40 mixed drinks and cocktails.

Capture
Applied Technology
Cassette, disk $12.50
Trap the robots by pushing the boxes together in this fast moving arcade game. Nine levels.

Castle Eldritch
Applied Technology
Cassette, disk $12.50
Battle Lord Eldritch in this real-time wargame/adventure. Requires 32 Kbytes.

Cave Hunt
Applied Technology
Cassette $12.50
A text adventure where you explore caves to find treasure. Requires 32 Kbytes.

Chess/Chess tutor
Applied Technology
Cassette, disk $12.50
Play chess at any one of six levels using high resolution graphics. Requires 32 Kbytes.

Chopper Pilot
Applied Technology
Cassette, disk $12.50
Guide the helicopter through tunnels and passages. Land safely to gain points. Requires 32 Kbytes.

Concentration
Applied Technology
Cassette $12.50
Play the computer or a friend in an attempt to match pairs. Requires 32 Kbytes.

Defender
Applied Technology
Cassette, disk $12.50
Save the human race from aliens.

Depth Charge
Applied Technology
Cassette $12.50
Drop depthcharges on the submarines before they torpedo you.

Destroyer
Applied Technology
Cassette $12.50
Level a city with bombs and then land your craft.

DragonSlayer
Applied Technology
Cassette $12.50
Save the king's daughter and slay the dragon. Win riches and the daughter's hand in marriage. Requires 32 Kbytes.

Draughts
Applied Technology
Cassette, disk $12.50
Play Draughts, Reversi and Link X.

Dungeons of Khan
Applied Technology
Cassette, disk $12.50
Find treasure, fight monsters and save Princess Lara from the Dungeon Masters. Requires 32 Kbytes.

Escape from Colditz
Applied Technology
Cassette $12.50
Get your escape kit and elude capture to break out of Colditz. Text adventure.

Euchre
Bendata Pty Ltd
Disk $13

▷

Eureka
Applied Technology
Cassette, disk $12.50
Go diamond mining, but beware of cave-ins.

Frontier Adventure
Applied Technology
Cassette $12.50
What is The Secret of The Lost Dutchman's Treasure? Find out in this western adventure. Requires 32 Kbytes.

Genius & Insanity
Applied Technology
Cassette $12.50
Similar to Rubik's cube, arrange the cubes with the colours matching. Requires colour.

Golf
Applied Technology
Cassette, disk $12.50
Fire a round of golf at the Beehaven golf course. Requires 32 Kbytes.

Goodison Car Rally
Bendata Pty Ltd
Disk $25

Graphic Lander
Applied Technology
Cassette $12.50
Land your space craft on the rough lunar terrain avoiding meteors and watching your fuel.

Gridfire
Applied Technology
Cassette, disk $12.50
Move around the grid and kill the enemies. Requires 32 Kbytes.

Laser The Invaders
Bendata Pty Ltd
Disk $15

Lazer Blazer
Applied Technology
Cassette, disk $12.50
Use your sights to aim at your target while avoiding the deadly laser beam.

Lemonade
Bendata Pty Ltd
Disk $15

Museum Adventure
Applied Technology
Cassette $12.50
A text adventure that has you finding ghoulish things in the dark corners of the museum. Requires 32 Kbytes.

One Day Cricket
Applied Technology
Cassette $12.50
Play the computer's bouncers, full tosses and good length balls.

Othello
Nectar Software, Bendata Pty Ltd
Cassette $13.44, disk $16
A game of strategy involving markers with one white and one black side.

Planet X
Applied Technology
Cassette $12.50
A text adventure where you try to get back to earth after being marooned on an alien planet. Requires 32 Kbytes.

Pogog Manor
Applied Technology
Cassette $12.50
Escape from Pogog Manor. Face the mad deputy principal and assorted weirdos. Requires 32 Kbytes.

Pontoon
Bendata Pty Ltd
Disk $13

Ring of Doom
Applied Technology
Cassette $12.50
Adventure based on the Lord of the Rings story.

Robotman
Applied Technology
Cassette, disk $12.50
Eat the dots in the maze while avoiding a bunch of robots.

Scrambler
Applied Technology
Cassette, disk $12.50
Pilot your ship through five levels of attack to bomb the enemy base.

Seadog
Applied Technology
Cassette $12.50
It's the battle of the square riggers. Fight the scurvy computer or a cut-throat friend. Requires 32 Kbytes.

Shipwreck Island
Bendata Pty Ltd
Disk $15

Space Invaders
Applied Technology
Cassette, disk $12.50
The original arcade game. Save the base while avoiding falling bombs.

Space Lanes
Applied Technology
Cassette $12.50
Clear the space lanes of pirate ships while protecting your own fleet.

Sword Quest
Applied Technology
Cassette, disk $12.50
Real time graphics adventure where you fight monsters and find treasures. Requires 32 Kbytes.

Sydney Approach
Applied Technology
Cassette, disk $12.50
Be an Air Traffic Controller coordinating flights as they leave Sydney's Mascot airport. Requires 32 Kbytes.

Target/ZTrek
Applied Technology
Cassette, disk $12.50
Shoot at targets or take command of the Starship Enterprise.

Valley & Caves
Applied Technology
Cassette, disk $2.50
Explore the cave or enjoy a full scale adventure where you conquer the black tower. Requires 32 Kbytes.

Video Maze
Applied Technology
Cassette, disk $12.50
Get to the ninth floor of the building through a maze of elevators and corridors.

Viper
Applied Technology
Cassette, disk $12.50
Slither about the screen eating rabbits. The more you eat the longer you grow.

Wonderwords
Applied Technology
Cassette, disk $12.50
The computer creates word puzzles for you to solve.

Yacht Race
Bendata Pty Ltd
Disk $15

EDUCATION

Addition (Extended Notation)
Goodison
Disk $12

Alpha Blast
Nectar Software, Goodison
Cassette $13.44, disk $14
An exciting game with superb sound effects and graphics to practise alphabetical ordering.

Anagrams
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
Competition between student and machine to achieve the most words from a number of letters.

Antony
Beesware
Disk $12

Area Tutorial
Bendata Pty Ltd
Disk $9

Artillery
Bendata Pty Ltd, Goodison
Disk $10

Assess
M.M.D. Software
Cassette $10
Ranks pupils marks with options of all subjects, individual subjects and alphabetical order.

Basic Tutorials
Nectar Software, Goodison
Cassette $17.92, disk $18.20
A set of four tutorials introducing Microworld Basic

Battleships
Goodison
Disk $12

Carespelling
Caresoft
Cassette, disk $12
A spelling program adaptable to any spelling scheme you use.

Climb
Beesware
Disk $12

Clodat
Beesware
Disk $15

Cloze Exercises
Nectar Software

Cassette, disk $11.20
Exercises to develop reading skills and improve the students' comprehension of word meaning.

Cloze Exercises 1
Goodison
Disk $12

Cloze Exercises 2
Goodison
Disk $12

Cloze Exercises 2a
Goodison
Disk $12

Cloze Exercises 3
Goodison
Disk $12

Cloze Exercises 6
Goodison
Disk $12

Cloze Writer
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $16.80, disk $18
This program enables teachers to write their own Cloze exercise.

Cluedo
Goodison
Disk $14.40

Codeword
Beesware
Disk $12

Comdat
Beesware
Disk $15

Copcat
Beesware
Disk $12

Counting House
Nectar Software, M.M.D. Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
A visual learning program for the pre-schoolers with excellent graphics.

Crocodile Words
Bendata Pty Ltd, Goodison
Disk $10

Crocwords
Nectar Software
Cassette, disk $11.20
Guess the word before the crocodile eats the explorer. Suitable for any infants/primary grade.

Cross Word Maker
Nectar Software
Cassette, disk $16.80

Crossword Capers
Goodison
Disk $18

Crossword maker
Bendata Pty Ltd
Disk $15

Dempac
M.M.D. Software
Cassette $14.95
Educational demonstration package for staff.

Division Revision
Bendata Pty Ltd
Disk $10

Divtab
Beesware
Disk $9

Dynamic Compositor
Bendata Pty Ltd, Goodison
Disk $15

Juggler
Bendata Pty Ltd
Disk $15

Edu Pack 1
M.M.D. Software
Cassette $24.95

Edu Pack 2
M.M.D. Software
Cassette $24.95

Elfron Tutorial
Bendata Pty Ltd
Disk $9

Engineer
Beesware
Disk $12

Escape
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
A motivating game incorporating mathematical operations and simple equations with graphics.

Factor Scramble
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
A challenging mathematical game dealing with prime numbers, factors and composite numbers.



Fish-3
Beesware
Disk $12

Fish-4
Beesware
Disk $12

Fish-5
Beesware
Disk $12

Fish-6
Beesware
Disk $12

Fisherman 3
Bendata Pty Ltd
Disk $12

Fisherman 5
Bendata Pty Ltd
Disk $12

French Animals
Goodison
Disk $14

Geometry
M.M.D. Software
Cassette $7
Demonstration exercises in geometry.

Haftstone Adventure
Bendata Pty Ltd
Disk $14

Home Budget
Goodison
Disk $14.40

Homony
Beesware
Disk $12

Infant
M.M.D. Software
Cassette $14.95
Educational drill exercises for infant school level.

Junior Matchmaker
Bendata Pty Ltd
Disk $12

Key Panic
Nectar Software, Goodison
Cassette $13.44, disk $14
Arcade-type game incorporating the matching of letters shown on the screen as 'bombs'.

Keyboard Ducks
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
Typing tutorial for infants.

Keyboard Tutorial
Applied Technology
Cassette $12.50
An introduction to the keys on the Microbee keyboard.

Keyword
Beesware
Disk $12

Koala
Nectar Software
Cassette, disk $13.44
This program incorporates graphics to make tables drill a more inviting exercise.

Lang-1
Beesware
Disk $12

Large Figure Addition
Bendata Pty Ltd
Disk $9.50

Large Figure Subtraction
Bendata Pty Ltd
Disk $9.50

Laser The Invaders
Bendata Pty Ltd
Disk $15

Lemonade Stall
Nectar Software, Goodison
Cassette $16.80, disk $18
An interesting way to learn about the market forces affecting a small business.

Letrec
Beesware

▷

Disk $12

Letter
Bendata Pty Ltd, Beesware
Disk $12

Lfadd
Beesware
Disk $9

Lfadd/Lfsub
Beesware
Disk $15

Lfsub
Beesware
Disk $9

Magics
Beesware
Disk $12

Map of Australia
Bendata Pty Ltd
Disk $10

Map of New South Wales
Bendata Pty Ltd
Disk $10

Map of New Zealand
Bendata Pty Ltd
Disk $10

Map of Queensland
Bendata Pty Ltd
Disk $10

Map of South Australia
Bendata Pty Ltd
Disk $10

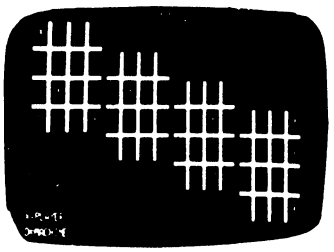
Map of Victoria
Bendata Pty Ltd
Disk $10

Map of Western Australia
Bendata Pty Ltd
Disk $10

Match
Nectar Software, Beesware
Cassette $13.44, disk $15
This is a matching activity using questions and answers. Suitable for 1st grade to high school

Match-Maker
Nectar Software, Goodison
Cassette $13.44, disk $14
This is a two player activity. The objective is to choose two items (words) that will match.

Matchmaker
Bendata Pty Ltd
Disk $12



Math Sheet Maker
Bendata Pty Ltd
Disk $15

Maths Invaders
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $13.44, disk $14
A space-age way to learn maths for years 2 to 8.

Maze
Beesware
Disk $12

Mentals
Beesware
Disk $12

Misfig
Beesware
Disk $12

Morse Code Tutor
Applied Technology
Cassette $12.50
Learn Morse code with the aid of the Microbee.

MrMan Spell Game & Quota Spell
Nectar Software
Cassette $15.68
A fun way to teach the younger student to spell.

Multab
Beesware
Disk $9

Multab/divtab
Beesware
Disk $15

Music
M.M.D. Software
Cassette $7
Singalong with stave, notes, words and sounds.

Musical Table Drill
Nectar Software
Cassette, disk $13.44
Maths tables with a musical difference. Suitable for years 2 to 8.

Musical Tables
Bendata Pty Ltd, Goodison
Disk $12

Muster
Beesware
Disk $12

Mystery Word
Bendata Pty Ltd
Disk $10

Mystery Word 3
Goodison
Disk $10.80

Mystery Word 4
Goodison
Disk $10.80

Mystery Word 5
Goodison
Disk $10.80

Number Facts
Goodison
Disk $10.80

Old MacDonald's Farm
Bendata Pty Ltd, Goodison
Disk $10

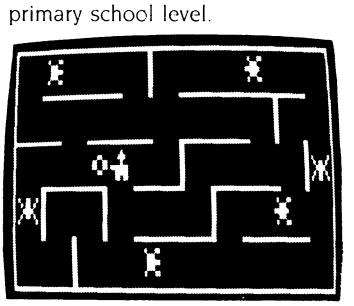
Old MacDonald's Farm
Nectar Software
Cassette, disk $11.20
This program involves counting cows in a field. It has two levels of activity.

Othello
Goodison
Disk $14

P1-val
Beesware
Disk $12

Perimeter Tutorial
Bendata Pty Ltd
Disk $9

Primary
M.M.D. Software
Cassette $14.95
Educational drill exercises for primary school level.



Punctuation 1
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $13.44, disk $14.40
Suitable for years 2 to 4. A fun way to learn about sentence punctuation.

Punctuation 2
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $13.44, disk $14.40
As Punct 1 but drills the use of commas, question marks and inverted commas for titles.

QT 10 M
Beesware
Disk $12

Robo's Picture Show (set of 3)
Bendata Pty Ltd
Disk $25

Screen Dump
Beesware
Disk $9.60

Secret Number
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
This program develops the student's understanding of the properties of numbers.

Sentence Ordering 5
Bendata Pty Ltd
Disk $12

Sentence Ordering 7
Bendata Pty Ltd
Disk $12

Sequence Train
Nectar Software, M.M.D. Software, Bendata Pty Ltd, Goodison
Cassette $11.20, disk $12
Trains, railway stations and passengers make this ordinal numbers exercise a popular one.

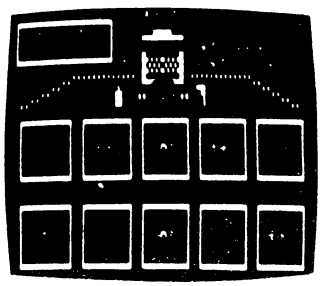
Shape 1
Beesware
Disk $12

Shape 2
Beesware
Disk $12

Shape 3
Beesware
Disk $12

Shape Tutorial
Bendata Pty Ltd
Disk $9

SOFTWARE ON THE CHEAP



Sharpshooter
Bendata Pty Ltd
Disk $14

Shipwreck Island
Nectar Software, Goodison
Cassette $16.80, disk $18
A challenging simulation program for a group of players building awareness of community needs.

Sord-5
Beesware
Disk $12

Sord-7
Beesware
Disk $12

Sord-10
Beesware
Disk $12

Speed Reading
Nectar Software
Cassette, disk $11.20
Six exercises for improving reading skills and comprehension.

Speed Reading Exercises
Goodison
Disk $12

Speed Reading Maker
Nectar Software, Bendata Pty Ltd, Goodison
Cassette $16.80, disk $18
This utility creates a new BASIC program which is itself a new speed reading exercise.

Spelling Master 3
Bendata Pty Ltd, Goodison
Disk $10

Spelling Master 4
Bendata Pty Ltd, Goodison
Disk $10

Spelling Master 5
Bendata Pty Ltd, Goodison
Disk $10

Spelling Master 6
Bendata Pty Ltd, Goodison
Disk $10

Spelling Pack
Nectar Software, Goodison
Cassette $13.44, disk $14
Four different spelling activities using your spelling list. Suitable for years 1 to 6.

Spellpack
Bendata Pty Ltd
Disk $12

Spread
M.M.D. Software
Cassette $7
Speed reading — 10 to 500 w.p.m. Underlining facility and changeable data.

Story 1 (The Lost Ball)
Beesware
Disk $12

Story 2 (The Cave)
Beesware
Disk $12

Story 3 (Small Time)
Beesware
Disk $12

Story 4 (Shipwrecked)
Beesware
Disk $12

Story Tracks 1
Bendata Pty Ltd
Disk $12

Student Ranking Program
Bendata Pty Ltd, Goodison
Disk $20

Tables Shoot Drill/Data Entry
Nectar Software
Cassette, disk $15.68
Balloons and drill questions make an interesting combination for this educational program.

Taipan
Nectar Software
Cassette, disk $16.80
Become a millionaire trading in jewels, silk, food and general cargo. Watch out for pirates!

Tank Battle
Goodison
Disk $12

The Yacht Race
Goodison
Disk $14.40

Towns and Cities
Nectar Software, Goodison
Cassette $11.20, disk $12
A program dealing with maps and city locations. A interesting approach to geography.

Turtle
Bendata Pty Ltd
Disk $25

Typing Tutor
Applied Technology
Cassette $12.50
Learn to touch type using the Pitman method.

Usage-1
Beesware
Disk $12

Vocab Quiz 5
Nectar Software, Bendata Pty Ltd, Goodison
Cassette, disk $11.20
Suitable for upper primary. A multiple choice format of words and meanings at a suitable level

Vocab Quiz 8
Nectar Software, Bendata Pty Ltd, Goodison
Cassette, disk $11.20
A multiple choice format of words and meanings suitable for years 8-9.

Vowels
Beesware
Disk $12

What's The Time Mr Wolf?
Caresoft
Cassette, disk $12
A program which gives practice in telling the time from a clock face.

Yacht Race
Nectar Software
Cassette, disk $13.44
A game for two players or two teams. A practical use of compass bearings and scaled distances.

ACCOUNTING

Adults
M.M.D. Software
Cassette $7
Designed to help with Car Expenses, Hire Purchase, Food, Investment, Cheques and Conversions.

General Ledger
Applied Technology
Cassette $12.50
Process cheque-butts, pay ins and other source documents without any accounting knowledge.

Insurance Inventory
Applied Technology
Cassette $12.50
Keep track of items and serial numbers for household insurance and other purposes.

DATABASE

Data Base
Applied Technology
Cassette $12.50
Keep track of lists and information with this straightforward data handler.

WORD PROCESSING

Mailmerge
Applied Technology
Cassette $19.95
Lets you use Wordstar to produce form letters.

Spellstar
Applied Technology
Cassette $19.95
Check text for spelling errors using a 20,000 word dictionary and 1000 words of your own.

Text Formatter
Applied Technology
Cassette $12.50
A word processor for people using Edasm instead of Wordbee.

SPREADSHEET

Busy Calc
Applied Technology
Cassette $12.50
Spreadsheet. On a 16 Kbyte machine it will have 10 by 20 rows, or 24 by 40 on a 32 Kbyte machine.

GENERAL UTILITIES

Big Character VDU
Applied Technology
Cassette $12.50
Display characters on the screen four times their normal size.

Debug
Applied Technology
Cassette $12.50
Execute a machine code program ▷

Introducing another member of the METAPHOR family.

Meta 5GL

The Australian 5GL Application Generator ... META4 plus more!

Generate Complete Applications WITHOUT ANY PROGRAMMING.
Generate professional integrated Data-Base Applications
MORE QUICKLY THAN WITH ANY OTHER PRODUCT.

Major Features of META-5GL

- Non-Procedural ... NO PROGRAMMING.
- Multi-User & Run-Time versions available.
- Capable of handling simple to VERY complex applications.
- Highly PRODUCTIVE
- Integrates
  - Data-Base
  - Text-Processing
  - Calculations
  - Menus
  - Bar-Charts
  - Data Entry Validation
  - Data-Base Query
- 2 Report Generators—QUICK and CUSTOM
- Complete On-line Documentation
- 3-Level Context-Sensitive HELP feature
- Device Independent Terminal/Screen Support for:
  - COLOUR
  - 80/132 COLUMNS
  - INVERSE VIDEO, BOLD, Etc.
  - FUNCTION KEYS
- Data-Base Oriented, with ACTIVE DATA DICTIONARY
- IMPORT/EXPORT to TEXT FILES
- UNIX VERSION SOON.

Application of the month
Increase your sales with SAMM, the computerised Sales & Marketing Management System (written in META-5GL).
Contact:
COMPUTER BROKERS of AUSTRALIA
SYDNEY (02) 977 8600

Brochure	Free
DEMO Disks (Full System, 'Z' & '9' keys disabled)	$50.00
Manual	$40.00
Full System (Single-User, MS-DOS)	$395.00
Full System (Multi-User, MS-DOS)	$1200.00
Full System (Multi-User, Micromation MP/M)	$1200.00
Single-User Support (Optional)	p.a. $150.00
Multi-User Support (Optional)	p.a. $300.00
Upgrade from Original META4 to META5GL	$150.00
Original META4 for 8-Bit CP/M (Upwards compatible)	$195.00

Available from:

SYSTEM SOLUTIONS PTY. LTD.
INCORPORATED IN VICTORIA
28–30 Palmerston St., Berwick, Vic. 3806. ☎ (03) 707 2851.

BANKCARD, AMEX, VISA accepted.

step by step to follow the path it takes.

Disk Catalog System
Applied Technology
Cassette $19.95
Keep track of files on disk with records of the directory tracks of any number of disks.

Escape Key
Applied Technology
Cassette $12.50
Enter BASIC command words without typing them in using this helpful utility.

Super Disassembler
Applied Technology
Cassette $12.50
Disassemble machine code for analyis using this utility.

MISCELLANEOUS

Computer Modelling
Applied Technology
Cassette $12.50
Evaluate a device or system when experimenting with the real thing is impractical. Requires 32 Kbytes.

Matrix Calculator
Applied Technology
Cassette $12.50
A number crunching program that uses matrix manipulation techniques.

Metric Converter
Applied Technology
Cassette $12.50
Metric to imperial conversions, hex to decimal and more.

PCG Sampler
Applied Technology
Cassette $12.50
An introduction to the principles and uses of PCG graphics. Includes demonsrations.

Sketch Pad
Applied Technology
Cassette $12.50
Sketch pad is a useful tool for creating graphics.

Sega 3000

GAMES

Blackjack
John Sands, High Technology
Cassette $19.95
A computer version of the game of Blackjack.

Dragonquest
John Sands, High Technology
Cassette $19.95
Gather gold from the caves of the Dwarvendelf (sic) people and protect it from dragons.

Environoid
John Sands, High Technology
Cassette $19.95
Adventure begins with being trapped in a tree house.

Heroic Quest
John Sands, High Technology
Cassette $19.95
Find the sacred emblem of Ra Shanrah and return it to your city to remove the curse of Urartu.

Ice Cream Stall
John Sands, High Technology
Cassette $19.95
A fun program that demonstrates some fundamentals of good business sense.

Reverso
John Sands, High Technology
Cassette $19.95
Outflank your opponent on a board of 8x8 squares.

Solar Conquest
John Sands
Cassette $19.95
Conquer and control the 20 worlds of the Delta Galactic System. Requires 24 Kbytes. ▷

North Star's Dimension.

THE IBM-COMPATIBLE MULTI-USER SYSTEM THAT'S ENGINEERED FOR GROWING BUSINESSES



NorthStar™
The brightest alternative to PCs.™

The brightest alternative to PCs.
When you stop and think about it, personal computers really have no business being in a growing business.
Because PCs are expensive to add, difficult to network and can test both your patience and your wallet.
But now there's Dimension from North Star.
Dimension is a multi-user computer system that can support up to 12 work stations, each having more processing power than a stand alone PC.
And new users can be added whenever you want for less than half the cost of adding PCs.
Regardless of how many users your DImension has, they'll be able to share software, data and expensive peripherals from the moment you plug the system in. Because Dimension has advanced networking capabilities built right in, unlike local area networks. This makes Dimension extremely fast.
While Dimension won't burden you with a PC's limitations, you'll still be able to use the most popular PC software. Because Dimension is compatible with all the best-selling programs for the IBM PC XT.
So before you decide on a PC you'll probably outgrow, take a closer look at Dimension. Call us now for your free data sheet.

MELBOURNE
TEL: (03) 792 4152

NEW DIMENSION COMPUTERS PTY. LTD.
PO Box 1167, Dandenong 3175. Victoria.
DEALER SUPPORT AVAILABLE

PERTH
JARASOFT
(09) 322 7499

Solar Quest
High Technology
Cassette $19.95

Word Block
John Sands, High Technology
Cassette $19.95
Build your own words and block your opponent's words.

EDUCATION

Addition Tutor
John Sands, High Technology
Cassette $19.95
Guidance in addition with five levels of difficulty.

Alpha Alphabet
John Sands, High Technology
Cassette $19.95
Helps you get all the letters of the alphabet in the right order.

Aust General Knowledge Tutor
John Sands, High Technology
Cassette $19.95
A program for all ages that tests knowledge of Australia.

Australian Geography Tutor
John Sands, High Technology
Cassette $19.95
Increases knowledge of Australian geography.

BASIC I Tutorial Program
John Sands, High Technology
Cassette $19.95
An introduction to the BASIC commands.

BASIC II Tutorial Program
John Sands
Cassette $19.95
An extension of the fundamentals of BASIC programming.

Demon Division
John Sands, High Technology
Cassette $19.95
Fight off the problem laden monsters by giving the correct answers.

Division Tutor
John Sands, High Technology
Cassette $19.95
Guidance in division with five levels of difficulty.

Flashword 1
John Sands, High Technology
Cassette $19.95
Helps children to read 220 words, 80 phrases and 95 of the most common nouns.

Flashword 2
John Sands, High Technology
Cassette $19.95
An extension to learning words, phrases and common nouns.

Keyboard Learning Program
John Sands, High Technology
Cassette $19.95
Introduction to use of the keyboard.

Learn the Alphabet Program
John Sands, High Technology
Cassette $19.95
Letter and object association training.

Learning to count
John Sands, High Technology
Cassette $19.95
Counting practice for children.

Roman Numbers-Up
John Sands, High Technology
Cassette $19.95
Learn and practice Roman numerals.

Satellite Subtraction
John Sands, High Technology
Cassette $19.95
Stop the satellites from attacking the spaceship by giving the correct answers.

Segaword
High Technology
Cassette $19.95

'Let's Type' Program
John Sands High Technology
Cassette $19.95
Keyboard familiarisation and lessons to increase general typing speed.

Marauding Multiplication
John Sands, High Technology
Cassette $19.95
Save the earth! Destroy the aliens by answering the questions correctly.

Maths Blaster Series
John Sands
Cassette $19.95

Metric Maths
High Technology
Cassette $19.95

Metric Mentals
John Sands
Cassette $19.95
Develop skills needed to handle metric relationships.

Multiplication Tutor
John Sands, High Technology
Cassette $19.95
Guidance in multiplication with three levels of difficulty.

Spelling Tutor
John Sands, High Technology
Cassette $19.95
Choose your level of difficulty and be rewarded for a correct answer with a colour display.

Spellomatic 1
John Sands, High Technology
Cassette $19.95
Learn 140 of the most commonly misspelt words in the English language.

Spellomatic 2
John Sands, High Technology
Cassette $19.95
Develop spelling from the easiest to the hardest words.

Subtraction Tutor
John Sands, High Technology
Cassette $19.95
Guidance in subtraction with five levels of difficulty.

Tank Addition
John Sands, High Technology
Cassette $19.95
Destroy the tanks by firing back the right answer.

Watch Me Draw Program
John Sands, High Technology
Cassette $19.95
Draw on the Sega's screen using the joystick and eight colours.

Whiz Kid Mental Arithmetic
John Sands, High Technology
Cassette $19.95
Test mental arithmetic at all levels while having fun.

WORD PROCESSING

Mailing List
High Technology
Cassette $19.95
Create files of names and addresses and use the 250 self adhesive labels for the Sega printer.

ACCOUNTING

Expense Analyser
John Sands
Cassette $19.95
Analyse your household expenses. Find out where the money does go.

Softax Program 1984
John Sands, High Technology
Cassette $19.95
Type in expense and income information for a detailed and analysed tax return.

GENERAL UTILITIES

Sprite Generator Program
John Sands, High Technology
Cassette $19.95
Assistance with producing sprites that can be used in your BASIC programs.

Tandy Color Computer

GAMES

Bedlam
Tandy
Cassette $19.95

Cordial Stall
Tandy
Cassette $9.95

Madness and the Minotaur
Tandy
Cassette $19.95

Micro Color Checkers
Tandy
Cassette $14.95
A computer adaptation of checkers.

Micro Color Games Pak
Tandy
Cassette $16.95
Lunar Lander, Breakout, Hangman and Pong, all on the one cassette.

Micro Color Pinball
Tandy
Cassette $16.95
A computer adaptation of the game of pinball.

Pyramid
Tandy
Cassette $19.95

Raaka-Tu
Tandy
Cassette $19.95

EDUCATION

Maths Invaders
Tandy
Cassette $9.95

Micro color Math/Design Pack
Tandy
Cassette $16.95
Perform math functions and plot graphics.

Spelling
Tandy
Cassette $9.95

Vocabulary Tutor 1
Tandy
Cassette $9.95

Vocabulary Tutor 2
Tandy
Cassette $9.95

Printing Util. Color Screen
Tandy
Cassette $14.95

Tandy MC 10

EDUCATION

Educational Games
Tandy
Cassette $9.95
Five games to test logic, reactions and knowledge of people of all ages.



Tandy PC 12

GAMES

Games Pak
Tandy
Cassette $24.95

EDUCATION

Chemistry Math
Tandy
Cassette $24.95

Math Pak I
Tandy
Cassette $19.95

Math Pak II
Tandy
Cassette $19.95

Math Plotter
Tandy
Cassette $19.95

TRS-80 Model 4

GAMES

Flying Saucers
Tandy
Cassette $9.95
Shoot down the aliens with your laser cannon.

Haunted House
Tandy
Cassette $19.95
Trapped in a ghostly mansion! You must solve the mysteries before you can escape.

Paddle Pinball
Tandy
Cassette $19.95
A computer adaptation of the game of pinball.

Starquest
Tandy
Cassette $24.95
Explore a planet and fight off aliens.



VIC-20

EDUCATION

Addition Invaders
Ozisoft
Cassette $9.95

Alphabet Quest
Ozisoft
Cassette $19.95

Auscap and Ausquiz
Ozisoft
Cassette $14.95
Geography quizzes on Australian capital cities, mountains and rivers.

Connect Four
Ozisoft
Cassette $19.95

Counter Blast
Ozisoft
Cassette $19.95

Counter Play
Ozisoft
Cassette $14.95
Numerals lessons requiring the child to count the objects and press the correct number.

Giant Maths
Ozisoft
Cassette $19.95

Mastermind
Ozisoft
Cassette $19.95

Mathmagic
Ozisoft
Cassette $19.95

Maths Quest
Ozisoft
Cassette $19.95

Mightywriter
Ozisoft
Cassette $19.95

Mr Fixit
Ozisoft
Cassette $19.95

Division Invaders
Ozisoft
Cassette $9.95

English Invaders
Ozisoft
Cassette $9.95

Multiplication Invaders
Ozisoft
Cassette $9.95

Rocket
Ozisoft
Cassette $19.95

Sketch and Paint
Ozisoft
Cassette $9.95
Draw on your computer's screen using joystick control.

Speedy Reader One & Two
Ozisoft
Cassette $14.95
A speed reading course that improves the speed and comprehension of children.

Spell Out
Ozisoft
Cassette $14.95
Helps children learn spelling lists with fill-ins, scrambled words and word searches.

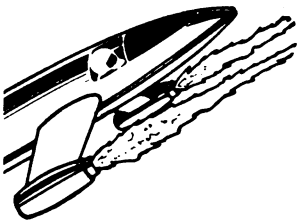
Spelling Helper
Ozisoft
Cassette $14.95
Enter words for your child or student to spell.

Subtraction Invaders
Ozisoft
Cassette $9.95

Tables Prac/Tables Launcher
Ozisoft
Cassette $14.95
Programs that take the drudgery out of learning the times tables.

Type Trainer
Ozisoft
Cassette $19.95 ▷

GAMES



Backgammon
Ozisoft
Cassette $19.95

Club Golf
Ozisoft
Cassette $19.95

Dragon Caves
Ozisoft
Cassette $19.95

Encounter
Ozisoft
Cassette $19.95

Fighter Command
Ozisoft
Cassette $19.95

Frogger
Ozisoft
Cassette $19.95

Galaxians
Ozisoft
Cassette $19.95

Global War III
Ozisoft
Cassette $19.95

Moon Flite
Ozisoft
Cassette $19.95

Nightmare Park
Ozisoft
Cassette $19.95

Space Panic
Ozisoft
Cassette $19.95

Tomb of Karnak
Ozisoft
Cassette $19.95

VZ-300/200

Asteroids
Dick Smith
Cassette $13.95

Backgammon
Dick Smith
Cassette $13.95

Blackjack
Dick Smith
Cassette $9.50

Checkers
Dick Smith
Cassette $13.95

Chess
Dick Smith
Cassette $13.95

Circus
Dick Smith
Cassette $9.50

Dracula Castle
Dick Smith
Cassette $13.95

Duel
Dick Smith
Cassette $13.95

Dynasty Derby
Dick Smith
Cassette $9.50

Golf/Tennis
Dick Smith
Cassette $9.50

Hangman
Dick Smith
Cassette $9.50

Hoppy
Dick Smith
Cassette $13.95

Horse Racing
Dick Smith
Cassette $9.50

Killer Tomato
Dick Smith
Cassette $13.95

Knights/Dragons
Dick Smith
Cassette $13.95

Ladder Challenge
Dick Smith
Cassette $13.95

Matchbox
Dick Smith
Cassette $9.50

Othello
Dick Smith
Cassette $13.95

Planet Patrol
Dick Smith
Cassette $13.95

Poker
Dick Smith
Cassette $9.50

Slot Machine
Dick Smith
Cassette $9.50

Star Blaster
Dick Smith
Cassette $13.95

Super Snake
Dick Smith
Cassette $13.95

Tennis
Dick Smith
Cassette $13.95

VZ Ghost Hunt
Dick Smith
Cassette $13.95

VZ Invaders
Dick Smith
Cassette $9.50

VZ Panic
Dick Smith
Cassette $13.95

GENERAL BUSINESS

Mailing List
Dick Smith
Cassette $13.95

Statistics 1
Dick Smith
Cassette $13.95

Statistics 2
Dick Smith
Cassette $13.95

EDUCATION

Flashcard 1+2
Dick Smith
Cassette $13.95

Flashcard 3+4
Dick Smith
Cassette $13.95

Intro To BASIC
Dick Smith
Cassette $13.95

Matrix
Dick Smith
Cassette $13.95

Metric Spycatcher
Dick Smith
Cassette $13.95

Music Writer
Dick Smith
Cassette $13.95

Speed Reading
Dick Smith
Cassette $13.95

Spellomatic 1+2
Dick Smith
Cassette $13.95

Spellomatic 3+4
Dick Smith
Cassette $13.95

Typing Teacher
Dick Smith
Cassette $13.95

Whizkid Spycatcher
Dick Smith
Cassette $13.95

GENERAL UTILITIES

Disassembler
Dick Smith
Cassette $13.95

Editor Assembler
Dick Smith
Cassette $22.95

Hex Utilities
Dick Smith
Cassette $13.95

MISC

Biorhythm
Dick Smith
Cassette $9.50

ZX Spectrum

GAMES

2003 A Space Oddity
Gametronics
Cassette $25

3D Combat Zone
Gametronics
Cassette $22.50

3D Quadracube
Gametronics
$19.50

Air Wulf
Gametronics
Cassette $24.95

Android II
Gametronics
Cassette $25

Apple Jam
Gametronics
Cassette $19.50

Aquaplane
Gametronics
Cassette $25

Arcadia
Gametronics
Cassette $19.50

Arcturus
Gametronics
Cassette $25

Armageddon
Gametronics
Cassette $20

Astro Blaster
Gametronics
Cassette $20

Atic Atac
Gametronics
Cassette $25

SOFTWARE ON THE CHEAP

Auto Chef
Gametronics
Cassette $19.50

Avalon
Gametronics
Cassette $24.95

Avenger
Gametronics
Cassette $22

Backgammon
Gametronics
Cassette $12.50

Backpackers' Guide
Gametronics
Cassette $22.50

Beach Head
Gametronics
Cassette $24.95

Bear Bovver
Gametronics
Cassette $22.50

Beetlemania
Gametronics
Cassette $22

Blade Alley
Gametronics
Cassette $19.50

BlindMice
Gametronics
Cassette $19.50

Brainstorm
Gametronics
Cassette $12.50

Braxx Bluff
Gametronics
Cassette $25

Bridge Master
Gametronics
Cassette $14.50

Bugaboo The Flea
Gametronics
Cassette $25

Centi-Bug
Gametronics
Cassette $19.50

Chequered Flag
Gametronics
Cassette $22.50

Classic Adventure
Gametronics
Cassette $22.50

Code Name Mat
Gametronics
Cassette $25

Colomata
Gametronics
Cassette $19.50

Combat Lynx
Gametronics
Cassette $22.50

Cookie
Gametronics
Cassette $25

Cosmic Debris
Gametronics
Cassette $19.50

Cosmic Kanga
Gametronics
Cassette $25

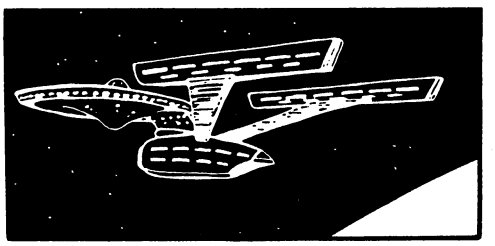
Cosmic Raiders
Gametronics
Cassette $16.95

Crazy Balloons
Gametronics
Cassette $19.50

Creepy Crawler
Gametronics
Cassette $25

Cruise Attack
Gametronics
Cassette $16.95

Decathlon
Gametronics
Cassette $25



Deffendar
Gametronics
Cassette $16.95

Devil Birds/Diggerman
Gametronics
Cassette $19.50

Dictator
Gametronics
Cassette $25

Digger Dan
Gametronics
Cassette $20

Dimension Destructors
Gametronics
Cassette $22.50

Dodge The Demon Driver/E.T.
Gametronics
Cassette $19.50

Dominoes
Gametronics
Cassette $22

Dragonsbane
Gametronics
Cassette $25

Dreadnoughts
Gametronics
Cassette $22

Earth Defence
Gametronics
Cassette $19.50

Eddie Kidd Jump
Gametronics
Cassette $18.50

Electro Storm
Gametronics
Cassette $20

Embassy Assault
Gametronics
Cassette $19.50

Espionage Island (Adv.D)
Gametronics
Cassette $22.50

Fighter Pilot
Gametronics
Cassette $25

Flight Simulator
Gametronics
Cassette $25

Forest at World's End
Gametronics
Cassette $25

Fred
Gametronics
Cassette $25

Frenzy
Gametronics
Cassette $22.50

Frog 5/Showdown
Gametronics
Cassette $19.50

Frogger
Gametronics
Cassette $25

Fruit Machine
Gametronics
Cassette $22.50

Full Throttle
Gametronics
Cassette $24.95

Galactic Patrol
Gametronics
Cassette $25

Galaxians
Gametronics
Cassette $19.50

Ghostbusters
Gametronics
Cassette $24.95

Gobbleman
Gametronics
Cassette $19.50

Gold
Gametronics
Cassette $16.95

Gold Mine
Gametronics
Cassette $19.50

Golden Apple (Adv.E)
Gametronics
Cassette $25

Golf
Gametronics
Cassette $20

Grid Patrol
Gametronics
Cassette $22

Gulpman
Gametronics
Cassette $22

Handicap Golf
Gametronics
Cassette $12.50

Hard Cheese
Gametronics
Cassette $19.50

Haunted Hedges
Gametronics
Cassette $22.50

Hopper
Gametronics
Cassette $22

Horace & The Spiders
Gametronics
Cassette $20

Horace Goes Skiing
Gametronics
Cassette $20

Hungry Horace
Gametronics
Cassette $20

I'm In Shock
Gametronics
Cassette $19.50

Inca Curse (Adv.B)
Gametronics
Cassette $22.50 ▷

Next month you'll have to dig just a little deeper into those pockets when we list software which retails for between $25 and $50, and in August we'll take it up to $100 — cheap, cheap ...

Invaders
Gametronics
Cassette $19.50

Invasion Force
Gametronics
Cassette $22

Jack And The Bean Stalk
Gametronics
Cassette $24.95

Jackpot
Gametronics
Cassette $12.50

Jasper
Gametronics
Cassette $22.50

Jawz
Gametronics
Cassette $19.50

Jet Set Willy
Gametronics
Cassette $24.95

Jetpac
Gametronics
Cassette $25

Johnny Reb
Gametronics
Cassette $22

Jumbly
Gametronics
Cassette $12.50

Kentila
Gametronics
Cassette $24.95

Knock Out
Gametronics
Cassette $16.95

Land Of Sagan
Gametronics
Cassette $25

Laser Warp
Gametronics
Cassette $16.95

Laser Zone
Gametronics
Cassette $25

Les Flicks
Gametronics
Cassette $22.50

Light Cycle
Gametronics
Cassette $22

Loco
Gametronics
Cassette $12.50

Luna Crabs
Gametronics
Cassette $22.50

Lunar Jetman
Gametronics
Cassette $25

Mad Martha
Gametronics
Cassette $16.95

Manic Miner
Gametronics
Cassette $24.95

Match Day
Gametronics
Cassette $24.95

Match Point
Gametronics
Cassette $25

Maze Death Race
Gametronics
Cassette $22

Meteor Storm
Gametronics
Cassette $22

Meteoroids
Gametronics
Cassette $19.50

Micro Mouse
Gametronics
Cassette $22

Micro Olympics
Gametronics
Cassette $24.95

Millimon
Gametronics
Cassette $19.50

Mined Out
Gametronics
Cassette $22.50

Monkey Bizness
Gametronics
Cassette $19.50

Monte Carlo
Gametronics
Cassette $12.50

Mugsy
Gametronics
Cassette $22.50

Mummy Mummy
Gametronics
Cassette $22

Munch Man
Gametronics
Cassette $19.50

Naanas
Gametronics
Cassette $22.50

Nifty Lifty
Gametronics
Cassette $25

Night Gunner
Gametronics
Cassette $22.50

Nightmare Park/ Dragon Maze
Gametronics
Cassette $19.50

One Hundred and Eighty
Gametronics
Cassette $12.50

Over The Spectrum 1
Gametronics
Cassette $20

Over The Spectrum 2
Gametronics
Cassette $20

Over The Spectrum 3
Gametronics
Cassette $20

Panic
Gametronics
Cassette $20

Paradroids
Gametronics
Cassette $16.95

Paras
Gametronics
Cassette $22

Pat The Postman
Gametronics
Cassette $16.95

Penetrator
Gametronics
Cassette $22.50

Planet Of Death (Adv.A)
Gametronics
Cassette $22.50

Planetoids
Gametronics
Cassette $20

Pogo
Gametronics
Cassette $25

Pontoon
Gametronics
Cassette $25

Privateer
Gametronics
Cassette $22

Psion Chess
Gametronics
Cassette $12.50

Pssst
Gametronics
Cassette $25

Psytron
Gametronics
Cassette $25

Red Baron
Gametronics
Cassette $22

Redweed
Gametronics
Cassette $22

Reversi
Gametronics
Cassette $22.50

Road Racers
Gametronics
Cassette $19.50

Road Toad
Gametronics
Cassette $19.50

Roman Empire
Gametronics
Cassette $22

Roulette
Gametronics
Cassette $12.50

Samurai Warrior
Gametronics
Cassette $22

SAS Assault
Gametronics
Cassette $19.50

Schizoids
Gametronics
Cassette $19.50

Scuba Dive
Gametronics
Cassette $25

Sheer Panic
Gametronics
Cassette $25

Ship Of Doom (Adv.C)
Gametronics
Cassette $22.50

Slicker Puzzle
Gametronics
Cassette $12.50

Snake
Gametronics
Cassette $19.50

Snooker
Gametronics
Cassette $25

Space Intruders
Gametronics
Cassette $19.50

Space Raiders
Gametronics
Cassette $19.50

Space Zombies
Gametronics
Cassette $16.95

Spawn Of Evil
Gametronics
Cassette $19.50

Spectrum Chess
Gametronics
Cassette $12.50

Speed Duel
Gametronics
Cassette $19.50

Sports Hero
Gametronics
Cassette $22.50

Star Trek 3000
Gametronics
Cassette $25

Starstrike
Gametronics
Cassette $24.95

T.L.L.
Gametronics
Cassette $25

Terror-Daktil
Gametronics
Cassette $22.50

SOFTWARE ON THE CHEAP

Test Match
Gametronics
Cassette $25

The Snowman
Gametronics
Cassette $25

Timegate
Gametronics
Cassette $25

Timequest
Gametronics
Cassette $25

Tir Na Nog
Gametronics
Cassette $24.95

Trader
Gametronics
Cassette $25

Tranz Am
Gametronics
Cassette $25

Travel With Trashman
Gametronics
Cassette $19.50

Traxx
Gametronics
Cassette $25

Trog
Gametronics
Cassette $19.50

Trom
Gametronics
Cassette $19.50

Tunnel Tester
Gametronics
Cassette $19.50

Two-Gun Turtle
Gametronics
Cassette $22

Tyrant Of Athens
Gametronics
Cassette $22

Velnor's Lair
Gametronics
Cassette $25

Warlord
Gametronics
Cassette $22

Wheelie
Gametronics
Cassette $25

World Cup
Gametronics
Cassette $25

Worse Things Happen At Sea
Gametronics
Cassette $25

Xadom
Gametronics
Cassette $25

GENERAL UTILITIES

Masterfile 16
Gametronics
Cassette $25

Mach. Lang. Beginners
Gametronics
Cassette $20

Monitor/Disassembler
Gametronics
Cassette $25

Print Utilities
Gametronics
Cassette $18.95

Zeus Assembler
Gametronics
Cassette $25

GENERAL BUSINESS

Matcalc
Gametronics
Cassette $14.90

Vu-Calc
Gametronics
Cassette $25

MISC

Club Record Controller
Gametronics
Cassette $22.50

Collector's Pack
Gametronics
Cassette $22.50

DLAN
Gametronics
Cassette $25

Musicmaster
Gametronics
Cassette $12.95

Sound FX
Gametronics
Cassette $22

SPDE
Gametronics
Cassette $19.95

Spectrum Bug 2
Gametronics
Cassette $25

Superdraw
Gametronics
Cassette $22

Sys 64
Gametronics
Cassette $25

Vu-3D
Gametronics
Cassette $25

EDUCATION

ABC
Gametronics
Cassette $22

ABC Lift-Off
Gametronics
Cassette $19.95

Adding and Subtracting
Gametronics
Cassette $19.50

Alphabet
Gametronics
Cassette $19.50

Breakaway
Gametronics
Cassette $22

Countabout
Gametronics
Cassette $25

Counting
Gametronics
Cassette $19.50

Diet
Gametronics
Cassette $25

Hot Dot Spotter
Gametronics
Cassette $25

Humpty Dumpty Mystery
Gametronics
Cassette $19.50

Pathfinder
Gametronics
Cassette $19.50

Shape Sorter
Gametronics
Cassette $19.50

Distributors

Ozisoft
33/8-24 Kippax Street
Surry Hills 2010
(02) 211 1266.

Melbourne House
70 Park Street
South Melbourne 3205
(03) 699 6155.

Commodore
5 Orion Road
Lane Cove 2066
(02) 427 4888.

Tandy
91 Kurrajong Avenue
Mount Druitt 2770
(02) 675 1222.

John Sands
6 Bay Street
Port Melbourne 3207
(03) 645 3333.

Gametronics
Shop 6 177 Toorak Road
South Melbourne 3205
(03) 241 3031

McGraw-Hill
4 Barcoo Street
Roseville 2069
(02) 406 4288.

AWA-Thorn
348 Victoria Road
Rydalmere 2116
(02) 638 8444.

Dick Smith
396 Lane Cove Road
North Ryde 2113
(02) 888 2002.

Applied Technology
1A Patterson Avenue
Waitara 2077
(02) 487 2711.

M.M.D. Software
P.O. Box 737
Manly 2095

Nectar Software
1 Barracks St
Emu Plains 2750
(047) 35 2158.

Caresoft Software
C/- Denistone
East Public School
Lovell Road
Eastwood 2122
(02) 85 6678.

Bendata Pty Ltd
19 Elliott Street
Beacon Hill 2100

J & H Beesware
221 Fragar Road
Penrith 2750
(047) 36 1063.

Goodison Software
14 Mollison Street
Broadford 3658
(057) 841 926.

FBN Software
16 Coles Place
Torrens 2607
(062) 86 1102.

MDG & Assoc
4573 Heatherglen Ct
Moorpark
CA 93021 U.S.A.

Glyphic Software
PO Box 391
Pennant Hills 2120.

High Technology Computer Systems Pty Ltd
87 Swan Street
Richmond 3121
(03) 429 1966.
290 Bay Street
Brighton 3186
(03) 596 6211.

Books of Special Interest to Our Readers

PROGRAMMING FOR REAL BEGINNERS: STAGE 1
Written for complete beginners, this book assumes no previous knowledge of computing at all, and guides you through the initial stages of building up simple programs. The text is written to be non-machine-specific, and so can be used with any micro that is programmable in BASIC. 82pp.
H0344A $8.95



PROGRAMMING FOR REAL BEGINNERS: STAGE 2
This book introduces you to the stages involved in planning a program, including the use of flowcharts, and explores the wider range of facilities the computer has to offer. You'll also learn how to plan your screen displays attractively to make your programs really user friendly. 80pp.
H0387A $13.95

THE MUSICIAN AND THE MICRO
A straightforward and practical guide for keen musicians, teachers and those who work in the music industry, covering the exciting world of microprocessors and computerised musical instruments. 192pp.
G0280A $9.95

COBOL FOR BEGINNERS
A solid text for introductory programming courses in COBOL, using a format that is easy to understand, yet comprehensive enough to make supplementary reading unnecessary. 369pp.
H0140H $33.95

DON'T (OR, HOW TO CARE FOR YOUR COMPUTER)
A guide to computer and peripheral preservation. Specific advice for the computer, floppy discs, hard discs, the CRT terminal, the printer, tape units, the computer room, software and documentation. 210pp.
H0153A $19.95

YOUR FIRST COMPUTER
An easy-to-understand beginner's book to small computers. Understanding them, buying them and using them for personal and business applications. 252pp.
H0271A $15.25

YOUR FIRST BASIC PROGRAM
Imagine — In just one hour you'll be writing your first BASIC program! This very entertaining book requires no computer experience at all. It's a fun, easy-to-understand introduction to computing — loaded with bright illustrations and simple diagrams. Anyone from 8 to 88 years old should make this their first BASIC computer book. 180pp.
H0423A $16.00

MICROPROCESSOR CIRCUITS
Presents basic microprocessor concepts in simple language for beginners and teaches you to construct a useful microcontroller system. Offers 30 demo circuits which take you through assembly, operation and programming a microcontroller. 106pp.
J0157P $14.75

MICROCOMPUTING DESIGN & TROUBLESHOOTING
Tells you how to design microcomputer systems and make them work without an expensive commercial development system or the need for costly test instrumentation. Includes a complete description of two microprocessors — the 8085 and the 6502. 346pp.
J0161P $26.75

APPLE INTERFACING
With this book you will be able to perform useful experiments which will provide a much clearer understanding of the fundamentals of computer interfacing and computer electronics. 201pp.
J0273P $15.95

STD BUS INTERFACING
Tells what the STD bus is, why it should be used and how to interface it with various peripherals. Explains addressing I/O devices, the use of different techniques to decode or assign addresses and the transfer of data and control signal timing. 281pp.
J0164P $21.75

MICROPROCESSOR INTERFACING TECHNIQUES
Teaches you how to interconnect a complete microprocessor system and interface it to the usual peripherals. The hardware and software skills needed to effectively interface peripheral devices are covered along with various bus standard and A/D conversion. 456pp.
J0167A $29.95

HOW TO PROGRAM AND INTERFACE THE 6800
An in-depth introduction to microprocessors and microcomputers in general and the Motorola 6800 microprocessor family in particular. Includes experiments for the Heath ET3400 and Motorola MEK6800D2 learning systems designed to demonstrate 'real world' applications. 410pp.
J0303P $22.95

PROGRAMMING IN BASIC FOR PERSONAL COMPUTERS
Simple instructions show how to give BASIC commands and statements a wide range of applications, from programming video games to business or scientific programs. 325pp.
K0186H $18.95

MASTERING DBASE II THE EASY WAY
Focues on how to use dBase II rather than on what it can do. It gets you off to a practical, painless start and then takes you step by step through the learning process without pages and pages of confusing computerese. 216pp.
K0197H $20.95

COMPUTER PROGRAMS FOR AMATEUR RADIO
A comprehensive collection of BASIC programs designed to help radio amateurs cut down on the time spent keeping records, doing mathematical calculations, and beaming in on other stations. 327pp.
N0399S $29.95

APPLE II ASSEMBLY LANGUAGE
Teaches assembly-language programming at the beginning level — no prior knowledge of 6502 assembly language is needed. Includes hands-on computer exercises and experiments with both software and hardware. Provides interfacing circuits and programs that can be used on the Apple II without modifications. 330pp.
K0195P $23.45

HART'S DICTIONARY OF BASIC
Contains more than 800 entries that summarise the actions of almost every statement, command or function that you are ever likely to meet. Each entry is explained in plain English, not computerese. 162pp.
H0276J $15.75

MICROCOMPUTERS: A PARENTS GUIDE
In clear, non-technical language the authors explain what micros are, what they can do, and what to expect in the future. 192pp.
H0275J $13.75

Order Today — Return the Freepost reply card to:

Federal Marketing Book Sales
PO Box 227, Waterloo 2017, NSW
Tel: (02) 663-9999 Tlx: AA74488

FEDERAL MARKETING BOOK SALES

Prices subject to change without notice. *Stock of some books may be limited*

Reviews

Crossdata **100**

The non-portability of software between different computers is a fact of life which has niggled at computer users for decades. Since a true standard is highly unlikely to emerge for some time, it's hardly surprising to find human ingenuity applying itself to getting around the difficulty in other ways — Crossdata is one of these.

By Les Bell

Samna III **104**

A lot of hoo ha has been created around Samna. Our reviewer found that while the package has a great many features, and in general operates according to a few simple principles, it wouldn't be his first choice in word processors.

By John Nicholls

Epson QX-10 ..... **109**

It's 'nicely engineered', has 192 Kbytes of memory as standard, uses graphics to display characters, its documentation is ideal for beginners, and if you make a small addition, that is, if you buy the QX-10+, you'll find even more interesting features.

By Les Bell

Commodore 16 ..... **114**

A complete computing package (all you need is a television set), this recent Commodore Business Machines' release is billed as a great entry into computers for doubting Thomases, eager, but indecisive beavers and the great unwashed in general. At $299, who's arguing?

By Andrew Farrell

Bit Bucket **118**

Someone had to do it soon: produce decorated, dramatic, distinctive, doodled and drawn-on disks — very flashy indeed. In his last Bit Bucket (Frank Lee and others will be continuing the tradition in later issues) Evan also looks at two outstanding monitors, a disk drive analyser, some racy ergonomic chairs and a spreadsheet data conversion package — just a drop in the bucket of all the things we have here to tell you about ...

By Evan McHugh

CROSSDATA — Changing Disk Formats

What do you do if you buy a new computer but want to save all your database files in the new format? Or you want to use a particular piece of software but find the manufacturer hasn't produced it for your machine's disk format? Les Bell has discovered Crossdata, a utility that will solve these problems for most micros.

A RECURRING problem facing many people in this industry, particularly dealers and software developers, is supplying software on the vast range of disk formats required. To some extent, the problem is going away as most new software is supplied for the IBM PC only, but there are still a lot of Microbees, Kaypros, Osbornes, Xerox 820s and other CP/M systems with 13 cm disk drives out there.

So the problem is that many US software suppliers only provide software in 20 cm IBM format or one of the most common 13 cm formats — typically Osborne. How do you get software from Osborne format onto a disk for some other machine?

A related problem is faced by end users who are upgrading from an 8-bit system to a 16-bit machine like the IBM PC. Here the problem is not the programs, since they won't run on the new machine anyway; it's with data files like mailing list databases and so on. How do you get your files off your Osborne disks onto PC-DOS disks?

Late last year, I was over in Perth giving a course on dBase, and one of the guys on the course, Peter Garrett (not he of the shaven head!), was experiencing just this problem. He had an Osborne I which had served him faithfully for some years, but which was about to be put out to pasture and be replaced by a TI Professional. But how to port across all those databases Peter had accumulated over the years?

Fortunately, he found the answer in a program called Crossdata. So impressed was Peter with this product that he obtained the distribution rights for the program in Australia, and he has sent me a copy to have a look at.

Twenty-nine Disk Formats

Crossdata is a file-copying utility for the IBM PC, close compatibles and certain other machines, such as the TI PC — which is how Peter found it. With Crossdata running, the user can configure either disk drive on a PC (or the one on an XT) for one of 29 different disk formats, listed in Table 1.

The program is quite simple to use, although its function-key-driven format can sometimes be a bit tedious, particularly if you're in a hurry.

The first thing to note is that while Crossdata can copy files between all kinds of disk formats, it is itself copy-protected, so you have to work from the master disk. That's not a problem; usually you'll have to remove the program disk from the drive anyway in order to use it, unless you have a three-floppy system.

The main menu allows the user to display the source and destination disk submenus, select files from the source disk directory, and start copying. These commands are logically organised on function keys 1 through 4, in the order in which they would normally be performed.

Also on the main menu are options for redisplaying the source and destination directories, and for entering customised CP/M format parameters. This allows use of the program on oddball formats not in the list.

The source and destination disk menus first of all allow definition of which drive is being used, and then selection of either a CP/M or DOS disk type. If the disk is in DOS format, no further format specification is required; the only thing Crossdata needs is the pathname for any sub-directory you wish to use.

However, if you choose a CP/M disk type, the top half of the screen shows the list of disk formats given in Table 1, and by using the cursor keys you can select which disk format you wish to use. F10 returns you to the main disk selection menu, where F3 can be used to specify a CP/M user area if required. F10 again leads back to the main menu.

This works the same way for both source and destination disks. The next task is to select the files to be transferred. Pressing F3 places the cursor at the top of the source disk directory display at the top left of the screen, and the cursor keys can now be used to move over the directory, with RETURN selecting and highlighting the appropriate files. The F4 key now starts the copying process, which should complete successfully unless you run out of space on the destination diskette.

Should the machine format which you need to work with not be one of the standard choices, don't despair. It is possible to add formats to the Crossdata format menu, so that virtually any machine can be handled successfully. Of course, there are exceptions — the most notable among them being the Apple II, which does not use conventional FM (frequency modulation — that is, single density) or MFM (modified frequency modulation — double density) recording on the disk surface. It uses Group Coded Recording, which floppy disk controller chips are not designed to handle.

In order to handle a 'non-standard' disk format, you'll need to know several things which describe it. These are as follows:

- Number of tracks per side: including the

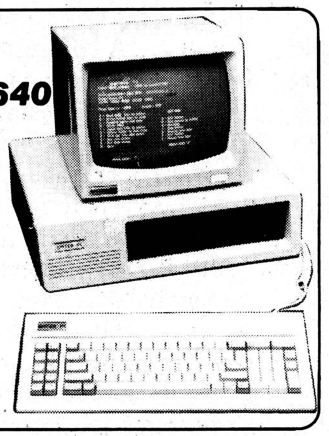
Access Matrix 8-sector SS	NCR Decision Mate V
Cromemco DS DD	NEC PC8000 SS
Cromemco SS DD	Osborne DD
DEC VT-180 SS 9-sector	Otrona CP/M-80
Digilog 1000 SS	Sanyo MBC-1000
Epson QX-10	Televideo 803
HP 125	Topper II DS DD
HP 9138	Toshiba T-100
IBM PC SS	Xerox 820 DS DD
IBM PC DS	Xerox 820 SS DD
Kaypro II	Zenith CP/M-85 DS DD
Max-80 Ver 2.2 DS DD	Zenith Z37 DD SS 1 Kbyte block
Max-80 Ver 3.0 DS DD	Zenith Z37X DS DD
Morrow Micro Decision	Note: SS = Single-sided, DS = Double-sided, DD = Double density
Morrow Micro Decision SS	
Multi-16 DS	

Table 1. *Crossdata disk formats.*

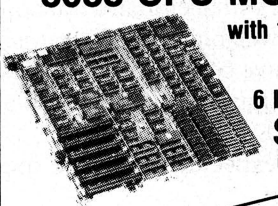
reserved tracks used by the CP/M system itself.

- Number of sectors formatted on each track.
- Number of sectors used per track: usually the same as the last number, unless the manufacturer is wasting space on the disk.
- First sector number: most manufacturers start at 1, but Kaypro starts at 0.
- Sides used: one or two.
- Number of 128 byte records per block: this information is in the CP/M disk parameter block.
- Density: either single or double.
- Number of blocks per CP/M extent: either eight or 16.
- Track/side allocation scheme: can be 0 to 39 on one side, then 39 to 0 (in reverse order) on the other, both sides in ascending order, allocated by cylinders and so on.
- Sector interleave: when writing to the disk, CP/M can skip sectors in order to speed things up. Many 13 cm systems have an interleave of 0, but some have other values.
- Sector size: 128, 256, 512 bytes, or whatever.
- Number of directory blocks: these are allocated to the directory by CP/M.
- Inverted data pattern: some systems (based on certain Western Digital disk controller chips) write inverted data; that is, with ones in place of zeros and vice versa. ▷

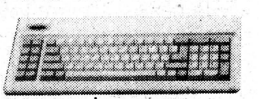
NEW MODEL
EMTEK-PC/640
$2499 INC. TAX
(Monitor not included)
• 640k RAM Standard
• 8K ROM (Expandable to 40K)
• 2 x 360K Floppy Disk Drives
• Colour Graphics or Monochrome Card
• 1 x Serial Port
• 1 x Centronics Printer Port
• Multitech DIOS • MS DOS 2.11
• Operation Manual
Optional — Perfect 11 library ONLY
Perfect Writer & Filer & Calc $695



8088 CPU MOTHER BOARD
with 128K RAM Expandable to 640K
as used in EMTEK-PC 640
6 IBM Compatible Expansion Slots
$793 inc. tax

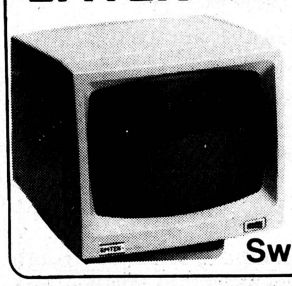


84 KEY
APPLE II — IBM
COMPATIBLE KEYBOARD
• BATTERY-BACKED PROGRAMMABLE FUNCTION KEYS
• 'SELECTRIC' TYPEWRITER LAYOUT
• ONE-KEY BASIC BUILT-IN
• POSITIVE "FEEL"



$177 inc. tax.

EMTEK HM-123



UNBELIEVABLE LOW PRICE!
22 MHz
AMBER OR GREEN
Swivel base

Sakata SP-1200PLUS
120 C.P.S. DOT MATRIX



$415 INC. TAX
WITH NEAR LETTER QUALITY MODE

EMTEK SP-2000
DAISYWHEEL PRINTER



$475 INC. TAX
20 CPS
bankcard welcome here

EMONA COMPUTERS PTY LTD
"THE TECHNOLOGY HOUSE"
1st Floor, 720 George St., Sydney, N.S.W.
(above Mick Simmons Sports Store)
Phone: (02) 212-4599 Tlx: 74500

EMTEK reg. trade mark of Emona Computers Pty Ltd
Apple: reg. trademark of Apple Computers Inc.
IBM: Trademark of International Business Machines Corp.



HIDDEN IN THIS PICTURE IS A DESKTOP COMPUTER.

The tiny portable computer you see above can do everything the average desktop can do. And more.

Meet the EPSON® PX-8.

As you can see, it's smaller than a transportable and considerably lighter — weighing 2.3 kilograms. Yet at the same time, it has a massive 64K RAM (expandable to 184K), a full 80-character Liquid Crystal Display and an excellent full-sized keyboard.

Normally you'd expect to find those specifications on a desktop computer.

But there's more. The EPSON PX-8 has inbuilt business software for word processing, graphics, data base (Portable Cardbox), spreadsheet (Portable Supercalc), communications and many more custom programs on simple plug-in ROM units. It also uses an extended version of Microsoft Basic and a CP/M* operating system — which means you have access to one of the world's largest software bases.

As well, the EPSON PX-8 can be used as a low cost, space saving, intelligent terminal that can be plugged directly into a mainframe or any high performance micro-computer like the EPSON QX-10.

And then it has features which you will never find on a desktop. Rechargeable NiCad batteries (with built-in back-up batteries to preserve data with a trickle of current until you resume operation). An inbuilt micro-cassette recorder for data storage while you're on the move. In fact, everything you would require for complete portability. The EPSON PX-8 and screen folds into a book-sized package that easily fits inside your briefcase.

PERIPHERALS. The EPSON PX-8 is more than just the first portable that performs like a desktop.

A complete range of portable peripherals has been designed to go with it.

There is a 3.5" battery-operated floppy disk unit with 360K formatted capacity. (There is also a standard 5.25" mains-driven version.)

There is a battery-operated Acoustic Coupler which allows you to use any phone — even the one in your car — as a direct communication line to your office or national data base.

There are 60K and 120K battery-operated RAM packs which can be permanently added to the PX-8, greatly enhancing its memory capacity, without sacrificing its portability.

There is also the EPSON P40 compact thermal printer which operates on NiCad batteries, as well as a complete range of dot matrix printers.

Personal computing has just taken a great leap forward. Although the EPSON PX-8 was designed from the ground up as a portable computer, it's going to make a lot of desktops look like dinosaurs.

Priced at only $1,300** including portable wordstar, calc and scheduler. Additional ROM based software is available on request.

EPSON AUSTRALIA, Unit 3, 17 Rodborough Road, Frenchs Forest, Sydney (02) 452 5222, Melbourne (03) 543 6455, Brisbane (07) 832 5400.

The PX-8 by **EPSON** AUSTRALIA

EPSON® *CP/M is a trademark of Digital Research Inc. **Excluding Sales Tax and does not include ROM based software. ® Registered trademark of Epson Corporation

- Reserved tracks: these are where CP/M resides on system disks.
- Number of tracks per inch: 35, 40, 80 or whatever.

Crossdata allows you to fill in a form with these values, and then save this new disk format onto the Crossdata disk under a name of your choosing. Bear in mind that it could take some trial and error to get it right, although in some cases the machine's manufacturer or distributor may be willing to give you the parameters required (though often they won't).

Once a new format has been created, it can be used in the usual way.

Simplicity vs Speed

In its menu-driven mode, Crossdata is very simple to use — you really don't need to read the manual. However, if speed of use is more important, Crossdata can be used in a command-line-driven mode. The command line is complex, involving an extended version of the syntax of the DOS COPY command. Various options like /C indicate the source and destination disk types, user areas and so on, while filenames can be given either explicitly or using standard CP/M and DOS wildcards.

For one-off jobs, it's simpler to use Crossdata in menu-driven mode. But if you have to do one particular type of copy frequently, then it's probably worth making up a batch file containing the appropriate options and possibly either the filenames or %1 and %2 parameters. This will simplify using the program from the command line.

We tried Crossdata on a variety of different disk formats and it worked without fail, and with the minimum of aggravation. What more can you ask for in a format conversion program?

□

PRODUCT DETAILS

Program:	Crossdata
Made By:	Award Software
Useful for:	Disk format conversion
Hardware required:	IBM PC or XT, TI Professional
Price:	$149.00
Review copy from:	Award Software Australia, 90 King Street, Perth 6000. (09) 322 6654

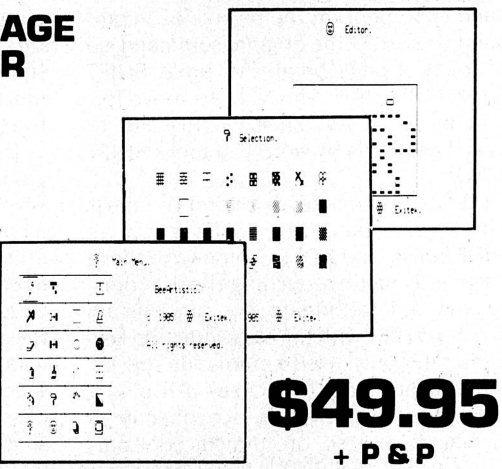
BEEARTISTIC.

You have a choice of drawing tools: pencil, brush, spray-can, fill can, eraser.
Draw points, lines, boxes, elipses or handcrafted drawings.
User-definable patterns – defined areas may be filled or you may brush them on. Text and graphics can be combined; perfect for overhead projector artwork, etc.
"Cut & Paste" facility. Define your own icons and copy them.
Zoom editing – allows you to edit your art in fine detail.
Pictures can be saved on or retrieved from disk, or printed out.
BEESLIDE – a variable speed slide-show package; user defined order and files.
Min. Requirements: 32k Microbee, CP/M, 1 disk drive (40 track DSDD), Epson compatible printer (option).

THE ONLY GRAPHICS PACKAGE AVAILABLE FOR THE MICROBEE

DESIGNED AND DEVELOPED IN AUSTRALIA

A FEW MENUS



$49.95 + P&P

I want to BEEARTISTIC too!
Cheque □ Bankcard □ Mastercard □ VISA □ ☐☐☐ ☐☐ ☐☐☐ ☐☐☐☐☐☐
BEEARTISTIC Packages @ $49.95_____
Postage and Packaging @ $3.50_____
NAME: .....SIGNATURE:.....EXP: ...../.....
ADDRESS: .....STATE ..... P/CODE .....

EXITEK

P.O. Box 348, Balwyn North, Victoria. Australia. 3104. (03) 846 3500

SAMNA III —Full-featured Word Processing

Do you choose a word processor by the number of features it offers? If so, look no further. John Nicholls found Samna III to have just about all the features known to man, and a few that no one has ever thought of before.

THE SAMNA programs exist in a number of forms. Samna I and Samna II are earlier programs offering fewer features; the current word processing program is Samna III. Samna III can also be purchased with some additional programs, including a spreadsheet and a database manager, as Samna+. We'll be reviewing Samna+ at a later date.

Samna III operates according to just a few simple principles. It is a command-driven program, so you invoke each command by keying in a particular sequence; for example, to insert a page break you press MARK b RETURN. To end a command or to perform the reverse of a command you SHIFT the original command, so to delete a page break you press SHIFT MARK b RETURN. Similarly, to move forward by word you press WORD and to move backwards by word you press SHIFT WORD.

The 10 function keys perform the most commonly used functions such as UNDERLINE and BOLD. You invoke these commands just by touching the appropriate key, and terminate the function by pressing SHIFT with the same function key. Less commonly used commands are invoked by pressing the DO key (F9) plus a single letter: C for copy, H for hyphenate, S for search and so on. 'Advanced' commands use the SELECT key (F5), again followed by a single letter, such as A for auto merge, G for glossary and P for proof (spelling checker).

Print commands such as footnotes, line spacing and double underlining are selected in the same way, using the MARK key (Scroll Lock). You do not have the option of selecting any commands by using keys other than the function keys. You will note the DO and MARK keys are at the corners of the normal IBM keyboard, so they are easy to find.

Simple when you know ...

This all sounds pretty simple, and indeed it is — once you have worked it out. The manual doesn't give any explanation such as the one above to indicate the reasoning behind when to use the DO, SELECT, and MARK keys; this is one of the flaws in otherwise good documentation.

Other dedicated function keys are used: the HELP key (Esc) and CANCEL. Oddly enough CANCEL uses both the Alt key and the PrtSc key, both of which do the same thing. There are also 10 user-definable function keys — the 10 number keys along the top of the keyboard when Ctrl-shifted.

The cursor movement keys deserve a paragraph to themselves. The four arrow keys work as expected, moving up or down a line or left or right by one character. The other keys on the numeric keypad are redefined as WORD, SENTENCE, LINE, PARAGRAPH, PAGE, and FILE. Pressing each of these keys moves the cursor forward, and using the SHIFT key in conjunction with them moves the cursor backwards. This consistency in the use of shifted and unshifted commands is one of Samna's best features.

Documentation

This would be an appropriate time to discuss documentation. We received the Samna+ version, which comes in a slip case containing two IBM-size manuals, one for Samna III and the other for the additional package to make up Samna+. The documentation is shrink-wrapped and you have to put it into the three-ring binders; a minor but annoying obstacle to getting to use the program quickly.

It starts with a READ ME FIRST section giving very detailed instructions on how to format diskettes, install the program and run the tutorial program. When I say "very detailed" I mean just that; the completeness can even be irritating at times!

In fairness I must say the commands are arranged alphabetically so they are easy to find and use. They do fall down in one instance, though. If you look at the paragraph above on cursor movement you will notice it omits two of the moves I use most of all: moving to the start of a line or the end of a line. Why? Because Samna uses the GO TO key (the 5 on the numeric keyboard) with the left or right arrow to go to the beginning or end of the line.

The GO TO command is very versatile: you can also use it to go to the top or bottom of the screen, the end or beginning of the document, a specific page, a 'string', word or phrase, a place marker, or to move between two files displayed simultaneously on the screen. The GO TO plus right arrow moves to the right margin rather than after the last character, which would be more useful.

The manual also includes diagrams of all the keyboards supported — English, French, Canadian bilingual, Spanish, Math/Greek/alternative symbols, German, Italian, Swiss French, UK and Norwegian/Danish! It also contains a fold-out reference card and keyboard diagram, stick-on keytop labels (not much use when you are using many programs), a list of Help Messages (what other people call error mes- ▷

The real alternative from Dick Smith Electronics!

OLIVETTI/AT&T M24 PC

Yes! The finest alternative yet. Born of the most important partnership in the history of computing.
A fast, flexible, reliable personal computer that is much 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 it is designed to be flexible enough to meet all your business needs - today and in the future.
Whether you use it as a stand-alone work station or in a fully integrated system, you'll find the M24 a high performance machine. And a hard working addition to your office.
Its faster processing and high resolution graphics will help make any computer task a computing pleasure. In addition, you can expect more standard features. More expansion slots. More options for future growth.
As you'd expect, the M24 is also totally compatible with the MS-DOS operating system. It runs the most popular off-the-shelf software (including Symphony, Lotus 1-2-3, Framework and Flight Simulator) with no modification.
Financial analysis. Forecasting. Budgeting. Word processing. Inventory. The Olivetti -AT&T M24PC does it all.
And its flexibility means that when it's time to expand, the M24 will actually make your computer growing pains painless.
Now the Olivetti-AT&T PC is ready for business.



Standard System ONLY $3995

Includes Olivetti M24 base unit with 128K RAM, one 360K disk drive, high res. green screen monitor, IBM-style keyboard, full MS DOS Operating system with GW Basic.

Expanded system $4495

As above with an extra 360K disk drive and a total of 256K RAM.

MS-DOS and Flight Simulator are trade marks of Microsoft Corporation. Lotus 1-2-3 and Symphony are trade marks of Lotus Corporation. Framework is a trade mark of Ashton Taite.

Specifications

Basic Unit:
- ☐ 16-bit CPU (8Mhz)
- ☐ Socket for optional 8087 numerical processor.
- ☐ 16KB ROM for bootstrapping, power-on diagnostics and BIOS.
- ☐ Alphanumeric and graphic monochrome and colour display controller with 4 simultaneous "shades of grey" or colours from a palette of 16.
- ☐ Asynchronous serial port (RS232)
- ☐ Parallel port (Centronics)
- ☐ Sound circuitry
- ☐ Calendar/Clock with battery
- ☐ One expansion slot (7-slot bus optional)

Display:
- ☐ 80 x 25, 40 x 25 (col. x lines) characters.
- ☐ 640 x 400 pixel resolution

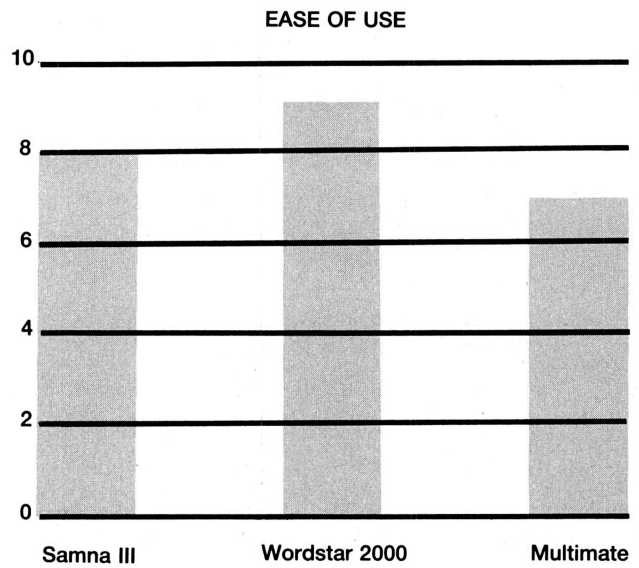
Dick Smith Electronics Pty Ltd

COMPUTERSTORE™

Your one stop computer shop at your nearest Dick Smith Electronics centre.

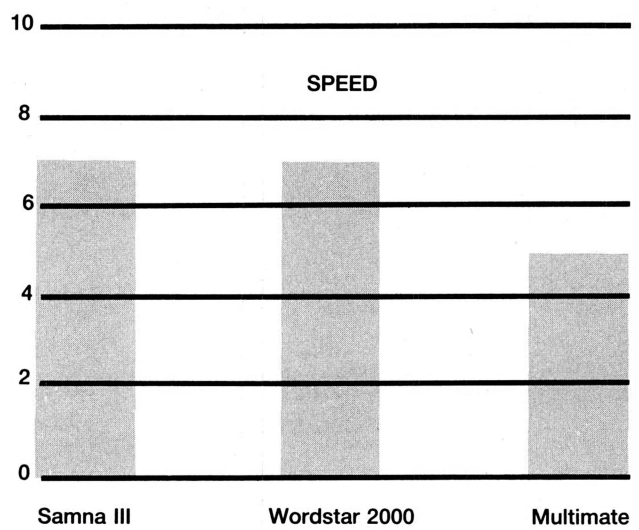
BankCard welcome here | MasterCard | Terms available to approved personal applicants through Custom Credit | VISA

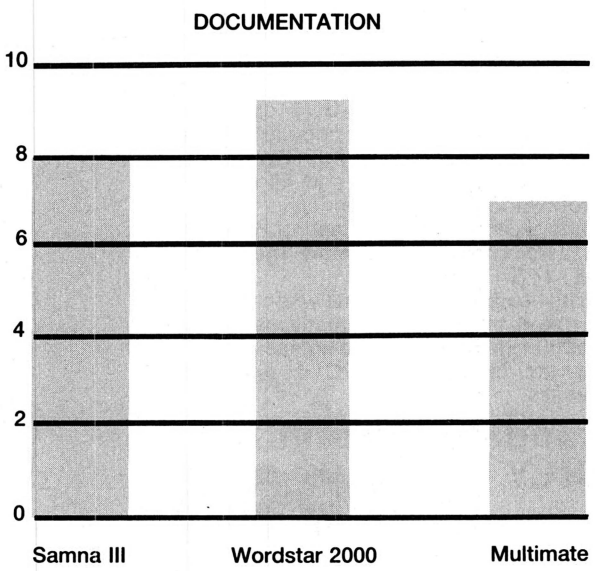
A 927



SPECIFICATIONS

Program:	Samna III
Made by:	Samna Corporation, Atlanta, Georgia
Hardware required:	IBM PC (for others see text); DOS 2.0 or higher; 256 Kbytes (320 Kbytes with DOS 3.0)
Best points:	Incredible range of features
Worst points:	A few frequently-used operations are clumsy
Price:	$786 (Samna+ is $995)
Review copy from:	Arcom Pacific, 252 Abbotsford Road, Mayne 4006. (07) 52 9522.





sages), a 'trouble-shooting section', a word processing glossary, a good index, diskette labels, a function key template and an as yet unused section for 'Tips and Tricks'.

Other than the points I have raised, I rate the documentation as very good. I also like the way Samna has listed the names of the programmers and writers who designed the package. This adds a personal touch; Lotus did this with 1-2-3 but abandoned the idea in the slicker and more impersonal Symphony.

An on-line tutorial is provided. The basic part of this program covers 54 topics; an advanced section deals with merging, spelling checking and line drawing. Provided you're prepared to take the time to go through the tutorial, you should finish with a good command of the program.

Samna has a number of default settings that can be changed by the operator. As it is delivered, a monochrome screen has two vertical shaded columns to indicate the margins. They look ugly and serve no useful purpose that I can see. Fortunately they can be removed; why not remove them as the default? On a colour monitor the default setting is monochrome; you can set colours for bold, underlining, subscripts and so on. Why doesn't Samna choose some colours as a default? You could always change them if they are not to your taste, but as it is the original impression is unfavourable.

Features Galore

I'm not going to list all the features of Samna III because there are so many there wouldn't be any space left for the review. I'll just comment on some of the less common ones. Samna III has provision for making automatic backups (actually, *two* ▷

Output Media

MANUFACTURER OF PRINTED BUSINESS FORMS
DATA PROCESSING SUPPLIES





SPECIAL FUJI DISKETTES

$33 Per box of ten
5¼" SS/DD
Incl. Tax and Postage

FUJI QUALITY

3½" (Apricot. Lisa etc.)
5¼ HD (1.6Mb) (Pulsar)
5¼ & 8"

LIFETIME WARRANTY

SPECIAL $28 Incl. Tax and Postage

Australian made lockable storage box
*Hinged Lid *Dividers *Labels
*Replaceable Keys *High Quality
Capacity = 60 5¼ Diskettes

WE ALSO SUPPLY

MIRA 1000 Computer Tape
Computer Paper, standard sizes
Computer Ribbons

COMPUTER FORM BURSTERS
SECURITY SHREDDERS

YOU ARE WELCOME TO CALL AT
UNIT 19, 170 FORSTER ROAD
MT. WAVERLEY, (Just off Mulgrave Freeway.)

Please supply Post free by return mail:

.....Boxes of Diskettes @ **$33** ea.

.....Storage Boxes @ $28 ea.

Amount enclosed $.....

Please charge my Bankcard ☐ /Visa ☐ /Master Card ☐
No ..... Expiry Date .....

Signature .....

Name .....

Address .....

.....

Postcode ..... Amount $ .....

bankcard VISA MasterCard

Output Media

Output Media Pty. Ltd. Manufacturer of printed Business Forms
Unit 19, 170 Forster Road, Mt. Waverley, Vic., 3149
Phone (03) 544 4400. Telex 134 947

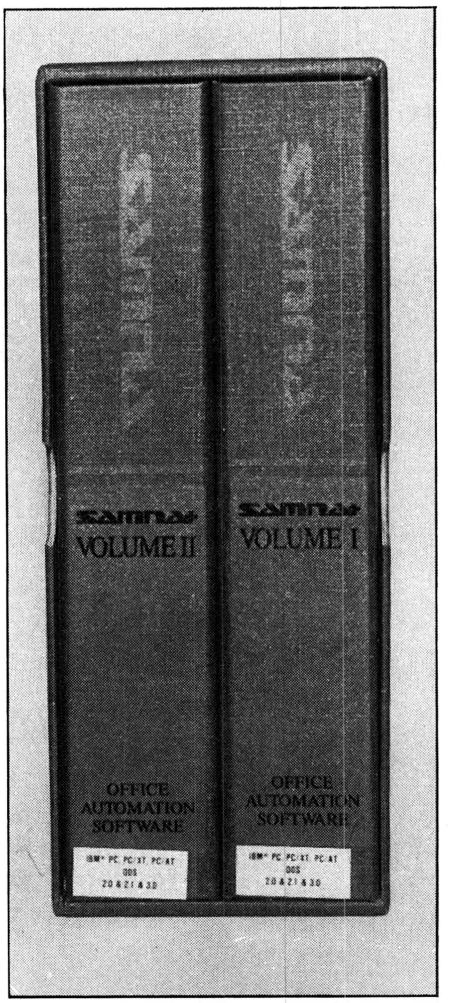
YC6/85

backups are kept), the ability to set up a page in newspaper-style columns, undelete, windows (showing either two different documents or two parts of the same document), automatically renumbered footnotes (either on each page or gathered at the end of the document), DOS file functions (copy, delete, rename), glossary (similar to that used by Wang), headers and footers of any size, three help levels (context sensitive), hyphenation help, place markers, on-screen right justification, line drawing (boxes), printing pitch change, the option of removing widow and orphan lines, automatic or manual repagination, vertical centring (for title pages), undo and translate in both directions between Samna and ASCII files.

Other features that are frequently extra-cost options in other programs are included: section and outline numbering in three styles, an automatically generated table of contents, automatic index generation (in alphabetical order with page numbers) and a spelling checker. The spelling checker comes from Merriam-Webster Inc and contains the usual features, including displaying a choice of alternative words. The number of words in the dictionary is not stated, but I understand it is 88,000. You can also have user dictionaries, one to each disk; the size of the user dictionary is limited only by the capacity of the disk.

Samna III is normally in overstrike mode, but the Ins key toggles in and out of insert mode. Insert is limited in its application, because while in it you can't use the cursor movement keys. I have now come to prefer programs where the default is insert, as there is less chance of removing text accidentally, but the restricted form of Samna's insert mode doesn't allow this option.

To delete text, you press the Del key, shade the text to be deleted, and press either Del or Return. This non-standard use of the Del key means that to delete a single character you have to press Del twice.



One feature that as far as I know is unique to Samna III is the ZOOM command. If you have graphics capability, this reduces the page displayed on the screen to a miniature version. The shrunken image is too small to read, but it shows the page layout exactly as it will print. Another unusual feature allows you to 'fold' text so you can see widely separated columns at the same time.

The only Save option available saves the document and clears it from the screen, so you have to reload it and then return to the point where you left off. Fortunately Samna III automatically saves to disk every few seconds, so backup is not a problem. Curiously the documentation makes no mention of this important feature. Some reviews of Samna III state it is possible to install the program only twice; we did not test this and it is not mentioned in the documentation.

Text being moved or copied is saved in a buffer. The amount of space in the buffer is described as "limited"; in the copy section it is said to be limited to about one page, and in the move section to about one paragraph. If the buffer cannot hold all the text you want to copy or move, it moves only the first section, tells you what has happened, and you repeat the operation. Samna suggests you copy-to-file or move-to-file if you're moving large amounts of text. It would be better if you could have a buffer limited only by the size of memory.

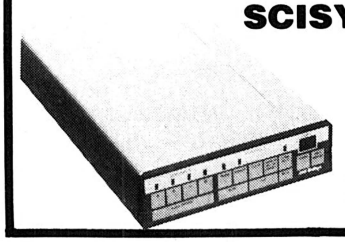
Which Hardware?

Samna III works on IBM, DEC Rainbow and TI computers. The IBM version requires DOS 2.0 or higher — 256 Kbytes with DOS 2.0 and 320 Kbytes with DOS 3.0 — and two floppy disk drives or one floppy drive and one hard disk. Most of the common printers and sheet feeders are supported.

One thing you may be wondering about is the meaning of 'Samna'. It appears the name was chosen to be unique and not offensive in any known language; it has no other meaning!

In summary, Samna III has a great range of features, probably more than any other microcomputer word processor, but with a few peculiarities that may not suit all tastes. □

SCISYS SERIAL PRINTSHARE



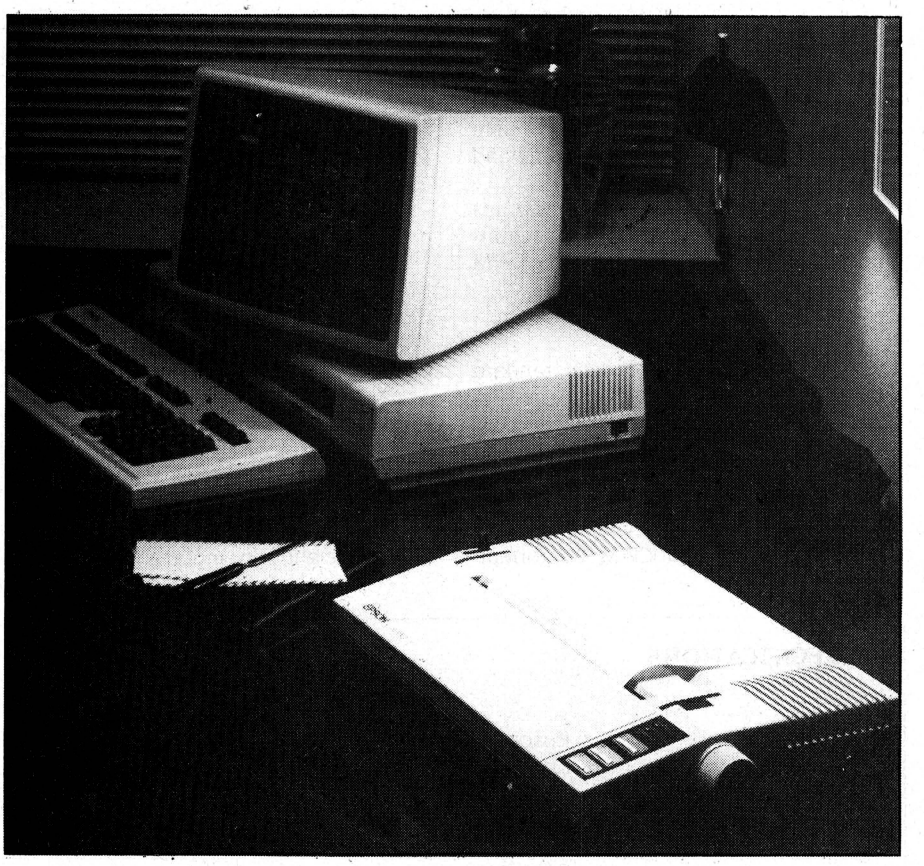
An intelligent 4-channel switch device
with built-in (64k) buffer
— flexible configuration —
copy function, LED display &
lots more features.

PRICE — $450 + sales tax

COMPUTERMAX

539 PITTWATER RD., BROOKVALE 2100. (02) 93-1383, (02) 908-1718

EPSON QX-10+



Epson Corporation has an enviable reputation as a supplier of printers. How do its computers stack up? Les Bell reports on the QX-10+.

FOR SOME YEARS NOW, since the original MX-80 printer, Epson has been a leading force in the low-cost printer market. Today, Epson has a range of printers and also a range of computers.

The QX-10 computer is a nicely engineered machine based on the Z80A processor. It features a very low-profile construction with two slim-line floppy disk drives, and so is rather less obtrusive than most PCs.

The machine is finished in a cream plastic which matches the RX-80/100 series of printers, and in fact it matches in height and depth, too. At the front of the QX-10 there's a reset button under the edge, and the two drives with a capacity of 400 Kbytes each.

At the right side is the on-off switch, while the rear panel carries the various connectors for serial and parallel ports, power and video output. A very neat green screen (colour is optional) sits on top of the machine, which also supplies power, eliminating the need for a separate on/off switch.

A 103-key low-profile keyboard plugs into the front of the unit. The keyboard is well laid out, with a full QWERTY complement of keys, a separate cursor pad (which could have a better layout), a comprehensive numeric pad and 14 programmable function keys. Miscellaneous keys include pause, help, insert, home, clear screen and screen dump.

Inside, the QX-10 boasts some unusual features. Although it is a Z80A eight-bit processor, usually reckoned to have a maximum of 64 Kbytes of memory, the QX-10 manages to handle 192 Kbytes of memory as standard, using bank-selection circuitry.

Memory is in fact expandable up to 256 Kbytes, although the last 56 Kbytes have to be used as a memory disk drive. A further 32 Kbytes can be added as the colour video support; this gives the machine a resolution of 640 by 400 in graphics mode, with the ability to mix graphics and characters on the screen.

The QX-10 actually uses graphics to display characters in any case; one of its unusual features is that its character set is software defined (although most fonts are actually stored in ROM) and up to four ▷

different fonts can be on-line at any time. This extends to the attached printer, too.

The standard QX-10 comes with CP/M 2.2 and MFBASIC, which supports multiple fonts. A variety of functions is supported in the standard BIOS, including reading and writing to the serial port.

However, we were particularly interested to review the QX-10+, which includes the QX+ package — actually CP/M Plus (CP/M 3.0).

CP/M Plus

The QX+ operating system is a standard banked CP/M Plus system. Bank zero is devoted to the TPA, while bank one contains the banked BDOS, banked BIOS and disk buffers. Banks two and three (if present) are used as a memory disk drive.

The disk drives support four disk formats: standard Epson CP/M 2.2 format, IBM PC single- and double-sided CP/M format and EPSON+. Density selection is automatic, although the system can become confused between single- and double-sided IBM disks, so it's better to set up for these explicitly using the SETIBM utility.

The QX+ BIOS knows about 10 physical devices:

KEYB	Standard keyboard
CRT	The QX-10 screen
PRINT	Parallel printer port
CMOS	CMOS buffer RAM (both read and write supported)
RS232	Built-in serial port
RS232A	Optional serial card 1, channel A
RS232B	Optional serial card 1, channel B
RS232C	Optional serial card 2, channel A
RS232D	Optional serial card 2, channel B
LPEN	Light pen, input only

The CMOS RAM buffer is a 2046-character FIFO (first in first out) buffer which can be both written to and read. However, a trap lurks for the unwary: if you try to read a character from the CMOS buffer before one has been written to it, the system will hang, waiting for a character — of course, it can't send a character because it's busy waiting to read one.

The light pen input sounds like quite a few interesting applications could be built around it. The light pen triggers an interrupt which captures its position and stores it as a two-byte pair which can then be read from the LPEN input device.

QX+ Utilities

The QX+ package includes a variety of special utilities, such as FORMAT, which is used to initialise blank disks. The utilities are rather more sophisticated than with previous implementations. For example, the FORMAT utility actually draws a graphic representation of a floppy disk and then progressively colours it in as the disk is formatted.

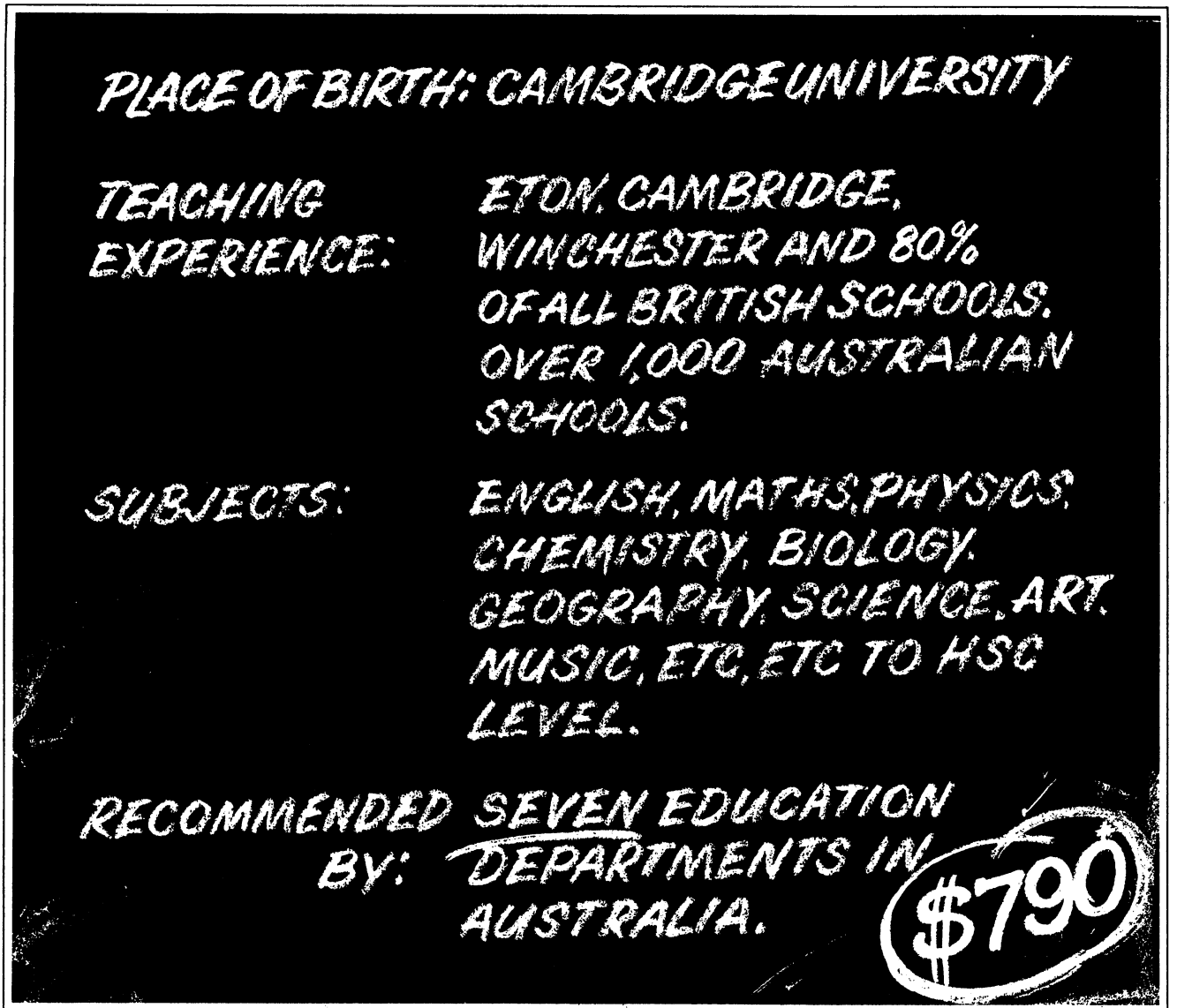
Other utilities supplied include DISKCOPY, which copies entire disks; CONFIG, which controls the RS232C port parameters, programmable function key settings, graphics font selection and other details; SETCRT, which is also used for font selection; SETRS232, which controls the settings of the built-in and optional RS232C ports; SETLIST, which controls printer font selection; SETEPSON, which is also used for typeface selection; SETDRIVE, which allows optimisation of disk drive head step and settle times; DISKSWAP, which allows renaming of the disk

SPECIFICATIONS

Unit:	Epson QX-10+
Made by:	Epson Corporation
Processor:	Z-80A
Clock speed:	4 MHz
RAM:	192 Kbytes up to 256 Kbytes plus 2 Kbytes CMOS RAM
I/O:	One parallel port, one serial RS232 port, light pen
Languages:	BASIC as standard, any and all CP/M languages optional
Keyboard:	103 keys, tiltable, good feel
Display:	80 by 25
Graphics:	640 by 400
Peripherals:	RX-series printer, lightpen
Expansion:	Five slots, IEEE-488, A/D, D/A, LAN
Best points:	Lotsa memory, CP/M Plus
Worst points:	None noticeable!
Price:	$2900
Review unit from:	Epson Australia

	Poor	Good	Very good	Excellent
Documentation				
Ease of use				
Functionality				
Support				
Value for money				

The market for the QX-10+ is most likely to be the more advanced hobbyist/hackers who know just what value they are getting, and are less likely to be fazed by the forbidding nature of the manuals.



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 $790?

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: _____

BBC is a product of Acorn Computers Limited.

BARSON COMPUTERS

drives; PRINT, which prints paginated listings; SETPRINT, which alters PRINT's parameters; and TERMINAL, which provides terminal emulation.

CP/M Plus (also known as 3.0) is much more sophisticated than earlier versions of that venerable operating system, and is capable of much higher performance on some applications. For example, we tried our standard dBase II benchmark on the QX-10+, and got the following results:

Stage 1	131
Stage 2	106
Stage 3	139
Total	376

This compares very favourably with the IBM PC (total: 802.66) and is close to the figure for the Compupro 10 with two users (372.63).

Other benchmark figures for the QX-10+ are:

Sieve of Eratosthenes	MBASIC	816.28
Sieve of Eratosthenes	MFBASIC	3204.59
BM9	MBASIC	837.90
"	MFBASIC	1276.55
Disk Test	MBASIC	18.55

These indicate quite a reasonable performance; for example, the IBM PC manages the Sieve of Eratosthenes in 1953.53, noticeably slower.

Graphics Support

The QX+ package is supplied with GSX-80, the Digital Research device-independent graphics driver system. This means the QX-10+ can run packages like DR Graph and DR Draw with no installation required other than loading the GSX driver set.

The documentation also includes a GSX Programmer's Manual, which gives the complete specifications for the Virtual Device Interface, which allows graphics programs to drive any device, be it the QX-10 screen, a graphics printer or a plotter. GSX also provides graphics input facilities for devices like mice and light pens.

A variety of graphics primitives is implemented in the QX+ BIOS. These enable the user (or rather, the program) to perform functions like writing text (in any of the eight major points of the compass and at a variety of magnification factors), drawing lines, and drawing markers, bars, circles, or pixels. Additional escape sequences set text mode and size, marker type and size, linestyle (dotted, tiny dashes and so on) and the text writing mode.

By placing these graphics primitives in the BIOS, sophisticated graphics capabilities are now available to all languages, simply through printing escape sequences. This means if you're a hot-shot Pascal programmer, you no longer need to feel forced to use BASIC simply because it has all the graphics functions built into it.

Other escape sequences control sound and music. Under CP/M 2.2, the QX-10 can only beep, but under QX+ its speaker is forced into playing music. Escape codes set the note to be played, sharpen or flatten it, set the duration and play it. Switched On Bach it ain't, but it has its uses on occasion.

Printer Control

Under QX+ (unlike the earlier Multifont CP/M 2.2), the printer can simply be driven as a straight dumb list device. However, by switching to multifont mode, the printer is driven in graphics mode, with a choice of 18 typefaces, ranging from OCR B font, through Helvetica and American Typewriter to Old Germanic.

Because the print line is formed in a graphics buffer before being sent to the printer, micro-justification and true proportional spacing are possible. The printer can also perform a graphics screen dump.

The QX-10's documentation is excellent for beginners; the User's Manual starts off by explaining basic terms and concepts such as cold booting, wildcards and others, then switches to a 'how to' approach, finishing with a reference section, description of the QX+ utilities which are unique to this machine and an introduction to GSX.

These documents will take the beginner and first-time CP/M Plus user to quite an advanced level; from there it's over to the Digital Research CP/M Plus manuals which, while rather more formal, are still much better than the CP/M 2.2 manuals many of us are regrettably familiar with.

The market for the QX-10+ is most likely to be the more advanced hobbyist/hackers who know just what value they are getting, and are less likely to be fazed by the forbidding nature of the manuals. For myself I'd prefer to have too much information than too little, as some Japanese manufacturers have supplied in the past. □

"CHARLIE'S CASHBOOK"

Any "Charlie" Can Use It!

"Cashbook" is two programs in one . . . both working together.
The *first* manages **all** your bank accounts and the *second* manages your expense ledgers.
"Cashbook" will **save hours** of your accountant's valuable time and provide 'up-to-date' financial reports . . . whenever **you** require them!

But, What Does It Do?

- Ultra fast
- Multi-Company or Department
- Multiple Bank Bank Accounts
- Detailed Bank Reports
- Detailed Expense Reports
- Full Bank reconciliation
- Comprehensive documentation
- Runs on IBM and compatibles

SPECIAL OFFER: PHONE YOUR ORDER THROUGH NOW! . . . AND WE WILL HAVE "CASHBOOK" ON YOUR DESK IN THE MORNING **$499**

MasterCard bankcard

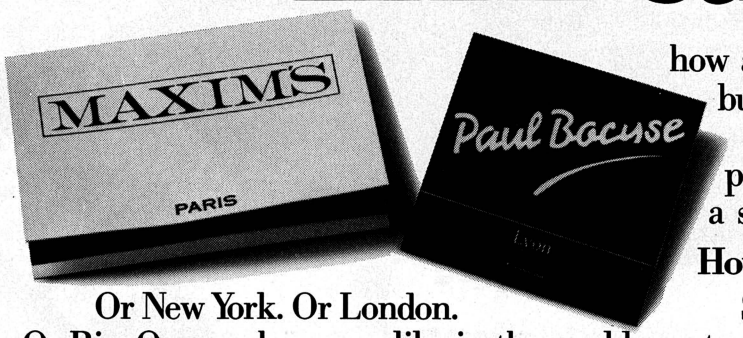
Charlie's Computer Products

P.O. Box 513, South Perth, W.A. 6151

PHONE: (09) 367-7532

★ Dealer Enquiries Welcomed ★

IBM wants to buy you lunch. In Paris.



Or New York. Or London. Or Rio. Or anywhere you like in the world.

To be eligible, all you have to do is participate in a demonstration of an IBM Personal Computer before June 30 from an authorised IBM PC dealer.

Then your name will be entered into a draw.

There's never been a better time to buy an IBM PC.

Despite devaluation, IBM has not raised its PC prices.

And if you buy one before June 30 you may also be eligible to take advantage of the 18% Investment Allowance.

Two good reasons to take a close look at the IBM PC now.

These reasons, combined with the chance to enjoy a fabulous dining experience anywhere in the world, make May and June the best time ever to buy an IBM PC.

One of Australia's most successful business PCs.

The IBM PC is made in Australia and has become an acknowledged leader in its field. Talk to a dealer, let him show you how an IBM PC can help you with your business needs.

No matter what your industry or profession, the IBM dealer network has a solution for your business.

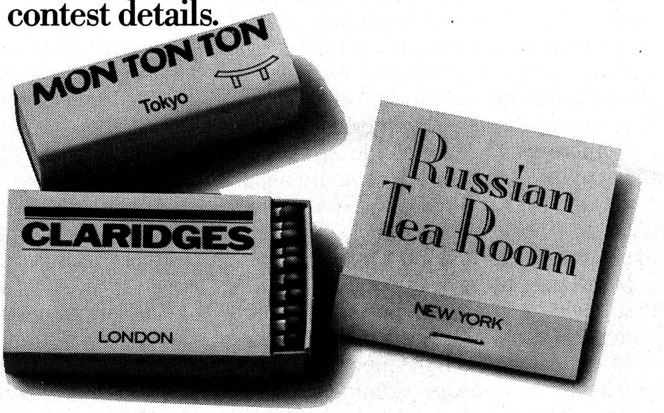
How to arrange your demonstration.

Simply call IBM Direct and ask for extension 23.

Sydney 20531, Melbourne 6141511, Brisbane 2296711 or Adelaide 2126899.

Canberra, Darwin, Hobart, Perth and all other areas 008 222 224.

Your IBM dealer will give you full contest details.



But hurry. If you attend an IBM PC demonstration before June 30, you'll also be eligible for the special prize.

Lunch for two at the restaurant of your choice anywhere in the world.

IBM

IBM Australia Limited. (Inc. in NSW)

DDB3905.001/YC

COMMODORE 16 LEARNER PACK

Since Commodore released the VIC-20 almost four years ago the company's success has increased with each later machine. The Commodore 16 is its latest entry to the under $300 market, providing an inexpensive start to low-level computing without sacrificing attractive features. Andrew Farrell takes a closer look.



I WILL NEVER cease to be amazed by the number of boxes new computers are packed in. Unpacking the Commodore 16 Learner Pack was no exception, except that each box was stamped with the royal warrant, which is also splattered across the user manual and various other articles (yes, the corgis use Commodores). Mind you, there was plenty inside apart from the actual computer itself. It would be fair to say a buyer could purchase a Learner Pack and have everything he or she is likely to need for a good while.

Many people have felt for some time that buying a home computer is a typical 'Catch 22' situation, where the base price only represents half the necessary total purchase. It appears Commodore has woken up to this fact, and in an attempt to make the going a little easier has packaged together a deal which is ample for most beginners.

Inside the Learner Pack you'll find a Datasette (Commodore-speak for a cassette player), user manual, introduction to BASIC, typing teacher and, best of all, a cartridge on using the machine. All this for around $299, which is reasonably good value for money.

The machine itself is styled along the same lines as the familiar Commodore 64 or VIC-20, but is dark grey in colour, There are two joystick ports, a reset button and a power switch on the right-hand side of the unit, while at the back, working from left to right, are the cassette port, serial port, video socket, UHF plug and expansion port. All are clearly labelled and easily accessible.

There have been a few major changes to the unit which make it very different from earlier machines. All the cursor keys have been located on separate keys, making it necessary to relocate some of the special symbols. Beginners will also find the HELP key useful in locating program errors. Other changes include a modified expansion port, non-standard joystick port and a new cassette port.

If any existing Commodore owner bought a C16, they'd find it reasonably easy to get used to the new keyboard layout. In any case, the Commodore 16 wasn't designed as an upgrade for the VIC-20, and any inconvenience found as a result of the changes in keyboard layout and ports should be quickly outweighed by the new features. The standard Commodore disk drive will connect to the serial port, making various other peripherals available such as printers and printer/plotters.

Under the Bonnet

What the Commodore 16 lacks in good looks, it makes up for in power. The circuit board is small, with plenty of space for the odd stray cockroach (speaking from experience!). BASIC 3.5 comes standard, along with 16 Kbytes of RAM — not a lot if you're into word processing or spreadsheeting; home hackers may also find this is a little tight. For the raw beginner, however, 16 Kbytes is a football field of space.

The bigger, better and more-bells-and-whistles BASIC is very friendly. It's a sort of zapped-up version of the standard BASIC in the average Commodore 64 or VIC-20, without all the file commands you might find on one of the bigger Commodore business computers. There are some great new commands in the graphics and sound areas, as well as some practical improvements in the DISK access commands.

DIRECTORY provides a look at the disk ▷

OSBORNE'S CUTE LITTLE VIXEN™



MORE POWERFUL THAN ALL OTHER PORTABLES!

THE NEW OSBORNE

VIXEN™

All you need in one neat little package. Working with VIXEN is like working with a much bigger computer, except that you can take VIXEN anywhere. Try bringing an IBM-PC home, or putting a Macintosh under your seat on the plane.

ENTER THE VIXEN! Small enough to take anywhere — powerful enough to do the job right. Features like an 18 cm Amber screen, 80 column x 24 lines display, full-size type keyboard, 2 x 400K disk drives that allow storage around 200 type pages/disk, and faster than ever before response time.

And the VIXEN comes with FREE productivity software for business, Wordstar III Word Processing, Electronic spreadsheets, SuperCalc 2, Graphics, and a host of tools for custom programming & games.

So — if you liked computers before — you'll love VIXEN!

Just $2950

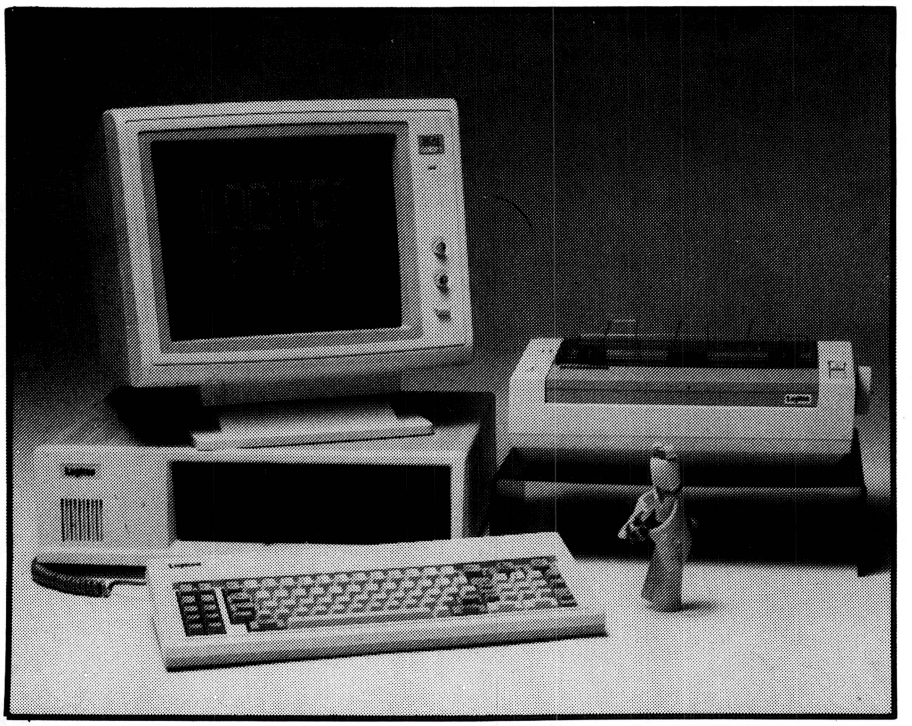
Available at Osborne dealers Australia-wide.
Call now for the name of your nearest dealer.

With the famous Osborne 6 months full warranty

OSBORNE

93 YORK ST., SYDNEY, AUSTRALIA

(02) 290-1122



Let Japan's best go to work for you.
Logitec PC/XT

Logitec, one of Japan's most respected micro computer companies sends you their best. The Logitec PC 1600 range of personal computers. A combination of clever planning, innovative thinking and quality Japanese craftsmanship. But really isn't that what you'd expect from a Japanese company that's been designing and making electronics for four decades?
Now you can feel confident about running IBM PC software, including Videotext, communications, and Multi-user on either the Logitec PC or powerful XT systems.
Logitec products have a full (6) month Parts & Labour warranty throughout Australia supported by Hills Computer Service.

LOGITEC PERSONAL COMPUTER SPECIFICATIONS

MICROPROCESSOR
16-bit, 8088
256K-832K

DISK SYSTEMS
2 Std half-height diskette drives, 5.25"
360Kb per diskette.
10Mbyte & 20Mbyte internal hard disk drives (optional).

DIAGNOSTICS
Power on self testing, parity check

DISPLAY SCREENS
Color or Monochrome
High-Resolution
80 chrs x 25 lines
Upper and lower case

KEYBOARD
83 keys, 1 Metre cord attaches to system unit, 10 Function keys, 10 key numeric key pad

LANGUAGES
Std. Forth-83 Opt.
Basic, Pascal Fortran, Dbase 3, etc., Runs IBM PC software

COLOR/GRAPHICS
text mode
16 colors
256 characters & symbols in ROM,
Graphics mode
4-color resolution
320h x 200v, black and white res
640h x 200v, simultaneous text & graphics capability

MULTI-USER (OPTION)
Available as LAN and to run UNIX.
Multi-user accounting available.

INTERFACES
Parallel printer
RGB color
Composite video
2 serial ports

SOFTWARE (STANDARD)
PC-DOS 2.1
Forth-83

LOGITEC PRICING

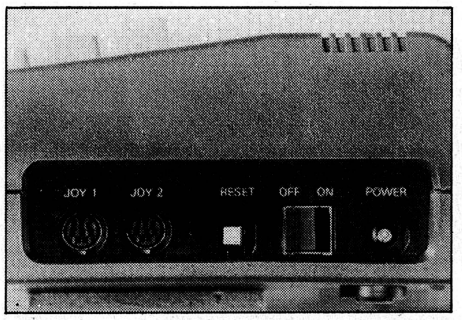
PC	$3195ex
PC SkaiPak	$3849
XT	$4795
XT SkaiPak	$5379

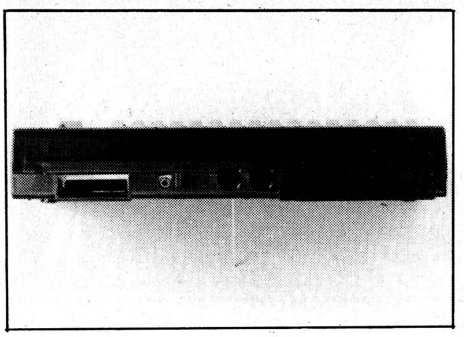
Dealer Network
Logitec dealers are Australia wide, and now being chosen in New Zealand. Phone for details of nearest dealer.

Logitec SkaiPak Systems
SkaiPaks include Logitec PC or XT plus Monitor; Skai accounting package; Electric Desk word processing database spreadsheet, communications; 512K RAM.

For further information phone or write:
PORCHESTER COMPUTERS
169 Victoria Pde., Fitzroy, Vic. 3065.
Tel. (03) 417 6999

Aust/NZ distributors: LOGITEC & SKAI





directory, without destroying your program. DLOAD and DSAVE will load and save a disk program, without the need to add that messy ',8'. There are also commands to BACKUP disks, SCRATCH a file and HEADER a disk. All these represent a vast improvement over the old method of having to OPEN a channel to the disk drive and then PRINT# your command.

Sprites are sadly lacking, and the sound capabilities are similar to those of the VIC. However, colours have been stepped up to include intensities, giving a total of 121 different shades. The usual high-resolution graphics are available, with multi-colour and single-colour modes. All these features are well supported from BASIC with commands such as GRAPHIC, DRAW, CHAR, PRINT and CIRCLE.

Structured programming commands are also available, as well as various utility commands such as RENUMBER. A good machine code monitor is provided, although it is not documented in the user manual. Perhaps a future reference manual will throw some light on its use.

One new feature, which has been on the older CBMs for some time, is screen windows. These allow the user to redefine the scrolling area of the screen to any portion of the standard screen. Although there are no direct commands to do this, the sequence of print codes required is fairly simple to follow. It also has the added advantage that you can execute it from a program or in direct mode.

The screen editing may be described as comprehensive and very un-Commodor-ish. The CONTROL key has been implemented to provide additional control of features such as insert mode, scrolling, screen size, flash and many more. It's almost like a word processor. (I did say almost!)

I had a few problems with the picture quality, with some background distortion in the form of dark and light strips. Although this didn't affect the readability of text, it was distracting. Perhaps the quality would be improved with the use of a monitor instead of a television.

Conclusions

Although the Commodore 16 is not what you might call a giant step forward, it does represent a small step in the right direction for Commodore. The 16 does not compete with any of the company's existing range and is directed specifically at the growing number of people who want to taste and see what the world of home computing is all about.

It's an inexpensive way to learn as much as you need to know to decide whether you want to buy a more powerful machine, or put your brief interest to rest in the attic. And you're not buying a useless 'baby'; the machine has a vastly improved BASIC in comparison with earlier Commodore machines and plenty of guts in the graphics area, even without sprite capabilities.

Don't expect the Commodore 16 to sell millions; it is not an all-purpose machine. However, at $299 it's a great way to get started. □

SPECIFICATIONS

Unit:	Commmodore 16
Made by:	Commodore
Processor:	7501
Clock speed:	1 MHz (2 MHz with screen off)
RAM:	16 Kbytes
ROM:	32 Kbytes
I/O:	Cassette, serial port, expansion bus
Languages:	BASIC 3.5
Keyboard:	66 keys, auto repeat and 10-stroke buffer.
Display:	40 by 25 or 38 by 25
Graphics:	320 by 200, 121 colours
Peripherals:	Commodore serial
Expansion:	No (64 Kbyte Plus/4 is compatible)
Best points:	BASIC, graphics and colour.
Worst points:	Memory limitations, no sprites.
Price:	$299
Extras included:	Datasette, typing teacher, introduction to BASIC, C16 tutor
Review unit from:	Commodore Business Machines, 5 Orion Road, Lane Cove 2066. (02) 427 4888.

	Poor	Good	Very good	Excellent
Documentation				
Ease of use				
Functionality				
Support				
Value for money				

BIT BUCKET

This issue, Evan's regular look at some of the interesting — or simply weird — products that pass through our office covers colourful diskettes, two outstanding monitors, a program that reformats data for use in spreadsheets, a disk drive analyser for the IBM PC *and a range of ergonomic office chairs.*



THE DISKETTE AT THE END OF THE RAINBOW

Manufacturer: Memron Australia, 25 Dalgety Street, Oakleigh 3166; (03) 568 4566.

When Henry Ford said we could have any colour as long as it was black, he could easily have been talking about diskettes. Until now the only choice has been black, which, let's face it, really ain't no choice at all.

Now a Melbourne company, Memron Australia, has formed a new diskette manufacturing business that will change all that. On the cover of the diskette you can have any colour you like — in fact, not just any one colour, but any combination of colours. Now those boring black diskettes can be replaced by illustrations that are only limited by the imagination.

The new diskettes are being targeted at software and hardware manufacturers and large institutions, where they are claimed to offer a number of advantages. According to Brian Johnstone, managing director of Memron, the new diskettes discourage software piracy and data or diskette theft.

"If a diskette is uniquely identifiable, as ours are, it's an aid to preventing piracy. If you see a black diskette with a shabby label up on a shelf you know you're being sold a pirate copy.

"You can also prevent thefts of disks," says Johnstone. "An industrial user can have a name printed on every disk which clearly identifies its owner. A dishonest employee is inhibited by the risk of being caught with a box of diskettes that have his company's name on them."

Users like accountants and secretaries can also increase the security of their disks. "You would wonder what an engineer was up to if he had a disk from accounts in his possession."

Memron will be selling the new diskettes in Australia and New Zealand, where the company hopes to take a five per cent share of the total diskette market. As Memron intends to sell largely to software manufacturers, who account for 10 per cent of the total market, it will be trying to get 50 per cent of this group's business.

Other users will include banks, large company departments and government, particularly education departments. Two companies which have already placed orders with Memron are Imagineering and Apple.

The key to the Memron operation will be the company's desire to cater for the specialist custom-made market which larger diskette manufacturers are neither interested in nor equipped to address. Production runs will be small, with initial runs of about 5000 to 10,000 diskettes, and an expected average run of between 2000 and 5000 diskettes.

A rare feature of the Memron diskette production operation is the use of individual plastic sheets to make each diskette sleeve. These are white to allow easy overprinting, and the colour range extends to any inks that can be printed on plastic. Some of the equipment used in the manufacturing process, such as the disk certifier, is the latest on the market. The certifier, which checks for faulty disks, has only been installed in one other site in the world. It is Memron's intention to apply the highest standards of diskette testing.

"If a disk fails for any reason we will replace it. When people are using our diskettes to distribute their product, there is no point giving them a diskette that may not be completely reliable," says Brian Johnstone.

The only disadvantage of the coloured diskettes is the added cost. The process adds an extra 20 to 25 cents to a disk. Some companies have baulked at this, but many others realise the importance of having a product that stands out. In fact, to date, all companies that have used this diskette printing process for their products have featured the diskette in the rest of the packaging. □

TAXAN/KAGA AND VISION MONITORS

Distributor: Colex, 7th Floor, 10 Help Street, Chatswood 2067; (02) 419 6588.
Price: $245 — $775

Among the numerous monitors that have passed through our offices, two have stood out from the pack: the Taxan/Kaga KX-1201 and the Vision-II. These two monitors have been linked to Apples and IBMs and the endless string of other computers that require review, and both have given long hours of operation with good-quality display.

The Taxan/Kaga KX-1201 is a compact high-resolution monitor with a 30 cm screen. It has a flat screen tube with an etched non-glare surface and P-31 green phosphor, for easy viewing over long periods. It accepts standard composite video signals, making it suitable for use with most normal 'monochrome' computers. The input connector is a standard RCA-type phono socket.

The KX-1201 is more than capable of displaying 80-character text lines and high-resolution graphics.

Display steadiness can be a bit of a problem with the IBM PC in Australia, due to differences in signals between the monitor and computer. We've found this with quite a lot of the cheaper monitors; but with the KX-1201 the picture was as steady as a rock.

The colour scheme of the KX-1201 is cream and light grey, a close match with the PC.

The Vision-II offers full colour display and surprisingly high resolution — 510 by 262 RGB. It is a highly adaptable monitor, with three modes and plugs for the IBM PC, Apple II and NEC PC, and the Apple III. These modes can also be used, with experimentation, with many other computers.

The Vision-II displays a very passable 80 columns by 25 lines, while its ability to display moving colour graphics is impressive. Even fast-moving objects are steady and constant in colour.

The beige casing of the Vision-II complements the colours of the Apple nicely, while providing a reliable, adaptable screen for serious work and added enjoyment of games.

We've spent more than six months reviewing these products; six months in which the equipment hasn't given the slightest hint of failure, despite the dust storms, transportation, and day-to-day hard slog of an extremely busy office.

The KX-1201 costs $245, with an amber version, the KX-1203, selling for $260. The Vision-II, at $560, is sandwiched between the Vision-EX, which costs $441 and has 380 by 262 resolution, and the Vision-III, which is $775 with 640 by 262 resolution. All these prices are retail, excluding tax. □

DISK DRIVE ANALYSER

Distributor: Quasar Computer Systems, 54 Turner Avenue, Fairfield 4103; (07) 30 5504; or GPO Box 1048, Brisbane 4001.
Compatibility: IBM PC, Apple II and III.
Price: $38 (plus $1.50 postage and packaging)

Take your PC to the shrink? You'd better believe it. A new product from Nortronics lets you analyse your IBM PC's on-line memory — specifically, its floppy disk drives. The Disk Drive Analyser lets you check four of the functions of the PC drives.

First, the radial alignment test checks the read head is correctly aligned over the tracks on the disk. Reporting of the results is straightforward, telling you operation is good, fair or poor and suggesting any action you might need to take.

The second test checks the drive speed and reports in the same manner as the radial alignment test.

The third test is a disk clamping test, which tells you if the clamp that grips your disk to rotate it is good, fair or poor. This is an interesting test which, while useful, would be very tricky to perform using software. How and if it works aren't certain, since the notes accompanying the package aren't enlightening on these points.

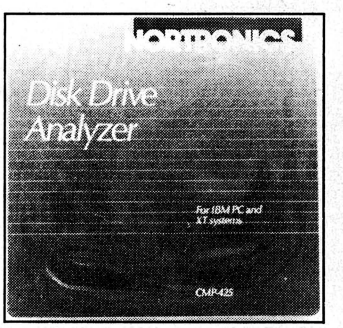
The fourth and final test is for read/write accuracy. Data is written to the floppy disk and read, to detect any errors. This test gives either a pass or fail.

A fifth option, autotest, lets you run all four tests consecutively. While the previous four tests are accompanied by displays that indicate what is happening during the test, autotest just clams up and gets on with the job.

The Analyser is useful if you're having persistent trouble with a floppy disk drive and don't understand why. In cases where faults are intermittent or only occur after long periods of continuous usage it may not provide you with a reason for a problem because it only performs tests for a short time. Quite often a problem will only arise when the drive is copying a large file or else it will occur from time to time amidst problem-free operation.

The documentation for the Disk Drive Analyser is scanty, with a brief explanation of the program's basic function and very little mention of how it goes about its testing.

The package should be able to test operation of most IBM-compatible machines' disk drives; certainly the speed and alignment tests should return valid results. The Analyser is also available in versions for the Apple II and III. □



BALANS CHAIRS

Distributor: Design Partners, 45 Corben Street, Surry Hills 2010; (02) 212 1388.
Price: $195 — $340

When I first heard the word 'ergonomic' I had to look it up in a dictionary — a back-pack I was buying had been 'ergonomically designed' for use by mountaineers. Ergonomics is 'the scientific study of the efficiency of man in his working environment', according to the 1978 edition of the *Shorter Oxford English Dictionary*. I bought the back-pack, not because of ergonomics, but because it had the name of my climbing hero, Dougal Haston, written on it.

Since then, ergonomics has sprung up all over the place, particularly in offices where the work environment has a profound effect on the productivity of the staff. The modern manager has to consider dozens of factors such as light, sound, air conditioning, common areas, decoration and furniture.

One of the more startling areas of modern ergonomic office equipment is the Balans range of chairs. At first sight most people find the space-age design hard to take seriously, and the initial reaction to using the chairs is that they are hard to sit on comfortably. However, the comfort improves with a little perseverance, and the benefits of using the chairs are significant.

Balans chairs aim to make you sit straight. It's something your mother always drummed into you, but in a new guise; research has shown people experience less back strain, more efficient metabolism and easier breathing if their backs are kept straighter.

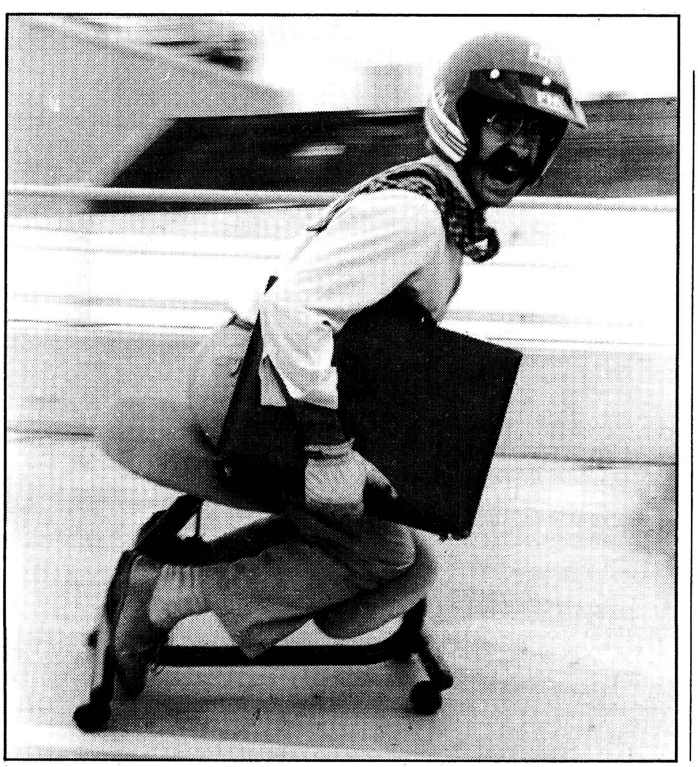
Most people find sitting in a normal chair lets them slump. Their back curves, pinching the front of the vertebrae and stretching them at the back. This can eventually cause backache, particularly in the lower back. While sitting in a slump the lungs are compressed onto the stomach, making breathing more difficult and putting extra pressure on the stomach and intestines.

Balans chairs let you sit in a more natural position, with the back forming an S shape similar to that you assume when you are standing. Mind you, you can still slump, as in a normal chair, but you can't slump as far — and you're more conscious that you're doing it and a lot less comfortable than when you're sitting straight.

The Balans chairs are all of roughly the same design, with a seat that's angled forward and a knee rest in front of and below the seat. Various models offer degrees of adjustability and some are on castors. Each chair is designed for a specific purpose; for example for a typist (with a five-star castor base), or as a single-person chair capable of several individual adjustments. There are also gas-operated and lever-operated models.

Using the chairs is an interesting experience. Initially, you may find them a little awkward and feel a preference for your old chair, but after a couple of days you adapt to the new feel, learning a new way of sitting that is ultimately more comfortable than the traditional slump.

You may experience slight pain in the knees or the middle of the back when you first start using the chairs. The pain in the knees usually passes, although it helps to stretch your legs from time to time. The pain in the middle of your back is a result of the muscles pulling to keep your back straight, a thing they should have been doing all your life; you just have to live with this discomfort while the muscles get their act together and learn to do their job without complaining. □



WORKLOAD

Distributor: Total Solutions, 10/281 Pacific Highway, North Sydney 2060; (02) 923 2466.
Compatibility: IBM PC and compatibles
Price: $250
Application: Spreadsheet data conversion.

Total Solutions has released a product that formats data for use in spreadsheets. In large corporate organisations data is often stored in a number of formats on a variety of machines. Total Solutions' package, Workload, sets about reformatting data for use by a number of popular personal computer worksheets.

These formats include Lotus 1-2-3, Data Interchange Format, Comma Separated Value Format, Superdata Interchange Format, Multiplan Symbolic Link files (SYLK), and Lotus Symphony worksheets. The data has to be in ASCII report format or tabular format with no more than 256 characters per record. The package will run on the IBM PC, XT, Compaq Portable or Compaq Plus, and other PC workalikes. We looked at the package on our Olivetti M24 and it worked without any trouble.

Each Workload package contains a manual, quick reference ▷

ASSCO

NEC APC-III

NEC's latest advance in personal computing, featuring high resolution colour graphics and the high performance 8 MHz 8086 processor — ideal for Engineering and CAD.



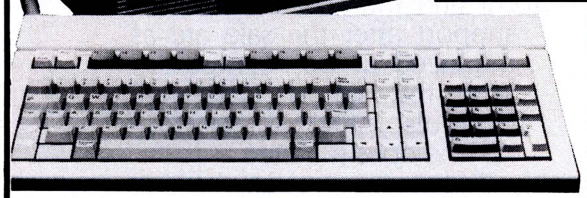
Complete CAD Systems tailored to your requirements.

- AutoCAD
- Civil and Structural Engineering
- Project Management
- Construction Estimation



HEWLETT PACKARD

Hewlett Packard's unique touch-screen personal computer with 10 and 15 Megabyte Winchester capacities and the newer, faster HP 150C model with a larger, 12 inch screen.



Houston Instrument and Hewlett-Packard Plotters
NEC and Hewlett-Packard Personal Computers

BAUSH & LOMB Houston Instruments HEWLETT PACKARD EPSON

VIC. 17 HEATHERDALE RD., RINGWOOD (03) 873 2266
S.A. 59 FULLARTON RD., KENT TOWN (08) 332 0122

SMART KEY

No matter who you are, your software was written by somebody else. Somebody who didn't know you or what you want your computer to do. The result? Wasted time, commands that don't make sense, keys that don't work and endless repetition.

Let SmartKey take over those boring keying tasks. Having SmartKey work for you is like having a macro for all of your application programs, not just a selected few.

Smartkey is the original of its type and has been on the market for more than five years. It is an Australian program which means that you get immediate availability, local support and updates as fast as they are developed.

SmartKey is available for 8 and 16 Bit microcomputers operating under PC-DOS, MS-MS-DOS, CP/M-80 and CP/M-86.

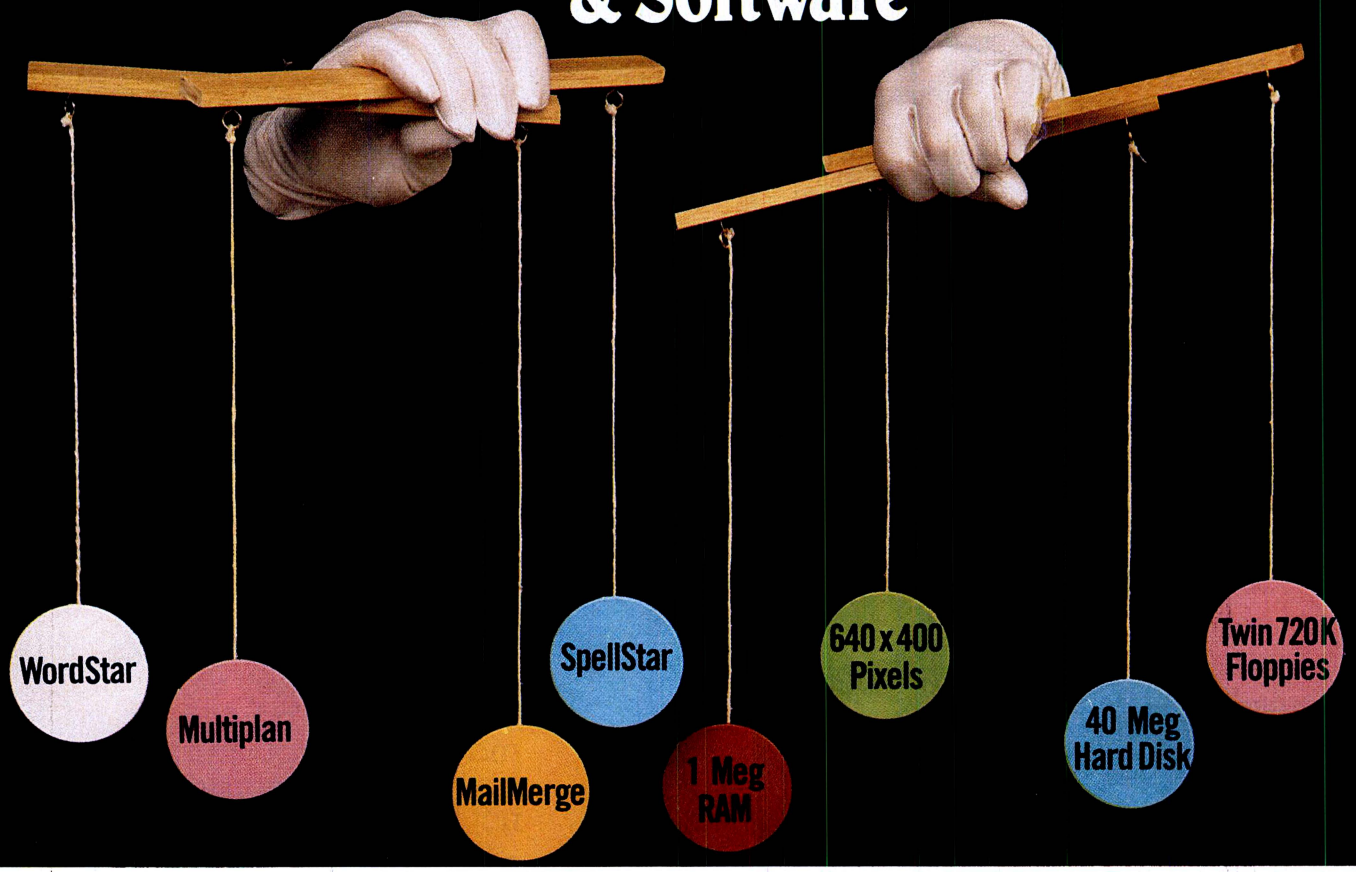
Price: $77

Call (062) 86 1102 or write for further information to;

FBN Software

AUSTRALIAN SYSTEMS SOFTWARE
16 COLES PLACE TORRENS ACT 2607

The Best in Hardware & Software



Duet-16 puts them all at your fingertips!

A design and manufacturing triumph from two of the biggest names in the business, Panasonic and Facom, the Panafacom Duet-16, provides everything your office needs in one exciting package.

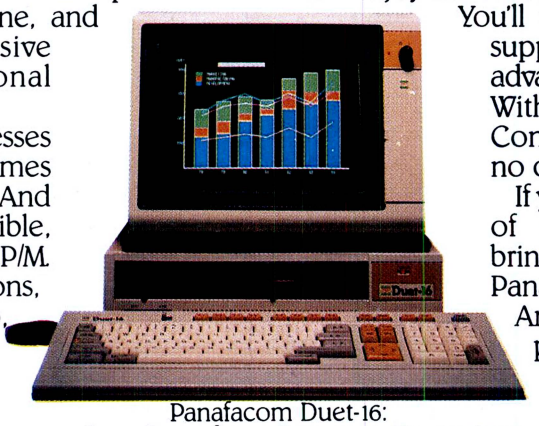
The numerical qualities of a computer and the language options of a word processor in a very practical machine, and backed with an extensive catalogue of international software.

Panafacom Duet-16 processes words and numbers 2.5 times faster than an IBM PC. And Panafacom is IBM compatible, running both MS/DOS and CP/M.

With very few exceptions, anything IBM can do, Panafacom can do better. And faster.

When your business Grows, Panafacom grows with it – more memory, bigger disk drives, or plug into outside mainframes. Without growing pains.

But you don't have to build a big computer network. Each Panafacom computer is a standalone system. Even a very small company can enjoy the benefits of a Panafacom.



Panafacom Duet-16:
another winner from Computer Enterprises

You'll find that our service and support after the sale are as advanced as our computers. With the aid of Honeywell Controls' national network, no one does it better.

If you're interested in the kind of comfort that capability brings, we have your answer. Panafacom Duet-16.

And, if you're one of those people who finds comfort in names, relax.

We're making one of our own.

Computer Enterprises

Sixth Floor, Chatswood Village, 47 Neridah Street, Chatswood NSW 2067, Telephone 419 8577

card, disk and licence. The disk can be copied for backup and stored on a hard disk as part of the licence agreement.

The manual guides the reader through the steps of reformatting a file and selecting the type of object file you want to create and the parts of the source file you want to use. Some of the functions include omission of blank lines and column 1 (which is sometimes used for printer control). You may also specify areas of a file for text, numerals or headings. You are not required to use entire files; you can specify a portion or various parts of a file for inclusion in the object file.

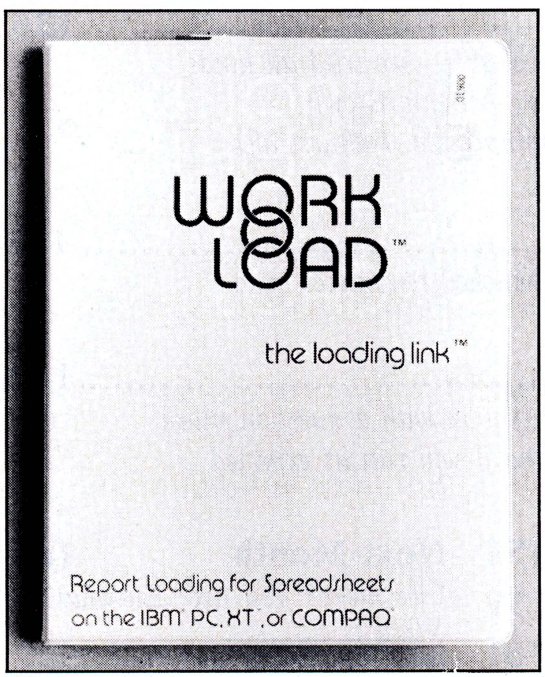
There are three ways to format a file: automatic, guided and combined.

Automatic mode takes the file and reformats it, defining text and numbers by itself. Automatic mode can be slower than some of the other modes and loads the entire report, a problem if you only want part of it. In guided mode you specify the areas of the file you want to load and the parts of it that are text or numbers. In the third, combined mode, you can specify the parts of the file you want and then the automatic function takes over to reformat the specified areas into text and numbers.

Since it may be a lengthy task to fully specify the required data on a file, you can save the specifications for re-use if required. This is particularly useful with production jobs where the same formats are used again and again.

Workload's documentation covers all the system functions, giving numerous examples and illustrations. It is assumed users have some knowledge of the spreadsheets to which they are attempting to transfer data, so you need to be familiar with the requirements of the spreadsheet before you start.

For people who are considering the package but would like to see more of it, a demonstration disk is available from Total Solutions, which shows a selection of the functions performed by Workload. This costs $10, which is deducted from the price of the package when you decide to buy. □



PC-ALIEN

Use your IBM or close compatible to read, write to and format diskettes for over 90 different microcomputers using CP/M-80 or CP/M-86 operating systems.

Transfer software and data files to and from the PC, or between incompatible formats using your PC as an intermediate stage.

PC-Alien is very easy to use and is designed to work just like DOS. Built-in help is only a keystroke away.

If the disk format you wish to access is not among our currently supported formats, we will be happy to try to add it to PC-Alien when you order the program.

THE PRICE? ONLY $95 PLUS SHIPPING.

Mainly due to incompatibility with the PC hardware, PC-Alien will not read:
- 'Hard-sectored' diskettes
- Apple and Sirius/Victor formats
- 3.5 inch formats (yet!)

Call (062) 86 1102 or write for further information to:

FBN Software

AUSTRALIAN SYSTEMS SOFTWARE
16 COLES PLACE TORRENS ACT 2607

Public Domain

New Products **125**
How to separate the News from the New Products? Rose has done it. From now on News will be News ... and New Products will be that section which sends you digging deeper and deeper into your pockets. (Take a subscription to Your Computer immediately so you can still drool over all the latest machines, software, peripherals and so on, after they've come to cut up your Bankcard.)

IBM Underground **128**
Not all software for the IBM PC is in the Lotus price league. Enthusiasts have written a huge number of programs for the public domain, too. John Hepworth has volunteered to be your guide through the labyrinth in this new monthly column.

Your IBM **132**
Norton Utilities written in C run on non-standard hard disks; the case of the crazy .COM, and do-it-yourself DOS.

Your Microbee **134**
A colourful tale.

Your Appletosh **136**
Your MacApple, Your Macintopple, Your Appintosh, Your #%!@slosh — we tried all kinds of combinations to try and reflect the content of this new column by Annette Brown. Macintopple was a favourite, but we were sure Apple would be unimpressed. Akhurst also applies the Granny Smith motif to a celebratory illustration.

Your BBC **141**
Our columnists really have excelled themselves this month. Bruce Mitchell reminisces on a six-year flight of fantasy.

Your OS **142**
If a program you have developed under CP/M 2.2 calls the open function with a question mark in the FCB, you can attach a Resident System extension (RSX) and it will run as expected under CP/M Plus. And Microsystems lives!

PAMS News **144**
Book Reviews **146**
Clubfile **149**
Classifieds **154**
Glossary **157**
Services/Ad Index **161**
Next Month **162**
Ewe nicks? You nix? Eu-what? What is it?

NEW PRODUCTS

We've decided the time has come to separate 'News' from 'New Products'. Rose Vines is in charge of this delicate operation, and would like to hear of any genuinely new releases manufacturers or distributors may have.

Software

Asset
Management Computer Systems,
(02) 690 1743
Price: From $595 per module
An Australian-designed suite of comprehensive accounting software which can support five screens and offers simultaneous updating with record protection. Modules available are accounts payable, accounts receivable, inventory, accounts receivable/inventory, general ledger, sales analysis, production planning, job costing, payroll and letter writing. Asset runs on the IBM PC and compatibles.

Co-Resident Utilities
Co-Resident Software,
(02) 908 2355
Price: Starting from $125
Co-Resident utilities are programs which reside in memory and can be accessed while the user is in the middle of an application such as WordStar, Lotus or dBase. Included in the range is Pop-Up Calculator, Pop-Up Alarm, Pop-Up PopDOS (runs DOS commands from within your application), PolyWindows (a suite comprising word processor, calculator, alarm clock, appointment book, calendar, filedex, keyboard enhancer and game) and APX Core (partitions RAM so you can run three programs at once).

d/Multi
TCR *Software,* (03) 299 1811
Price: $500
d/Multi is an Australian-developed multi-user version of dBase II. It provides file and record locking and error message control, with all dBase commands functioning normally. The only additional software required is a single-user version of dBase and the TurboDOS Operating System.

Hartley software for the IBM
Hartley, (07) 377 0509
Hartley, well-known for its accounting systems, has produced a board and a program disk for the IBM PC which let you run Hartley software (such as the accounting system HAPAS) on it. The new development also makes it possible to interconnect Hartley and IBM hardware.

Inmagic Text Retrieval Software
Trimagic Software, (02) 922 3076
Price: $1400
Inmagic is designed for professional users such as librarians, lawyers, engineers, records managers and researchers to build textual databases and use them to provide information in a variety of formats. Data is stored in variable-length fields, and there is online help to ease the learning process. Also available are specific applications packages, such as Biblio — a library applications module. A test version may be purchased for $96.

LAN version of KnowledgeMan
Micro Data Base Systems,
(03) 523 5947
Initially available under PC-DOS for the 3Com local area network, this new version of the powerful KnowledgeMan database system allows multiple users to share common data resources and peripherals. There is a deal of flexibility in sharing data, including protection of data integrity and choice between shared and local status for each table (database file). Files created under other versions of KnowledgeMan are compatible with the LAN version.

Medical Practice Administration System
Foundation Medical Systems,
(02) 419 5755
MPAS is a total system for small medical practices, which handles all aspects of client contact, including appointments, registers, clinical records and accounts and billing. A complete system for a two-doctor practice with three terminals costs less than $25,000.

Mite Communications Software
Telecorp, (02) 450 2522
Price: $249
Mite is a complete communications package for any MS-DOS or CP/M computer, as well as the Apple Macintosh. It works on a menu system, providing ease-of-use and flexibility in file transfer. It will work with most auto-answer/auto-dial and manual modems.

Multimate WP for HP Touchscreen
Hewlett-Packard, (03) 895 2895
Price: $764 excluding tax
Multimate on the HP Touchscreen incorporates all the standard features of this popular word processor adapted to the Touchscreen environment. There are built-in spelling checking, a merge-printing facility and five training lessons. A minimum of 384 Kbytes of RAM is necessary to run the program.

RID Disk Drive Tester
Communication Control,
(02) 597 2538
Price: $68
The RID (Recording Interchange Diagnostic) disk automatically carries out a number of test functions on 13 cm disk drives, allowing users with no hardware knowledge to appraise their disk drive performance in approximately one minute.

Spellbinder Scientific
Software Source, (02) 389 6388
Price: $1095
Spellbinder Scientific is a word processor designed to give the technical user a complete range of mathematical and chemical symbols. Scientific text is displayed on the screen exactly as it will appear on the printer. The package is also available as an upgrade to the standard Spellbinder word processing package. It will run on the IBM PC and compatibles and the HP 150 Touchscreen.

Sperry UserNet
Sperry, (02) 929 7800
Described as a 'fast, easy-to-use' local area network, UserNet will connect 63 personal computers, with eight levels of data access security. For most MS-DOS machines.

Travelling Software
Strategy Software, (03) 233 9227
Price: $74.95 to $124.95
Travelling Software has been specifically developed for lap-held computers. Titles are T-Writer, T-Base, Appointment Manager, Sales Manager, Expense Manager, Time Manager and Project Manager. Runs on the Tandy M100, Olivetti M10 and NEC 8201A.

Trigger
Interactive Applications,
(02) 920 1377
Price: $950
Trigger comes from US company Thoughtware Inc. The package is an 'electronic consultant' — rather like having a management consultant in your computer. The system will keep track of your business's performance according to specific indicators you wish to track. The package is built around the concept of 'management by exception': you determine a business plan and Trigger builds up a database of causes of deviations from that plan and actions which help to keep your business on the right track.

Uniplex Word Processor
Rakon Computers, (02) 43 1351
Price: $1390
A word processing system for Unix machines, Uniplex includes electronic mailing, spelling checker, extra-wide report formats and online help. Files created by Uniplex WP have no embedded control characters, so they are completely compatible with other applications. Uniplex WP is part of a series of integrable software, including a spreadsheet, database, spooler and screen compiler. The complete package costs $3200. ▷

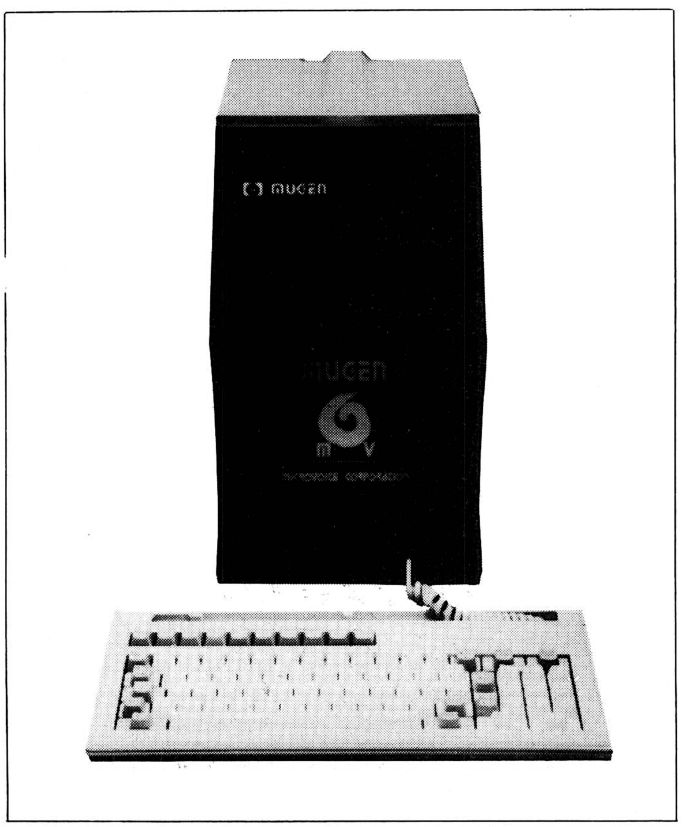
New Machines

GridCase Portable Computers
Vicom, (03) 62 6931
Price: From $4600
More IBM compatible portables. GridCase 1, 2 and 3 all weigh less than 6 kg, have a built-in 9 cm 720 Kbyte disk drive and up to 512 Kbytes of user-installable ROM packs. These computers are claimed to provide more I/O interfaces than any other briefcase machines. The model 1 has an LCD screen, the model 2 an enhanced LCD screen and the 3 a light-emitting plasma display which will run from mains or battery power. All screens are 25 lines by 80 characters.

Mugen Personal Computer
R P *Sewell*, (02) 957 5388
Price: $3995
Another IBM compatible luggable. This is a rather strange-looking machine, weighing in at 13 kg and incorporating two 13 cm floppy drives, 23 cm monochrome display and a standard 256 Kbytes RAM. It is based on the 8088 processor and comes with a range of interface options.

PC College
Osborne Australia, (02) 290 1122
Price: From $1200 for a basic system
This is an IBM-compatible computer specifically developed for the education market. Its low cost has been achieved by paying less attention to external cosmetics while maintaining capacity and expandability. It runs a variety of operating systems, including MS-DOS 2.11 and Concurrent CP/M 86. The processor is an 8088, RAM is 64 Kbytes expandable to 640, there are eight expansion slots and it is available with dual floppy disks or one floppy and one hard disk drive.

President Jr
President Computers, (03) 529 1788
Price: $1400 excl. tax



A 'bare bones' IBM compatible portable, with 256 Kbytes RAM, one 360 Kbyte drive and inbuilt keyboard. It may be connected to a television or monitor, and has one parallel, one serial and one joystick port. Supplied software includes MS-DOS, Eazytype, a word processor and spreadsheet.

Sharp PC-1246
Sharp, (02) 728 9111
Price: $85
A pocket computer with 16-digit dot matrix display, instant BASIC commands, battery backup and 2 Kbytes RAM.

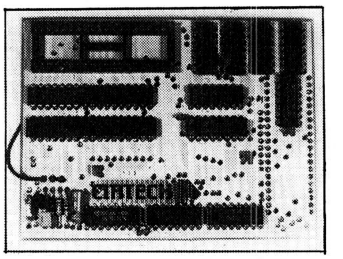
Sharp PC-1421
Sharp, (02) 728 9111
Price: $195
A pocket computer/business calculator with 16-digit display, specialised inbuilt financial calculation, instant BASIC commands and an interface to printer and cassette.

Sharp PC-2500
Sharp, (02) 728 9111
Price: $545
The PC-2500 has a built-in colour plotter/printer, four-line LCD display and full-size keyboard. Business programs are built in and optional expansion cards boost standard memory from 5 Kbytes to 21 Kbytes. It has an RS232 interface.

Toshiba HX-10
Woolworths, Myer, Grace Bros and Toshiba outlets
Price: $449
The HX-10 is Toshiba's MSX machine. It has 64 Kbytes main memory, 32 Kbytes ROM and 16 Kbytes video RAM, with a full keyboard. It can be connected to any UHF colour television set. Other features include an eight-octave sound range, MSX BASIC software and cassette interface (with expansion available for disk drives).

Visual Commuter
Kenelec Australia, (03) 560 1011
Price: $2874
An 8 kg IBM compatible portable, the Commuter has an 80 by 25 LCD screen, dual 13 cm disk drives and 256 Kbytes RAM (expandable). It has a variety of inbuilt and optional communications facilities.

Peripherals Extensions



Cirtech Apple IIc CP/M Module
Thinking Systems, (02) 211 0944
Price: $299
This dealer-installed CP/M module fits completely inside the case of the IIc, allowing it to run all standard Apple CP/M software without modification. It slaves the Apple to a Z80 microprocessor and includes RAMdisk software to take full advantage of the IIc's memory.

Digicard Dual High-Capacity Disk Drive
Maclagan Wright, (03) 439 1366
Price: $1290 excl. tax
The Digicard drives provide relief for Apple users frustrated by their own skimpy drives. The system includes two 80-track double-sided 800 Kbyte 13 cm drives with their own power supply, an interface card and a cable to the Apple II. Operating systems supported are CP/M 56, CP/M 60, Softcard II CP/M, ProDOS, Pascal and DOS 3.3.

Ozmon EPROM-based monitor
G J *Armitage*, 8 *Menzies Parade, Lalor* 3075
Price: $47.50 plus $1.50 postage and packaging
Claimed to be the first Australian-designed and manufactured monitor in EPROM for the BBC micro, the Ozmon features disk sector editing and random access file editing capabilities, in addition to normal RAM editing. Ozmon contains a single-pass assembler, a single-step mode and memory fill, search, compare, move, dump and edit commands.

PC Encryptor
Eracom, (075) 56 0911
Price: $750
The PC Encryptor is a board and

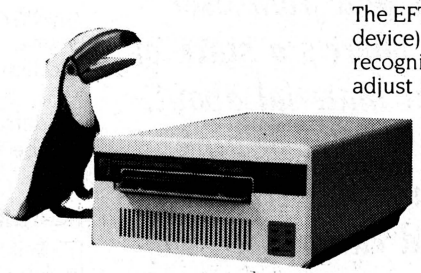
software for PC-DOS and MS-DOS operating systems which provides encryption security for the operating system, program and data files on floppy or Winchester disk drives. It can be easily upgraded to add communications and key management capabilities. The board uses the Data Encryption Standard (DES) algorithm, implemented on a high-speed integrated circuit chip, to perform encode/decode functions.

PC-Tape
Alloy Computer Products,
(03) 529 8455
Price: $1995 excl. tax
A 25 Mbyte cartridge tape backup unit for the IBM PC range and Sperry PC. It plugs directly into the back of the PC, requiring neither power nor hardware slots. File-oriented backup is supported.

Preview! Graphics Board
Sourceware, (02) 411 5711
This graphics card provides bit-mapped graphics and high-quality text for the IBM PC/AT monochrome displays. It allows resolution of 720 by 348 pixels, and comes with a SuperPak utility disk containing a RAM disk simulator and a printer spooler.

Spinwriter Accessory Kit
NEC *Information Systems,*
(02) 438 3544
Price: $99 excl. tax
Daisywheel printing with your Mac! This kit consists of a program disk containing the software to enable Macwrite to drive NEC Spinwriters, a Macintosh-to-Spinwriter cable and a user's guide.

Tallgrass Hard Disk Subsystems
Tallgrass Technologies,
(02) 712 2010
Price: from $5695 excl. tax
A new family of hard disk systems with integral tape backup. The disks are available in 25, 35 and 80 Mbyte capacity, with 60 Mbyte tape backup. A new tape format increases ease of use and archival flexibility. For the IBM PC/XT/AT and compatibles.



Tandon Disk Drives
Micro General, (02) 398 8601
Micro General has a range of disk drives from 10 to 15 Mbytes for Apple machines and from 10 to 30 Mbytes for IBMs. All systems use Tandon drives, with Konan controllers for the Apple and Xebec, Konan or DTC controllers for the IBM. Prices start at $1995 (excluding tax) for the Apple drives and $1876 for the IBM drives.

Taxan KPL-710 Flat-Bed Plotter
Megavision, (02) 290 2655
Price: $1900
The KPL-710 provides full HP7475A compatibility, with six-colour pen auto-change and a plotting speed of 300 mm/sec in axial directions. Plotting area is A3 or smaller.

Tulpi EFT Modem
TeleCorp, (02) 450 2522
Price: $1595
The EFT (Extended Features Teledevice) provides auto baud rate recognition, allowing the Tulpi to adjust its two primary operating speeds (300 full duplex and 1200/75 full duplex) to that of the incoming call. An upgrade from the previous model is available for $600.

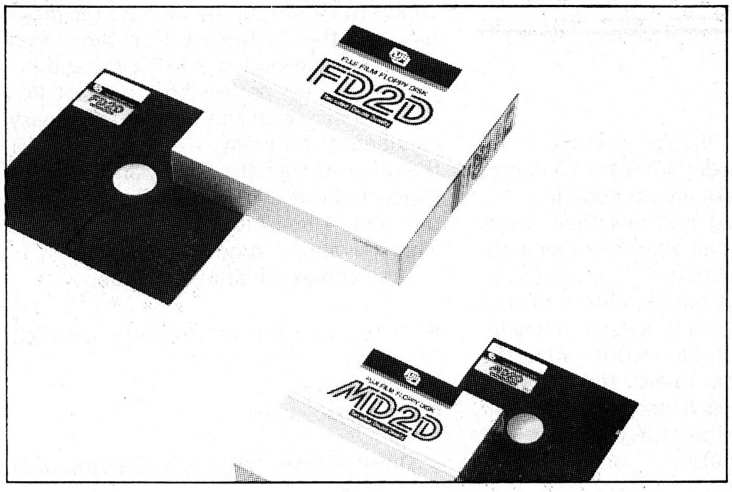
Services

'Hands Off' Shopping
Strategic Software Club,
(02) 957 6667
'Hands Off' shopping is a mail-order software service, particularly useful for country people. The Software Club selects software and describes it in a magazine sent to club members. Membership to the club is free, and currently software is available for the Commodore 64 and Apple computers.

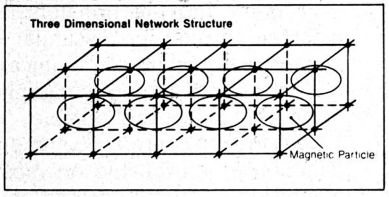
Furniture

Deskmate Monitor Mover
Computer Products Network,
(02) 290 3100
Price: $200
The Monitor Mover is a swivel arm which allows the operator to adjust the position of the monitor. Suitable for most VDUs up to 30 kg, it clamps onto any desk with an overhanging lip. □

FUJI FILM FLOPPY DISKS BRING PEOPLE, INFORMATION AND MEDIA TOGETHER



RD Binder System.
The RD (reliable and durable) Binder System–developed under FUJI FILM's own technology–is what gives FUJI FILM floppy disks their incredible toughness and stability. It acts as the adhesive which binds the magnetic particles together and to the tape base. The system ensures uniform dispersion of the magnetic particles using a "Three Dimensional Network Structure".
Our disks provide greater durability during repeated use, and are weather-proofed, ensuring peak performance even under severe environmental conditions.



Contact Your Local Supplier

SYDNEY: Calmar Distributors 660 2499, Caringbah Computer Centre 526 1515, Transcript 764 2177, MELBOURNE: Goodman Cannington 241 1341, Output Media 544 4400, BRISBANE: The Byte Shop 371 0711, ADELAIDE: Australian Business Machine Co. 212 3244, PERTH: W.K. Witt 446 6100.

Trade Enquiries Fujimex (02) 938 0241

Checked your mailbox yet today?

No, not the one in the fence beside the front gate — try the one in the computer across the room, across the city, or even across the world.

One of the more impressive demonstrations I have seen was Chris Howell of DataNettComm checking his mail on Apple Computer's electronic bulletin board in California. It took only moments to connect, seconds to check for messages, and an instant to disconnect. All that was needed was a computer, a modem to connect it to the telephone line and a communications program to tell the computer how to send the appropriate characters down the line.

If you have the computer and the modem, you need software, but don't spend heaps of money buying commercial programs. Enthusiasts have written some of the best communications software available, and have released it to the public domain.

I use Modem7 and PC-Talk III every day. Why two? Both are excellent, but at times I need the features of one, and at other times I need the strengths of the other.

Modem7 is the classic program designed by the legendary Ward Christensen, while PC-Talk III was written by Andrew Fluegelman, now Editor-in-Chief of the US magazine PC *World*.

Modem7

Modem7's major strength is that it comes in many flavours for so many different computers — there's the MS-DOS version, one for the Apple and others for 8-bit CP/M machines. They all have the same cryptic screen displays and commands, and the error-checking XMODEM protocol.

Program and file transfers from one machine to another dissimilar machine are very easy, while communication with bulletin boards and downloading of programs are efficient and reliable.

Only limited control of communications parameters is available on most implementations — baud rate can be selected by the user, and can be changed during a session. Word length, number of stop bits and parity stay at 8-bit word length, no parity and one stop bit.

Batch Mode

The main strength of the various Modem7 versions is batch mode. Here the computer at the sending end is told the filename(s) to send, and the receiving end operator only needs to set up the machine to receive in batch mode. Wildcard filenames such as *.z or *.wks are acceptable.

The transmitting machine then sends the selected files one after the other without operator intervention. You might imagine this could scramble all the files at the receiving end, but it doesn't. A header is sent before each file incorporating the filenames, and this causes the receiving computer to save each incoming file under its own filename, identical to the one on the sending computer.

While you probably will find yourself buying a certain amount of commercial software for specific applications, any adventurous IBM *(or compatibles) user can make valuable, free (no contradiction) additions to their software library by rummaging through the public domain material available on bulletin boards and from user groups. There's a stack of excellent material about, and a fair bit of junk. John Hepworth, a practised rummager, will be passing on useful leads in this column each month, and reviewing the best of what he finds.*

I have heard suggestions that Modem7's batch mode is not compatible with batch mode in other programs like YAM, and will continue investigations along these lines for a later column.

My primary use for Modem7 is to send files at 9600 baud using batch mode between an IBM PC and an 8-bit CP/M machine. This is much too fast to send over a phone line, but my two computers are a metre apart, and the transfer is swift and efficient.

Sub-Directories

Modem7 has one big advantage over other communications programs — it is all in one file, without Help files and so on. This makes it easy to put Modem7 into a communications sub-directory on a hard disk and call it up, after specifying a path, from any default drive or sub-directory.

Modem7 can be found disguised under various filenames on almost any bulletin board around the world. The one I use on my IBM is MDM7I, but I have seen it on some boards called IBM-MOD or Modem7I. Versions for Apple I have seen (but not used) have been named Modem7A, and many other sub-variants will be found.

PC-Talk III

PC-Talk III has to be one of the greatest finds of the public domain world. Written in BASIC, it fills a double-sided 360 Kbyte MS-DOS disk with the source code in ASCII, a compiled version, help files, dialling directory and a disk file containing a fully formatted and comprehensive 70-page manual.

Users are encouraged to get a copy, give copies to all and sundry, and use the program. Only then, if they like it, are they asked to send a contribution of $35 to the author.

As a quality, professional product PC-Talk III ranks with the best of the glossy commercial programs — at a fraction of the price. As well, the Shareware/Freeware concept allows a 'test drive' before paying one cent — how often does a commercial 'shrink-wrapped' product offer that?

The package's features include:

- Autodial from a directory with 60 names.
- Autoanswer.
- Auto disconnect.

These support the Hayes Smartmodem

protocols and are fully compatible with the DataNettComm In/Modem. Use of simple manual modems is fully supported.

Running the program reveals a copyright message, and then the screen clears. Communication starts immediately using the default settings for the program, which the user can easily change either temporarily or permanently.

The Options

Pressing the <Home> key brings up a help screen revealing all the possible commands. PC-Talk III uses a combination of the Alt key and the alphabet keys for instructions. It is also possible to reprogram the function keys from within PC-Talk III.

Alt-C	Clears screen
Alt-T	Sends a file
Alt-R	Saves incoming data to file
Alt-V	Views a file on disk
Alt-Y	Deletes a file
Alt-L	Changes logged drive
Alt-D	Brings up dialling directory
Alt-Q	Redials once every minute
Alt-P	Changes communications parameters
Alt-F	Resets program defaults
Alt-Z	Elapsed time for current call

Most of these commands bring up second-level options. As an example, Alt-F brings up two columns of defaults for resetting, and the new drive, baud rate and so on are typed in against the old settings. Alt-T or Alt-R both ask for the filename to be sent or received. Entering a '?' gives a directory listing of the logged drive, and directories of other drives are available. Alt-V pauses the screen display, and reads a file from disk onto the screen 24 lines at a time — essential to confirm that the right text file is about to be sent across the world.

I often want to transfer ASCII files from my NEC PC8201 to my IBM at up to 9600 baud. The NEC does not have XModem and PC-Talk III is the only program I have used so far which will take files from the NEC in straight ASCII at speeds over 300 baud without dropping occasional characters. About the only feature PC-Talk III lacks is batch mode.

PC-Talk III is now my first choice, although Modem7 remains essential for batch mode transfers. Modem7 should be available from any bulletin board, while PC-Talk III with all its files and manual may only be available via your user group. □

More Gems

In another month or two Bill Bolton will be hurling himself into the even larger pit of general public domain software, and surfacing every now and again to tell other computer users of his finds — keep an eye out.

SPECIAL $33 FUJI DISKETTES
per box of ten
5¼" SS/DD
incl. tax and postage.

SPECIAL $28 DISKETTE STORAGE BOXES
Incl. tax and postage.

FUJI QUALITY
3½" (Apricot, Lisa etc.)
5¼" HD (1.6Mb) (Pulsar)
5¼" & 8"
LIFETIME WARRANTY

High Quality Lockable.
Capacity Stores = 60
5¼" Diskettes

WORD PROCESSING PAPER
BOXES OF 1000 @ $16.50

You are welcome to call at 28 Lionel Road, Mt. Waverley

Please supply Post free by return mail:

..... Boxes of Diskettes @ $33 ea.

..... Storage Boxes @ $28 ea.

Amount enclosed $.....

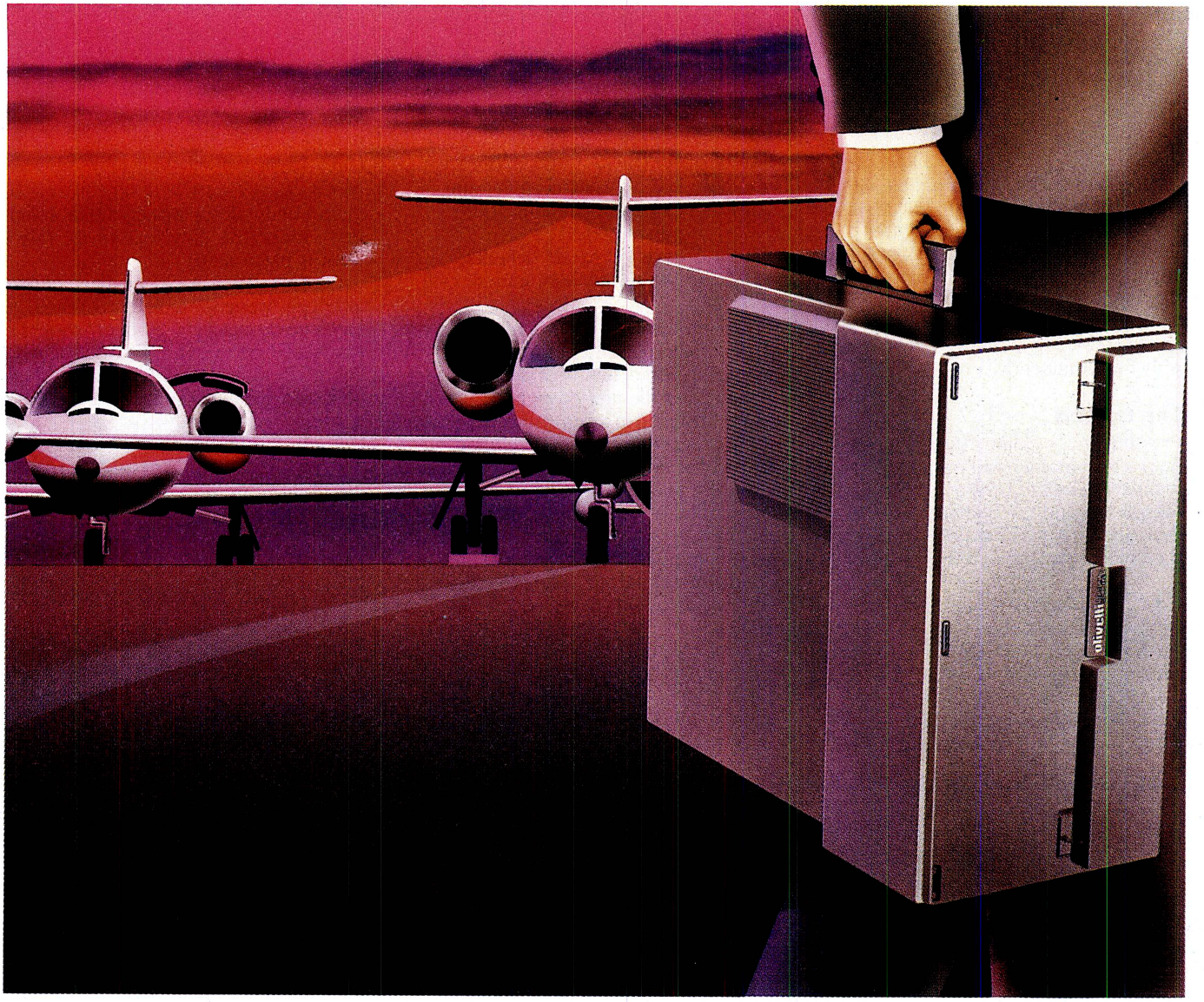
Please charge my Bankcard ☐ /Visa ☐ /MasterCard ☐
No ..... Expiry Date .....
Signature .....
Name .....
Address .....
.....
Postcode ..... Amount $ .....

bankcard VISA MasterCard

Output Media

Output Media Pty. Ltd. Manufacturer of printed Business Forms
P.O. Box 227, Mt. Waverley 3149
Phone (03) 544 4400. Telex 134947

Y/C 6/85



From the most important partnership in the history of computing comes the portable version of the world's fastest growing PC. It's the M21, a compact M24. And it makes the average portable look suspiciously like a toy.

It's fast, flexible, expandable. A high-performance machine with high resolution graphics and a range of integrated options, just like its best selling brother.

A portable with all the power of the most advanced PCs. Hi-tech with a handle. And amazing value for money.

The M21's features are still options on many other machines. High resolution graphics with up to 640 x 400 pixel clarity. A true 16-bit computer and bus with serial and parallel interfaces.

The M21 is compatible with MS-DOS and runs the most popular off-the-shelf software. And it also supports CP/M-86 and the UCSD P-System.

You can choose either one or two floppy disk drives for up to 1.5 MB of inter-changeable storage.

And the disks you use in the M21 can be used in your M24 desk top.

The M21 also connects with a 10MB hard disk unit.

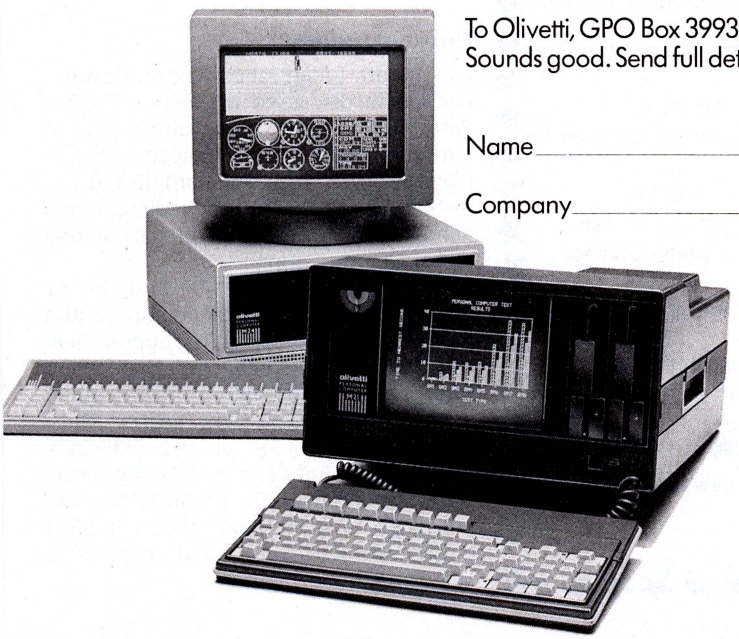
All this and more for a price you can pick up as easily as the machine.

Now the M21 is ready for business, call your nearest authorised distributor for a full presentation. Or phone Olivetti direct on 008 02 2018 (toll free). Or send this coupon.

MS-DOS is a trade mark of Microsoft Corporation.

olivetti
COMPUTERS
The Intelligent Alternative

NOW, THERE'S A PORTABLE ALTERNATIVE. THE OLIVETTI-AT&T M21 PC.



To Olivetti, GPO Box 3993, Sydney, NSW 2001.
Sounds good. Send full details on the M21. ☐ Please phone me. ☐

Name _____

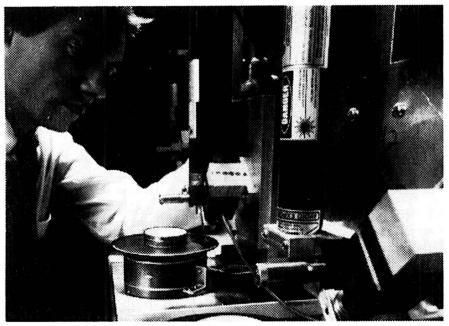
Company _____

Address _____

_____ P/code _____

Business Phone _____

GREY/OLIV 0205



Laboratory testing of the radically new discs.

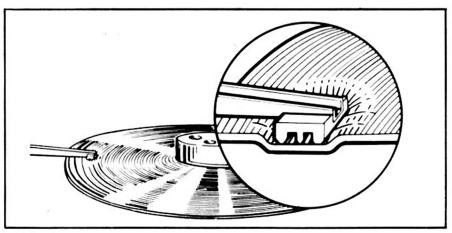
3M boosts memory by 2,500%

The weak link in many small computer systems has been data storage. Hard discs are expensive and delicate, while conventional diskettes lack storage capacity.

3M solved both problems by creating a unique **Stretched Disk Technology** medium. It's tougher and cheaper than hard discs, yet stores 25 times as much data as conventional floppy diskettes.

Comprising a flexible medium stretched over a rigid "frame", the new disc is dimpled by air pressure as it passes under the heads of the drive. This "trampoline effect" throws off accumulated dust which can destroy data on conventional discs.

The new discs will soon join 3M's extensive range of magnetic media for everything from portable PC's to huge mainframe computers.



Inset shows how the stretched medium "dimples" around the head, permitting closer spacing of tracks for increased memory.

3M has over 50,000 products for industry, business, health care and everyday life. And we're inventing new ones all the time. Ring for more information, or write to: **Inventors, Freepost 7, Pymble, NSW 2073.**

Talk to the Inventors

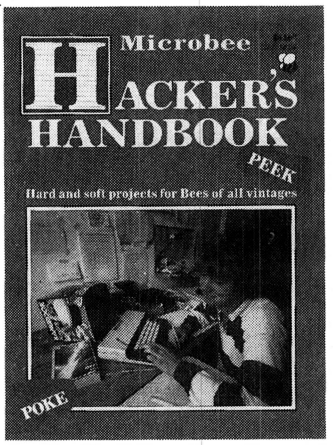
Melbourne 542 5312
Sydney 498 9459
Brisbane 391 7844 Ext 99
Adelaide 268 1122 Ext 99
Perth 328 5244 Ext 99

3M Australia Pty Ltd (inc. in NSW)

3M

Results E

Microbee HACKER'S HANDBOOK



From the publishers of 'ETI' and 'Your Computer' magazines.

The Microbee Hackers Handbook will tell you how to:

- 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 hardcopy — cheaply.
- Expand your 16K Bee to 32K
- Make the Bee a better games machine.
- Turn your Bee into a facsimile decoder.
- Solve equations on the Bee . . . and much more!

★

$6.50 at your newsagent now.

BY JOHN HEPWORTH

THE PC SHOW at Sydney's Centrepoint was a bit of a disappointment after last year; I was concentrating on the IBMs and compatibles, and this year there was a marked reduction in numbers and polarisation of those products.

The big boys were there without any real surprises. IBM didn't have the AT, even though Roland showed expansion boards from STB for it. I didn't even see a copy of DOS 3.00. Olivetti had its M24 and TI its Professional and two portables, but only TI's lap computer with LCD screen was really new.

Other machines looking for their own niche were there — the PC-Slave multi-terminal system, the Wyse (claiming full compatibility with IBM, but only as thick as a half-height drive) and the amazing Morrow Pivot. With LCD screen, two slimline drives and claimed IBM compatibility, this is only about as big as a shoebox. The promised electro-luminescent screen should make it a real winner.

Even more interesting were the number of machines claimed to have Lotus 1-2-3 and Flight Simulator compatibility, but which had no copy of either running or available. These are not the most demanding of the compatibility tests, but they are a good 'sieve', and when they were claimed but not shown my nasty suspicious mind went to work. Very few of the 'Taiwan compatibles' were on show either.

Still, out of all the disappointment there were a few goodies for users of IBMs and compatibles worth writing about in this column.

Norton Update

Last month I mentioned Norton Utilities. The version discussed was version 2, which Peter Norton wrote using direct calls to hardware, making it very specific on display and drive types. The hard disk had to be the XT configuration and many external hard disks (Davong and Tallgrass among them) were not supported.

The advent of DOS 3.00 and the AT brought new fixed disk configurations and the 1.2 Mbyte floppy disk. To support them the Utilities have been redesigned and totally rewritten in C with some Assembler routines. Using only DOS function calls, they now should run on most MS-DOS machines including the TI Professional, the Wang and the NEC APC III. If there are any disk format problems, then a transfer of the programs over a serial link from an IBM should sort them out.

```
+---------------------------------+
| Screen Display                  | Notes
|
|---------------------------------
|---------------------------------|
| A>debug                         |Start DEBUG
|
| -a 100 <enter>                  |Assemble from offset 100 (hex)
|
| 17E5:0100 mov dl,0C <enter>     |Put output character (0C)in DL
|
| 17E5:0102 mov ah,5 <enter>      |Put DOS function call no. in AH
|
| 17E5:0104 int 21 <enter>        |Do function 5 to the 0C in DL
|
| 17E5:0106 int 20 <enter>        |End program - return to DOS
|
| 17E5:0108 <enter>               |
|
| -r bx <enter>                   |Display BX register
|
| BX 0000                         |
|
| :0 <enter>                      |
|
| -r cx <enter>                   |Display CX register
|
| CX 0000                         |
|
| :8                              |Input 0108 minus 0100 (in hex)
|
| -n ff.com <enter>               |Name output file
|
| -w <enter>                      |Write output file
|
| Writing 0008 bytes              |
|
| -q <enter>                      |Quit DEBUG - return to DOS
|
| A>                              |
```

Listing 1. *This routine* (FF.COM) *was created using the Assembler built into* DEBUG.

I have just spent a few hours with a review copy from PC Extras, and all routines appear to work with my Davong hard disk. Most are great improvements over version 2, but in a few cases I prefer the last version. I'll be most reluctant to send this one back!

The Case of the Crazy .COM

Ever tried to run a .COM or .EXE program, and found it to mysteriously misbehave?

I've had this trouble with FORMAT, SHELL, and DEBUG, among others. Using DEBUG to assemble short .COM files was unpredictable: sometimes the resulting file did not run as expected. Then, when I attempted to use Unassemble to look at the file, DEBUG looked at unexpected addresses.

Bill Bolton suggested a use for the public domain program SHELL.COM in the March 1985 issue of *Your Computer*. I used it first with a different AUTOEXEC.BAT file from Bill's; it went into an endless loop, and the computer had to be switched off to get out!

Yet again, under some circumstances FORMAT would not work, just reporting that track 0 was unusable, and quitting.

Reports have it that on rare occasions Peter Norton's file directory sorting routines may be affected.

Was there a common factor?

The above symptoms happened to me on two different machines, configured with quite different boards, one running DOS 2.00, the other DOS 2.10. Other people using other machines and software have had similar problems.

The oddities happened with quite different combinations of programs resident in memory — FONT.COM as used by the Hercules Mono Graphic Board, Persyst's Waitless printing, and the AST Super Spooler.

The problem is even more general than this, however, the list of programs which can trigger problems being greater than the list above, and the list of programs which can be affected definitely greater than those mentioned.

So, if a program misbehaves, check which other programs are resident in memory, reboot without them, and try again. In the case of the incompatibility between SHELL.COM and FONT.COM I merely changed the order in which they are invoked from my AUTOEXEC.BAT file so that SHELL.COM is run first.

To use DEBUG and FORMAT I boot up with an alternative boot disk which does not bring in any resident programs. When using DEBUG to assemble routines I use a third boot disk which does not even bring up my hard disk.

Do It Yourself DOS

Microsoft offers a macro assembler for the IBM PC. It does a great job, and is essential for assembling all but the tiniest routines. But built into DEBUG from DOS 2.00 on is a neat Assembler, so fire up your machine *without any resident programs* and let's use DEBUG to create a DOS external command — FF.COM.

What is FF.COM?? It's a routine which allows you to send a form feed character (decimal 12, hex 0C) to a printer either directly from the keyboard at DOS command level, or from a batch file.

The program puts a character expressed in hex into the DL register, and the DOS function call number (in this case 5) into the AH register. INT 21 outputs the contents of DL to the device determined by the contents of AH — in this case to a printer.

I assembled FF.COM with DEBUG, used Sidekick to record the screen display, and then inserted it into my word processor file — no apparent conflict here between the resident Sidekick and DEBUG. In Listing 1, for the sake of clarity, I have underlined the characters entered by the user, leaving the computer's responses plain. Where <enter> appears just press your enter key once.

Two little points. The notes column is just for information — don't key it in. The 17E5: portion of the address will vary from machine to machine and from time to time, depending on various factors — don't worry about it, your IBM will take care of this detail.

To output a different character, change the 0C in the line with offset 0100 hex to the hex value for the desired output character — a hex 0F will sent an Epson printer to condensed mode, and other characters will give other effects. Remember that in DEBUG all numbers are in hex, not decimal.

Save each variation under a different name. A filename can include drive and/or sub-directory identification.

In later issues I will give simple routines to output short strings to printers and do other useful duties. Some I use to reset printers from batch files and do other housekeeping tasks. Watch this space! □

BY COLIN TRINGHAM

AT THE TIME of writing, there are comparatively few colour Microbees around, mainly due to the lack of low-priced colour monitors. Now Applied Technology is about to release its own colour monitor at a very reasonable price, which must surely give a big boost to colour machines.

Colour is expensive to reproduce on Bees because of the method AT chose to implement it. Whereas many units can use a domestic colour TV, the Microbee needs a special RGB monitor, although the results certainly make you see why AT went this way. To produce colour on a normal television receiver, the colour information is restricted to less than 1.5 MHz bandwidth, meaning very fine details are not coloured at all. The Microbee provides three colour signals — red, green and blue, each capable of three intensities — and the bandwidth of each signal is a full 13.5 MHz. Colour displays from a Microbee on a suitable monitor are really stunning, rivalling far more expensive machines.

The colour facility is provided by adding an extra 6116 RAM chip in parallel with the PCG memory. It occupies the same address space, but is switched into circuit for reads and writes by port 8 of the PIO. A write to the PCG with this bit high will in fact write to the colour RAM, while with a low bit 8 it will write to the PCG as normal. It would have been much more convenient to have the colour RAM occupy the same memory space as the screen, but this is impossible as the Character Generator ROM already occupies that area.

Now we have eight extra bits of memory for each screen position to define its colour. Theoretically there is a total of 255 colours, defined as being foreground or background colours. Note how each screen position (8 by 16 character space) is assigned *one* foreground and *one* background colour designation, which means setting a single dot of colour is not really possible. You can simulate a single dot of colour by specifying a PCG character with single dot 'ON', and a colour background the same as the adjoining characters.

In BASIC, three colour commands are possible:

COLOUR N: Sets the foreground colour; N is from 0 to 31.
COLOURB M: Sets the background colour; M is from 0 to 7.
COLOURH P: Sets half-intensity colour; P is in the range of 0 to 7.

You can also POKE locations 156 (foreground), 157 (background) and 158 (half-intensity mode) directly, or use the OUT 8,64 instruction to switch the PCG RAM out and the colour RAM into place, and POKE each individual screen position location (*higher* than the corresponding SCREEN memory location).

The colour information is presented to the user as six colour signals (red, green and blue and half-intensity red, green and blue signals). On earlier machines you have to combine these signals externally to become linear (three-level) signals, while on later machines this is done internally by an extra IC (you can tell a later machine by the colour card with a red sticker attached to it, clearly visible by looking at the bottom of the Microbee near the colour board plug). As this information

QUALITY COMPUTER PRODUCTS

PRINTERS:

CPA-80	Centronics and Serial versions available. 100 cps, 2K expandable to 8K buffer	
	Centronics	Ex Tax **$281.68** Incl. Tax $321.23
	Serial	Ex Tax **$304.30** Incl. Tax $346.19
DWX-305	Letter quality daisywheel printer, 18 cps	Ex Tax **$519.75** Incl. Tax $595.16
	Cut Sheet Feeder	Ex Tax **$332.73** Incl. Tax $372.66
	Tractor Feeder	Ex Tax **$111.12** Incl. Tax $123.78
SHINKO 1310	300 cps, Dot Matrix, near Letter quality	Ex Tax **$1035.51** Incl. Tax $1188.17

TATUNG TVT600A TERMINAL Ex Tax **$803.22**

DISC DRIVES

F-051APC	5.25" slimline SSDD 40 track, Taut band, direct drive, 250 KB, Low noise	Ex Tax **$228.13**
CF82AP2	Slimline disc drive	Ex Tax **$187.31**

HIGH PERFORMANCE DEVELOPMENT TOOLS FOR 6502 FAMILY

EC-EP	EPROM Programmer	Ex Tax **$77.44**
EC-TTLT	Tester	Ex Tax **$138.00**
EC-MEMT	Memory Tester with Fast Programmer	Ex Tax **$256.00**
EC-PALP	PAL Programmer Incl Software	Ex Tax **$426.52**
EC-LOG	Logic Analyser 10MHz	Ex Tax **$3554.80**

EC-64 Apple™ compatible, variety of Packages available
MPF-PC IBM™ compatible, variety of Packages available

A variety of instrumentation tools available for Laboratory instrumentation.
CONTACT THE OFFICE FOR PRICES AND AVAILABILITY

energy CONTROL

Please allow $5.00 Post and Package with all orders.
SUBSTANTIAL OEM QUANTITY DISCOUNTS AVAILABLE. PLEASE CONTACT THE OFFICE FOR PARTICULARS.
ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTIFICATION.
BANKCARD & MASTERCARD ACCEPTED

73 Eric Street, Goodna, Qld., Australia
P.O. Box 6502, Goodna, Qld. 4300
Telephone (07) 288 2455. Telex AA 43778 ENECON

BACK UP YOUR DISKS

$98.95
plus $2.00 postage & packaging

EDD is the most powerful disk duplicator available for your Apple™ computer. Unlike the Copycards, which only copy single load programs, EDD backs up your entire disk. EDD can back up more protected software than all other copy programs or Copycards put together. Since EDD is automatic, you will no longer have to change parameters to duplicate most disks, although every parameter is fully documented in our extensive manual. We also provide updated EDD program lists.

EDD runs on Apple *II, II+* (including most compatibles), *IIc, IIe* and *III* (in emulation mode), with one or two 3.3 disk drives.

ESSENTIAL DATA DUPLICATOR *III*™

- EDD rarely needs parameter changing.
- Automatically finds the beginning of each track.
- Unlike any of the Copycards; EDD backs up the entire disk — not just what is in memory.
- Accurately finds "auto-sync" bytes and their lengths.
- Can copy ¼ and ¾ tracks.

To order your copy send Cheque or Money Order to:

Order by phone
bankcard MasterCard

UTILICO SOFTWARE
83 Hall Street, Bondi Beach, NSW 2026
Telephone: (02) 30-2105

```
00100 CLS:LORES
00110 FOR X = 0 TO 255:POKE 61440+X,X:NEXT X:REM show all chars.
00115 FOR X = 0 TO 64*16:POKE 64512+X,64:NEXT X
00120 REM colour demo program
00130 REM by C.T. 10 - 2 - 85
00140 X = 0:Y = 0:REM pick initial starting point
00150 A = INT(RND*48): REM pick random vertical position
00160 B = INT(RND*128):REM pick random horizontal position.
00170 COLOUR INT(RND*24)+1:REM pick random colour, avoiding black (0)
00180 PLOT X,Y TO B,A
00190 X=B:Y=A:REM new start equals old end
00200 GOTO 150
```

Listing 1. *This program draws a continuous line which changes direction and colour randomly.*

is clocked out at the standard Microbee speed of 13.5 MHz you have to handle the leads with care to avoid degrading the performance of the machine.

About Colour Displays

The colour picture you see on a typical colour television receiver is produced by groups of three colour patches (which can be round, square or oblong, depending on the tube design) in close proximity to each other. Each colour patch can be lit independently of the other two, giving a wide (but not infinite) range of colour. The size of these patches will determine the resolution of the picture.

We know how much better the display of a Microbee looks with a high-quality green-screen monitor than when it has a fuzzy converted black and white TV, and colour works in the same way. There are four commonly used dot sizes for colour monitors: 0.063 mm, 0.047 mm, 0.038 mm and 0.031 mm, and obviously the last is going to give much higher resolution than the first. Even finer dot sizes are used in the more expensive professional monitors. A good deal of development is going on in Japan at the moment on colour television sets which are designed to be compatible with home computers, and one manufacturer (Thompson) has a small inexpensive TV set on the Australian market which also has RGB drives. National has also released a 21 inch (53 cm) colour receiver with a special plug which can be utilised for RGB drive.

If you have a colour machine you might like to try the experimental program in Listing 1, which leaves some interesting questions unanswered. The program merely draws a continuous line which changes direction and colour randomly. Initially, *leave out* lines 110 and 115. Run the program and you will have a brilliantly coloured patchwork on the screen. Now type in line 110 (try this even if you don't have a colour machine). Note how there are two sets of identical low-res characters — which is logical since there are only six blocks in a low-res character and two to the power of six is 64. The second set is really not used by the program in BASIC which plots, sets and resets low-res lines.

When you've examined the program, type in line 115; this cancels out the second set of 64 PCG characters. Note that the Plot function still works normally, but the colour doesn't extend to the two lines of PCG characters. The program will blank out the top two lines on the screen that are the normal character set, but although the next two lines will be changed there are certainly some other unexplained things that happen which aren't shown in the BASIC manual! When you've looked at the patterns for a while, change the PLOT command to PLOTI and you'll have a completely new effect.

Listing 2 shows how you can colour individual patches on the screen to give colour to a program which uses PCG characters. POKEing colour into a screen location by using the OUT 8,664 command also enables you to produce rapidly changing coloured printing, as in the label at the top of the 'picture'.

Executing lines 260 to 290 before printing lines 210 to 230 will produce an instant colour display; as it's printed, the program produces a white image first, then the colour. □

SPRING FLOWERS

```
00100 REM colour display program - C.T. 10 - 2 - 85
00110 CLS:COLOUR 4:CURS 22,4:PRINT"SPRING FLOWERS"
00120 FOR A = 64528 TO 64639:READ B:POKE A,B:NEXT A:REM get PCG data
00130 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
00140 DATA 0,0,0,0,0,0,0,0,0,12,22,19,12,7,0,0
00150 DATA 24,24,88,121,26,31,28,24,24,24,152,88,56,248,24,24
00160 DATA 0,48,240,48,224,128,0,0,0,0,0,0,0,0,0,0
00170 DATA 0,16,60,62,30,195,255,127,31,127,255,199,30,60,24,0
00180 DATA 24,60,118,118,126,189,126,231,231,126,189,126,110,118,60,24
00190 DATA 0,8,60,124,126,195,255,254,248,254,255,99,120,60,24,0
00200 COLOUR 7:CURS 1,10:PCG
00210 PRINT"EFGAEFGAAEFGEFGAAEFGAAAAAEFGAAAEFGAEFGEFGAAAAAAAEFGAAEFGAAAA
      EFG"
00220 PRINT"BCDABCDAABCDBCDAABCDAEFGABCDAAAEFGABCDEFGAAAEFGABCDAAEFGAEFG
      BCD"
00230 PRINT"BCDABCDAAEFGBCDAABCDABCDABCDEFGBCDABCDBCDEFGBCDABCDAABCDABCD
      BCD"
00240 PLAY 0,10:OUT8,64:REM delay then switch colour ram in.
00250 FOR X = 61440+2048+9*64 TO 61440+2048 +12*64-1
00260 READ A:POKE X,A:NEXT X:REM read colour information
00270 DATA 7,7,7,0,6,6,6,6,0,0,5,5,5,5,4,4,4,4,0,0,8,8,8,0,0,0,0,0,1,1,1,0,0,0
      ,8,8,8,0,4,4,4,4,5,5,5,5,0,0,0,0,0,0,0,0,7,7,7,0,0,4,4,4,4,0,0,0,0,0,6,6,6,0
00280 DATA 2,2,2,0,2,2,2,2,0,0,2,2,2,2,2,2,2,0,0,2,2,2,2,0,3,3,3,0,2,2,2,2,0,0,0
      ,7,7,7,0,2,2,2,2,6,6,6,6,0,0,0,0,5,5,5,5,0,2,2,2,2,0,0,0,4,4,4,4,0,0,3,3,3,3,2,2,2,2,0
00290 DATA 2,2,2,2,0,2,2,2,2,0,0,0,6,6,6,6,2,2,2,2,0,0,2,2,2,2,0,2,2,2,2,0,2,2,2,2,6,6,6,6
      ,2,2,2,2,0,2,2,2,2,2,2,2,6,6,6,6,2,2,2,2,0,0,2,2,2,2,0,2,2,2,2,2,2,2,0,0
00300 FOR Y = 1 TO 7:FOR Z= 1 TO 24:REM poke colours into title
00310 POKE 61440+2048+192+20+Z,Y+Z
00320 NEXT Z:NEXT Y:GOTO 300
```

Listing 2. *Colouring individual patches on-screen to give colour to a program that uses* PCG *characters.*

BY ANNETTE BROWN

IT'S GREAT to be able to share with you all the news about the Macintosh, and it's my intention to keep you up to date with developments in the Apple II family as well. This month, however, there are so many integrated packages in the pipeline for the Macintosh that they took up all the space. Next issue I'll review some changes for the Apple II.

The Mac and all that Jazz

Jazz is an integrated package for the Mac produced by Lotus Corporation, comprising spreadsheet, database, graphics, word processing and communications abilities. The latest release I have worked with is version .29, although I've heard of a .30; both these versions are fairly close to the final. As you may be aware, the package was due for release in Australia at the end of April, but this date has now been put back to June 13.

One feature of Jazz is to provide Lisa-type windows on the screen. When you link a spreadsheet to a graph and use the process called HotView while updating your figures, the windows allow you to see the update to the graph on the screen while still within your spreadsheet. In fact it's possible to have all five applications visible at once, although the small size of the windows makes this of limited use.

The spreadsheet is a good-sized 8192 rows by 256 columns, while the graphics package allows you to have six major graphs: line, pie charts, area, bar, scatter, and per cent. Using the windows you can display different graphs of the same data on the same screen.

The word processing module improves on Macwrite (including the new disk-based version — final release number 4.5). It's not as powerful as Word, but has a nice date feature with which you can select a date function that automatically picks up the system date whenever the data is loaded. This is great for form letters.

I haven't tried the database manager, which is claimed to allow more than one file to be open at a time, and also to have data and statistical functions. I also can't give first-hand information on the communications package, which seems to be based on MacTerminal, and gives you the ability to read 1-2-3, Symphony and Multiplan files.

Jazz requires 512 Kbytes and two drives, and as distinct from its stablemate, Symphony, utilises the mouse extremely well. It works on the Macintosh XL.

Quartet

This is known as a 'poor man's Jazz' — which is a misnomer as it has some great implementations. It only requires 128 Kbytes and one drive, but still comprises a spreadsheet, graphics, word processing and database facilities. It's produced by Haba Systems, the publishers of 3EZ Pieces for the Apple III.

One very nice feature is the way in which you create a window from the spreadsheet and 'move' it into the graphics and text functions: you select a cell within the spreadsheet, then expand that cell by 'dragging it out' with the mouse. The speed of calculation is faster than Multiplan's, although the package is less powerful.

Like Jazz, Quartet has what I would call a 'compass' icon you can use to move around the screen in diagonal directions.

Obviously this package is ideal for those who want an integrated product for home or less sophisticated business use, since the lack of a communications facility is not necessarily a disadvantage in all applications. However, the logical functions of the spreadsheet are limited and the database seems to be only as powerful as the sort capability in Multiplan.

Ensemble

This package is available in the US, but I haven't seen it in its final form yet. It is reported to be a database with graphics, word processing, calculation (I suspect this is achieved through the database), and a report facility with form-generation capabilities.

Published by Hayden, it is also known as CX Macbase from France. My first contact with this program was six months ago, when I was under the impression it was only a database, but the latest software list from the Macintosh division classifies it as integrated. It uses Lisa-like desktop icons to display the selections available, and is suitable for 128 Kbyte, 512 Kbyte or XL Macs. I suggest this package needs further investigation.

Excel

This is Microsoft's integrated package, due in Australia in June/July. Excel doesn't have word processing or terminal capabilities but contains the most powerful of the spreadsheets available. It has 256 columns by 16,384 rows; at first I thought the release I saw was limited to 256 by 275, but by clicking on the elevator box I was able to access the extra rows.

Excel is a very powerful spreadsheet, with a subset of Chart graphics and a database similar to that of Lotus 1-2-3. The database commands are very similar to those of Jazz, using statements like daverage, dcount, dmax, dmin, dstdev, dsum, and dvar. Jazz uses the same except with davg and dstd for daverage and dstdev.

The power of the spreadsheet is reflected in the commands: date, day, growth, hour, match, mirr, now, npv, rate, transpose, weekday. The formatting capabilities are also greatly increased. For example, you can use the number 14 and have the program add the words 'years long'; the next cell can then be calculated by adding 1 to 14 and will automatically display 15 'years long'. You do not have to type the words.

I became quite excited about this program during the limited time I spent with it; it may well be the Rolls Royce of the spreadsheets. It's not Jazz — more like a 1-2-3 utilising the speed and power of the 68000. Excel requires either a 512 Kbyte Mac or an XL, and it's quite possible it could also need an external drive for the 512 Kbyte version. Interestingly, I found it worked with the Switcher (see below).

Mouseworks

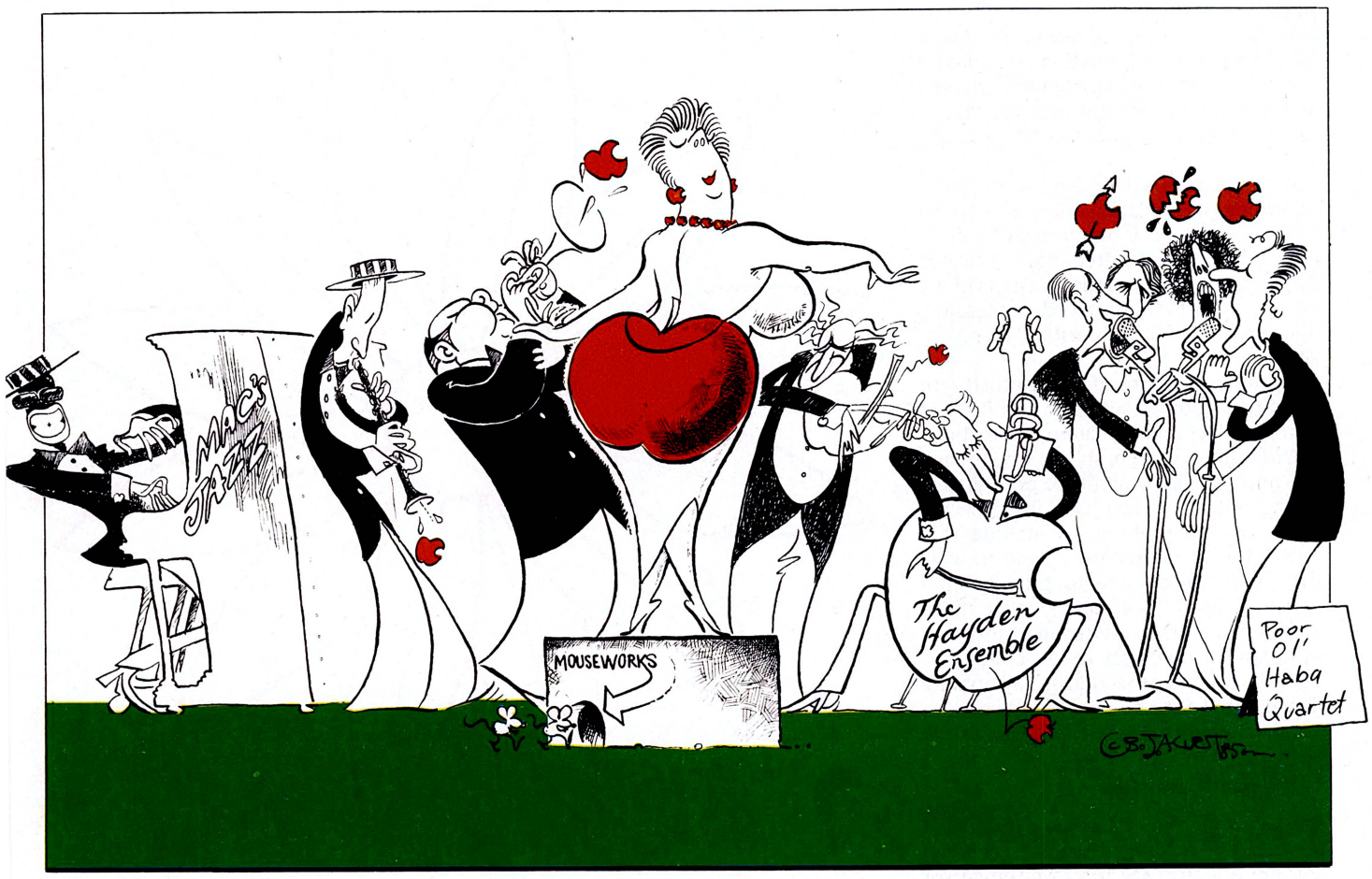
This is one of the hot products in the software industry, with reports from the US saying it has become one of the most sought-after programs by software publishers wanting to add it to their stable. Written by Robert Lissner of Appleworks fame, it will be a lower-cost entry into the integration stakes.

Appleworks is the only program to outsell Lotus in the US, and here in Australia it's reported to be selling more than 1000 copies a month, while Lotus 1-2-3 is claimed to sell 800 a month.

Mouseworks will obviously have the three programs currently contained in Appleworks and possibly a graphics facility as well (the likelihood is about 10-4 on, as the Macintosh is largely sold on its graphics capability). *Infoworld* USA suggests Microsoft was the publisher that got the nod to produce Mouseworks.

Switcher

This is the Macintosh answer to IBM's Topview — a program that lets you load up to four 128 Kbyte programs into memory and then switch between each program. Written by Andy Hertzfield, it should be available by the time you read this. The only 'if'



is the way in which it will be distributed.

Switcher works with most programs, and its power lies in the freedom of choice you have between the programs you load into memory. You can also eliminate the programs you don't need and load in a fresh set.

One of its nice features is the animation capability, which gives a scrolling effect as you switch from one program to another. If you disable this feature the screen just disappears and another appears, but the rolling effect is more impressive. It is that perception of things happening that I like.

Switcher's speed is instantaneous unless you opt to transfer information between packages, which involves the clipboard being recorded to disk, taking about five seconds. It is also possible to load the same applications twice so that you can work on one document and take information into another.

The power of this package is evident with programs like Front Desk, a diary management package; previously you needed to devote the Macintosh solely to that task. Designed for professional persons to keep track of appointments, it had to be available instantly. Now with Switcher it can be resident while the computer is being used for word processing or other functions.

Other scenarios include: Multiplan with accounting; BASIC with Pascal; Chart with Word, and so on. Flexibility is the great power of this package, allowing you to mix and match programs just as you wish.

Switcher requires 512 Kbytes and is best suited to an external drive or the hard disk of the XL. (On the XL it can switch between up to eight programs.)

Apple Modem 1200

In the communications area, one of the neatest and easiest-to-use modems is the Apple 1200, although it's underrated by most dealers I spoke with. The unit can work with Prestel videotex systems and is Hayes Smartmodem compatible — meaning it can use a lot of communications packages without modification. While it's in the higher price range it would be value for money, especially because of the split baud rate capability which means you can access Telecom's Viatel network. It also features auto-answer and auto-dial.

Viatel

You can't access Viatel with Macterminal; you need to have special Viatel software. This is being developed in Australia by the award-winning DataNettComm, and should be available by now or within the next few weeks. Check with your local Apple dealer.

'Your Computer' Bulletin Board.

I'm trying to encourage public domain software on this bulletin board. As soon as I can I'll download some Mac software, so keep an eye open for it. □

LOTUS HOTLINE

BY JOHN NICHOLLS

Jazz

When Lotus announced Jazz for the Apple Macintosh, early information suggested it was basically a copy of Symphony adapted as necessary to conform with the Macintosh user interface (mouse and icons and so forth).

It now appears this isn't quite right. According to PC *Magazine*, Jazz isn't based on a spreadsheet; if not, it must be different indeed. Many writers have criticised Symphony on the grounds that parts of the program, particularly word processing, don't exist too happily within a spreadsheet.

To run Jazz, you need a Macintosh with 512 Kbytes (otherwise known as a Fat Mac or a Big Mac) and an external disk drive.

One feature present in Jazz but missing in Symphony is the ability to print graphs in the middle of text. Can we expect a revision of Symphony to include this soon? The Jazz database is said to work with word processing to provide mail merging capabilities, but whether these are the same as or better than those in Symphony I don't yet know; although I haven't tried it, the one in Symphony doesn't appear to be simple to use.

The recommended retail price of Jazz is $845.

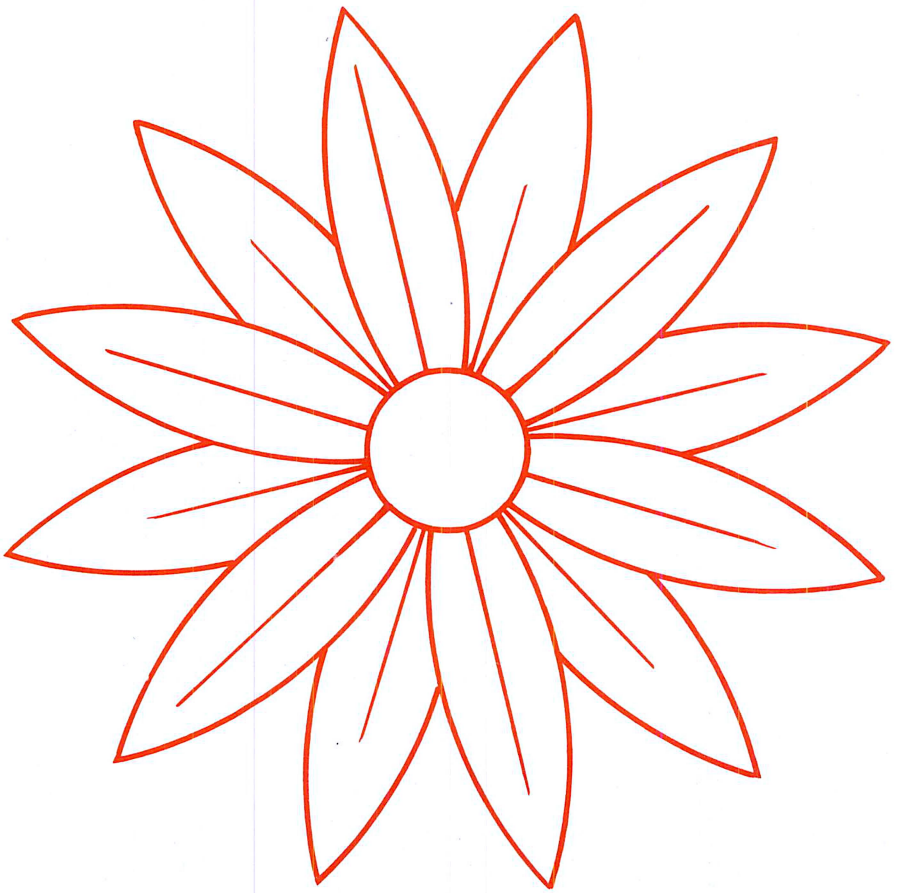
1-2-3 Hints and Info

Ranges: When you have defined the area of a range, but before you enter it, you can use the full stop key to move the cursor around the four corners of the highlighted range, to see if it includes all the desired information. This is especially useful with ranges that take up more than one screen. Each time you press the full stop, the cursor in the highlighted area will move to another corner of the range, without changing its size.

Loading 1-2-3 and Symphony Without a Floppy

Normally it is necessary to have the program disk in Drive A because of the copy protection system. This is inconvenient, so several companies have programs to make it unnecessary to do this. They include:

- Blue Heron Publishing Co, 8350 Lincoln Avenue, Skokie, Illinois 60077. 'The Fix', US$34.95 + $5 shipping and handling. Available for 1-2-3 and Symphony.
- Nostradamus Inc, 5320 South 900 East, Suite 110, Salt Lake City, Utah 84117. 'HardRunner', US$34.95 + $15 shipping and handling. This program is said to work with Lotus 1-2-3 (1A and 1A*) and Symphony (1.0 and 1.01) and to be compatible with ProKey, Sidekick and RAM disks.



Utility 1-2-3 Version 1

A software utility of this name, written by Bob Quinn and Gary Wagner, is in the public domain and should be available through PC User Groups. It offers:

- Access to the complete extended ASCII character set for use onscreen.
- Character by character control of how the worksheet will be printed, including control of typefaces, emphasis, line spacing, pitch and so on.
- Use of specialised Lotus 1-2-3 macros with the RoseSoft program ProKey to create macros to save keystrokes.

In case you're unfamiliar with the extended ASCII character set, you'll find details in Appendix G of IBM's BASIC manual. The characters from 000 to 127 stand for printer control characters, numbers, letters of the alphabet (both upper and lower case) and punctuation symbols. This is the normal ASCII set. The extended ASCII set as used by IBM includes characters 128 to 255 and includes some foreign language characters and various graphics symbols you can use to create boxes and borders and other interesting effects. Unlike much public domain software, Utility 1-2-3 is well documented.

Symphony Add-ins

Two add-ins have been announced by Lotus. One is a spelling checker, which is an essential item for any word processing program today. The other is a text outliner, presumably along the lines introduced by Framework; I'm not so convinced of the value of this. At the time of writing, it was not known when the add-ins would reach us. □



GEM'LL BOWL YOU OVER

DIGITAL RESEARCH

GEM lets you operate your personal computer* through visual commands and symbols. It's ideal for anyone who is frustrated by computer jargon. The best news is that existing business programs like Supercalc³, dBASE III and Framework can all work without change with GEM.

Whenever your computer is turned on, **GEM Desktop** surrounds you with familiar items found on a desk e.g. a calculator, clock or file folder. You work by pointing the arrow at the appropriate icon, and selecting commands from a menu of choices.

GEM Draw allows you to produce charts, logos and other pictures. The program includes a library of predesigned graphics for you to use.

GEM Graph is designed specifically for you to communicate information about your data. It's not just a data analysis tool. Pre-designed templates can be selected from the gallery of graph-styles provided.

**GEM works on the IBM PC, PC XT, PC AT, and most close compatibles. It is also being ported to many other machines including the Apricot, and Atari ST.*

GEM Wordchart produces high quality text slides, the kind which make up over half of most presentations. The quality rivals those made by commercial artists and at a fraction of the cost and time.

Other GEM products include **GEM Paint,** an on-screen graphics tool, and **GEM Write,** a full function word processor. **GEM Programmers Toolkit** is available for software developers who wish to drive their application software with icons.

GEM Desktop and Programmers Toolkit are available now. GEM Draw will be available at the end of May, other GEM products will be released in the following 3 months. For more information contact your local computer dealer, or complete the coupon below.

arcompacific
■master distributor■

---------- CUT ALONG THIS LINE ----------

Please send me more details about GEM Desktop ☐ GEM Draw ☐ GEM Graph ☐
GEM Wordchart ☐ GEM Paint ☐ GEM Write ☐ GEM Progammers Toolkit ☐

Name ..... Address .....

Post to: FREEPOST 2, ARCOM PACIFIC, P.O. Box 13, Clayfield, Q. 4011

The latest word on Symphony.

Introducing Text Outliner and Spelling Checker.

Symphony™ Software now has an enhanced word processing capability. Text Outliner and Spelling Checker are the first of a new series of Symphony Add-In products from Lotus. Add-Ins designed to meet your specific needs and applications.

Text Outliner is a unique writing tool that allows anyone who uses words to organise their thoughts and ideas in a logical order. It makes your writing easier and your reports and documents more concise.

And Spelling Checker puts an 80,000 word electronic dictionary right at your fingertips.

Because both Add-Ins were designed to work as an integral part of Symphony's word processing, they're far more flexible than any stand-alone product. And since they work just like Symphony, you won't have to learn a new program to use them.

New Text Outliner and Spelling Checker — the latest word from Symphony isn't the last.

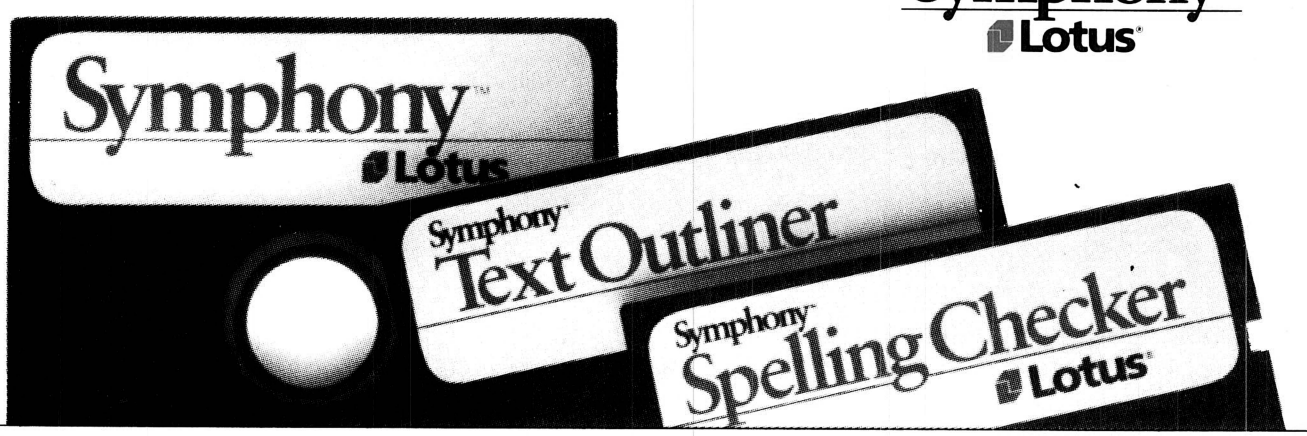
For more information on Symphony's new Add-Ins, contact your local authorised Lotus dealer.

FREE SEMINARS & TRAINING

Call Imagineering 212 1411 Ext. 106

IMAGINEERING™
"The Art of Software"

Symphony™
Lotus®



I'VE JUST completed a journey of discovery that has lasted nearly six years, and in doing so I've found a game for the BBC that could well take that long to complete. If this sounds like a flight of my imagination, you're not far wrong. Let me explain ...

Before I bought a Beeb, I longed for an Atari. My yearnings had nothing to do with the machine's innards, its dialect of BASIC or peripherals; it had everything to do with a game called Star Raiders. Put simply, the game had nearly everything: strategy, a wide range of options, flexibility, lots of shoot-em-ups and above all superb graphics. Nearly everything? Well, it didn't have much of a sense of humour, and anyway I didn't buy an Atari because I saw FS1 running on an Apple. FS1 was a flight simulator that allowed me to pilot a combination of Piper Cub and Sopwith Camel at stultifying speeds around a rather dull landscape, inevitably being left in a spiralling mess of tattered canvas and twisted wires after I strayed over the enemy's landing strip. After eventually mastering navigation I began learning the gentle art of landing. The flying habit is not an easy one to kick, and I admit to being quite addicted, but the finances weren't up to an Apple at that stage so I remained grounded.

And then along came the Beeb! I wasn't attracted to it by the software, because for a long time there wasn't any worth buying. Just looking at the machine I felt sure that someone, sometime had to write superb software for it; it seemed as inevitable as 'No such variable' appearing on my screen at least once a minute in the course of my (futile) attempts to produce the said software. After a near miss or two, my hopes (or were they appeals to a higher being?) have been rewarded.

The near miss was 747 from Dr Soft. Now, the 747 is a bit like 'The A Team's' B.A. Barakas; it's hard to ignore, but utterly predictable and too well-behaved to be true. Flying a 747 must be one of the less thrilling aspects of holding a commercial pilot's licence if this program is anything to go by. This isn't to say it's easy: I spread about $3 billion of plastic, engines and paintwork across Heathrow and Gatwick before I eventually landed it more or less intact. There was no excuse to miss the runways because this simulator has full ILS facilities, but I managed it time after time after time.

Dr Soft's 747 may have superb navigation facilities, but any hostie who sat on the pilot's knee would have to be interested in more than the scenery to stay there for long. Apart from the horizon, there are only the navaids and runways to look at. The graphics are updated about four times a second, making the flicker objectionable at times of rapid change of direction.

Just looking at the Beeb I felt sure that someone, sometime had to write superb software for it.; it seemed as inevitable as 'No such variable' appearing on my screen at least once a minute ...

The sound is excellent and the controls well laid out, with a choice of twin joysticks or keyboard (for some reason the keyboard seems to be easier to use than the joysticks). My moment of greatest disappointment was when I realised the 747 wasn't able to loop the loop, something I've always wanted to see a Jumbo do as long as I'm not inside at the time.

And then along came Aviator! All (well, most) of my teenage dreams came true as, seated behind my trusty Merlin, I pressed 'T' and heard the unmistakable sound of a Spitfire's propeller. I wound it up to full throttle, released the brakes, and within a few metres the horizon suddenly rose halfway up the screen. (I say, chaps, this kite has a tailwheel!) At about 150 knots I decided it was time to lift her up. A gentle pull on the stick ... and there was a sickening groan behind me as an onlooker turned away, clutching his stomach. Could anyone say more about the graphics? There are plenty of them and they are so smooth as to, I hate to say it, make your stomach turn.

The Spitfire handles rather differently from either the FS1 or 747 at medium throttle; it's very lively, with lots of pitching and rolling that takes some time to settle down if you aren't smooth with your joysticks. At full throttle it becomes almost unmanageable. Flick rolls are easy, looping the loop is but a twist of the wrist, but landing is ... yet to be attempted. Why bother landing when there's a bridge to fly under, main streets to beat up and a river valley to follow? I don't wish to boast, but I flew under the bridge at my very first attempt, upside-down and all. Perhaps it was just a beginner's oversight that I pulled the stick back to climb away afterwards.

Joysticks are a must with Aviator, the keyboard layout being pretty poor. Yes, it has a Browning .5 or two, and yes, there are funny-shaped things to use them on if you need to do that sort of thing, but why bother when there's a program to fly that is as well-built as the plane?

Back to Star Raiders

It must be six years since I first saw Star Raiders, but I hadn't forgotten it until Elite came along. Like Aviator, it is published by Acornsoft, and this company has served up all the good points of the old Atari game along with lashings of *The Hitchhiker's Guide to the Galaxy*-type humour, plus about fifty times the number of complications.

There are hundreds of planets to visit, and the handbook contains full specifications of over a dozen spacecraft you're likely to meet. The government on each planet can vary from industrial democracy through agricultural anarchy to primitive hunters. Each planet's welcome for you, the intergalactic trader, may vary from benign acceptance to a quick missile up your boosters from a battle fleet of waspish little fighters.

Your aim is to build up wealth and social standing. Beginning as 'harmless', you may progress (I haven't) by cunning and skill through a dozen social levels to become 'average', 'dangerous' or, in a year or two's time, maybe even a member of the 'elite'. Each player only plays one game of Elite, for at the end of each session you save your current standings on the disk and begin at that point next time. One game could easily go on for a year or two.

The graphics, while only in two colours, are stunning. The flying skills required even at the lower levels make handling a Spitfire look like riding a tricycle, and the complexity of the tactics needed to succeed, the depth of understanding of social and economic systems required and the quality of humour implicit in much of the game make it the most rewarding recreational software I have used.

I'd hoped to review some spreadsheets and utility ROMs this month, but if they don't arrive I can't review them! Sorry, but maybe next time — if I can tear myself away from the controls of my Spitfire ...□

CP/M Plus

In CP/M-80 version 2.2 the filename specified in a File Control Block (FCB) given for a BDOS Open File function call (function 15) can contain question mark 'wildcard' characters. The BDOS will open the first file whose name matches the ambiguous filename. This technique is used extensively in some CP/M 2.2 programs like CRC.COM. If the same program is run under CP/M Plus, the error condition '? in filename' is reported and the program usually terminates. This is an incompatibility between CP/M 2.2 and CP/M Plus.

If a program you have developed under CP/M 2.2 calls the open function with a question mark in the FCB, you can attach a Resident System eXtension (RSX) to your program and it will run as expected under CP/M Plus.

The RSX modifies the BDOS Open File function with the following routine: when the BDOS is called with the function number equal to 15, it intercepts the call and checks the FCB for question marks. If no questions marks are found in the FCB, the call is passed to the BDOS for normal processing. If a question mark is found in the FCB, the RSX uses the ambiguous filename in the FCB in a call to the BDOS Search First function 17. If the search does not result in any matching files being found, the RSX returns a 'file not found' condition to the calling program. If the search is successful, the RSX takes the filename found and places it into the user's FCB. The RSX then makes the originally requested call to the BDOS to open the file.

To use OPENRSX you should:

1. Use RMAC to assemble the OPENRSX.
2. Use LINK to link the RSX file. Use the OP option so LINK will produce a Page Relocatable (.PRL) file.
3. RENAME the file created by LINK so it will have the file type .RSX.
4. Find a program you know uses FCBs with question marks in the filename and attach the RSX file to it using GENCOM; that is, GENCOM <your

```
;This program is assembled using RMAC and LINK to create an RSX
;to catch BDOS Open File calls which specify an FCB that has
;question marks in it.
;
TRUE    EQU     0FFFFH
FALSE   EQU     NOT TRUE
;
DEBUG   EQU     TRUE            ;Will display more messages while
                                ; debugging
;
; Define all the "magic" numbers
;
OPEN    EQU     15              ;BDOS Open File function
SFIRST  EQU     17              ;BDOS Search First function
GETSCB  EQU     49              ;BDOS get/set SCB function
LENGTH  EQU     11              ;Number of characters in filename
;
; Start of RSX header
;
        DB      0,0,0,0,0,0     ;Serial number
;
        JMP     START
;
NEXT    DB      0C3H            ;JMP instruction
        DW      0               ;Address of BDOS or next RSX
PREV    DW      0               ;Address of previous module
REMOVE  DB      0FFH            ;Remove on warm boot
NONBNK  DB      0               ;Load for banked or non-banked
RSXNAME DB      'OPEN           ;Name of this file is OPENRSX
        DB      0,0,0           ;Used by the BDOS
;
START:
        MOV     A,C             ;Check BDOS function number
        CPI     OPEN            ;Is it a File Open call?
        JZ      CAUGHT          ;Yes, process it
        JMP     NEXT            ;No, jump to next RSX or BDOS
;
CAUGHT:
        LXI     H,0
        DAD     SP              ;Get current stack pointer and
        SHLD    USERSTACK       ; save it for later
        LXI     SP,RSXSTACK     ;Use local stack
        PUSH    B
        PUSH    D
;
; Check filename for ?
;
        MVI     B,LENGTH        ;Number of characters in filename
        INX     D               ;Point to filename
        LDAX    D
LOOP:
        CPI     '?'             ;Found a "?" ???
        JZ      DOIT            ;Yes, execute rest of RSX
        INX     D               ;No, try next character
        DCR     B               ;Adjust length counter
        JNZ     LOOP
;
; If the program has reached here, there is no ? in the filename
; so pass the call onto the BDOS for normal execution.
;
        POP     D               ;Restore user's registers
        POP     B
        LHLD    USERSTACK
        SPHL                    ;Restore user's stack
        JMP     NEXT            ;Go to next RSX or BDOS
;
; Here we will do a Search First, update the FCB and pass the Open File
; command on to the BDOS. If the Search First call returns an error
; then we will return the appropriate error.
;
DOIT:
        POP     D               ;Get the FCB address
        PUSH    D               ;Save it again
        MVI     C,SFIRST        ;Search First
        CALL    NEXT            ;Call the real BDOS
        CPI     0FFH            ;error?
        JNZ     FOUND           ;No
        POP     D               ;Yes, restore user's registers
        POP     B
        LHLD    USERSTACK
        SPHL                    ;Restore user's stack
        RET                     ;Back to the user's program
;
; Update the user's FCB with the FCB of the file that was found and
; jump to the BDOS Open File function.
;
FOUND:
        ADD     A               ;Multiply the directory code
        ADD     A               ; by 32 to get the offset
        ADD     A               ; to the FCB of the file
        ADD     A               ; that was found
        ADD     A
        PUSH    A               ;Save the offset
;
; We need to get the current DMA value so we can get the FCB of
; the file that was found. The user may have modified the current
; DMA address, so we will have to get the address from the SCB.
;
        MVI     C,GETSCB        ;Get/set SCB function
        LXI     D,GETDMA        ;SCB PB address
        CALL    NEXT            ;Call the real BDOS
        POP     A               ;HL <---- DMA address
        MOV     C,A
        MVI     B,0             ;BC <---- offset
        DAD     B               ;HL points to the FCB of the found file
        INX     H               ;Point to the start of found filename
        POP     D               ;DE points to user's FCB
        PUSH    D               ;Save it again for later
```

Listing 1. *Resident System Extension* (RSX) *to allow for '?' wildcard filenames in* CP/M Plus.

program name> OPENRSX.

This application (shown in Listing 1) was developed and tested by Digital Research Technical Support using standard DR products. Modifications required to compile and execute under non-standard or non-DR products are the responsibility of the user, as are modifications specific to a given application.

'CBNews'

CBNews is an independent newsletter for CBASIC Compiler users. I just received my first issue and it has several interesting items, including a discussion on a standard library for CBASIC, chaining to a submit file from CB86, passing parameters when chaining and a discussion on some aspects of program optimisation

It is available from CBNews, PO Box 40690, Cincinnati, OH 45240-0690, USA, at US$28 for a 'foreign' subscription. By the way, that zip code is correct — the US is finally changing over to nine-digit zip codes. The company doesn't take plastic so you'll have to send an international bank draft.

'Microsystems' Lives

Lament no more, *Microsystems* lives. Until its untimely demise at the hands of Ziff-Davis at the end of last year, *Microsystems* magazine was a highly regarded publication covering the more technical aspects of microcomputers.

Sol Libes, the editor of *Microsystems*, has started a new magazine called *Micro/Systems Journal* with the same editorial policy and content as *Microsystems*. Volume 1, Number 1 just arrived and it's certainly up to the standard of the old *Microsystems*, although the production is a little less slick than in the Ziff-Davis days; it's more like the time when Sol Libes published *Microsystems* himself. *Micro/Systems Journal* will be appearing six times a year.

It's a worthy successor to *Microsystems* and you can take out a 'foreign' subscription to it for US$58 for two years by writing to *Micro/Systems Journal*, PO Box 1192, Mountainside, NJ 07092, USA. This company doesn't take plastic either, so you'll have to send a bank draft. □

```
        INX     D               ;point to start of user filename
;
; Now we will transfer the filename in the FCB of the file found to
; the filename location in the user's FCB.
;
; IF YOU HAVE A Z80 CPU USE THIS CODE
;       LXI     B,LENGTH
;       DW      0B0EDH          ;Z80 LDIR instruction
;
; IF YOU HAVE AN 8080 or 8085 USE THIS CODE
        MOV     B,H
        MOV     C,L             ;BC contains filename source
        MVI     H,LENGTH                ;Move 11 characters
LDIR:
        LDAX    B               ;Get character
        STAX    D               ;Put character
        INX     D
        INX     B               ;Update pointers
        DCR     H               ;Update counter
        JNZ     LDIR
;
; User's FCB now has the full name in it so go and do the open
;
        MVI     C,OPEN
        POP     D
        POP     B
        LHLD    USERSTACK
        SPHL                    ;Restore user's stack
        JMP     NEXT            ;BDOS will now open the file normally
;
GETDMA:                         ;SCB parameter block
        DB      03CH            ;Offset in SCB of DMA address
        DB      0,0,0
;
USERSTACK:
        DW      0
        DS      10                ;Space for stack
RSXSTACK:
;
        END
```



PAMS NUMBERS

BY BILL BOLTON

Two for Brisbane

The two new systems this month are both in Brisbane. Computer retailer Competron has established an IBBS system which will be concentrating on IBM-compatible and NEC PC issues. It is a 'closed' system, but you can get registration details by logging onto it. Registration and use of the IBBS are free, and the sysops are Mike Walsh and David Johnson.

Hi-Tech has established a BBS system to support users of the Hi-Tech C Compiler. It's running on an IBM PC compatible under the Venix operating system. At the moment you can only get information on Hi-Tech and compile some benchmark programs, but later you'll be able to place orders and leave messages on the system. Both the Hi-Tech and Competron systems are available 24 hours daily.

Using V.23 on Austpac

It seems everyone assumes that if you're using V.23 modems, you must want them for communicating with videotex services. When you log into Austpac on the V.23 PAD (Packet Assembly/Disassembly), for example, you are greeted with an Austpac sign-on message in videotex format. So if you're using a standard ASCII terminal with a V.23 modem on Austpac and were wondering what all the strange stuff surrounding the sign-on message was about, there's the answer.

Now with data packet switching networks like Austpac there is a 'profile' associated with the PAD interface that casual 'dial-up' customers use. The profile specifies some of the characteristics of the communications link as far as the dial-up user is concerned. It's too complex a subject to go into in detail here, but if you're interested in it you should ask your Telecom Business Office for a copy of the *Asynchronous Character Mode Service* (X.28) *User Guide*.

The point is that with the V.21 (300 bps) and V.22 (1200 bps) PADs for Austpac, the default user profile is '0', which suits most common data communications needs. For the V.23 (1200/75 bps) PAD the default profile is '9', which is optimised for videotex communications needs. So if you intend to use the V.23 PAD to connect to a non-videotex service, say perhaps the Source in the US via Midas, the videotex profile may not be optimum for that sort of data communications. Fortunately you can change the profile once you have connected to the V.23 PAD; all you have to do is type 'PROF 0' followed by a carriage return, and you will be using profile '0' instead of profile '9'. The new profile will remain in effect for you for the duration of your telephone call to the PAD, so if you connect to several different hosts during the one call, the same profile applies.

PAMS Numbers

Queensland (EST)

Software Tools RCPM (ST-RCPM) (07) 378 9530 24 hours
BEX RCPM (BEX-RCPM) (07) 393 3151 24 hours
Tomorrowland DIRECT (BRIS-TLD) (07) 286 2438 24 hours
Competron IBBS (COMPT-IBBS) (07) 52 9294 24 hours
Hi-Tech C BBS (HTC-BBS) (07) 38 6872 24 hours
Texas Instruments (TI-BBS) (07) 263 6161 2100-0600 weekdays only

New South Wales (EST)

Mi-Computer Club BBS (MiCC-BBS) (02) 662 1686 24 hours
Micro Design Lab RCPM (MDL-RCPM) (02) 663 0151 24 hours
Sydney Public Access RCPM (SPA-RCPM) (02) 808 3536 24 hours
Ausborne UG RCPM (AUSBD-RCPM) (02) 95 5377 24 hours
Tesseract RCPM (TES-RCPM) (02) 651 1404 24 hours
Sorcerer UG (SUG-RCPM) 'Ring Back' (02) 387 4439 1800-0800 weekdays, 0800-2400 weekends
Omen RTRS (OM-RTRS) (02) 498 2495 1630-0900 + 24 hours weekends
Sydney TRS-80 UG RTRS (STRUG-RTRS) (02) 332 2494 24 hours
Prophet BBS (PROPHET-BBS) (02) 628 7030 24 hours
Dick Smith Electronics (DSE-BBS) (02) 887 2276 24 hours
Tomorrowland DIRECT (SYD-TLD) (02) 411 2053 24 hours
Sydney Apple UG (AUG-BBS) (02) 451 6575 24 hours
Texas Instruments UG (TEXPAC-BBS) (02) 560-0926 1900-0600 + 24 hours weekends
Oracle RTRS (ORACLE-RTRS) (02) 960 3641 0-1800 weekdays, 00800 weekends
Newcastle Micro RCPM (NMC-RCPM) (049) 68 5385 1700-0830 + 24 hours weekends

Victoria (EST)

Melbourne CBBS (MICOM-CBBS) (03) 762 5088 24 hours
TARDIS RCPM (TARDIS-RCPM) (03) 67 7760 1800-0800 + 24 hours weekends
Sorcerer CUA RCPM (SCUA-RCPM) (03) 434 3529 24 hours
East Ringwood RCPM (ERING-RCPM) (03) 870 4623 1600-2400 daily
PC Connection IBBS (PCC-IBBS) (03) 528 3750 24 hours
HiSoft IBBS (HISOFT-IBBS) (03) 799 2001 24 hours
Computers Galore IBBS (CG-IBBS) (03) 561 8479 24 hours
OMEN IV RTRS (OM4-RTRS) (03) 846 4034 24 hours
Gippsland RCPM (GL-RCPM) (051) 34 1563 24 hours
Gippsland MAIL BUS (GL-MBUS) (051) 27 7245 24 hours

Tasmania (EST)

Mike Scott's BBS (MS-BBS) (003) 34 9411 24 hours

South Australia (CST)

Adelaide Micro UG BBS (AMUG-BBS) (08) 271 2043 1000-2200
Computer Ventures BBS (CV-BBS) (08) 255 9146 24 hours

Northern Territory (CST)

Outback RCPM (OUTB-RCPM) (089) 27 7111 24 hours
OMEN II RTRS (OM2-RTRS) (089) 27 4454 24 hours

Western Australia (WST)

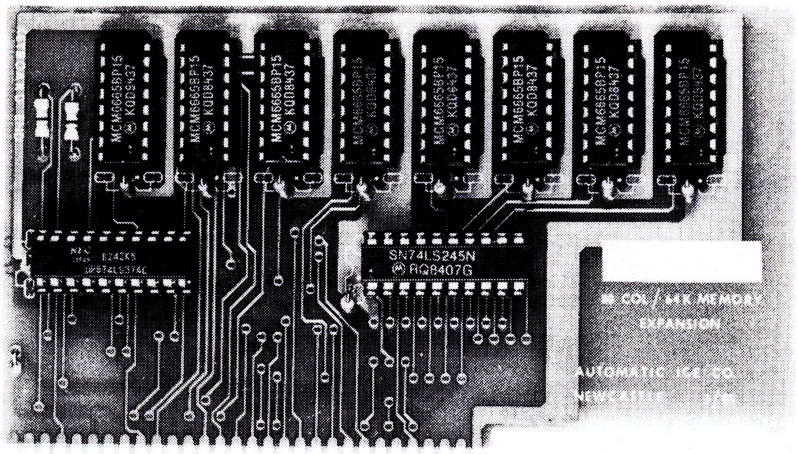
OMEN III RTRS (OM3-RTRS) (09) 279 8555 0800-2400 + 24 hours weekends

New Zealand (NZT)

Attache RBBS (ATT-RBBS) ISD 64 9 78 9084 24 hours, domestic (09) 76 9084
Rotorua BBS (ROT-BBS) ISD 64 73 70 154, domestic (073) 70154 □

MICRO-EDUCATIONAL PTY LTD

NEW PRODUCT



$195

APPLE *IIe* EXTENDED 80 COLUMN CARD

*Expand the capabilities of your Apple **IIe** by adding 80 columns of text and 64,000 extra bytes of memory. The Auto Ice Extended 80 Column Card is 100% compatible with Apple's extended 80 column card but is less than half the price.*

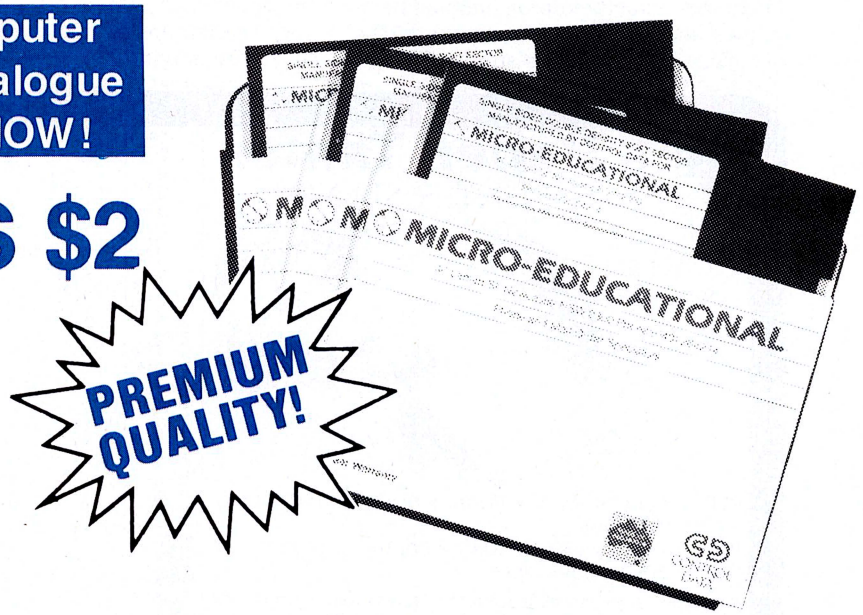
*The benefits of an extended 80 column card are many. Not only does the 80 columns of text enhance your word processors and spreadsheets capabilities, but the extra 64k of memory doubles your Apple **IIe**'s storage capabilities. It will also double your graphic resolution from 280 by 192 pixels in 6 colours to 560 by 192 pixels in 16 colours.*

Because the Auto Ice Extended 80 column card is 100% Apple compatible you can use all software that takes advantage of the extra memory. Some of the more popular programs to use the extra 64k and double hires graphics are — Bank Street Writer, Zardax, Visicalc, Appleworks, ProDOS, Logo, Master Type, Beagle Graphics, Dazzle Draw ePlot, HGR6, Zaxxon, DiskQuick, Merlin assembler, and the list goes on...

ALL FOR JUST $195 (incl. Tax)

FREE!! Autumn Computer Reference Catalogue AVAILABLE NOW!

DISKS $2



Top-quality 5¼" s.s. d.d. 5 year warranty disks from Control Data or Verbatim (specify which you require when ordering). These are the same disks you pay $60 a box for!

We are selling these disks in quantities in the hundreds of thousands hence the ridiculously low price of $20 per pack of 10 and $22 per plastic box of 10. Add $2 per pack delivery (Max del charge of $5).

BANKCARD

008 02 5229

ORDERLINE

ENQUIRIES (049) 26 4122

40 Laman St., NEWCASTLE, NSW 2300

MICRO-EDUCATIONAL

BOOK REVIEW

BY ROSE VINES

Advanced Programmer's Guide - Featuring dBase II and dBase III

Authors: Luis Castro, Jay Hanson and Tom Rettig
Publisher: Ashton-Tate
Distributor: Arcom Pacific, (07) 52 9522
Price: $67 rrp

THE COMPUTER section of most bookshops these days holds a bewildering selection of books about dBase, reflecting the package's pre-eminent position among microcomputer databases. Hidden in the crowd of titles are a few gems, brightest of which is the *Advanced Programmer's Guide*, which must be destined to become the serious dBase user's bible.

This book contains over 650 pages of dBase wisdom accumulated by the authors in their jobs with Ashton-Tate's technical support section. Although called an 'advanced' guide, it covers the basics of computer systems, programming concepts and using dBase, so you don't have to be a pro to read it.

The first section covers fundamental hardware concepts, operating systems, languages, structured programming techniques, and data types and structures. The second section contains an excellent introduction to systems analysis and design, and the maintenance of system security and data integrity.

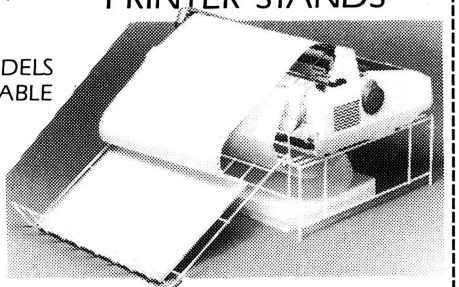
```
ERASE
@  1, 0 SAY "========================================="
@  1,40 SAY "========================================="
@  2, 0 SAY "||"
@  2,21 SAY "P R I N T    D O C U M E N T A T I O N"
@  2,78 SAY "||"
@  3, 0 SAY "========================================="
@  3,40 SAY "========================================="
@  5,25 SAY " 0. exit"
@  6,25 SAY " 1. data/index file structures"
@  7,25 SAY " 2. memory file structures"
@  8,25 SAY " 3. database data dictionary"
@  9,25 SAY " 4. change output file name"
*
STORE "Current output file :" + outfile TO filename
@ 15, (80 - LEN( filename )) / 2 SAY filename
*
STORE  5 TO selectnum
DO WHILE selectnum < 0 .OR. selectnum >  4
```

A fragment of one of the many excellent utilities provided in the 'Advanced Programmer's Guide'.

The third section is entitled 'Implementation', and systematically analyses the use and workings of the various dBase functions and commands. Included in each chapter are sections on 'algorithms' and 'work-arounds'. The algorithms are procedures for accomplishing a variety of useful tasks which all dBase programmers will need to perform frequently. There are algorithms for stripping leading blanks from string fields, centring variables on the screen, changing user areas under CP/M-86, checking for duplicate records, recreating damaged files and simulating the XOR operator — all in all, dozens of algorithms providing techniques to accomplish most regular data manipulation functions.

The work-arounds are hints for overcoming (or avoiding) the various bugs and pitfalls of dBase. In addition, four of the six appendices provide further work-arounds, algorithms, dBase subroutines, assembly language subroutines and programs. Included are date manipulation routines, mathematical functions, interfaces to operating system commands and program generators.

All in all, there is plenty here for anyone interested in getting more from dBase. Reading the book is a delight, because of its clarity and the richness of the information it contains. The text covers all versions of dBase II and III (except those, such as 2.02 and 2.4E, which are virtually collectors' items), with specific algorithms and work-arounds for each version where applicable. For a further $US25 you can get the various programs and subroutines on disk, so there's no need to type them in yourself. Buy it. □

NEW!
Paper Tamer
PRINTER STANDS
2 MODELS AVAILABLE

PT1 — Suits all Matrix Printers using 210mm (8¼") A4 paper.
PT2 — Suits all 136 col. Matrix Printers using 380mm (15") wide paper.
● "Paper Tamer" saves space and restores order to your desk top micro-centre. ● Neatly stores up to 900 sheets continuous paper under the printer. ● Allows perfect input paper feed and collects out-put efficiently in special tray. ● Manufactured from **sturdy** white colour coated steel rod. ● Excellent value for money.
NEW in Australia NOW available direct from Supplier
LinTek Computer Accessories
23/243 Ernest St., Nth Sydney NSW 2060. (02) 929 3217
QTY | SIZE | PRICE inc. freight | TOTAL
80 col. suits 210mm (8¼") paper | $49.95
136 col. suits 380mm (15") paper | $59.95
Name .....
Address .....
☐ CHEQUE ☐ MONEY ORDER ☐ BANKCARD
Signature ..... Expiry Date .....
If I am not fully satisfied, I may return goods within 30 Days for full refund
AS012L CA500JL
DEALER ENQUIRIES WELCOME

Osprey!

An exciting game introducing the challenge of wildlife conservation.

Can you save the Ospreys?

32-page colour booklet gives background history and instructions PLUS project ideas.
'Osprey!' was developed in conjunction with the Royal Society for the Protection of Birds.

PACKAGE PRICE: $45.00

In the world of computer games it's not uncommon to find birds of prey threatening the survival of their human opponents, usually on some inhospitable planet light years from our own.

In reality, as 'Osprey!' vividly reflects, the situation is just the opposite. Man is the more menacing.

Given the responsibility of protecting the precariously small Scottish Osprey population, you have at your disposal a team of wardens. They will enable you to keep egg-stealers at bay, prevent huntsmen from shooting the birds, and control the ever-inquisitive tourists who can easily disturb the nests.

BES Bourne Educational Software Ltd.
Another Great Product from
SRIA — ask for details of
these programs for the ACORN-BBC

SRIA SYSTEMS RESEARCH INSTITUTE OF AUSTRALIA
4th FLOOR, 22 ST GEORGE'S TERRACE
PERTH, WESTERN AUSTRALIA 6000
TELEPHONE (09) 325-7644

Other BES software from SRIA at $35 each:

MAP RALLY — Teaches compass and coordinate directions.

TIMEMAN ONE & TWO — Entertaining teaching of 12 and 24 hour clocks.

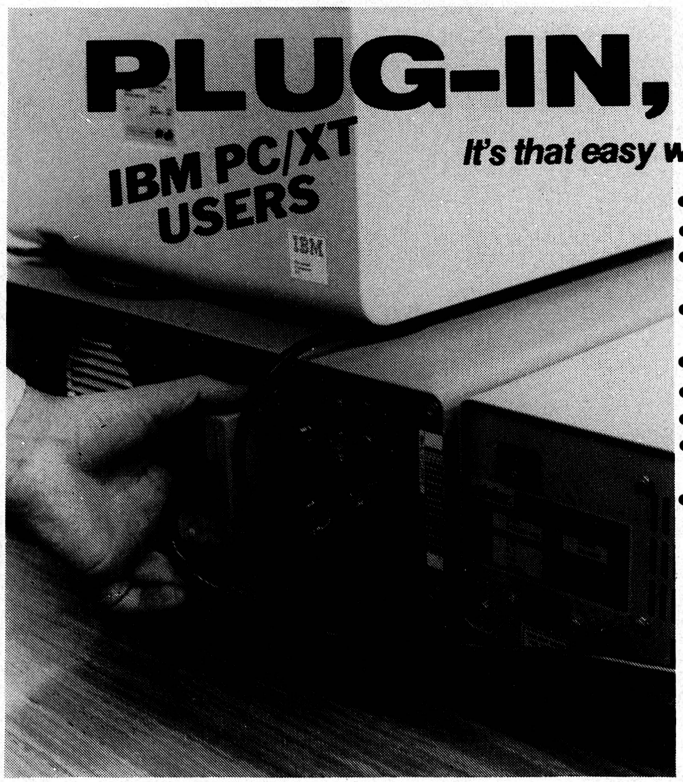
WORD HANG — The Rolls Royce of Hangman programs.

HAPPY NUMBERS — Number recognition for the very young.

ANIMAL, VEGETABLE, MINERAL & WORDWISE — Great database programs to teach by and learn from.

(All programs include BES Monitoring System for Teachers)

PLUG-IN, BACK-UP



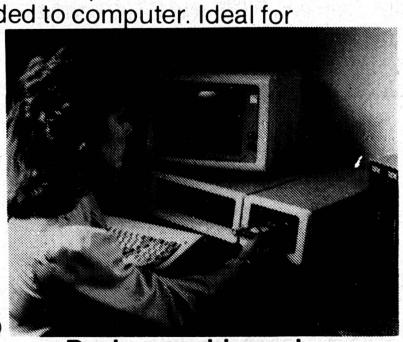
It's that easy with a Cipher 5210 FloppyTape™ System

- Plugs directly into external floppy connector.
- Backs up to 25Mb single or dual 10Mb hard disks.
- 1.1Mb/minute speed - more convenient and easier than floppies.
- Simple commands - FTBACKUP, FTRESTOR, FTFORMAT.
- Selectively archive data from hard disk.
- Single ¼" cartridge replaces up to 50 floppies.
- File orientated - only back-up what you need to.
- Eliminates data transfer problems with mirror image copying due to bad sector maps.
- No modifications needed to computer. Ideal for multiple installations.

Host configuration
IBM-PC with internal (IBM-XT) or external Hard Disk 128k RAM min
IBM floppy disk and controller
PC-DOS 2.0 or 2.1 Operating System

System Specifications
Capacity: 25MB (formatted)
Media: DC600A ¼-inch tape cartridge
Recording Method: MFM bit serial, six-track serpentine
Operating Mode: Streaming
Backup Rate: 1.0 MB/minute (128K system) 1.1 MB/minute (256K system)

Interface
The 5210 system consists of a Cipher Data Model 526 FloppyTape drive, a power supply and enclosure. It comes with a two-meter interconnecting cable that connects to the external floppy disk connector on the rear of the IBM PC or XT



Dealer enquiries welcome

cipher® data products, inc.

Ask your IBM dealer or contact

ELMEASCO
Instruments Pty. Ltd.
P.O. Box 30. CONCORD
NSW 2137 Tel: (02) 736 2888

VICTORIA
Tel: (03) 879 2322
QUEENSLAND
Tel: (07) 369 8688
SOUTH AUSTRALIA
Tel: (08) 271 1266
WESTERN AUSTRALIA
Tel: (09) 398 3362

SIEMENS

Make sure you specify this super silent printer

Anything else is just a lot of noise



IBM® PC COMPATIBLE SUPPORTS LOTUS 123*

Before you finally decide on your computer, make sure your first add-on will be a printer that is reliable, versatile and quiet. Siemens PT88 and PT89 can be interfaced with most computer systems. Look for these peak performance features.

- ☐ Full EPSON® compatibility
- ☐ 80 or 132 column
- ☐ Variable character pitch
- ☐ High speed (150 cps) printing
- ☐ Tractor and friction feed
- ☐ Full graphics capability
- ☐ Consistent print quality
- ☐ High duty cycle

Siemens PT88 and PT89 Ink-Jet Printers put it all together with one compact, super silent unit. You'll appreciate the long term value and a quietly efficient working environment.

Distributed Australia wide by:

BDS Computer Australia Pty. Ltd.

Melbourne:	(03) 690 1222
Sydney:	(02) 437 4122
Brisbane:	(07) 353 3090
Adelaide:	(08) 79 9211
Perth:	(09) 322 1206

BDS Dealers

ACI Computer Services	(03) 543 6166
Insystems Pty. Ltd.	(03) 690 2899
Hisoft Aust. Pty. Ltd.	(03) 529 2333
Businessworld Pty. Ltd.	(002) 34 8677
BS Microcomp Pty. Ltd.	(03) 614 1433

Siemens Ltd.
Melbourne, Sydney, Brisbane, Perth

Send now for Free Booklet

To BDS, 145 Sturt Street, South Melbourne, Vic. 3205

Please forward your informative free booklet on "All you ever wanted to know about printer systems . . . now the facts."

Name .....

Position .....

Company .....

Address .....

.....

A6/85

698/2450

Quietly impressive printers from Siemens

® IBM is a registered trademark of International Business Machines Corp. * 123 and Lotus are trademarks of Lotus Development Corp. ® EPSON is a registered trademark of EPSON America, Inc.

CLUB FILE

One of the best places to get information and help with a particular machine is through a computer user group or club. Such little pockets of wisdom are scattered throughout Australia, as you can see from this listing which we'll be publishing every couple of months.

Australian Capital Territory

ACT Apple Users' Group, Ernie Kruck, GPO Box 1231, Canberra City 2601, (062) 86 1208.

ACT Micro 80 Users' Group, Bill Cushing, 10 Urambi Village, Kambah 2902, (062) 31 3630.

ACT PC Users' Group, Nick Hammond, PO Box 188, Parkes 2600. Meetings last Monday each month at Reid Tafe, 8.00 onwards. (062) 86 1102.

ACT VIC-20 Users' Association, Chris Groenhout, 25 Kerferd St, Watson 2602. Meetings first Monday each month at Boys' Grammar Scout Hall, Red Hill, 7.30 onwards. (062) 41 2316.

ACTARI, Chris McEwan, co-ordinator, ACTARI, PO Box E112, Canberra 2600, (062) 88 7861.

Apple User Group (ACT), Jeff Brock, 1 Buckley Circuit, Kambah 2902, (062) 31 3630.

Australian ZX80 Users' Group (AZUG), David Brudenall, 19 Godfrey Street, Campbell 2601; for ZX80/Microace owners.

Canberra ACT Sirius User Group, Jim Bland, (062) 81 2824, (062) 81 2832.

Canberra Compucolor Club (CCC), Meets 7.30 on first Sunday of every month at the offices of Digital Equipment, 28 Lonsdale Street, Braddon ACT.

Canberra Microbee Users' Group, Hugh Gibson, Microbee Store, Level 1, Cooleman Court, Weston 2611, (062) 88 6384.

Canberra Microbee Users' Group, Adrian Van Wierst, 9 McGowan Street, Dickson 2602, (062) 49 7030.

Canberra Micro-80 User Group, Milt Cottee, 33 Crawford Cres, Flynn 2615; meetings third Monday each month, 7.30 pm, in the small theatrette, Reid TAFE, for System 80, TRS80 and so on. (062) 58 8822.

Canberra NEC Users' Group, Mal Smith, PO Box 173, Belconnen 2616; meets first Tuesday each month at Main Conference Room, CSIRO Headquarters, Limestone Avenue, at 7.30. (062) 54 1614.

Canberra Osborne Group, c/o Geoff Cohen, PO Box 136, Kippax 2615, (062) 54 7608.

Micsig, Registrar, PO Box 446, Canberra 2601.

Sirius/Apricot User Group, M J Sim, 253 Hindmarsh Drive, Rivett 2611; meetings 7.30 pm third Tuesday each month, 88 Wollongong Street, Fyshwick 2609.

New South Wales

Albury-Wodonga District Microbee User Group, Eric Eulenstein, 202 Kooba St, Albury 2640, (060) 25 1601.

APF Users' Group, Norm McMahon, 288 Kissing Point Road, Turramurra 2074, (02) 44 2645.

Apple Users' Disk Exchange Club, Peter Lapic, 45 Malabar Street, Canley Vale 2166.

Apple Users' Group, Colin Rutherford, PO Box 505, Bankstown 2200; meets 6.30 pm second Monday of each month (Tuesday after public holidays) at Sydney Grammar School, Stanley Street, Sydney. (02) 520 0926.

Atari Computer Enthusiasts, Tony Reeve, PO Box 4514, Sydney 2001.

Ausborne, The Secretary, PO Box C530 Clarence Street, Sydney 2001; meetings third Wednesday each month at 6.30 pm in the North Shore Council Chambers, Cnr Miller and McLaren Streets, North Sydney 2060. (02) 95 5378.

Ausbug, Stephen Ford, PO Box 62, Londonderry 2753.

Australasian ZX80 Users' Group, Tony Mowbray, 87 Murphys Ave, Kieraville 2500, for ZX80/81 Microace owners. (042) 28 5296.

Australasian ZX80 Users' Newsletter, 87 Murphys Ave, Kieraville 2500.

BBC Educational Users' Group of NSW, Dick Cleary, PO Box 939, Darlinghurst 2010; meets 7.30 pm third Wednesday of each month at various locations.

Blue Mountains Microbee Computer Club, Roger Cooper, (047) 58 7238.

Blue Mountains Computer Club, Joe McKay, 25 Reserve Avenue, Blaxland 2774, (047) 39 3154.

Broken Hill Microbee Users' Group, Peter Cotter, 533 Radium Street, Broken Hill 2880, (080) 88 1621.

Central Coast Apple Users' Group, C W Lee, 662 The Entrance Road, Wamberal 2260; meetings first Tuesday each month at the Niagara Park Public School from 7.30 pm. (043) 84 3419.

Central Coast Microbee Club, Max Maughen, PO Box 36, Ettalong Beach 2257, first Tuesday every month at Applied Technology, West Gosford. (043) 24 2711.

Commodore Users' Group, John Guidice, GPO Box 4721, Sydney 2001.

Compucolor Users' Group, Tony Lee, 52 Cowan Road, St. Ives 2075, phone (02) 449 8824.

Cumberland Computer User Group, S O'Neil, (02) 682 3851.

DBase Users' Group, PO Box 297, Neutral Bay Junction 2089; meets every second Tuesday each month at the Cowper Room, St. Andrew's House, corner Bathurst and Kent Sts, Sydney.

DEC Personal Computer Special Interest Group, Marion Rhydderch, DEC Australia, Northern Tower, Chatswood Plaza, Railway Street, Chatswood 2067, (02) 412 5252.

Dubbo and District Microbee Users' Group, Coralie Taylor, 18 Cunningham Street, Dubbo 2830; meets fourth Wednesday each month at 7.30 pm in the Dubbo High School Computer Room.

Griffith Computer Association, Ron Gauci, PO Box 425, Griffith 2680, (069) 62 5877.

Hawkesbury Commodore Computer Club, Richard Farrell, 12 Inverary Drive, Kurmond 2757; meets fourth Tuesday of each month at 7.30 pm at Neighbourhood Centre, West Market Street, Richmond 2753.

Hawkesbury Microbee Computer Club, Bruce Rennie, 6 Warks Road, Kurrajong Heights 2758; workshops 7.00 pm third Friday, and general meetings 7.30 pm first Friday of each month in the Microbee Network Room, Library Building, Richmond High School, Cnr Penrith and Lennox Streets, Richmond 2753. (045) 67 7329.

HP Desktop Computer Users' Group, Dr R W Harris, CSIRO Division of Mineral Physics, PMB 7, Sutherland 2232, (02) 543 3460.

Hunter Users' Group — All Microcomputers, Secretary, PO Box 39, Broadmeadow 2298; meets on the second Wednesday of each month in Room 308, Building W, University of Newcastle, at 7.45 pm. Membership is primarily Apple II oriented, but anyone with interest in micros welcome. ▷

Illawarra Microbee Computer Club, Ronald Read, 49 Beatus Street, Unanderra 2526.

Illawarra Super 80 Users' Group, Jim O'Grady, Chairman, PO Box 1775, Wollongong 2500.

Kaypro Users' Group NSW, Harry Richards, 4/2 Bortfield Drive, Chiswick 2046; meets second Tuesday each month at 8.00 pm in the Burwood RSL. (02) 713 1585.

Lismore C-64 Users' Group,John Grimmond, Richmond Hill Road via Lismore, meets second Wednesday each month at 7.00 pm, Kadina High School, Lismore. (066) 24 2320.

Macarthur Computer Association, J Napier, 23 Athel Tree Crescent, Bradbury 2560; meets first Monday each month at Airds High School, Briar Road, Campbelltown 2560, at 7.30 pm each month; all machines are catered for. (046) 25 2055.

Macquarie Microbee Users' Group, Brian Thompson; meetings first Monday each month at Denistone East Primary School at 7.30 pm. (02) 85 1659 after hours.

MEGS (Microcomputer Enthusisasts' Group), John Whitlock, PO Box 1309, Chatswood 2067; meetings third Monday each month at rear of St Andrew's Presbyterian Church, 37 Anderson Street, Chatswood 2067. (02) 638 1142.

Microbee Users' Club (Broken Hill), Peter Cotter, 533 Radium Street, Broken Hill 2880, (080) 88 1621.

Newcastle Microbee Users' Group, Lee Osman, 12 Cleverton Close, Warners Bay 2282, (049) 48 8813.

Newcastle Microcomputer Club, Angus Bliss, PO Box 293, Hamilton 2303; meetings 7.30 pm second and fourth Monday each month at Room G12, Physics Building, Newcastle Uni. (049) 67 2433.

NSW Primary School Microbee Users' Group, Mr Peter Stretton, c/- Hunters Hill Primary School, Alexandra Street, Hunters Hill 2110.

NSW 6800 Users' Group, 27 Georgina Avenue, Keiraville 2500.

Northern Beaches VIC User Group, E. Tuxford, 161 Barrenjoey Road, Newport 2106, (02) 997 2467.

Northern NSW MICC Chapter, Alen Hartley, Dundurrabin via Dorrigo 2433, (066) 57 8160.

NSW Peach User Club, Daniel Soussi; weekly meetings on Saturday from 2 pm at Cybernetics Research, 120-122 Lawson St, Redfern 2016. (02) 698 8286.

OSI Users' Group, Nigel Bisset, (02) 411 7142.

Pocket Computer Users' Club, George Antonijevic; for those interested in pocket computers, whatever the brand. Meetings held on the first Wednesday of each month at 7.30 pm at the Woodstock Community Centre, Church St, Burwood 2134, (02) 683 4296.

Sorcerer Users' Group, PO Box E162, St James 2000; meetings third Friday each month at 8.00 pm in Greenwich Community Hall, Greenwich Road, Greenwich 2065.

Southern Districts Commodore Users' Group, Lex Toms, 3 Lucille Crescent, Casula 2170; meetings first and third Wednesdays each month, API Hall, Currajong Road, Prestons 2170. (02) 602 8691.

Sutherland Super 80 Group, Jim Traeger, (02) 525 2018.

Sydcom 64 (C64 User Group), Andrew Farrell; meetings first Tuesday of each month at 6.30 pm above Computerwave, George Street, Sydney 2000. (02) 99 2640.

Sydney Forth Group, Peter Tregeagle, 10 Binda Road, Yowie Bay 2228; meets second Friday of each month at 7.00 pm in the John Goodsell Building, UNSW room LG19. (02) 524 7490.

Sydney Lotus 1-2-3 User Group, Ron Pollak, (02) 29 5316.

Sydney Microbee Users' Club, Colin Tringham, PO Box C233, Clarence St, Sydney 2000; meetings third Saturday each month 1-5 pm, Strathfield Girls' High School, (02) 92 6408.

Sydney Northside Apple Users' Group, Philip Webb, meets first Tuesday each month 6.30 to 8.30 pm, Willoughby Council Library, 411 Victoria Avenue, Chatswood 2067. (02) 419 3294.

Sydney Peach User Group, Ben Sharif, 261 Northumberland Street, Liverpool 2170, (02) 601 8493.

Sydney TRS80 Users' Group, meetings second, third and fourth Saturday of each month at Botany. (02) 666 4716 bh.

TAG — The Access Group, Bob Dolton, PO Box 943, Orange 2800; for Access and Actrix users.

TI Sydney Home Computer Users' Group, PO Box 149, Pennant Hills 2120.

Tuggerah Lakes Computer Users' Group, Frank James, 125 Woolana Avenue, Budgewoi 2262; meetings second Thursday each month at Old Primary School, Wyong, at 6.30 pm. (043) 907 339.

Wagga Microbee Users' Group, John Simmons, 47 Undurra Drive, Glenfield 2650; meetings first and third Tuesdays each month in the Tolland-Glenfield Neighbourhood Centre at 8.00 pm. (069) 31 1302.

Wizzard User Group, John Mifsod. 150 Bouganville Road, Blackett 2770, (02) 628 0801.

ZX-Spectrum Users' Club, Craig Kennedy, PO Box 466, Epping 2121.

Victoria

Apple Users' Society of Melbourne, D Halprin, PO Box 43, Forest Hill 3131, (03) 387 3221.

AT Microcomputer Club, Grant Forest; this club has been formed for people interested in the Applied Technology DGOS Z80; (03) 879 2257 ah, (03) 699 2888 bh.

Atari User Group Melbourne, Kelvin Eldridge. PO Box 173, Reservoir 3073.

Australian Forth Interest Group, Tony Latermore, PO Box 704, Sale 3850, (051) 44 2011.

Australian North Star Users' Association, PO Box 194, Wangaratta 3677.

Ballarat Computer Users' Group, Publicity Officer: John Preston, (053) 31 4363.

Billanook Computer Forum, Maurie Canterbury, Cardigan Road, Mooroolbark 3138, (03) 725 5388.

BUG 80 (Burwood Users' Group), PO Box 46, Blackburn South 3130.

Chip 8, 6800, 1802 User Group, Frank Rees, 27 King Street, Boort 3537.

Compucolor Users' Group, L Ferguson, 12 Morphett Avenue, Ascot 3342.

DEC Personal Computer Special Interest Group, see NSW entry.

Forth Interest Group, Lance Collins, PO Box 103, Camberwell 3124; meets on the first Friday of the month at the Bowen Street Neighbourhood Centre, 102 Bowen Street, Camberwell South 3124. (03) 29 2600.

Geelong Commodore Computer Club, D Gerrard, 15 Jacaranda Place, Belmont 3216, (03) 44 2863.

Is your club listed? Think of our tens of thousands of readers waiting to join a club just like yours. Ring Felicity Skinner on (02) 662 8888, or write to us at 'Your Computer' PO Box 227, Waterloo 2017.

CLUB FILE

Geelong Computer Club, Peter McKeon, PO Box 93, Geelong 3220.

IBM & Columbia Computer Users' Club, Giles Bray, 22/11 Auburn Grove, Hawthorn East 3123; meets second Tuesday each month, 7.30 pm, at the Victorian College of Pharmacy, (03) 82 7632.

Kaypro Users' Group of Victoria, George Kunz, PO Box 159, Forest Hill 3131; meetings fourth Sunday each month at Burwood State College Community Resources Centre at 2 pm. (03) 857 5462.

KAOS (Ohio Scientific), David Anear, 49 Millewa Crescent, Dallas 3047.

Latrobe Valley Colour Computer Users' Group, George Francis, 31 Donald Street, Morwell 3840; for TRS80 and MC10 users. (03) 22 1389.

Melbourne Atari Computer Enthusiasts, PO Box 133, Mulgrave North 3170; meetings held on first Sunday of each month at 11.40 am at Monash University Rotunda.

Melbourne Lotus 1-2-3 Users' Group, Robert Taylor, (03) 267 4800.

Melbourne Microbee Users' Group, President: Grant Forrest, PO Box 157, Nunawading 3131; meetings 7.00 pm second Wednesday each month at Victorian State College — Burwood Campus, 221 Burwood Highway, Burwood 3125.

Melbourne PC User Group, Stephen Wagen or Christopher Leptos, c/o Pannell Kerr Foster, 14th Floor, 500 Bourke Street, Melbourne 3000, (03) 605 2222 bh.

Melbourne Peach Users' Group (MPUG), P.O. Box 191, Rosanna 3084, (03) 434 2541.

Melbourne Super 80 Users' Group, Hon. Sec. Victor Shuttleworth, (03) 723 2713.

MICOM (Microcomputer Club of Melbourne), PO Box 60, Canterbury 3126.

National Mutual Micro Users' Group, R Prewett, NMLA, PO Box 2830AA, GPO Melbourne 3001; for National Mutual staff.

National Sinclair User Group, PO Box 148, Glen Waverley 3150.

National ZX80 Users' Club, 24 Peel Street, Collingwood 3066.

NEC Portable Users' Group, D Green; meetings second Wednesday of each month at Myers Computer Centre, Lonsdale Street, at 7.30 pm. (03) 611 3380.

Northern/Western Suburbs Computer Users' Group, John King (Secretary), 284 Union Road, Moonee Ponds 3039. Contact CP/M Data Systems, (03) 338 9304.

Peninsula Computer Club, George Thompson, 3 Patterson Street, Bonbeach 3196; meets second Tuesday each month at Chisholm College, Frankston 3199; many types of computers catered for. (03) 772 2674.

Have you changed your club address? The meeting place? The contact number? Let us know.

Seymour-Pucka Computer Club, Garry Sutton, 25 Malaya Road, Puckapunyal 3662; (057) 93 1091.

Sharp Computer Users' Association, The President, 7 Faye Street, East Burwood 3151.

Spectravideo Users' Group, Mitch Raitt, 3 Clivejay Street, Glen Waverley 3150, (03) 233 2357.

Sorcerer Computer Users' (Australia), Secretary, GPO Box 2402, Melbourne 3001.

TI-99/4A Users' Group Melbourne, Wayne Worladge, 123 Ashburn Grove, Ashburton 3147, (03) 25 1832.

The Motorola User Group (MUGS), Clive Allan, 11 Haros Avenue, Nunawading 3131; group is interested in 6800/02/09-based computers, particularly if running Flex, although this is not a prerequisite to join. (03) 878 1298.

Victorian Association of Computer Educators, Arthur Totrall, PO Box 69, Whittlesea 3757.

Victorian Osborne Users' Group, Scott Samuel, PO Box 169, Camberwell 3124, (03) 232 0822.

Victorian VZ-200 User Group, Luigi Chiodo, 24 Don St, Reservoir 3073, (03) 460 3770.

Victorian Wizzard Users' Group, Barry Klein, 24 Russell Street, Bulleen 3105.

Yarrawonga Computer User Group, Chris Younger, 10 Witt Street, Yarrawonga 3730, (057) 44 385; for all machines.

ZX81 Software Exchange, c/- Chips Taens, 5 Muir Street, Mount Waverley 3149.

Queensland

Adventure Club, Christine Ogden, 37 Samford Road, Leichhardt, Ipswich 4305; for all Adventure-type game players.

Apple-Q — The Brisbane User Group, The Secretary, PO Box 721, South Brisbane 4101; meetings every third Sunday of month at Hooper Education Centre, Kuran Street, Wavell Heights 4012. Centre is open from 8.30 am till 4.30 pm; members encouraged to bring Apple along.

Australian Sirius Users' Group, PO Box 204, Chermside 4032; looks after the needs of Sirius One and Victor 9000 computer users; (07) 350 2611.

BASIC User Group, Chris Lucey, Cranium Computers, 34 Lawless Street, Blackwater 4717.

Brisbane Medfly Users' Group, K J Walker, 120 Highgate Street, Coopers Plains 4108.

Brisbane Sinclair (Spectrum) Computer Club, V Lewis, 37 Samford Road, Ipswich 4305; meets third Sunday at Everton Park State High School, at 2.00 pm. (07) 355 7809.

Brisbane Super 80 Users' Group, Gary Gatfield, (08) 355 3173.

Brisbane Youth Computer Group, A Harrison, PO Box 396, Sunnybank 4109.

Cairns District Microbee Users' Group, Chas Eustance, 21 Marr Street, Edmonton 4869, (070) 55 4531.

Commodore Computer Users' Group Queensland, Mrs D D Dillan, PO Box 127, Stones Corner 4120.

Commodore Users' Group, John Egan, PO Box 274, Springwood 4127; for owners of Pet/CBM and VIC-20 machines. Meetings held on the first Tuesday of the month at 130 Petrie Terrace, Brisbane 4000. (07) 287 2705.

Computer Owners' Group, Betty Adcock, 42 Lucan Ave, Aspley 4034; meets second Wednesday each month, 7.45 pm; all kinds of computer are catered for. (07) 263 4268.

DEC Personal Computer Special Interest Group, see NSW entry.

Gold Coast Microbee User Group, Col McLaren, 1/100 Imperial Parade, Labrador 4215; meetings first Sunday each month, 3.00 pm, at the Southport High School. (075) 31 4610.

IREE Microcomputer Interest Group, N Wilson, PO Box 811, Albion 4010.

Mackay Microbee User Group, Geoff Gehring, PO Box 230, Mackay 4740, (079) 42 3214.

Osborne Users' Group of Queensland Uni, Glen McBride; meetings second Thursday each month, open to all. (07) 371 4243.

Southport Commodore Computer Users Group, Bill Fitzpatrick, PO Box 790, Southport 4125, (075) 32 0061.

Superboard Users' Group, Ed Richardson, 146 York Street, Nundah 4012.

Tandy, Apple, Commodore User Group, Chris Lucey, 34 Lawless Street, Blackwater 4717.

The Microcomputer Society, The Secretary, ▷

Software Duplication

Are you wasting your time...

Why waste valuable software developmental time duplicating and packaging your software when you should be developing the next generation product.

Consider the advantages:

TOP QUALITY: We only use the highest quality magnetic media for our disks and tape.

LOW COST: Our prices start at $2.38 per disk which includes the disk and duplication fee.

CONFIDENTIALITY: All clients' products are safeguarded by a written copyright agreement.

CONVENIENT: We offer label printing and affixing as well as packaging.

FORMATS: Most computer disk formats can be duplicated including Apple, IBM and Commodore.

We are the experts. We make the marketing of software easy.

Data Transfer

Whether you are an end user or a software supplier you may need to transfer system or data files to another computer.

Consider the possibilities:

Transfer between similar operating systems but with different disk formats. For example Osborne CP/M to Morrow CP/M or IBM PC DOS to Apricot MS-DOS.

Transfer between different operating systems. For example Osborne CP/M to IBM PC DOS or Apple DOS 3.3 to CP/M.

All the popular disk sizes are catered for -

31/2" - 51/4" - 8".

For worry free data transfers we are the experts.

INDEPENDENT SOFTWARE DUPLICATION

3 Park Ave, Westmead NSW 2145
Telephone (02) 635 0704
(02) 633 5944

PO Box 580, Fortitude Valley 4006; meetings are held on the second Friday of each month in the Old Town Hall, corner Vulture and Graham Streets, South Brisbane 4101. Meetings start at 7.30 pm; if main gate is closed use the back stairway.

Townsville Microbee User Group (TMUG), Mannie Van Rijswijk, PO Box 5751 MC, Townsville 4810; meetings 7.30 pm on second and fourth Mondays each month on the Ground Floor, St Margaret Mary's Secondary School, Crowle Street, Hermit Park 4812.

TRS80/System 80 Computer Group, Secretary, 16 Laver Street, Macgregor 4109; meets first Sunday each month at Lindum Hall, Lindum Street, Lindum 4178, at 2.00 pm. (07) 343 5771.

VZ-200 Pacific Region Club, J D'Alton, 39 Agnes Street, Toowong 4066, (07) 371 3707.

ZX81 Club, P Carswell, 22 Braud Street, Bundaberg 4670.

South Australia

Adelaide Atari Computer Club (AACC), Secretary, PO Box 333, Norwood 5067; meets at Gilles Street Primary School, City, on first Monday (second if first is on public holiday) of each month.

Adelaide Lotus 1-2-3 User Group, Paul Wragg, Pannell Kerr Foster, GPO Box 1969, Adelaide 5001.

Adelaide Micro User Group, R G Stevenson, 36 Sturt Street, Adelaide 5000; for TRS80 and System 80 users.

Adelaide Osborne Group, Russell Barter, The Secretary, 410 Regency Road, Prospect 5082.

Beebnet, BBC and Econet User Group PO Box 262, Kingswwod 5062; the group intends to produce a newsletter on a monthly basis. It is interested in any software producers or distributors who would be interested in serving the group's market requirements.

Commodore/VIC Computer Users' Association, Mr Eddie Hann, 13 Miranda Road, Paralowie 5108; the SA branch meets monthly.

Compucolor-Intecolor Users of South Australia, PO Box 86, Torrensville 5031, (08) 352 3296.

DEC Personal Computer Special Interest Group, see NSW entry.

IBM-PC South Australia Users' Group, PO Box 68, Walkerville 5081.

Kaypro User Group, Ralf Engler, 16/34 John Street, Payneham 5070.

Microbee Users' Group of South Australia (MUGSA), The Secretary, GPO Box 767, Adelaide 5001.

South Australian Commodore Computers' User Group, Eddie Hann, Secretary, PO Box 427, North Adelaide 5006; meetings second Tuesday each month, 7.30 pm, at Royal Caledonian Hall, 379 King William St, Adelaide 5000. (08) 258 6367.

South Australian Foundation for Computer Literacy, Michael Kennett, PO Box 210, Norwood 5067; caters for children from six years (unaccompanied) or four years with older friend or brother or sister. Special emphasis on the needs of handicapped, educably disabled and socially disadvantaged children, but *all* children welcome. Family participation encouraged. (08) 51 5474.

South Australian Peach User Group, Geoff Drury, 27 Creslin Tce, Camden Park 5038; special interest group attached to the SA Microprocessor Group, which holds separate meetings. (08) 352 2555 bh or (08) 295 2778 ah.

South Australian Microprocessor Group Inc (SAMG), The Secretary, PO Box 113, Plympton 5038, (08) 278 7288.

Sorcerer Users' Group of South Australia, Don Ide, 14 Scott Road, Newton 5074.

South Australian Apple Users' Club, The Secretary, c/- The Bookshelf, 169 Pirie Street, Adelaide 5000.

South East Computer Enthusiasts' Group, Glenn Mibus, 3 Millard St, Mount Gambier 5290; meetings second and fourth Tuesday of each month from 6.30 pm at Mt Gambier High School Computer Room, for all machines and interested parties. (087) 25 1046.

Northern Territory

Alice Springs Microbee Users' Group, Douglas Craigie, c/- PO Box 3230, Alice Springs 5750.

The accuracy of this listing depends on updates from club organisers. Ring Felicity Skinner on (02) 662 8888, or write to us ...

Darwin Microbee Users' Group (DBUG), Felino Molina, PO Box 3111, Darwin 5794, (089) 82 5613 bh, (089) 88 1455 ah.

Northern Territory Computer Club, Ian Diss; meets at Wulagi Primary School on the first and third Thursday of each month at 7.30 pm. Users of all machines and other interested parties welcome. (089) 27 9208.

Northern Territory 80 Computer User Group, R T O'Brien, 433 McMillans Road, Jingili 5792.

VZ-200 Users' Club, 7 Abbott Crescent, Malak 5793, (089) 27 2830.

Western Australia

Agriculture Users' Group, c/- Mr R Fenwick, Dept. of Agriculture, Albany 6330. For farmers and the agriculture service industries.

CU West WA Compucolor/Intecolor Users' Group, John Newman, 8 Hillcrest Drive, Darlington 6070.

DEC Personal Computer Special Interest Group, see NSW entry.

KAOS-WA,Gerry Ligtermoet, 39 Cloister Ave, Manning 6152; for Ohio Scientific Users. (09) 450 5081.

Kaypro User Group of Western Australia, Ainslie Sharpe, PO Box 91, Claremont 6010; meetings second and fourth Mondays of each month in the Canteen of the Department of Agriculture, Jarrah Road, South Perth 6151. (09) 384 5511.

Microbee Users' Group of Western Australia, The Secretary, 4 Garnkirk Road, Greenwood 6024, (09) 447 5366.

OSWEST-Osborne Users' Group of Western Australia, Mal Ferguson, PO Box 199, Mundaring 6554; meets first and third Wednesdays at the Palmyra Recreation Centre and the Subiaco Exhibition Hall respectively from 7.30 pm, for Osborne and other interested computer users. (09) 295 1449.

Perth 80 Users' Group, C Powell; for System 80 and TRS80 users. (09) 457 6849.

Perth Hitachi Peach Club, The Secretary, 1 Charf Court, Riverton 6155; for Hitachi Peach and 6809s. (09) 367 5880.

Sharp PC Users' Group, John Paulic, PO Box 79, Gosnells 6110, (09) 398 6303.

Sorcerer Computer Users of Australia, The Secretary, 90 King George Street, South Perth 6151, (09) 367 6351.

Super 80 Users' Group Perth, Garry Black, 19 Bendigo Way, City Beach 6015, (09) 385 8813.

The West Australian Atari Computer Club, Mr Alf Gaebier (Secretary), PO Box 7169, Cloisters Square, Perth 6000.

VIC-Ups, G. Padfield, (09) 451 4629.

Western Australian Wizzard Users' Group, John Reid, 13 Wenlock Road, Wattleup 6166, (09) 410 2359.

Western Australian ZX Users' Group, Phil Taylor, (09) 328 4111 bh.

Western Australian University Computer Club, 2nd Floor, University of WA, Guild Building, (09) 386 1455.

Tasmania

DEC Personal Computer Special Interest Group, see NSW entry.

Devonport Computer Interest Group, John Steveson, RSD 422, Sheffield 7306, (004) 92 3237.

Down Under Atari User Group; contact Robert Bronstein, 191 Rokeby Street, Howrah 7018.

Spectravideo Computer Users' Group, Mr W P Decket, 48 Heather Street, Launceston 7250; membership costs $15, which entitles members to a newsletter and to discounts on computer equipment. (003) 44 4836.

Tasbeeb, John Hannon, PO Box 25, North Hobart 7000; meetings first Monday each month at Elizabethan Matriculation College in D Block at 8 pm, for BBC computers. (002) 34 2704.

Tasmanian Apple Users Group, Ray Williams, PO Box 188, North Hobart 7008, meets third Tuesday each month at 8.15 pm, 73 Murray Street, Hobart.

Tasmanian TI User Group, Co-ordinator, 1 Benboyd Court, Rokeby 7019; meetings third Sunday of each month at University of Tasmania, room 373. (002) 29 4009.

TAS-Micro, Peter Deckert, 1/456 West Tamar Road, Riverside 7250.

Tasmanian Commodore Users' Association, Vincent Staggard, Secretary, GPO Box 391D, Hobart 7001, Commodore and others. (002) 72 0295.

Tasmanian OSI User Group, David Tasker, 111 Bass Highway, Westbury 7303.

New Zealand

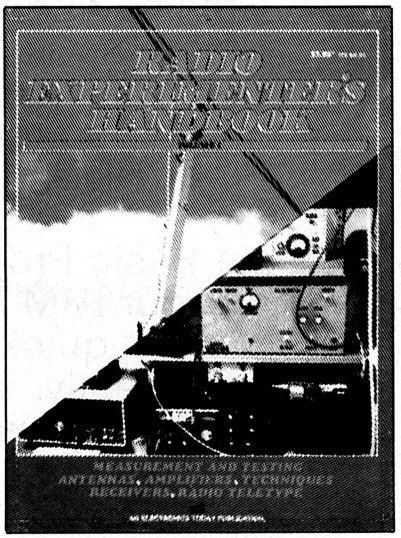
1802 Users' Group, PO Box 6210, Auckland, New Zealand; for those who own an ETI-660 or a Cosmac VIP; please send a return addressed envelope and International Reply Coupon.

Nelson VIC Users' Group, Peter Archer, c/- PO Box 860, Nelson, New Zealand; for VIC and Commodore 64.

Wellington Microcomputer Society Inc, Lindsay Williams, 2 Pope Street, Pimmerton, New Zealand.

ZX81 Club, R Skelton, c/- Harbourside □

THE ONE YOU'VE BEEN WAITING FOR!



The **Radio Experimenter's Handbook,** Volume 1, from Electronics Today International is 132 pages chock-full of circuits, projects to build, antennas to erect, hints and tips. It covers the field from DX listening to building radioteletype gear, from 'twilight zone' DX to VHF power amplifiers, from building a radio FAX picture decoder to designing loaded and trap dipoles.

Edited by Roger Harrison, VK2ZTB, this book carries a wealth of practical, down-to-earth information useful to anyone interested in the art and science of radio. $7.95 from your newsagent or through selected electronics suppliers. It is also available mail order through **ETI Book Sales, P.O. Box 227, Waterloo NSW 2017** (please add $1.75 post and handling when ordering by mail).

JUST RELEASED
SPEEDIT

MORE THAN A PROGRAM ITS AN EDUCATION

- Simplifies Basic Programming
- Creates bug-free Programmes
- Cuts Development Time
- Improves Programming Productivity

Create Basic Programmes on your IBM PC or compatible, quickly, simply and efficiently. **SpeedIt** eliminates the use of line numbers, Gotos, and the obscurities of traditional Basic programming.

Simple flowcharts translate directly into Basic.

So if you're writing a programme in Basic, **SpeedIt** to perfection. Minimum requirements —IBM PC or clone, 192k RAM, DOS

MICROSHARE SYSTEMS PTY LTD

PO Box 169, Milsons Point, NSW 2061
Telephone: (047) 588 005

Please rush me: **SPEEDIT** system ☐ $79.95
☐ Demonstration Version $19.95
(Prices include Tax)

Name .....

Address .....

..... Postcode.....

My Cheque/Money Order for $..... is enclosed.

Limited stocks at this price. Special concession for schools, universities and technical colleges.

CLASSIFIEDS

Spectravideo
SU-318 MSX machine with 32 Kbytes of RAM, data cassette, joystick, and MSX-BASIC — $350 ono. Phone (02) 705 5175 after 6 pm.

Casio PB-700 Users
Send a program on cassette to Terry Gill, 35A Kent Street, Regents Park 2143, and receive a program back.

IBM Portable PC
640 Kbyte machine with Sigma expansion card, colour graphics card, Epson RX-80 printer and software — $4,500 ono. Phone (03) 417 5720 ah.

Commodore 64
Large variety of software available. For further information contact D. Hamilton, 32 Miro Street, Young 2594.

VZ200-VZ300 Quality Software
Tape and Disk. Educational, business, games and M/L units. Extended BASIC with disk commands. Please send SASE to Mr J DGAlton, 39 Agnes Street, Toowong 4066. Phone (07) 371 3707.

Microbee: 'Tax 85'
Prepare and print your own S or A tax form. Suits 16 Kbyte machine and popular printers. Tape: $16. K Cousins, 9 Mair Crescent, Korumburra 3950.

Microbee 64 Kbyte ROM Board
Contains five EPROM programs, Oz-logo, EDASM, Datbas, Wordbee. $75. (067) 68 0395.

For Sale
VIC-20, seven-slot expansion, datasette, three cartridges, 40 programs, six books and many magazines, joystick. $500. (059) 66 5270.

Computer for Sale
32 Kbyte Microbee, with Wordbee in ROM, parallel printer cable, cassette recorder, cassette software, manuals, books and newsletters. $450. (03) 546 1233, ah.

Microbee Tape Copier
Backup M/C programs at 300 or 1200, remove/add auto start, modify code. $9.80 incl postage. J Arnold, 36 Victoria St, Rooty Hill 2766.

Computer Business Name For Sale
Name well-known and respected Australia-wide and overseas. For information contact A Turner, PO Box 111, Melville 6157.

For Sale
Microsoft Editor/Assembler and TRS-80 *Assembly Language* book to suit System 80. Write to T Cammell, 333 Piper St, Broken Hill 2880.

☐

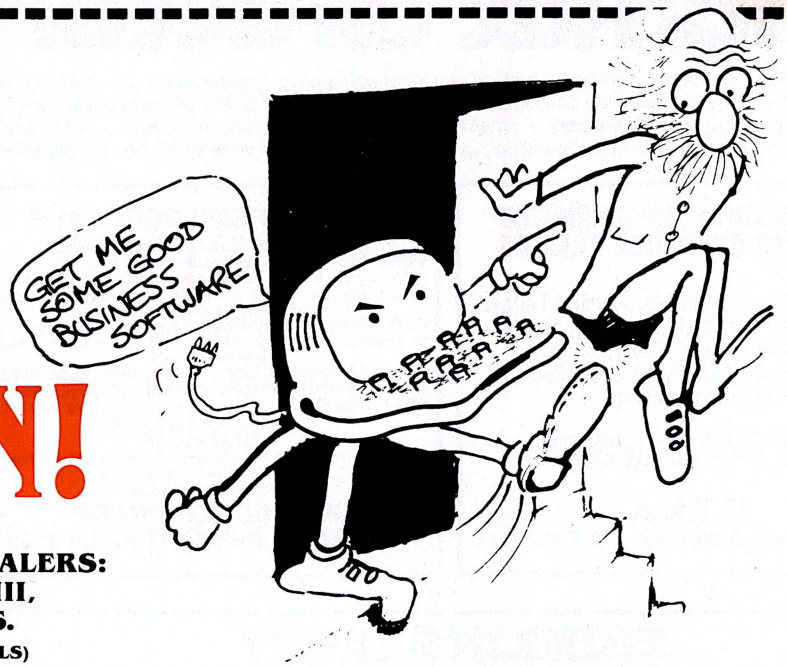
MUSIC SOUND RECORDING STAGE LIGHTING

SONICS

MAGAZINE

For: Musicians, Road Crews, Recording Engineers, Lighting People, Managers, Promoters and anybody interested in what goes into today's music-making.

IT'S ON AGAIN!



FROM PARTICIPATING DEALERS:
SUITS APPLE II, IIc, IIe, III,
IBM PC AND LOOKALIKES.
(ASK FOR HARDWARE CONFIG. DETAILS)

SIX'S' SOFTWARE 6-PACK

$1195

NORMAL RETAIL VALUE OF THIS SOFTWARE PACKAGE $2130

THE 6S SOFTWARE 6-PACK INCLUDES

- **DEBTORS** with sales analysis and comprehensive reports
- **INVOICING** with automatic pricing and full integration to Debtors/Inventory ledgers.
- **INVENTORY** with sales and profitability analysis - auto buying levels
- **CREDITORS** open item, with complete automatic G/L integration
- **GENERAL LEDGER** with automatic balancing and double-entry
- **PAYROLL** with pay slips, group certificates, automatic taxing and holiday pays.

Plus Special Offer

To further enhance the value of the 6-pack: You can receive ABSOLUTELY FREE the incredible

- ASK: Accounting Scenario Key Program for business analysis
- TELL: A powerful, effective word processor.

ONLY APPLICABLE TO SUITABLE HARDWARE

GIVE YOUR COMPUTER WHAT IT WANTS - AND WHAT YOU NEED!



NEWSFLASH!
Six "S" Business Software is now on the Macintosh

PROVEN, GUARANTEED, SUPPORTED

SOFTWARE
Six "S" Business Advisory Pty. Ltd.
1st. floor, 39 Gheringhap Street,
Geelong, Victoria 3220
P.O. Box 1220
Telephone (052) 22 4311

Y/C

Cam. Wil 1112

market directory

DEALERS, distributors, mail-order houses and other commercial organisations or individuals who have a message to spread but don't want to outlay the sums required for full-scale advertising can take advantage of our Market Directory — small ads to help those searching for outlets, services and equipment. For details contact *Your Computer* on (02) 662-8888 or write to PO Box 21, Waterloo 2017.

NEC PC-8201A LAP COMPUTER BUSINESS SOFTWARE CATALOG

Spreadsheet and Graphing, General Ledger, Cash Flow Forecast, Invoicing, Sales Canvassing, Sales Statistics, Date Encryption, Sort Utility, Printer Handler (word processing).

TO RECEIVE YOUR COPY PLEASE SEND A SELF-ADDRESSED ENVELOPE TO:

ITEKA
13 Dilga Street, Kings Langley, N.S.W. 2147

POOR PERSON SOFTWARE FOR CP/M 2.2 COMPUTERS

WRITE-HAND-MAN — Wordprocessing and can't find a pencil? One keystroke opens a window to save notes, edit a 'phone list, update a diary, scan a disk directory or data file. Add YOUR option! 9-page manual. Example. Instructions . . . **$45.**

POOR PERSON'S SPREAD SHEET — Easy screen design and versatile programmable calculator. Tutorial. One-line help. 28-page manual. 7 examples . . . **$38.**

PLUS POOR PERSON'S LABEL PRINTER, CROSSWORD GAME, WINDOW SYSTEM, SPELLING CHECKER, SPOOLER, MENUS, KEYED SEQUENTIAL FILES. All In Popular Formats, eg. Kaypro II, Osbourne DD, Microbee, 8" SSSD.

ALSO AVAILABLE

MEDIA MASTER for IBM-PC + compact & Rainbow-100 Fuji Floppy Disks — Full Range — Lifetime G'tee
Write for catalogue. Price include tax.

GLYPHIC SOFTWARE
PO. BOX 391 PENNANT HILLS 2120



CALYPSO JANE SOFTWARE

P.O. Box 160
St Peters.2044

*Specialising in individualised science education materials.
D.C.CIRCUITS KIT(Apple II edition)
*class set of instruction cards.
*accompanying computer disk.
*comprehensive teaching manual.

$80.00

THINKING IBM™?

TRY VIDEO TECHNOLOGY FOR IBM COMPATIBLE PRODUCTS. WE ARE SETTING THE STANDARDS FOR QUALITY AND PRICE. WE STOCK COMPLETE XT COMPATIBLE UNITS (FROM $2000) AND INDIVIDUAL PARTS, i.e. K-BRDS, DISK DRIVES, HARD DISK, RAM AND MOST ADD-ON CARDS. WE ALSO SUPPLY S.K.D. KITS AND O.E.M. SUPPLIERS.

Phone: VIDEO TECHNOLOGY 569-3015
(Computer & Peripheral Product Engineers)
17-19 Herbert St., DULWICH HILL 2203

AUTHORISED commodore computer centre

SERVICE VIC-20 & 64 SALES

- Prompt repairs by friendly experts
- Easy Access
- Plenty of parking
- Open Saturday mornings
- Established 1968



Melbourne's largest range of Computers, Programs, Printers, Disc Drives, Monitors, Plotters, etc.

TELEPHONE: 419 6811

Maxwell OFFICE EQUIPMENT (VIC) PTY. LTD.
162 – 164 NICHOLSON ST.
(Near Collingwood Football Club) ABBOTSFORD

PAY-PACK

PAYROLL SYSTEM for MS/DOS, CP/M80

"A cost-effective package written in Australia with Australian business in mind."
Reviewed: YC March, p.46

Everybody who has seen PAYPACK has rated it the best payroll package on the market.

Contact: Dr Geoffrey Lewis
CUSTOM-MADE SOFTWARE P/L
P.O. Box 507, Randwick, 2031 (02) 399-8520

NEW

MICROMASTER SBC $495*

A new complete single board computer specially designed for system integrators, OEMs, educators, and hobbyists.

- Z-80B CPU at 6 MHz
- 64K RAM
- Floppy disk controller for both 8" and 5" drives
- 2 Serial Ports
- Centronics printer port
- Clock calendar
- Hard disk adapter (optional)
- DMA controller (optional)
- Improved CP/M compatible op system.

Available as board only or as complete system.
• Introductory special plus sales tax.

Microtrix Pty. Ltd.
24 Bridge Street, Eltham. 3095
(03) 439 5155.

RENT IBM SOFTWARE

Symphony ...	$58.05 (B)	Sargon III	$4.50 (G)
Lotus 123	$43.65 (B)	Flight SIM ...	$5.22 (G)
C Compiler ...	$13.50 (B)	Pinball	$4.95 (G)
Copywrite	$6.03 (B)	Pig Pen	$2.61 (G)

Join the Down Under Software Rental Library, and save on all your IBM SOftware. You pay only 9% of the dealer wholesale price. Join the Games Library (G) for only $25; join the Business Library (B) for $30; or join both for only $35. Start saving now — your very first rental (including joining fee) will probably be less than buying the equivalent program.

Down Under Software
1 Botherambo Street,
Richmond. Ph.: (03) 429-3216.

NOTICE TO S-100 USERS

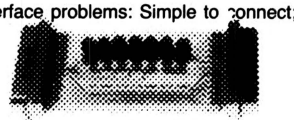
Unique Australian Dual Mode CPU Board
Plug GO-88 into your CP/M system:
★ address over a million bytes of memory
★ add powerful 16-bit instruction set
★ coprocessor with existing CPU, or stand-alone
★ memory manager for 16 address-line boards
★ runs CP/M86, MSDOS or UNIX operating systems
★ change operating systems with a single command
★ entire hardware/software investment preserved

GO-88 with standard monitor & manual $385
CPM86 BIOS & utilities for DJ-2D controller $60
other BIOS's in preparation
add 20% sales tax to these prices

COMPUTER ART
CMB 59, BABINDA, 4861 (070) 67-4124

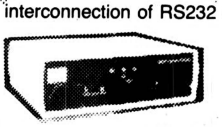
RS232 — ALL PROBLEMS SOLVED!

The RS232 Tester — helps with computer interface problems: Simple to connect; No power needed; displays transmit data.
$38 + Tax Call for details.



The RS232 Bit Switch — designed for versatile interconnection of RS232 devices — "One in", "Three out" change-over switch (bi-directional).

Call for details. From **$108**
+ Tax if applic.



M.F. Computers 35 Carter Road, BROOKVALE 2100.
Ph: (02) 939-1800 **Telex: AA 73775**

GLOSSARY

A

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others, some registers can perform a subset of the full set of operations.

Acoustic Coupler: A device for connecting the telephone handset to data communications equipment.

Address: A memory location which can contain data or an instruction.

AI: Artificial Intelligence.

Algol: Algorithmic Language. An early computer programming language for mathematical applications. Widely used in Europe, it embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measurable datum, rather than a binary or other representation based on counting.

Application: What you do with your computer. For example games, word processing and graphics.

Array: A set of values under a common variable name, accessed through a subscript. For example A[1] is the first item in array A, A[2] is the second, and so on. A[N] is the Nth item.

ASCII: American Standard Code for Information Interchange; a common system for representing character information.

ASM: Assembler. Also a suffix added to assembly language file names under CP/M to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code instruction: 10010110is: SUBL(subtract contents of register L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction.

Assign: To make one thing equal to another; for example, [AB] assigns the value of B to A.

Attribute: A property possessed by some object, such as a file being read-only.

B

Background Task: In a multiprogramming environment, a low-priority program which runs when the processor has nothing else to do.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage to the original.

Bandwidth: The range of frequencies that can be carried by a communications channel.

Base: The lowest number inexpressible as a single digit in a given number system.

BASIC: Beginners' All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College by Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

Baud: The number of bits transmitted per second along a data communications line.

BCD: Binary Coded Decimal, a 4-bit binary representation of the digits 0 through 9, with two BCD digits usually packed in a byte.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The base 2 system of counting used by digital computers.

Binary Search: A method of finding an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each type of machine and provides any special I/O routines for disks, terminal, printer, and so on.

Bit: Binary digit, being the basic unit of data storage. Either 1 or 0, off or on, true of false.

Block: A physical division of data in a logical record.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: An error in a program. Makes programmers itch.

Bus: A set of wires over which data, addresses, or control signals are transferred between the central processor and memory or I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or -128 and 127), or a computer instruction.

C

C: A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so when the subroutine is finished executing control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCITT: Consultative Committee on International Telegraphy and Telephony. The committee sets standards for various aspects of telephone and telegraph usage.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances a control code such as 'carriage return'.

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

COBOL: Common Business Oriented Language; a high-level language, mainly used in business applications.

Code:

Absolute: Machine instructions which are intended to be loaded and executed in a particular area of memory.

Object: Machine instructions, as distinct from the source code from which it was generated.

Re-entrant: Code which may be called by more than one program at a time.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembly language, or a high-level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM File: In CP/M parlance, a command file; that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high-level language, and produces as output an object file containing the machine instructions which are actually executed.

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y:

```
IF X > Y   THEN GOSUB 500
```
(BASIC) ▷

Conditionals are one of the most powerful features of any computer language.

Configure: To organise the I/O or other aspects of a system.

Console: The keyboard and screen from which the operator controls the computer.

Control Characters: Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.

CP/M: A disk operating system for 8080- and Z80-based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS-80), DOS 3.3 (for Apple) and MSDOS on many 16-bit micros.

CPS: Characters Per Second.

CPU: Central Processing Unit. The part of the computer responsible for fetching, decoding and performing instructions.

Crash: A situation where the system becomes inoperative, due to a hardware or software error.

CRT: Cathode Ray Tube. Usually refers to the screen of a video terminal.

D

Daisywheel Printer: A high-quality printer which has a printhead in the shape of a daisy.

Data: Information to be processed by, or output from, a program.

DBMS: Data Base Management System. A program which manages the systematic storage and retrieval of a centralised data pool.

DDT: Dynamic Debugging Tool. A program that assists the user to find errors in machine code programs.

Debug: To locate and fix errors.

Decimal: Based on ten.

Device: A piece of equipment such as a printer or tape drive which the computer uses.

Directory: A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape, particularly when information is not stored sequentially.

Disk Drive: The mechanical assembly which rotates the disk and positions the read/write head.

DOS: Disk Operating System.

Disk Operating System: A program which operates one or more disk drives automatically and manages the system.

Display: The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can produce graphics (charts and pictures) on the display.

Distributed System: A system in which information is stored in several computers; peripherals may be shared, but the information storage is decentralised.

Dot Matrix Printer: A printer which creates a text image from a cluster of dots; produces relatively low-quality, high-speed text and graphic output.

Double Density: A method of recording twice as much information on a floppy disk, requiring a higher-quality recording surface than on a single-density disk.

Driver: A program which controls input and output to a device.

E

EBCDIC: Extended Binary Coded Decimal Interchange Code; an 8-bit character coding system — IBM's answer to ASCII.

ED: An editor program; part of CP/M.

Editor: A program which lets you alter and correct source files and other documents.

Error Message: Tells you something went wrong, and sometimes what.

Execute: To run a program; to follow its instructions.

F

FIFO: First in, first out. A technique used in memory management procedures, or a device used in buffering data flow between two asynchronous devices operating at different speeds.

File: A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.

Fixed Point: Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as 9/5 1.

Flag: A variable, sometimes a single bit, which can have only two values and is used to indicate some condition.

Floating Point: The kind of arithmetic used in scientific calculators.

Floppy Disk: A disk, made of thin, flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are three varieties, 9 cm, 13 cm and 20 cm. These can typically store somewhere between 140,000 and three million bytes (characters).

Flowchart: Symbolic representation of the sequence of instructions in a program.

Focal: Formula Calculator. A simple language rather like a small BASIC, found on some mini and microcomputers.

FORTRAN: Formula Translator. One of the first computer languages, and beginning to show it, although still the king of the scientific or number crunching languages.

Function: A sub-program that processes variables in some well-defined way.

G

Garbage Collection: The process of going through memory or disk space, reclaiming all the redundant used space.

Gigabyte: One thousand megabytes (1,024,000,000 bytes).

Glitch: A pulse of electronic 'noise' which may cause a system failure.

Global: A variable which is known to all the parts of a program. See local.

H

Handshaking: A technique for controlling data communication between two devices; data flow only occurs when the receiving device sends a signal indicating it is ready to receive.

Hard Disk: A disk made of hard material, which is larger, faster and more fragile than a floppy disk, but capable of storing 70 million bytes or more.

Hard Copy: Printout.

Hardware: The bits of a computer you can kick, as opposed to the programs you can only swear at.

Hashing: A method of reducing the size of a table which otherwise would have mostly empty entries.

Hexadecimal: The method of counting to the base sixteen or the method of splitting binary digits into groups of four, which is the same thing. In hex, you count: 0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22.

I

IC: Integrated Circuit.

Identifier: A label, or the name of a variable.

Index: A variable which usually points to an entry in a table or list.

Index Register: A processor register which is used to access tables and lists in memory.

Indirect Addressing: Referring to a variable which actually contains the address of another variable.

Inkjet Printer: A device which prints by electrostatically aiming a jet of ink onto the paper.

Input: To get data into the computer.

Instruction: A step the computer can perform.

Instruction Set: The range of commands which can be performed by a particular processor.

Integer: A whole number.

Integrated Circuit: A circuit built on a single chip of silicon.

Interface: The (hardware or software) connection between any two devices.

Intermediate Code: A special kind of object code which cannot be run directly on the computer, but must be interpreted.

Interpreter: A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler.

Interrupt: To electronically drag the computer away from what it is doing in order to respond to some time-critical situation.

I/O: Input/Output.

I/O-bound: A process in which the performance speed is limited by the speed of input/output.

GLOSSARY

J

Jump Instruction: Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.

K

Kilo-: Prefix meaning one thousand.
Kilobyte: 1024 bytes (Kbyte).
Kilobaud: 1000 baud (Kbaud).

L

Label: A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.
LAN: Local Area Network.
Language: The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.
Laser Printer: A printer which works a bit like a photocopier, but uses a laser to draw an image directly onto the printing drum.
LCD: Liquid Crystal Display.
Library: A set of programs, or sub-programs, that can be called from your program so you don't have to waste space with a block of commonly used code; for example, a date routine can be held in a library.
LIFO: Last In, First Out. A device or data structure in which the most recent item stored is the first available for retrieval. A stack is a LIFO.
Line Number: A number at the beginning of a line, which identifies it in a similar way to a label.
Line Printer: A high-speed printer for computer output.
Link: Part of a data item in a list, which tells the computer the location of the next data item.
LISP: List Processor. A language much favoured by the artificial intelligence community.
List: A sequence of consecutive data items.
Load: To transfer some data or program into the computer memory.
Locate: To 'fix' a relocatable code so it will only run if loaded in a particular location.
Local Area Network: A system of interconnected computers, within a limited geographical space (usually in a single building).
Logical Device: A device as the computer 'sees' it: what the computer regards as the 'list device' may be one of several 'physical devices', such as a line printer or teletype.
Loop: To repeatedly execute a sequence of instructions; part of a computer program that is so executed.

M

Machine Language: The binary codes the machine actually executes.
Macro: A user-defined sequence of instructions which can be inserted anywhere in a program. See Library.
Macro-assembler: An assembler which can utilise macros.
MBASIC: Microsoft BASIC, the BASIC used in the TRS-80, PET, Apple II and so on.
Megabyte: One thousand kilobytes — 1,024,000 bytes (Mbyte).
Memory: Where the computer stores data and programs internally for fast access.
Menu: A display which offers the operator a choice of alternatives.
Microcomputer: A small computer based on a microprocessor.
Micro-floppy: A 9 cm 'floppy' disk, produced with a rigid plastic case.
Microprocessor: The central processing unit of a computer, built into a single silicon chip.
Millisecond: One thousandth of a second.
Mini-diskette: A 13 cm floppy disk.
MIPS: Million Instructions Per Second. A measure of processor speed.
Modem: Modulator/Demodulator. Device used to link a computer to the telephone line. It encodes digital bits into frequencies, and vice-versa.
MOS: Metal Oxide Semiconductor. Technology used for manufacturing high-density semiconductors. CMOS (complementary MOS) technology is characterised by low energy consumption, and is increasingly used in portable computers.
Mouse: A device connected to a computer which, when moved around on a desk, moves a pointer on the computer screen.
MP/M: A multi-user version of CP/M.
Multiplexer: Device used to divide a communications line among a number of users.

N

Nanosecond: One billionth (.000000001) of a second.
Nibble: Half a byte (4 bits).
Node: A connection point on a network.
Network: A system of inter-connected computers.

O

Object Code: Machine code.
Object File: A file containing object code.
Object Module: An object file containing part of a program, ready to be linked to others.
Octal: The system of counting to base eight, or grouping bits in threes.
Offset: To give the operating system the characteristics of a file so that it can subsequently read or write it.
Operand: The number an operator (+, -, and so on) operates on.
Operator: An arithmetic function or some other function which alters variables.
Optic Fibres: Cables made from thin fibres of glass (or similar material). Signals are encoded as light and transmitted along the cables.
Optimisation: Making a program work better (or faster, or using less memory).
Output: What the system produces.
Overlay: A technique for efficient use of memory space, in which different routines use the same memory locations. Routines using the same area are held in a backup store, and transferred into memory when needed.

P

Packed Data: Data which shares the same address, and has to be unpacked before use.
Packet Switching: A system of communicating data by dividing it into small packets addressed to particular receivers.
Page: A length of memory, typically 256 bytes.
Parallel Transmission: A method of moving data so that all elements of a compound unit are sent simultaneously. For example, the eight bits in a byte may be sent at the same time by using eight channels. This is the method used within the computer, and with some printers. Fast and expensive.
Parameter: A constant which sometimes has to be varied.
Parity: An extra bit on the end of a character or byte for error detection.
Pascal: A modern structured language which may eventually rival BASIC in popularity for microcomputers.
Password: A secret word the system may demand of you before allowing you access to certain (or all) programs or data.
Patch: A temporary (ha, ha) fix on a bug.
Peripheral: A piece of equipment the computer uses, like a printer, disk drive, or modem.
Physical Device: See Logical Device.
Picosecond: One trillionth (.000000000001) of a second.
PIP: Peripheral Interchange Program. A CP/M utility for copying files between devices.
PL/I: Programming Language One. A good general purpose commercial language.
Pointer: A variable used for indirect addressing.
Polish Notation: A method of separating operators and operands; for example, + 5 4 is Polish notation for 4 + 5.
Poll: To ask a peripheral if it requires service. For example, a processor will regularly check a terminal to see if it has output ready to be processed.
Port: A physical input/output connection point.
Postfix Notation: Also known as Reverse Polish Notation, this is similar to Polish; + 4 5 means 4 + 5.
Preprocessor: A program which does part of a job to make life easier for the program which follows; for example, a macro processor before an assembler.
Priority: The resolution of which interrupt is serviced first if two should arrive at the same time.
Process: A program.
Processor-bound: A process in which the limiting performance factor is the speed at which the processor can perform the required computations.
Program: A sequence of instructions which can be understood ▷

and ultimately followed by a computer.
Prompt: A message asking the operator or user to supply information.
Protocol: The rules governing the exchange of information between two devices.

Q

Queue: A list in which entries are made at one end, and removed from the other.

R

R/O: Read Only; cannot be overwritten.
RAM: Random Access Memory.
Random Access Memory: The computer's internal memory, which is used to hold running programs and data. The computer can write and read RAM.
ROM: Read Only Memory.
Read Only Memory: Internal computer memory used to store programs, which cannot be erased or overwritten.
Reader: Paper tape input device.
Read/Write Head: The small coil which reads and writes on the surface of a disk.
Real-time: A system in which the processing of data input to the computer takes place virtually simultaneously with the actions which generate the data.
Record: A set of related data items. For example, an employee's name, address, payroll number and pay rate
Recursion: The ability of functions in some languages to call themselves.
Re-entrant Code: Code which can be used by several programs simultaneously, keeping separate data for each.
Register: A location in the processor capable of performing logical or arithmetic functions on the contents.
Relocatable: Capable of being moved in memory.
Relocatable Object Module: Part of a larger program consisting of many such modules, all linked together and located.
Resident: Permanently in the system.
Reverse Polish Notation: See Postfix.
RS232: (also RS232C) Registered Standard 232C. A widely used standard for connecting components in a computer system.
Run: To execute a program.

S

S100: A popular 100-line microcomputer bus, originally developed for the first 8080-based computer.
Save: To store a program on disk or cassette (particularly BASIC).
Screen: See CRT.
Sector: A section of data on a disk.
Serial Transmission: Movement of data one bit at a time. One byte will be sent as eight bits, one following the other. Cheap and slow.
Simulation: Making one system behave like another.
Software: Programs.
Source Code: The original text form of a program.
Source File: A file of source code.
Source Language: The language the source code is written in; for example, BASIC, Assembler, C.
Sort: To arrange items of data in order.
Spool: Simultaneous Peripheral Operations Online. A method of outputting information by queuing information for low-speed output devices, while simultaneously continuing other computer operations.
Stack: A list in which both entries and removals are made at the same end. A microprocessor usually has a hardware stack which is used to save subroutine return addresses, for temporary storage of data, and to pass variables between subroutines.
String: A sequence of characters.
Submit: To put the system under control of a file of system commands.
Subroutine: Part of a program which can be accessed from several points within the program.
Symbol: The name of a variable or a location in memory.
Symbol Table: A table constructed by an assembler or compiler to give the addresses of all variables and labels in a program.
System: A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
System Disk: A disk carrying the operating system.

T

Teletype: An electro-mechanical printer/keyboard.
Terabyte: One thousand giga bytes (1,024,000,000,000 bytes).
Timeshare: Running several programs on a system simultaneously.
Track: The area under the read/write head during one rotation of a disk.
Transient: A program that is only in memory for a short time before being overwritten. Often, the only program that is not a transient is the operating system.
Tree: A list in which each data item may refer to several others.
TTY: See Teletype.

U

UART: Universal Asynchronous Receiver/Transmitter. A device which handles the serial-to-parallel and parallel-to-serial conversion of bits in a data message.
Unix: A multi-user, multi-tasking, multi-programming operating system.
Utility: A program of use to most users.

V

Variable: Named quantity that can take on different values.
VDT: Video Display Terminal.
VDU: Video Display Unit.
Verify: To check that data written on a disk or tape can be read again correctly.
Viatel: Telecom Australia's videotext system.
Videotext: Also known as viewdata. A technology which uses slightly modified domestic televisions to access data from a computer database along the telephone lines. Prestel in the UK was the first such system. Australia's version is called Viatel.
Virtual Memory: A technique allowing programs larger than RAM to run. Only part is in memory. Parts are swapped from an online storage device as required.

W

Warm Boot: To reload the operating system a second or subsequent time.
Window: A part of a computer screen which has been divided into sections for displaying distinct information. On some systems which run a number of processes at once, each concurrent process may be displayed in its own window.
Word: The amount of data fetched from one memory location. Typically one byte, but can be two on recent processors.
Word Processor: A system for manipulating, editing, printing and formatting text files.
WordStar: A proprietary word processing program.
Word Wrap: A word processing function which automatically breaks lines exceeding the set right margin limit, and begins placing the words on the next line.
Write Protect: To remove the cover from the notch in a 20 cm floppy disk, so it cannot be written on. With 13 cm mini-floppies, the reverse action (that is, covering the notch) will write-protect the disk.

Z

Z80: A popular 8-bit microprocessor.



SERVICES

LETTERS TO THE EDITOR

We are happy to receive your comments and, if they are of interest to other readers, publish them. Letters will only be considered for publication if they include your name and address, although we can withhold such details from publishing on request. Note that we reserve the right to (and probably will) edit all letters for the sake of brevity, clarity or accuracy.

SUBSCRIPTIONS

Standard 12-issue rate within Australia: $27. Surface rate for New Zealand and Papua New Guinea: $35.60; airmail rate: $47.60. Rates for other countries on application. All overseas rates quoted are to be paid in Australian dollars. Allow up to eight weeks for subscription processing.

BACK COPIES

Back copies and single issues are available from the publisher's office ($2.95) or by mail ($3.95). We will supply photostat copies of articles where a back issue is not available, at the single-magazine price for each feature copied.

READERS' ENQUIRIES

We will make every effort to answer readers' written enquiries, if accompanied by a stamped, self-addressed envelope, although staff shortages and deadline pressures may cause delays. Please include your telephone number(s) with any enquiry. Phone enquiries not related to subscriptions, readers' advertisements, or other 'service information' cannot be accepted.

COPYRIGHT

All material appearing in *Your Computer* magazine is copyright and cannot be reproduced in part or in full, by any means, without the written permission of the Publisher or Managing Editor. Computer clubs and schools can, however, apply for restricted permanent reproduction rights for non-commercial, limited-circulation use (for example, newsletters and class instruction). Given that it sometimes takes us a while to answer such requests, you can consider that restricted permanent rights apply in these cases from the day you send in your letter, and will later be confirmed (or withdrawn) by our reply.

LIABILITY

Although it is policy to check all material used in *Your Computer* for accuracy, usefulness and suitability, no warranty, either expressed or implied, is offered for any losses due to the use of any material in this magazine.

EDITORIAL CONTRIBUTIONS

Contributions to *Your Computer* are welcomed and will be given every consideration*. Please read these notes carefully to get an idea of the style and format we prefer.

All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

Contributions on Disk: Contributions can be accepted in a wide variety of disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks. We can also handle, in-office, Kaypro II and Osborne 13 cm disks, and 13 cm Apple DOS or Apple CP/M disks. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error – if the computer typed it, the computer probably accepted it. Print listings with a dark – preferably new – ribbon on white paper, and try to format the output to a narrow (40-characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies – no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum.

*Although the greatest care will be exercised with contributions, no responsibility can be accepted for the safety or return of any letters, manuscripts, photographs or other materials supplied to *Your Computer* magazine. If return is desired, you should include a stamped, self-addressed envelope. If return is critical – say it's something you can't afford to lose – then don't send it; we *are* careful, but we're not perfect. □

AD INDEX

3M 132
AED ..... OBC
AID Systems 15
All States 34
Apple 42
Applied Technology 63, 65
Arcom Pacific 139
Assco 77, 121
Australian Microcomputer 51
Automation Statham 19
Barson 111
Bi-Computer 70
Breeze 36
Chambers 60
Classifieds 154
Commodore 18
Compudat 112
CompuShack 27
Computer Enterprises 122
Computer Spot 10
Computer Trader 44
ComputerMax 108
Datascape 16
Datatel 9
Dick Smith 83, 105
Elmeasco 147
Emona 101
Energy Control 134
Entercom ..... IFC
Epson 39, 102
Exitek 103
Fagan 58
FBN 121, 123
Fujimex 127
Hi-Tech 11
Hi-Tron 13
Hills 13
IBM 113
Imagineering 140
Interfaceware 33, 35
ISD 152
John Sands 25
Labtam 5
Lintek 146
Magnabiz 14
Market Directory 156
Micro Educational 145
Minicomp 64
Mitsui 55
New Dimension 91
Nucleus 12
Olivetti 130
Optsoft 53
Osborne 30, 41, 59, 115
Output Media 107, 129
OziSoft 6
Pace 26
Porchester 116
Progressive Computing 48
Qubie 28
Rod Irving 71
Siemens 148
Six-S 155
SpeedIt 154
System Solutions 90
Utilico 134
Wang ..... IBC
Wesoft 147

your computer

NO BLUES IS GOOD BLUES

July's *Your Computer* will turn its back on BMI CPs and CP-SOD and take a look instead at one of the few effective alternatives to Big Blue's way of doing things. We'll examine the *Unix operating system* in depth, and look at whether it really is the way of the future, as many of its supporters claim.

We'll have stories from *Bell Laboratories*, birthplace of the Unix system, explaining it in detail, as well as coverage of the significant Australian involvement in the development of Unix.

We'll hear from Professor Juris Reinfelds of the University of Wollongong — the first place outside the United States to port Unix (it was almost the first anywhere) — and from Hartley Computers, the Brisbane-based firm which recently announced Unix System V as the operating system for its new supermicro. Hartley carried out the port itself, using a popular personal computer from a large American company (see, we didn't say it!) to do the job.

We'll have a *Unix product survey* which looks at the hardware available to run Unix, and the software you can get to run under it.

Guest editor for the issue will be John Lions, Associate Professor of Computer Science at the University of New South Wales, who was one of the first people (if not the first) in Australia to use Unix.

MORE TO C

We couldn't cover Unix without a look at the C Language, so July will also have a feature on *evaluating C Compilers*. We're currently reviewing several compilers, and this story is an introduction to those reviews, setting out how we'll do our performance testing, what features we'll be looking for, and so on.

There'll also be several reviews of books on C and Unix.

And, if he gets it together in time (something he is not famous for), Les Bell will start a new tutorial series on *Programming in C*. However, this may be delayed an issue or two while Les gets started on another too-good-to-miss tutorial, *PCs in Marketing*. This series will show marketing people how to use computers in their jobs, and will cover market research, new product development, forecasting, budgeting, planning, sales management, direct marketing and more. In each instalment Les will describe the techniques required, present a sample program to do the job, and review one of the more powerful commercial programs available for the particular task.

Meanwhile, *the Great Database Search* continues with a look at (we hope — the best laid plans . . .) Sensible Solution and R:base. Reviews will include (perhaps we'll say *should* include, *if* the moon is full and Jupiter is aligned with Mars ...) WordStar 2000, NEC's new colour Pinwriter, and Tandy's Model 1000 (a Popular Computer compatible).

July will have another of our super buyers' guides — part two of the *Software on the Cheap* series will cover packages in the $25 to $50 price bracket. And, of course, there'll be our usual favourites like *Pocket Programs*, *the Phil Grouse tutorial on Structured Programming*, the *User Columns*, *Bit Bucket* and more ...

SPEAK NOW ...

Already other magazines are stealing our ideas, but we'll continue giving you advance warning of upcoming features in this column so contributors, distributors and manufacturers can ensure they don't miss out on stories they should be involved in.

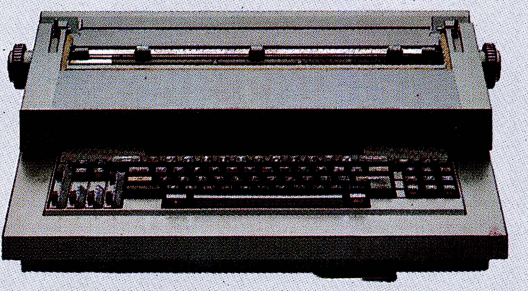
The August issue of *Your Computer* is going to become known as the *Cheap* issue: it's all about *Computing On The Cheap*. For starters, it will carry a feature/comparison on some of the more sophisticated machines available for *less than* $1200. Then we'll close off our Software On The Cheap series with all the packages we can find which sell for between $50 and $100. And (maybe) we'll look at Cheap Thrills (games), Cheap Frills (accessories) and Cheap Quills (word processors).

If you think that's just about as cheap as we can get, have we got a surprise for you! But you're gonna havta buy the August issue to see it all ...

Anyone interested in Artificial Intelligence should tell us about it now, in preparation for our September issue, while those involved in anything remotely Do-It-Yourself should be bombarding us with information for October. But remember, if you read similar features in other magazines, you saw it here first (and, usually, best) ...

One final piece of forward planning: the staff of YC is considering retiring to an island. Any travel agents who have an interest in this subject should let us know.Yeah!

Theirs types.



Ours types, files, does word processing, spreadsheets, and even scheduling.



Introducing the amazing new Wang Office Assistant—the first computer designed for secretaries.

It not only types like a normal typewriter, but the Wang Office Assistant can also do word processing, filing, scheduling and even spreadsheets.

Not only that, it's easy to use and you can switch from job to job at the press of a button — so interruptions are no longer a problem.

Best of all, the new Wang Office Assistant costs not that much more than an electronic typewriter, so it's not only the answer to a secretaries' dreams but a boss' as well.

The Wang Office Assistant — whoever designed it knew what she was doing.

The Wang Office Assistant.

To find out more about the Wang Office Assistant contact your nearest Wang dealer or phone the Wang Dealer Hotline, Sydney 212 0011 or (008) 230 200 outside Sydney, for the price of a local call.

WAUS 097

Wang Computer Pty. Ltd. (Inc. in N.S.W.)

WANG

We put people in front of computers.



COMPUTER OBSOLESCENCE

How we avoid it

Will the computer you buy be the best next year?

Computers become obsolete at a frightening rate. You either wait (and miss out on the benefits) or buy a computer that will soon be a compromise. Universe avoids this problem. It is continually being upgraded, both in hardware and software so that all owners benefit.

How we fix the problem. Universe is based on world standard S100 plug in cards. All major microcomputer innovations are available **first** on these cards.

Plug in improvements. As a Universe owner you are able to upgrade before anybody else. Universe owners were able to run 16 bit software over 18 months before IBM and DEC introduced there 16 bit micros. Another advantage; by upgrading rather than changing computers you keep all existing software and data. No traumatic changeovers, no waiting, no need to ever pay for a computer that's bigger than you need.

Compare Universe:

☐ **8 & 16 bit, single and multiuser.** 80286/Z80H dual processor runs the world's biggest software base via CP/M, MP/M and MS-DOS. DMA hard discs and high speed processor provide the performance to run multiple 8 and 16 bit software.

☐ **Multiuser efficiency.** Up to 25 workstations under a single Universe, each running any combination of 8 and 16 bit programs.

☐ **Multitasking.** Each operator can use any four 8 and 16 bit programs at the same time. Switch screens with a single keystroke.

☐ **Full security enhancements** – e.g. Login and file passwords. Users restricted to directory areas, programs and nodes on the network.

Start with a computer that is right for you now. Expand it inexpensively when you need to. Impressed? Then call your nearest AED sales office for the whole story.

AED COMPUTERS

NSW: Head Office, Unit 3, Prospect Industrial Estate, 2 Stoddart Rd., Prospect NSW 2149. (02) 636 7677. Telex AA 70664
ACT: 21 Northbourne Ave., Canberra 2601 (062) 47 3403. Telex AA 62898
VIC: 53 Waverley Rd., East Malvern 3145. (03) 211 5542 Telex AA 30624
WA: 465, Canning Highway, Como 6152. PO Box 22 Como 6152 (09) 450 5888

UNIVERSE SUPERCOMPUTER

Glover & Assoc AED 1