

# Australian Personal Computer

ISSN 0725-4115 NZ \$3.50  
REGISTERED BY AUSTRALIA POST PUBLICATIONS VBP 3691

December 1984 \$2.95

IBM PC AT  
BENCHTEST

AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE



Dressed to kill?  
EXCLUSIVE JAPANESE MSX BENCHTEST



# OSBORNE

WORLD CLASS COMPUTER



## INTRODUCING OSBORNE SUPER DEALERS

- \* Five star treatment from your Osborne Super Dealer.
- \* In-house customer training facilities.
- \* Staff specially trained in all aspects of Osborne's expanding range.

### NEW SOUTH WALES

Delta Computer Systems — PARRAMATTA

(02) 633 4055

Foremost Office Equipment — PARRAMATTA

(02) 635 5477

Landlink — TAMWORTH (067) 65 4622

Prestige Office Equipment — BURWOOD

(02) 745 2977

S.C.C. Computing — SYDNEY (02) 290 1122

### AUSTRALIAN CAPITAL TERRITORY

Boulevard Business Services — CANBERRA

(062) 48 5411

### NORTHERN TERRITORY

Computer Sales & Leasing — DARWIN

(089) 84 4656

### QUEENSLAND

Scarborough Fair Computers — SOUTHPORT

(075) 32 5133

Byte Shop — NEWMARKET (07) 352 6621

Town and Country — TOWNSVILLE

(077) 75 4000

### SOUTH AUSTRALIA

Myer Computer Centre — ADELAIDE

(08) 217 0123

### VICTORIA

Data Parts — SHEPPARTON (058) 21 7155

— ALBURY (060) 21 8080

— BALLARAT (053) 31 3399

— BENDIGO (054) 43 4866

Direct Data — ARMIDALE (03) 20 6949

### TASMANIA

Strawberry Enterprises — BERRIEDALE

(002) 72 2621

### WESTERN AUSTRALIA

Ossie Computers — CLAREMONT (09) 384 5787

Country Soft — VICTORIA PARK (09) 362 6416

PHONE OSBORNE AUSTRALIA FOR COMPLETE DEALER LIST

Now in stock **TRANTOR** hard disk drives with 5MB removable disk. Only \$3595 for 10MB. Comes ready to connect and ready to run. Osborne Disk Manager software has full 6 months warranty.



# EXECUTIVE 1

is Australia's No. 1

FREE  
STAR USERS  
MANUAL WITH  
EACH PACK PURCHASED

## Now OSBORNE reaches for the STAR



\$1200  
FREE

### We Give You More

Included in our one low price. Purchase an Osborne Executive before December 31st and receive this accounting package worth \$1200 for free.

**IF IT CAN'T BE DONE ON THIS SYSTEM — IT CAN'T BE DONE.**

The Osborne Executive with complete software, MULTILEDGER, Dot Matrix Printer and 6 months nationwide service and backing.

**YOU PAY ONLY \$3248**

If you twist your Dealer's arm . . . a high-speed Star Gemini 10X 120cps fat Dot Matrix Printer, including interface to Osborne, will be included for only

**PLUS . . .**

**Total package worth \$8336. But until December 31st you pay only \$3198 plus \$50 for printer.**

**(TAX INCLUDED)**

The **MULTILEDGER** Accounting System includes a complete General Ledger, Debtors System & Creditors. It is written in Australia and developed for total compatibility with the **EXECUTIVE**. Along with **MULTILEDGER** you will also receive the Extended **OSBORNE EXECUTIVE** Software package.

- CP/M 3.0 Plus, advanced CPM operating system
- Wordstar, wordprocessing and Mailmerge
- Supercalc, spreadsheet and Financing Modelling
- Personal Pearl, full database management
- CBASIC and MBASIC, Programming languages
- UCSD, p-System Universal Format system
- Over \$400 worth of CP/M 3.0 Utility programs
- MAC Assembler etc.
- Character generator — for any language.
- NOW — Terminal Emulation is here —



**OSBORNE AUSTRALIA (02) 290 1122**  
3RD FLOOR, 93 YORK STREET SYDNEY

**FULL 6 MONTHS WARRANTY ON OSBORNE**  
by Hills Computer Service in your capital city.

**PARTS  
AND  
LABOUR**



Managing Editor Sean Howard; Consultant Editors Steve Withers, Ian Davies; Advertising Manager Mark Reiss; Sales Executive (NSW and Qld) Simon Tindall (02) 268 0666; Sales Executive (Vic, WA and Tas) Sean Carnell (03) 531 8611; Graphics and Typesetting Graphic Heart Pty Ltd; Subscription Manager Valerie Meagher; Subscription rates: Australia \$35.00 per annum, Overseas A\$47.00 (surface), A\$130 (airmail). Printed by Quadricolor Industries Pty Ltd. Published by Computer Publications Pty Ltd, a subsidiary of Consolidated Press (Holdings) Ltd, 77 Glenhuntingly Road, Elwood, Victoria 3184. Telephone (Editorial and Publishing): (03) 531 8411. Telex: AA 30333 AMJ. Distributors Network Distribution Co. 54 Park Street, Sydney 2000.

## REGULARS

### 5 NEWSPRINT

Telecom Australia launches its own (communicating) PC — does it smack of monopolisation?

### 17 YANKEE DOODLES

The age of isolation is coming to an end in the US — David Ahl keeps in touch with local area networks.

### 32 COMMUNICATIONS

Computer evolution; a claim for a \$25,000 prize; Spanish word processing . . . what will our readers think of next.



Lateral thinking — see page 60

### 59 ORIENT EXPRESS

The MSX bandwagon keeps on rolling — our Tokyo correspondent hitches a ride.

### 69 BRAINDUMP

Martin Lack relates his experience with the new way of sampling software: Demo-disks.

### 72 BANKS' STATEMENT

There's not much point in an applications package that gives PhD-standard problem solving capabilities, if you need a PhD to use it. Martin Banks refuses to go back to college.

### 111 BIBLIOFILE

'Computer Power and Human Reason', an appeal against the inappropriate use of computers, is just one of the books discussed by Steve Withers this month.

### 117 TJ'S WORKSHOP

Ways to make the most of your micro.

### 141 NETWORK NEWS

Steve Withers and Alan Tootill with news of Telecom's Viatel and new Bulletin Boards.

### 149 MICROCHESS

Tony Harrington discovers that Colossus lives up to its name.

### 153 SUBSET

Machine code routines to simplify assembly language programming.

### 161 PROGRAMS

The best programs for your machine — covering games, utilities and business.

### 206 SCREENPLAY

The best of the new games, with full colour screen-shots.

### 180 DIRECT ACCESS

As promised, a full user groups listing plus news of forthcoming events and Benchmark listings.

### 201 LAZING AROUND

JJ Clessa disrupts your lazy holiday with another of his infamous brain-teasers!

### 213 BLUDNERS

Ashamed as we are to have made them: our mistakes.

### 213 CHIP CHAT

Mr T and Telecom come under fire plus a computer trivia test.

### 216 ADVERTISERS INDEX

Alphabetical (or as close as the advertising manager can get to it) guide to advertisers.





Material contained within *Australian Personal Computer* is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from Computing Publications and VNU Business Publications B.V.

## FEATURES AND SERIES

### 60 LATERAL THINKING

Natural language processing is a challenge, but not an insurmountable one. Andrew Couch explains how to set about it.

### 84 A CHIP OFF THE OLD BLOCK

An introduction to the 68000 processor.

### 91 IT'S FOR YOU!

Running your own bulletin board is a good way to cut down on phone bills — and to lose sleep. Peter Tootill and Steve Withers weigh up the pros and cons.

### 101 TEACH YOURSELF LISP

Dick Pountain explains how to move from the mathematical side of Lisp to working on a computer.

### 129 DIY SPEECH SYNTHESISER

Peter Vernon shows you how to build and program your own speech synthesiser.

### 145 HOW TO WRITE GREAT SOFTWARE: PART III

Mike Bolan concludes his series of writing and marketing software.

### 204 UPGRADE TO SUIT

Dust down those old VIC programs and convert them to your 64.

## BENCHTESTS & REVIEWS

### 18 IBM PC AT

Tired of watching rivals release PC lookalikes? IBM has come up with another machine for the opposition to chase. Peter Bright joins the hunt.

### 38 DRESSED TO KILL

APC exclusive Tony Hetherington Benchtests a sample of the new wave of Japanese micros conforming to the MSX standard. The waiting is almost over.



IBM PC AT — see page 18

### 48 DIGITAL RESEARCH GEM

An exclusive hands-on review of a radical desk-top system. GEM looks set to usher in a 'new age of user friendliness' and upset the Applecart. The Graphics Environment Manager gives you the features of Lisa and Mac (icons, pull-down menus . . . ) on the 16-biters (including the IBM PC).

### 53 TI SPEECH COMMAND

An executive toy or passing fad? Martin Banks examines the long term worth of voice recognition.

### 75 dBASE III

The youngest member of the Ashton-Tate family is dBase III, a data management system which has ironed out most of the wrinkles in dBase II. Kathy Lang finds out if, in this instance, beauty precedes age.

### 108 APPLE AND IBM SHARE NETWORK

Laurel Allen looks at the Sun01 network designed to allow connection of both Apple and IBM personal computers.





Turn the  
**Mac**page for the  
**Microsoft**  
**Mac**deal of  
the **Mac**century

**MICROSOFT**  
The High Performance Software™



APC's latest micro news. This month there's talk of a portable computer in NASA's Space Shuttle, Telecom's controversial personal computer, an updated version of the 6502 processor, problems with the Symphony/Lotus 1-2-3 exchange programme and what the inventors of VisiCalc are doing now.

## Fair exchange?

The number of people sending in for copies of Lotus Symphony, and asking for part-exchange on their old 1-2-3 disks is not (says Mitch Kapor) significant.

The original idea at Lotus was that the old (1-2-3) program could be upgraded to the new (Symphony) for only US\$200, for anyone who sent in a disk with 1-2-3 on it.

It appears to have worked pretty well, with Lotus turnover now bigger than MSA, which was previously accepted as the world's biggest software company. And MSA has shot itself in the foot with too-clever marketing by Peachtree, leaving Lotus home and dry on the top of the software heap.

But Kapor does acknowledge some trivial, miniscule percentage of Symphony users have asked for their old 1-2-3 back.

Critics suggest that the problem is bigger than Kapor would like to believe. 'They have thousands of requests,' suggested one American industry observer, 'and they have a problem in that they don't have the old disks to give back. And we are literally seeing some people who say "never mind the \$200 refund, just give me 1-2-3, because Symphony is too much."'

Lotus does have two answers to the problem.

For those who simply find Symphony too complex (a minority, surprisingly, of complainers) Kapor reckons time and practice will solve most snags.

For the more significant number of people who find that Symphony won't accept their very biggest 1-2-3 spreadsheet templates, Kapor is launching a new software tool which will give Symphony users more memory inside the IBM PC.

And, coming soon, will be add-in applications'.

These will be new sections of the orchestra (to coin a phrase). 'It's as if we didn't provide a word processor with Symphony, and decided to offer one as an add-in application, part of the Symphony', Kapor told me shortly before the launch.

The biggest Lotus announcement of the next few months, however, will be the Macintosh version.

This isn't the same as Symphony, nor the same as 1-2-3.

Symphony on the IBM family of machines has only one database, with the various application bits and pieces interpreting it in different ways — the graphics section sees it as pictures, the text processor as words, the database as data, and so on. In Macintosh, there will be separate data structures, more along the lines of 1-2-3.

But unlike 1-2-3, the basic structure of the Macintosh product is not a spreadsheet. Instead it is a series of matched files, with automatic cut-and-paste always available from one to the other.

The plan is to make this very nice feature (simply not available with ordinary word processors) actually fast enough to be useful.

I was expecting to see convincing demo versions of the new product at Comdex on the Apple stand, but that doesn't mean you should get excited about it yet. It won't be appearing in dealers' stock lists until March/April, which is a much bigger gap between announcement and release than Kapor likes.

'It's just a question of not being able to keep the secret any longer,' he told me. 'I like a 90-day gap, ideally.'

I'm not altogether astonished the secret is out.

Kapor was, after all, demonstrating it in public at the Softcom show in New Orleans, as long ago as last March, and announced it even before Macintosh was officially launched, as part of the Apple launch promotions.

Guy Kewney

## Good and the bad

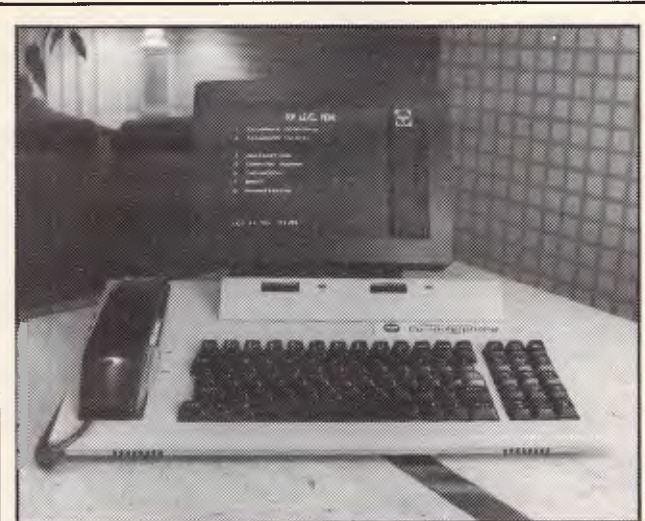
Things could change for users of the 6502 processor chip — that is, people on Commodore, Apple II and others — with Apple's announcement of an Apple

IX with a 16-bit chip in it.

The original designer of the 6502 was Chuck Peddle, whose chip company, MOS Technology was taken over by Commodore before the PET came to Australia five years ago.

But Peddle left to start up Sirius, and so nobody ever designed the equivalent of a 68000, and Commodore's founder Jack Tramiel fired the people who were trying to.

Now a company called Com Log, together with Western Digital Design, both in Phoenix, Arizona, has come up with a chip it calls the 65816. Like the original



On November 26, Telecom announced its communications-oriented PC, the ComputerPhone, to suggestions of "unfair" and "monopolisation" from the media. It's a product of the British firm ICL with some input from Sinclair Research, is based on the 68008 CPU and has 128k of RAM, 208k of ROM and two 95k Sinclair Microdrives. The machine connects directly to a telephone socket to enable access to the usual analogue (voice) network but it also can be used to connect to videotext services, mainframe computers and Austpac and other public networks.

Other features are a concurrent operating system and Basic interpreter, a voice synthesiser (for automatic answering of incoming calls), simultaneous voice and data calls and auto-dial auto-answer modem.

Applications software comes with the ComputerPhone in the form of the Xchange suite of programs in ROM (spreadsheet, business graphics, word processor and database). Telecom reckons the ComputerPhone "will revolutionise the way managers go about their business".

Prices start at \$2,950 for a mono screen machine. Naturally you'll read the first hands-on full test in APC — in next month's Benchtest.

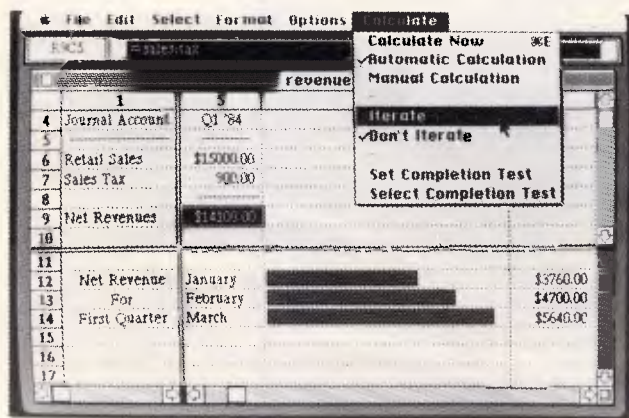


# Microsoft gets the

**We're called Microsoft.** In 1981, Apple asked us to assist in the birth of it's new baby, the revolutionary Apple Macintosh. The software we created has given Macintosh Microsoft's best features: incredible brilliance, power and versatility.

Microsoft's Macintosh programs are born to perform. They are all designed to think like you, even work like you. And they all share the same plain English commands.

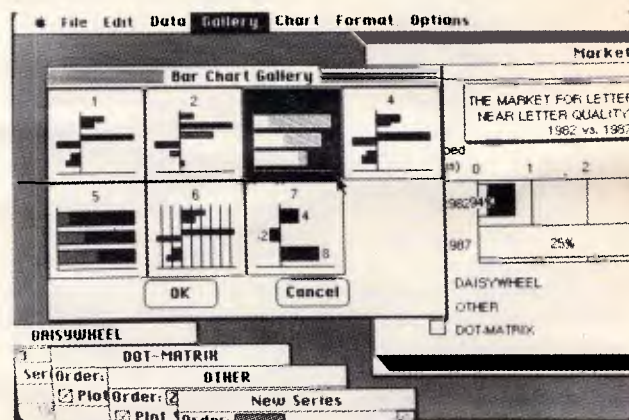
**Meet Multiplan.** Multiplan is our financial whiz, an electronic spreadsheet that actually remembers how you work. Even offers suggestions on spreadsheet set-up.



Microsoft Multiplan

**Blaze with Basic.** The language spoken by nine out of ten microcomputers worldwide. Now enhanced to take advantage of the Macintosh mouse, windows and graphics.

**Check-out Chart.** Our most artistic package is chart. It gives you 42 presentation-quality chart and graphic styles to choose from.



Microsoft Chart





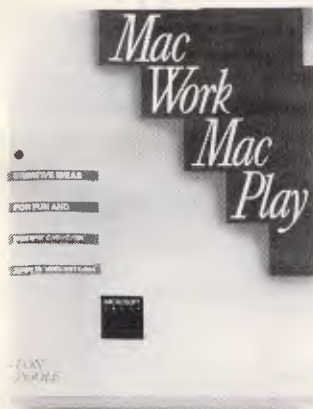
# Max out of Mac.

## Here's the **Macdeal** – Grab it while it lasts!

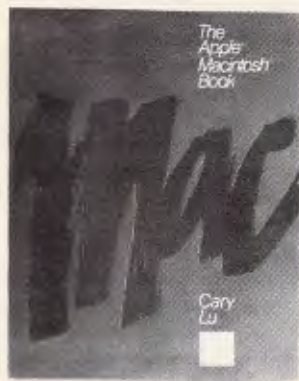
Buy any of these three Microsoft Mac packages – Basic, Chart or Multiplan – between December 1 and December 31 and receive, at no extra charge, one copy of any one of these three Macintosh books from Microsoft Press (individual retail value \$27.95) for each purchase:

### **Mac Work Mac Play**

Lon Poole's (author of the best-selling Apple II User's Guide) inspired assortment of applications for MacWrite, MacPaint and Microsoft Multiplan.



### **The Apple Macintosh Book**



Cary Lu's (microcomputer editor of High Technology Magazine) unique insider's view of an historic advance in computer

technology that will enhance your Macintosh pleasure and productivity.

## Presentation Graphics on the Apple **Macintosh**

Steve Lambert shows you how to combine Microsoft's innovative



Chart software and Apple's breakthrough technology to create dazzling high-quality presentation graphics.

To: Microsoft Pty Ltd  
Freepost 3  
Forestville NSW 2087

**RUSH** me the following  
Macintosh book (list order of  
preference):

- Mac Work Mac Play
- The Apple Macintosh Book
- Presentation Graphics on the  
Apple Macintosh

Proof of purchase of one or more specified Microsoft Mac packages between Dec 1 and Dec 31 (inclusive) is enclosed.

Please mail my BOOK to:

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Mail today. No postage stamp required.

**MICROSOFT**  
The High Performance Software™



Intel 8088 inside the Sirius and IBM, this is a 16-bit chip with only an 8-bit data bus.

But what matters is the fact that the new chip can use more than 16 bits in its addressing — where the 6502 could use 64k, the new one can handle 312k.

All this doesn't make the 6502 a rival to the Intel family, which starts with the 8088 and rises to the soon-available 80386. But it does mean that the Apple II can be upgraded, giving it an extra couple of years of life when Apple releases a system based on the new chip.

So much for the good news. The bad news: the machine isn't likely to appear for another 18 months at least.

Guy Kewney

## Concurrent releases

Fascinating, isn't it, how Microsoft, author of MS-DOS and PC-DOS, always manages to make

some kind of announcement whenever Digital Research, author of Concurrent DOS, comes up with something new.

This time, just to prove they aren't rivals, Microsoft announced MS Net the same week as DR released details of GEM, its Graphics Environment Manager.

Anybody who starts at the back of APC and reads forward will know what GEM is — there's a preview elsewhere in this issue. For those who don't, it is designed to make an IBM look like a Macintosh as the picture on this page shows.

The big question about this product is: does it slow things down for the user?

Normally 'ease of use' features like this are applications programs. They occupy space in the machine, take time to load, and time to re-load after the application is finished. In the case of machines like the Hewlett-Packard 150, these friendly interfaces can drive you crazy with frustration as data cranks slowly in and out of the system, on and off

disks, like a fast bowler strolling right back to the pavilion before starting to bowl.

Microsoft, which (as Digital Research will remind you at any opportunity) is not primarily an operating system company, chose a few days later as the date for announcing a system of linking MS-DOS machines.

The announcement was impressive say those who managed to attend, because it was the first time Microsoft had announced something before IBM.

Those less impressed remembered last year's announcement of MS Windows, due out last March. It is now expected this June, and was clearly announced purely to steal the wind from DR's sails over the announcement of windowing on Concurrent. That, too, by the way, was not announced as an IBM product at the time.

With regard to both these launches, I really feel like the old warning 'wait till you see it in the shops' applies as much as on any of the other unlikely sounding products

mentioned in these pages with enthusiasm and pleasure.

Guy Kewney

## Apple news

The (unofficial) word from Apple comes in the form of knowing winks, nudges and subtle hints indicating that something really special is to be unveiled next month.

My sources tell me that, candidly, Apple had better have a good rabbit to pull out of the hat, because it is in need of a boost. It's short of cash.

Frankly, if Apple came to me with a request to borrow money, and an offer to pay me interest on it next year, I'd lend whatever I had.

Well, exactly what are we looking forward to next month?

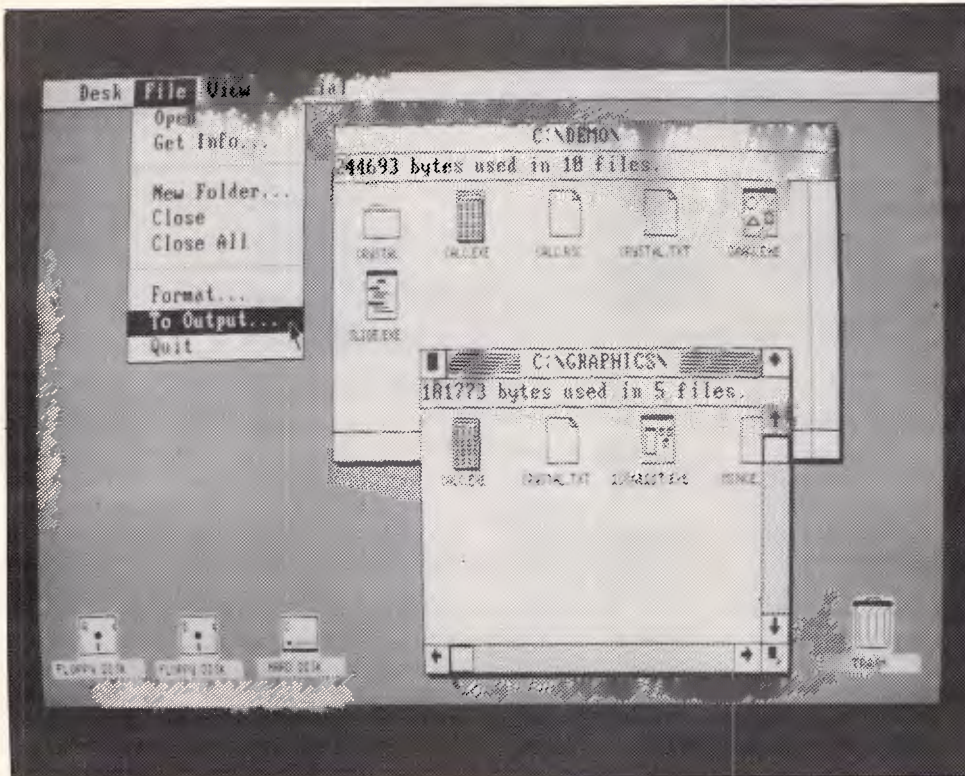
There will be a network, a file server, and a laser printer costing US\$7000 — but not the drastic price cut which the rest of us are hoping for.

Worse, there is no sign of the go-faster things that Macintosh needs.

The machine is dreadfully slow. Even the new, 512k machine doesn't quite make up for its wonderful user interface by the relaxed way it uses its disks. You could make a cup of coffee between deciding to stop MacPaint and starting MacWrite.

At the time of writing my Macintosh test drive is being enhanced by a hard disk unit. There is \$8,000 worth of hardware strapped onto the Applebus port of my Mac, and it still took me 20 seconds to close one text file, find another, and open it.

There are reasons for this. The machine keeps an awful lot more data about a file than most micros, because of the pretty typefaces, and the detailed graphics, and so on. Also, each time it stores a permanent copy of a file onto disk, it goes to a lot of trouble to make sure that it knows how far it has gone.



DR GEM showing its windows and pull down menus on an IBM PC.



Give yourself  
a break ...



How many activities are you doing at the moment? Reading, listening, thinking. Why shouldn't your Personal Computer be as versatile? Think of the time it could save you. No need to wait while your PC runs payroll or quit your spreadsheet to answer questions about stock. ■ You need the timesaver — the remarkable Concurrent PC DOS from Digital Research. This lets you run up to four separate jobs simultaneously. You start a single program just as you do now. But when you want to, just touch a key and you get a fresh screen to work with... while your original program continues to run. ■ A two-user facility is ideal for people who communicate regularly to remote staff or offices. ■ Remember, each of your four programs is only a keystroke away. ■ And with the built-in window facility, you can keep track of all of your work on screen simply and easily. ■ Get a personal demonstration of Concurrent PC DOS at your local micro dealer, or complete the coupon below for more information.

# Switch to Concurrent PCDOS

DIGITAL RESEARCH

I want to switch to Concurrent PC DOS, please send me more information

My Name is .....

Company Name .....

Address .....

..... Postcode .....

The micro I currently use is .....

and software .....

Write to the address below for more information, or visit your local computer dealer for a demonstration.

■ 252 Abbotsford Road ■ Mayne, Brisbane Q 4006

■ Fax (07) 52 7820 ■ Telex AA44187

■ Phone (07) 52 9522

**arcompacific**  
Brisbane ■ Sydney ■ Melbourne ■ New Zealand ■ master distributor ■





*This is the GRiD Compass, a machine with the unique distinction of being used on the US space shuttle, where it was code-named SPOC (the Shuttle Portable Onboard Computer).*

*It has three noteworthy features: its 80 column by 25 line display, its bubble memory and its price. The front portion of the top cover of the GRiD tilts up to reveal a restful amber coloured flat screen. Unlike the LCD route taken by the latest lap-helds with 80 column by 25 line screens, the GRiD uses an electroluminescent display.*

*The machine runs an 8086 CPU, can have up to 512k of RAM, comes with 384k of non-volatile bubble memory and, in the recently released Compass II, ROM sockets which allow up to 512k of read only memory to be installed.*

*Also you can opt for a built-in modem, and several types of interfaces (including RS232).*

*On the software side you can go for a range of software from GRiD itself or run MS-DOS which will give you access to a very wide range of applications software, including Lotus 1-2-3, WordStar, dBase II and the full range of Microsoft languages.*

*The second noteworthy feature is the bubble memory. It retains its contents when the power is switched off but it is slow by RAM standards, and expensive — which would contribute significantly no doubt to the GRiD's third feature: price.*

*A basic GRiD Compass (without the extra ROM, with only 256k of memory and no modem) will cost \$5,313 plus \$188 for GRiD's operating system or MS-DOS on disk, and in each case you'll have to buy a disk drive for \$1500. Or you could purchase an operating system in ROM for \$469 (GRiD's OS) or \$625 (MS-DOS).*

*Details are available from Vicom on (03) 62 6931.*

If the power goes off, it can usually pick up the very complex threads left hanging, and weave them back together into your document or database, or whatever.

Nice, but not good enough — something just has to be done to speed things up.

A really fast disk would be one way of doing it. Even better, would be a lump of semiconductor memory, plugged into the second disk socket, pretending to be a disk — but running at memory speeds (several hundred times faster than a floppy).

Hints and nods suggest that such things are on the way — *but*, I gather, not for some months.

The hard disk, by the way, is rather better value than its enormous price makes it sound, because it includes the beginnings of a working local network.

On my pre-production test sample it was possible to hook up two Macs (all I could get hold of!) and an Apricot simultaneously. Passing files from one machine to another, however, wasn't easy, and was only possible between the Apple models. I could have plugged an Apple IIe in, too.

But for the hard disk to work well requires the software writers for Macintosh to wake up to the fact that people need bigger disks than Mac gives. If you want to put your programs on the hard disk, you'll find that a great many idiots have copy-protected their stuff in a way that prevents this.

Officially, Apple's rules about copy protection are: you must have the original disk in the machine, but can run from a copy. PFS File and Report won't work like that (a new version is promised) and neither will Macintosh Pascal.

**Rebirth**

The original Personal

Software company has finally managed to bury itself, and is now struggling to turn the tragedy into a sort of tree-planting exercise.

It was called Visicorp after the success of its best-known product, VisiCalc, the rights to which it has now lost. And having failed so far to sell its next-generation product to the world under the name VisiOn, Visicorp has now decided to swallow itself up in the young, dynamic and thrusting Paladin software corporation of Santa Clara.

This is known as a 'reverse takeover' where the small company swallows its larger victim.

The news to come is interesting.

What we can expect is that the money Visicorp raised (it got finance from investors, and also sold off the development rights to VisiOn to Control Data) will go into new products from both Visi and Paladin stables.

In particular, there will be an IBM version of the Flashcalc product which sells quite well to Apple users, and applications to run under the VisiOn 'environment' — in particular, graphics.

A product called PC Paint is due for release very shortly, aiming to offer the sort of enjoyable drafting tools you get on a Macintosh with MacPaint, together with a 'frame grabber' for getting outside pictures into the machine.

Also prices on VisiOn will come down sharply.

*Guy Kewney*

## Taking centre stage

Fresh from the triumphant burial of Visicorp, Software Arts (inventor of VisiCalc) has come up with a successor — called Spotlight.

It's the sort of program that I've been praying for, for some time now. It includes



# MICROMAIL

Australia's No. 1 Microcomputer Mail Order Club.

## FIJI FOR FREE!!

Any purchase from Micromail between October 15th and December 31st (Over \$200) qualifies you for automatic entry into the draw for a FREE trip to Fiji. Just order from Micromail and you're in!

Drawn on 3rd January, 1985 — 9 a.m. — At 303 Pacific Highway, Lindfield.

### Check out these Anniversary Specials!



#### COMPUTERS

John Sands Sega  
Sinclair 48K  
Atari 800XL  
Commodore 64  
Memotech 500  
Memotech 512  
Sinclair QL  
Commodore plus 4  
Sanyo MBC 550 1 drive  
Sanyo MBC 550 2 drives  
CBMSX-64

#### BOARDS

AST 6 pack plus  
Persyst 64K board  
Persyst Colour card  
Apple Vision 80  
Z-80-Apple  
Apple Pal Colour Card  
Apple CED Parallel card  
Microsoft Z-80 Apple vers.2

#### MICROMAIL \$ PRICE

289  
299  
379  
399  
559  
759  
Call  
Call  
1795  
2250  
1350  
450  
450  
300  
199  
99  
145  
89  
495

#### ACCESSORIES

Cicada Modem 300  
Cicada Modem 300T  
Apple RF Modulator  
PX85 Storage Box  
Nashua disk 2 pack SSDD  
Nasua disk box 10 SSDD  
Le Floppie box 10 SSDD  
Datalife disks 10 SSDD  
Easy Computer Table  
Wico 3-way joystick  
Wico bat handle joystick  
Wico redball joystick  
Apple Kraft joystick  
Head Cleaning Kit  
Parallel Cable  
Apple Professional keyboard  
Koala Pad-Apple  
Superchamp joystick  
Microspooler 16K  
Cut sheet feeder

#### MICROMAIL \$ PRICE

195  
225  
46  
32  
8  
37  
34  
37  
95  
45  
45  
45  
75  
12  
45  
189  
149  
25  
499  
Call

#### PERIPHERALS

Juki 6100 daisywheel  
Comx Green Monitor  
Princeton Graphic Monitor  
Logitech Printer  
Star Gemini 10X  
Star Gemini 15X  
NEC Pinwriter 2  
NEC Pinwriter 3  
Uchida daisywheel printer  
Sinclair Microdrive  
Sinclair ZX-1 interface  
Taxan 1201 monitor  
Taxan 1212 monitor  
Taxan Vision III  
Taxan Vision IV  
Brother EP-44  
Brother HR 15  
Brother HR 25  
Brother HR 35  
Epson printers

#### MICROMAIL \$ PRICE

850  
189  
695  
495  
399  
725  
Call  
1095  
650  
139  
139  
239  
295  
750  
Call  
350  
725  
1150  
1395  
Call

## PHONE ORDERS — (02) 467-1933

Lotus 1, 2, 3  
Symphony  
Multimate  
Framework  
DBase II  
DBase III  
Supercalc 3  
Knowledgeman  
Wordstar  
Wordstar professional  
R-Base  
Multiplan  
Smartkey  
Microsoft flight simulator  
Sybiz  
Attache  
Championship Blackjack  
Optimum  
Perfect Link  
Spellbinder  
IBM AT

549  
749  
375  
695  
550  
695  
395  
475  
395  
550  
550  
325  
75  
78  
Call  
Call  
39  
995  
129  
595  
Call

#### SOFTWARE

##### MAC SOFTWARE

MAC the Knife  
Transylvania  
Daisywheel Connection  
Filevision  
Macmanager  
PFS File & Report  
Helix  
Microsoft Word  
Microsoft Multiplan  
C-Compiler  
Inside Mac  
Mainstreet File  
Hard Disk  
DB Master  
Megamerge  
Thinktank  
Macpuzzle  
Macslots  
Mouse Stampede  
Zork 1  
Thunderscan  
Macedge  
Mac Fun Pack  
Microsoft Basic  
MacForth

79  
64  
140  
275  
74  
279  
Call  
Call  
279  
545  
135  
349  
Call  
320  
195  
190  
59  
99  
49  
69  
Call  
64  
80  
242  
165

##### APPLE 11e, 11c

DBase II CP M/Z80  
Bank Street Writer  
Zardax  
Visicalc  
Flashcalc  
Zork  
Witness  
Wizardry  
General Manager  
PFS File, Report, Graph, Write  
Terminapple  
Master Type  
Print Shop  
Home Accountant  
Basic English  
Basic Maths  
Hardware  
The Incredible Jack  
11C serial to parallel port  
Dollars & Sense  
Zork I, II, III  
Flight Simulator  
Choplifter  
Transylvania

250  
79  
229  
195  
150  
50  
59  
65  
189  
145 ea.  
115  
60  
64  
87  
75  
75  
Call  
235  
149  
149  
55  
74  
49  
27

**TAVA PC**

99.4% Compatible  
from \$3295

We are expanding throughout Australia — if you are interested give us a ring.

**TOLL FREE ORDERS  
AUSTRALIA-WIDE  
(008) 23-0200**

**303 PACIFIC HIGHWAY,  
LINDFIELD, NSW 2070  
(02) 467-1933**

Prices subject to change without notice.



an appointment book, a disk file system manager, an onscreen calculator, phone book, index card file, and a note pad.

If all that works, it takes it quite a few steps further down the friendliness road than Macintosh's utilities, because the one thing Mac doesn't let you do while running a program, is look at the disks.

Spotlight runs in the background, or all by itself, 'with nearly every program available for the IBM PC, XT or Compaq computers,' says Software Arts, which means that any of its functions can be used at any moment.

It sounds a lot more con-

vincing than TK!Solver (pronounced TKShriekSolver) (or pling) which Software Arts raved about earlier, but which no one I know would understand.

Until we have full dealer details, contact the company itself in New York, on (212) 206 9090.

Guy Kewney

## What went wrong

It looked like such a good idea at the time, it's still hard to believe that Peachtree's strategy of selling to people like IBM rather than the end-

user, has failed so drastically.

No doubt somebody else will try the same idea sooner or later, so it's interesting to try to analyse why Peachtree made such a mess of the micro software market.

The idea was sweet and simple. 'If we sell direct to IBM, they will label all our software with the IBM label, and people will buy twice as much,' they argued. 'And if we do similar deals with other suppliers, business users of a wide range of micros will share the same software product.'

Software is one of those things which it's very hard to judge objectively, and I really don't have any personal opinions about whether Peachtree software was any better or any worse than the average. Common sense tells me that *some* was probably very good, and *most* was probably average or below, since that seems to be the rule in the software market — there are a few very good, and a lot less than ordinary.

What I can report is that

the bad was, in the opinion of some people who worked on it, very bad indeed.

Now, it actually isn't important whether their opinion was correct or mistaken. The point is that the way Peachtree sold its software, the company was less likely than most to find out when users had grumbles.

Manufacturers like IBM and Digital Equipment were more concerned to be able to show a wide range of software in the catalogue than they were to actually sell the stuff. They made their profits on hardware, after all, and the purpose of a long catalogue was just to encourage people to buy the software.

Today, Peachtree is up for sale. New products and new marketing strategies will (one hopes) make all the above comments out of date shortly. But the memory of the \$1.8 million third quarter losses suffered by parent company MSA will take some time to fade.

Guy Kewney



This Commodore Datassette alignment device is used for adjusting the azimuth alignment of the play/record head of computer cassette recorders. It consists of a small metal case with a level meter, on/off switch, volume control and an input cable. The user must solder three wires into the Datassette and also drill a hole to mount the output jack.

Once this is done, it's just a matter of plugging the 'Datalign' into the jack and adjusting the tape heads with the small screwdriver supplied until the signal 'peaks'. The Datassette is then aligned to the reference cassette.

After instalment the operation of this device is extremely simple for any person that can use a screwdriver. It would appear to be a solution for most if not all Datassette alignment problems.

Call (05) 87 3487 for more details.



'It's a new cereal. When you add milk, it goes snap, crackle, pop, syntax error.'



# PORTA PAK COMPUTER

## ...other computers cringe

PortaPak comes with its sleeves rolled up. It was designed in Australia to get the most work done in the least time and at the lowest price.

If you want results, sheer computing power, trouble free performance, then PortaPak is the only choice. If you want prestige, if you need to stroke your corporate ego, we suggest you buy something else. Something that costs more, isn't as powerful but has a lot of "image."

Put PortaPak up against imported machines costing \$5000, \$6000 even \$7000. The other machines cringe with embarrassment.

PortaPak has 800K of formatted space on each disk drive. The expensive machines which boast about having 360K suddenly look rather silly. With PortaPak you'll be able to handle much bigger data files and have far more programs on hand without having to fiddle around changing disks.

Reliability is often thought of in terms of machine breakdowns. Nowadays, the big problem isn't with breakdowns it's with hangups - when your machine turns out to be incompatible with your software. This is an enormous, widespread problem.

It's why we teamed up with Australia's software geniuses - Software Source Pty Ltd, the top suppliers of business and professional programs in the country. First, they specially customized PortaPak's operating system so it works with exceptional speed and simplicity.

Then they customized all their CP/M products to run perfectly on the PortaPak - products like dBASE II, SuperCalc, all the major languages, accounting

systems, etc. Most importantly, they stake their reputation that all these products will work without hitches. No other computer in Australia can offer this total software support.

As for electrical and mechanical reliability, look inside a PortaPak. There's a striking difference. The PortaPak is completely modular. We didn't scrimp by putting all the circuits on one board. We use *ibree*. Servicing is simpler, quicker and cheaper. It's why the leading national computer service company, TCG Pty Ltd, is pleased to offer a 12 month service contract on PortaPak in all capital cities.

Take an extra close look at the Canon disk drives. If Rolls-Royce built computers, they'd use Canon drives. See the massive head protection shield? Hear the way the heads lock away every time they deselect? The designers had an unusual attitude to reliability - fanatical.

Now carry out some speed tests. On a standard benchmark test using BASIC routines\*, the timings are: PortaPak 12.9 seconds, IBM PC 16.4 seconds, NEC APC 19.7 seconds and Sirius 16.4 seconds. Using a standard dBASE II routine\*\*, the timings are: PortaPak 8 minutes 11 seconds, IBM PC 11m 52s, Sirius 17m 9s and NEC APC 19m 16s.

The expensive imports really cringe at this because they make so much of being "16-bit" machines. PortaPak is an 8-bit machine and proud of it. Not only is an 8-bit machine inherently better suited to jobs like word processing, accounting, spreadsheets, etc, but the 6MHz clock rate ensures it can run rings around the others even in complicated mathematical tasks.

Now to really rub it in, look at PortaPak's stunning additional features:

- Compact portability. It needs only half the desk space of its nearest rival. It goes with you on business trips, at night, on the weekend. *In one hand, you hold the concentrated working power of an entire office.*
- 9-inch screen, 80-characters wide but with 35 lines instead of 24. You see more of your work and the characters are the normal shape - not elongated. Much more readable.
- 640 x 304 high resolution, dot addressable graphics.
- Free software including Spellbinder word processing and office management system (the most powerful available), EBASIC compiler, MENU to make life easy for new users, MODEM for telephone communications, and Speed Print which lets you continue working while you're printing.
- Universal terminal emulation lets your PortaPak mimic the screen handling of other computers and run the programs installed for them. Your PortaPak can act as a terminal for any computer you care to name.
- Ability to read and write to other 5.25-inch disk formats - e.g. Kaypro and Osborne. Lets you exchange software directly with owners of different computers.
- User definable character set lets you work with foreign alphabets, scientific symbols, etc.
- Five input/output ports for connecting to printers, modems, etc.
- Wide range of peripherals including 5 and 10 Mbyte hard disks, built-in world modem, RAM drive, EPROM programmer, A/D converter, etc.

*Radically different, distinctly Australian design using industry standard software.*

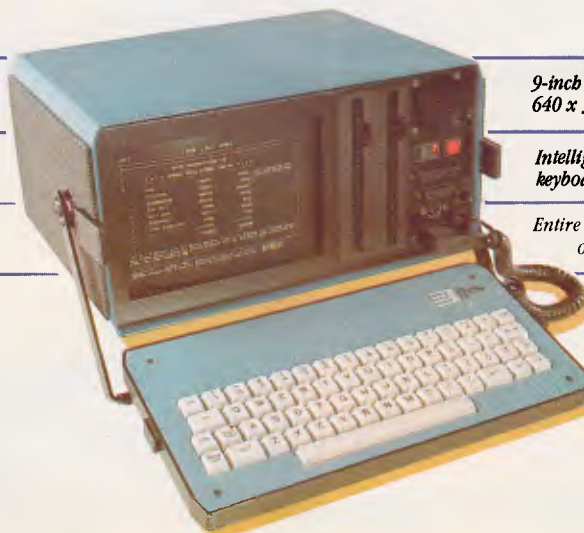
*Two one-megabyte disk drives - total formatted capacity = 1.6Mb.*

*Z80B processor running at six megahertz.*

*9-inch screen, 80 characters by 35 lines 640 x 304 graphics.*

*Intelligent, capacitive, spill-proof keyboard.*

*Entire system including software and sales tax - only \$3,555!*



For the name of your nearest PortaPak dealer contact:  
The Portable Computer Co.  
80 Beauchamp Rd, Matraville, 2036.  
Phone (02) 661 4877. Telex AA71063

\*See Australian Personal Computer, Feb., 1984.  
\*\*See Australian Micro Computerworld, Nov., 1983.



**THE  
PORTABLE  
COMPUTER  
CO.**



# apricot

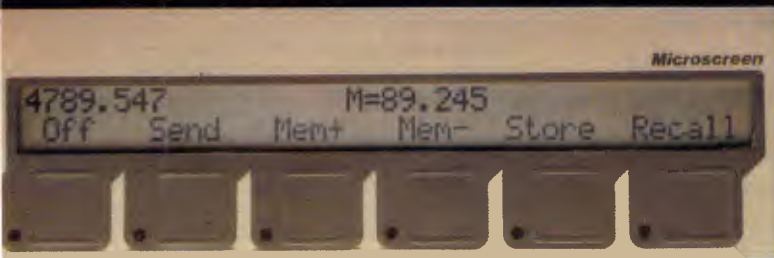
## The 4th generation personal computer

A computer that, for the first time, works with you rather than just for you. Hardware and Software co-ordinating perfectly, Apricot arrives complete and ready to work.

The MicroScreen™ on the keyboard, unique to Apricot, performs a variety of practical functions—as a calculator, calendar, time display, and as a window on the screen. Most significantly the MicroScreen™ prompts and assists the user by presenting simple options whilst running applications.

As you'd expect with a 4th generation system, Apricot offers true 16-bit processing, multi-processor architecture and 256K RAM as standard.

With 16-bit business software and compatibility with the best selling Sirius 1 and IBM PC, Apricot already has the largest available software library.



Incorporating the very latest advances in computer technology, Apricot uses 3½" pocket-size diskettes. Secure and compact, yet offering increased storage capacity.







Apricot includes over \$1,000 of software—SuperCalc spreadsheet, business and communications software—to ensure that your system is immediately effective.

And because executives are not office bound, Apricot offers portability, a further feature aimed at improving efficiency. Powerful sleek and sophisticated—and all at an amazing 4th generation price.



**BARSON**  
computers

Please send me the latest information on  
Apricot—the 4th generation personal computer.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Post Code \_\_\_\_\_  
Phone Number \_\_\_\_\_

**BARSON COMPUTERS**  
335 Johnston St. Abbotsford, Vic 3067  
or call 03-419 3033





# This year's model. Every year.

Universe Supercomputer fulfils this seemingly impossible requirement. Because we don't bring out new models every year. We continuously improve the same one, in response to the needs of our customers.

When you buy Universe, you know you will continue to have the most advanced product, with the widest software base in the industry. Universe accesses over 65% of all applications software via its single, all powerful concurrent operating system, which is compatible with CP/M, CP/M-86, MP/M II and MP/M-86 software. Modular construction, based on IEEE 696 S100 cards means progressive enhancements are inexpensive and easy to implement.

#### **Multuser vs Networking**

Universe is built to grow. In multiuser operation, it is up to 5 times faster than well known networked systems. And it costs much less!

#### **On site service**

A full 12 month on-site warranty (a Universe first in Australia) and service are carried out by AED personnel. The most advanced computer is also the most reliable!

#### **Check out our record**

Here are a few Universe initiatives that have helped make it

this year's model.

**1982:** Universe releases locally developed concurrency capability with MPS (Multiple program Selection) and SUPERAED enhancements to CP/M operating systems.

**1983:** Universe introduces dual 8/16 bit processing. Development work on high speed Multiuser operating systems culminates in release of MP/M 8-16, catering for simultaneous use of 8 and 16 bit software by multiple users.

**1984:** Development work at AED on 80286 processor results in sub-mini performance from Universe. AED wins government grants for earlier MPS work and further grants for work on I/O/File processor. UNIX is currently being implemented on Universe.

Join us and stay **permanently** ahead of your competitors.



**Phone now for a consultation.**

**Sydney** (02) 636 7677 Telex AA 70664,  
**Melbourne** (03) 211 5542, **ACT** (062) 47 3403,  
**Perth** (09) 450 5888

# UNIVERSE SUPERCOMPUTER





David Ahl has some good news for isolated business micro users in the form of companionship and price cuts.

## Let's join together

The increasing number of small computers in offices means that users who are unable to share common data often find themselves in isolated, single-user islands. But all that is changing.

Today there's a major move towards local area networks. Ethernet, the first industry-standard local area network, was announced in 1980 by Xerox, DEC and Intel; and there are now more than 5000 Ethernet systems in operation supported by more than 200 vendors. Initially, Ethernet was hampered by a relatively high cost per node, but today the cost is down to about \$600 per hook-up and experts expect this to decline even further.

Since 1980, many other local area networks have been announced and it's estimated that there are about 16,000 currently in operation.

These include offerings from Wang, Apple, Corvus, Datapoint and IBM. Consultant Architecture Technology Corp estimates that network sales will grow from about \$300 million this year to \$1.5 billion by 1988.

IBM is expected to be an important player. Its first offering is the recently announced PC Network which links up IBM Personal Computers.

Expected soon is an announcement of a factory floor 'industrial network' designed to tie together factory automation systems.

And two or three years away is the 'token ring' network, which will allow IBM computers of all sizes (and perhaps those of other manufacturers) to communicate with one another.

## Eat your words

In 1950, a study by Univac

indicated that five computers would meet the total worldwide demand for the foreseeable future.

In 1976, Ken Olsen, president of Digital Equipment Corp, told a World Future Society meeting in Boston that he couldn't see any reason for an individual ever to need his own computer.

In 1982, Future Computing, a market research firm, predicted that Commodore, Texas Instruments and Atari would be the leading three vendors of home computers for the following three years.

## Soft in the head

The new software packages being issued by third-party vendors for three leading computers, the Commodore 64, Apple II, and IBM PC tell an interesting story. In the last six months, more business packages have been issued than anything else, followed by educational and games packages. However, the proportions vary widely for the different machines: IBM leads in business, Apple in education, and Commodore in games.

But, of course, not all the new packages will be successful. Furthermore, business packages tend to be priced considerably higher than games and educational ones, thus vendors of business software need fewer unit sales to break even.

## If the price is right . . .

Typical of companies in the personal computer market, Tandy assumed that prices of home computers might fall as fast as 30 per cent per year, but the prices of business systems would fall more slowly, say, 15 per cent a year. However, in recent months Tandy, along with many other

manufacturers, has had to face the realities of price declines of mid-and upper-end systems by as much as 40 per cent. In response, Tandy has cut the price of its bread-and-butter Model 4 by 40 per cent to \$1299 (with two drives).

Also fuelling the price competition is a new PC compatible from Tandy itself, the Model 1000, priced well below \$2000.

Seemingly a competitor for the sluggish PCjr, in reality the 1000 is more of a competitor for the IBM PC. It has a 16-bit 8088 CPU, 128k (expandable to 640k), monochrome and colour graphics adaptors (640 x 240 pixel resolution), single or dual floppy disk drives (360k each), a full-stroke detached keyboard, three-voice sound circuit, a parallel printer interface, two joystick interfaces, and a light pen interface. The CPU operates at the same clock rate as the IBM PC (4.77MHz) and almost twice as fast as the PCjr.

The expansion bus is completely compatible and has three expansion slots, so third-party peripherals can be used directly on the Model 1000. Software compatibility with the IBM PC is very high: the two 'test' programs, Lotus 1-2-3 and Microsoft Flight Simulator, run without a glitch.

According to Tandy, the machine is being aimed at home and small business users, so the initial 40 software releases include such packages as Lotus 1-2-3, Multiplan, MS-Word, DR Graph, Friday!, the PFS: series, Knoware, Micro Illustrator, and a nifty group of games.

Best of all, the pricing on the Model 1000 is 35 per cent to 40 per cent under that of the IBM PC. The base price of the Model 1000 is \$1199; an entire system with 256k, a colour monitor, and two disk drives costs \$2348 compared with \$3578 for the corresponding IBM PC configuration.

## Random bits

As well as announcing the 512k Macintosh (\$3195) about four months earlier than expected, Apple lowered the price of the 128k Mac by 12 per cent and lowered the prices of the IIc and IIe by \$100 each. Is this an indication that Apple is in

trouble, or is the company just trying to get a bigger piece of the holiday season business while other mid- and low-end manufacturers are in disarray? . . . Jobs at

Japanese computer companies in the US continue to be revolving doors: Sanyo, Sharp, and Panasonic have all had recent shake-ups . . . The shakeout of computer magazines continues to increase with well-established titles such as

*Microcomputing*, *Softalk*, *Microsystems*, and *Commander* biting the dust along with newer entries such as *Compute's Gazette*, *Personal Software*, *Color Computer*, *PCjr*, and *Jr*. Experts expect the failure rate to rise to four or five a month leaving perhaps 20 healthy titles . . . A

study by Communispond, a New York management consulting firm, found that most business executives preferred pencils to computers for composing their correspondence: 89 per cent chose pad and pencil, 10 per cent opted for dictation, and only one per cent used computers . . . Most software companies are reluctant to commit themselves to developing packages for the Coleco Adam, citing doubts about Coleco's long-term intention to stay in the market. Sierra On-Line had cartridges ready to burn in and decided to hold up and eat the costs itself. Other vendors are also taking a wait and see attitude . . . Future Computing projects that 67 per cent of all US households will have a computer by 1990 (presently 10 per cent). **END**



The PC AT follows its immensely successful and much-copied little brother into the market, but does it represent good value to the single user or is it designed for bigger things?  
Peter Bright tests the latest product from the seemingly infallible IBM.





# IBM PC AT

You're on a 'hiding-to-nothing' reviewing a new IBM micro — the people who don't know any better will buy it anyway, and the people who do, can work out how good it is for themselves.

It was with these thoughts in mind that I set out to review IBM's second offering on the micro scene, the PC AT. 'AT' apparently stands for 'Advanced Technology', and I must admit that on the face of it the AT does boast one or two interesting features: multi-user, the new Intel 80286 processor, and an optional 1.2Mbyte floppy disk. It looks like IBM might have come up with something new for a change.

## Hardware

IBM won the prize for the lowest specification in the biggest box with the original PC, but I'm glad to say it has managed to do rather better with the AT. The main box is only slightly larger than the PC box, even though it has much more inside it. That said, putting an AT on your desk is as good a way as I have found of hiding yourself from the rest of the office — it's still a big beast.

For this reason, IBM can supply a floor mounting stand which allows you to stand the system unit on its side next to your desk.

The AT is a three-box design in the

same mould as the PC and the vast majority of other desktop micros. The monitor is exactly the same as that used on the PC, but the system unit and the keyboard have been completely redesigned.

The system unit is finished in a mixture of grey and cream. Most of the unit is the same grey as the PC, but the front panel is finished in cream to match the monitor and the keyboard.

On the front of the system unit at the far right-hand side is space for two half-height 5¼in floppy disk drives. On the left-hand side are two LEDs, a key and the IBM badge.

The LEDs are used to indicate power on and when the hard disk is reading or writing. The key is used to disable keyboard input from the main unit; it does not disable input from remote terminals. The idea is that the system manager can prevent access to his terminal without throwing off authorised users.

When the machine arrived, I spent a happy 10 minutes trying to bypass the lock. I thought I had found a way by removing the main cover and wedging the micro switch on the lock closed with the aid of a pen top. Then I found that you can't take the cover off if the lock has been activated. Back to the drawing board.

I wouldn't usually class the maker's badge as one of the most innovative features of a micro (I don't know though . . . ); however, IBM seems to employ someone to design useless appendages for the AT. On the front panel that person has been hard at work designing a spring-loaded swivelling IBM badge. The idea is that if you have the unit standing on its side on the floor, at least you can make sure that the IBM logo is the right way up. Isn't that wonderful!

The rear of the main unit is very unremarkable. From left to right there are sockets for power in and out, the fan, a DIN plug for the keyboard and the exit holes for no less than eight expansion slots. There are also four strips of velcro which look like the work of the useless appendage person.

The velcro is used to hold an optional plastic blanking plate in place. This fits onto the back plate and doesn't seem to serve any useful purpose other than to cover various type approval badges and a few screws. It looks pretty but I'm sure it wouldn't last long before it got lost in an office.

Getting inside is just the same as for the PC: remove five screws and slide the cover off (remembering, of course, to turn the key to the locked position).

The inside is also reminiscent of the PC. The power supply dominates the rear right-hand corner. In front of that are the twin disk drives and the hard disk (which can't be seen from the outside). To their left are the eight full-length expansion slots. The main processor board lies along the bottom of the unit. However, while the layout remains the same, the



The PC AT keyboard is a great improvement on the PC — the typing areas are well spaced and the RETURN and shift keys are larger.



## HAPPY CHRISTMAS EVERYBODY . . .

Yet again, CPC is the place to do all your Apple Christmas shopping, with fantastic bargains and a host of free software and accessories with Apple IIc and Macintosh computers.



**TRAINING CENTRE OPENS DEC.**

## . . . HAPPY BIRTHDAY CPC

For 4 years we've been Sydney's best Apple dealer. And we intend to remain so with improved service,



**FREE MAC & LISA NEWSLETTER AVAILABLE**

training and everything else that sets us apart from the rest.

Ask about our new Computer Training Centre.

**SYDNEY**  
55 YORK ST.  
29-2461

**NTH. SYDNEY**  
100 MOUNT ST.  
922-3600

**CITY PERSONAL COMPUTERS**

individual components are very different from the original PC.

The PSU is a multi-voltage unit with external switching (although you'd have to be Superman to lug this lot around the world in your hand luggage). The PSU box also incorporates the system cooling fan. This has a built-in thermistor which regulates the speed of the fan according to how hot the unit is. This apparently helps cut down unnecessary noise. It doesn't work — it's still noisy.

The AT is available with a bewildering range of disk drives. The review machine had one 360k floppy drive, one 1.2Mbyte floppy drive and a 20Mbytes full-height 5¼in hard disk. A 40Mbytes hard disk is also available. The floppy drives aren't marked 'A' or 'B', although the 360k PC compatible drives are marked with a '\*' embossed onto the casing. All the new floppy drives are half-height as opposed to the old full-height units on the PC.

The most interesting aspect of the new drives is the 1.2Mbyte high capacity unit. The only other mass micro I can recall which offers 1.2Mbyte on one 5¼in floppy is the Sirius. This did it by varying the speed of rotation of the disk to allow it to pack in more data.

The AT drive doesn't do this, but it's still non-standard. The drive can actually work in two modes — IBM compatible and high capacity.

If you put a standard 360k PC format disk in the drive, it will happily read the data. It will also write data back in 360k format, but this is more dodgy. The

manual stresses that IBM doesn't guarantee that data written to a 360k disk in a high capacity drive can be read by a standard drive. In practice I didn't have any problems, but don't say you haven't been warned.

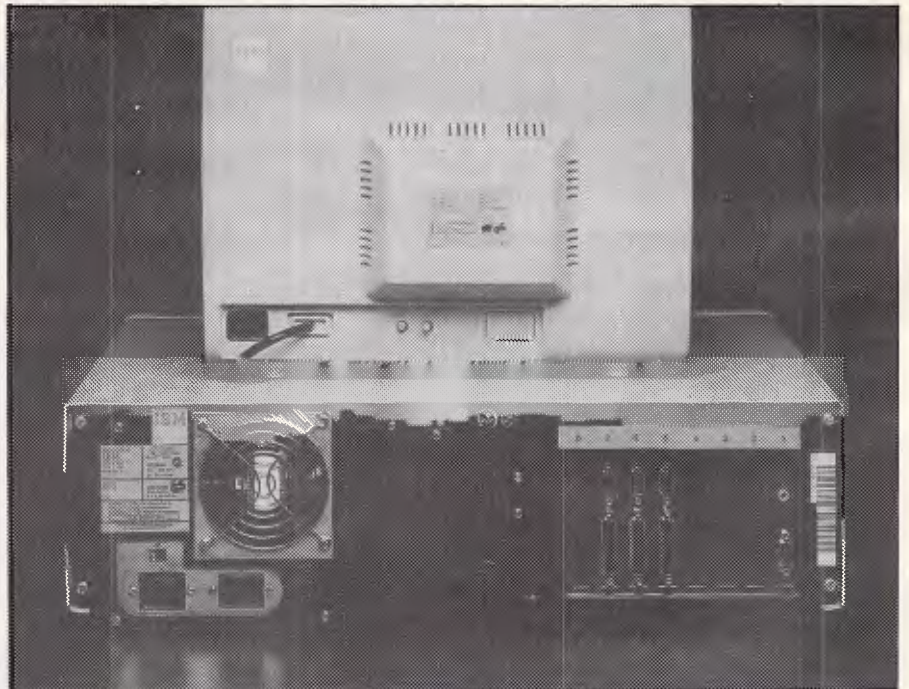
The drive will only work in high capacity mode if you use it with special disks supplied by IBM. At first I thought it might just be a marketing ploy, so I shoved one of my "all-singing-all-dancing" disks into the drive and tried to format it. The AT would have none of it and spat the disk out with a message to the effect of 'You can't fool me like that, sonny.'

It transpires that the disks have a special surface which can handle the high density needed to achieve 1.2Mbytes. The only doubt I have is about the supply of these new disks. No-one I talked to at IBM was sure whether they were available from anyone other than IBM. If they aren't it means you are dependent on IBM's whim until a third party tools up to produce the things. Not recommended.

The main PCB takes up two thirds of the floor space in the system unit. It is dominated by the processor, memory and the expansion ports.

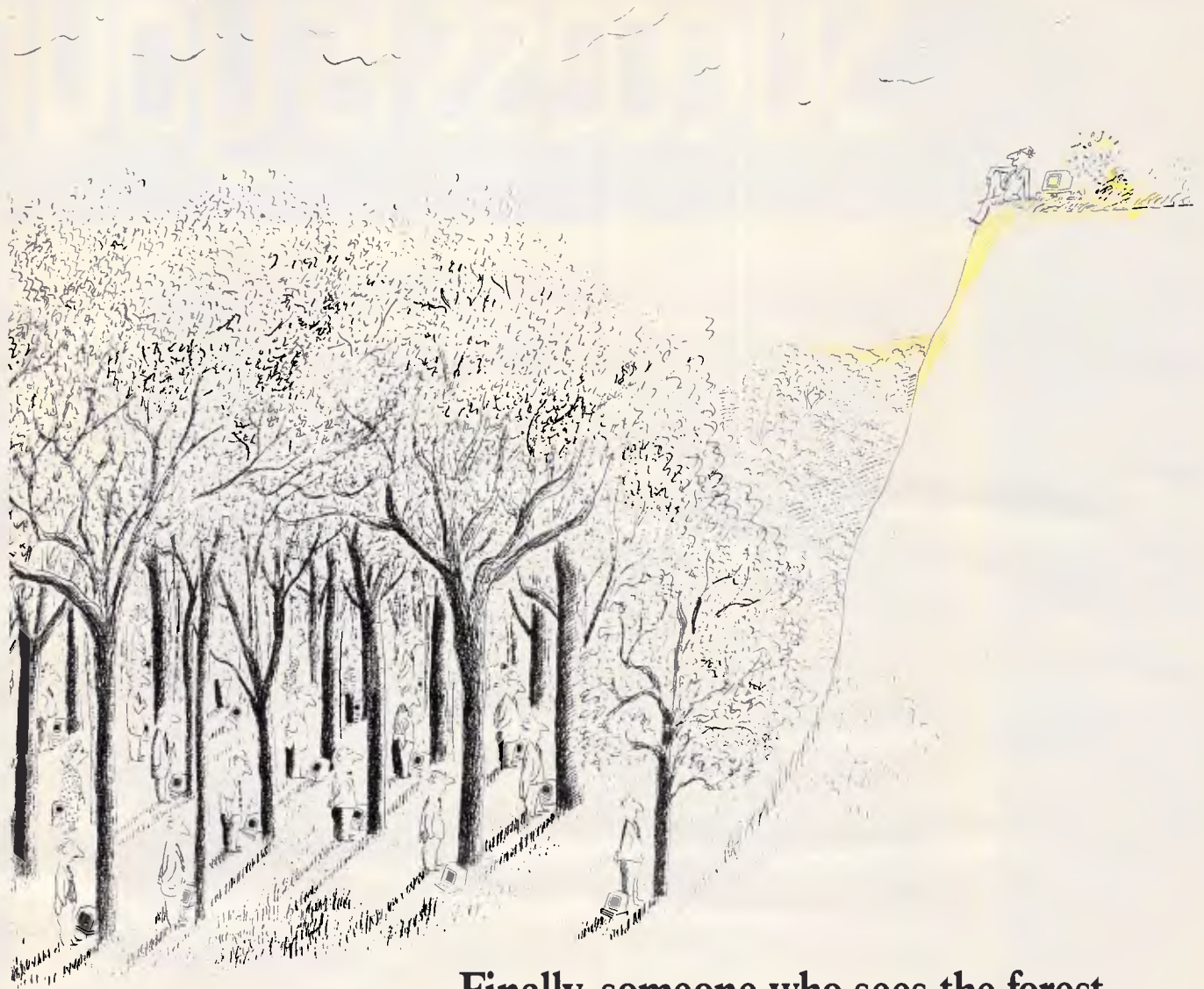
The Intel 80286 main processor is very easy to spot because it's square rather than the conventional oblong DIL package. Many modern VLSI chips are adopting this shape because they can run pins out of each side of the square rather than just two sides on DIL packages.

The 80286 and its smaller brother,



Nothing out of the ordinary here — exit holes for up to eight expansion slots





## Finally, someone who sees the forest. As well as the trees.

In their great rush to fill the office with personal computers, people lost sight of the ultimate objective. To work together more productively.

Then Sperry appeared.

With a remarkably simple solution.

### The Sperry PC.

It was personal, but not so personal that it would keep people from being part of a system.

It could run all of the software of IBM's PC.

It performed all the user-friendly functions people expected. It was,

in fact, even friendlier than IBM's machine.

It had a more comfortable keyboard.

A more dramatic display of graphics.

And a high-speed "turbo" switch that allowed it to run 50% faster than IBM.

And it could keep people in touch with the most valuable resource an organization can have — the main computer.

No matter whose big system they have.

Sperry or IBM.

Or both.

The Sperry PC.

Admittedly, big picture.

But then, that's what

happens when you look at the forest. As well as the trees.

See how the Sperry PC can work for you. Contact Geoff Saunders, Sperry, Northpoint, 100 Miller Street, North Sydney, N.S.W. 2060.

(02) 929 7800

© Sperry Corporation, 1983

#### SPERRY PERSONAL COMPUTER SPECIFICATIONS

##### OPERATING SYSTEM

MS DOS Version 1.25 or 2.0 with G.W. BASIC

MICRO-PROCESSOR High-Speed 16-bit 8088

##### DISPLAY SCREENS

High Definition monochrome display. High resolution color display. IBM compatible graphics.

COMMUNICATIONS Built-in Asynchronous

##### KEYBOARD

84 keys, 6ft. cord AUXILIARY MEMORY

Up to two internal 5 1/4" diskettes 10MB internal fixed disk when configured with single diskette.

USER MEMORY Standard 128K bytes, expandable to 840K

DIAGNOSTICS Power-on self test CLOCK

Time-of-day with battery back-up

# SPERRY



The Sperry PC.  
What the personal computer  
should have been in the first place.



# Success is yours



Hitachi have cut the price of their MBE 16002 personal computer by \$2,000. So now there is no reason to compromise on quality when choosing a computer for your home or business. The Hitachi "Success" offers you features like...

#### State of the art hardware

Gareth Powell of "The Weekend Australian" described the Success as "a leading example of the new

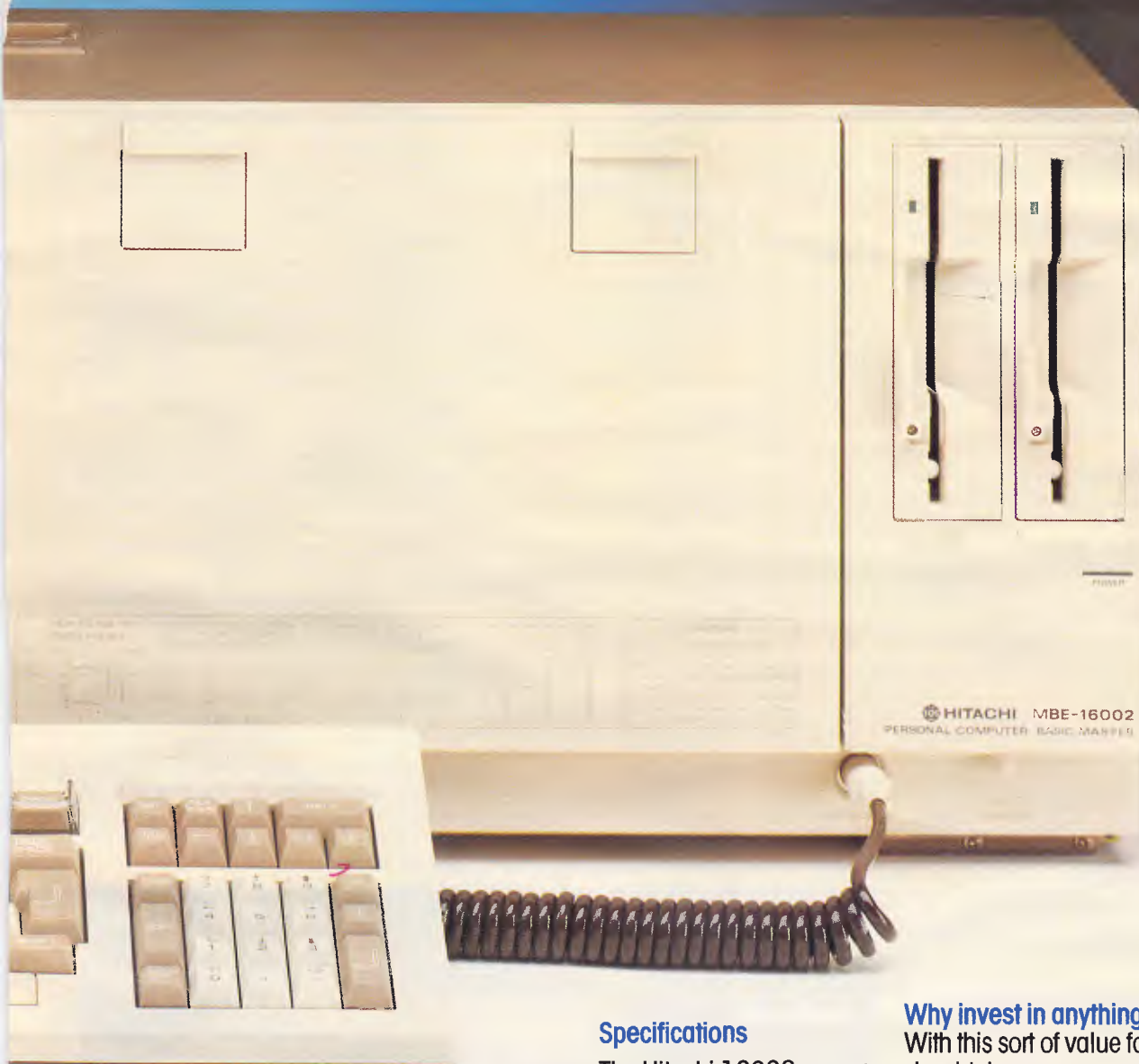
breed." The RGB colour monitor he said had "the best resolution I have



seen on a personal computer." Compare it with any other personal computer. We think you will agree. **All the software you could need.** Your Hitachi dealer is willing to help you get started with greatly reduced prices on any of the following soft-ware when bundled with the Success. You can run LOTUS 123; Multimate;



# for only \$3995



Wordstar 3.3; D Base II or III; Attache Accounting Software, and many more.

#### **Huge resources behind you**

The Hitachi Corporation's sales for last year were in excess of 19 Billion U.S. Dollars. In short, they have the resources, the technology, and the financial stability to be around for a very long time.

#### **Specifications**

The Hitachi 16002 comes with 128K bytes of user RAM (expandable to 384K); dual 5" DS/DD Disk Drives; new IBM graphics card; 16 bit CPU; High resolution colour monitor; MS Dos and Basic.

**robs**  
**COMPUTER CENTER**  
295 Thomas Street, Dandenong 3175  
Phone (03) 7912900

#### **Why invest in anything else?**

With this sort of value for money you should ring your nearest Hitachi dealer now and let them tell you how Hitachi can help you, your family, and your business to success. Hitachi Success.

#### **Authorised Hitachi Dealers**

**N.S.W.:** Professional Computer Solutions (02) 630 6933; MicroDelta; Drinday.  
**VIC.:** Robs Computer Centre (03) 791 2900.  
**QLD.:** Software 80. (07) 369 6888.  
**S.A.:** Metropole (08) 223 5538.



## BENCHTEST

the 80186, have been on the stocks for quite a while, but production difficulties and problems with the mask have put the chip in short supply. The mask problem also means that, although the chip has a design clock speed of 8MHz, the production versions can only safely run at 6MHz.

In hardware terms, the 80286 can be looked on as a CPU and advanced memory management unit combined into one chip. It has a full 16-bit external data bus and a 24-bit address bus which would theoretically give access to a maximum 16Mbytes of RAM. I say theoretical because the amount of RAM that the processor can access is dependent upon the mode in which it's running. In compatibility mode the maximum is 1Mbyte.

Although it's loosely based on the older 8086/8088, the design of the processor unit is very different resulting in much higher throughput.

The instruction set of the 80286 is also based on the older chips, but in protected mode programmers have access to an extra 28 instructions. Most of these are designed for use with the memory management unit.

The review machine also came with an 80287 maths co-processor fitted. ATs are usually shipped without the chip but with a socket if your software needs it. The 80287 performs the same function for the 80286 processor as the 8087 does for the 8086: that is, it relieves the processor of mathematical calculations and lets it get on with less time-consuming work.

The base model AT is supplied with 256k of RAM. However, the review machine arrived carrying the full 512k, which the main board can take without having to resort to using expansion slots. Maximum RAM using the expansion slots is 3Mbytes. The RAM was provided by 36 of the new(ish) Texas Instruments 128k x 1 giving 512k with parity. The main board also holds 64k of ROM-based operating system routines and diagnostics.

Like the PC before it, the AT makes heavy use of expansion slots to provide basic functions such as video generation, disk control and printer connection. The AT does rather better than the PC by having eight full-length slots. The main difference between the two machines is that where the PC has an 8-bit data bus and limited memory addressing, the AT has a 16-bit data bus and a 24-bit address bus. This means that if you want to take full advantage of the AT's architecture, you need extra lines for the expansion cards.

IBM gets around this problem by giving each slot a PC-compatible socket and

a 36-way socket to take the extra data and address lines. This means that the AT will work both with custom-designed cards and most PC cards.

The expansion cage in the review machine was occupied by four cards: a disk controller, two serial/printer cards and a colour graphics card.

The disk controller card is the only one of the three to make use of the extra socket. This is a new custom-designed unit which controls the high capacity floppy, PC-compatible floppy and the hard disk. The card fitted to the review machine was obviously an early version and had a couple of patches fitted.

The two serial/printer cards are used to connect remote terminals to the main unit. Each card houses a standard (for IBM) 25-way D plug for connecting a parallel printer and a 9-way D plug for the RS232 line. The 9-way RS232 line is a bad idea. It seems that whenever IBM comes across something that everyone else uses as a standard, it changes it. It happened on the PC with the parallel printer port and now IBM has done it to the RS232 connection. Everyone else uses a 25-way D plug, so why use a 9-way version?

Interestingly, according to IBM, the maximum number of remote terminals that can be connected is two. At the launch it was said that this was due to a hardware limitation. I have a feeling it has more to do with IBM not wanting to compete with products higher up its range.

The PC keyboard certainly evoked strong reactions when it was released. You either loved it or you hated it. I rated it as the best keyboard I had ever used until I tried the keyboard on the AT.

The AT keyboard is similar to the PC unit. It's connected to the main unit by an extra long cable, which allows it to be used a fair distance away from the main unit if necessary. Like the PC unit, it has

two legs which can be flipped down to alter the typing angle.

A total of 84 keys is divided into three main areas. The main qwerty typing section is in the middle, with 10 function keys set down the left-hand side and numeric pad/editing keys to the right. The feel of the keys is just the same as on the PC — firm, sharp and beautifully positive.

A great deal of criticism was levelled at the layout of the PC keyboard. IBM seems to have taken note of this and rectified it on the AT.

One of the major criticisms was that the RETURN key was too small and difficult to find. The AT has a RETURN key so large that anyone could find it. The shift keys get similar treatment. Another criticism was that there was no gap between the function keys and the typing area, and between the typing area and the numeric keypad. The gaps are there now. Finally, there was no indication on the PC keyboard that CAPS LOCK or NUM LOCK had been selected. Now there is a bank of three LEDs in the keyboard to indicate CAPS LOCK, NUM LOCK and SCROLL LOCK.

It is not all good news though. A major criticism of the PC keyboard was that the cursor control keys doubled up with the numeric keys and invariably the wrong mode was selected. Unfortunately this is still the case with the AT.

Worse than that is what IBM has done with the ESCAPE key, which usually lives somewhere in the top left of the keyboard. IBM has put it in the numeric keypad on the right-hand side of the keyboard. This makes life difficult for anyone used to running Lotus 1-2-3 *et al* which make heavy use of ESCAPE. Having said that, the AT keyboard is still a vast improvement on the PC keyboard and now rates as my favourite keyboard on any micro.



On the right two half height 5¼in floppy disk drives





## Introducing the Smith-Corona Printers

Meet the Smith-Corona printers, 3 of the highest quality, yet reasonably priced printers, to meet your toughest demands.

With superior print quality and proven reliability backed with exceptional service and support, these dot matrix models are compatible with all business micros, PC and home computers and are fully compatible with **IBM** and **EPSON** printers.

**SPEED**-From 80 cps to 160 cps with bi-directional and logic-seeking features. **FLEXIBILITY**-Six pitches, up to 128 variations of type style and seven international character sets. **QUALITY**-Consistent high quality printing, true descenders, 160 cps draft, 40 cps NLQ, superb graphics capability too! **PRICE**-We believe the Smith-Corona has the best price performance of any machine in Australia, ring us and find out just how good they are.

### Smith-Corona Data Products

81 Regent Street  
Redfern 2016  
Ph: (02) 698 8211

IBM Trade Mark of International Business Machines  
EPSON Trade mark of Epson



# Amstrad's new CPC464 comes with plenty of free plugs.

Sophisticated and complex programs are easily accommodated.

And the CPC464 offers you high resolution graphics, 80 column text display, up to 8 text windows, a graphics window and a palette of 27 colours.

"The CPC464...  
in two boxes and one  
lead includes a list  
of features that would  
shame a hybrid  
of the major machines."

PERSONAL COMPUTER WORLD

One of the most obvious is the quality of the on-screen graphics. Quite simply, the CPC464 beats the micro/domestic TV combination out of sight.

That's because our monitor drives each colour on the screen directly from the computer. Nothing gets in the way of the best possible picture. And you won't have tuning problems, either.

There's plenty of interest for music lovers when the 3-voice, 7-octave stereo output is fed through a hi-fi amplifier and speakers.

"The Amstrad is  
a powerful, fast machine,  
with plenty of memory,  
easy to program..."

PERSONAL COMPUTER WORLD

A fast growing range of Amsoft programs is already available.

The high quality software takes full



CPC464 green screen VDU (GT64)

You may have noticed that the press has got very excited about our new computer system.

And rightly so.

Because the new CPC464 comes complete with its own green screen VDU or colour monitor, built-in cassette data recorder, 64K of RAM, 32K of ROM, typewriter style keyboard and a very fast extended BASIC.

When you consider that the complete computer system including green screen VDU and cassette data recorder hardly costs a fortune, that's plenty to get excited about.

You can use the greenscreen version of the CPC464 with a colour TV by con-

necting the optional power supply and modulator (MP-1).

"I think the Amstrad  
will give a lot  
of sleepless nights to  
Sinclair, Acorn  
and Commodore..."

POPULAR COMPUTING WEEKLY

Other micros can't get anywhere near the CPC464's memory for the price. Over 42K is available to users, thanks to the implementation of ROM overlay techniques.





advantage of the CPC464's high specification and speedloading capability. Which means even complex programs can be loaded quickly.

Arcade games, educational programs and business applications are all designed to utilise the CPC464's impressive graphics, sound and processing abilities.



**Amstrad. User Information Service.**

Whether you're interested in serious commercial applications or you're a games fanatic you'll want to receive the latest information about your AMSTRAD Computer. Upon request you will be advised about the latest software and its application, special information concerning your CPC464, available peripherals and software reviews. There will also be programs and exercises to try.

**User Clubs.**

In addition to the User Information

Service you will be given details of where you may contact your nearest independent user club.

**"The Amstrad machine provides a lot of other features for a very low price."**

GUARDIAN

At Amstrad, we're constantly looking to the future. That's why the CPC464 has a built-in parallel printer interface. A low cost optional disk drive system including CP/M\* (with the option to access 3000 programs) and LOGO. A joystick port. And the virtually unlimited potential of the Z80 data bus with sideways ROM support.

**With so many free plugs from the press, it's little wonder the CPC464 only needs one.**



Optional 80 column dot matrix printer DMP-1. Offers high performance computerised text processing

Distributed and guaranteed throughout Australia by:

**AWA-THORN AMSTRAD**

\*Trade mark Digital Research  
I'd like to know more about the incredible CPC464 complete computer system and where to see one.  
Please send literature right away.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

POSTCODE \_\_\_\_\_

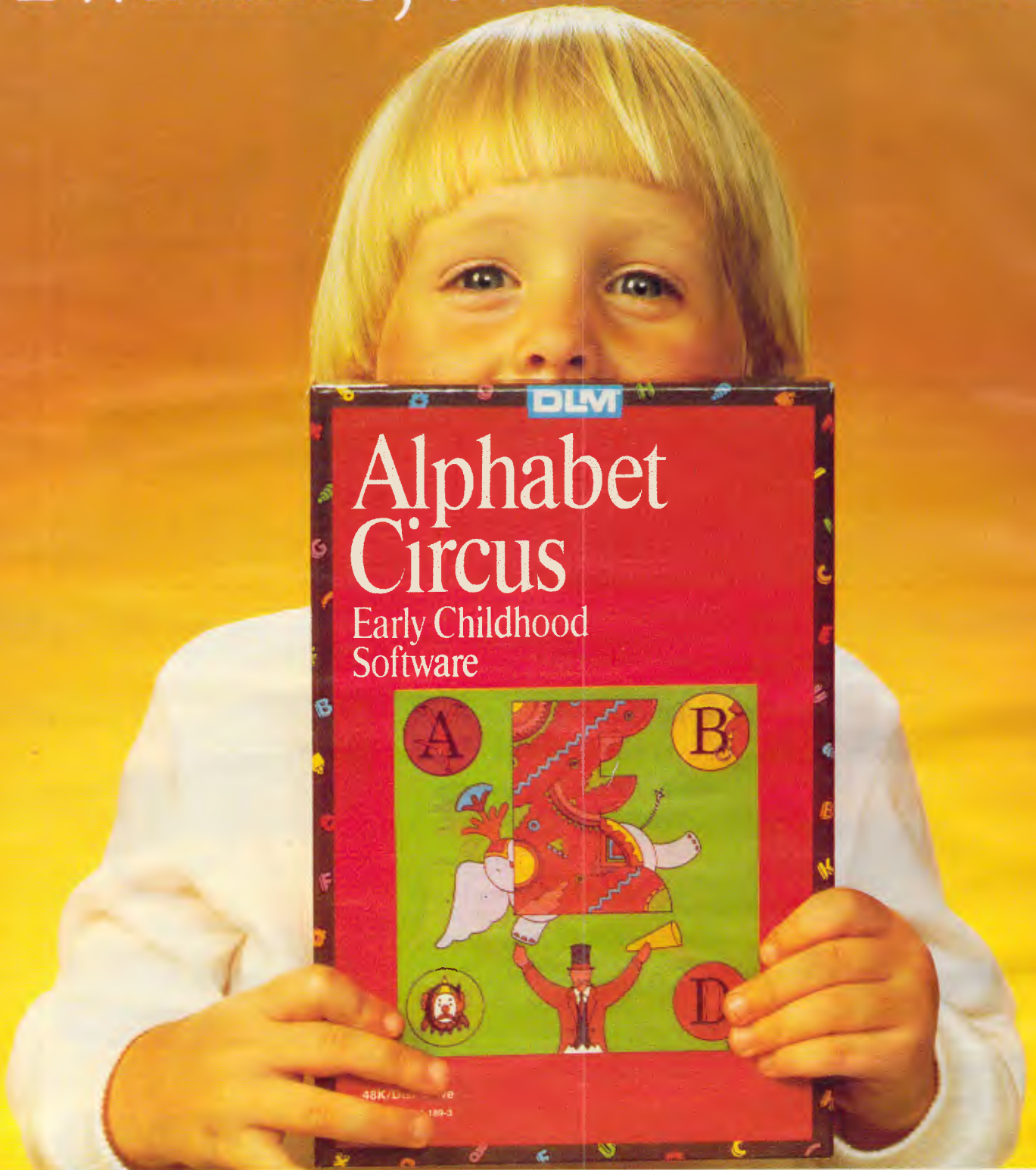
To: AWA-THORN Consumer Products Pty. Ltd.,  
348 Victoria Road, Rydalmere, N.S.W. 2116.



CODE NO: TFB 187



# Twinkle, twinkle DLM



Bring the shine of knowledge and excitement into your child's eyes! With over twenty software titles like Spelling Wiz, Alphabet Circus, Number Farm, Verb Viper and Freddy's Puzzling Adventures, DLM software will give hours of fun and pleasure to your child, while at the same time teaching important educational skills.

Available for the Apple II/IIe/IIc,

Commodore-64, IBM-PC, Atari 800XL and Dick Smith Cat and Challenger. From all quality computer outlets, or phone Dataflow on (02) 745 3303 for a free colour catalogue and the address of your nearest supplier.

**dataflow** COMPUTER SERVICES PTY. LTD.  
6-8 Elizabeth Street, Burwood N.S.W. 2134 Phone: (02) 745 3303



The display on the AT is standard IBM, just the same as the PC. That means that you get an acceptable monochrome display and a downright horrible colour display unless you want to pay for a third party display card that may or may not work in the AT.

The review machine was supplied with the same IBM colour monitor as supplied with the PC. The trouble with this monitor is that it doesn't tilt and only swivels if you pick it up and put it down facing in a different direction.

## System software

With the introduction of the AT, the IBM system software scene is starting to look rather muddled. The AT will be offered with a choice of two operating systems, PC-DOS Version 3 and Xenix.

PC-DOS Version 3 is the latest updated version of the PC-DOS single-user operating system which was originally on the PC. Xenix is Microsoft's adaption of AT&T's Unix multi-user operating system. In addition, a special single-user version of Xenix called PC/IX will be made available for the PC. However, PC-DOS Version 3 won't run on the PC, so it stays with PC-DOS Version 2.11.

Xenix won't be available for the AT until next year, so the review machine was tested in single-user mode running PC-DOS Version 3.

When you switch on the AT it goes through its self-test routine in much the same way as the PC; the only difference being that it's thankfully much quicker. It then goes on to boot DOS and ask for the date and time in the same way as the PC — only this time you take the defaults because the AT has a battery-backed clock/calendar built-in.

The 80286 processor in the AT is capable of operating in two modes: either compatibility or protected mode. In com-

patibility it emulates an 8088 processor so that programs written for the 8088 will run. In protected mode, the processor offers an extended instruction set along with some very comprehensive memory management features designed for use in multi-user/concurrent processing applications.

DOS 3 works in compatibility mode and limits user memory to 640k. This means that even though you can physically expand your AT to 3Mbytes, your program can only access 640k. The rest will have to be used as RAMDisk.

To all intents and purposes DOS 3 is just the same as DOS 2.11 with a few bits rewritten to take advantage of the new architecture on the AT. The user image is exactly the same as DOS 2.11. It looks very much as if IBM and Microsoft have done as little as possible to get PC-DOS up on the AT, which may not have been such a good move. Digital Research is about to release its 80286 version of Concurrent CP/M, and the signs are that it will make full use of the processor as well as offer PC-DOS emulation and a multi-user option. If I were a prospective AT owner I'd give Concurrent CP/M a very close look.

The only interesting features I found with DOS 3 on the AT were a couple of utilities which I've seen elsewhere — but not on IBMs. They are a RAMDisk manager and a prompt utility.

The RAMDisk utility is called VDISK.SYS and is used to set aside an area of RAM as a virtual disk; the advantage being that you can treat the virtual disk in the same way as you would a normal disk, except that the access time is extremely fast.

To set aside a RAMDisk you add an entry calling VDISK.SYS in the CONFIG.SYS configuration file. For example, an entry in CONFIG.SYS such as 'device = vdisk.sys 256 512 64'

would mean that every time the system was booted up, a 256k RAMDisk would be set aside with a phantom 512 sectors and up to 64 directory entries.

The other *new* utility is called 'Prompt'. This is very like a similar utility found in Unix which allows you to alter the system prompt. For example, if you were fed up with the system showing 'A>', you could type 'PROMPT GET LOST' and the system would use 'Get Lost' instead of the default prompt. It's fun for five minutes but wears thin after that. Just out of interest I tried booting my PC system disk with PC-DOS Version 2 on the AT. It booted with no problem and even ran applications, but it couldn't recognise the hard disk.

## Applications software

Applications software — there's the rub. The obvious use for the AT is as a small multi-user machine. In this role IBM's favoured operating system is Xenix. The problem is that there's not yet a great deal of good multi-user applications software on the market, but no doubt this will change. Such is the pulling power of IBM that software houses will be falling over themselves backwards to convert their software to multi-user. This will take time, but IBM is giving them some lead time by not releasing Xenix officially until 1985.

There are no such problems with PC-DOS, thousands of programs are available for the PC. The only question is: will they run on the AT? The answer is that you can never be totally sure, but it seems that the majority of popular programs will run out of the box. IBM is giving technical assistance to software houses who have to re-write.

I had a go with Flight Simulator on the AT and it wouldn't run. The reason for this isn't clear as it got very close to running and only failed when it tried to load in the scenery from the disk.

IBM has been very thorough in trying to assist with getting applications software over from the PC. Two of the user manuals supplied with the machine were devoted to giving instructions on how to install specific programs on the AT.

A look at the Benchmark timings shows that the AT is fast, but perhaps not quite as fast as one would have expected. Remember that the AT has the brand new 80286 super processor and that the review machine was also equipped with the 80287 maths co-processor. Even with all this it only came out fractionally faster than the Olivetti M24 with a humble 8086 and no

## In perspective

The AT sits comfortably above IBM's current range of PCs. Although it can be used as a single user machine, its main role will be as a small multi-user unit with a couple of remote terminals added on to the base unit. The only possible conflict would have been the base model AT competing with the PC XT; IBM got over this potential problem by cutting the price of PC XT's.

The base model AT has 256k of RAM and a 1.2 Mbyte floppy drive. However, I think it's likely that most AT users will go for the 512k RAM, 20Mbytes disk version. This is the minimum configuration with which you can do any serious multi-user work.

The fact that the AT was going to be based on the Intel 80286 chip wasn't a particularly well-kept secret. Consequently the flow of AT 'think-alikes' has already started and is likely to continue in much the same way as the PC look-alike market. Most of these products will either give superior performance or be priced lower than the AT.

As with the PC, the people who know what they are doing will probably be able to get better price-performance elsewhere, but other users are likely to buy it regardless.



## MICRO CITY

245 Pacific Highway  
North Sydney  
Tel. (02) 957 2337

### IBM SOFTWARE

Lotus .....	\$585
Symphony .....	\$870
Supercalc III .....	\$355
dBase II .....	\$539
dBase III .....	\$669
Cardbox .....	\$279
R Base .....	\$539
Wordstar Pro-Pak .....	\$680
Harvard Project Manager .....	\$539
*Cardbox/Wordstar .....	\$675
*Wordstar/dBase II .....	\$914

AND MANY MORE NOT LISTED.

### STORAGE

Everex 10mb Hard Disk .....	\$1890
"Le Floppies", Box of 10 Diskettes.	\$49.99

### PRINTERS

SUPERB LETTER QUALITY

Brother HR15 (13 cps) Daisy Wheel Printer .....	\$699
Brother HR25 (23 cps) Daisy Wheel Printer .....	\$1178
Brother M2024L (160 cps) Dot Matrix Printer .....	\$1599
Cut Sheet Feeders	
For HR15 and HR25.....	\$350
For M2024L.....	\$464
Tractor Feeds	
For HR15 .....	\$150
For HR25 .....	\$150

### COMPUTERS

Corona Portable - the truly IBM compatible - backed by AWA - with 256k RAM - twin 360k Disk Drives, DOS 2.0, Multimate and PC Tutor.  
Only ..... **\$3,980**

All prices include tax.  
Add \$5 post and packaging.

## MICRO CITY

245 Pacific Highway  
North Sydney  
Tel. (02) 957 2337

maths chip.

The reasons for this are varied. Firstly, Basica makes no use of the 80287, so it might as well have not been fitted; and secondly, Basica is an 8-bit Basic and is not optimised for this processor. Even so, it's an interesting comparison because the Olivetti's GWBasic is an 8-bit Basic . . .

### Documentation

What is the world coming to when IBM documentation sprouts yellow cartoon birds saying how nice DOS 3 is?

Luckily the bird has so far only managed to penetrate the guide to DOS supplied with the machine. Let's hope it gets no further! As a rule IBM manuals are well laid out and easy to understand, and don't need the 'Gee-Whizz' style.

The AT was supplied with three other manuals: the *Set Up Guide*, *Guide to Operations* and the *Applications Installation Guide*. The DOS reference manual wasn't available, so I can't comment on it. However, the others were of standard IBM quality: good use of two-colour printing, plenty of diagrams and easy to follow.

### Prices

Until IBM actually announces the AT in Australia, it replies to questions about price with the infamous "No comment". Our estimate for the basic AT with 256k of RAM and one 1.2Mbyte floppy disk is \$6,500 (including sales tax). However, it's more likely that most people will go for the expanded version with 512k of RAM, a 20Mbytes hard disk and a 1.2Mbyte floppy drive which, by our estimates, will sell for around \$10,000.

### Conclusion

I found nothing to dislike about the AT and quite a lot to like. The 1.2Mbyte disk drive is interesting, but I'm not sure how useful it is in a machine which already

has a hard disk. It makes backups easier but not *that* much easier - I'd still go for a high capacity tape streamer. It would be of much more use in the PC, but the disk controller card won't work there.

DOS 3 is a disappointment. I was hoping IBM would take the opportunity to improve the operating system, but it hasn't made full use of the main processor's facilities.

As far as Xenix goes, it will be a while before it's launched and even longer before decent software is available. I think a long look should be given to the 286 version of Concurrent CP/M. Assuming Digital Research doesn't make any major *faux pas*, it could have a great deal to commend it to the AT user.

The AT doesn't look like good value as a general purpose single user machine, nor was it so designed. But as a small multi-user system or as part of IBM's new micro LAN it begins to look much better. Perhaps even good value.

The IBM PCAT is a good solid product, just as you would expect from IBM. It leans towards innovation by using a new chip and a high capacity disk drive, but on the whole sticks with what IBM stands for - good solid conservative technology that sells by the bucketful.

### Benchmarks

BM1 .....	0.8
BM2 .....	2.2
BM3 .....	4.9
BM4 .....	5.1
BM5 .....	5.6
BM6 .....	9.4
BM7 .....	15.0
BM8 .....	13.9
Average.....	7.1

All timings in seconds. For a full listing of the Benchmark programs see 'Direct Access'.

### Technical specifications

Processor:	Intel 80286 running at 6MHz
ROM:	64k
RAM:	256k expandable to 3Mbytes
Mass storage:	20 or 40Mbytes hard disk, 360k or 1.2Mbytes floppy disks
Keyboard:	84 keys
Size:	6.5 x 21.25 x 17ins
Weight:	19kg
I/O:	Eight extended PC compatible slots
DOS:	PC-DOS Version 3, AT Xenix





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

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

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

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

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

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

In addition, a number of State Education Departments in Australia have

written a range of curriculum specific software to plug any cultural gaps.

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

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

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

In short, the BBC is the computer for learning.

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

## The BBC school computer.

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

Name: \_\_\_\_\_

School: \_\_\_\_\_

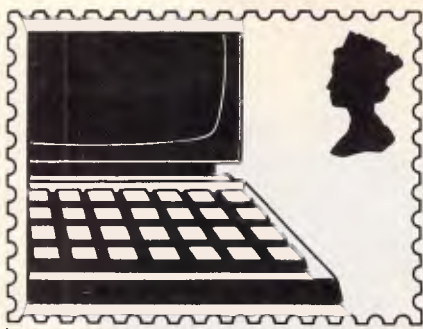
Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

## BARSON COMPUTERS

Dow McIntosh & Kelly BAR 051





APC welcomes correspondence from its readers but we must warn that it tends to be one way! Please be as brief as possible and add 'not for publication' if your letter is to be kept private.

Address letters to: 'Communications', APC, 77 Glenhuntly Road, Elwood, Victoria 3184.

## Calculating the prize

I have written a program which calculates the prime numbers by additions and occasional multiplication, that is, without dividing. It's much faster than the method of testing by division and saves unnecessary testing of non primes.

Furthermore, the formulae used in this program prove that prime numbers, and particularly prime pairs, are not random. It proves many other things besides, and I forwarded some of this work to two masters of science in mathematics. They have agreed it's very interesting and certainly accept the proof of some of the formulae, while they are checking the others. These formulae, when combined, indicate that there are an infinite number of twin primes.

As you state in 'Brun's Constant' on page 97 of the August issue, there is a \$25,000 prize for this part of my work. I would be grateful for information so that I can claim same.

G Wright

*(Kenneth Carter is just one reader now coding up the best way to spend his \$25,000. To qualify for the prize, the winning proof must be published in either Proceedings of the American Mathematical Society or Transactions of the American Mathematical Society. A copy of the article in published form, identified as the twin prime proof or disproof, must be delivered by certified mail to Twin Primes, Worldwide Computer Ser-*

*vices Inc, 7 Doig Road, Wayne NJ07470, USA. The proof must stand unrefuted for one year following the date of delivery of the publication to WCS. The prize offer expires on 31 March 1987 — Ed)*

## Computer evolution: a battle against time?

If one examines the progress of biological evolution, it can be seen that the overall level of organisation and complexity in living organisms has increased as the degree of specialisation of, and division of labour between, the subunits (for example, cells) of the organisms has increased. For example, the single cell which is known as an amoeba is far more complex than, say a cell from the human mouth, but the latter is found in an infinitely more complex organism.

It seems possible that computer evolution will follow a similar path. Will the super-powerful computers of tomorrow be derived from today's mainframes, or will processor array machines make the traditional mainframe an extinct species? What sort of power will a computer that has advanced as far past a Cray-1 as a human has passed the amoeba possess? More importantly, perhaps, what will it think of us?

D Roberts

*(The exponential curve that maps computer*

*evolution suggests that before such a computer has had time to think at all, it will be obsolete — Ed)*

## Learning a new language

In the hope of increasing computer awareness among my employees I run a number of computer classes for my company. I have successfully taught Basic and am now looking at other computer languages and their application.

Can you help?

R Bright

*There are a number of alternative languages available for the more popular micros. Having worked with a Basic interpreter, it would probably be interesting to look at a compiler in order to appreciate the increase in speed of programs and the extra stages a compiled program must go through before it can be run.*

*I will try to cover the most common languages available on micros and the type of application to which they are suited, leaving you to choose the ones you wish to cover.*

*First up is Logo, an increasingly popular micro language. The greatest attraction of this language for most people is its graphic capability. Logo graphics are generated by an imaginary turtle crawling across the screen with a paint-brush attached to its tail. Simple commands are used to move the turtle, such as FORWARD 100 and RIGHT 45. Peo-*

*ple who find generating graphic screens difficult in Basic usually find Logo a joy to use because of these 'turtle graphics' commands. Logo's biggest success has been in educational environments with children from the ages of six upwards being taught a structured approach to problem solving.*

*It is important to realise that Logo is not just turtle graphics but a complete computer language with the ability to define your own commands, list processing and all other computer language features. Logo is, however, an interpreted language and not particularly fast. Of the Logos I've seen on micros, Apple Logo and Terrapin Logo for the Apple, Atari Logo and Sinclair Logo are good implementations. Watch out for so-called Logos that are only turtle graphics programs.*

*For a complete contrast from Basic programming try the Lisp language. Lisp stands for LISt Processing. In Lisp everything is represented in list form and all operations are operations upon these lists. Although specifically designed for this purpose it has been adopted by the Artificial Intelligence fraternity and forms a good basis for experimentation in this area.*

*Lisp is one of the oldest computer languages, being designed to run on an IBM mainframe in the early 1960s. I feel that the transition from Basic to Lisp could be difficult as Lisp contains some idiosyncrasies from that old IBM mainframe. This*



**PLACE OF BIRTH: CAMBRIDGE UNIVERSITY**

**TEACHING  
EXPERIENCE:**

**ETON, CAMBRIDGE,  
WINCHESTER AND 80%  
OF ALL BRITISH SCHOOLS.  
OVER 1,000 AUSTRALIAN  
SCHOOLS.**

**SUBJECTS:**

**ENGLISH, MATHS, PHYSICS,  
CHEMISTRY, BIOLOGY,  
GEOGRAPHY, SCIENCE, ART,  
MUSIC, ETC, ETC TO HSC  
LEVEL.**

**RECOMMENDED SEVEN EDUCATION  
BY: DEPARTMENTS IN  
AUSTRALIA.**

**\$859\***

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

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

The teacher is a computer.

The BBC school computer.

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

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

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

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

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

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

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

The price.

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

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

### The BBC school computer.

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

Name: \_\_\_\_\_

School: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

**BARSON COMPUTERS**



is especially true for inexperienced Basic programmers. Lisp is available for very many micros including the Spectrum, IBM PC and others. For a detailed description of the language and a tutorial, look at APC's back issues from August '84 onwards for Dick Pountain's 'Teach yourself Lisp' series.

On to Pascal, which was designed for use in teaching students computer programming. The idea behind Pascal was to produce very reliable programs which could be easily understood, modified and reflect the algorithm used to implement your program. Pascal also has a high reputation in terms of portability and transferring a program from one machine to another. It is probably a good choice for a second language as it is compiled.

Pascal is also available for a number of micros. The most popular version is one known as UCSD Pascal — general micro Pascal compiled into a special internal code known as P-code which is then interpreted, but the difference in speed can still be appreciated.

Another language, Forth, has a great following among the 'hacker' type of computer enthusiast. Forth systems give you a very small group of central commands from which you generate your own commands. It has been used to design the software within arcade machines, giving you some idea of its power. Although it is possible to generate readable programs in Forth, a lot of Forth users seem to delight in writing their programs as cryptically as possible.

Other languages you might consider are C, which is like Pascal but gives you a lot more power to deal directly with

the machine you're programming; Action, a 'C' and Pascal clone available for Atari micros; and Cobol, a business language that will run on CP/M and other business-like operating systems.

TH

## Immortality taped

According to a leading tape manufacturer all tapes, even C15s, should last indefinitely as long as the tape is rewound at least every six months to eliminate print-through problems.

Although software houses cannot be unaware of this fact, I find that no information on this subject has been given in advertisements or with any program I have purchased on cassette. The implication is, therefore, that the program will last forever.

If a program on a tape deteriorates to such an extent that it's no longer loadable, a reliable software house will replace it upon its return. However, the possibility of the software house ceasing to trade cannot be eliminated, which leaves the tape owner with no absolute guarantee of the program's immortality.

I suggest that all programs sold on tapes which have no free listing supplied, or which have an anti-copying device, may have been sold under false pretences (that is, no warning given that the tape will not last forever unless rewound regularly), and that the owners of such tapes could be legally entitled to a listing of their program.

N Davidson.

## Viva Espana!

My problem is finding a word processor suitable for our Spanish Department. It must be complete (inc monitor and printer) and cost

less than \$6,000 inclusive of a year's supply of any necessary software (floppy disks, printing ribbons, and so on).

The prospective machine needs to perform two tasks: firstly, store the kind of information that is currently held on cyclostyped sheets in the secretarial office (booklists, and so on) allowing easy and quick revisions to be made; and secondly, enable members of staff to put drafts of articles and books onto disk for subsequent (and usually repeated) text-editing (including re-paragraphing and re-pagination).

To date I have run up against two problems. We need a keyboard that has all the necessary Spanish as well as English characters, that is, ¿ ¡ ñ ´ (and if the accent is on a dead key so much the better). We need a printer with italic font as well as roman if we are to achieve neat, camera-ready copy. The problem here seems to be the mixing of two typefaces on the same page: if you leave a gap for the later insertion of italic words and titles you can easily foul the line when re-adjusting the paper in the printer.

Is there an answer?

Dr A Longhurst

*There's no need to buy an expensive dedicated WP system nowadays unless it's got to take an eight-hour-a-day pounding in a typing pool. The main difference between dedicated system and microcomputers used as word processors is that the former are tank-like in construction.*

*Your problem wouldn't be a problem if you lived in Spain because you could buy an off-the-shelf system (for example, an IBM PC, WordStar and an Epson FX-80 printer) all ready to run in Spanish and English.*

*Here it's not so easy. There are two main pro-*

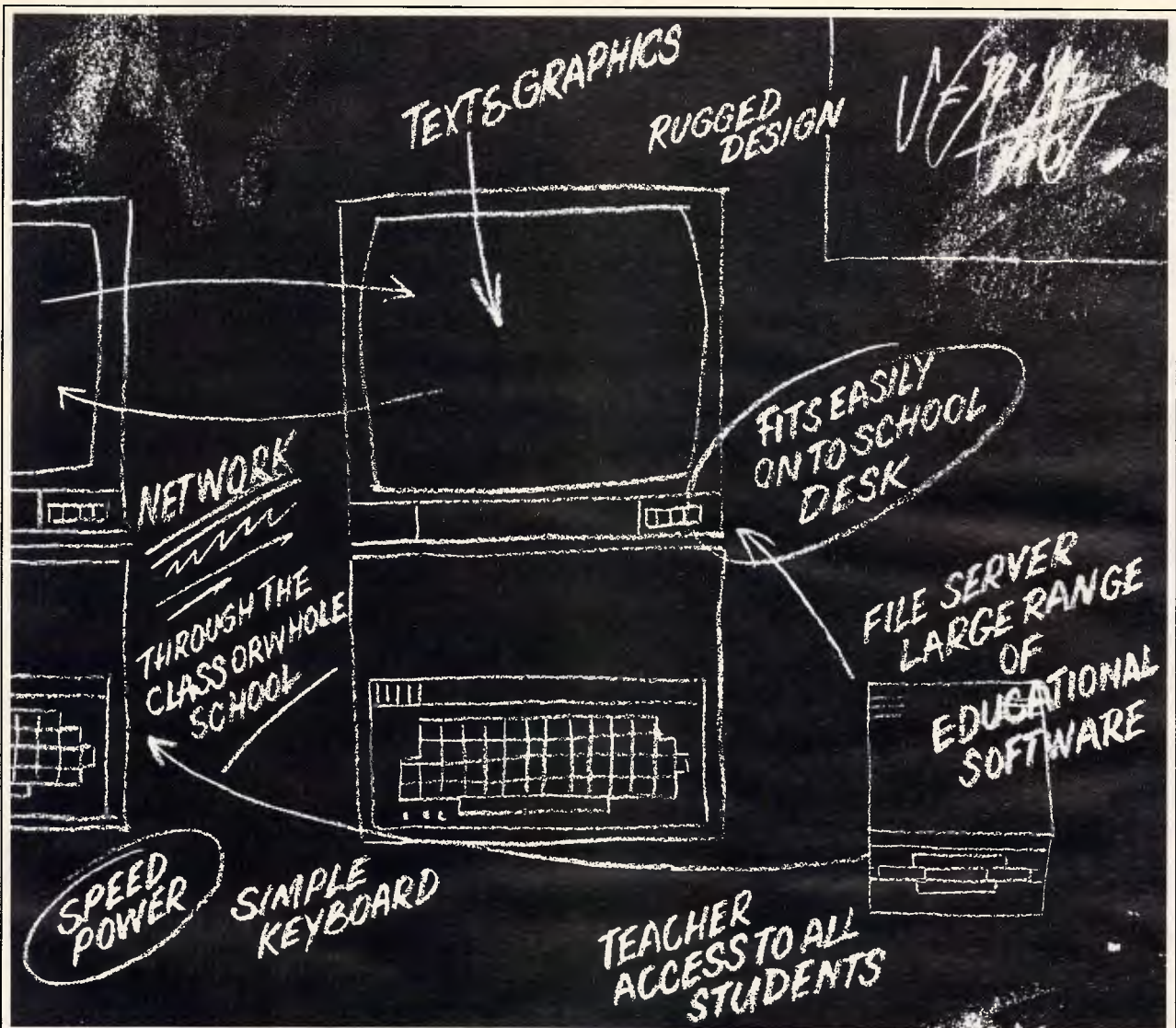
*blems: the computer keyboard has to be reconfigured to give foreign character entry and screen display; and the printer has to be able to print the desired characters.*

*Regarding keyboard and screen, the IBM PC and lookalikes win hands down, since PC-DOS (the IBM PC operating system) includes routines known generally as KEYB command files. Simply type, for example, KEYBSP at the keyboard and it becomes a Spanish one, with a dead key for accenting vowels, and so on.*

*You don't indicate whether you want daisy-wheel or matrix output. With today's matrix printers you can often achieve Near Letter Quality (NLQ) printout which should be good enough for your requirements. Furthermore, a matrix printer can swap between fonts itself, whereas unless you spend many thousands of dollars on a two-wheel daisy machine, you have to stand over a single wheel one waiting for the computer to tell you to 'change print wheel now'. That's how it copes with different language character sets — you put a wheel for the language required into the printer every time the text changes language.*

*So we're down to an IBM PC, a matrix printer (either the IBM graphics printer, which is an Epson MX-80 customised to include extended graphics and font capability) or an Epson FX-80. The last part of the equation is the software. Although you can get word processing packages such as WordStar in foreign language versions, you'll only get one language pair for your money. That's because the package allows you to write*





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

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

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

Most others came into being in factories.

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

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

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

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

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

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

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

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

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

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

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

## The BBC school computer.

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

Name: \_\_\_\_\_

School: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

## BARSON COMPUTERS



## AUSTRALIAN SOFTWARE LIBRARY

P.O. Box 808  
Renmark, S.A. 5341  
Phone (085) 882877  
24 hours

### Special Offer for Xmas

Mockingboard C - \$219.00  
Add stereo music, sound effects and speech to your Apple II + /Ile computer.  
Normal price \$275.00

#### APPLE

Beyond Castle	
Wolfenstein	\$39.95
Bruce Lee	\$39.95
Championship Lode Runner	\$39.95
Cutthroats	\$44.95
Dallas Quest	\$39.95
Dazzle Draw (IIC/128K Ile)	\$54.95
Flashcalc	\$119.00
Flight Simulator II	\$59.95
King's Quest	\$54.95
Mach III Joystick	\$64.95
Practical II	\$79.95
Print Shop	\$54.95
Summer Games	\$44.95
Turbo Pascal	\$59.95
Zaxxon	\$28.95

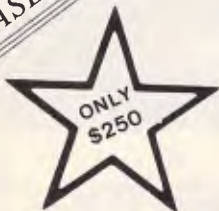
#### MACINTOSH

Enchanter	\$44.95
Filevision	\$219.00
Frogger	\$44.95
Murder by the Dozen	\$49.95
Pensate	\$44.95
The Quest	\$44.95
Run for the Money	\$54.95
Sargon III	\$54.95
Seastalker	\$44.95
Sorcerer	\$49.95
Starcross	\$54.95
Suspended	\$54.95
Zork I	\$44.95
Zork II, III	\$49.95 ea.

To order, send payment or Bankcard/Mastercard number. Add \$2.50 postage per order. Send \$1 stamp for catalogue.

Subscriptions to The Source now available — only \$59.95!

NEW RELEASE



### "CLATATRAP" A Complete ACOUSTICAL COVER For 80 Column Printers

- Can be tilted to 40° to allow cover to be used as copy holder
- Attractive ALMOND top and BROWN base
- COMPACT — requires only 20 x 17 inches of valuable desk space
- Tailored vents for airflow & removal of heat
- Sturdy ABS construction surrounding sound-absorbing foam lining



DEALER ENQUIRIES WELCOME

### INFOCOM (AUSTRALIA) PTY LTD

PO BOX 446 TOOWONG QLD 4066 PHONE (07) 371 9515

Please send me \_\_\_\_\_ "CLATATRAP" (s)  
I enclose \$250.00 for each one.

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CHEQUE  MONEY ORDER  BANKCARD

SIGNATURE: \_\_\_\_\_

EXPIRY DATE: \_\_\_\_\_

English anyway because (as you know) there are no funny 'squiggles' over or under English letters.

Since you'll have to order a foreign language version anyway, I suggest the best package for you is the Western European version of a word processor called *Multilingual*, from a company called *Economic Insights*, 416 Centre Street, 365, Washington Grove, Silver Springs, Maryland 20880, tel: (301) 258 5235. For \$450 you get a WP package for the IBM PC which can display and print character sets for all West European languages of the Indo-European family.

The total package should come well within your \$6,000 budget.

## Adventure expertise

Help me! This adventurer needs urgent help. Every time I play Enchanter, Infidel and all three Zorks, I end up dead, sacrificed, squashed or eaten.

Is there a senior more experienced adventurer out there in Infocom or APC land that can help me? Or is this adventurer destined for the land of the dead.

C Anderson

We'd be interested to hear from an expert adventurer too who can spend time chairing a forthcoming adventure feature. Write to 'Expert Adventurer', The Editor, APC, 77 Glenhuntly Road, Elwood, Victoria 3184.

## Add-ons for VZ-200

In reply to Nigel Pope's letter in the October issue of APC: an RS232 interface for the VZ-200 is available from Mr Ronald Rohde, 13/12

Walsh Street, South Yarra, Vic, 3141. It is sold for \$49.95 by mail order only.

Mr Rohde also manufactures and sells various add-ons for the VZ-200, and offers an extensive range of software on cassettes.

I am a primary school teacher at a Perth primary school using the VZ-200 as an educational tool in classes.

R Bleckendorf

## When in doubt — cheat!

RUN

- 110 Dear Ed, GOTO 130
- 120 BRAINDUMP, return
- 125 September issue of APC, return
- 130 With regard to the, GOSUB 120, article in the, GOSUB 125, which, GOSUB 150, was a very valid argument, GOTO 230
- 135 'RETURN without GOSUB in line 15', see the GOSUB 125, GOTO 220
- 140 It's an, GOSUB 170, that, GOSUB 150, often interrupts the smooth running of a program when using, GOSUB 190, this, GOSUB 170, is, GOTO 135
- 150 In my opinion, GOSUB 200, return
- 160 'RUN' return
- 170 'ERROR!', return
- 180 If you are reading this line you have crashed this program
- 190 'GOSUB', return
- 200 For what it's worth, return
- 210 But I have found an, GOSUB 170. This, GOSUB 170, occurs when the program is, GOSUB 160, GOTO 140
- 220 END
- 230 A time & a place for everything, GOTO 210

John Brown

(1000 If you read this you're cheating — Ed)



# SAMPLE THE POWER OF FRAMEWORK ASHTON-TATE

ON YOUR OWN COMPUTER!

# \$19.95!

FOR



**2-DISK SET. For your IBM PC, PC XT or Compatible!**

Sample Software is an exciting new concept in Software evaluation, supported by the major software houses! Sample Software - it's the perfect chance to try before you buy!

DISCOVER FRAMEWORK - the most exciting and powerful integrated software program recently released! Requires 384K RAM. Integrates WORD PROCESSING, SPREAD SHEETS, DATA BASE - AND WINDOWING - PLUS GRAPHICS, COMMUNICATIONS - ALL IN THE ONE PACKAGE!

**OTHER SAMPLES AVAILABLE NOW!**

- APPLE II:** MEC Education, Hypergraphics.
- MS-DOS:** Martin's Marvellous Public Domain Software
- CP/M:** Bill's Bonanza - Best of the Public Domain Software (Specify Disk Size and Format when ordering).
- PLUS! THESE LATEST-RELEASE PC-DOS SAMPLES:** dBase III, RBase, SuperCalc 3, Symphony, Attache Accounting, Energraphics (specify IBM, PC-XT, Columbia or PC-Compatible), Friday!, DR Graph, DR Draw.



Every Sample Software Order entitles you to a GIFT VOUCHER OF EQUIVALENT VALUE - redeemable with your chosen full-price software purchase.

These sample programs show you at firsthand the real power of the very latest Micro-computer software releases - on your own computer - at a fraction of the full price! However, each sample deliberately limits the extent to which you can make use of it, while still providing utilisation of most of the key features in the full price software!



**PROMPT & SAFE DELIVERY GUARANTEED!**

Yes please, I would like to sample THE FRAMEWORK 2-DISK SET @ \$19.95! TOTAL ORDERS:  @ \$\_\_\_\_\_ PLUS \$1.50 P&P.

I would also like to order @ just \$11.95 each:

- APPLE II:**  MEC Education;  Hypergraphics.
- MS-DOS:**  Martin's Marvellous Public Domain Software.
- CP/M:**  Bill's Bonanza - Best of the Public Domain Software. (Specify Disk Size and Format).
- PC-DOS:**  dBase III;  RBase;  SuperCalc 3;  Symphony;  Attache Accounting;  Energraphics (specify IBM, PC-XT, Compatible);  Friday!;  DR Graph;  DR Draw.

My Computer is: \_\_\_\_\_  
Specify Operating System, Disk Size and Format: \_\_\_\_\_

OR, I am planning to purchase: \_\_\_\_\_

I would like to receive more information on: \_\_\_\_\_

I enclose  Cheque;  Bankcard;  Mastercard.  
Card No: \_\_\_\_\_ Expiry: \_\_\_\_\_  
NAME: \_\_\_\_\_  
COMPANY: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
P/CODE: \_\_\_\_\_ TEL: ( ) \_\_\_\_\_

**NO STAMP NEEDED! SEND TO:**

Sample Software,  
Free Post 18, PO Box 169,  
DARLINGHURST NSW 2010.  
OR TELEPHONE: (02) 357 2109







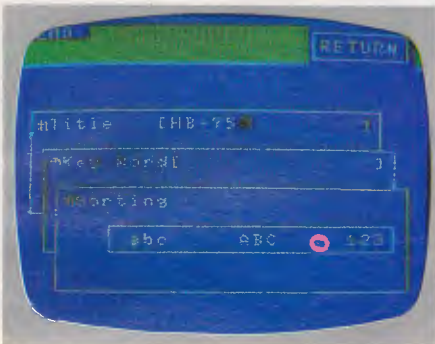
# Sony MSX

Australia is about to receive the long awaited wave of Japanese home computers. Most will conform to a standard known as MSX, designed to allow software produced for one machine to run on any other MSX micro (with some exceptions). Tony Hetherington looks at Sony's offering due to be released here in the first half of '85. Toshiba intends to precede Sony's launch date with its machine, set to be in the shops in March. The similarity of the machines means that many comments related to the Sony can be applied equally to the Toshiba and other MSX machines to follow.





The built-in programs are selected using the cursor and return keys



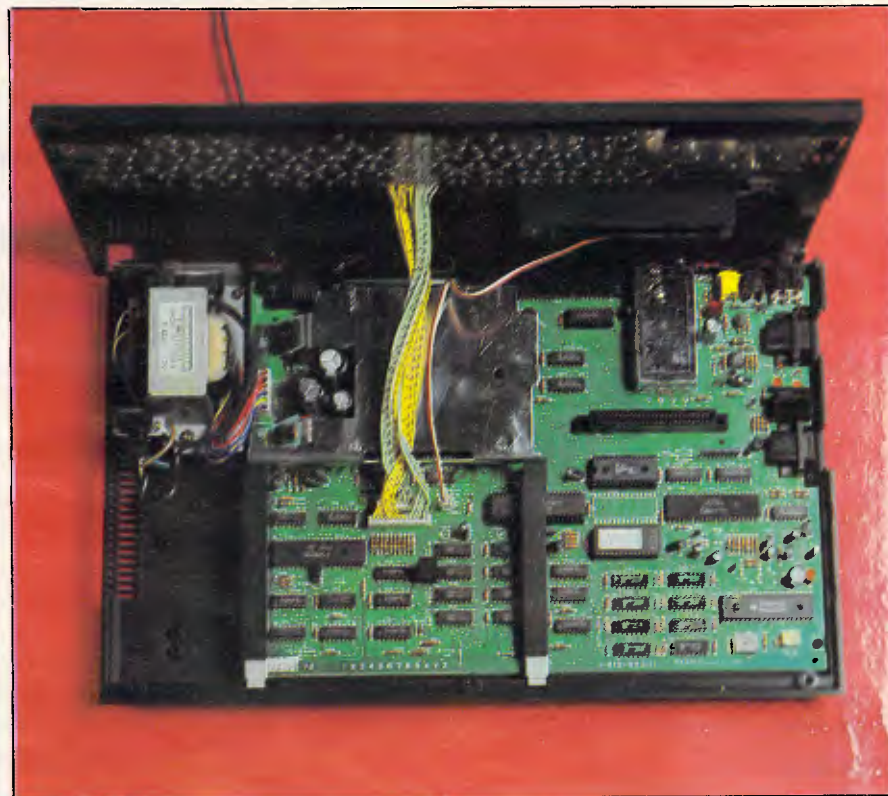
Pages of data can be searched for or sorted with this powerful utility



Information held on the Data Cartridge can be saved and loaded from tape



Executive image—the standard MSX keys are housed in a beautifully styled unit



Inside: the main circuit board is dominated by four chips

MSX and the principle of software compatibility between machines have dominated the pages of computer magazines ever since the idea was first conceived a year ago.

Few people doubt the reputations or the financial resources of the companies involved — they read like an index of the major Japanese electrical manufacturers. Yet MSX has already had many critics. These critics, however, have based their arguments on the minimum specification of an MSX machine and have therefore missed the vital point: that MSX is only a central core around which computers may be built.

As the first wave of these computers is about to reach our shores, it is becoming clear that they go beyond that central core and contain some

interesting built-in features.

The Sony HB-75 is not only one of the first MSX machines, it is also one of the better models. For around \$400-\$500 it offers 64k RAM, MSX Basic, an impressive choice of video output,

including RGB, and 16k of built-in software.

### Hardware

The Sony HB-75 computer conforms



It Reads, Writes and  
does Arithmetic.  
It Paints in 3-D, Keeps  
Your Appointments  
and Talks to the World.

**OPEN ACCESS is now available for the following MS DOS/PC microcomputers:**

AT&T PC; Chamellion; Columbia; Compaq; Corona; Data General; DEC Rainbow; Eagle; Emtex; Ericsson; Friend; HP-150; Hyperion; IBM PC; ITT Extra; Monroe; NCR Decision Mate V; NEC-APC Olivetti M24; Pantek; Philips PC; President; Sigma Elite; Sperry PC; Tandy 2000; TeleVideo; Texas Instruments PC; Toshiba T-300; Wang PC; and Zenith 150.

# O·P·E·N ACCESS

"OPEN ACCESS," is the result of 60 man-years of effort to create a truly do-it-all, super-program — one that can perform virtually every task you're ever likely to encounter.

The beauty of it is, all that capability resides on a single program. You don't have to re-enter data. Or spend time trying to get unmatched programs to work together.

OPEN ACCESS takes its name from the source of its power — a relational data-base manager that gives you access to more data in more ways than any comparable software.

OPEN ACCESS includes an electronic spreadsheet, 3-D graphics, word processor, appointment scheduler and telecommunications module — all revolving around the powerful information manager.

For your nearest  
dealer contact the  
Australian distributor...

 **SOFTWARE  
SUPPLIERS**

7 Avon Road  
North Ryde, NSW 2113  
Telephone (02) 888 1955  
Telex AA 75364



to the MSX requirements but goes further. It is supplied in functional packaging complete with a carrying handle. Opening the box reveals the micro itself, three manuals and the TV and cassette leads.

The review machine was in fact an English translation of the Japanese version and not the PAL version that will be available in the shops. Obviously there are some differences between the two versions but I'll try to rectify these in the appropriate sections.

The MSX standard states that the keyboard will contain 73 keys including the standard qwerty layout, five function keys and a cluster of cursor control keys. However, it is left to the individual manufacturer to decide what to make the keys from and how to organise them on the keyboard. Sony seems to have spared no expense on your behalf, and has gone for the executive image by housing the keys on a beautifully styled unit.

The keys themselves are set into the front part of the unit which slopes towards the user. They are typewriter style with a good positive feel. Surrounding them are the grey 'support keys' which include a CAPS SHIFT with a built-in LED (showing when it is engaged), a graphics key to obtain the graphics characters from the qwerty keys and a suitably large RETURN key.

The five function keys are found above the qwerty keys and are rectangular rather than the usual square shape. They also require a firmer press to register in order to avoid accidental pressing. Another set of such keys are to the right of the function keys and include an INSERT and DELETE key which are used with the full screen editor. Also in the group is a STOP key to pause or stop a program, and a HOME key to position the cursor to the top of the screen. Further cursor movement is performed by the four cursor keys arranged in a cluster to the right of the other keys. These are a bonus to anyone using the screen editor and can be used in games if you haven't got a joystick.

To complete the top of the keyboard there are keys for RESET and POWER. These are suitably guarded by plastic ridges to stop you from accidentally wiping out your programs.

Finally, the rear-raised section of the keyboard houses an MSX-compatible cartridge slot. A second cartridge slot can be found on the back of the unit in the PAL version which replaces the Japanese version's I/O port. This is

quite a sensible change since all peripherals can be connected to the Sony via a cartridge slot or the built-in Centronics interface. Also along the back is an impressive array of video outputs and a cassette interface which, via the lead supplied, allow programs and data to be stored on an ordinary cassette recorder. The video outputs include the MSX standard RF (UHF channel 36) and composite audio and video, as well as the RGB output. This isn't particularly surprising considering Sony's interests in this field but is a welcome addition to any machine.

The external features of the Sony are completed by two joystick ports on the right-hand side of the machine.

Undoing just three screws allows access to the inside of the Sony HB-75. This contains an internal power supply and the main circuit board which is dominated by four chips.

The Z80A processor is partly obstructed from view by a supporting strut that protects the circuitry from over-zealous keyboard pressing. It runs at just over 3.5 MHz and has access to 64k of RAM.

The processor is ably supported by a remarkable chip, the TMS9918A, which is made by Texas Instruments and is a sprite-based display chip. It is fully interfaced with the CPU and controls the screen resolution, sprites, colours and monitors, updates the additional 16k of video RAM and provides the various video outputs.

Another chip, the PSG AY 3-8910, complements the graphics chip and is responsible for the 3-channel, 8-octave sound that is a feature of the MSX machines.

Finally, there is a 32k ROM chip. This holds the MSX Basic and completes the recognised MSX standard. Although the original MSX specification only called for 8k of RAM, all the MSX machines that I know of have 64k, although there are reports of some 16k versions.

One further chip of interest, which is unique to the Sony micro, is the 16k ROM chip. This contains a collection of programs and utilities held in firmware that gives the Sony the luxury of built-in software.

An additional piece of hardware called the Data Cartridge should be mentioned here. This should be considered by Sony owners as a *compulsory* optional extra as it fits into the cartridge slot and provides instantaneous storage and retrieval of data: compulsory because its presence brings out the full potential of built-in software. The Data Cartridge doesn't

involve any new technology but illustrates the Japanese flair for innovation. Quite simply the one I had consisted of 4k of low voltage CMOS RAM continually backed up by a small battery with a five-year life — all packed into a cartridge. The theoretical limit would be a 64k cartridge but the cost of CMOS RAM imposes a realistic limit of 16k.

Although this facility is available to the other MSX machines, so far only Sony has given it any prominence. This is a shame as I feel when the cost of CMOS RAM falls this will become an important storage medium.

## System software

Unlike the other MSX micros which go directly into Basic, the HB-75 displays a menu of options when the machine is switched on. These options are selected using the cursor keys and the RETURN button and include an address book, memo pad and diary-like schedule reminder.

Such applications have always been mentioned as uses for a home computer but have never been realised, as the time to load from tape has been too long. However, Sony seems to have found the answer through the Data Cartridge.

Each of these programs is identical in structure and provides the user with screens of nine lines of 15 characters in which to store an address, memo or schedule. These screens of information are given a heading through which they can be located and sorted.

Selecting the address option takes you into another menu of options which stretch along the top of the screen. The first of these is 'files' which, when selected, displays a list of all the address headings that are stored in the machine (or on the cartridge). Moving the cursor down to the one required and pressing the RETURN key is all you have to do to select the screen for that address. A nice little trick with the address headings is to arrange them so that they contain the person's name and phone number. This creates an additional phone directory.

New entries can be made via the NEW option by simply typing in the entry. When you've finished, pressing ESC not only returns you to the previous menu but also saves it to the DATA Cartridge if one's present in a cartridge slot.

Similarly, entries can be altered with the UPDATE option and, as with NEW, characters can be entered, altered or



# PROFOUND



## PC-1600/XT-1600

### FEATURES:

- IBM PERSONAL COMPUTER COMPATABILITY
- RUNS LOTUS 1-2-3, WORDSTAR, dBASE 2 ETC.
- 256K-RAM STANDARD
- DUAL 360K-BYTE DRIVES STANDARD
- SERIAL PORT STANDARD
- PARALLEL PORT STANDARD
- COLOR/GRAPHICS I/F STANDARD
- BATTERY BACKED CLOCK/CALENDAR
- 20MHZ HIGH RESOLUTION MONITOR STANDARD
- 10M-BYTE HARD DISK (OPTIONAL)

WE PROVIDE YOU WITH ALL THE ADVANTAGES OF THE WELL ESTABLISHED IBM PERSONAL COMPUTERS AT AN AFFORDABLE PRICE. WE ALSO BOAST AN EXTENSIVE IN-HOUSE SERVICE CENTRE PROVIDING UNPARALLELED SERVICE SUPPORT.

### THIS MONTH'S SPECIALS:

LOTUS 1-2-3 \$595, LOCKING DISK HOLDER \$29.95

### SAVE FOR CHRISTMAS

Present this advertisement and receive a huge discount of \$700 off the normal price of \$3500 (incl. tax). BUT HURRY, this offer is limited to the first 20 purchases made during December '84.

DEALER & CORPORATE ENQUIRIES WELCOME!

## EASTERN MICRO ELECTRONICS



92-94 BANK STREET, (Cnr of Bank Street and Kingsway)

SOUTH MELBOURNE, VICTORIA 3205. Phone: (03) 699 3088 Telex: AA38432 ATT EME

## EME MODEL III

### FEATURES:

- 6502 & Z80 DUAL PROCESSORS
- 64K-RAM
- UPPER & LOWER CASE
- EXTENDABLE KEYBOARD
- PROGRAMMABLE 10 FUNCTION KEYS
- 188 FUNCTION KEYS
- BUILT-IN COOLING FAN
- SINGLE OR DUAL SLIMLINE DRIVES INTERNALLY INSTALLED (OPTIONAL) (\$299 EACH)

HI RESOLUTION (20MHZ) MONITOR WITH SWIVEL BASE

**\$199**

Incl. Tax



**\$799**

Tax incl.



### SAVINGS

Bring along this ad and receive a \$100 discount during December '84



deleted anywhere on the screen. Again pressing ESC ends this process, but this time you are given the choice between keeping the updated version or losing it in favour of the original. While updating, you can clear the whole entry by selecting the delete option at the top of the screen.

The final option on the address menu takes you to the search/sort screen. Here you can search for a particular address by either typing in the whole title or a keyword. This keyword can be any number of characters and in either case only the appropriate files are listed. For example, if you had stored the addresses of all known computer magazines then the keyword 'Personal' would produce several entries whereas 'Computer' would result in a longer list.

As you create new entries these appear on the top of the 'files' list but there is a sort facility which will instantaneously rearrange into descending order, giving preference to either numbers, capitals or small letters.

There doesn't seem to be a limit to the number of file entries that you can have unless you are using the Data Cartridge which would impose a 4k limit — about 22 full screens. The entries can be either kept on the Cartridge or saved to tape using the transfer utility. If the Cartridge is present then an additional tape to cartridge utility is also available. Any tape-saving process also includes an automatic verify, so you should ensure that you note the tape position from which the data is saved.

The whole process is very user-friendly and simple to use. So simple that I managed to discover all its facilities without having to delve into the accompanying Japanese manual. Thank goodness!

The software on the review machine still contained some Japanese characters which won't be present in the PAL version. According to Sony the opportunity is also being taken to improve the machine. This will be a difficult task as the HB-75 already performs well. Yes, the screen size is limiting but 150 characters should be enough for anyone's address, memo or schedule reminder.

As mentioned above the memo and schedule reminder have identical structures but you should use the former as a notepad and the latter as a diary. Sony included various entries already saved onto the cartridge as examples for me to find, including a reminder of when to return the machine. Obviously the software is only at its best with the Data Cartridge which is why I referred to it as a compulsory extra.

You can also use the Cartridge to store a program using the SAVE "CAT:" command. This can then be recalled at any time by the opposite LOAD "CAT:". Unfortunately only one program can be stored at any one time. However, with careful planning you could have several routines as part of a single program. This ability to write to a Data Cartridge is just one of the Basic command sequences that sets MSX Basic above run of the mill dialects.

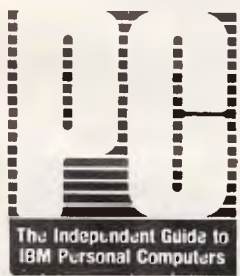
MSX Basic is the final option on the main menu and when selected takes

the user into the standard programming screen found on all MSX micros. The screen colours are set to white letters on a dark blue background, although any of the 16 colours can be used.

The current setting of the function keys is displayed at the bottom of the screen. (F1-F5 are displayed, pressing shift reveals F5-F10.) The keys are pre-set to include commands which are useful to programmers and include AUTO to generate line numbers, LIST and of course RUN. These keys can be easily redefined and can be used effectively in programs via the ON KEY GOSUB command. This command is followed by a series of line numbers which the program jumps to depending on which function key is pressed. This matches the ON GOTO and ON GOSUB commands found on other machines for jumping to a line number depending on the value of a variable. However MSX also includes the useful ON STRIG which is dependent on the direction of a joystick.

These commands should not be confused with the more powerful interrupt-driven commands which have a similar syntax; for example, ON INTERVAL. These are driven independently of the Basic program by interrupts that are generated by the display chip sixty times a second.

The ON INTERVAL command is used to define time intervals at which subroutines will be called. The time interval is written in sixtieths of a second, so 10 seconds would be coded as ON INTERVAL=600 GOSUB 1000. This command would be at the beginning of the program and would



Magazine series rates

# REVELATION

## 'best there is'

*"... the most comprehensive and powerful database manager available today."*

*"... it gives you the best there is."*

— PC Magazine, September, 1984 pp.246-248

Demo Disks plus Manual available for only \$125! — fully refundable if returned within 60 days, or upon subsequent purchase.  
REVELATION PLUS — includes FREE PickSoft Programs & Utilities — available for your MS.DOS micro now only from Picksoft!

Join the REVELATION REVOLUTION and win the information war

**PICKSOFT**  
THE PICK SOFTWARE HOUSE

Suite 5/211 Ben Boyd Rd., Neutral Bay  
2089 Sydney, N.S.W. Australia  
Phone: National (02) 908 4033  
International (612) 908 4033

A Division of Pick Information (Aust) Pty Limited (Incorporated in NSW)



be started by INTERVAL ON. Thereafter, every 10 seconds, the program would jump to the subroutine at line 1000. Later in the program it could be halted by INTERVAL OFF.

Other interrupt commands include ON SPRITE which is activated by a sprite collision, ON ERROR by a program error and ON STOP by an attempt to stop the program. The ON SPRITE command is particularly powerful since, without it, it would be almost impossible to check for collisions between the 32 sprites supported in MSX Basic.

These sprites are just one of the advanced graphics facilities which earn MSX the X for extended in its name. The others include the self-explanatory CIRCLE and PAINT and the powerful LINE command. This, in its simplest form, draws a line between two points but adding a 'b' in its syntax draws a box with two of the corners at the defined points. Finally, add an 'f' after the 'b' and the box is filled in.

More complex line drawings can be quickly created using the graphics macro language via the DRAW command. This is a logo-style language which follows simple drawing instructions. For example, U10 draws a line 10 pixels long up the screen. There are similar commands for left, right and down as well as the diagonals. The instructions are placed in a string which is then drawn. DRAW "U10L10D10R10" draws a box. A similar macro language controls the sound which is then PLAYed.

The pixels referred to above are part of the 256 x 192 graphics screen — just one of three screen modes which can be selected with the screen command. However, I would imagine that the 30 x 24 text mode would be dropped in the PAL version, leaving the 40 x 24 mode, as Australian users will have little use for Japanese character sets.

These advanced Basic commands will be ample compensation to MSX

users for the relative slowness of the Basic (see Benchmarks) and only having 28k of the original 64k for program use. They will allow even the beginner to produce remarkably sophisticated games and programs and the more advanced machine code programmers will relish the 60k of memory available.

## Applications software

The amount of software available for a machine is of critical importance to its performance in the market. A number

immense, possibly even rivalling the Commodore 64's range.

It is obvious that such a large range will include the inevitable fruit machine and space invaders programs which seem to plague most micros; but then I feel the machine's facilities will generate more advanced software. For example, machine code programmers have 60k to play with which is unrivalled in the home market. Similarly the Data Cartridge combined with a cartridge in the second slot provides the opportunity for immediate software.

*'The Sony HB-75 will be a very tempting buy to a first-time buyer. . . As an MSX machine it carries the benefits of an easy to use and powerful Basic with a promised glut of software.'*

of technically sound machines have failed because of the comparative lack of software. MSX machines should have no problem in this area because the principal theory behind MSX is software compatibility.

This is the quite simple idea that software written for one machine should work on another. The video market is a good example of this in practice where any VHS machine can use all VHS cassettes (although even in video there's the rival Betamax standard).

The software houses obviously agree with the principle as at the time of writing over 45 of them are preparing catalogues of up to 15 titles each. This list of 45 companies contains the majority of the market leaders, planning MSX versions of their chart-topping titles.

On top of those already committed there is probably an equal number waiting in the wings to see how well MSX-based micros sell. Should MSX take off, then I would imagine that the number of titles available will be

Sony 3½in disks will be a third medium available to software houses and will no doubt be used to provide MSX owners with a range of home and small business packages including a comprehensive CP/M library.

Another reason for the availability of software is the help that the MSX group is giving to software houses — including a full list of useful ROM calls. This should be taken as a lesson to other companies who try to keep such information to themselves; which attitude is somewhat self-defeating as without such information programmers cannot best use a machine's capabilities. Consequently, the standard of software suffers and therefore so does the machine itself.

## Documentation

Documentation is especially important in a machine aimed at the first-time user and therefore should contain a Basic language tutorial as well as machine instructions. The task of evaluating the Sony manuals was almost impossible as they were all in Japanese. However, by virtue of the

## Technical specifications

CPU:	Z80A processor running at 3.58 MHz
ROM:	32k MSX Basic; 16k firmware
RAM:	64k RAM; 16k video RAM
Keyboard:	73-key MSX standard incorporating five function keys and a cluster of cursor keys.
Display:	Text mode 40 x 24, graphics 256 x 192. 32 definable sprites, 16 colours.
Sound:	Three channels, eight octaves.
Interfaces:	Centronics (printer), two MSX cartridge slots, standard cassette (1200/2400 baud).
Video output:	RF (UHF ch 36), composite audio and video and RGB.
Dimensions:	407 x 67 x 245mm (width, height and depth respectively)
Weight:	2.8kg

## Benchmarks

BM1	2.1
BM2	6.0
BM3	16.8
BM4	18.3
BM5	19.3
BM6	31.2
BM7	44.8
BM8	216.3

*All timings in seconds. For a full listing of the Benchmark programs see 'Direct Access'.*



# UNLEASH THE MUSIC IN YOUR COMMODORE 64

SIGHT & SOUND  
Music Software, Inc.



## THE INCREDIBLE MUSICAL KEYBOARD

Now with no musical experience you can unleash the music that's hidden deep within your computer. This unique keyboard comes complete with its own software that will get you playing right away. It even includes two music books, one for the beginner, and one for the more advanced musician.

### KAWASAKI SYNTHESIZER

This transforms your computer into a programmable synthesiser and sound processor. Use the polyphonic keyboard and preset sounds to create your own music. Unique three-track recording capabilities to produce an unlimited number of instrument sounds and special effects.

### KAWASAKI RHYTHM ROCKER

Create space sounds and hi-resolution colour graphics to the beat of electronic rhythms. This creative Music/Video synthesiser offers a variety of percussion and synthesiser sounds that can be laid down on top of pre-programmed bass lines.

### MUSIC PROCESSOR

Create, edit, record, play and compose your own musical arrangements. Use your joystick to change any of the 99 preset instrument and special effect sounds. Full music editor allows you to create new music or change one of the 16 pre-recorded tunes. See visual musical notation on the screen. Music Processor is compatible with the entire computer song album series.

### TUNE TRIVIA

Challenge yourself and your friends to music trivia from an almost infinite number of songs and questions. Four fascinating games in one, add your own tunes and trivia questions, try to stump your friends. Tune Trivia comes complete with superstar songbook and full documentation.

### COMPUTER SONG ALBUMS

Listen to the hits of Michael Jackson, Willie Nelson, Denise Williams, The Eurythmics, while you control computer generated instruments and special effects. Every musical arrangement comes complete with bass, rhythm, melody and harmony. Computer Song Albums are also compatible with the music video kit soon to be released.

**Ozi Soft**<sup>™</sup>

AUSTRALIAN DISTRIBUTORS.

### FUTURE 1984 RELEASES INCLUDE:

#### Music Video Kit -

Make your own music videos with this powerful graphics processor. Paint a background scene, then synchronize your masterpiece to your music.

#### 3001 Sound Odyssey -

Travel through a complete tutorial on musical synthesis. Learn how subtle change in A.D.S.R., waveforms, ring modulation and filters work together, then create your own music.

AVAILABLE AT ALL GOOD COMPUTER STORES ...



# RIGHT PRICE. RIGHT SIZE. RIGHT SPEED.

*That's Riteman!*



RITEMAN II

RITEMAN 15

RITEMAN PLUS  
(Tractor feed and cover optional)

RITEMAN BLUE PLUS

If you're looking for an Epson\* or IBM\*\* compatible dot matrix impact printer that's lower in price, smaller, durable, and fast enough to keep pace with your work flow . . . we'd like to show you a Riteman!

Four great new printers. All priced well against comparable Epson models. All substantially smaller. Yet solid as a rock. With print speeds up to 50% faster than the competitors.

The Riteman Plus, Riteman II, Riteman 15, and Riteman Blue Plus with IBM graphics. All are backed by a full one-year warranty. And, as you can see, they're great-looking, too!

For further information contact your local Riteman dealer, or Warburton Franki

\* Epson is a registered trademark of Epson America, Inc.

\*\* IBM is a registered trademark of International Business Machines Corp.

## •RITEMAN:

Distributed exclusively in Australia by:-



# Warburton Franki

A DIVISION OF THE ANI CORPORATION LTD (INCORPORATED IN N.S.W.)

- ADELAIDE (08) 356-7333 • BRISBANE (07) 277-0222 • HOBART (002) 28-0321
- MELBOURNE (03) 795-9011 • PERTH (09) 277-7000 • SYDNEY (02) 648-1711
- AUCKLAND N.Z. (09) 50-4458 • WELLINGTON N.Z. (04) 69-3016



## BENCHTEST

fact that Basic keywords are recognisable, an educated guess can be made.

The three manuals supplied were: the introductory guide to the HB-75; an explanation of the built-in software; and a Basic tutorial guide.

The introductory guide takes you through setting up the computer and on to an explanation of the keyboard, particularly the function keys and CTRL key permutations. It closes with a full technical specification and even a vague memory map.

The second manual provides relatively clear instructions about the use of the firmware. This manual couldn't go wrong as the programs are well-structured and easy to follow. However, the manual presents it comprehensively and includes a diagram of the tree structure of the software marked with the key presses necessary to move around it.

The Basic tutorial manual will no doubt be renamed the 'Fido' manual as it likens the computer to a dog called Fido who is very good at following commands. This is quite a nice analogy which sets the tone for a manual blatantly aimed at children. (I was supplied with a direct English

translation of this book which turned out to be a competent beginners' guide to MSX Basic).

The main failing in the three manuals is the apparent lack of any explanation of the more advanced and useful facilities of MSX Basic. For example, there is no mention of the machine's 32 sprites, nor of the useful graphics commands or of the more involved interrupt-driven commands. This is a shame since it is these facilities that set MSX Basic ahead of other dialects.

However, according to Sony a fourth manual is being prepared which should answer these criticisms. This manual is said to include an explanation of each of the Basic keywords, with discussions and examples of the more advanced features.

### Prices

At the time of writing exact details of the prices of the MSX machines are still somewhat vague. An early indication suggests that they will vary between \$400 and \$500.

This price compares well with other \$400+ micros; for example, the Commodore 64 and the Plus/4. The 4k

Data Cartridge is likely to cost about an additional \$50.

### Conclusion

The Sony HB-75 will be a very tempting buy to a first-time buyer, particularly if they already own a Sony product. As an MSX machine it carries the benefits of an easy to use and powerful Basic along with a promised glut of software.

It also expands on the MSX core with the inclusion of RGB and three useful firmware packages which illustrate the potential of the Data Cartridge. The 3½in disk drive will be only one of the many peripherals available as hardware manufacturers will no doubt jump on the MSX bandwagon.

However, it is unlikely that the computer industry will stop developing at its current rate. It may slow down a little, but development will continue. Consequently, there will always be room for really innovative designers as they take home machines into the next generation.

It is debatable whether the MSX machines will be able to cope with these developments. Even if they don't, they will still form a much needed base line.

# CONGRATULATIONS A.P.C.

We are pleased to be participating in your  
world first software offer.

Independent Software Duplication makes the marketing of software easy with:

- Fast, low cost diskette duplicating.
- All copied diskettes 100% verified.
- High speed computer cassette duplicating.
- Inter-format data transfers (media conversion).
- Disc formatting.
- Label printing and packaging.
- Fast turnaround on any size order.

For more information contact Vaughan Hillier on (02) 635 0704.



## INDEPENDENT SOFTWARE DUPLICATION

3 Park Avenue, Westmead N.S.W. 2145  
P.O. Box 545 Parramatta, N.S.W. 2150  
Telephone (02) 635 0704



# Deskt



In this exclusive hands-on review, Peter Worlock takes the wraps off a major new desktop system from Digital Research. Running on any 16-bit machine, with all the features you've come to love, it's a real gem, he says.

Things have been fairly quiet at Digital Research recently. Certainly, the company has released some useful products — DR Logo and DR Graph among them — but nothing to compare with the industry-shaping CP/M on which the company was founded.

However, a product announced last month should change that. At a secret location we were allowed an exclusive hands-on preview of a product that will shake a few people. Not least the people at Apple Computer.

DR's latest release is a full, Lisa-like desktop system that will run on any 16-bit machine. To call it a welcome development is a gross understatement — it should be met with open arms by users, programmers, software publishers and manufacturers. Everyone except those at Apple, in fact.

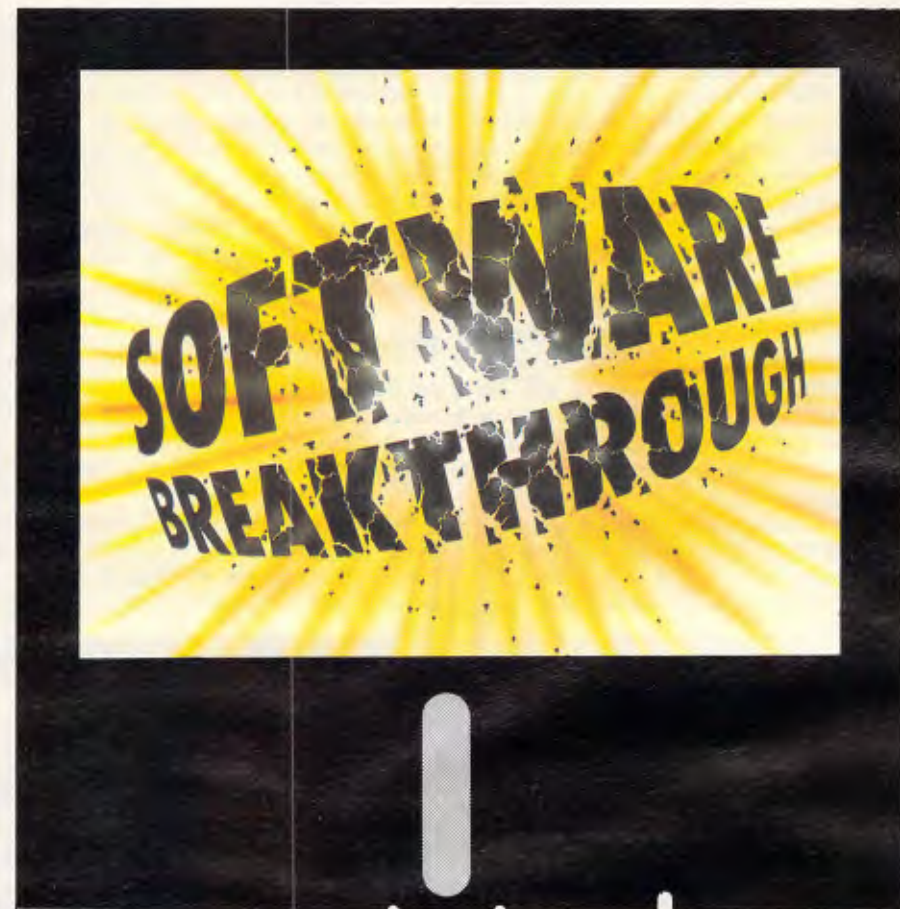
Consider the predicament of many computer buyers: everyone has found the desktop interface introduced by Apple's Lisa an attractive proposition, but Lisa is expensive. The Macintosh promised a cheaper way to get your hands on the system but with drawbacks; the single drive on the Mac has attracted criticism, and the tardy arrival of its software has not helped.

Now enter Digital Research with its Graphics Environment Manager — GEM. Suddenly here's the prospect of the desktop environment running on IBM PCs, Olivettis, Sperrys and the like. And GEM is compatible with the massive range of existing software.

## Features

So, what is GEM offering? All of the features you've come to know and love from Lisa and Mac — icons, pull-down menus and so on. However, in many respects the GEM is closer to Lisa than to the Mac, especially running under Concurrent DOS.

The basic GEM software sits between the operating system and the applications and on boot-up presents icons representing the disk drives. Open the relevant icon and you get an open folder containing all files on disk, again represented by different icons according to file type. Perverse users can select text



mode and the icons vanish to be replaced by a more normal-looking directory complete with file types and length. Directories can be sorted alphabetically, by size or type.

Your existing software — WordStar, 1-2-3, Supercalc or whatever, will also appear in icon form. Position the cursor over the icon, select, and you go to the usual program environment and things work as normal. Exit the program and you find yourself back on the desktop.

The compatibility is achieved by using a GEM core which provides only the simple disk icons. Further into the system you're using more of GEM, but when you select another program the core flips out most of GEM and hands control to your application, loading GEM back in when you're finished.

DR will also be offering a number of utilities using the full GEM system. They

include GEM Draw — a sort of Lisadraw — and a program for creating presentation slides. Both offer facilities familiar to Mac and Lisa users — boxes, fills, a range of text sizes and fonts.

For the programmer, GEM offers a similar range of benefits. Not least of these is the fact that it's portable across a range of machines and offers a standard interface. So software authors can program the environment, not the target system.

DR will offer a programmer's toolkit containing development tools and this should run with a range of languages including Pascal, Cobol and C. The programmer also gets complete redistribution rights.

## In use

GEM is difficult to fault, even in the pre-



# ...s get friendly

release version we saw. Running on a standard 5MHz IBM PC it was very fast and smooth, and embodied the extreme friendliness of Lisa and Mac.

Once further programs appear using its facilities the software should be exciting. In the meantime, it scores heavily by allowing you to run the industry's best-selling applications on the most popular machines.

GEM will also support a variety of input devices: the mouse, of course, as well as standard keyboard cursor controls, joysticks, digital graphics pads — even a touch screen (with an eye to Hewlett-Packard?) and voice input.

DR is talking about a minimum system of 256k and single disk drive — the memory requirement allows for operating system, GEM and a larger utility like 1-2-3.

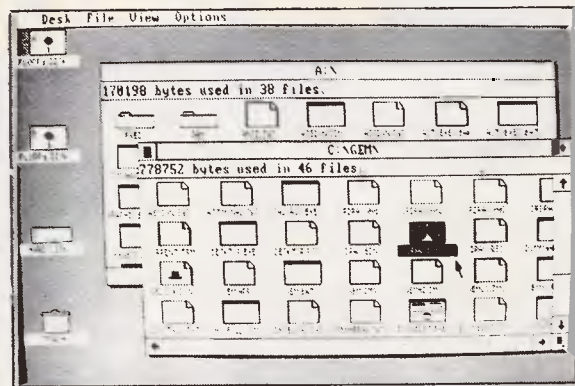
The origins of GEM are not hard to discern given DR's success with its GSX graphics system, now under license to more than 75 OEMs, and the company seems set to repeat that success on the same route.

## Conclusion

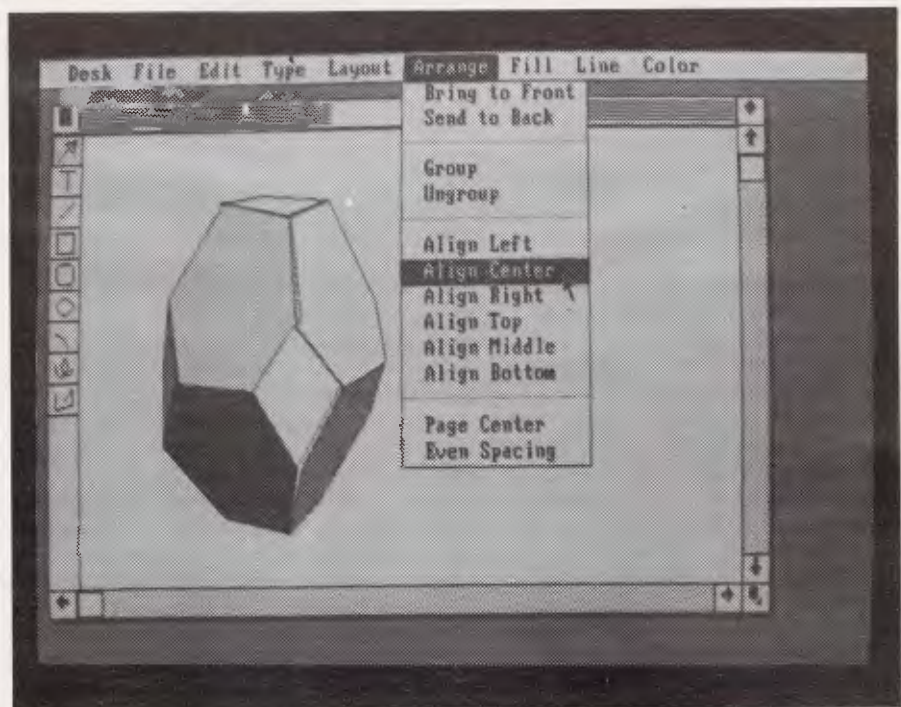
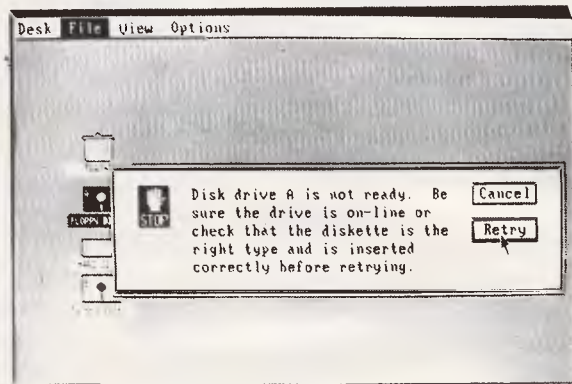
It's hard to see how GEM will fail. It is rumoured that some computer dealers use the Mac's supremely friendly face to lure buyers into the shop, and then sell them PCs and compatibles. DR may have heard similar stories; the company says: 'We think what the computer people find attractive should be the computer they buy.'

With Apple counting on the Mac to fend off IBM, GEM will be as welcome there as a worm in your Granny Smith. But for other manufacturers it offers a spring-board to that 'new age of user-friendliness' they're all talking about.

The GEM desktop in action showing directories of drives A and C (a hard disk). The 'C:/GEM/' designation shows that the directory is one level — ie a directory of the folder GEM on drive C.



GEM features full error messages and demands a response before allowing you to continue operations.



The GEM Draw application lets users create and edit charts and diagrams



# AMUST GO

DUE TO MARKET DEMANDS, AMUST GOES RETAIL

## Printers — Dot Matrix

		<b>Normal Retail</b>	<b>Our Price</b>
Amust DT-100	100 cps; 10/12 Pitch Almost letter quality (over 6000 sold in Australia)	\$ 329.00	\$ 275.00
Amust P88-2	120 cps with 24 cps Near Letter Quality; Unique 3 position switch selectable print	\$ 379.00	\$ 325.00
Mitsui MC2100	120 cps/NLQ; 4000 hour MTBF reliability; Trac/Frix	\$ 599.00	\$ 350.00
C. Itoh 155ORE	132 column; 120 cps <b>Dual ports</b> ; limited quantity OR	\$ 995.00	\$ 695.00
C. Itoh 1550 SP/SR	New 180 cps; 132 col Serial or Parallel	\$1395.00	\$ 995.00

## Printers — Daisy Wheel

TEC F10-55	New superb quality 55 cps (including wordstar)	\$2695.00	\$1895.00
------------	---	-----------	-----------

## Monitors

Amust GR-1	Hi-Res Green by <b>Mitsubishi</b> ; Latest style	\$ 179.00	\$ 130.00
Amust GR-2	Extra HiRes (20 Mhz) Green by <b>Taxan</b> ; Latest Model	\$ 245.00	\$ 150.00
Amust AM-1	Extra HiRes Amber by <b>Taxan</b> ; Latest Model	\$ 260.00	\$ 160.00
Vision PC	Kaga Denshi IBM Colour Compatible; 640 x 262	\$ 775.00	\$ 575.00
Mon Stand	Latest IBM Colour Full Tilt Monitor Stand	\$ 49.00	*\$ 25.00

## Ribbons\*

DT80/DT100	Ribbons for Amust DT80/100 & BMC80, CP80, Visa80, SP80	\$ 13.95	\$ 7.50
------------	---	----------	---------

\* Monitor offer does not apply.



# ES DIRECT

## Liquidation Items!

**Our Price**

**Rec Retail**

Due to one of our dealers failing, we offer AT OR BELOW COST

## Disc Drives

National/Matsushita JA551 40 track	\$ 129.50	\$ 259.00
National/Matsushita JA561 80 track (1.2 MB)	\$ 169.50	\$ 349.00
National/Matsushita JU581 80 track (1.6 MB)	\$ 199.00	\$ 399.00
Atlas-8 — Apple Slimline by National	\$ 135.00	\$ 299.00

## Typewriter/Printers

Amust PD113	Electronic daisy wheel typewriter with one line memory eraser. All latest features	\$ 399.00	\$ 599.00
-------------	--	-----------	-----------

**IN A WORLD OF UNCERTAINTY, THE CORRECT DECISION IS AMUST.**



# AMUST COMPUTER CORP.

\* MAIL YOUR COUPON — PHONE — CALL-IN — DEALERS *STILL* WELCOME

TO: Amust Computer Corp. P/L  
35 South Road, Moorabbin 3189, Vic.  
Ph: (03) 555 3644. Tlx: AA34663 AMUST  
Delivery per Airfreight \$7.00 per 10 kilos

Enclosed is my Cheque or Money Order for \$ .....  
or please charge my Credit Card Indicated.

BANKCARD  AMERICAN EXPRESS  
 VISA  DINERS CLUB ALL WELCOME

\_\_\_\_\_

BANKCARD, VISA, AMEX, DINERS — ALL WELCOME

Please send me .....

.....

.....

Expiry date ..... Signature .....

NAME

ADDRESS

CITY/SUBURB

STATE  POSTCODE

TELEPHONE NO



# STAR WORDS



## WHICH PRINTER TALKS TO ANY COMPUTER IN THE GALAXY AND COSTS AROUND 30% LESS THAN IT'S COMPETITORS?

### Who else but STAR?

Character for character, the new STAR GEMINI family is the best value on the planet. A snappy 120 cps is yours for only \$449\* (10 inch paper) or \$795\* (15 inch paper).

And the GEMINI speaks all languages, be it Apple, IBM, NEC, T.I., Commodore . . .

Just see your nearest computer retailer for a demonstration of the Gemini's many features — all included as standard. You'll be amazed at our paper feed system that includes friction platen and fully adjustable tractor feed. Or how about the variety of type styles and graphics — printable in the same line?

\*Please add sales tax where applicable



## The Printer Range That's Taking The World By Storm

Distributed by:



**Case Communication Systems Ltd.**

1-3 Rodborough Road  
Frenchs Forest NSW 2086

Telephone (02) 452 5231  
Telex AA72982





# TI Speech Command System

Will speech recognition/synthesis become the accepted way of communicating with your micro, or will it remain an expensive plaything for the jaded executive? Martin Banks confers with the Speech Command System from Texas Instruments, and has a lot to shout about.

We take speech for granted. It has been for many millennia the best method of communication between individuals. It makes sense to assume, therefore, that at some stage it will also form the best way of communicating between those two other individuals — the human being and the computer system.

We have all become so used to the idea that competent speech recognition and synthesis systems are the stuff of science fiction — that they will happen sometime in the future — that it comes as something of a surprise to discover just how much they belong to the here and now. While computer companies and software houses try to promote mice and touch-screens as sensible alternative input devices to the keyboard, the natural alternative — speech — has been creeping up on us unawares.

Several companies now offer speech-based systems for personal computers, not least of which is Texas Instruments (TI). This company can arguably claim to have played the most significant role of all in developing speech systems, having long ago introduced such wonders as the educational toy, *Speak'n'Spell*. This utilised a speech synthesis technique called Linear Predictive Coding, which allowed the company to make systems with tolerably 'human-like' speech in a simple and inexpensive form.

Real speech was recorded as discreet words and phrases in a digitised form. The predictive coding technique meant that each second of speech could be stored in a much reduced capacity — 12k rather than the 30k normally required at the time. Each word or phrase was stored at a specific address in memory, and speech could be simply constructed by calling out the addresses in the right sequence.

At the same time, the company was

working on speech recognition systems with vocabularies of up to 50 words or phrases, which could be used to control simple functions where one-word commands were sufficient or where numeric data input was required.

TI has now taken these two capabilities and combined them in a hardware/software add-on product for its Professional range of desk-top personal computers.

Called the Speech Command System, the product has been available for several months. TI did not shout about it from the roof-tops: the company's conservatism, a natural state of mind for Texans, precluded making too much ballyhoo about the speech system, even though there's a great deal to be said in its favour.

## Hardware

For \$3000 the user gets the add-on circuit board containing the speech synthesis and recognition systems, a microphone, a headset (giving the option of machine responses that can only be heard by the user — useful in open-plan offices), and system software.

On the test machine, these items came pre-installed by TI on a hard disk Professional system. The company had also performed some pre-installation of voice commands for Lotus 1-2-3 which had been created at a previous demonstration. These allowed me to control the operation of the package, as well as enter data — and meant that I could use the machine immediately.

## Software

Setting up a vocabulary for any applications package is a relatively simple, if time-consuming, one-off task. The

beauty of this facility, once installed and working, is that it allows the user to operate in a largely hands-off mode: TI calls it the 'Transparent Keyboard'.

For many applications it won't be relevant: it's not the Orwellian 'Speakwrite' machine that all frustrated keyboard drivers pray for. With others, however, and Lotus 1-2-3 is a good example, it works well.

Imagine the harassed executive telling the computer to enter data, speaking numbers to it and getting printed results, all while scribbling something else by hand.

When the software has been installed on the hard disk, setting up the system is quite simple. The Speech Command System is called from the Professional's MS-DOS operating system by keying in SCS. This offers the user the choice of four applications — Telephone Manager, Calendar/Tickler Manager, Dictation File Utility and Transparent Keyboard — plus an exit back to the OS. Each application is called by function keys, and three have distinct capabilities based on the system's speech synthesis and/or recognition facilities.

The Telephone Manager offers a variety of telephone answering and control capabilities. The Calendar/Tickler Manager is a non-speech application, being just a nice, if standard diary and calendar facility; the Tickler part is a facility enabling specific events to be brought to the user's attention at a stated time. In other words, you can get the machine to flash a reminder message onscreen.

The Dictation facility and the Transparent Keyboard are of most interest. The latter is called by function key F4. Once loaded, it asks you for a vocabulary file name which can be any descriptor you like; for example, the pre-



# Memorex reliability, the inside story.

Vast experience, renowned reliability and technological supremacy of the world's leading computer media manufacturer contribute to the story inside every pack of Memorex flexible discs.

The extensive research, exhaustive testing and stringent quality control procedures which surround every Memorex product ensure that

Memorex users have the most reliable flexible disc on the market. Every track of every disc is 100% error free tested.

Use Memorex flexible discs and you'll discover that our "inside story" is not just another "tall story".

Special soft polyester liner constantly cleans disc during use.

Unique burnishing process provides ultra smooth surface for better head to disc contact and reduced head wear.

The Memorex name is your assurance of the ultimate in quality and reliability.

Coating uses the latest oxide technology, optimising signal output and recording accuracy.

Precision applied plastic hub ring protects disc edge from damage.

The carefully applied Memorex serial number allows identification of each disc.

Extra stiff glue bonded jacket ensures greater reliability, lower disc torque and easy loading.



MEMOREX Pty Ltd

Available from: Sydney (02) 908-2211

Melbourne (03) 267-2955

Or a Distributor near you

# MEMOREX

A Burroughs Company





*The TISpeech Command System is an easy to use but expensive add-on for the TI Professional range of computers*

installed Lotus filename was E:123.VOC, E: defining the drive location and .VOC defining it as a vocabulary file (it isn't necessary for the user to key in the .VOC extension). The system will also ask for a description of the file for easy clarification by the user. Each vocabulary is stored as two separate files: one being the words used in the vocabulary together with their equivalent keystrokes; the other the digitised recording of the spoken words.

The system requests the phrases to be used, together with the equivalent keystrokes. The phrases obviously depend on the application, but will be predominantly of the 'right', 'left', 'mark block', and create a graph' type. They can also be

numbers or letters of the alphabet. Each vocabulary, of which there can be nine, holds fifty words or phrases, and can be used for different applications of the same voice, different voices for the same application, or continuations of single application vocabulary. When each phrase has been keyed in, the system asks for the equivalent keystrokes. In some cases (for example 1, 2, 3, 4, and so on) the keystroke is obvious; for others, it requires checking the applications program manual to see which control keys are used (for example, 'centre text' in WordStar is CTRL OC), and then checking the Speech Control System documentation appendix for the equivalent codes. (Although this may

sound rather tortuous, it is quite straightforward.)

Once the phrases have been entered into their file, the next stage is to enrol the voiceprint for each one for which the system provides easy, explicit, onscreen instructions on what to do and how to do it.

When the enrolling process is selected, you are asked to speak each word or phrase as it's highlighted on the screen. You start the recording process by pressing the relevant function keys; as each phrase is highlighted you say it. Should the system not register it, it stays on that word and you repeat it; otherwise it highlights the next phrase, and so on, through the vocabulary.



You are then asked to update the voiceprints, which gives a better chance of recognition by the system. TI recommends a minimum of three updates per word, although the maximum allowed is nine. The system cycles through the vocabulary in blocks of five words at a time, which you repeat the stated number of times.

The recognition capabilities can be tested by displaying the full vocabulary onscreen and saying any of the phrases. The system will display the phrase in red (poor recognition), yellow (reasonable) or green (good), and gives a rating out of 10 for each one. Users are advised to give the red phrases further updates.

To run an application program with this newly created Transparent Keyboard vocabulary requires one further stage. By going back to MS-DOS, you have to call up the keyboard interrupt program TPKSETUP: this allows the voice control to enter the commands or data for which it has been configured. This program contains the one quirk in the system. It is essentially a menu-based configuration program that cycles endlessly through the same menu until you realise you have to QUIT to get out of it.

With all these stages complete, it's now possible to load the application program in the normal prescribed manner and talk it through its paces.

## In use

Although speech synthesis is still a new technology and not without its teething problems, this system shows what will be possible in the future. The problems mainly revolve around the recognition rate, which can be patchy, but this is not so much a fault of the system as of the human operator.

By its very nature of operation (comparing an input with a stored record), there has to be a high degree of consistency in the voice before actions occur. Human speech and inflection is not, however, always as constant as it might be. Sometimes, the system does not recognise a command or phrase that it received a few minutes earlier, revealing the need for a certain circumspection in pronunciation. One way round this is to update the stored phrases periodically. The keyboard interrupt program does not block out the use of the keyboard, so all normal command keys are fully functional if required.

One notable improvement in the system over early speech recognition equipment is that its speed of recognition is vastly increased. The spoken words and phrases can be picked up quickly by the machine, so the user does not have to

converse in the boring monotone normally associated with such systems.

It is indeed fast enough to pick up commands and data in the middle of normal conversation: a user can 'talk' to his computer in the 'Will you Create A Graph of the Block made up of Rows A4 and A5' mode, and it will select the relevant instructions.

The Linear Predictive Coding technique used by TI to digitise speech has one particular advantage over other approaches which makes it one of the fastest systems available. It's not necessary to speak so slowly as to forget what you want to say. Indeed, the machine can record the spoken word as fast as you can say it, and then play it straight back at you with a quality approaching that of audio cassette recorders.

Also, there's no limit, excepting disk capacity, on the amount of speech that can be recorded. On a 10Mb hard disk, some four hours of continuous speech can be stored, and stored as one large disk file if necessary. The value of this capability might seem minimal, but it does offer considerable promise for the future.

TI has introduced a networking system for the Professional, so it's theoretically possible to append a number of supplementary disk files to a document being sent via electronic mail to another user. There is no reason, in theory, why one of these should not be a file of recorded speech that offers the recipient help, comfort or advice of a verbal nature. At present, TI does not have the specific software tools available to do this, and company executives smile sweetly and 'refuse to speculate on future products' when asked about it.

Having called the Dictation File Utility up from the speech command system menu, the system asks for a filename and description. The means of identifying up to 50 different dictation items appears, with each one requiring a different entry name and description. By using the function keys to select the input device (microphone or headset) and the Record function, you are ready to start: you can record all 50 entries in sequence, or select a specific entry. It also allows you to modify existing entries and add new ones easily. Then, press the appropriate function key and start recording. Playback is either by pressing P to play the last file, or function key 5 to play all files.

To test the system's quality, I recorded a portion of Test Match radio commentary via the microphone and a small portable radio. Tony Greig sounded remarkably like himself at playback until, of course, I speeded

things up. A feature of the TI speech system is that recordings can be played back faster, slower, louder or quieter without the pitch of the voice changing. Spoken phrases are still being made by a recognisable voice, but you never knew you could talk that fast!

A more important feature of this facility is that, once the exact entry filename is known, it's possible to get straight into a dictation file from MS-DOS: messages can be left on the machine to be played back later.

## Documentation

The documentation is well-written and well-presented, with simple built-in demonstration routines to show how to set up the system. The program obeys the same rules when applications other than the demos are tried.

## Prices

The Speech Command System is an add-on product aimed at the top-of-the-range TI Professional (although it will run on smaller models). It adds \$3,000 to the price of the machine.

## Conclusion

One of the most interesting aspects of the Speech Command System is that, despite being a product well out at the forefront of technological development, it's surprisingly easy to use.

It would be easy to dismiss the Speech Command System as an expensive executive's plaything, primarily suitable as the ultimate status symbol within the corporate pecking order. In its early stages of availability and use, this is likely to be its main market-place. It does, however, offer facilities that are of considerable value beyond the gimmick of driving a spreadsheet by voice. The Dictation File Utility, for example, especially when coupled to electronic mail and networking, has boundless possibilities in extending the power of voice communications.

The speech recognition system, which can be made to work with some 450 different words or phrases, could, for example, be turned into a simple word processing system for the disabled. It would not be able to decipher every word spoken to it, but if the word or phrase were one of a limited vocabulary, then it could be brought together in a word processing system for those who cannot use their hands.

This is a product that is fun to get to know, interesting to use, yet has real purpose and value, too. It's also an indication of what the future holds.



Internal Modern\* direct - connects to any telephone network.

Standard 132 columns (compressed print) add wide format for spreadsheets, financial data.

Full size keyboard is a professional's tool.

Optional cartridges plug-in for one-step dial and log-on.

TI's lightweight portable gives heavyweight performance.

Rechargeable battery puts you in the know wherever you go.

TI Silent 700™ printer operation won't add noise to surroundings.

## Only Texas Instruments packs a whole Merchant Banker's Office into half a briefcase.

Here's a brief case for the Texas Instruments' Silent 700™ Model 709 Portable Data Terminal.

It comes from the same reliable line of TI-manufactured terminals you've been using for years.

It's the most complete portable yet.

A full-sized typewriter keyboard, versatile printer typewriter and wide format make it easy to request and print out information you may need anywhere you take your briefcase.

Its optional acoustic coupler and battery pack make it telephone portable.

In the home or office, the Silent 700™ connects to your business service via your telephone network.

The optional one-step dial and log-on cartridge saves time and money with easy access.

For the most complete, most portable business terminal available, get a TI Silent 700™ and pack an office full of functions into your briefcase!

For further information contact your nearest TI dealer, or phone Texas Instruments, Sydney (02) 887 1122, Melbourne (03) 267 4677, Adelaide (08) 255 2066.

**TEXAS**   
**INSTRUMENTS**  
Creating useful products  
and services for you.

Please send me information on the "Silent 700™ Model 709 Portable Data Terminal".

Name \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_ Address \_\_\_\_\_

Postcode \_\_\_\_\_ Telephone No. \_\_\_\_\_

Texas Instruments (Australia) Pty. Ltd., 6-10 Talavera Road, North Ryde 2113.

Texas Instruments (Australia) Pty. Ltd., 418 St Kilda Road, Melbourne 3004.

TEXI 0136BM

\*Telecom Approved

™ Silent 700 is a trademark of Texas Instruments Incorporated.



# Headaches cured



## Genesis computerised medical practice management

Genesis is a powerful and comprehensive software package that takes over the record keeping and accounts for any medical practice.

Developed in Australia, Genesis suits individual doctors and multi-doctor practices. GP or specialist.

- Runs on most microcomputers
- Simple for receptionists to use
- Produces a comprehensive range of reports for the practice manager
- Uses a database approach
- Supported by an Australia-wide dealer network with a telephone hotline service

## Genesis is the solution

### Also from Cerebral Solutions

## MICROSTAT

MICROSTAT® Rel. 4.0 has all the powerful features that have made MICROSTAT the most popular interactive statistics package for the past several years and now includes:

- \* Interface with ASCII files and external data base/spreadsheet files.
- \* Output redirection to text files for editing and report generation.
- \* Missing data handling.
- \* Improved Recode/Select options.
- \* Handles large data sets. File size is

limited only by disk capacity for most procedures.

- \* Data Management Subsystem (DMS) for file creation plus the ability to: edit, list, destroy, delete cases, augment, sort, rank order, lag, move, merge and transform the data.
- \* Data transformations include: add, subtract, multiply, divide, reciprocal, log, natural log, natural antilog, exponential, linear transformation, adding any number of variables to create a new variable, plus others.
- \* The DMS places you in complete control of the data files and allows you to create new variables from existing variables via the transformations.

Other features include:

- \* Descriptive statistics
- \* Hypothesis tests
- \* Analysis of Variance
- \* Scatterplot
- \* Correlation analysis
- \* Simple, Multiple, and Stepwise Multiple Regression analysis
- \* Time Series analysis
- \* Nonparametric Tests
- \* Crosstabs
- \* Factorials, Permutations, Combinations, and Probability Distributions

Runs under MS-DOS/PC-DOS, CP/M86, and CP/M. Requires 128K memory (64K for CP/M).

Using Genesis is as easy as filling in this coupon.

- I would like more information on Genesis.
- I would like more information on Microstat
- I would like the name of my local dealer.
- I would like to attend a free seminar.

In Victoria contact:

**National Business Systems**

34-40 Clayton Rd., Clayton North, 3168.

Phone: 543 2144

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_ Postcode \_\_\_\_\_

Telephone \_\_\_\_\_

**Cerebral Solutions**

No. 2, 281-285 Pacific Highway

North Sydney, NSW 2060 Phone (02) 923 2288

**Dealer enquiries welcome**



**CP/M-80 and CP/M-86 software to run under MS-DOS . . . a pocket computer for car insurance salesmen . . . the Japanese equivalent of the IBM PC . . . Shinichiro Kakizawa brings you the latest news from the Japanese hot-line.**

*Shinichiro Kakizawa is a computer technology and applications consultant, and a freelance journalist. He has worked in the computer industry for twenty years, originally on mainframes, and for the last five years on micros. Fujitsu and NEC are among the companies he has worked for and he has been involved in policy setting for the Japanese fifth generation project.*

## Multi O/S software

Megasoft is selling a package which allows CP/M-80 and CP/M-86 software to run under MS-DOS. This interesting approach comes in the form of interface software which will run immediately below MS-DOS (versions 1.25 and 2.0). Data can be shared between MS-DOS and CP/M, exchanged, and stored on the same disk. The package is called the EM/3 O/S Integration Adaptor and costs around \$350. Manuals unfortunately are only available in Japanese at the moment.

## 1 Mb, 1.6 Mb in one floppy drive

There is good news for micro users who have difficulty knowing what to do with ever-increasing piles of diskettes in different capacities and densities for a variety of systems.

The majority of the machines on display in shops in the electronics bazaar, Akihabara, Tokyo are now equipped with a standard 1.6Mb floppy disk drive. Only a year ago, the standard was more like 1 Mb. As elsewhere in the world, micro users in Japan are facing difficulties with stacks of incompatible floppy disks.

Matsushita (also known as Panasonic) has come up with a decent solution for this problem.

Its new drive, called 'Super mini FDD JU591', can read/write two different capacity disks with a single drive by automatically changing the rotation speed of 5¼in disks between 300rpm (1 Mb) and 360rpm (1.6Mb). Diskette type can be identified automatically within one second of insertion. Matsushita's plan is to produce 200,000 units this year at its Hananomaki factory in Northern Japan, and it has been talking to a number of micro assembly makers around the world. You may see new micros with this drive before Christmas. The price (note that it's only for OEM sale) is \$300.

## From black/white to colour in the classroom

Panaboard is a little expensive but a very useful tool for classroom training. What you have written on a black/white board can be hardcopied in colour, transferred to VDU or large video projector, or stored on disks.

Panaboard is from Matsushita, manufacturer of the IBM 5550; price is a little over \$15,000. Last year Oki developed a black and white hard board copier, and this new machine is certainly a welcome addition to the micro classroom.

## Let your watch do the walking

A watch capable of memorising telephone numbers for 10 people is being sold in Japan by Casio. The watch has a one-chip CMOS CPU, stores 10 sets of four alphabetic characters and 10 numeric digits, and provides a calculator function as well. The

idea is similar to the Seiko wrist computer, but unlike the Seiko, this watch does not require a separate keyboard for input. How it will sell is yet to be seen, but my feeling is that watch computers have now established themselves firmly in the market.

Many more with a wide variety of features will soon follow, including offerings from Sanyo, Citizen, Ricoh and Seiko.

## Calculating the premium

Sharp and Unix Ltd (a Tokyo system house) have developed a special purpose pocket computer for helping car insurance policy salesmen to calculate the premium quickly. The machine is based on the popular CE-1253H with 24k RAM. It has special function keys needed for car insurance, and cannot be used for any other purpose. This trend of developing more dedicated pocket computers suitable for only one task is a forerunner of future pocket expert systems. Sharp expects to sell a lot — over 20,000 — this year.

## Industry overview

In the business microcomputer market, the biggest difference between Japan and the rest of the world is probably the non-existence of the IBM PC (I daresay you can buy it somewhere in Tokyo if you really want it). Instead, IBM Japan sells the 5550, something similar to the PC/XT in terms of horse power. The machine has been reasonably successful and large mainframe users are buying it, but unlike the PC, you can't buy the 5550 in micro shops in Japan.

The major supplier of microcomputers in Japan is, of course, NEC. It has sold over half a million systems, including

the ever-popular 8-bit PC8000, PC6000 series, and 16-bit PC9000 machines. NEC has now firmly established itself as the leader in Japanese micros, mainly because it had the right machine at the right time when the micro took off in Japan four years ago.

NEC enjoys the same privileged position that the IBM PC has in other markets. Every software house writes packages primarily for NEC.

## MSX arrival

There is no clear distinction between machines to be used by home users and business users, unlike Australia where the Commodore 64 etc are clearly for home and educational use.

In Japan, everyone has been using NEC, Sharp, Fujitsu, Hitachi, OKI, Mitsubishi, and Toshiba machines whether it's for home or business.

The only difference is the money spent on peripherals. Home and hobby users spend less, but the CPUs are usually the same. However, this situation is rapidly changing as more and more MSX machines are joining the force. MSX machines are cheap — current offerings are around \$220 for an 8-bit 64k average machine. It will be interesting to see if the MSX standard is accepted worldwide.

Among the major suppliers, Sord is one of the first and has a lot of enthusiastic followers mainly among large business users. Sord's PIPS spreadsheet package has been as popular as VisiCalc.

It's rather sad that we don't see many world popular brands like Apple, Tandy, and Commodore. You can get hold of them if you wish but, except at the beginning of the micro fever, they haven't sold well.

Wrong pricing, inadequate advertising budgets and lack of decent support networks were the reasons.

It's very sad indeed that major companies of this stature let themselves down in this way.



A structured approach to programming the English language can lead to some interesting results.

Andrew Couch gets to grips with natural language processing.

Providing artificial intelligence on a computer is undeniably difficult. But it's not too hard to make a computer a *little* more intelligent, even if not quite up to the standard of an expert system. As one example, this article explains how to program a computer to form an intelligent reply to a question it has never been asked before.

## Structured language

Putting it simply, this can be done by identifying structures in the way words are used. The clever part comes when you have already structured this information and you ask the computer to interpret a pattern of words in a combination that it may not have seen before. The computer then has to

word structures. As we know (but do not often recognise), the English language is very complex, with an average adult having a vocabulary of over 100,000 words. Because of this, writing a program to deal with every possible question is very difficult, so some simplification is required. Consider the following: we have informed the computer that people can own cars but cars cannot own people. We then ask two questions concerning John and his Ford Telstar.

'Can John own a Ford Telstar?'

'Can a Ford Telstar own John?'

Before the computer can answer either of these questions it requires more information. It needs to know that John is a person and that a Ford Telstar is a car.

# Lateral thinking

consult its structures to see if the new combination of words conveys a meaning or asks a question which is consistent with the structures it possesses.

To manage this the computer must have a vocabulary, an understanding of tense and a set of structure rules. The computer will operate in one of two modes: *Learn*, in which it learns the relationship between words and obtains a symbolic representation of what the word means; and *Question*, where you ask questions which can involve new patterns of words to which an answer must be formed. Mixing these modes, such as asking a question like 'Did you know that...?', is not allowed. If it were, and a conflict arose between what was said and what the computer contained in its structures, how would the computer know who was correct?

## Word classification

But before the programming problems are solved, we first have to identify the

The generalisation of the above example leads to the rule that people can own objects but objects cannot own people. Problems arise in statements such as 'He was a company man' which implies ownership of a person by a company, but these can be solved by specifying that a company is a name for a group of people, and as such is a grouping word for people and not an object.

Therefore, there is a need for some broad classification of words, so that the computer can establish general rules such as the validity of ownership between items. We shall consider four classifications of words which provide the basis for a good system: material objects, actions, values, and properties.

Material objects are all the things which make the world what it is. They are people, possessions, objects, and can be divided into three sub-classes.

(1) names of people; for example, John;

(2) objects which people can see, own, touch; for example, car; and



(3) parts of the objects in class (2); for example, wheel.

This type of sub-classification is relative. We could equally have defined our classes as:

(1) names of cities;

(2) famous buildings in cities; and

(3) objects found in the famous buildings.

The actual choice of what is to be classified is to some extent arbitrary. Only the relative importance, that class (1) is more important than class (2) which is more important than class (3), must be maintained.

The sub-classification of material objects sets up a type of hierarchy among the objects.

Actions are words which reflect that





something is being carried out, such as running, dancing and swimming; for example, 'The tree was *falling over*.' Values are of a purely personal nature. They express feelings, such as hatred and love. Properties are physical attributes of objects, such as colour, shape and size. They also reflect the current 'state' of something or someone; for example, 'John had flu.'

The 'state' here is that of illness.

Will any word fit into one of our categories? The answer, unfortunately, is 'not always'. But there are many cases where the classification works.

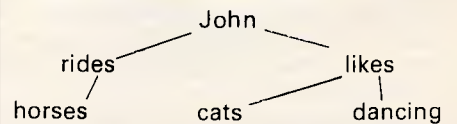
### Word structures

Having classified words, we need to put them into a structure, and the one I've

adopted is the familiar tree structure. The tree hierarchy starts from the base, that is the key word, and spreads out to various branches which represent words associated with the key word. From the branches hang the buds, that is the words related to the key word via the branch words.

If the analogy isn't clear, a practical example should help to straighten things out. In a sentence such as 'John likes cats', 'John' is a base word (and a grade 1 material object in our classification), 'likes' is a branch (and an action), and 'cats' represents a bud (and a lower-level material object). If another branch were added, for example 'rides', and further buds, for example 'dancing' and 'horses', the tree structure would

be:



This simple structure is equivalent to storing the three statements:

'John rides horses',

'John likes cats',

'John likes dancing'.

We've said that the computer requires the capacity to handle tenses. The way in which this is incorporated can be seen from the following example.

Consider the three statements:

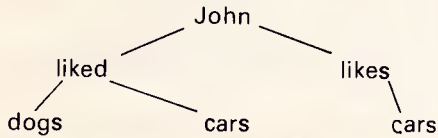
'John liked dogs',



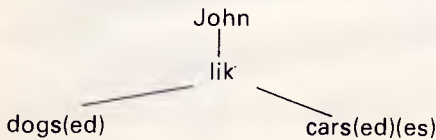
# PROGRAMMING

'John likes cars',  
'John liked cars'.

There is a definite distinction between *having* liked something and *still* liking it! We would normally construct the following:



However, the structure becomes more complex as we add on branches for tenses, so it is much easier to store the tense of a branch with its associated bud:



For cars we have the connecting branches 'liked' and 'likes' indicating that John both likes and *has* liked cars.

## Programming

Now onto the programming. Each material object, action, value and property is stored as an ASCII string, closed by a delimiting symbol to indicate where the word ends. The delimiter is followed by three pointers. Material objects require a pointer to a possible plural ending, values and actions pointers to tenses, and properties pointers to endings. Using three pointers is sufficient to cover a range of possibilities, including the past, present and future tenses of regular verbs.

After the pointers comes a flag indicating the word's classification: flag 1 for a material object, 2 for an action, 3 for a value, and 4 for a property. Material objects are further divided into the three previously mentioned sub-classifications. Any inapplicable flag or pointer is given a value of zero.

Thus the word 'cars' would be stored as the ASCII code for 'car', followed by the delimiter, a pointer representing 's', two zero pointers, flag 1 (indicating that a car is a material object), and finally its sub-classification (in this case, 2). A value such as 'like' would be stored as 'lik', followed by three pointers providing a range of suffixes such as '-e', '-es' and '-ed', and then ended by flag 2 indicating its classification (3).

There are two approaches to setting up a vocabulary of the words themselves. The first is to set up an array of strings and search various elements in

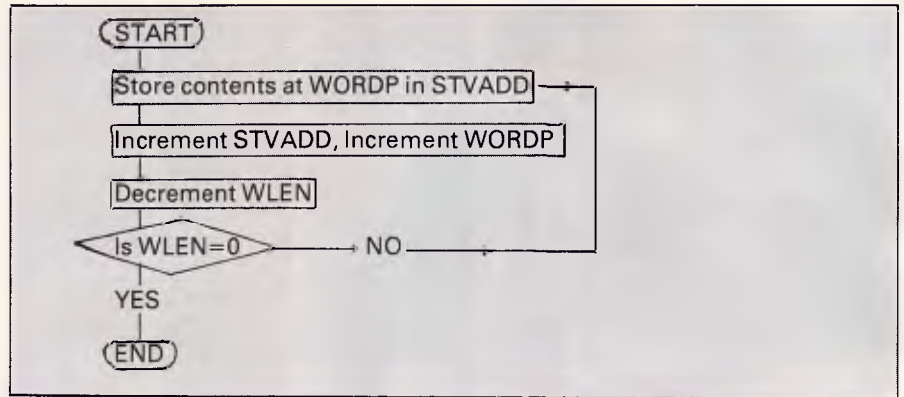


Fig 1 Algorithm for storing a word in the vocabulary

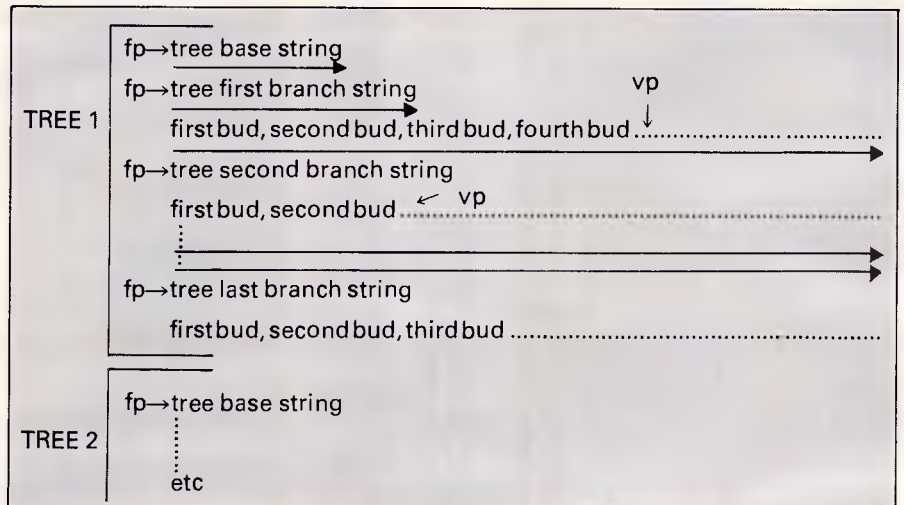


Fig 2 Storage layout of trees in memory

Pointer Table or Array	Pointer	Contents
P(0)	tree base 1	200
P(1)	tree 1, branch 1	210
P(2)	tree 1, branch 2	220
P(3)	tree 1, branch 3	230
P(4)	tree base 2	240
P(5)	tree 2, branch 1	250
P(6)	tree 2, branch 2	260
.	.	.
.	.	.
.	.	.

Fig 3 Pointer table

the array. The other method, and the one adopted here, is to set aside areas of memory for the various parts of the program and use machine code search routines. This utilises the available memory best and also provides a very fast searching method.

We'll now describe in algorithmic form the technique to store a word in the vocabulary. For those who have a 6502-based machine the following is

implemented using the facility of post-indexed indirect addressing (see also Fig 1).

STVADD start vocabulary memory pointer

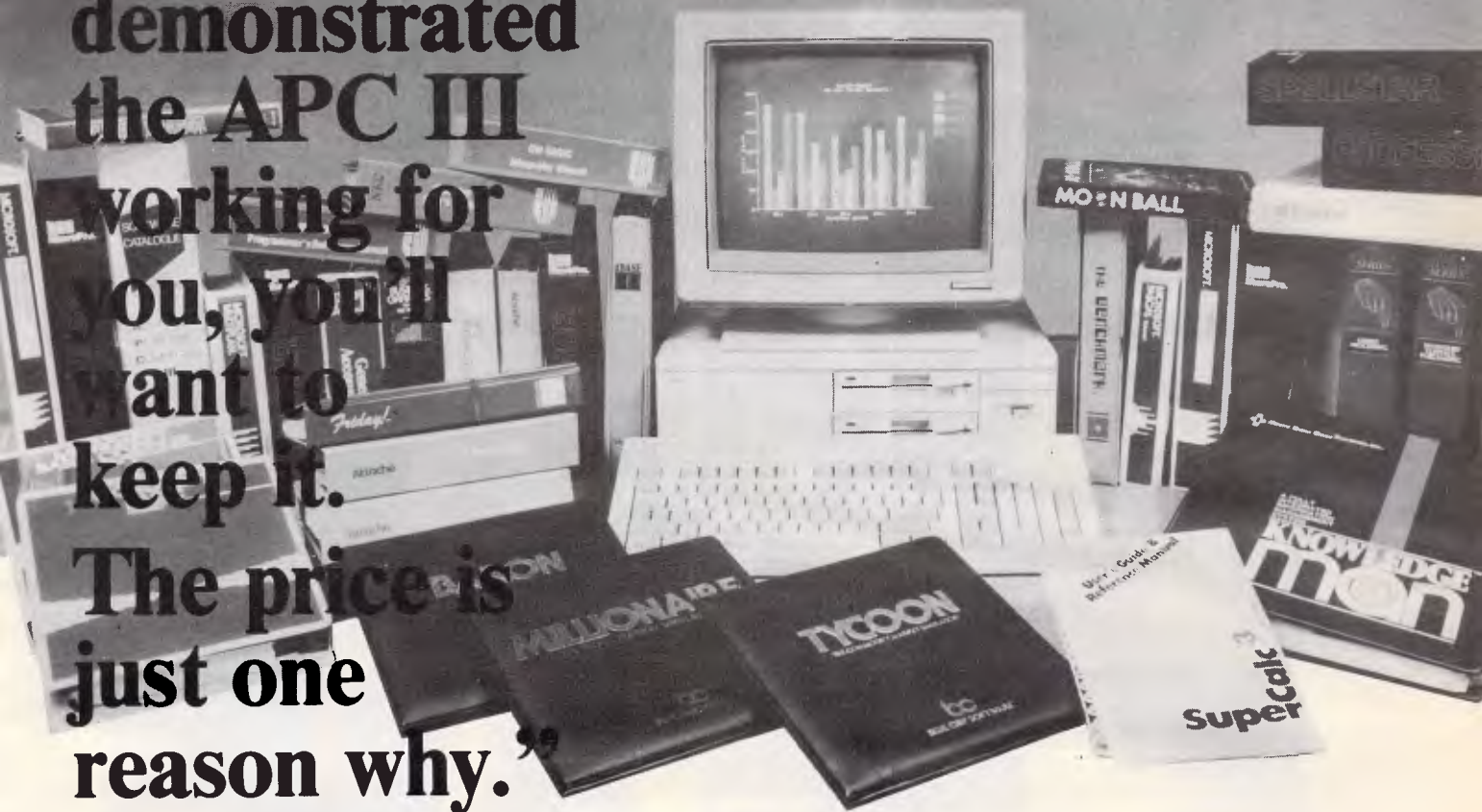
WORDP pointer to beginning of vocabulary word, where the vocabulary word is (string)(del) (P1)(P2)(P3)(C)(Sub-C) as described earlier.

WLEN Word length, that is, string



**“Once we’ve demonstrated the APC III working for you, you’ll want to keep it. The price is just one reason why.”**

*- Natwick Management*



With twice the speed and capacity of the IBM PC, the new NEC APC can handle all the work you can throw at it. And at \$3,565, it's half the price of the IBM.

Plus:

**It'll get the work out faster**

The APC III runs at around double the speed of most computers -8MHz. The processor is a true 16 bit (8086). So the job gets done faster.

**More storage - more power**

Ultra high speed 5¼ disks store 640,000 bytes each. An inexpensive hard disc adds 10 megabytes -enough for very powerful business applications.

**Easy to use**

The familiar IBM Selectric keyboard layout plus numeric keypad will put you and your staff at ease.

**NEC can service and support you**

NEC are one of the few

companies with full service throughout Australia. They have the hardware (and software) expertise to support you.

**There are no hidden extras**

Serial and parallel interfaces are built in. 128K of memory is standard.

**What does it all cost?**

Less than you might think. Here are leasing rates on two packages.

**System 1.**

- 2 x 640K floppy discs
- Monitor
- 180cps dot matrix
- or
- 20cps daisy wheel printer
- Attache business pack 1
- Software, including accounts receivable, invoicing, sales analysis, inventory.
- WordStar wordprocessing

**\$197.18/month\***

**System 2**

- 1 x 640K Floppy disc
- 1 x 10MB Hard Disc
- Monitor
- 180cps Dot Matrix
- or
- 20 cps Daisy Wheel printer
- Attache business pack 1
- Software, including accounts receivable, invoicing, sales analysis, inventory.
- WordStar professional pack wordprocessing

**\$247.03/month\***

\*(Based on leasing over 4 years with 10% residual)

**We come to You**

Call us. Evaluate the APC in your home or office, solving your problems. We back every sale with training and expert advice.

**Natwick Management**

Suite 1, 25 Burns Bay Road,  
Lane Cove NSW  
Phone (02) 428 1666



# Commodore Makes Software For Every Member Of The Family.



## Almost.

Commodore make software for people. All kinds of people. Software for fathers, mothers, brothers, sisters, uncles, aunts, nieces, nephews, grandparents and even brothers-in-law who fix cars. Everybody. Software for fun, profit, homework, housework and officework. We do not however, make software for dogs. Yes, we are working on it, but as research in this area is fairly limited, we're calling for all the help we can get. If you have any suggestions please contact your nearest Commodore dealer.

---

**commodore**  
COMPUTER

**Keeping up with you.**

Contact your nearest Commodore dealer or Commodore Business Machines:  
Sydney: (02) 427 4888 Melbourne: (03) 429 9855 Brisbane: (07) 393 0745 Perth: (09) 478 1744

BMS/cc 304



# PROGRAMMING

length+ 6

The values assigned to the pointers covering tenses and endings are stored in exactly the same way, at a different point in memory. In both cases a record of the next free memory location is kept.

We will now look at how memory is to be allocated for the tree structures, and how these structures are formed, updated and searched.

The trees are laid out in memory as shown in Fig 2, where 'fp' indicates a fixed pointer to the beginning of a tree structure and 'vp' indicates the point in memory to which the tree has grown.

The arrows indicate how the memory is all sequentially laid out. Having trees of a fixed length with a fixed maximum number of buds in a tree does impose some limitations. However, this does simplify many other aspects of the program, and we trade off memory for speed of searches. Typically a useful tree system may have about five trees each with five branches, and each branch containing about 10 buds. The fixed and variable pointers associated with the tree structures are stored in tables, so to access any given bud a simple offset can be constructed from the tree number and branch number.

At this point in the pointer table the fixed pointer for the given branch will be stored. The memory starting from this fixed pointer can then be sequentially searched to find the desired bud (that is, the branch is accessed in an indexed indirect manner).

To illustrate this point, consider accessing the second branch on the second tree where each tree has a maximum of three branches. The pointer table would be as in Fig 3.

The index to the pointer table is calculated as follows:

$$(TREE - 1) * 3 + (BRANCH + 1),$$

that is,  
 $(2 - 1) * 3 + (2 + 1) = 6$

So, pointer(6) contains 260, that is, the desired branch starts at memory location 260.

We'll now consider the 'Learn' mode of operation to explain how the tree structures are constructed. The Learn mode consists of three parts, two of which, 'add to vocabulary' and 'add to tense table' are straightforward applications of the algorithm described earlier to set up these tables. The third part of the Learn mode is constructing a tree structure or updating an existing structure.

Most of the time we are interested mainly with first class material objects and their relationship with other objects, so we'll only construct trees for first class objects. To aid explanation

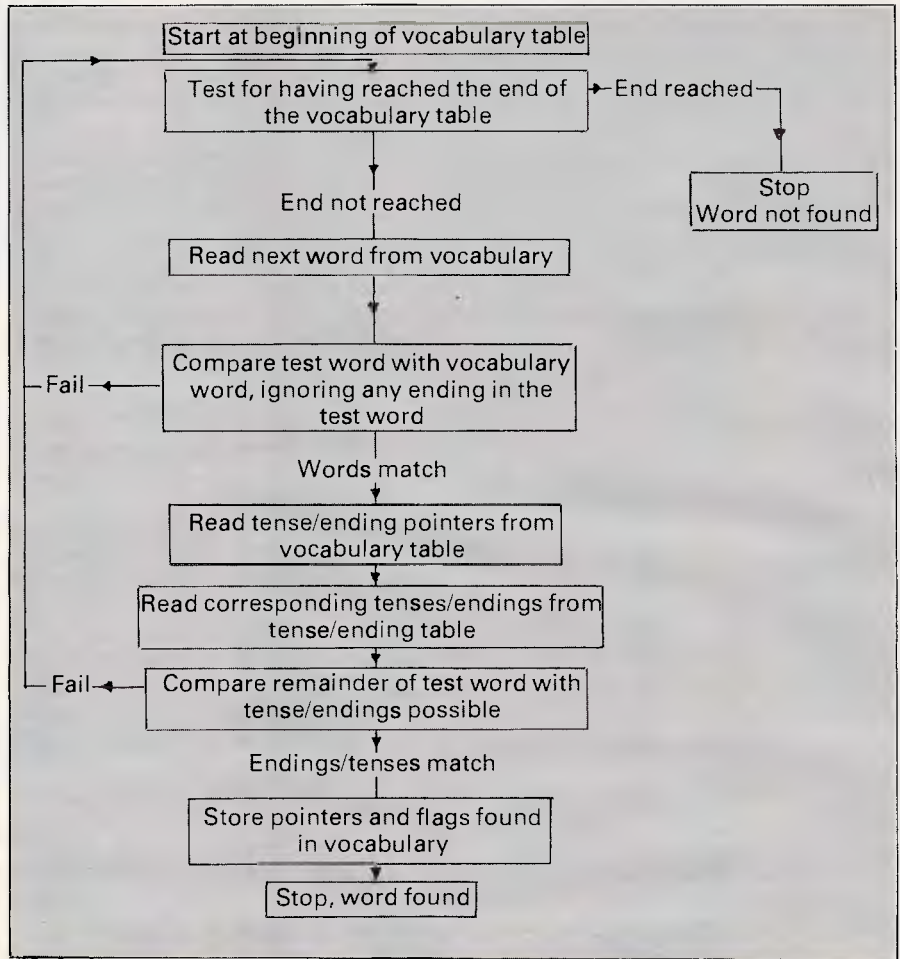


Fig 4 Word search for words in the Learn string

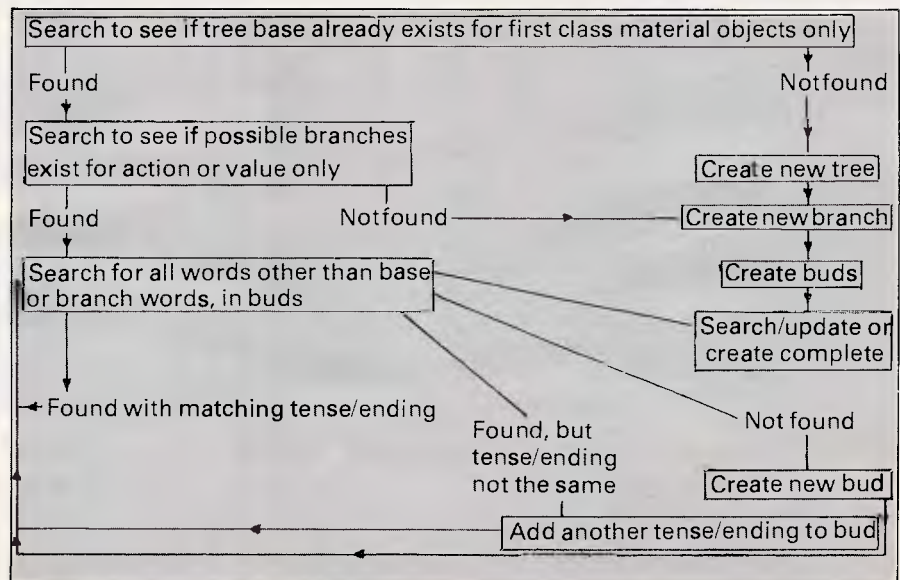


Fig 5 Cascade search

consider constructing a tree to contain the relation between John and his car. From the point of view of operating this part of the program all that need be

entered is the statement: 'John likes cars.' This is the 'Learn string'. This statement would be read into a string variable.



# IT'S EASIER TO ADD WITH A SPECTRA VIDEO.

The worst feature of most beginner's computers is just that.

They're beginner's computers.

A fact that becomes increasingly evident as you become increasingly competent at using them.

However this isn't so of the Spectra-video SV328.

It grows smarter as you do.

From around \$400 you start with the

basic SV328 featuring 80K RAM (incl. 16K for graphics) and 32K ROM with SV extended BASIC by Microsoft® and a full stroke, professional keyboard.

It can connect to any television, so you can use it wherever you are.

As your demands grow you can store your programmes on the SV904 data cassette.

Or drive your SV328 further with the





new SV605 super expander with one or two built-in disc drives.

Add the SV328's built-in CP/M capability and you automatically have a system that gives you immediate access to a vast range of business and educational software.

And as you introduce the SV328 into your work situation the SV901 Dot Matrix Printer will let you communicate

with people who can't even read the screen.

And that all adds up to something quite impressive.

The SV328, available from your Spectravideo dealer now. Or for a free brochure write to Spectravideo, 17 Market Street, South Melbourne, 3205.

Saatchi/RM6429

MSX

**SVI**<sup>TM</sup>  
SPECTRAVIDEO



## PROGRAMMING

The next stage is to split up all the words in the string and store each in a separate string. This can be done by performing searches for the space characters between words and using some simple string manipulations. Having performed this we next have to determine the classifications of each word, by searching in the vocabulary for each word, then checking for the ending or tense, and then retrieving from the vocabulary the flags which tell us the type of word we are examining.

The algorithm for this searching process is shown in Fig 4 and performed for each word in the Learn string.

Having established the word classification and found all words to exist in the vocabulary, we now want to search the existing trees to see if this information already exists, and if not, add the information to an existing tree or create a new tree. This can be illustrated in the form of Fig 5.

The search is referred to as a 'cascade search': if a test results in a word being found then the search cascades to the next level of search. The buds on the end of the branches are stored in the following format: (string)(Pointer value

for tense/ending used)(delimiter)(Pointer value for tense/ending used) and so on. If we had both 'liked' and 'likes' used in conjunction with the same branch, then the bud is constructed as (LIK-)(Pointer to ED)(Pointer to ES).

Note that when adding another tense/ending pointer to an existing bud, some shifting along in memory will be needed for other buds after the one in question to make room for the new addition.

The string from which all this stemmed was very simple, containing only three words. It is left to the reader to consider some of the more complex situations that could arise, such as two first class material objects in the same statement; for example, 'John loaned June his pencil.' Here indeed more tiers may be required in the tree structure.

### *Intelligence level*

To return to our opening paragraph, the intelligence rating of this program depends on how well it can form replies to questions presented in a form new to the computer. In its simplest form the question mode is not too difficult and yields satisfactory results. Consider asking the question:

'Does John like cars?'

Here we would look for a tree called 'John' after establishing that 'John' is a first class material object, then search for a branch called 'lik', 'li', 'like' or 'l'. Having found such a branch, we then search for a bud 'cars' and a bud tense/ending pointer which completes the branch word. For example, we could find a branch 'lik' and a bud 'cars' with a pointer to 'e', so completing the branch word 'like'. In this case a simple answer of 'yes' or 'no' would suffice.

Questions of the form 'What does John like?', are also easy to handle. In this case we simply search the branch 'lik' and then list all the associated buds. The reply could be 'John likes cars . . .'. Things start to get more complex as we permit more complex questions:

'Is it possible that John likes cars?' Another more advanced feature would be to construct searches so that if the question 'Did John like cars?' is asked and the structure only contains the information that John likes cars, the reply is:

'No, but John does like cars.'

However, constructing a program which could handle this level of reply would indeed be a huge task. **END**



# FUJI FILM FLOPPY DISKS

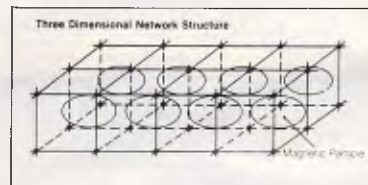


## BRING PEOPLE, INFORMATION AND MEDIA TOGETHER

### 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:** C.A.E. Electronics 621 4242, Calmar Distributors 660 2499, Caringbah Computer Centre 526 1515 Empire Office Supplies 560 4444, JBN Data Products 605 8698 Manly Stationary Supplies 938 2522, R.I.O. Distributing 399-9900, Transcript 764 2177, **BATHURST:** Bathurst Computer Service (063) 31 3964, **DUBBO:** Orana Cash Registers (063) 82 5833, **WOLLONGONG:** Business & Leisure (042) 29 9744 **MELBOURNE:** Goodman Cannington 241 1341, Output Media 544 4400 **GEELONG:** Systems Stationary (052) 22 2844, **BRISBANE:** The Byte Shop 371 0711, Data 3 Office Centre 221 5588, Servatronics 341 5340, **ADELAIDE:** Australian Business Machine Co 21 23244, **PERTH:** W.K. Witt 446 6100.

**Trade Enquiries Fujimex (02) 938 0241**



# Braindump

Martin Lack, Marketing Manager of Arcom Pacific,  
gives an unashamedly biased view of the Framework "Demonstration Disk".

Wink wink, nudge nudge. Does that sample software, you know, the stuff being pushed in the magazine? Wink wink. Does it, you know. Does it work? Wink wink, nudge nudge, you know what I mean. Or is it all a big con?

Showing my age, Monty Python was first broadcast in the UK on Sunday-night TV 15 years ago. That was when I first became involved with computers. It was also the last time I ever operated the brutes. Since then, my fear of computers has grown such that I now spend all of my time understanding the businessman's needs. I leave the button-pressing technology to the rest of the team.

So last night, the press bulbs flashed, the TV cameras whirred; Martin Lack was caught, at home, using a Personal Computer. Wink wink, nudge nudge. And what was the heroic occasion?

To confess, I really wanted to find out if sample software worked. A market survey of one, if you like, using me with my fear of computers. (All those rude A-prompts, rejecting my commands. Any-body would think I was going to beat it!)

So what is the truth? To all you people suffering PeeCeeophobia, get yourself a copy of a Framework sample disk — it's easy.

First you have to switch the machine on. (If I can operate the dishwasher...!) Next you insert the PC-DOS disk in the floppy slot. A couple of button presses to get rid of 'date' and 'time' and we're ready to start.

Now for some gobble-de-gook. Type DEMOFW, hit return. Wow. Look at that picture! Now you're on a delightful roller-coaster under the complete control of the machine. If you press a wrong button it politely suggests you try again. (I did this in the privacy of the closet so no-one could tell on my mistakes.)

The Framework sample disk has three separate parts. First a self-running demo which lasts about 15 minutes and familiarises you with all the major points.

Remember, this is an integrated product with word processing, spreadsheet, graphics, database, communications, outlining and PC-DOS interface. There is a lot to cover. But you do get used to some of the expressions so it's worth spending the time passively reading.

Now it's your turn, the sample disk presents us with seven lessons. All are interactive. Some, like the keyboard lesson, are quite demanding. Here you have to press keys indicated by the screen. Most are control keys so if you're really not used to PCs, finding them in time really gets the adrenalin flowing. The tutorial gives you three attempts to achieve the test within 110 seconds. My score was 104.85, second go.

Whoever wrote the tutorial had a very dry sense of humour. At the end of the eight lessons you really do know the fundamentals of Framework.

For example, you know that the screen is a desk top with a pile of files in the bottom right hand corner. Opening files (frames) is really easy and combining them together is very simple.

The tutorial forces you to use the nine command instructions (eg., create, edit, graph, etc.). And you begin to realise that just like in the real world, you can drop everything you're doing, switch to a new task and then return to where you left off, with zero effort.

Linking items is also a strong point which is brought out. You point to a frame, press the function key to 'MOVE' then point to where you want it to go. It's so easy. Much more logical than all those keys you have to press to move text around in a word processing package.

Finally, you learn about outlining. Here you list the major points you want to make. Then you develop each point in a frame. You can do it in any order. Suppose like me, you want to say even more about an item. Easy, just add other frames, almost as sub-points. Frames can be words, numbers even pictures. In the end you reorganise the points to

make the argument as strong as possible to the reader. Then when everything is printed out each frame is correctly numbered and, if you're like me, in quite a different order from how you started.

One feeling you get is that the number of keys you have to know to do things is very small. The arrow keys, +, -, ESC, Return, Ins, Delete and the ten function keys. This is very important because in the last phase of the tutorial you're on your own.

Yes, you get an almost complete Framework to do your own thing with. Lack of disk space restricts some of the HELP responses. And you can't Save or Print. (Which is quite sensible, after all there has to be a reason to buy the full package.)

Some of the detailed commands you have to guess because you don't have a manual. But there's always HELP and if you're really hooked, then call-up your local dealer. He has a second Framework tutorial which takes about three hours to do and gives you even more information. It comprises 20 pages of exercises and another data disk.

So how do I feel? Great. It was easy. I wasn't made to feel a fool. And I really did learn something about Framework. Was it worth it? Yes, not just for the money, more for the time I invested. I certainly now know enough to decide how it could help me and whether I should invest more time buying it.

Today Framework, tomorrow the world. I might try SuperCalc3 or even dBase III. And I'll let you know how I got on.

P.S. You know, FRED the Framework programming language must be really powerful. Thinking about it in the shower, the whole tutorial must have been written in it. If it's good enough for the Spy Academy and controlling my blunderings, how much better it would be for a serious business application! It's worth thinking about.



# DON'T BE L

## NETWORKING FOR APPLE RANGE INCLUDING MACINTOSH AND APPLE IIc

KE



- 42 MB storage on Macintosh with Symbiotic
- any number of users to manipulate data on any Macintosh
- Symbnet local area network for all Apple products
- Electronic Mail
- Interface for IIc which supports Symbiotic network & hard disk, DOS 3.3, Pascal & Prodos
- IIc disk adaptor allows disk capacity of 32 MB
- IIc can connect to stand alone Symbfile, Symbnet or both
- Multi-user software available on Symbfile/Symbnet to allow simultaneous updating of same files from different terminals on network

KEY S  
for L  
Maci



Farm Accounting  
Break Even Analysis  
Crop Management  
Swine Management  
Financial  
Management

Ag Disk for  
Macintosh

## TEKALIKE

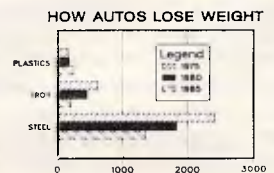
A Graphics  
Terminal  
for Lisa,  
Macintosh & Apples.

Macintosh, Lisa, Apple are registered trademarks of Apple Computer Corporation.

 **apple computer**  
Authorized Dealer



Computer  
Company P/L



Dealer Enquiries Welcome

292 Canterbury Road Surrey Hills, Victoria, Australia, 3127. Tel.(03)836 8835



# LEFT BEHIND

STEP UP AT IMA

KEYSTROKE  
for Lisa &  
Macintosh

Screen  
Dump on  
an Apple IIe

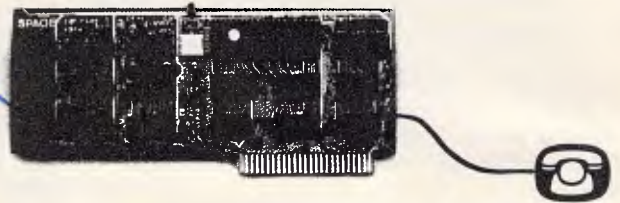
Print-it Card for  
Apples



Modem  
inside  
your Apple

Inboard Modem Card

for Apple, IBM & Wang with  
software



**KEYSTROKE Data Base** combines power with ease-of-use to achieve the perfect information-handling software tool. Whether your applications are business or personal, KEYSTROKE is up to the task. For beginners and experts alike, it's the one database that thinks like you do.

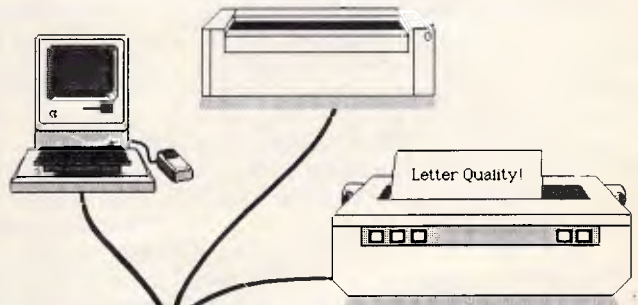
KEYSTROKE Data Base turns your Apple® Lisa into a powerful electronic filing cabinet. You can STORE, FIND, UPDATE and PRINT information, quickly and easily. Let KEYSTROKE write your application.

To reveal the full power inside your Lisa and Macintosh, visit your Apple Dealer and ask for a BROCK KEYSTROKE demo or contact us directly.

#### SPECIFICATIONS FOR LISA KEYSTROKE

Maximum number of records per file .....	2,000,000,000 or size of disk
Maximum number of open files .....	2
Maximum number of fields per record .....	255
Maximum number of characters per record .....	4,096
Maximum field width .....	74 characters
Maximum number of rapid search fields .....	4
Maximum number of sorts in a Labels report .....	1
Maximum number of computed fields .....	254
Maximum number of characters in a computed field formula .....	End of screen or next field
Maximum number of sorts in a report .....	4
Maximum number of columns in a report .....	28
Maximum report width .....	2 pages, approx. 500 characters
Maximum computed columns in a report .....	10
Maximum number of characters in a computed column formula .....	40
Minimum System Requirements:	
Lisa Computer with 1 Megabyte Ram Memory, Hard Disk Drive, and Lisa Office System or Workshop	

#### MACINTOSH PRINT OPTIMIZER WITH BUFFER AND DAISYWHEEL CONNECTION



Printing Control Centre for Macintosh —

combines several printers, auto switching, letter quality printer connection, 64k-256k buffer and much more!

**IMA COMPUTER COMPANY P/L**

292 Canterbury Rd, Surrey Hills 3127. Tel.: 836 8835





## BANKS' STATEMENT

# Friend or foe?

**'What's the point of labelling a package 'user friendly' when it isn't compatible with you or your machine?'**

**Martin Banks gets to know the term better.**

You know how it is with journalists: they hang around in clumps during press conferences. A company executive is desperately trying to extol the virtues of a product in which no-one is interested; and the assembled hacks huddle together for protection and pray for the verbiage to stop.

To help ward off the evil spirits, the journalists talk among themselves, saying such things as 'here, have you tried this new fully-integrated, all-singing-all-dancing-does-every-function-you-ever-thought-of package called "X"?' Being of a solicitous nature, I'm curious as to why the question is asked. The reason, I am informed, is that package X is reckoned to be the most complicated piece of high functionality the journalist has ever seen.

Now this might not seem to be a particularly significant event. After all, journalists are by repute totally unable to cope with anything more complicated than a four-function calculator on which to work out their expenses. When, however, the same basic complaint is made casually to me by a user of said program, it makes me wonder. After all, if the users find it difficult to make their selected packages run, there's likely to be something amiss with either one or the other.

There was a time when the package was always wrong, certainly in the field of personal computing, if only because the business was so new and inexperienced.

But as the industry grew up, so did the software writing. Packages became easier to use and, with a little training and guidance, the simple things of computer life were easily accomplished. It was during these days that the phrase 'user-friendly' was first coined. It was meant to depict how the software industry had come out of those dark, early days of applications programming and realised that if the user couldn't make a program run, then there wouldn't be much of a market for the product in the long run.

For a time it seemed like a valid descriptor for a software package: 'This is user-friendly', they would say, and sometimes it looked as though it might be true, I have always wondered, however,

about one tiny little point. If the packages were actually user 'friendly', why did they have to tell us? Couldn't we guess?

Now this pigeon has come home to roost. There are available today new ranges of applications software that are claimed to be user-friendly, but which are, in practice, rather choosy about whom they befriend. If the user has the time to really get to know and love an application, then it will eventually respond with much friendliness, help and comfort.

Unfortunately, most users rarely have the time to develop more than a passing acquaintanceship. They just want the damned thing to work.

There's little point in having an applications package that gives PhD-standard problem-solving capabilities if you need a PhD in computer science to drive the beast. If the new packages are only advantageous in the former area, they are still of little value to the user; it would be easier to stick with VisiCalc, a piece of paper and a pencil than to try and work the newer, more complicated, hyper-powered programs.

One reason that such a situation has developed at a time when it appeared that user-friendliness might come to mean something really tangible, is the ironic fact that software technology is now outstripping hardware technology on a cost-benefit basis. For a good, intuitive programming team, the amount of time taken (and investment made) in developing a new integrated applications suite for the business community is not going to take much longer than developing each of the original individual applications programs. The lessons learnt on these still exist and are automatically integrated into the new packages.

This means that there are now program suites which offer the user the potential of highly integrated operations, with powerful, flexible packages that are the theoretical equivalent of any fancy product available for a mainframe or large minicomputer. In some ways they are, theoretically, much better products. Their price is also attractive: many of them have an end-user price tag of around \$1000 which represents

outstanding value for money on a bangs-per-buck basis.

But getting all the bangs to work properly on the available hardware is the problem.

It seems that we're enthusiastically trying to get the litre of potentially high-quality software poured into the 600ml carton of the current crop of computers. It can be made to fit, but with some compromises along the way. The current 600ml carton in demand is the IBM PC which is OK in so far as it goes, but arguably does not go far enough for the tasks being asked of it by these packages.

The necessary compromises needed to make the packages run on the PC also make them difficult to use. For example, the IBM PC has function keys, a control key, a shift key and the ALT key. Each of these plays an individual and unique part in getting a package to run properly: press one in conjunction with another key and a useful function results. This is all very well for the expert user, but for the average person it's rather complicated. It's bad enough having to remember the relevant keys that accompany the CTRL key in something like WordStar; multiply that by three or four and the combinations of possible functions get to be quite big — too big to remember.

In two years' time, when we can all buy a desk-top computer with the power equivalent to a medium-sized DEC VAX and costing less than \$10,000, applications packages like these will make sense, and will run better than they do now. There will be the power available in the system to make all the user-friendly bits genuinely friendly. It would be nice to think that the software companies will spend some time talking to end users (and, more importantly, potential end users) to find out what the friendly bits ought to be like. This is somewhat different from the current situation: experts trying to give the end users what they think the end users hope they need.

Users sit like someone with a can of beans and no can opener. Somewhere in there is goodness and usefulness . . . if only they can find it.





Illustration by Tony Healey



**TEAR OUT THIS PAGE NOW  
 AND YOU'LL BE IN  
 A MUCH BETTER POSITION  
 TO SELL YOUR PRODUCT  
 NEXT MARCH.**

Yes, I realise that space is at a premium, but I would like to be in the best possible position to claim a good slice of the projected \$200,000,000 Sydney microcomputer market in 1985.

Please send me by return mail everything I need to know about The Fourth Australian Personal Computer Show - including a detailed floorplan of the Centrepoint, Sydney, display area. I also understand that my name on this coupon in no way represents a commitment of any kind.

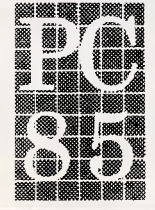
To: Australian Exhibition Services, Suite 3.2 Illoura Plaza, 424 St Kilda Road, Melbourne, Victoria 3004. Telex AA39329. Telephone (003) 267 4500

Please print in block capitals:

Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 \_\_\_\_\_ Postcode \_\_\_\_\_  
 Contact \_\_\_\_\_ Title \_\_\_\_\_  
 Telephone \_\_\_\_\_ Telex \_\_\_\_\_  
 General description of products  
 to be exhibited \_\_\_\_\_

THE FOURTH AUSTRALIAN  
 P | E | R | S | O | N | A | L |  
 C | O | M | P | U | T | E | R |  
 S | H | O | W |

CENTREPOINT



SYDNEY 13-16 MARCH 1985





If you are looking for a powerful data management system with full tailoring features and multi-file handling, then dBase III may be the answer. Available for the IBM PC and compatibles (with other machines in the pipeline), Kathy Lang believes this single-user package is well worth investigating.

Ashton-Tate has long been among the market leaders with its data management system dBase II. It is regarded by many as being very difficult to learn, but even its detractors acknowledge that, until recently, it has been one of the most powerful packages on the market. In recent months, however, two major groups of competitors have emerged: on the one hand there are powerful systems such as Sensible Solution

where appropriate I've added brief comments about extensions from dBasell. Certainly Ashton-Tate expects a good many people to upgrade to the new package, since it comes complete with conversion programs to copy data files across and to help convert dBasell program files, as well as a short manual aimed at existing dBasell users.

dBasell is presently available only on the IBM PC and on close compatibles

link up to 10 data files together at any one time. Such linkages must be made explicitly by the user; although dBasell does provide powerful commands to help in this, there is no equivalent of the 'data dictionary' approach taken, for instance, by Sensible Solution. Most data is stored in fixed-length fields; however, the package also allows you to create a special type of field called a 'Memo' field, which can be of almost unlimited length, and which takes up only the space it actually needs (more on this below).

At present, dBasell is only a single-user system, and Ashton-Tate is very cagey about the prospects for a multi-user version; however, it probably doesn't need a crystal ball to see that a likely first step in that direction would be via an Ethernet option, as has already been done for dBasell.

dBasell provides a wide range of commands to carry out the necessary processing tasks. These can be given directly by the user, or stored in a file to be executed as a group (either with interaction from the user or in 'batch' mode), or activated by a set of menus provided by the dBasell ASSISTant — which should make it easy (and much easier than is the case with dBasell) to graduate to entering in commands directly, without prompting from the system. (The Help facilities and the documentation are also a distinct improvement on dBasell.) In addition to commands which may be given either from the keyboard or from a file, there is a group of commands which control the execution of command files; these provide facilities comparable with many programming languages (and more powerful than those in many forms of Basic).

### Constraints

The major constraints on use of dBasell are shown in Fig 1. All the limitations should now be sufficiently permissive to be acceptable to even the most demanding user, although some professional developers may run out of files, especially if memo fields are in use. (Although you may have up to 10

# dBasell joins the family

aimed largely at the professional systems developer which concentrate on providing full database facilities; and on the other the so-called 'integrated packages', which aim to provide spreadsheet, graphics and word processing closely integrated with data management. Indeed, Ashton-Tate has a horse in the latter race called Framework — reviewed in September APC, alongside its arch rival, Lotus' Symphony — which, like most of its competitors, requires the whole of the database to be in the computer system memory while being processed.

How and where does dBasell, which has already been dubbed 'son of dBasell' fit into this highly competitive market, both by comparison with the other Ashton-Tate products, and against those of the other major suppliers?

I've tried as far as possible in this review to look at the product as though it were a newcomer to the market, but

(although it is to be made available on other MS-DOS-based systems. Ashton-Tate has explicitly stated that an 8-bit version will not be supplied, so CP/M-80 users will not have access to dBasell.) It is distributed on two floppy disks, one containing the basic system, and the other various example files and utilities, including the separate screen formatting program. dBasell is protected by the PROLOK system, which obliges you to have the system disk present in drive A when it is started up, though you can then remove it and use the drive for other files. Two copies of the system disk are provided, but you cannot produce further back-up copies of your own. You can, of course, back-up data disks in the normal way, and the system disk need not contain any files which are changed during runs of the package.

The basic format of dBasell is a set of records all having the same format, stored in a single file, with the ability to



# SPINNAKER TURNS GAME PLAY INTO LEARNING ADVENTURES.

When it comes to cultivating adventurous young minds, the computer's potential is endless.

Until now though, the search for software to inspire that potential has been endless too.

The Spinnaker collection of Learning Adventure games taps the curiosity of growing minds with adventures that help children develop

valuable skills instead of tired thumbs. But what makes the Spinnaker Learning Adventure Series unique, educational value aside, is how much fun they are.

Through hours of entertainment, while they're bargaining with aliens, searching a haunted house, or building their own railroad empire, kids enjoy developing very important skills. Skills

like deductive reasoning, note taking and problem solving.

So, if you really want to cultivate young minds, pick up the Spinnaker Learning Adventure Series and turn your child's game playing into an endless learning adventure.

There are Spinnaker Learning Adventure games available for Atari, Commodore 64, Apple and IBM home computers.



**FUTURETRONICS AUSTRALIA PTY. LTD.**

Sole Authorised Distributors of Spinnaker software.

**SPINNAKER**  
We make learning fun.™



Maximum file size	OS Limit
Max record size	400/512,000
Max no fields	128
Max field size	254/4096(UL)
Max digits	19
Max prime key length	100 characters
Special disk format?	No
File size fixed?	No
Link to ASCII files?	Yes, various
Data types	Numeric, Char, Logic, Date, Memo
Fixed record structure?	Yes
Fixed record length stored?	No for Memo fields Yes for others
Amend record structure?	By copying
Link data files?	Yes
Number data files open	10 (fewer if using memo fields)
Number sort fields	Not stated
Number keys	7
Max key length	100 chars, UL fields
Subsidiary indexes kept up-to-date?	Yes
Data validation	Average
Screen formatting	Default or 'Paint-a-screen' or Col and row pos
Unique keys	No on entry, yes on retrieval
Report formatting	Default or Col and row
Save calculated data	Input, update.
Totals & Statistics	Yes
Save selection criteria	Permitted
Combining criteria	And, Or, Not
>1 criterion/field?	Yes
Wild code selection?	String Within
Browsing methods	Any Field
Interaction methods	Menu, commands, full tailoring
Reference Manual†	****
Tutorial Guide†	****
Reference Card†	****
On Line Help†	****
Hot-line?	Dealer support

Fig 1 Features and constraints

data files open, you may only have 15 files open altogether at any one time, and these include format and index files as well as data files.)

The provision for varying length items is generous, and should provide a reasonable compromise between flexibility and speed. Numeric, ordinary character, date and logical fields use the maximum amount of space whatever their actual length, but memo fields are treated rather differently. Each occupies a 10-character field in the main record; this field acts as a pointer to a record in another related file, which contains one record for each memo field actually used in the parent file. These records take up exactly the amount of space needed to store the

text entered, up to a maximum of 4000 characters. This related file counts towards your maximum of 10, but otherwise can be regarded as part of the main file.

You may edit and print memo fields using a conventional word processor rather than dBasell's own editor, and in that case memo fields may be of virtually unlimited length. Even without that provision, any or all fields may be memo fields, so that with 128 fields available (a welcome improvement on dBasell), you can have a record of 512,000 characters in length. That would, however, be of distinctly limited utility, since memo fields may not be indexed, and there are some limitations on their processing. But in conjunction with conventional fields, the dBasell approach could provide an appropriate solution to many problems where the data is of mixed type.

dBasell *aficionados* will notice the introduction of a Date format. This normally displays in the standard American format MM/DD/YY, but a battery of functions is provided to make it easy to display the date in any way you wish, including the ability to access the day of the week from the (numeric) date.

### File creation and indexing

Initial creation of a data file involves issuing the CREATE command, either directly or through ASSIST, and specifying for each item its name, type, and length (for ordinary character and numeric fields).

The process of specifying this information has been well thought out; some basic information is always displayed, such as the number of characters used in the record so far, with help on how to enter the information available either all the time or by pressing the Help key, as you choose. The file is then ready for information to be entered. You can copy and then modify this structure to make it easier to set up a file with similar characteristics. You can also modify the structure at any time, just by amending the screen representation of the structure, and the data will be preserved. To do this, you must have enough disk space available to allow dBasell to make a complete copy of the data file on the same disk. (If you haven't, then you must use the combination of Modify and Copy which is necessary in dBasell.)

Any file may be indexed automatically by using up to seven keys. A key may consist of a combination of fields, totalling up to 100 characters. These indexes may be used both to control the order in which information is displayed

when editing and reporting on files, and also for fast access to individual records. To ensure that indexes are kept up-to-date as records are added and changed, you must remember to tell dBasell the names of the indexes when you begin to use the file — this doesn't happen unless you request it. (Since each index increases the time taken to make changes, dBasell doesn't want to keep up-to-date indexes that you have created for a specific non-recurring need. Remembering to activate the indexes can, however, be a bit of a pain unless you put the necessary USE command in a procedure to reduce the typing and memory strain.)

### Data input and updating

dBasell provides one command for adding records, three ways of changing them from the keyboard, and two more for making batches of alterations automatically, as well as the full control available if you program your own input and editing procedures through the tailoring commands (on which more later). Simple addition of records is provided through the APPEND command, which just adds records to the bottom of the file. To change records, you can use EDIT to display an individual record retrieved either by scrolling through the file, or by selecting a record with a particular key value, or by specifying the record number. Or you can amend a set of records, one at a time, using the CHANGE command to specify which set you want (all those whose accounts are overdue, or all the children in a particular class). Finally, the BROWSE command allows you to show several records on the screen at the same time so that you can make changes to one while still seeing others. All these commands give you full screen editing facilities.

Amending batches of records may be done with REPLACE, which simply replaces a field or fields in all or a group of records with the results of a calculation. Where several files are related to one another, one file may be UPDATED with information from another. This updating may involve replacement, or a calculation such as addition or subtraction. For example, where one file holds stock information and another holds orders, the stock file can have its levels reduced to reflect the sales represented by the orders. UPDATE allows you to specify the fields to be used to relate the files; these must be indexed files. (This is an improvement on the equivalent dBasell features, which permit only replacement or addition, not subtraction or other calculation.) The UPDATE command gives similar facilities to



those provided by 'Posting' in some other packages.

## Screen display

When you define the structure of a file, dBaselll automatically sets up a display format, which will be used to show individual records on the screen unless you specify an alternative format. Such a format may be specified in a Format file, set up directly using the dBaselll editor and defining field positions, prompts and messages by row and column positions.

If you think that sounds like hard work, the alternative is to use dBaselll's separate formatting program, dFORMAT, which allows you to use simple 'paint-a-screen' techniques to define the layout, and then builds the appropriate Format file for you from that specification. dFORMAT can be used from within dBaselll if you have enough memory, or you can use it direct from PC-DOS. (What 'enough' is, depends on what else you are using, but it ran quite happily on our 384k system.) Whichever way the Format file is constructed, once you have issued a SET FORMAT TO command, that format is used for all commands which display one record on the screen at a time (such as APPEND, CHANGE and EDIT).

Other commands, such as DISPLAY (which shows specified fields from selected records without permitting editing) and BROWSE (which displays selected fields from all records starting at the current position in the file, and allow you to edit these records) have a fixed display format of one line per record. DISPLAY 'wraps round' lines which are too long to fit, while BROWSE keeps to one line but allows you to 'pan' across each record with the cursor keys — and you can 'freeze' specified fields so that these are kept displayed at the left of the screen while those to the right change.

Memo fields are treated slightly differently. While amending or editing records using the 'one record per screen' display mode, you can edit a particular memo field; dBaselll will then present the field on an otherwise blank screen, giving you simple editing commands for the purpose. These are, like all dBaselll editing commands, based on the WordStar conventions.

In addition to the specific screen display formats, any report may be displayed on the screen instead of being printed.

## Printed reports

As with screen display, dBaselll pro-

vides both simple 'default' facilities and more powerful 'DIY' features through the ability to store sequences of commands.

The REPORT command allows you to set up a tabular format with headings for the report and for each field; column widths may be specified, or you may let dBaselll use the defined maximum field size. Two levels of sub-totals can be produced, provided the file is already sorted or indexed appropriately. Totals can be printed, and any field may contain the result of an expression if desired.

Once set up, a report format can be modified, or copied and modified to provide the basis for another similar report. (This is another improvement on dBaselll, in which report formats could not be edited.) Fields from several related files may be included in a single report, provided the appropriate commands to define their relationship are issued first.

Once a report format has been defined, you can show the report on the screen to check it, and then print it just by adding the TO PRINT parameter to the REPORT command.

For most people, REPORT should provide sufficient flexibility for all printed reports.

One irritating feature has carried over from dBasell: both packages use the semi-colon to indicate that a command is continued on the next physical line of the screen or a command file. This character should logically have no such effect in data items, but in fact when REPORT encounters a semi-colon in a field value it starts a new line, without of course printing the semi-colon.

Several applications I have come across use semi-colons for delimiters in fields such as titles, so this practice can

be a real nuisance. The problem could be avoided by allowing the user to redefine the 'continue' symbol where necessary.

Where you need greater flexibility than REPORT can provide, you can write dBaselll command files to produce completely tailored reports. This can be done directly using column and row coordinates in the '@' SAY command. No paint-a-screen features are provided directly for producing formatted reports in dBaselll, though you could use dFORMAT with some adaptations.

## Selection & sorting

Most dBaselll commands operate on the whole file if you don't specify otherwise. If you want to be selective, you can specify a scope (a range of record numbers) and/or a FOR parameter which sets conditions for the inclusion of a record in the processing. For example, you can ask the package to display all records which meet the condition

```
FOR MARSTAT="SINGLE" .AND.  
(EYE_CLR="BL" .OR. EYE_CLR="BR")
```

You will then see only those records where the person is single and has blue or brown eyes. As you can see, brackets may be used to make sure that, where several conditions are needed, they operate correctly together.

Conditional expressions may include the usual range of comparison operators such as less than, greater than, and so on, and a 'string containing' operator to provide for conditions such as 'does this field contain the characters tennis' which would find values such as tennis, table-tennis, tennis racquet. Conditions may be linked with And, Or and Not.

## Benchmarks

BM1	Time to add 1 new record	Inst
BM2	Time to select record by primary key	Inst
BM3	Time to select record by secondary key	Inst
BM4	Time to access 20 records from 1000 sequentially on 3-character field	50 secs inc scroll
BM5	Time to access record using wild code	Inst
BM6	Time to index 1000 records on 3-character field	1 min 50 secs
BM7	Time to sort 1000 records on 5-character field	1 min 55 secs
BM8	Time to calculate on 1 field per record and store result in record	3 min 25 secs
BM9	Time to total 3 fields over 1000 records	1 min 25 secs
BM10	Time to add 1 new field to each of 1000 records	1 min 58 secs
	Time to import a file of 1000 records:	1 min 55 secs

Fig 2 Benchmarks using IBM-PC/XT (hard disk)







Selection conditions may be placed on most commands; for example, modifying the CHANGE command in this way can give a very precise method of finding a particular subset of records to amend using the screen editor. BROWSE cannot be used selectively in this way, though you could use the FILTER command first. This provides a global filter, which applies to all subsequent commands until countermanded. Such an approach can be especially useful if you are processing several separate sub-groups within a group; you could set a FILTER on the whole file, and then use the FOR parameter to select sub-groups within that selection when issuing individual commands.

As with any dBaselll command, a sequence of commands used to display or edit selectively may be acted upon immediately, or stored for future re-use.

In addition to the indexing facilities, dBaselll also provides a SORT command which allows you to sort the records into a particular physical order. Initial indications are that this command is much faster than its equivalent in dBasell.

## Calculation

dBaselll's facilities for calculations are very good. You can use the system as a desk calculator, you can set up batch calculations to replace existing fields, and by using the command file facilities you can arrange for calculations to take place on input data. (By popular request, dBaselll includes an extra function not available in dBasell, Square Root.)

By using memory variables (up to 256 are allowed), it is possible to do most calculations not requiring more than limited use of arrays, which need to be simulated in a rather tedious fashion if they must be used.

## Tailoring

dBaselll provides a powerful tool for the system developer, in the shape of a set of commands which can be used to tailor a system for a particular application. All commands which can be issued from the keyboard can also be stored in a file. In addition, there are commands for controlling the execution of these command files, including DO WHILE, IF...ELSE...ENDIF and DO CASE. Command files may be called with parameters, making it possible to build up suites of procedures which can be used in different aspects of applications without duplicating effort.

Using the facilities for formatting the screen, you can build menus for novice users. Calculations and tests may use memory variables, which may be global or local to particular procedures and stored for future re-use. (Up to 256 memory variables are allowed; there is no provision for contiguous lists of variables.)

## Multiple files

Up to 10 data files may be open at any one time, though not all could be using indexes, since the overall file limit is 15. Each file is opened in a separate area, indicated by a number or letter according to your choice. Only one file may be active at a time—that is, several may be available for reading but only one for writing. Fields in non-active files may be referred to by prefacing their names with the file name or by the letter or number of the area in which they were opened.

## Security & housekeeping

Security provisions are limited to some self-help procedures aimed at preventing accidental deletion of records. Any record deleted is not actually expunged and lost until an explicit PACK command is issued. The only exception to this is the ZAP command, which allows you to empty an entire file—it does require confirmation, though!

dBaselll provides facilities for copying and deleting any file, and for directory information. The package gives almost the full path facilities provided by DOS. You can run any legal DOS program from within dBaselll, provided there is enough memory. (This improves upon the rather clumsy dBasell feature of QUITting to a .BAT file which included a dBase command for return.)

## Summary

Package Type	Powerful and sophisticated data management facilities with full tailoring. Menu-driven for novices if necessary
Strong points	Powerful and flexible data entry, display and selection facilities; good multi-file features; unusually good calculation features; very good documentation and onscreen help in relation to the complexity of the package.
Drawbacks	Single user only; limited security provisions; no explicit letter-writing features
Ease of Use	Very good for a complex package
Error messages	Adequate
Documentation	Very good
Costs	\$795
Supplier	Arcom Pacific, 252 Abbotsford Road, Mayne, Brisbane, Qld 4006. Telephone: (07) 529 522.

## Links with outside

dBaselll can read any ASCII text file in fixed length or comma-delimited format. I used the fixed length format successfully, but couldn't persuade the package to read beyond the first field of each record of my comma-delimited file. The package can also write files in these formats, allowing you to prepare files for word processors such as WordStar's Mail-Merge.

## User image

dBaselll is a command-based package, which can be more difficult for novices than menus. A special command called ASSIST is provided to help out here: all the commands you are likely to need initially are available through menus. These use the proper command names, and allow you to short-cut much of the prompting as you become more practised. Once into the main part of the package, there is still quite a lot of help available if you need it, always through the F1 function key. This is the only function key which cannot be reset; dBaselll provides facilities to allow you to set the others, and to dictate the colour of the screen and areas of enhancement if you have a colour monitor.

## Documentation

dBaselll comes with a single manual slightly larger than the standard IBM format. It is divided into separate sections for tutorial, reference and glossary, and has one index for the whole manual (quite a promising index too). In addition, separate booklets provide a good reference summary, and a 'bridge' for dBasell users describing the automatic conversion programs and the small number of situations they cannot cater for, plus a list of new and



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

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

**2.** Is it fully compatible with readily available IBM PC software, like the AWA Corona?

**3.** Has it got at least 256 K bytes of memory like the AWA Corona?

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

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

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

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

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

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

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

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

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



Shown AWA 11

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

Name \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_ Telephone \_\_\_\_\_



## AWA COMPUTERS

Phone: NSW: (02) 922 3300. VIC: (03) 529 4133. ACT: (062) 47 7522. QLD: (07) 359 3577. SA: (08) 333 2044. WA: (09) 321 9334. TAS: (002) 34 4532. AUCKLAND: 76 0129.



**STOP  
PRESS**

# THE BIG NEWS ON SMALL PRINTERS FROM BROTHER

INTRODUCING  
THE NEW BROTHER COMPACT  
DOT MATRIX PRINTER M-1009

brother M-1009

## **M1009. Big on features. Small on cost.**

Here is a new compact printer with features you would only expect in more expensive machines. Like a 9 pin dot matrix printing head with a 20 million-stroke service life, crisp 50cps bidirectional logic seeking printing for normal characters, unidirectional printing for super and subscripts and graphs, plus low noise operation.

The M1009 incorporates 96 ASCII type characters with 63 graphic sets and international characters and Centronics parallel interface. Printout is on cut-sheet paper or, optionally, fanfold and roll paper.

All this for only \$299!

## **HR-15. Letter quality printouts for under \$799**

A compact, letter quality printer, the HR-15 offers features which give it a quality and versatility unmatched for the price; interchangeable letter quality daisy wheel; optional electronic keyboard, tractor feeder and auto cut-sheet feeder; proportional spacing; colour print; 3K buffer memory; Centronics parallel or RS232C interface and many more.

## **HR-5. The world's most compact printer.**

This is the smallest, most versatile, fully functional heat transfer thermal printer available. At only \$249, it is fully portable (battery or mains operation) and so small that it will easily fit into your briefcase. The HR-5 is the only printer in its class able to offer the choice of thermal or plain paper and its other features include: full graphics function; roll paper feed; Centronics parallel or RS-232C interface; silent operation; variable printout; 30cps printout.

# brother®

**Affordable  
Electronic Printers  
Brother Industries Ltd.,  
Nagoya, Japan.**

**Brother Industries (Aust.) Pty. Limited,  
7-9 Khartoum Road, North Ryde.  
N.S.W. 2113.**

Sydney (02) 887 4344. Melbourne (03) 873 3655.  
Brisbane (07) 52 5257. Adelaide (08) 42 6373.  
Perth (09) 478 1955.

All prices are recommended retail and include sales tax.  
They may be slightly higher in W.A.

CSO4304



# SOFTWARE

changed features.

The tutorial manual is written around a set of example files, which make up a simple accounting suite; the example files needed are supplied on the second disk, and you are encouraged to go through the lessons with them, up to and including setting up inter-related files. Although this should make a good introduction for a beginner, someone with a little experience of computing will undoubtedly get on a lot more easily than someone without.

The reference manual consists of an introduction to the main ideas of dBaselll, plus a list of the commands and their functions followed by a detailed explanation of every command, with short examples. I thought it quite well done, and I guess most people who criticised the dBasell documentation will be satisfied with the new versions.

The only part of dBaselll not covered in the manuals is dFORMAT, which comes complete with its own 'online' manual.

Having done quite a lot of research into what people do and don't like about manuals, I am deeply sceptical about

putting large manuals online, but the size of the subject in this case is just about small enough to make the idea feasible. The most obvious lack is a thorough explanation of the concepts involved — it may be there, but I couldn't find it despite the online index. However, I did manage quite easily to find out how to set up a simple screen form, and I enjoyed using the program, so on the whole I would regard the exercise as a success.

## Conclusion

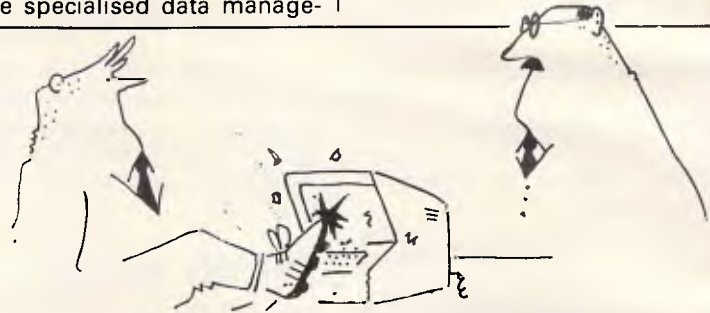
dBaselll is well worth investigating. It has ironed out most of the wrinkles in dBasell, and should give its competitors in the specialised data manage-

ment systems market a good run for their money.

As for the 'integrated' packages, clearly dBaselll is superior in terms of the amount of information it can handle, and it is very fast: times for the Benchmark using a hard disk are shown in Fig 2, and they don't look wildly inferior to those for in-memory systems, for data sets up to the size that such systems can handle.

I look forward to a further opportunity to use the package in conjunction with Symphony or Framework, to see just how 'integrated' one could get using a large database with a multi-function memory-based package.

END



'No, no Jones, that's not what we mean by re-booting the system!'



## AUGUST MAIL ORDER

02-933-218

<b>SANYO</b>		<b>PRINTERS</b>	
MBC 550 (160k Drive)	\$1370	Juki 6100	\$865
MBC 550 (360k Drive)	\$1825	Gemini 10 fx	\$420
MBC 555 (160k * 2)	\$1825	Gemini 15 fx	\$725
*MBC 555 (360k * 2)	\$2175 *	<b>MONITORS</b>	
Disk Drv Teac 360k	\$350	Sanyo Green/Amber	\$170
"Sanyewriter" inc.		Sanyo Colour	\$380
MBC 550 (360K), 12"		Sanyo HiRes (Green)	\$270
VDU, Daisywheel Ptr,		<b>MODEMS</b>	
W/Star, C/Star	\$2860	Cicada 300	\$199
M/Merge, S/Star,		Cicada 300T	\$228
InfoStar	\$270	Cicada 300C	\$213
Multiplan	\$295	Cicada 300CT	\$235
dBASE II	\$499	Sendata 700 + p/supply	\$250
<b>IBM SOFTWARE</b>		<b>DISKETTES</b>	
dBASE III	\$695	Memorex SSDD (10)	\$38.50
Framework	\$695	Memorex DSDD (10)	\$48.00
MS/Word + Mouse	\$595	Datalife SSDD (10)	\$8.50
Super Calc 3	\$350	Datalife DSDD (10)	\$50.00

**SEND NAME AND ADDRESS FOR FULL CATALOGUE**

Cheque To: AUGUST COMPUTER SERVICES  
7/3 Greenwood Place, Harbord N.S.W. 2096

**FREE DELIVERY !!!**

**CITY**  
72 DRUITT ST  
SYDNEY  
**267 7288**



**WEST**  
16 HUNTER ST  
PARRAMATTA  
**635 4733**



## COMPUTER CONTROLLED MUSIC SYSTEMS

**SOFTWARE by**

Jellinghaus ★ Roland ★ Yamaha  
★ Sequential Circuits ★ Passport Design ★

**HARDWARE by**

Commodore ★ Yamaha ★ Roland  
★ Sequential Circuits ★

**RUN BY MUSICIANS FOR MUSICIANS**

Bankcard ★ American Express ★ Visa ★ Personal cheque



# A chip off the old block

Nick Ryman-Tubb explains how to program the 68008 CPU and introduces the other members of the 68000 family.

The 68000 family is fast becoming the processor every one wants to use, and already features in machines like the Fortune, Wicat, Sage II, Corvus Concept and TRS 80 model 16, not to mention Apple's Macintosh.

Three good reasons why the micro makers are clamouring for this chip are its elegant instruction set, fast instruction cycle and the availability of CP/M-68k and the multi-user Unix operating systems. National Semiconductor is fighting back with its NS 16000 family, but it isn't getting the same level of support despite having the advantage of supporting virtual memory operations directly. But the youngest Motorola relation, the MC68010 Virtual Memory Processor, has just arrived on the scene and is object code upward compatible with the MC68000. What's more, its virtual memory system is unique in physically detecting a bus error and then acting upon this condition through a relocatable exception vector.

## The 68000 family

Each member of the 68000 family is upward compatible with its relations at the machine code level, and all share the same basic features as follows: 32-bit address and data registers; 56 powerful instruction types; memory mapped I/O; 14 addressing modes; and five main data types. Fig 1 shows the 68000 family tree.

Considerable confusion about whether the 68000 is a 16-bit or 32-bit processor has been caused because, while most internal registers and data paths are 32 bits wide, the 68000 can only communicate with the outside world 16 bits at a time. It's best described as 32:16-bit CPU, the numbers referring to maximum register size

and external data bus size respectively. In the same way, the Intel 8088 used in the IBM micros could be termed a 16:8-bit CPU. Result? The MC68000 can process twice as much data in a cycle as the 8088 can.

## The MC68008

The MC68008 (Fig 2) is fully software compatible with the 68000 CPU, but has an 8-bit data bus instead of 16 bits (32:8-bit CPU). This means that for every instruction op-code needed, the MPU must make two fetches from memory.

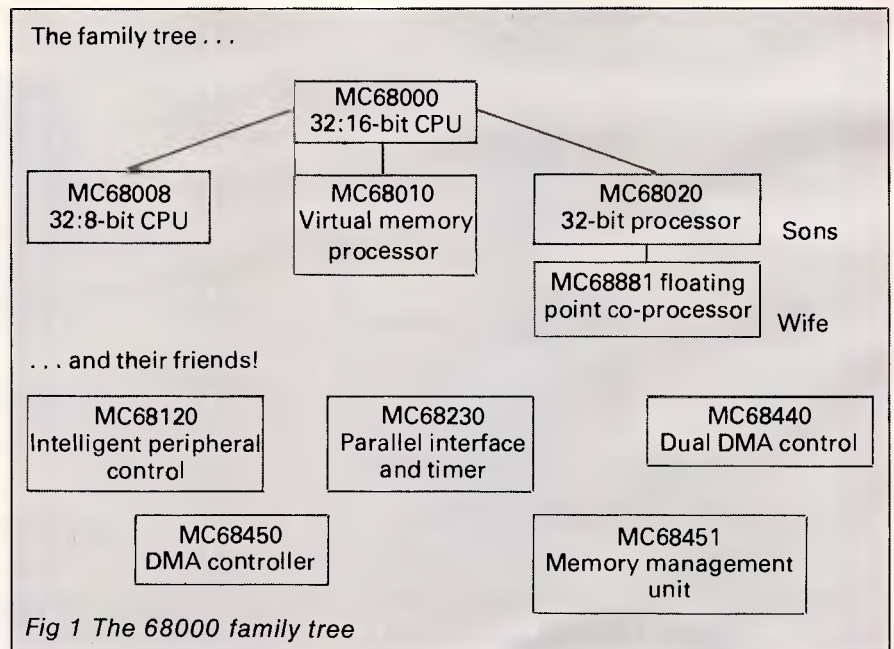
While this might slow down the operation of the processor when compared with its 16-bit father, it is still very fast compared with the Z80. This is due to the pipelining technique used within the CPU. While most 8-bit CPUs fetch

and execute instructions in series, the MC68008 can fetch the next instruction while executing another. This greatly speeds up the fetch/execute cycle, which reduces the speed difference between the 16-bit and the 8-bit external data bus versions.

The 68008 has 20 external address lines which means that it can address up to 1024k of memory. Its father, the MC68000, has 24 address lines and so can address 17.7Mbytes of memory.

The MC68008 has 56 basic instruction types with six basic types of addressing modes: register direct, register indirect, absolute, program counter relative, implied and immediate.

The instruction set is 'regular', which means that you can use all of the 14 addressing modes with nearly all of the instructions. The instruction set has been thoughtfully put together, and is





**COMPUTERTIME -**



*- have time for you!*



**\$499**

<b>Incredible Musical Keyboard</b>	\$69.95
Kawasaki Synthesiser (D)	\$69.95 (T) <b>\$64.95</b>
Kawasaki Rhythmmocker (D)	\$64.95 (T) <b>\$59.95</b>
Music Processor (D)	\$54.95 (T) <b>\$49.95</b>
Computer Song Albums (D)	\$39.95 (T) <b>\$34.95</b>

**ALSO AVAILABLE**

Commodore	1701	Monitor's
Commodore	1541	Disk Drive's
Commodore	801	Printer's
Commodore	802	Printer's
Commodore	1101	Printer's
Epson	RX80	Printer's
Epson	RX80F/T.	Printer's

**commodore**

Prices include Sales Tax

RRP	Computertime	ENTERTAINMENT SOFTWARE		
Simons Basic (C)	\$80.00	\$75.95	Son of Blagger (T)	\$19.95
Introd. to Basic 1, 2 (D/T)	\$40.00	\$37.50	Son of Blagger (D)	\$24.95
Easy Script (D)	\$100.00	\$93.50	Loco (T)	\$19.95
Manager (D)	\$100.00	\$93.50	Loco (D)	\$24.95
Typing Tutor (T)	\$19.95	\$18.50	Miner 2049 er (C)	\$59.95
Typing Tutor (D)	\$24.95	\$23.50	Cuddly Cuburt (T)	\$24.95
Calc Result Advanced (D)	\$200.00	\$189.00	Cuddly Cuburt (D)	\$29.95
Calc Result Easy (C)	\$100.00	\$93.50	Mummy's Tomb (T)	\$29.95
Multipian (D)	\$150.00	\$142.00	Space Mayhem (T)	\$19.95
CPM (C/D)	\$80.00	\$75.00	Neoclyps 64 (T)	\$29.95
Assembler (D)	\$60.00	\$55.00	Climber (T)	\$19.95
Koala Pad (D)	\$149.50	\$142.50	Star Post (C)	\$30.00

**MERIDIAN BUSINESS PACKS FOR THE C64**

Debtors (D)	\$100.00	\$95.00
Creditors (D)	\$100.00	\$95.00
Stock Control (D)	\$100.00	\$95.00
Invoice/Sales Analysis (D)	\$100.00	\$95.00
General Ledger (D)	\$100.00	\$95.00

**ENTERTAINMENT SOFTWARE**

Flight Simulator (D)	\$79.95	\$77.95
International Soccer (C)	\$30.00	\$28.00
China Miner (T)	\$24.95	\$23.50
China Miner (D)	\$29.95	\$28.50
Thermonuclear War Games (T)	\$19.95	\$18.50
Thermonuclear War Games (D)	\$24.95	\$23.50
Ski Devil (T)	\$19.95	\$18.50
Vortex Raider (T)	\$24.95	\$23.50
Vortex Raider (D)	\$29.95	\$28.50
Zone 6 (T)	\$19.95	\$18.50
Zone 6 (D)	\$29.95	\$28.50
Secret of Barstow Manor (T)	\$19.95	\$18.50
Secret of Barstow Manor (D)	\$24.95	\$23.50
Metro Blitz (T)	\$29.95	\$28.50
Metro Blitz (D)	\$34.95	\$33.50
Crosswords (D)	\$24.95	\$23.50
Crosswords (T)	\$19.95	\$18.50
The Hobbit (C)	\$39.95	\$37.95
Guide to playing the Hobbit		\$9.95
Blagger (T)	\$19.95	\$18.50
Blagger (D)	\$24.95	\$23.50

All items in stock at time of print  
 Manufacturer's FULL WARRANTY on ALL Products

Stella Wars (T)	\$12.00	\$10.50
Labrinth (T)	\$12.00	\$10.50
Soooper Fruit (T)	\$12.00	\$10.50
Depth Charge (T)	\$12.00	\$10.50
Super Grider (T)	\$24.95	\$22.95
Stock Market (T)	\$25.95	\$28.50
Data Form (D)	\$24.95	\$23.50
Data Form (T)	\$19.95	\$18.50
Beach-Head (G)	\$29.95	\$28.50
Beach-Head (D)	\$39.95	\$38.50
Pit Stop (C)	\$39.95	\$38.50
Pogo Joe (D)	\$34.95	\$33.00
Pogo Joe (T)	\$29.95	\$28.50
Strip Poker (D)	\$39.95	\$37.95
Chopflifter (C)	\$54.95	\$52.50
Loderunner (C)	\$39.95	\$37.95
Cops & Robbers (T)	\$24.95	\$23.50
Dragonsden (C)	\$30.00	\$28.50
Gridrunner (T)	\$21.95	\$20.75
Grand Master (T)	\$24.95	\$23.50
Grand Master (D)	\$34.95	\$33.50

**ADVENTURE GAMES**

Lords of time (T)	\$25.00	\$23.50
Colossal Adventures (T)	\$25.00	\$23.50
Dungeon Adventures (T)	\$25.00	\$23.50
Snowball (T)	\$25.00	\$23.50
Ultima II (D)	\$44.95	\$42.95
Ziggurat (D)	\$39.95	\$37.95

**ADVENTURE GAMES**

Dunzhin (T)	\$35.00	\$33.50
Kaiv (T)	\$35.00	\$33.50
The Wyld	\$35.95	\$34.50
The Institute (D)	\$39.95	\$37.95
Zork I (D)	\$25.00	\$23.50
Zork II (D)	\$25.00	\$23.50
Zork II (D)	\$25.00	\$23.50
Reach for the stars (D)	\$39.95	\$37.95

**ENTERTAINMENT**

	Retail	Computertime
Retro Ball (C)	\$56.95	\$55.50
Slinky (D)	\$25.95	\$24.50
Cave Kooks (T)	\$16.95	\$15.95
Crush, Crumble and Chomp (T)	\$45.95	\$44.50
O'Riley's mine (D/T)	\$59.95	\$58.25
Snokie (C)	\$59.95	\$58.25
Jawbreaker 11 (D)	\$41.95	\$40.00
Laserzone (T)	\$22.95	\$21.95
Summer Games (D)	\$29.95	\$28.50
Brands (T)	\$19.95	\$18.95
Eagle Empire (T)	\$19.95	\$18.95
Gridtrap (T)	\$19.95	\$18.95
Jumpin Jack (T)	\$19.95	\$18.95
Triad (T)	\$19.95	\$18.95
Turmoil (D)	\$49.95	\$48.50
Rootin Tootin (C)	\$49.95	\$48.50
Squish'em (D)	\$48.95	\$47.50
Curse of RA (D)	\$29.95	\$28.50
The Factory (D)	\$54.95	\$53.50
Fast Eddie (D)	\$48.95	\$47.50
Bat Attack (T)	\$19.95	\$18.95
Super Dogfight (T)	\$19.95	\$18.95
Snooper Troops (D)	\$54.95	\$53.50
Snake Byte (D)	\$50.95	\$49.50
Cosmic Tunnels (D)	\$49.95	\$48.50
Trains (D)	\$49.95	\$48.50
Aerobics (D)	\$49.95	\$48.50
Sea Fox (C)	\$48.95	\$47.50
Dino Eggs (D)	\$54.95	\$53.50
The Blade of Blackpool (D)	\$59.95	\$58.25
Perplexian Challenger (D)	\$44.50	\$43.00

E. & O. E. (C) = CARTRIDGE (D) = DISK (T) = TAPE  
 Prices subject to change without notice.

Tech Sketch Light Pen	\$89.95
Light Pen	\$79.95

**commodore**  
**COMPUTER**  
 Keeping up with you.

Shipping & handling charges: Sydney - \$5.00; anywhere else in Australia - \$10.00  
 Call at **COMPUTERTIME, 345 VICTORIA AVENUE, CHATSWOOD N.S.W. 2067**  
 or phone (02) 411 5277 or (02) 411 5757 for immediate attention  
 All Major Credit Cards Accepted - Write, phone or call for our SOFTWARE AND BOOK CATALOGUE

**COMPUTERTIME: FOR TOP VALUE**





ASHTON · TATE ™

Privately, even the experts will tell you that dBASE is the number 1 database management system in the world.\* Now with dBASE III, you can get even more out of your IBM PC or close compatible. It's fast, it's easy.

**It's also very clever.** dBASE III copes equally with the needs of the novice and the demands of the expert. If you're unsure of a command, HELP will tell you what to ask for. If you don't know what command comes next — ask the database ASSISTANT. And experts can talk in code, just the way they're used to.

**dBASE is used** to handle your information. Doctors and lawyers. Accountants and salespeople. Big business and small. The routine and the unexpected.

**You've never seen anything like it.** dBASE III can handle over a billion records per file, and you can have up to ten files open. When you have two related files, information in one can be accessed based upon data in the other. dBASE III now handles procedures, parameter passing and automatic variables. dBASE III isn't just fast. It's ultra-fast sorting.

**What about dBASE II?** If you have an 8-bit computer running CP/M, then dBASE II is still No.1.

## Expert or novice?

There's no hidden extras with dBASE III. You get a complete manual, tutorial and all the software. And top Australian support. Contact your local dealer, now, for a demonstration. Or use the coupon below to obtain more information from the Master Distributors, Arcom Pacific.

**arcompacific**  
■ master distributor ■

Please send me details about dBASE III   
and other ARCOM PACIFIC products

My name is .....

Company name .....

Address .....

..... Postcode .....

The micro I currently use is .....

and software .....

Send to ARCOM PACIFIC Freepost 2 (no stamp required)  
P.O. Box 13, Clayfield Qld. 4011

\* Over a quarter of a million copies of dBASE are in use throughout the world, more than any other business data base product.

† dBASE II and dBASE III are registered trademarks of Ashton-Tate. IBM is the registered trademark of International Business Machines.



# PROGRAMMING

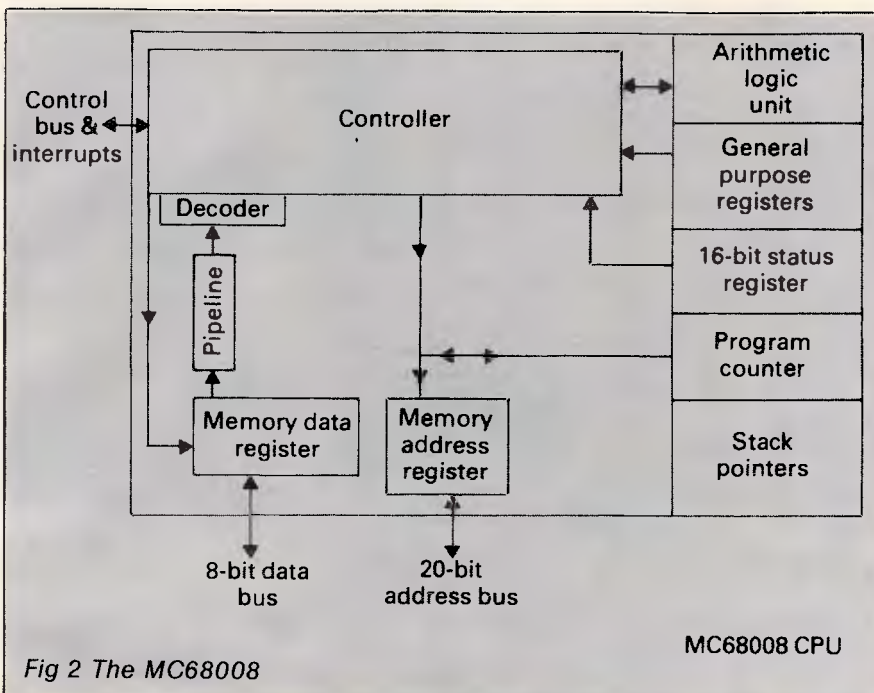


Fig 2 The MC68008

Data Register Direct:	MOVE	D0,D3
Address Register Direct:	ADD	A1,A4
Immediate:	MULU	#\$22,D2
Absolute Short:	JMP	\$1200
Absolute Long:	JSR	\$123456
Address Register Indirect:	SUB	(A0),D4
Address Register Indirect with postinc:	AND	(A2)+,D4
Address Register Indirect with predec:	MOVE.L	-(A7),D0
Address Register Indirect with index:	ROL	\$20(A3),D3
Address Register Indirect with index & disp:	BCLR	\$12(A1,A2),D5
Program counter relative with disp:	JSR	\$8(PC)
PC relative with index and disp:	JMP	\$55(PC,A1),D3
Quick Immediate:	ADDQ.B	#2,D1
Implied Register:	MOVE	SR,D0

Fig 3 Addressing modes

especially good for compilers (such as C or Pascal), where the LINK and UNLK instructions can be used for holding local variables within a procedure. Other instructions include data movement, logical operators, integer arithmetic, rotate and shift operations, BCD operators, bit manipulation and control instructions.

Five data types are supported: bits (single binary digits), BCD digits (four bits = a nibble), bytes (eight bits), words (16 bits = two bytes) and long words (32 bits = four bytes).

All the instructions are words and can have up to a further four extension words (these hold the data for the instruction). All the instructions on the MC68008 must start on an even byte address, and data must be padded out so that it, too, starts on an even boundary.

The standard format of the mnemo-

tics, in 68000 assembly language programming, is:

MNEMONIC.size source,destination  
The size can be B(=Byte),W(=Word)  
assembler defaultsto  
word,orL(=Long word)

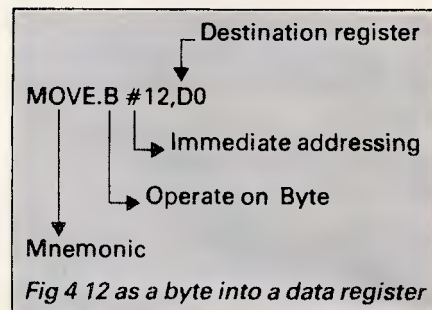
Both the source and destination values could be any of the 14 addressing modes. Some instruction mnemonics only allow one or two of the addressing modes to be used, such as the move quick instruction (MOVEQ #0,D1). The addressing modes available are shown in Fig 3 with an example mnemonic.

## Registers

The MC68008 has eight 32-bit data registers, seven 32-bit address registers, two stack pointers, a 16-bit status register and a 32-bit program counter. The eight data registers can be used

with bytes, words or long words. Numbers can be put into any of these data registers to represent counters, indexes or anything.

For example, if we wanted to put the number 12 into a data register as a byte then we would use the example shown in Fig 4.



This is like LET A=12 in Basic, only much faster!

There are seven address registers which can handle words or long words. Address registers are normally used to point to memory. Each memory cell has a unique number: data can be stored within this cell and then accessed by using the address registers.

For example, let's assume that we have a list of numbers stored in memory as words. We can point an address register to the start of the list by the instruction:

```
MOVEA.L #124,A2
```

This will fill all 32 bits of the A2 register with 124. Other instructions can now be used to get at the list of numbers pointed to by A2:

```
MOVE.W (A2),D4
```

This instruction will put the contents of memory pointed to by A2 into the data register, D4. So D4 will be equal to 76.

Address register seven (A7) can act as a stack pointer as well as a normal address register. So, if we want to put three numbers onto the stack, say, 19, 20 and 30, first set up the stack pointer:

```
MOVEA.L #5002,A7,
```

and then put 10 onto the stack:

```
MOVE.W #10,-(A7).
```

This mnemonic will decrement the contents of A7 by two (5002 - 2 = 5000). It will then use this address to store the data (that is 10). For the other two numbers we write:

```
MOVE.W #20,-(A7),and
```

```
MOVE.W #30,-(A7).
```

If we now wish to remove these values, we must do so in the order 30,20,10. The first number put in is the last out, that is:

```
MOVE.W (A7)+,D0 D0=30
```

```
MOVE.W (A7)+,D1 D1=20
```

```
MOVE.W (A7)+,D2 D2=10
```

There are in fact two stack pointers—one for the operating system, and one for the user (which you can use). The



# PROGRAMMING

## A chip off the old block

CPU will sort out which one you are using. Some assemblers allow you to use 'SP' instead of 'A7' in the mnemonic. This makes the code easier to understand.

The program counter is 32 bits long and is used by the processor to hold the address of the next instruction to be executed. However, since there are only 20 external address lines on the MC68008, only the first 20 bits in the PC are valid. The status register consists of two bytes, one for the system (normally the operating system in a general purpose computer) and one for the user (your programs). The function of each is as follows:

### User Status:

**C=carry:** this is used to hold the most significant bit from a logical or arithmetic operation.

**Z=zero:** this bit will be set to 1 if the previous operation yielded a zero result.

**V=overflow:** this bit will be set if a result greater than that specified is produced.

**N=negative:** this bit will take on the same value of the most significant bit of a result (it is usually set to 1 if the result is negative).

**X=extend:** this is always the same as the carry flag!

### The System Status:

**T=trace mode:** this generates an

exception interrupt after each instruction (like single-stepping).

**S=supervisor mode:** when this is set to 1, then the system operates in supervisor mode which has special privileges.

**I<sub>2</sub> I<sub>1</sub> I<sub>0</sub>:** the interrupt mask bits. (NB: You cannot change these values unless you are in the supervisor mode — that is, within the operating system.)



'It's got the ingredients of all the best video games — violence, destruction, death, war . . .'

## RAM CARDS

### apricot

128K — \$551, 256K — \$857

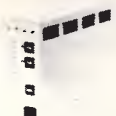
### sirius

128K — \$581 256K — \$799  
384K — \$1018 512K — \$1236

### IBM SUPERAM

64K — \$318 128K — \$403  
256K — \$574 384K — \$744  
Multi — includes parallel port, serial port, clock with battery back-up & Expandable RAM  
64K — \$527 128K — \$612  
256K — \$782 384K — \$1029

### PRINT BUFFER

SP 110  64K — \$450  
128K — \$600  
256K — \$900

All prices include Sales Tax

Diskettes  
Single Sided  
Double Density **\$28**

We are  
Brisbane's  
Largest & Best  
Supplier  
of

apricot  
sirius  
Spectrum  
BBC

22MHz Bandwidth  
1000 Lines Resolution  
FREE — 360° Swivel Stand  
Anti-Reflective Screen  
Crisp 80 Column Width Display



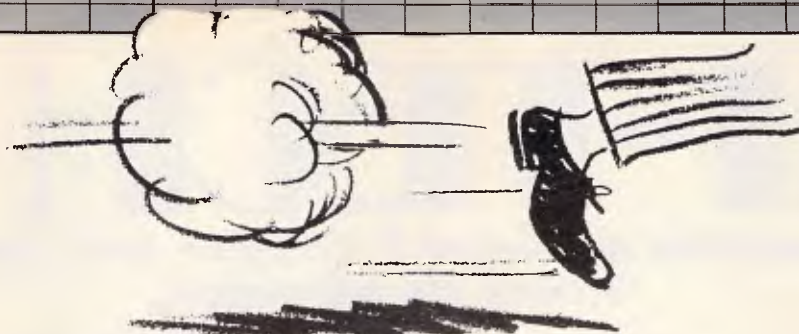
SUPER HI-RES  
MONITORS AT  
UNBELIEVABLE PRICES  
AMBER OR GREEN  
JUST \$159

# compsoft

Computers & Software for Business & Leisure  
537 Boundary St, Spring Hill, Brisbane 4000

Ph (07) 839 0066





# Some PC salesmen are quick off the mark when they make a sale. We've made our mark by being professional & always on hand.

As direct importers Megatron save you big money. But that's only where the benefits begin. We have a professional approach to sales and service with a team of fully qualified engineers always at your disposal. We won't let you down.



**DUAL PROCESSOR 64K RAM Z80a**  
On board programmed keyboard.  
Numeric key pad - upper and lower case - expansion slots.

Price includes full system computer, disk drive, controller card and monitor.

**\$995** Guaranteed Quality INCLUDING TAX

**16 BIT COMPUTER - MEGATRON PC301 IBM COMPATIBLE**  
Includes 10mb hard disk and 5 1/4" disk drive 128K expandable on board to 256K. Runs MSDOS and CP/M86 - RGB and composite colour on board.

**\$5150** Guaranteed Quality INC. TAX PLUS MONITOR-COLOUR OR GREEN



**Megatron Computer Industries Pty Ltd**  
192 Mt Dandenong Rd, Ringwood East, Victoria  
**(03) 870 4017** A/H: (03) 879 4472

TO: MEGATRON COMPUTERS,  
192 Mt. Dandenong Rd, Ringwood East, Victoria.  
Please contact me re.....  
NAME.....  
ADDRESS.....  
.....P/C.....



# HI-TECH C

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

## Features:

- Compiles Full V7 C — including enums and structure operations • 50%—100% faster code than any competing compiler
- 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.

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 answer to your needs.

## Benchmark:

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

## AVAILABLE FOR:

Z80, 8086/8088, CP/M-80,  
MS-DOS, CP/M-86

**Pricing:** (includes 12 months support) Z80 — \$250; 8086 — \$300; Post and Handling \$5 on all orders.

**Disk formats:** 8" SSSD most 5 1/4" formats (add \$5 for 5 1/4" formats)



MasterCard.

WE ARE MOVING TO  
QUEENSLAND!!  
Here's our new address.

## HI-TECH SOFTWARE

The leading edge of Software Technology

P.O. BOX 103, ALDERLEY, 4051, QLD.

PHONE: (07) 359 7897

# Our Guarantee

We have the **BEST** prices on **DATA BASE MANAGEMENT**  
If you can find a **BETTER** price... call us right now and we'll match it.

## DATA BASE MANAGEMENT

PRODUCT	Fields per Record	Records per Data Base	Files Open	Other Features	Stored Program Language	Graphics	Operating Systems	Our Special Price inc. Sales Tax
D-BASE II	32	65535	2	Limited HELP fac. Books & Tutorials	Easy command language	External to program	CP/M-80 CP/M-86 MS-DOS PC-DOS	<b>\$540</b>
D-BASE III	128	2 billion	10	good HELP facility	Easy command language	External to program	PC-DOS	<b>\$695</b>
FRAMEWORK	Framework can access DBase files DEPENDENT ON USER R.A.M.			DOS access Word Proc. HELP facility	Easy command language	Full graphics	PC-DOS	<b>\$695</b>
KNOWLEDGE-MAN	255	65535	no limit	Screen & Text util, stats spreadsheet	Extensive SQL-like command language	Graphics available (PC-DOS only)	CP/M-86 MS-DOS PC-DOS	<b>\$645</b>
LOTUS 1-2-3	256	2048	1	HELP facility	S' sheet capabilities only	Full graphics	PC-DOS	<b>\$595</b>
SYMPHONY	DEPENDENT ON USER R.A.M. Max. 256 Fields/Record		1	Word Proc. Comms Windows	Easy command language	Full graphics	PC-DOS	<b>\$795</b>
OPEN ACCESS	55	Hardware dependent	5	Word Proc. Comms Diary Windows	V. Easy SQL subset command language	Full graphics	PC-DOS	<b>\$695</b>
CONDOR 3	127	65535	2	HELP facility	Easy command language	External to program	CP/M-80/86 PC-DOS MS-DOS XENIX	<b>\$550</b>

Prices subject to change without notice

## THIS MONTH'S SPECIALS

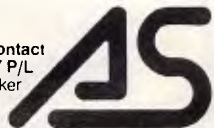
\* ZF 151 Zenith IBM Compatible PC, 10.6 Mb HD, 320K Ram, Colour Graphics Serial Port, Parallel Port.  
**\$8360 inc.**

\* ZF 161 Zenith Portable IBM Compatible PC, 2 x 360Kb Diskettes, 320Kb Ram, Serial Port, Parallel Port.  
**\$4917 inc.**

**FREE**

## INFORMATION

For orders or further information please contact  
**ARCHIVE COMPUTER SERVICES SYDNEY P/L**  
Shop 13, Mount Street Plaza, Mount & Walker  
Street, North Sydney, 2060  
Or Telephone (02) 923 1200



Please send me

Product ..... Qty.....

Name .....

Address .....

..... P/Code .....

B/card No.....

Signature .....

Add \$4.00 Postage..... Total \$.....



# It's for you!

Make new friends in exotic, faraway places (and nearer home) — start your own computer bulletin board system. Peter Tootill, co-editor of *Network News*, advises on the rewards and pitfalls of such a venture.

What are the reasons for running a BBS? I'm often asked this question by people who use my bulletin board system, who are also curious to know what is involved: what hardware and software are needed, and so on. BBS operators can be divided into two groups — hobbyists and businesses. The reasons for running a BBS as a hobby are difficult to define. If you're interested in micro-communications, it can help to keep your phone bill down: people will call you from all over the world and they will foot the bill. It's rather like ham radio — it's the contact and interaction with other people that make it interesting.

There's also a certain fascination in seeing your micro respond to commands typed by someone you can't see — who may be just across the road or thousands of miles away.

## What's involved?

One of the first things to realise is that running a BBS takes time and dedication. It's not something to be undertaken on the spur of the moment, whether as a hobby or for business purposes. The operator needs to do 'housekeeping' every day: clearing out messages that have been read, or are no longer relevant; keeping an eye on whether there's any bad language (it does happen); backing-up disks regularly; and rescuing much-used files that have become damaged. The time it takes depends on how much the system is used, but it will probably take around half an hour a day, every day.

Most full-time public BBSs can expect around 40 calls — more if they're very popular, or have a large local call catchment area, less if there are a few systems around to share the load. Many callers will leave messages, so you can see how quickly disks fill up. The more storage space you have, the longer you'll be able to go before being forced into action because a disk is full.

Another consideration is whether to install a separate phone line for the BBS. If you're going to use it for business pur-

poses, then there's no question about it. However, for the hobbyist it's more difficult; but if you can afford it, get a separate line.

But the main decision to make is whether you intend to run a part-time BBS or a 24-hours a day system. A part-time system (evenings only, perhaps) can be run using your own home phone line, as long as you can educate your friends not to hang up and report a fault each time they hear the modem tone. The 'ring-back' method can be used to avoid this problem; some clever modems will even answer the phone, and if they don't get a carrier within a certain time they'll assume it's a voice call and ring, just like an ordinary telephone.

If you want to run a 24-hour system, you really *do* need a separate phone line. Even for a part-time system a separate line is preferable, as you'll find that no matter how carefully you specify system times, people will call outside them. Whatever the reason, it can be aggravating and has been the reason for many BBSs closing down.

## Hardware

To set up your own BBS the minimum hardware requirements are a micro-computer, an RS232 interface, an auto-answer modem, a floppy disk, a real time clock and a printer. The last two items are not always necessary, but would normally be found in a reasonably capable system.

Let's look briefly at the items in turn. Almost any micro will do. BBSs run on everything from Spectrums to IBM PCs, and minicomputers and mainframes can also be used.

Many computers have built-in RS232 interfaces. In addition to the two data lines, the interface must have at least one control line that can be used to keep an eye on the carrier detect circuit. This is required so that if the caller hangs up or the line is poor and the modem loses the carrier tone, the software can be informed and reset itself to standby mode to await the next call.

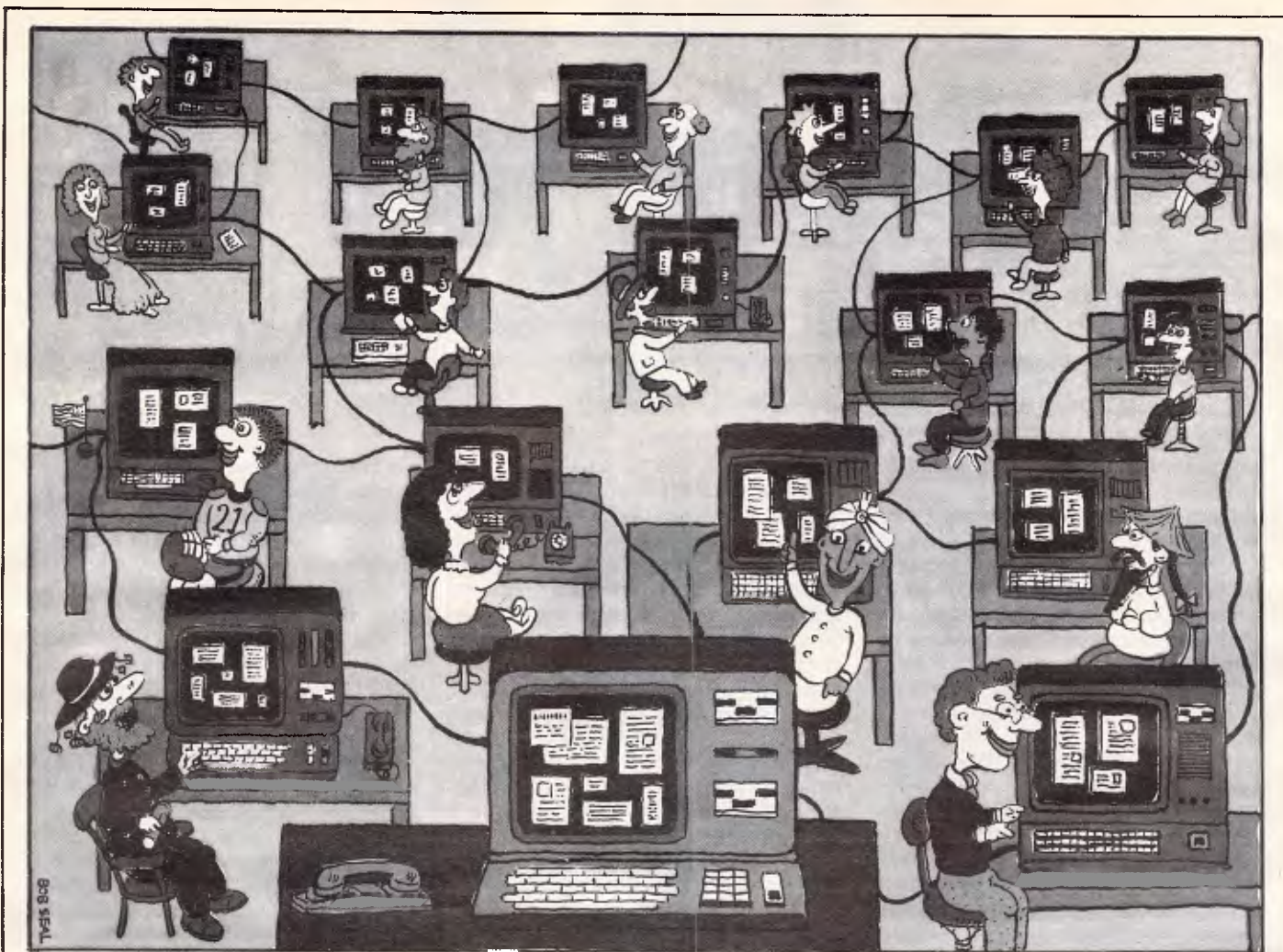
Some modems will automatically answer the phone when it starts ringing; others just tell the computer that there's a call coming in and need to be told to answer it. The latter will need an extra control line (usually the RI signal on pin 22 of the 25-way plug).

One other control signal may be needed on the RS232 interface if you intend to run the system at more than one speed. This is very common in the States, where systems offering Bell 103 (300/300) and Bell 212 (1200/1200) are popular. The modem answers the call and if it's of a high speed, lets the computer know. Modems which can detect the speed on an incoming call are rare as yet, but if you get the chance to use one, make sure that it's compatible with your software and RS232 interface.

An auto-answer modem is essential. The modem needs to be able to answer the phone by itself and to hang up again at the end of the call, or when the carrier drops for any reason. Answering and releasing the line may be done automatically or on instructions from the computer. There are two methods of auto-answering: in one, the modem does the work, answering the phone when it rings, checking for the carrier and hanging up at the end of a call; in the other, it keeps the computer informed of what's happening and waits for instructions (that is, it tells the computer the phone is ringing, answers it when instructed to do so, and so on). A 'ring-back' system is easier to implement with the latter method.

Your main consideration is to ensure that the modem is compatible with your software. It's no good the modem waiting for instructions if the software is waiting for the modem to answer the phone! Indeed, the matter of compatibility can be critical as some software is designed specifically for a particular make of modem. This is particularly true of BBS software for the Apple II, which has a number of plug-in modem cards available in the US. The US is the prime source of BBS software, which is not surprising as the idea was formed there, and





other parts of the world are still several years behind in some respects.

The interaction between software and hardware is even more important when you want to run a two-speed BBS. The way in which the modem recognises the high speed call and notifies the software must be compatible with the BBS program.

Another way of running a multispeed BBS is for the software to do the work; for this to happen, the baud rate of the modem must be controlled by the computer in some way. There's more than one way of doing it, but the obvious method of setting the modem to a particular baud rate and then checking to see if carrier detect is on is not reliable. It's quite possible for the carriers of two different modes to be close enough for the modem to think it has a correct carrier when in fact it hasn't. One simple method is to send a message such as 'press return if you can read this' at each different mode and wait for a recognisable carriage return to be received. It it doesn't come in a reasonable period of time, the computer could change the baud rate and send the message again. This is somewhat crude, but effective.

A number of US dual-speed modems work in a similar way. The caller sends a

few carriage returns and the modem, knowing what to expect, analyses the incoming signal to see at what speed it's travelling. These dual-speed auto-answer modems have a lot of processing power built in, and this will often extend to auto-dial as well as auto-answer features. They are often termed 'intelligent' modems.

Disks are also essential. It's possible to build a fairly basic BBS system that keeps all its information in memory, but it would be severely limited as to the facilities it could offer and the number of messages it could store. If there's a power failure, all the information in RAM would be lost. It isn't practical to use cassettes for running the system, although they could be used to save the RAM contents occasionally so that something could be recovered in the event of a power failure. Floppy tape/microdrive storage can be used, but its viability depends on the access time and the amount of data to be stored.

## Software

There are a few general points to consider here:

- ★ Will it suit your needs?
- ★ Will it run on your micro?

★ Is it flexible enough to be tailored to suit your future needs?

However, the most important consideration for the hobbyist is 'How much is it?' BBS software can cost you nothing for a public domain package such as Remote CP/M or the C language Citadel system (which comes from the CP/M and C users' groups respectively). On the other hand, you can pay hundreds of dollars for one of the sophisticated commercially published packages. Be warned, however — price is not always a good guide to the features and flexibility of the software.

Because of the variation in the way that 'compatible' micros are set up when it comes to such things as RS232 ports, you'll probably find that any BBS package will require a certain amount of installation before it will run on your system, unless it was specifically written for that make and model. CBBS, for example, is for CP/M systems but you need to be familiar with assembly language programming to be able to install it on particular systems.

You should approach the problem of choosing BBS software from two directions. Firstly, write down your requirements, as far as you can define them. Secondly, ring as many BBS sys-



**This is why you get  
better scores at the arcades.  
Now take it home.**



This is The Boss  
– the arcade control  
with the firepower and  
accuracy of an aviation  
joystick. The authentic  
control made by Wico\* that's been test-fired by  
millions in arcades around the world. And now you  
can take it home for only \$29.95<sup>RRP</sup>.  
The Boss features five built-in leaf switches for hair-  
trigger sensitivity, a jet fighter's grip  
that nestles in your hand and a thumb-  
action, rapid fire button.  
Available from leading video games  
retailers.



**THE BOSS**<sup>TM</sup>

**Arcade accuracy, precision  
and control by WICO\***

The Boss plugs directly into the Atari® 2600™, Atari®  
Home Computers, Commodore Vic-20\*\* and Commodore\*\*  
64. And the Apple† II Computer with a Wico\* adapter.

\*Wico is a trademark of Wico Corporation. \* & TM are the trademarks of Atari, Inc. or Futuretronics Australia Pty. Ltd. \*\*Commodore Vic-20 and Commodore 64 are trademarks of Commodore, Inc.  
†Apple is a trademark of Apple Computer Inc.



tens as possible and see what features they have that you like, and those that you dislike. Take note of how different BBSs using the same software vary: this will provide some indication of the package's flexibility. If they all look the same, it may be that the operators cannot personalise the system to suit their own requirements. If they vary widely, then the software must have a reasonable

frequently as disks are heavily used in most BBS applications. Disk errors are not uncommon; if you don't have a recent back-up, information can be lost.

It's difficult to generalise about the capacity you need. I have heard of BBSs running with as little as 200k; I started my system with about 500k, but that didn't last long. It depends on the space

ring-back method is by means of appropriate software. The program simply needs to monitor the modem's ring indicator circuit (pin 22 on the RS232 connector), and when the phone rings it counts the number of rings. If there are only one or two, it starts a timing loop and answers the phone if it rings again inside this loop. If the phone doesn't ring again, the software resets itself to standby mode.

It's possible to do the same thing in hardware, using a ring detector and timer circuits. Indeed, this might be the only way to do it if the software can't be made to support the ring-back system.

***'A ring-back system is one way of running a BBS. The caller dials the number, lets the phone ring once, hangs up and then calls again; and the second call should be answered by the modem.'***

amount of flexibility. BBS software is an area where you can try out a lot of different packages and talk to the people using them without ever leaving your desk or your own lounge room.

This research will provide a reasonable idea of what to look for in terms of software, and as most BBSs will give you details of the hardware they use, it will help with that aspect too.

Writing your own BBS software is not as difficult as you might imagine. Apart from a small machine code driver, the main programming can be done in Basic. In a 300-bit/sec system, the software has only to keep up with the system operating at 30 characters a second, and even slow Basics can manage that. The main BBS program will consist of some file-handling routines to: save and retrieve messages; maintain a user log; and display information files. Downloading can be done in this way too. The machine code routine referred to above is needed to perform a few background tasks and possibly to handle the RS232 input and output, if such commands are not built into your system. The background routines are as follows:

- 1) Keep an eye on the carrier detect circuit, and tell the BBS software if it gets low.
- 2) Provide nulls after carriage returns if the caller needs them.
- 3) Provide line feeds after carriage returns if the caller needs them.
- 4) Convert lower case output to upper case if the caller cannot handle the former.

The other features that can be provided are many and varied, and the best way to proceed is to write software in modules. These can then be chained to a main 'core' program that does the major work, but has the facility to load a further module for any extra features; quite successful BBS software has been written in this way.

At least two disks are desirable for ease of back-up, which should be done

your disk operating system and the BBS software need, plus a fairly generous allowance for message and information files.

Software for downloading is another disk-eater. One megabyte is approximately the right amount to think about, but a hard disk is ideal. It not only gives you plenty of space, but radically speeds up the system operation.

'Real time clock' is computer jargon for something that enables the computer to tell the time. It's normally used by the BBS software to mark the entry time of messages, and to perform certain standard operations at set intervals. It's not essential unless the software you use needs it, but many modern micros have a built-in clock fitted as standard. Battery back-up is useful, so that the time is not lost if there's a power failure.

## Applications

There are many areas in which businesses can and do use bulletin board systems. Some of the more obvious ones are electronic mail ordering, cataloguing and stock level information. The BBS can be private (for employees only), for employees and customers, or public. In the latter case it could form, for example, a natural extension to the mail order side of the business.

Another common application is customer support: a 24-hour two-way telephone answering system. Other applications are legion: a publisher uses one for uploading author's copy while another system forms a collecting point for information for a bibliographic database. The message facilities can be useful for companies with field staff who are frequently absent from the office, and

***'There are many areas in which businesses can and do use bulletin board systems. Some of the more obvious ones are electronic mail ordering, cataloguing, and stock level information. The BBS can be private, for employees and customers, or public.'***

A printer is very useful for keeping track of calls and for general listings of files, userlogs, and so on, but there's no special need for a sophisticated one. As the printer will only be printing the occasional message, it doesn't need to be able to keep up with the BBS transmissions (which will only be running at thirty characters per second on a 300bps system).

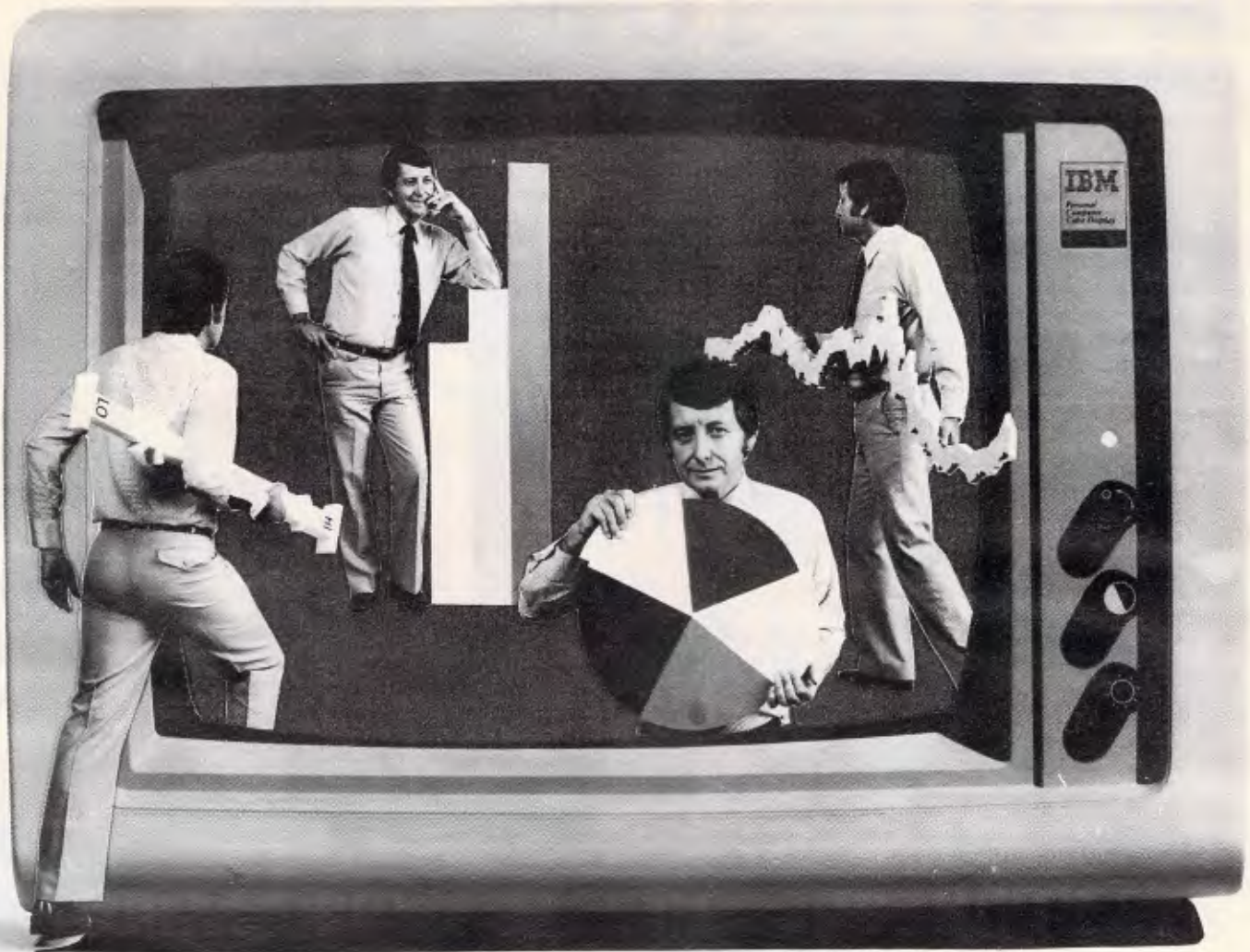
A ring-back system is one way of running a BBS. The caller dials the number, lets the phone ring once, hangs up and then calls again; and the second call should be answered by the modem. The advantage of this system is that ordinary callers don't get a loud whistling in their ears when they are expecting a human voice. The easiest way to implement the

in such situations it's often used for passing orders back, and for telling the staff member of his next task. BBSs can even be tied to packet switching systems to give cheap access via the worldwide networks.

The possible applications are wide, especially with the advent of portable computers with built-in terminal software. Here's an area where a little lateral thinking could produce some new ideas for business applications. Can you think of a novel use for a BBS in a business environment.

I must point out that it's very difficult to make a BBS pay its own way. You may charge callers a subscription, or sell goods by mail using a BBS. Both are possible, but to charge a subscription





## Actions speak louder than words

Put action into your financial information. Highlight the growth; pinpoint the loss; spot the trends. Do it faster by using the powerful graphing commands integrated into SuperCalc<sup>3</sup> from Sorcim/IUS. ■ SuperCalc<sup>3</sup> is a state-of-the-art spreadsheet, but with a few significant advantages. ■ Graphing is so simple. Just a single keystroke enables you to view, print or plot your information. There is no need to change disks or create intermediate data files. The range of graphs is extensive. You can produce pie charts, bar charts, line, scatter, X-Y and hi-lo graphs. ■ There are other advantages as well, like calculations, up to 10 times faster using the 8087 Maths chip. Database, iterative cell calculations, and sideways printing are also available. ■ The best news is that SuperCalc<sup>3</sup> costs just \$422.00. ■ **Contact your local dealer to arrange a demonstration of SuperCalc<sup>3</sup> Version 2, or try a limited facility version in your own office.**

SuperCalc<sup>3</sup>, The Lotus Eater

I want to switch to **SuperCalc<sup>3</sup>**, please send me more information

My Name is .....

Company Name .....

Address .....

Postcode .....

The micro I currently use is .....  
and software .....

*Write to the address below for more information, or visit your local computer dealer for a demonstration.*

■ 252 Abbotsford Road ■ Mayne, Brisbane Q 4006

■ Fax (07) 52 7820 ■ Telex AA44187

■ Phone (07) 52 9522

**arcompactic**

Brisbane ■ Sydney ■ Melbourne ■ New Zealand ■ master distributor ■

SuperCalc<sup>3</sup> requires an IBM PC, PC-XT or close compatible running PC-DOS 2.0. Minimum memory is 96K. Neither colour nor graphics is compulsory although recommended.



# WHAT TO LOOK FOR . . . THE NEW-LOOK PCG

STARTS  
JANUARY at  
the ridiculously  
low price of  
\$1.95

## PERSONAL *Computer* GAMES

**DO IT...**

Free programs in Australia's  
largest listing section

**SOLVE IT...**

Hints, tips and better  
ways to program

**PLAY IT...**

Adventure or arcade,  
action or application

**GET IT...**

Only in the new  
action-packed PCG

**PLUS...**

Circuits to build and  
connect to your micro!



## BULLETIN BOARDS

# It's for you!

you have to have something to offer that other *free* systems don't have. Why should someone pay you a sub when they can call other BBSs for nothing? Mail order can work, but again you need to have something special to offer callers. Mail order goods are available from a wide range of places and competition is tough.

Few BBSs make money for their operators unless run in conjunction with an existing business. In such cases it's usually in advertising and publicity, or as part of their existing mail order business that it becomes financially viable, not in terms of direct income generated.

### Conclusion

Don't be easily discouraged from running a BBS by the above dos and don'ts. If you're serious you'll find it's a very rewarding hobby, and will make you many friends locally, interstate, and around the world.

However, commitment is essential in terms of time and effort to keep the system ticking over, and to keep it interest-

ing for regular callers. It takes over your micro: sometimes the only way you can get to use it is to take the phone off the hook, and then feel guilty about all the people who are trying to get through and can't! Is it worth it? Well, I think so.

If you're interested in micro communications, look out for Peter Tootill's book, *The Communicating Micro*, just published by Sunshine Books.



## Paper Tamer<sup>®</sup>

### PRINTER ORGANIZER

Suits all Matrix Printers using 210mm (A4) paper

23/24-3 Ernest St., Nth Sydney, NSW 2060  
Telephone (02) 929 3217



Lintek  
Please rush me PAPER TAMERS. I enclose \$39.95 plus \$3.00 freight and packaging for each.

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.

● "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**

# THE PRICE/PERFORMANCE WINNER CICADA 300 DATA MODEM

- CICADA 300
- CICADA 300T with telephone
- CICADA 300C for use with Commodore 64 and Vic 20 computers



**CENTRE INDUSTRIES**  
**ELECTRONICS & TELECOMMUNICATIONS EXPERTISE**

187 Allambie Road, Allambie Heights, P.O. Box 184, Brookvale, NSW 2100. Tel. (02) 451 5555. Telex AA22671

# MODEMS

FREE  
MEMBERSHIP OF  
"THE AUSTRALIAN  
BEGINNING"  
WITH EACH MODEM!

We  
solve  
your

## Data Communications problems

When you're purchasing a modem, how do you know it is right for your job (or indeed that it will work at all)? The salesman said it would, but then he was after a sale for his brand, wasn't he?

At Rosser Communications we sell a wide range of brands and models — and we are specialists in data communications. So you can be sure that what we recommend is what you need and that that recommendation is backed by all the help you require to fully implement your application.

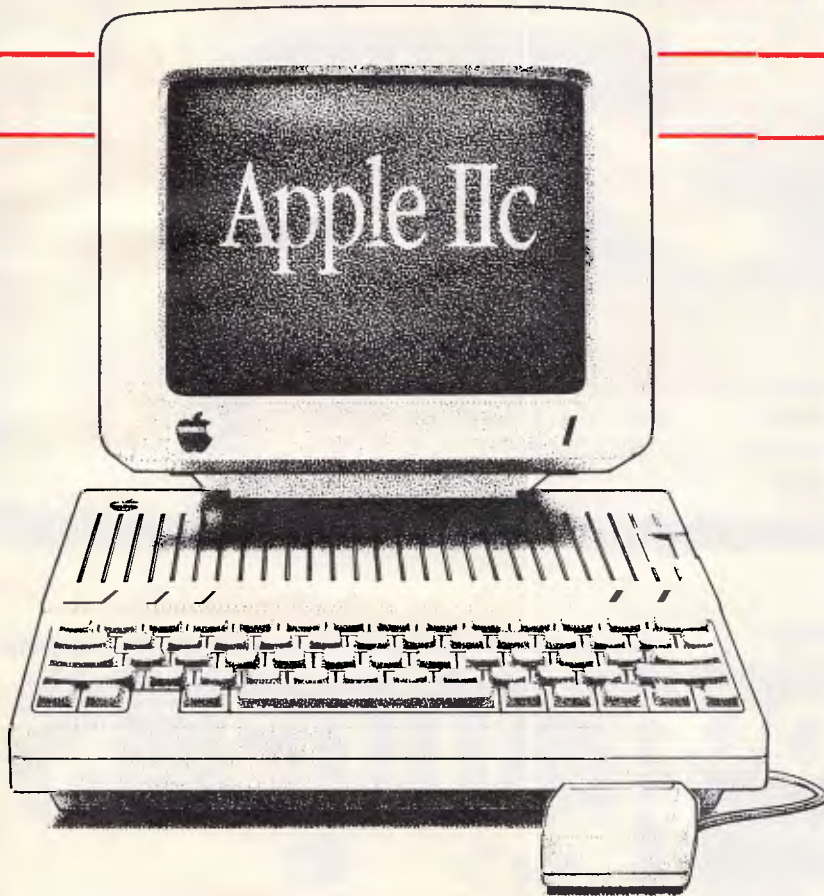
Get your data communications on-line fast — talk to us today!

**(02) 449 8233**

**ROSSER COMMUNICATIONS**  
**Suite 1, 25 Bridge St., Pymble, N.S.W. 2073**



# Gift Wrappers at Rob's Com



**YOUR NEW**

## APPLE IIC PACKAGES

THE FAMILY PACKAGE can give Mum, Dad, and the kids hours of productive fun and enjoyment. You get . . .

- APPLE IIC Computer with 128K of memory and built-in disk drive
- APPLE IIC Monitor and stand
- Colour RF Modulator
- Ultra high resolution graphics in 16 colours

## SOFTWARE

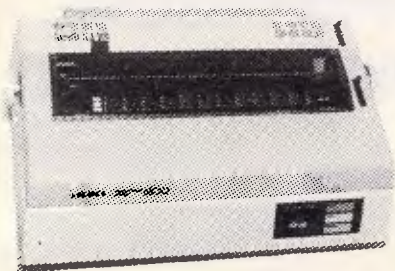
- Apple Mouse and "Mouse Paint"
- Bank Street Writer
- Odesta "Chess"
- Broderbund "Print shop"

**\$1,995.00** You save **\$515!**

THE PROFESSIONAL PACKAGE is a great introductory package for running business applications in the home or small business. You get . . .

- APPLE IIC Computer with 128K of memory and built-in disk drive
- APPLE IIC Monitor and stand
- Colour RF Modulator
- Add-on Disk Drive
- Ultra high resolution graphics in 16 colours

## JUKI 6100 DAISY WHEEL PRINTER.



Control codes are identical to Diablo Printer.

**CHRISTMAS SPECIAL**  
**\$795** (1 Month only)



## HITACHI 16000

Now includes a new graphics card to give far greater compatibility with IBM software.

### Includes

- High Resolution Colour Monitor
- 128K RAM
- MSDOS & Basic
- Printer, Serial & Light pen interfaces
- Free games Disk

Was **\$5,995** Now **\$3,995**

## NEW HITACHI S1

Hitachi's first Super Home Computer packed with features that leave the others gasping.

In fact you need to see it to believe it.

Hitachi S1	- \$975
Colour Monitor R6B Vision II	- \$595
High Res Green or Amber Monitor	- \$185
Single DS/DD Disk Drive 320K formatted	- \$650
Dual DS/DD Disk Drive	- \$1,050
64K RAM Card expandable on Board to 512K	- \$195



# d Apples puter Center

## APPLE DEALER

### THE APPLE MACINTOSH

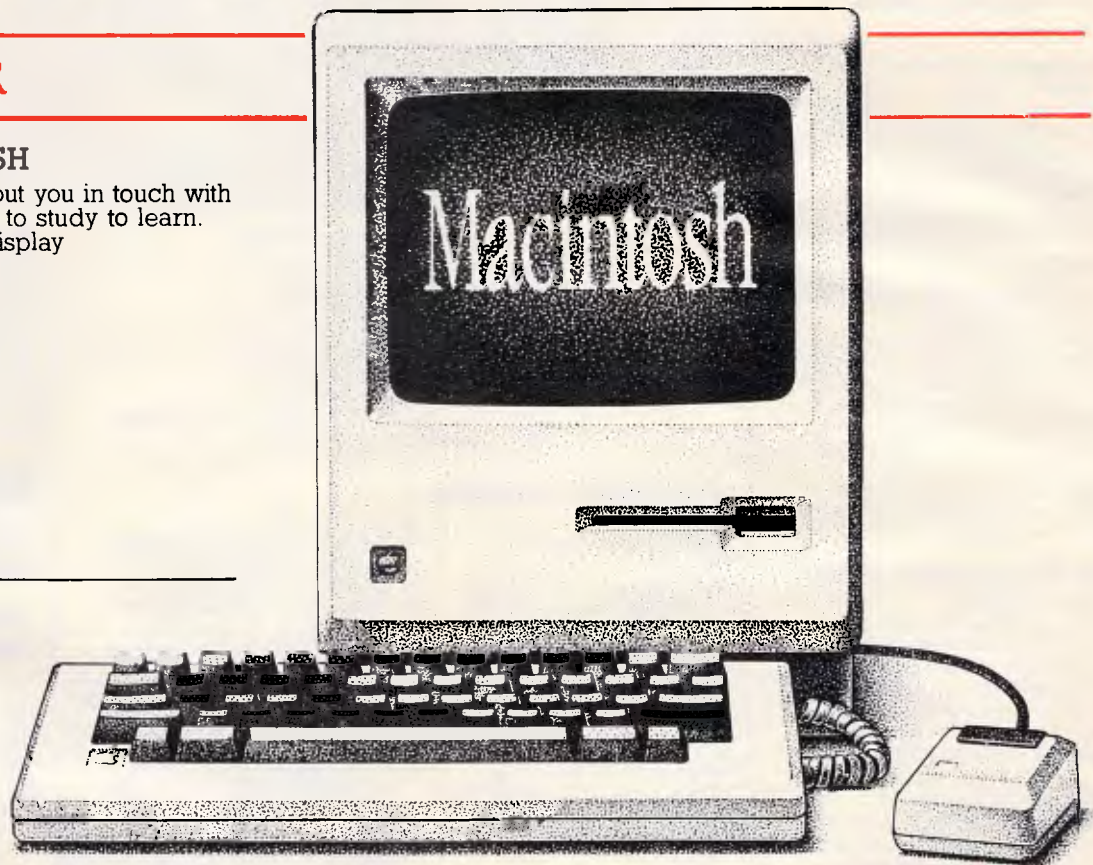
Let Rob's Computer Center put you in touch with the Computer you don't have to study to learn.

- Nine inch high resolution display
- Built in Disk Drive
- 128K RAM
- The Apple Mouse

### SOFTWARE

MacWrite and MacPaint

**\$3,240**

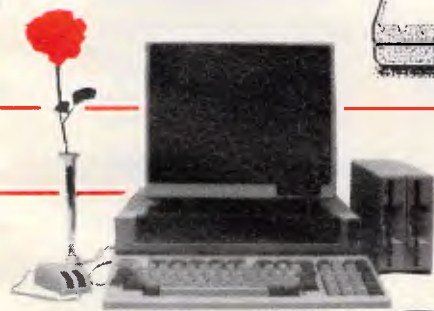


### SOFTWARE

- Apple Works
- Master Type
- Odesta "Chess"

**\$2,550.** You save \$500!

ALL PRICES INCLUDE TAX



- 102K Total ROM standard.
- 96K Total ROM standard.
- Expandable to 1 Megabyte.
- Ultra Reliable Hitachi Quality
- High Resolution Graphics  
640 x 20 16 colours  
640 x 400 1 colour
- High Level Basic Commands such as View window.
- Ultra Fast (Ask for our Bench Mark Tests)
- Runs all Peach Software (Twice as fast)
- Runs Standard Flex operating system
- Micro Soft Basic
- Many other features (please phone or send for more details)



# rob's

## COMPUTER CENTER

295 Thomas Street, Dandenong 3175

Phone (03) 7912900



# Why do AVTEK modems work better?

MultiModem and MiniModem bring superior data transfer within every computer users reach.

Using new VLSI technology, these modems use digital signal processing to achieve functions normally requiring analogue filters. The result? Reliable data transfer on terrible lines where most modems just give up in disgust! An added benefit: digital modems never require alignment.

● **They never requires adjustment.**

Complex modulation, demodulation and filtering functions are carried out by integrated circuit A/D and D/A convertors. A digital signal processor uses 24K of ROM and 1.3K of RAM to perform the filtering functions. Critical analogue adjustments give way to crystal locked precision.

● **Digital filters mean less errors.**

They are much sharper than on conventional modems. Line interference is screened out. You get error free data transfer, even on very noisy lines.

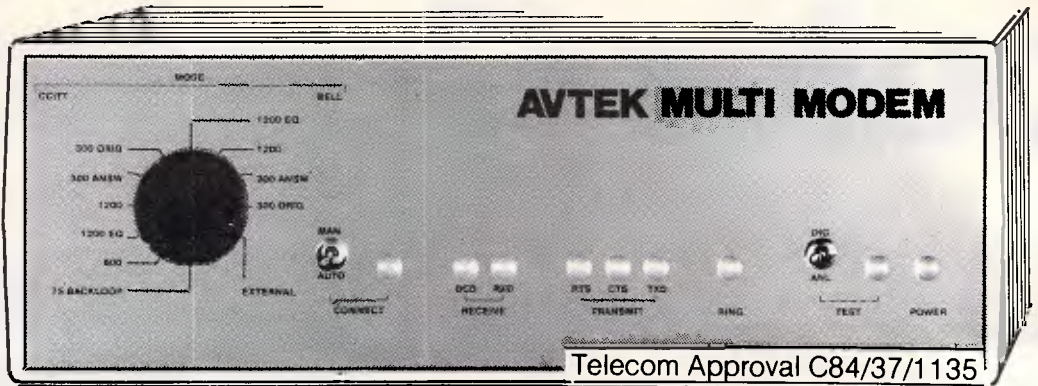
● **Auto Answer Option**

What is autoanswer? It is the ability of your computer/modem to switch into receiving mode when the phone rings. Some computer/software combinations do this. MultiModem offers the alternative, for computers without this facility - a hardware autoanswer. You can leave your computer waiting for information.

● **Products for the MicroBee**

● **MultiProm Interface Kit allows you to:**

- Extend the ROM capacity of your MicroBee to 44K, or to a total of 308K by daisy chaining
  - Takes 2532s or 2764s (can be mixed) and has 11 open collector outputs and eight buffered inputs;
  - The address of the ports used for EPROM selection can be changed.
  - Select between Editor/Assembler, WordBee, Logo, MiniPascal etc. with a few keystrokes.
- only \$99.00**



MODE	RATE	DUPLEX DESCRIPTION
1	300	Full Bell 103 originate
2	300	Full Bell 103 Answer
3	1200	Half Bell 202
4	1200	Half Bell 202 with equaliser
5	300	Full CCITT V21 Originate
6	300	Full CCITT V21 Answer
7	1200	Half CCITT V23 Mode 2
8	1200	Half CCITT V23 Mode 2 with equaliser
9	600	Half CCITT V23 Mode 1

● **MultiModem has all the standards.**

You won't be left with an obsolete product. MultiModem gives you both Australian/European (CCITT) and American (Bell) standards at 300, 600 and 1200 baud.

While most facilities currently use modes 5 & 6 (300 baud (CCITT V21), the standard for Videotext is to be modes 7-9 (CCITT V23). MultiModem is ready for future developments.

● **MiniModem only \$199.00 inc. phone**

When only 300 baud full duplex is required, MiniModem is the right choice. Using the same digital filtering as MultiModem, it provides:

- 300 baud full duplex
- Answer/originate
- Includes phone hardwired plus plug
- Superior VLSI chip performance (identical to MultiModem).



● Telecom Approval C84/37/1173

● **Baud Rate Convertor**

Coming soon, this powerful accessory for the MultiModem allows computers to communicate using split baud rates (1200/75 and 600/75, 75/1200) when they do not support it internally - (e.g. Commodore, Tandy and early MicroBees.)

● **MultiModem**

Complete, including the phone hardwired into the modem.

**\$349.00**

● **Autoanswer MultiModem**

Includes phone and switchable hardware auto answer.

**\$399.00**

● **Kit MultiModem**

Save by building it yourself. Does not include phone. Not for connection to Telecom lines. **(only available \$249.00 from Avtek)**

● **Autoanswer Facility (retrofit)**

Module must be fitted by Avtek. **\$59.00 plus \$7.50 return P&P**

● **Postage and Packing:**

On Modems is \$7.50 (registered). On other products is \$3.00

● **MULTIROM Boards XM-1**

Fits inside the MicroBee and lets you select say WORDBEE or EDASM from the keyboard. Suits all Bees with 8000 serial number (or earlier) **\$19.95**

● **XM-2**

As XM-1 but suits all Bees with 9000 (MicroBee IC etc) serial numbers upward **\$29.95**

● **XM-3**

This great little adaptor allows owners of early MicroBees which use 2532 ROMs, to use the later 2764 ROMs. **\$17.95**

## AVTEK DEALERS

- Melbourne**  
Rod Irving Electronics (03) 489 8866  
Compak Computer Centre (03) 555 9844
- Perth**  
Altronics (008) 999 007 (Orders)  
(09) 328 1599 (Enquiries)
- Brisbane**  
Jaycar (07) 393 0777
- Sydney**  
Paris Radio (Kingsford) 344 9111  
Jaycar (City) 267 1614  
Jaycar (Hurstville) 570 7000  
Jaycar (Carlingford) 872 4444  
Jaycar (Concord) 745 3077

# AVTEK

(Electronics) Pty Ltd

Call us on our new hotline

Phone 427 6688 or write to us C/O Lane Cove Post Office.





# TEACH YOURSELF LISP

Dick Pountain continues his 'Teach Yourself' series with a look at some of Lisp's non-applicative features.

Lisp arose from a purely mathematical system of notation for working with functions, and implementing it on a computer was almost a side issue.

In our examples so far, we've treated Lisp as a purely functional (or 'applicative') language. Our programs have been functions, or functions applied to functions, and so on, which were evaluated by Lisp. We've used no special I/O operations at all — when a program printed its result onscreen, this was merely the value of a function which Lisp obligingly puts on the screen for us — when a program needed input from us, we merely supplied it in the shape of parameters to the function.

However, there comes a time when we have to realise that we aren't doing maths but working on a computer, with physical bits like memory, VDU, keyboard, and so on.

Let's start with the non-applicative feature I/O. Input is quite straightforward: the function READ causes a program to pause and wait for input from the keyboard; this input is returned as the value of READ, which requires no arguments. READ will only accept one expression (a number, an atom or a list) as its input, and looks for a carriage return to tell it you've finished. If you type a whole line of words, followed by CR, only the first will be returned to the program by READ. Try it by typing in:

```
* (CONS (READ) ' (A B C))
```

Some dialects have the additional function READLINE which reads in everything you type up to the CR, not merely one expression. MuLisp has READCH which reads only one character, like the Basic INKEY\$.

READ is also used to read from files in most Lisp systems, but the methods of redirecting input from keyboard to disk or cassette are extremely machine-

dependent; I leave you to the mercy of your manual.

Output is a little more complicated. The most commonly used function is PRINT, which behaves very much like the Basic PRINT. It prints the value of its single argument on the screen, and then performs a newline. One thing that initially confused me is the fact that PRINT, being a function, also returns a value, which is again the value of its argument. If you type:

```
* (PRINT 'HELLO)
```

HELLO

HELLO

you begin to see double. One of the HELLOs is the *side effect* of PRINT (to print on the screen, which is what we use it for) and the other is its value as a function, returned as normal. Inside a program you'll normally discard the returned value, but if your program starts to stammer you'll know why.

Most Lisp dialects provide the function PRIN1, which behaves like PRINT but without the newline. Some dialects will also supply functions with names like PRIN and PRINC, which have a variety of more specialised behaviours. The most common of these is to print output in a form re-readable by Lisp, which entails giving special treatment to any characters illegal in a Lisp name. The utility of such functions arises because PRINT, like READ, can usually be redirected to write to a file instead of the screen, and it's not much use writing files that can't be read back in.

Saving and loading programs are done by the special functions SAVE and LOAD, which are usually very blunt instruments indeed, merely storing the whole of the workspace, definitions and variables. This has the merit of restoring a session exactly as you left off, but makes any kind of library-building rather tiresome. Supersoft Lisp and MuLisp both have more selective ways of saving

```
(DEFINE PRINT-NUMBERS-NICELY ()
  (PROG (NUM)
    (SETQ NUM 0)
    LOOP
    (SETQ NUM (PLUS NUM 1))
    (COND ((EQUAL NUM 100) (RETURN 'CENTURY!))) )
    (PRINT NUM)
    (GO LOOP)
  )
)
```

Fig 1 The function GO label acts like a Basic GOTO

```
(DEFINE PRINT-NUMBERS ()
  (PROG (NUM)
    (SETQ NUM 0)
    LOOP
    (SETQ NUM (PLUS NUM 1))
    (PRINT NUM)
    (GO LOOP)
  )
)
```

Fig 2 PROG takes its value from the RETURN statement

```
(DEFINE MATCH (PATTERN LIST)
  (COND ( (AND (NULL PATTERN) (NULL LIST)) T )
        ( (OR (NULL PATTERN) (NULL LIST)) NIL )
        ( (OR (EQUAL (CAR PATTERN) '?')
              (EQUAL (CAR PATTERN) (CAR LIST)))
          (MATCH (CDR PATTERN) (CDR LIST)) )
        )
)
```

Fig 3 MATCH allows the wildcard character '?' to match any expression





# Cash & Carry Computers & Software

## IBM

	OUR PRICE	R.R.P.
Perfect Link	129.00	149.00
Crosstalk	249.00	299.00
Prokey	230.00	269.00
Loadcalc	165.00	199.00
AST 5251/12	1195.00	1595.00
Irma	1695.00	1895.00
APL/Plus PC	1045.00	1199.00
Symphony	795.00	995.00
Lotus 123	575.00	745.00
dBase II	460.00	540.00
dBase III	675.00	795.00
dBase II-III	249.00	299.00
Framework	675.00	795.00
Multimate	395.00	595.00
Word Perfect	465.00	650.00
Easywriter	465.00	579.00
Havard Project Manager	545.00	649.00
Graphwriter	845.00	995.00
RBase	530.00	630.00
Clout	215.00	256.00
Wordstar Propak	595.00	795.00
Spell Binder	655.00	695.00
Supercalc 3	367.00	445.00
Corporate MBA	1020.00	1200.00
Open Access	675.00	940.00
Quickcode	300.00	380.00
Flight Simulator	69.95	87.95
Cardbox	279.00	328.00
Ada	360.00	420.00
C-Compiler CP/M86	315.00	385.00
Fortran IV	499.00	578.00
Turbo Pascal	79.95	135.00
Revelation	1499.00	1762.00
KnowledgeMan	595.00	895.00
Hercules Graphics	595.00	938.00

**FOR ALL SOFTWARE REQUIREMENTS — CALL US NOW FOR SUPER SAVINGS!**

AST Sixpack	call	
All T.I. Software	call	
Abstat	599.00	742.00
Stat pac	577.00	637.00
Pascal MT +86	585.00	725.00
Concurrent CP/M 86	508.00	610.00
C-Basic 86	314.00	395.00
Basic Program Tools	295.00	370.00
Personal Pearl	435.00	510.00
Blue Linx SNA Emulation	1445.00	1890.00
Key II — 123	375.00	427.50
BPS Graphics	488.00	562.50
STB Graphics	724.00	867.00
NBI Remington	990.00	1245.00
Jack 2	690.00	770.00
PCOX	1707.00	1895.00
Havard Project Manager	545.00	658.50
Auto Cad	1523.00	1875.00
Micro Cad	876.00	982.00
K-Graph	349.00	510.00
K-Paint	176.00	249.00
Peachtext 5000	547.00	599.00
Peachtree Basic Acc System	Call for a price	

## commodore KAYPRO Televideo

	OUR PRICE	R.R.P.
Call	Call	Call
Call	Call	Call
Call	Call	Call

## apple

Apple CED Par	135.00	175.00
Apple CED Ser	125.00	165.00
Microsoft Softcard	422.00	545.00
Digitek Printmaster	138.00	202.00
CP/M + Wordstar + 64K	495.00	595.00
CP/M + Infostar + 64K	566.00	666.00
10 mb Davong for Apple III	2495.00	2898.00
RGB for II+, Ile	142.00	162.00
RGB 80 column for Ile	189.00	234.00
Accelerator II (for II+)	811.00	990.00
Applicard 64K/D0S	565.00	632.00
Applicard 192K with CP/M	835.00	961.00
Polo Serial Card	355.00	388.00
Ultra Term	715.00	806.00
MacCash	245.00	275.00
MacLedger	345.00	385.00
Mainstreet Filer	285.00	320.00
Transylvania	57.95	65.95
MacManager	66.95	75.95
MacPuzzle	57.95	65.95
Mouse Stampede	46.95	54.95
Filevision	235.00	275.00
More Mac Software	Call	Call
Zardaxx	256.00	324.00
Homeward	89.00	99.65
PFS File, Graph, Report	145.00	175.00
dBase II	395.00	540.00
ALD System II	182.00	215.00
Wordstar Propak	595.00	795.00
Uspeed	698.00	897.00
Perfect Writer	175.00	295.00
Beagle Bros. Graphics	Call	Call
Nevada Languages	55.95	59.95
Grappler +	165.00	185.00
Turbo Pascal	79.95	135.00
Apple Multiplan	345.00	395.00

## MISCELLANEOUS

64K Chips	90.00	135.00
Diskettes 5"	40.00	67.00
Printer Cable	45.00	73.00
Diskette File	35.00	62.00
Printer Paper 10"	53.00	80.00
<b>MONITORS</b>		
Kaga Green IBM	307.00	327.00
Taxan Kaga Green	246.00	306.00
Taxan Kaga Amber	251.00	311.00
Roland RGB	872.00	995.00
Kaga Vision Ex	455.00	565.00
Kaga Vision II	560.00	672.00
Kaga Vision III	775.00	930.00

## PRINTERS

### INTRODUCING

Olympia NP Dot Matrix  
160 cps Draft mode switchable  
to 90 cps premium Letter  
quality.

The quietest dot matrix on the  
market. Leading the way for  
Epson compatibles.

### EPSON

RX-100	825.00	904.00
FX-100	1215.00	1333.00
FX-80	839.00	926.00
RX-80 FT	595.00	649.00
RX-80	465.00	525.00
LQ-1500	1899.00	2130.00

### TOSHIBA

P1350	2369	2581
P1340	1085	1144
Tractor	208	223
Sheet Feeder	1095	1214

### ROLAND

8 Pen Plotter	1286.00	1395.00
1 Pen Plotter	795.00	895.00

### BROTHER

HR-15 par	675.00	895.00
HR-25 par	1035.00	1345.00
HR-15/25 Tractor Feed	108.00	189.00
HR-15/25 Sheet Feeder	248.00	449.00

### WRITER'S DREAM

Brother EP-44 Personal Electric  
Typewriter/Printer

Serial Interface, Liquid Crystal  
Display, 4K Buffer, Electronic  
Calculator, Terminal  
Capabilities

369 399

### CHRISTMAS STOCKING STUFFER

Brother HR-15 serial ..... 625 895

## HARD DISKS

### EVEREX

10 mb	1945.00	2244.00
Half Height Internal		
20 mb	2165.00	2465.00
Graphics	505.00	584.00
Colour	895.00	1003.00

### SYSGEN

10 mb External	1595.00	1814.00
Tape Backup		
10 mb Tape/Disk	4495.00	5409.00
20 mb Tape/Disk	5495.00	6254.00





**Level 2-0 Perfect  
Introductory offer  
CALL!**



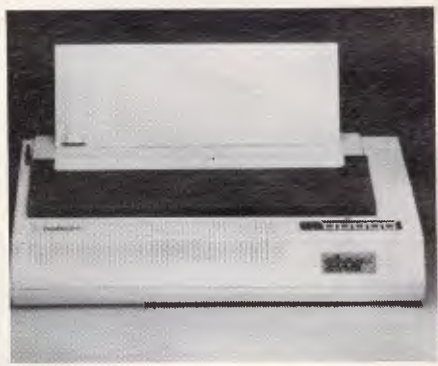
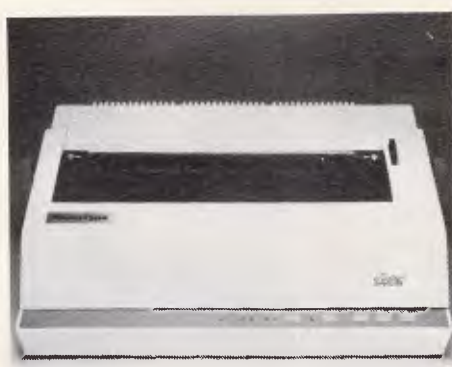
# PRE-CHRISTMAS



# SALE

Call for prices and availability on the machine that will dominate the market for the next five years. The All-new, All-powerful IBM PC-AT. Various configurations available.

	our price	R.R.P.
<b>STAR GEMINI 10X</b> 120 cps, 80 col, tractor, parallel, graphics, friction.	\$399.00	\$595.00
<b>STAR GEMINI 15X</b> (132 col)	\$645.00	\$795.00
<b>STAR DELTA 10X</b> serial/parallel in- cluded tractor/ friction, 160 cps, 8K buffer — same as Epson FX-80.	\$605.00	\$850.00
<b>STAR DELTA 15X</b> same as Epson FX-100.	\$885.00	\$1185.00



	our price	R.R.P.
<b>STAR RADIX 10X</b> serial/parallel in- cluded, rear tractor/ friction, semi- auto sheet feeder, 16K buffer, 200 cps/50 cps near letter quality.	\$1195.00	\$1536.00

### QUADRAM SPECIALS

QUADCOLOUR I	\$365.00
QUADCOLOUR II	\$418.00
QUADCOLOUR III	\$725.00
QUADBOARD 256K	\$795.00
QUADBOARD 64K	\$495.00
QUADBOARD 512K	\$1685.00
PRINCETON GRAPHICS	\$398.00
PRINCETON COLOUR	\$785.00
PRINCETON HI-RES 690 x 480	\$1175.00
6 MB REMOVABLE	\$2995.00
12 MB	\$2945.00
20 MB	\$3475.00
27 MB	\$3689.00
72 MB	\$8274.00

	our price	R.R.P.
<b>STAR POWERTYPE</b> serial/parallel in- cluded, 18 cps/ standard Qume daisywheels/ ribbons.	\$699.00	\$850.00

<b>STAR RADIX 15X</b> 132 col, same as Epson LQ-1500, with tractor/serial/ parallel, 16K buf- fer/sheet feeder.	\$1395.00	\$1860.00
--	-----------	-----------

Turn your micro into a mainframe with Pick or Unix. Whether for development or business applications, wouldn't you rather maximize your PC than minimize it with MS-DOS? Have a true multi-user, multi-tasking computer just by attaching terminals to your serial ports. See what your machine is truly capable of with Pick or Unix.

**Pick** for the IBM PC  
**Unix** for the IBM PC, DEC Pro or Apple Lisa

Looking for hardware, software, printers, paper, monitors, systems, diskettes, add-on boards or cables?? Call, write, telex or drop in to Cash & Carry Computers and Software. Special equipment?? Call! Our connections with some of America's largest computer warehouses make it easy for you to buy literally anything. Don't hesitate! Give us a chance to show you our commitment to not only price but service and support. Any doubts? Call us for local and interstate references. We accept Bankcard, Mastercard, mail or phone orders, cash, Bank cheque, company cheque, official company\* and government purchase orders. Leasing? Have your finance company call for an invoice. Special circumstances? Call. We aim to please. \$5 overnight delivery on most items.

\* subject to approved credit.

## Cash & Carry Computers & Software

Postal Address **P.O. Box 696, Darlinghurst 2010**  
Office Address **480 Crown St, Surry Hills 2010**  
**TELEPHONE (02) 331 3888**  
Tlx No. **ERNEX AA70842**

*All prices include Sales Tax. Price subject to change without notice.*



```
(DEFINE MATCHER )
  (PROG (PATT LIST RESULT)
    (PRINT 'TARGET-LIST?)
    (SETQ LIST (READ))
    (PRINT 'PATTERN?)
    (SETQ PATT (READ))
    COND (MATCH PATT LIST) (SETQ RESULT 'SUCCESS!) )
    T (SETQ RESULT 'FAILED' ) )
  RETURN RESULT)
```

Fig 4 Interactive program with prompts

```
DEFINE EXAMPLE (ARG1 ARG2 ARG3)
  (PROG (LOCAL1 LOCAL2)
    (RETURN ( Rest of definition.....))
```

Fig 5 PROG is a dummy, its body a return clause

```
(DEFINE MATCH (PATTERN LIST)
  COND ( (AND (NULL PATTERN) (NULL LIST)) T )
        ( (OR (NULL PATTERN) (NULL LIST)) NIL )
        ( (OR (EQUAL (CAR PATTERN) '?')
              (EQUAL (CAR PATTERN) (CAR LIST)))
          (MATCH (CDR PATTERN) (CDR LIST))
        )
        ( (EQUAL (CAR PATTERN) '*')
          (COND ( (MATCH (CDR PATTERN) LIST )
                 ( (MATCH PATTERN (CDR LIST)) )
                )
        )
        )
```

Fig 6 "\*" as a second wildcard will match any number of expressions

individual function definitions.

Now that we are deep into the fleshpots of non-applicative functions, we might as well go the whole hog. Any Basic programmer who has been following this series and trying out the examples will probably have experienced, as I once did, a peculiar kind of unease. How exactly in Lisp do you program a sequence of actions of the sort: do this, then do this, then do this . . . ?

This type of sequence is a natural way of expressing programs in Basic (or Pascal, Forth or most other languages). In Basic the very layout of program text dictates this structure, with numbered statements following one another. But most of the Lisp functions we've seen have a nested structure, with function calls inside function calls inside function calls, and once you enter the body of a definition there seems to be no way of controlling sequence at all.

Using only the constructs we've seen so far, it isn't easy. In fact, it would only be possible using the body of a COND clause (in which, if you remember, the expressions are evaluated one after another and the value of the last one is returned). There's another way though. It's a function called PROG, which is rather like COND in that it acts as a control structure. It also provides a way of

introducing local variables for use inside a definition, and a method for ordinary looping without using recursion. In other words, PROG allows you to write Basic programs in Lisp! (PROG, sometimes called PROGN, stands for PROG-ression).

Like COND, PROG can take any number of non-evaluated arguments: that is, they don't require a quote in front of them. Its first argument is always a list of variables: these are the local variables which are to be used inside the PROG structure. Then comes a series of expressions (you can think of them as statements) which are evaluated one after another. Some of these expressions can be atoms which act as labels, with the function GO<label> acting like a Basic GOTO, causing evaluation to begin again at <label>. Fig 1 makes this clear.

If you try this function, you'll find that it prints the whole numbers from one upwards without end. It is, in fact, exactly equivalent to the Basic program:

```
100 NUM=0
200 NUM=NUM+1
300 PRINT NUM
400 GOTO 200
```

except that NUM is global in Basic while it's local to the PROG in Lisp. In other words, were a variable called NUM

already in use in the program, then its value would be saved on entering the PROG and restored upon leaving it.

Incidentally, in most dialects of Lisp, PROG variables are automatically set to NIL on entry, but the (SETQ NUM 0) is still necessary. Why? The atom LOOP (no brackets) is a label which GO uses to cause backward looping.

PROG must, of course, return a value and the normal rule here is that if the last statement is reached and is not a GO (if the PROG runs off the end), then the value returned is NIL. If the value returned by a PROG is important to your program, then it can be controlled more precisely by RETURN. When a RETURN is reached, the PROG finishes immediately and takes its value from the RETURN statement in Fig 2.

By using a judicious combination of PROGS and CONDS, you can create any kind of program structure. Don't overdo it though, or you'll merely succeed in introducing all the bad habits of Basic into your Lisp: tangled webs of GOs are just as hard to decipher as GOTOs or GOSUBs. If you persist with Lisp you'll soon get a feel for which types of problem are best solved by recursion and which by looping with PROG, and the former will tend to predominate.

As PROG is rather frowned upon by Lisp purists, it isn't surprising that it's subject to a great variation between dialects. Some squeaky-clean versions don't allow it at all. Serious Software's Spectrum Lisp has PROGN, which uses WHILE <condition> instead of GO and has no RETURN. Acornsoft has a PROGN without looping, but uses a different function — Loop . . . WHILE or . . . UNTIL — to give Pascal-like structured loops. MuLisp has no PROG but a LOOP, which repeats as long as none of its conditional clauses evaluates to T; rather like a COND biting its own tail.

Let's finish with a rather more meaty program example. The function MATCH performs a crude pattern matching between two lists, allowing the wildcard character ? to match any expression: (FRED IS A ?) will match (FRED IS A PLUMBER). Fig 3 shows the definition.

Reading this in English should tell you how it works: 'If both lists are empty then they match, or if one of them is empty and the other isn't then they can't match, or if their CARs are the same (possibly a wildcard) then see if their CDRs are the same.' Notice the use of the Boolean functions AND and OR whose effect is exactly what you'd expect.

Now let's use PROG, PRINT and READ to put this function into a simple interactive program with prompts (Fig 4). The PROG here adds nothing to the function-



# ONLY THE **SUNOL** HARD DISK GETS IBM PC AND APPLE MACINTOSH WORKING TOGETHER!



**New SUNOL technology brings consensus to business Microcomputers in Australia ...now your IBM PC and PC-Compatible can talk to your Macintosh, Lisa, Apple //e, Compaq, Kaypro, Apricot, Sirlus and ALL popular business micros!**

Incompatibility has posed insurmountable barriers to computer communications. You recognise the symptoms. Too many dialects. Incompatible hardware. Immense loss of commercial opportunity.

The Sunol Winchester Hard Disk System changes all that immediately – and permanently!

Now, great minds can think alike – or at least share the same thoughts! Sunol's data access is 10 times faster than a floppy – at 7.5 megabits per second transfer rate. (Our rivals can only manage 5 megabits!)

**Choose your SUN★DISK from 10 to 368 megabytes (formatted) for all the right reasons:**

**SUNOL's SUN★MAC** allows operation of up to 31 Macintoshes by using Apple's very own Local Area Network (LAN).

**SUNOL's SUN★MAC** can then be connected into SUN★NET, giving you the best of both worlds – files created on Macintosh can be used on IBM PC, PC-Compatibles, and vice versa!

**SUNOL's SUN★NET** allows up to 64 micro-computers at a time (most popular brands) – with as many as 7 different operating Systems – to be networked on the same SUN★DISK.

**SUNOL's UNIQUE SUN★SAVE TAPE BACKUP SYSTEM** can be also accessed at random – in floppy disk style! No-one else can offer this facility!

**SUNOL's CUSTOMER PROTECTION WARRANTY** covers Hard Disk Drives for 6 months (Tape Drives for 90 days).

**SUNOL WINCHESTER HARD DISK SYSTEM** allows ALL popular micros to talk business! So, talk with our Dealer about installing SUNOL – TODAY!



**SUNOL AUSTRALIAN DISTRIBUTORS**  
Level 1, 3 Bruce Street, Crows Nest NSW 2065.  
Telephone: (02) 922 2022

**SUNOL Australia-wide Dealer Network Members:**

**SYDNEY:** INTELLIGENCE (AUST) 699 3877; **THE LOGIC SHOP:** 439 1072; **NEWCASTLE:** COMPUTER CELLAR (049) 675 700; **MELBOURNE:** INTELLIGENCE (AUST) 690 6600; **BRISBANE:** COMSOFT 839 0066, CLEVELAND COMPUTER ORCHARD 286 3777; **PERTH:** NATIONAL COMPUTER SERVICES 322 1677

**SUNOL National Service Agents:**

**COMPUTER MAINTENANCE OF AUSTRALIA:** **SYDNEY:** (02) 406 4744; **MELBOURNE:** (03) 338 7833; **BRISBANE:** (07) 371 1911; **FYSHWICK (ACT):** (062) 80 5359; **ADELAIDE:** (08) 49 9211; **PERTH:** (09) 458 9752; **HOBART:** (002) 344 522; **DARWIN:** (089) 84 4611; **NEWCASTLE:** (049) 676 299; **TAMWORTH:** (067) 66 1599. Also distributed and serviced in NSW & Vic by Intelligence (Aust).

THE ADVERTISING AGENCY. AMS.2

Apple, The Apple Logo & Lisa are trademarks of Apple Computer, Inc. Macintosh is a trademark licensed to Apple Inc. IBM PC is a trademark of International Business Machines Corporation. Compaq is a trademark of Compaq Computer Corp. Kaypro is a trademark of Kaypro Corp. Apricot is a trademark of ACT. Sirlus is a trademark of Victor Technologies.



# LANGUAGES

ing of MATCH but is purely cosmetic; instead of evaluating a function you have a 'proper' program. By adding a suitable LOOP, you can have it continue prompting until told to quit. This is probably the best use for PROG, as an outer 'shell' to your program, the inner levels being wholesome recursive Lisp functions (like MATCH).

Another important use is to create local variables in those dialects which don't allow the use of 'spare' formal arguments for this purpose. In this case, the PROG is a dummy, whose body is one large RETURN clause (Fig 5).

The MATCH function is a simple example of an immensely important Lisp technique which is the basis for many of its applications to Artificial Intelligence. Pattern matching is at the root of natural language manipulation (for example, parsing sentences) and database searching.

Let's modify MATCH to accept \* as a second wildcard which matches *any number* of expressions (including none). Now we have (FRED \*) matching (FRED IS A PLUMBER), (FRED BLOGGS) or (FRED) while (A \* D?) matches (A B C D E) but not (A B C D).

Adding a final clause which tests for \*

will do the trick (Fig 6). Notice that the clauses of that new embedded COND don't perform any action except to cause a recursion. Don't be downhearted if you can't immediately see how it works; try tracing the recursion on paper using real example lists. The detection of an \* in PATTERN causes the recursion to scurry down the successive CDRs of LIST (using the MATCH PATTERN (CDR LIST) expression) until LIST is empty, which ends that branch of the recursion (with T if \* was the last item in PATTERN,

or with NIL allowing the rest of the lists to be matched). The key to understanding this function is that in MATCH PATTERN (CDR LIST), PATTERN is not 'reduced' by taking its CDR: this means that when an \* is encountered it will be kept until LIST is empty.

*This is part five of our six-part Teach Yourself Lisp series. Back issues can be obtained from our office at 77 Glenhantly Road, Elwood, Victoria 3184.*



'Left-right—lookout!—mind that supernova— watch thatKlingonbattlecruiser!'

## FORMAT COMPUTER PRODUCTS PTY LTD

Ph.: (02) 477 6871 1st FLOOR 31A FLORENCE ST., HORNSBY, N.S.W. Ph.: (02) 477 6871



**AMAZING  
NEW PX-8**

### THE EPSON SPECIALISTS

- Wordstar, Spread Sheet and Scheduler in ROM.
- Text 8 lines x 80 columns
- Graphics 480 x 64
- 63.5 K CP/M
- A4 size — battery operated
- Battery operated disks and printers

WE SELL THE COMPLETE RANGE OF EPSON  
RELIABLE PRODUCTS.

DESKTOP COMPUTERS • PRINTERS • HARD DISKS • CP/M  
• MS-DOS • NETWORKING • SMALL BUSINESS  
• ACOUSTIC COUPLERS  
• COLOUR GRAPHICS • PORTABLES

**EPSON ...**

**THE COMPLETE SOLUTION**

PLEASE SUPPLY Pamphlet with information   
Computer System   
Enclose cheque/money order   
Bankcard   
Name ..... P/Code .....  
Address .....  
Phone .....

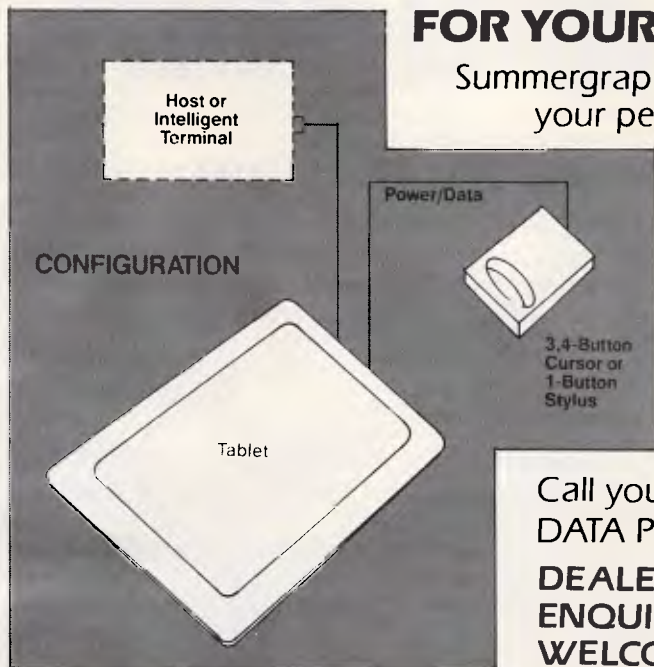


**Summagraphics**<sup>®</sup>  
CORPORATION



**DIGITIZERS**

**THE QUALITY CHOICE  
FOR YOUR PERSONAL COMPUTER**



Summagraphics digitizers are now available for your personal computer, including the IBM PC/XT, NEC APC, SIRIUS,

APPLE, TI, TELEVIDEO DEC and most IBM PC Compatibles.

Summagraphics digitizers are fully software compatible with packages such as AUTOCAD, MICROCAD, PALETTE, MIRAGE, CHEETAH and PCAD.

Call your nearest DATA PERIPHERALS office for more details

**DEALER** SYDNEY (02) 888-5733  
**ENQUIRIES** MELBOURNE (03) 598-5111  
**WELCOME** BRISBANE (07) 44-8943

**Australian Micro Network**

**Software for the BBC Micro**

001 MEMO CALC	Data Base Calc sheet with up to 255 columns. String or numeric data. Sorts, searches calculations with automatic, fully formatted print-out facility. Complete with manual.	\$51.80
002 MAILING	Holds 218 addresses. Alpha and Post Code sorts, fast search. Delete, add and amend. Any format labels.	\$48.80
003 SPELCHECK	For use with "Wordwise". 12 dictionaries with 10,000 words. You can add your own speciality dictionaries also 7 complete function key sets to programme your Epson Printer. Disc only.	\$69.50
004 HANGMAN	Word game in English, French, German Italian and Spanish. Plus spare section for your own words.	\$34.50
005 DISTANCES	3 Geographical maps - Australasia, Europe and the World. Calculate the distance between any 2 points.	\$23.50
006 STATPACK	Statistics data base. 30 results include Mean Geometric, Harmonic, Median, Moving and Progressive averages. Plus Deviations and Graphs.	\$42.30
007 BANNER	Print your own banner with letters up to 230mm high and any length.	\$23.50
008 BIGLETTER	Print your own leaflets, posters etc. on your graphics dot matrix printer. Characters from 3 - 230mm size. Includes machine code screen dump.	\$27.70
009 UTILITY A	Superb programmers package. Contains 7 of the most useful programming aids you could want. Includes sorts, searches, flushes etc.	\$27.70
010 GAMES 1	5 Games. Battle, Cards, Darts, Pontoon Mr. Middon.	\$27.70

All programmes guaranteed to run. Available on 80t Disc or Cassette. Mail or Phone orders our speciality. Bankcard and Mastercard accepted. Ask for our catalogue now.

**Australian Micro Network  
COMPUTER SOFTWARE SPECIALISTS**

3 Cassandra St., Rosedale South Q. 4123  
IP.O. Box 295, SPRINGWOOD Q. 4127 Ph: (07) 341 1839  
Dealer Enquiries Welcome.

**THE BIG NEWS IN SMALL  
PRINTERS FROM BROTHER**



**\$299**

**M1009. Big on features.  
Small on cost.**

Here is a new compact printer with features you would only expect in more expensive machines. Like a 9 pin dot matrix printing head with a 20 million-stroke service life, crisp 50eps bidirectional logic seeking printing for normal characters, unidirectional printing for super and subscripts and graphs, plus low noise operation.

The M1009 incorporates 96 ASCII type characters with 64 graphic sets and international characters and Centronics parallel interface. Printout is on cut-sheet paper, or optionally, fanfold and roll paper.

**All this for only \$299!**



**Affordable Electronics  
Printers from**

EST. 1960 (CAULFIELD BUSINESS COMPUTERS)  
874 Glenhuntly Rd., Caulfield South

The large open building on the corner of Roselea Street  
Tel. KEN FORSHAW 528 4555



# Apple and IBM sh

AppleBus hits town, but not from Apple. Laurel Allen hops on line.

The Australian distributor, Auster, has announced the first Macintosh network. Not only does Sun01 network the Apple II, Macintosh and Lisa, but it also lets

Macintosh share data with PC-DOS and MS-DOS machines. Auster's Sun01 is in fact the long-awaited AppleBus, but it gets to us before Apple delivers its own

network in January. Auster says the only difference between the Apple future offering and Sun01 is that the AppleBus will come in white boxes: the Frog





# are network

design of Germany "Snow white" colour scheme.

Like the Corvus network, Sun01 lets a number of operating systems live on the same disk. Unlike Corvus, it networks Apple II, Mac, Lisa, IBM and compatibles, HP, Sirius, Apricot and other operating systems to a limit of seven on the same 10 to 92 megabyte disk. And you can have four units of 92Mb in two cabinets for a total of 368Mb with one controller.

Up to 32 devices can share the disk: 31 Macintoshes, or a collection of different computers, printers and other devices. Macs get a low \$149 per unit connect cost with cheap twisted pair cable at up to 1000 feet length per network.

Sun01's offering finally validates the Macintosh as a socially acceptable computer: it talks to IBM.

A software utility, Sun\*Share lets Mac share data with PC-DOS and MS-DOS machines. The rush of software for the Mac promised by Apple in September has been delivered on time. The range of business products now available, combined with the Sun01 networking, make Mac a practical standard option for most users.

The Sun01 hard disk unit is about the same size as an average PC system unit, but slightly longer and flatter and comes in memory graduations of 10 to 92Mb all with an optional built-in back-up tape. Drives just announced for Australia are: 16Mb \$4225, 25Mb \$5012, 25Mb \$7528, 65Mb \$9828 and 92Mb \$10830. A streaming tape unit is extra at \$2338. Storage expansion within the same cabinet goes up to 184Mb and a rumour of a 150Mb drive means that four units could give you 600Mb on line (for a price, of course!)

The unit is also faster; "Sun01 has managed to increase the speed of data transfer on the file server by 50% to 7.5 mega bits per second, compared with the Corvus 5 mega bits", says Andrew Holland, technical advisor with Austor.

The hard disk is divided into virtual drives that look like floppy drives to each computer. You can do all the hard disk "set-up" on the Mac via the Sun\*Mac interface which acts as an intelligent controller of the hard disk drives.

The Sun\*Mac interface is connected to the Mac via the AppleBus, which uses the highspeed RS422 ports at the back

On the down side though, the Macintosh finder can access volumes up to 8Mb in size only, giving room for 128 folders.

To share with non-AppleBus computers, a quadplexor, (four-way multiplexor) is used. This lets the Sun\*Mac share the hard disk with up to three other devices such as non-AppleBus computers or a printer server. By using more levels of multiplexing, up to 16 non-Apple devices and up to seven operating systems can be used. And you can have more than one Sun\*Mac interface on a drive allowing more than 31 Mac-

---

*Unlike Corvus, it networks  
Apple II, Mac, Lisa, IBM and compatibles,  
HP, Sirius, Apricot and other operating systems  
to a limit of seven on the same  
10 to 92 megabyte disk.*

---

of the Mac. Any Mac may then access the hard disk, and treat the hard disk as if it were a large floppy. All directories, folders and icons work the same way, only faster. MacWrite, for example, takes 12 seconds to load on the hard disk compared with 30 seconds on a 128k Mac.

intoshes per Sun01 disk.

A Sun\*Safe tape back-up unit gives a 21 Mb back-up with a back-up rate of 1.5 minutes per megabyte. The Sun\*Serve printer/modem's server supports two RS232 devices, the baud rate being switch selectable.

## The big software package with the small price tag.



Information Business Manager is a complete accounting package suitable for most businesses and compatible with 8 and 16 bit micro computers (all those with CP/M or MSDOS available).

Totally developed in Australia, Information Business Manager performs the following accounting functions

- Accounts Receivable
- Accounts Payable
- Stock Control
- Order Entry/Invoicing
- General Ledger

Fully integrated, easy to use  
Multi-user version available  
Comprehensive Manual

### Other programmes also available

- Real Estate System
- Insurance Brokers System
- Payroll
- Software written to your specifications

**Information Unlimited**  
specialists in cost effective business solutions

2 Prospect Hill Road, Camberwell, Vic. 3124  
Telephone (03)813 3022 813 3077



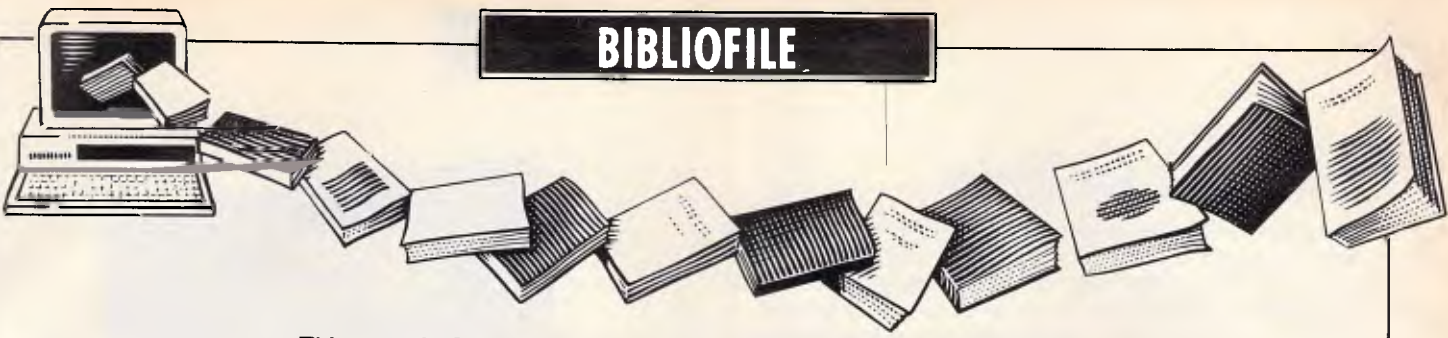
# WHAT AM I?

- I print almost as well as the very best typewriter.
- But I'm as fast as a 200 character-per-second dot matrix printer. (That's when I'm printing for drafts); in regular letter-quality styles, I print 67 characters-per-second - which is faster than Daisy Wheel printers costing much more.
- I could be a dot matrix printer that offers similar print quality to a Daisy Wheel.
- Or I could be a letter-quality printer that's as fast and as versatile as a dot matrix.
- I can type with a definition that's far superior to any normal dot matrix printer.
- Yet I can still offer you a choice of 255 different modes and styles - giving you added impact for the most demanding applications.
- I can handle the most complex graphics and charts with a crispness and definition you probably wouldn't have seen before. Graphic modes range from 816 x 8 to 2448 x 24 dots per line.
- But I behave like the most sophisticated typewriter: I can print in 5, 6, 8.6, 10, 12 or 17 pitch as well as Proportional Spacing.
- I'm a full 132-column printer using standard friction feed and I offer optional cut-sheet and tractor feeds.
- I use standard interfaces which means I'm compatible with all computers.
- I'm made by the best known printer manufacturer in the world.
- I have a recommended list price of only \$1885. (Not inclusive of sales tax).
- I'm the EPSON® LQ-1500 letter-quality dot matrix printer.

**EPSON AUSTRALIA**

PTY LTD  
**The Secret of Success.**  
Epson Australia, NSW 452 5222, VIC 543 6455, QLD 832 5400.  
® Registered trademark of Epson Corporation.



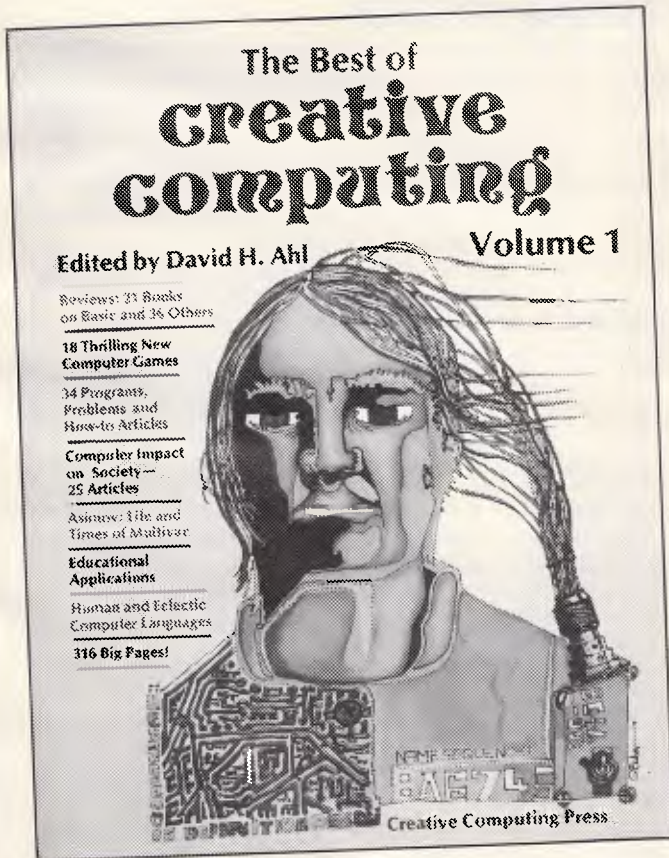


This month Steve Withers takes a creative look at computing; how to turn your programs into hard cash; and presents us with a little food for thought.

## The Best of Creative Computing — Volumes 1 & 2

Creative Computing has just celebrated its tenth anniversary, making it one of the earliest and longest running popular computing magazines. Volume One comprised six issues from late 1974 to the end of 1975. The big change since that time is that people now own computers — the Altair 8800 didn't appear until Christmas 1974, and that is usually regarded as the birth of the microcomputer industry. All those years ago (!) people interested in computers relied on access to big machines at school, college, or work. There were a few hardy souls who built their own machines, but they were very rare individuals. Volume Two included one article on building an Altair, and another on turning it into a system.

This might make you think that articles from that period are of little interest or use, apart from their curiosity value. Think again: there's a discussion of the problem of students



'breaking in' to computer systems, a description of smalltalk (can you get that language for your micro yet?), and the effect of computers on privacy. Sure, there is a great deal of information with curiosity value — "within five to 10 years video disk players will be commonplace in homes and schools". There are also some listings of classic games like Wumpus and Star Trek that tend to be overlooked by those used to arcade-style 'twitch' games.

Other timeless material includes fiction (Volume One includes a short story by Isaac Asimov) and poetry as well as games and puzzles. Books like these tend to be on the expensive side for recreational reading, but they are worthwhile reading for those with an interest in the early days of our hobby.

**The Best of Creative Computing Volume One**  
**The Best of Creative Computing Volume Two**

Editor: David Ahl  
 Publisher: Creative Computing Press  
 Price: \$20.00 each



## Programs for Profit

Can you *really* make money with a personal computer? The authors of this book think so, and they provide ideas, programs, and advice for people that agree. Despite the title, the programs are probably the least important part of the book — even if you came up with an idea with money-making potential, how would you go about finding customers or setting prices?

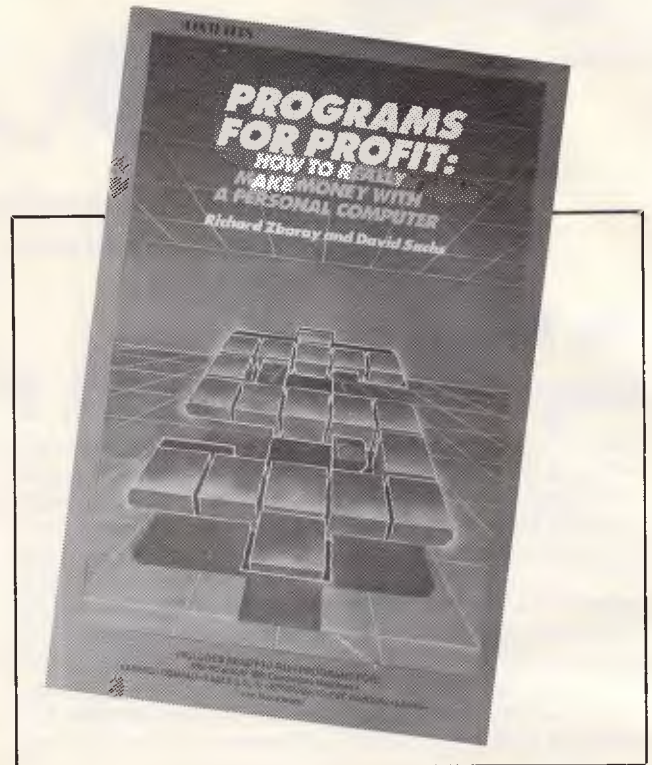
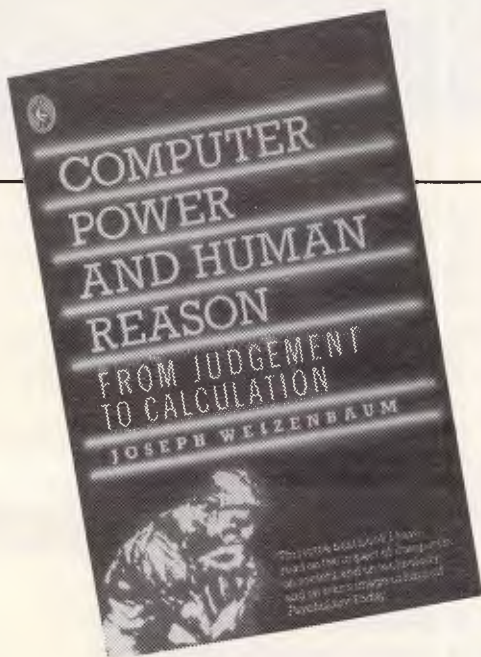
Taking the programs first, there are complete Microsoft Basic source listings for five applications: mailing lists, accounts payable, accounts receivable, (gridiron) football information program, and a 'tickler' system. The accounting programs would probably need modifications to suit Australian practises, and the football information system certainly would. The point is that the ideas are valid. In any case, it wouldn't be hard to justify the purchase price by pointing to the two remaining programs.

While the emphasis of the book is on providing specialised bureau services, other possibilities are examined. One obvious opportunity is selling your own programs, but you might be surprised by the number of different ways Zboray and Sachs suggest this can be done. They even offer a few ideas in related areas (like evaluating programs for software companies on a freelance basis).

If the idea of starting your own business, even part-time, appeals to you, then *Programs for Profit* could well give you that extra surge of enthusiasm needed to turn thoughts into action.

### Programs for Profit

Authors: Richard Zboray and David Sachs  
 Publisher: McGraw-Hill/Byte Books  
 Price: \$17.95



## Computer Power and Human Reason

Although this book was originally published in 1976 it has only recently appeared in paperback form, reflecting the fact that a wider audience have become interested in computers and computing. The popular press has given the most attention to the chapter on compulsive programmers, probably because of an assumption that people don't like to think too hard — *Computer Power* demands concentration as well as reflective thought between chapters.

The central theme of the book seems to be an appeal against the inappropriate use of computers. This of course requires an analysis of humankind, the tools it employs, and the effect one has on the other. Weizenbaum says this of tools: "they symbolize the activities they enable, ie, their own use. An oar is a tool for rowing, and it represents the skill of rowing in its whole complexity. No one who has not rowed can see an oar as truly an oar." He goes on to point out the impact certain tools have had on our view of the world. Since the invention of the clock people tend to eat at appointed times, not when they feel hungry. The whole idea of time as something that passes rather than a rhythm (eg, of day and night) has a profound effect on humanity, leading to a rejection of that which is experienced in favour of that which is measured.

The idea of 'knowing' is important to Weizenbaum's thesis. If a person who has never rowed cannot 'know' an oar, what can a computer 'know' of such human concepts like justice, loyalty, compassion, or love. He expresses concern that attempts are being made to apply computers to applications that require the application of humanity, in the belief "that life is what is computable and only that". He describes his famous Eliza program, written apparently as an exercise in the analysis of English sentences. The most



**\* Due to Popular Demand \***

**BUY TWO —  
GET ONE FREE\***

Mountain Valley Software is extending their special offer until Xmas 1984

**\* Buy any two Mountain Valley Software programs and receive one other of your choice absolutely free — offer expires Xmas 1984.**



The sacred crown of Mydor has been stolen by the evil wizard. Explore the eerie castle, defeat the Troll and return the crown.



Explore mysterious temples and distant monasteries in your quest for the Green Eye of the yellow god. Beware of the Yeti!



In the drifting sands of the desert lies a seemingly deserted oasis. Among the ruins lie ten golden treasures to discover.



Explore tunnels and temples, fight the giant eel, escape the wrath of vengeful idols and collect valuable Maya relics.



Trek across darkest Africa, face burning deserts, malarial swamps and hungry crocodiles in your quest for the fabled mines.



Inside the forbidding walls of the city of Akbar Khan lies the fabled scroll. Can you find the scroll and escape from the city?



Discover the secret of the blind statue, break into jail and tread dangerous lava tunnels in your quest for five treasures.



On an uncharted island lie ten hidden treasures. Can you defeat the giant crab, escape the many dangers and recover them all?



A challenging game of poker with sound and colour graphics, set aboard a Mississippi paddle steamer bound for New Orleans.

Available from your nearest participating dealer — or order direct on the form below.

Explore eight magical worlds of mystery and intrigue. Text adventures with colour graphics for the Commodore 64. Tape **\$26.95**, Disk **\$28.95**.

**ORDER FORM**

To: Mountain Valley Software P.O. Box 407  
Boronia Vic 3155  
I wish to take advantage of your special offer.

Name ..... Purchase 1 ..... I enclose cheque/money order for  
Address ..... Purchase 2 ..... \$ ..... or charge my Bankcard/  
My free game ..... Mastercard No .....  
Postcode ..... Please supply Tapes  or Disks  Expiry Date .....  
Signature .....



# SUPERFILE

## THE FREE-FORM DATABASE FOR MICROCOMPUTERS

by Southdata Ltd.

- Indexing (i.e. findability) on ANY characteristic !
- Search commands include phonetic or "sounds-like", embedded string (e.g. find \*green\* anywhere), wild card, > and <
- Fast Record retrieval ! Superfile 16 uses B-tree indexing !
- Flexible records — easy to change — add new Fields at any time. All Records stored can have different structures !
- Logically a multi-file database, with no limit to the number of Files open or the number of Fields.
- Simple-to-use Screen Forms and Report generator packages. Design and paint the electronic counterpart of paper forms on the screen. Filter out typing errors automatically. Print tabular reports. Sort and do arithmetic operations.
- Interface with Mailmerge !
- Program your own individual requirements in a language you already know e.g. Basic, Cobol, Pascal. Language interfaces supplied at nominal cost.
- Single and multi-user 8 bit systems require a Z80 machine. Operating systems include CP/M, MP/M, TurboDOS, MmmOST and others.
- Single and multi-user 16 bit systems. Operating systems PC-DOS, MS-DOS, CP/M-86, Idris (Sage IV) and others.



Exclusive Australian Distributor  
SUNSHINE STATE SCIENTIFIC SYSTEMS  
P.O. BOX 4, DARLING HEIGHTS.  
QLD. 4350. (076) 35 3362

### LIKE TO KNOW MORE?

Contact us and we'll rush you more information, or ask your dealer for a demonstration. If he doesn't have Superfile yet, show him this ad and ask him to contact us.

# BACKUP YOUR DISKS

## \$98.95

EDD runs on Apple II, II plus (including most compatibles), IIc, and III (in emulation mode), with one or two 3.5 disk drives

EDD is the most powerful copy program available for backing up your protected Apple software.

Since EDD has been preset to copy a broad range of copy-protections, many disks can be copied easily, without changing messy parameters. Even though you rarely need to change them, each parameter is fully described in the operating manual. Unlike the copycards, which only copy single load programs, EDD backs up entire disks. Thus, not only copying single load, but, multi disk access programs as well. We feel on an average, EDD can back up many more protected disks than all other copy programs or copycards put together.

### ESSENTIAL DATA DUPLICATOR III™

- Automatically copies most protections.
- Rarely needs parameter changing
- Average duplication time 2½ minutes
- Accurately finds "self-sync" bytes and their lengths
- Can copy ¼ and ¾ tracks
- Updated program lists available
- Unlike copycards, EDD backs up entire disks, not just what's in memory



## UTILICO SOFTWARE

To order your copy send cheque or money order to  
UTILICO SOFTWARE 83 Hall Street, Bondi Beach, NSW 2026  
AUSTRALIA. Telephone (02) 302105



# BIBLIOFILE

famous of Eliza's scripts was that which allowed it to simulate a Rogerian psychotherapist. The results worried Weizenbaum, because he found that some psychiatrists felt that Eliza was the precursor of systems that could replace human therapists, and that people quickly accepted Eliza as being real, in that they truly felt that conversing with it could help them with their real problems.

My original (late 1970s) reaction to this story was to wonder if it really mattered. After all, I reasoned, psychiatrists probably apply set techniques to their patients' problems, so what's wrong with automating the process? In the case of Eliza, it didn't matter that people believed the program could help them even though they knew it didn't 'understand' their problem. Eliza could simply act as a mirror for self-examination. Weizenbaum answers this by pointing out that this argument is based on a fraud, that this acceptance can only occur because our society is tending to go along with the idea that the difference between people (as intelligent beings) and computers is one of degree rather than kind. For him, the matter is simple: "there are some human functions for which computers *ought* not to be substituted. It has nothing to do with what computers can or cannot be made to do. Respect, understanding, and love are not technical problems".

Give your brain a treat — read 'Computer Power and Human Reason', and then think about its message.

## Computer Power and Human Reason

Author: Joseph Weizenbaum  
 Publisher: Penguin (A Pelican Book)  
 Price: \$7.95

## EDUCATIONAL SOFTWARE for Apple® II

**BIOLOGY, CHEMISTRY, PHYSICS, SCIENCE**

over 100 computer  
 assisted educational  
 programmes

**\$22.95** ea.

frequent use of hi and low resolution graphics with permanent record maintenance routines for classroom use. Examples:

**BIOLOGY**, cells, transport, genetics, photosynthesis, respiration.  
**CHEMISTRY**, moles and formulas, redox, acids and bases, bonding.  
**PHYSICS**, free fall, circular motion, sound, momentum, waves.  
**SCIENCE**, light, matter, radioactivity, electricity, magnetism.  
**SPELLING**, for chem., biol. and physics, 2 disks for each subject.

### ENGLISH

Spelling (6 levels and 10 programmes per level), homonyms, antonyms, suffixes, prefixes, plurals, ie or ei, sentence structure, and beginnings, excess words, quotations, word endings, punctuation, capitalization.

### INDIVIDUAL STUDY CENTRE and DATA FILES

A CAI (drill and practice) preparation programme for teachers, useful for Primary and Secondary schools and parents who want to prepare study material for their children.

We can provide over 150 DATA FILES for use with the STUDY CENTRE. eg. grammar, spelling, language skills, mathematics, Australian geography and history, Introductory French, Italian, German, Greek.

**STUDY CENTRE \$29.95**

**DATA FILES \$9.95** for the first and **\$4.95** for each extra file.

further enquiries or orders to:

**PED.** P.O. BOX 332, GREENSBOROUGH, VIC. 3088  
 WE PROVIDE GENEROUS DEALER DISCOUNTS,  
 UP TO 55% OFF THE RRP.

## WHY BUY FROM OTHERS? OUR PRICES ARE THE BEST!



### Kaga \* TAXAN 12" GREEN MONITOR

- Apple compatible
- 2000 character display
- Only 7 kg nett weight
- H.285 x W.310 x D.321 mm

**only \$140\***

ex. tax

### Admate DP80 Printer

- Apple compatible
- Epson look-alike
- serial impact dot matrix printer
- 228 ASCII character set
- 80 cps, 640 dot/line-sec speed
- 80 col/line (with 142 col on Compressed print)
- Centronics parallel interface
- Optional RS232c serial available

**only \$290\***

ex. tax



### The excellent SHUGART 5½ inch Disk Drive Don't miss this one

- Low cost Apple II compatible
- Using SHUGART'S drive mechanism



**At only  
 \$230\***

ex. tax

**DATA MEDIA Wholesalers**  
 20b Edward Street,  
 SUMMER HILL, NSW  
 (02) 799-3930

\* All prices quoted excluding Sales Tax,  
 if tax applies add 20% to our prices.

## ★ MAIL ORDER ★ MAIL ORDER ★

Please send me .....

I enclose Cheque/Money Order for \$.....

I enclose Sales Tax Exemption certificate:

Yes.....No.....

Name: .....

Address: .....

..... Postcode.....



# SAVE ...SAVE ...SAVE!!!

## on the top software for your IBM PC

### OPEN ACCESS

OPEN ACCESS—the best integrated software package! Why—because it is easy to use! You can step logically from the database to spreadsheet to graphics to word processor to communications to appointment scheduler. And it's all managed by windows with extensive help text wherever you need it. Why waste your valuable time learning software designed for programmers—buy OPEN ACCESS and get results instead of headaches.



### KNOWLEDGEMAN

KNOWLEDGEMAN/KGRAPH/KPAINT—you have read about it, now buy it. The most advanced database using the power of your 16 bit micro. KnowledgeMan for your PC/XT includes KGraph, extensive graphics facility, and KPaint, the screen designer. This combination package is unrepeatable value while stocks last. So if you're serious about database applications get KNOWLEDGEMAN today.



LOTUS 123	\$595	DBASE III	\$650
WORDSTAR PROFESSIONAL	\$495	SUPERCALC 3	\$369
R BASE	\$475	MULTIPLAN	\$275
CROSSTALK	\$199	MICROSOFT WORD	\$399
FLIGHT SIMULATOR	\$69	TURBOPASCAL	\$79
MULTIMATE	\$425	SIDEKICK	\$79
MILLIONAIRE	\$79	TURBO/TOOL BOX	\$79
TYCOON	\$79	MICRO SOFT PROJECT	\$299
IN SEARCH OF THE MOST AMAZING THING	\$79	MICRO SOFT CHART	\$299

Send your cheque, money order or bankcard authority today for the best value software in Australia.

# the byte shop

\*FREE AIR COURIER DELIVERY

P.O. BOX 987,  
WEST PERTH. 6005.  
WESTERN AUSTRALIA.  
TELEPHONE: (09) 322 1729



# TJ'S WORKSHOP



Our monthly pot-pourri of hardware and software tips for popular micros. If you have a favourite tip to pass on, send it to 'TJ's Workshop', 77 Glenhuntly Road, Elwood, Victoria 3184. Please keep your contributions as concise as possible. We will pay \$10-\$30 for any tips we publish. APC can accept no responsibility for any damage caused by using these tips, and readers should be advised that hardware modifications may render the maker's guarantee invalid.

## COMMODORE SCREEN SCROLL

This program consists of a set of scroll routines. These allow the screen to be scrolled up, down, left or right one character at a time. The program was written containing no jumps, so the code can be located anywhere in memory. When the program loads it asks for the start location for the machine code: I would suggest 49152. The code is then loaded starting at the specified address and the appropriate locations for each scroll are displayed. If the start address is 49152, then the scrolls are called as follows:

SCROLL LEFT...SYS 49152  
 SCROLL RIGHT...SYS 49255  
 SCROLL DOWN...SYS 49373  
 SCROLL UP...SYS 59626

The scroll up is a call to the KERNAL ROM scroll routine and always has the same value.

In games or business programs, often only a portion of the screen is required to scroll while the rest of the display remains fixed. The following POKE will adapt the scrolling routines to maintain fixed 'windows' on the screen while the rest of the display scrolls as normal. POKE 49199,0:POKE 49171,24 — top six lines don't scroll left  
 POKE 49252,193:POKE 49180,48 — bottom six lines don't scroll left  
 POKE 49324,0:POKE 49356,8 — bottom five lines don't scroll right  
 POKE 49381,207 — bottom six lines don't scroll down  
 POKE 49282,0:POKE 49347,240:POKE 49309,255:POKE 49310,4 — top six lines don't scroll right.

The program incorporates a checksum feature to make sure the hex data is correct. If you get a 'DATA ERROR' message when you run the program, check the data statements again.

S Bolton

```

1 REM **** SCREEN SCROLL ****
2 REM BY
3 REM
4 REM SEAN BOLTON
5 REM
6 REM **** (C) 1984 ****
7 REM
8 T=0:W=Z
9 POKE53281,11:PRINT"*****":INPUT"ENTER THE START ADDRESS";Z:W=Z
10 READA$
20 IFA$="S"THEN100
30 X=ASC(A$):A$=MID$(A$,2):Y=ASC(A$):A$=MID$(A$,2)
40 IFX>57THENX=X-7
50 IFY>57THENY=Y-7
60 X=X-48:Y=Y-48:Q=(X*16)+Y:POKEZ,Q:Z=Z+1:T=T+Q
70 IFA$=""THEN10
    
```

```

80 GOTO30
100 IFT<>31580THENPRINT" DATA ERROR.....":END
110 PRINT:PRINT" SCROLL LEFT.....SYS"W
120 PRINT" SCROLL RIGHT.....SYS"W+103
130 PRINT" SCROLL DOWN.....SYS"W+221
140 PRINT" SCROLL UP.....SYS 59626"
150 END
510 DATA1808,AD0005,8DFD02,AD0006,8DFE02,A200,A920,9D0004,9D1805,9D3006
520 DATA9DF806,188A18,C9F0,F007,18,6928,AA,18,90E4,A200,BD0104,9D0004
530 DATABD0105,9D0005,BD0106,9D0006,E8,E0FF,D0E9,18,ADFD02,8DFF04,ADFE02
540 DATA8DFF05,AD0007,8DFF06,18,A200,BD0107,9D0007,E8,E0E9,D0F5,60
550 DATA1808,ADFF04,8DFD02,ADFF05,8DFE02,ADFF06,8DFF02,18,A2FE,BD0004,9D0104
560 DATABD0005,8D0105,BD0006,9D0106,E000,F004,CA18,90E6,18,ADFD02,8D0005
570 DATAADFE02,8D0006,18,A2E9,BD0007,9D0107,E000,F004,CA,18,90F2,18,ADFF02
580 DATA8D0007,18,A200,A920,9D0004,9D1805,9D3006,9DF806,18,8A,18,C9F0,F007
590 DATA18,6928,AA,18,90E4,60
600 DATA1808,A2F0,BDCF06,9DF706,CA,D0F7,18,A2F0,BDDF05,9D0706,CA,D0F7,18
610 DATAA2F0,BDEF04,9D1705,CA,D0F7,18,A2F0,8DFF03,9D2704,CA,D0F7,18,A920
620 DATAA228,9DFF03,CA,D0FA,60
630 DATAS
    
```

## SPECTRUM ON ERROR GOTO

This routine allows any Spectrum owners to make the computer perform certain operations when an error has occurred in a Basic program. Many Basics found on more expensive machines, such as the Apple, have an instruction such as ON ERROR GOTO 1000, which makes the computer execute from line 1000 in the program when an error has occurred — such as 'Integer out of range' or 'Out of memory'. At line 1000

then, the type of error found in the program could be used to tell the user what has happened, and why.

This routine uses the variable 'error' (if it has been assigned a value) and jumps to the line number that this variable contains. If the variable does not exist, or has the value 0, then there will be no jump and the usual report will appear. If the line number is larger than the largest one in the program, then the 'OK' report will appear — just as GOTO 9999 will produce the 'OK' report if there is no such line number as 9999.

The routine also creates two new variables (or alters



them if they already exist) called 'err' and 'erl'. The variable 'err' is assigned the code of the error — 0 to 27 (0 = OK, 4 = Out of memory, and so on). All these codes are in appendix B of the manual. The variable 'erl' is assigned the line number at which the error occurred.

If, however, there is an error in a direct command, such as RANDOMIZE 65536, the variable 'erl' will contain the number 65534 which is the line number of any direct command.

As it stands, the routine will not make the computer jump if the error is one of the following:  
 STOP statement;  
 BREAK — CONT repeats;  
 STOP in INPUT;  
 BREAK into program; and  
 OK

A jump to the specified

line can be made by entering:  
 FOR f=60125 TO 60144:  
     POKE f,0: NEXT f (for the 48k).

This will cause a jump to the line number in the variable 'error' every time the computer tries to print a report other than OK.

Now here's the problem: if you do enter the line above, you must be sure that the line you want when an error occurs contains no error itself! If there is one, the computer will keep jumping to that line *ad infinitum* — you will not be able to BREAK into it.

If the line does contain an error, but you haven't entered the line above, you will be able to break into the loop.

*J Torjussen*

```

30 REM *      ON ERROR GOTO *
50 REM *      Written by *
70 REM *      James Torjussen *
110 REM *      for the *
130 REM *      48K ZX Spectrum *
160 REM
170 CLEAR 59999
180 PRINT OVER 1; AT 8, 13; "PLEASE"; AT 10, 14; "WAIT"
190 PLOT 1; 129, 30; DRAW OVER 1; 0
, 145, 253*PI
200 DATA "33882ab25c363e2bf92b2
b223d5c1807fd363102cd9517cdb0163
e00cd0116fd3600ffcd2c0fcd171bfdc
b007e2013fdcb3066cad5ea2a595ccda
711fd3600ff18d82a595c225d5ccdfb1
978b1c208ecdffe0dca6eafdc3046c
4af0dcd6e0d3e19fd964f328c5cfdc0
1fe9d3600fffd"
210 DATA "28e9360a01cd8a1b3a3a5
cfeffca7aebfe08ca7aebfe0cca7aebf
e10ca7aebfe14ca7aeb2168ec225d5cc
db22830132a595c2b010800cd5516233
6a52336722336f2233a3a5c3c3600233
6002377233600233600216c2c225d5cc
db22830132a595c2b010800cd5516233
6a52336722336"
220 DATA "2cefec23ed4b455c36002
33600237123702336002162ec225d5cc
db228381f23c3db433cda22d78b128143
e0032445c3d323a5ced43425c11d5ead
5c3751b76fdcb01aefdc304ec4df0e3
a3a5c3c1521000fd7437fd7426220b5
c21010022165ccdb016fdcb37aec6e0
dfdc02eeef147"
230 DATA "2b1ffe0a3802c607cdef1
53e20d778119113cd0a0caf113615cd0
a0ced4b455ccd1b1a3e3ad7fd4e0d060
0cd1b1acd97103a3a5c3c281bfe09280
4fe152003fd340d01030011705c21445
ccb7e280109edb8fd360afffdcb019ec
375aeed43495c2a5d5ceb215aece52a6
15c37ed52e560"
240 DATA "20bf69cd6e192006cdb81
9cde819c1793db02828c5030303032be
d5b535cd5c5516e122535cc1c5132a6
    
```

```

15c2b2bedb82a495cebc1702b712b732
b72f1c36eaa3e0a010000c38aeb45525
24f520d4552520d45524c0d000000000
00000000000000000000000000000000
0000000000000000"
1000 LET a=10: LET b=11: LET c=1
2: LET d=13: LET e=14: LET f=15:
LET h=60000: LET l=200
1010 FOR g=1 TO 5
1020 READ a$: LET s=VAL a$(1)*40
96+VAL a$(2)*256+VAL a$(3)*16+VA
L a$(4): LET a%=a$(5 TO )
1030 LET t=VAL a$(1)*16+VAL a$(2
): LET s=s-t: POKE h,t: LET h=h+
1: LET a%=a$(3 TO ): IF a%<>" T
HEN GO TO 1030
1040 IF s<>0 THEN PRINT AT 19,0
;"Error in line ";l: STOP
1050 LET l=l+10
1060 NEXT g
1070 PRINT OVER 1; AT 8, 13; "PLEA
SE"; AT 10, 14; "WAIT"
1080 PRINT OVER 1; AT 9, 15; "OK!"
1090 PLOT OVER 1; 129, 30; DRAW
OVER 1; 0, 145, 253*PI
1100 LET a%="to use, type RANDOM
IZE USE 60000"
1110 FOR f=1 TO LEN a$: PRINT AT
19, 32-f; a$( TO f): BEEP .02, 20:
PAUSE 4: NEXT f
    
```

## NEC HAND-HELD HINTS

There are several external device names, not all of them explained in the manuals:  
 RAM: RAM memory  
 CAS: cassette  
 COM: RS232 communications link  
 LCD: screen  
 LPT: parallel printer and it is perfectly correct to use OPEN "LPT:" FOR OUTPUT AS#1  
 PRINT #1, A\$;B\$ instead of LPRINT A\$;B\$ which can sometimes be useful (see the program in Basic Reference Manual p9-15 for an example; correct "SCRN:" to "LCD:" on line 410).  
 Contrary to what the Basic Reference Manual states on p4-103, it's possible to use both the data recorder and RS232 circuit simultaneously. I wrote a program which reads a text file from the data recorder

and sends it through RS232 to my printer. It works well, simply because I didn't notice the remark on p4-103 and didn't realise that such a connection should be impossible.

Finally, here's a memory dump program for the PC-8201A which can be used to find out some interesting things about the machine (for example, locations of file control blocks, undocumented keywords, and so on). The program works in two modes: ASCII (characters only) or full dump (hex values and characters).

- Notes:**
- (1) Output may be suspended by <CTRL-S> and resumed by <CTRL-Q>.
  - (2) Output may be interrupted by pressing the space bar (do not use STOP as it does not properly close the file and reclaim the buffer space).

*M Wiechowski*

```

10 GOTO 35
11 Hex -> Dec
12 D=0 FOR I%=1 TO LEN(H$)
13 H1$=MID$(H$, I%, 1) : D%=ASC(H1$) - 48
14 IF D%>9 THEN D%=D% - 7
    
```



# decworld

Suite 305, Henry Lawson Business Centre, Birkenhead Point,  
Drummoyne. NSW 2047. Phone (02) 819 6811



## Word Processing Specialists



SHORT  
TERM  
RENTALS  
AVAILABLE

WPS-8 on the Decmate II

WPS-80 on the Rainbow 100 & Pro 350.

Both with the **MAGIC KEYBOARD** that makes word processing easy

A quick demonstration will show why it is preferred by so many businesses.

**Christmas  
Presents  
for you  
or your staff?**



What about a high quality DIGITAL computer? OR some software for the one you already have?  
Just the answer for those "who have everything".

### SOFTWARE

We have the most extensive range of programs in Australia for DIGITAL PCS. And with regular trips overseas the list will continue to grow.

In addition to software released by DIGITAL, we also distribute:

**WPS-80** Word Processing specifically for the Rainbow 100 and PRO 350 (with CP/M)

**IMPORT** to read many "foreign" disc formats

**SWITCH MATE** to enable up to three Decimates to automatically share one printer.

**LOGO TECHPAK** Civil Engineering Design.

*Many additional products are continually being added. Call us now with your wish list.*

### QUALITY

The highest standards in design and aesthetics from the world's largest manufacturer of minicomputers — Digital Equipment Corporation

### SERVICE

Full 12 months warranty on all systems and on-site service included free of charge within 50 kms of our DIGITAL Field Service office.

### SUPPORT

Professional training from DECWORLD. Hotline Support on a toll-free (008) number free of charge direct from DIGITAL with all systems sold.



```

15 D=16*D+D%:NEXT I%:RETURN
16 'Dec->hex4
17 H$="":FOR I%=1 TO 4
18 D%=D-16*FIX(D/16):D=FIX(D/16)
19 IF D%<10 THEN H$=CHR$(D%+48)+H$
20 IF D%>9 THEN H$=CHR$(D%+55)+H$
21 NEXT I%:RETURN
22 'Dec->hex2
23 H$="":FOR I%=1 TO 2
24 D%=D MOD 16:D=FIX(D/16)
25 IF D%<10 THEN H$=CHR$(D%+48)+H$
26 IF D%>9 THEN H$=CHR$(D%+55)+H$
27 NEXT I%:RETURN
28 'Outchar
29 IF V%<32 THEN PRINT#1," ":RETURN
30 IF V%>130 THEN PRINT#1," ":RETURN
31 PRINT#1,CHR$(V%):RETURN
32 'Interrupt?
33 Z$=INKEY$:IF Z$=" " THEN RETURN 54
34 RETURN
35 'Main
36 MAXFILES=1:CLS
37 INPUT"From (hex)";H$:GOSUB 11:F=D
38 INPUT"Output (LCD:,LPT:,COM:)";OF$
39 OPEN OF$ FOR OUTPUT AS#1
40 INPUT"Ascii only";Q$:CLS
41 IF Q$="Y" OR Q$="y" GOTO 49
42 FOR I=F TO 65535! STEP 8
43 D=I:GOSUB 16:PRINT#1,H$;" ";
44 FOR J=I TO I+7:V%=PEEK(J):D=V%
45 GOSUB 22:PRINT#1,H$;" ";NEXT J
46 FOR J=I TO I+7:V%=PEEK(J)
47 GOSUB 28:NEXT J:PRINT#1,""
48 GOSUB 32:NEXT I:GOTO 54
49 FOR I=F TO 65535! STEP 32
50 D=I:GOSUB 16:PRINT#1,H$;" ";
51 FOR J=I TO I+31:V%=PEEK(J)
52 GOSUB 28:NEXT J:PRINT#1,""
53 GOSUB 32:NEXT I
54 CLOSE:MAXFILES=0:END
    
```

## VISICALC TIPS

**(1) Printing tips**  
 Have you noticed that the start and end positions of a print are seldom on the screen together? You can waste time running the cursor down to the place you think you used last time without wrap-around on the printer. On the other hand, you could put the bottom print cell coordinate into a cell just left or above the starting cell. Perhaps you already do. If not, try it! See below for an example in cell C1.

There are important restrictions to consider when creating a sheet as to the size of the numbers used and the amount of columns

to screen or print. The numbers below form an easy guide to checking and initial design of sheets.

Chars/col	5	6	7	8	9	10	11
	12	13	14	15	16		
Scr 64 Y	12	10	9	8	7	6	5
	5	4	4	4			
	N	13	11	10	9	8	7
	6	5	5	5			
Prt 80 Y	16	13	11	10	8	8	
	7	6	5	5			
	N	17	14	12	11	9	9
	8	7	7	6	6		

**(2) Error flags**  
 Just suppose you miss a decimal point in your data entry and the results are way out. Can you quickly find the line or even the cell to change it, or perhaps there are more than one? Don't panic, try this. Use the \* for-

mat for a cell on the far right or bottom of a sheet.

Let's say you are checking a calculation less than 100%. If the sum calculated in a total column has 100 taken from it and the result is a positive number, then the cell will 'flag' the error using asterisks. Errors less than the column width can be found; for example, a column width of 8 will show an error value of 6 as six asterisks.

Or you can temporarily change the cell's format back to no format for the value to appear to help find

the culprit. A cross reference grid of a row and a column of error checks will exactly point to the error, though it can waste precious memory if taken too far. I use a column on the right in a split screen of a couple of columns and enter data on the left screen, then call the calculation manually (!) to check for errors. See columns U and V below. The formulae are U4/F\*(V) @SUM(E5...H5)-A5. The formula quoted above is U 12/F\*(V) + 112 - 100.

*John Wilkinson*

A4 (V)	+A2-(A1*A2)		
		...A...B...C...D...E...F...G...H...I...U...V...	
1	1	1=8H D2T56 MAIN HALL USAGE FOR W/E....	
2	84 78	<---OFF PEAK-- 84---	2.** = ERRO
3	OFFP PEAK	TOT DAY CASL ADVB UB40 OTHR %USE	3.OFFP PEAK
4	84 78 162	MON	0 4.
5	84 78 162	TUE	0 5.
6	84 78 162	WED	0 6.
7	84 78 162	THU	0 7.
8	84 78 162	FRI	0 8.
9	162 162	SATXXXXXXXXXXXXXXXXXXXXXXXXXXXX	9.
10	156 156	SUNXXXXXXXXXXXXXXXXXXXXXXXXXXXX	10.
11	-----		11.-----
12	420 708 1128	%USE 0 0 0 0 0	12.
13	OFFP PEAK	TOT DAY CASL ADVB UB40 OTHR %USE	13.

## CENTRE YOUR TEXT ON THE 64

Here's a machine code routine to produce a command for the Commodore 64 which locates itself at the top of memory, \$C000 in hex or 49152 in decimal. The program replaces the LET command with the new command CEN (this is done by using a system wedge).

CEN "The text to be centred" places the text in the centre of the screen. It centres text up to 38 characters long. The command can also

be used with strings as can be seen with the following example:  
 10 A\$="COMMODORE 64"  
 20 CEN A\$  
 30 END

The following is a short version of the listing in Basic.  
 10 A\$="COMMODORE 64"  
 20 S=INT(40-LEN(A\$))/2  
 30 FOR I=1 TO S  
 40 PRINT CHR\$(32);  
 50 NEXT I  
 60 PRINT A\$  
 70 END  
 The routine should prove useful in tidying up many of your programs.

*S Jonas*

```

10 REM          CENTRE COMMAND
15 REM          FOR THE COMMODORE 64
20 REM          COPYRIGHT 1984 BY S.JONAS
25 REM          TO USE TYPE CEN "TEXT HERE"
30 REM
35 T=0:FORI=0TO169
40 READA:POKE 49152+I,A
45 T=T+A:NEXT
50 IFT<>24554THENPRINT"CHECK SUM ERROR":END
55 PRINT"  CENTRE COMMAND          [C]1984 BY S.JONAS"
    
```



# You get the best of both worlds — great value and high performance

## Chinon disk drives

Built for high precision, high quality and high durability.  
Ideal for use with TRS 80, Microbee, IBM, etc, etc.



### CHINON MODEL F051D

Double density, slim drive, single sided.

**\$129 exc (\$149 inc)**

### CHINON MODEL F502

Double density, sim line drive, double sided.

**\$199 exc (\$239 inc)**

## 10 high quality diskettes for only \$24.50 (exc)

**\$29.50 (inc)**



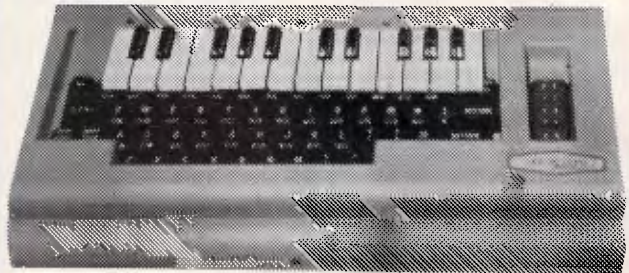
### Data Parts Diskettes

High quality DDSS diskettes, plastic library box, famous manufacturer, 5 year warranty.

## BONUS OFFER

Quote this ad and receive your free Verbatim head cleaner.

## The incredible keyboard



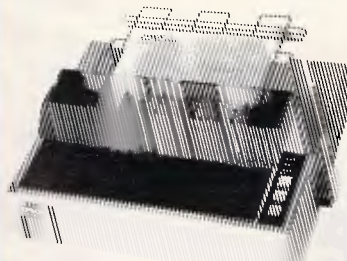
A spectacular music synthesiser for the Commodore C64 at an affordable price. Discover the Commodore's full potential as a music machine to produce songs and playback tunes by Michael Jackson, Boy George, The Eurythmics, Billy Joel — only to mention a few. Your screen is instantly turned into a sheet of music while you watch the notes move up and down through the scales producing unbelievable sound. You won't believe your computers capabilities. Using your joystick you can alter the sound structures to produce tones like guitars, drum machines, bass guitars and horns as well as many electronic sounds.

**Introductory low price \$66.50 (inc)**

## The simply affordable

# EPSON

Personal Printer with friction feed



New low  
price

**9**

(inc)

**\$349 (exc)**

## Easy to use, easy to own

ROM expansion to 8KB, and extended functions make the RX-80 easy to use, and its affordable price makes it the cost performance leader.

Freight \$4 anywhere in Australia. Prices are subject to change without notice. This ad must be quoted to qualify for special price.  
Or \$10 overnight most places (Comet).

TRADE ENQUIRIES WELCOME

CASH/CHEQUE OR BANKCARD WELCOME HERE

# DATA PARTS

**MAIL ORDER CENTRE**  
11 EDWARDS STREET,  
SHEPPARTON VIC 3630  
Telephone: 21 7155 (058)

- SHEPPARTON (As Above) Telephone: (058) 21 7155
- ALBURY 658 Dean Street Telephone: (060) 21 8088
- BENDIGO 27 Bath Lane Telephone: (054) 43 4866
- BALLARAT 307 Mair Street Telephone: (053) 31 3399

- WAGGA 33 Thompson Street Telephone: (069) 21 6466
- Disk Drives also available from:
- DC Electronics SA — Ph (08) 223 6946
  - SALTER SYSTEMS QLD — Ph (07) 369 5900



# MONITORS TO SUIT EVERY APPLICATION

## ADI COLOUR MONITOR

**\$398 inc**

**\$338 exc**

### COLOUR MONITOR

RGB & COMPOSITE VIDEO  
EXCLUSIVE GREEN SCREEN SWITCH

Suits Commodore, Apple, Microbee, BBC Electron etc. (Manufacturers rec. retail price \$518).

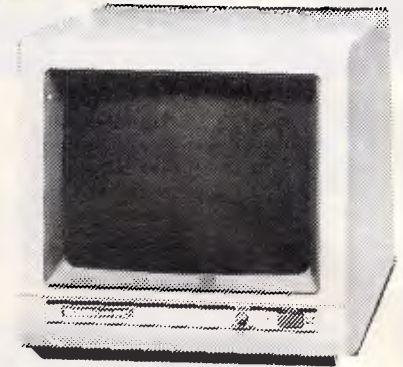
Has proven performance, reliability and adaptability.



## IBM — COMPATIBLE (25 MHZ)

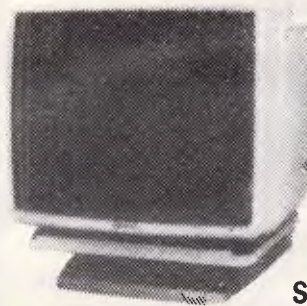
### KAGA

### 12-INCH COLOR DISPLAY MONITOR VISION-PC or III



This high-resolution 12-inch color display uses a black-face non-glare CRT ideal for displaying sharp characters and computer graphics. (25 x 80). Super Hi Res, 640 dots.

**SUPER HI-RES \$599 (exc tax)  
\$699 (incl tax)**



### BMC HI-RES MONITOR

18 MHz, 80 col . . . suits  
Apple, Microbee,  
Commodore, Executive,  
Osborne, IBM etc.

**\$169 incl**

Saves time and money and is  
incredibly easy to operate.

### FULLY AUTHORISED IBM DEALERS



### SOFTWARE (inc tax)

- LOTUS 1, 2, 3 ..... CALL
- SYMPHONY ..... CALL
- D BASE 11 ..... \$539
- WORD STAR ..... \$549

### HARDWARE all prices inc. tax

- IBM PC 256K with 320K drive,  
monitor & printer interface. **\$3980<sup>00</sup>**
- Check our range of printers,  
Monitors & add on boards to suit.

**\$3980<sup>00</sup>**



## BBC Model B

Recommended by Education  
Dept. in most states.

**\$949 (exc)**

Or new 'ACORN' Electron

**\$399 (exc)**

*Printers (Incl. tax)	* Cables (Printer) (Incl. tax)
DT80 ..... 284.00	Serial — serial ..... 19.95
Epson FX80 ..... super price POA	Centronic — Centronic ..... 29.95
Epson FX80 ..... super price CALL	Microbee Cable ..... 39.95
Star Gemini 10X ..... CALL	Centronics plugs
Amust 120 ..... 399.00	(soldier type) ..... 4.90
Diablo/Xerox 630 ..... 1698	<b>Paper Special</b>
DT 100 ..... 319.00	10" tractor feed top
Praxis 40 ..... 695.00	quality — box 2000 ..... 39.00
C. Itoh Color Printers ..... CALL	

**Add \$4 freight per order anywhere in Australia.**  
or \$10 overnight almost anywhere. (Comet).

### KAGA

### 12-INCH COLOR DISPLAY MONITOR. VISION-EX



Vision-ex features ultra-low-cost operation, a lightweight compact design, and a capability for input by both composite and RGB signals.

**RGB/PAL \$449 (incl)  
\$395 (exc.)**

Ideal for BBC, Electron, Microbee

### YES — WE DO HAVE THE FULL RANGE OF COMMODORE

	Price (inc. tax)	*APPLE COMPATIBLE Price (inc. tax)	
*COMMODORE			
1541 DISK DRIVE.....	385.00	Z80 CARD.....	54.00
802 PRINTER.....	399.00	SNAPSHDT CARD.....	120.00
1701 MONITOR.....	425.00	80 COL.....	84.00
64 COMPUTER.....	365.00	DISK CONTROLLER.....	54.00
COMMODORE 2031 DISK DRIVE.....	349.00	PARALLEL PRINTER CARD & CABLE (Auto ice).....	89.00
64' REFERENCE GUIDE.....	20.00	COOLING FANS.....	49.00
DATASET.....	45.00	JOYSTICKS.....	39.00
KOALA PAD.....	129.00	PADDLES (Pair).....	39.00
EASY SCRIPT.....	79.00	RGB CARD.....	129.00
SIMONS BASIC.....	69.00	(with 80 col adaptor)	
RIFLE PRACTICE with real look rifle & s/ware.....	49.50	*MEMORY (exc. tax)	
64 FLIGHT SIMULATOR.....	69.50	6116 RAM.....	5.68
PRINTRON INTERFACE.....	99.00	4116 RAM.....	1.59
		2732 EPROM (any quantity).....	4.50
		2764 ETROM.....	6.99
		2716/2516.....	3.80

\* Save on  
IBM Ram Kits 4164 **\$6.99 inc**

Prices are subject to change without notice. This ad must be quoted to  
quality for special price.



# Outstanding value

## OSBORNE

The Osborne 1 — still as popular as ever. 64K, built-in Monitor & Dual drives, all the software. Ask about our special deal on accounting software and printer to suit.

**\$1669**  
(inc.)

Both systems include Wordstar, Mailmerge, Supercalc, M Basic and C Basic.



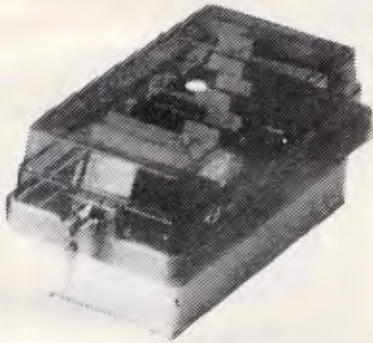
Executive

**\$2995**  
(inc)

## OSBORNE EXECUTIVE

The big brother to the Osborne 1, the magnificent Osborne Executive features all screen multi format compatibility software as per Osborne 1 plus Personal Pearl Data Base & UCSD system.

★ Ask about special printer offers.



Model DX85 holds 85 disks — \$24.50  
Model DX50 holds 50 disks — \$19.50



**\$129**  
inc

## The Two-in-One MAGIC TOUCH PAD with joystick

- Use it as a graphic tables to write or draw on your computer screen.
- Use it as a paddle controller or joystick; compatible with most game software.
- Create a custom keyboard with overlays and software.
- Create charts, play games, etc.

To suit Apple 2 & 2E.

## "SUPER FAST" COMMODORE DISK DRIVE



**\$598**  
EXC  
(\$698 incl tax)

Up to 10 times faster, heavy duty mechanism, plug directly into 64 (interface included), 6 months warranty.

## COMPATIBLE DISK DRIVES

ON QUALITY IMPORTED APPLE COMPATIBLE DISK DRIVES. MODEL AD501. (\$199 inc. tax).

**\$169<sup>00</sup>** (EXC.)

## APPLE JOYSTICK



Self centering, mech & electricly, one metre cable, high tensile re-coil.

**\$39** normally \$59

**OUT BEST QUALITY EVER**

Total freight charges \$4 per order anywhere in Australia or O/night (Comet).  
Prices are subject to change without notice. This ad must be quoted to qualify for special price.

TRADE ENQUIRIES WELCOME

CASH/CHEQUE OR BANKCARD WELCOME HERE

# DATA PARTS

**MAIL ORDER CENTRE**  
11 EDWARDS STREET,  
SHEPPARTON VIC 3630  
Telephone: 21 7155 (058)

- SHEPPARTON (As Above) Telephone: (058) 21 7155
- ALBURY 658 Dean Street Telephone: (060) 21 8088
- BENDIGO 27 Bath Lane Telephone: (054) 43 4866

- BALLARAT 307 Mair Street Telephone: (053) 31 3399
- WAGGA 33 Thompson Street Telephone: (069) 21 6466  
Opening in Melbourne soon.



# YEAR END CLEARANCE

**HURRY!**  
Offer applies  
only while  
stocks  
last

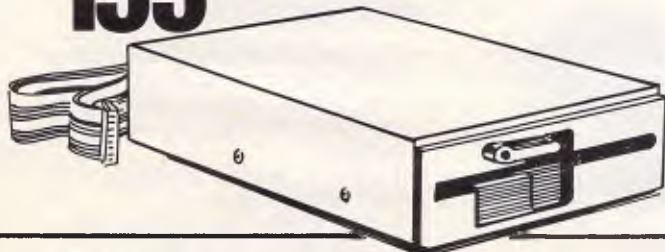
Major importer clears entire stock  
at Australia's Hottest Prices

## ATLAS 8 SLIMLINE DISC DRIVE

Apple II Compatible

Rec. Retail  
~~\$249~~

**\$199** exc.  
(\$229 incl tax)

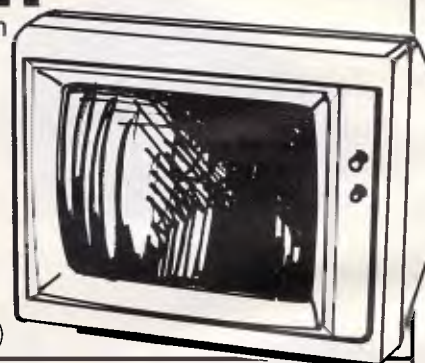


## TAXAN MONITOR

Amber Hi-Res Screen

Rec. Retail  
~~\$269~~

**\$169**  
exc.  
(\$199 incl tax)



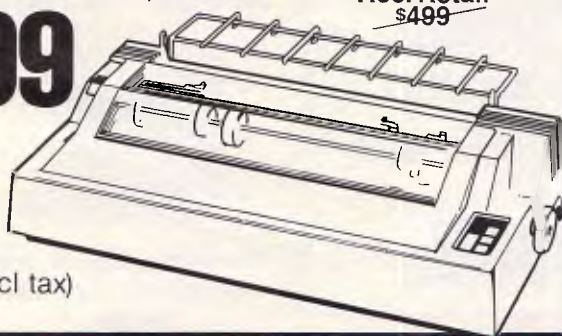
## MITSUMI MC2100

120 c.p.s. D.M. Printer 24 c.p.s. NLQ Facility  
Parallel & serial ports included

Rec. Retail  
~~\$499~~

**\$399**

exc.  
(\$449 incl tax)

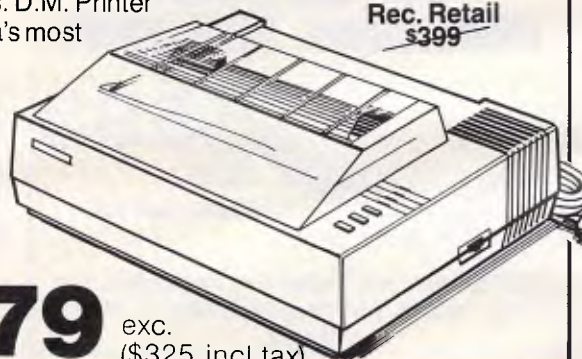


## AMUST DT 100

100 c.p.s. D.M. Printer  
Australia's most  
popular  
printer

Rec. Retail  
~~\$399~~

**\$279** exc.  
(\$325 incl tax)



TRADE ENQUIRIES WELCOME — CASH/CHEQUE OR BANKCARD WELCOME HERE

# DATA PARTS

MAIL ORDER CENTRE  
11 EDWARDS STREET,  
SHEPPARTON VIC 3630  
Telephone: 21 7155 (058)  
Add \$4.00 freight anywhere in Aust.

- SHEPPARTON (As Above) Telephone: (058) 21 7155
- ALBURY 658 Dean Street Telephone: (060) 21 8088
- BENDIGO 27 Bath Lane Telephone: (054) 43 4866

- BALLARAT 307 Mair Street Telephone: (053) 31 3399
- WAGGA 33 Thompson Street Telephone: (069) 21 6466  
Opening in Melbourne soon.



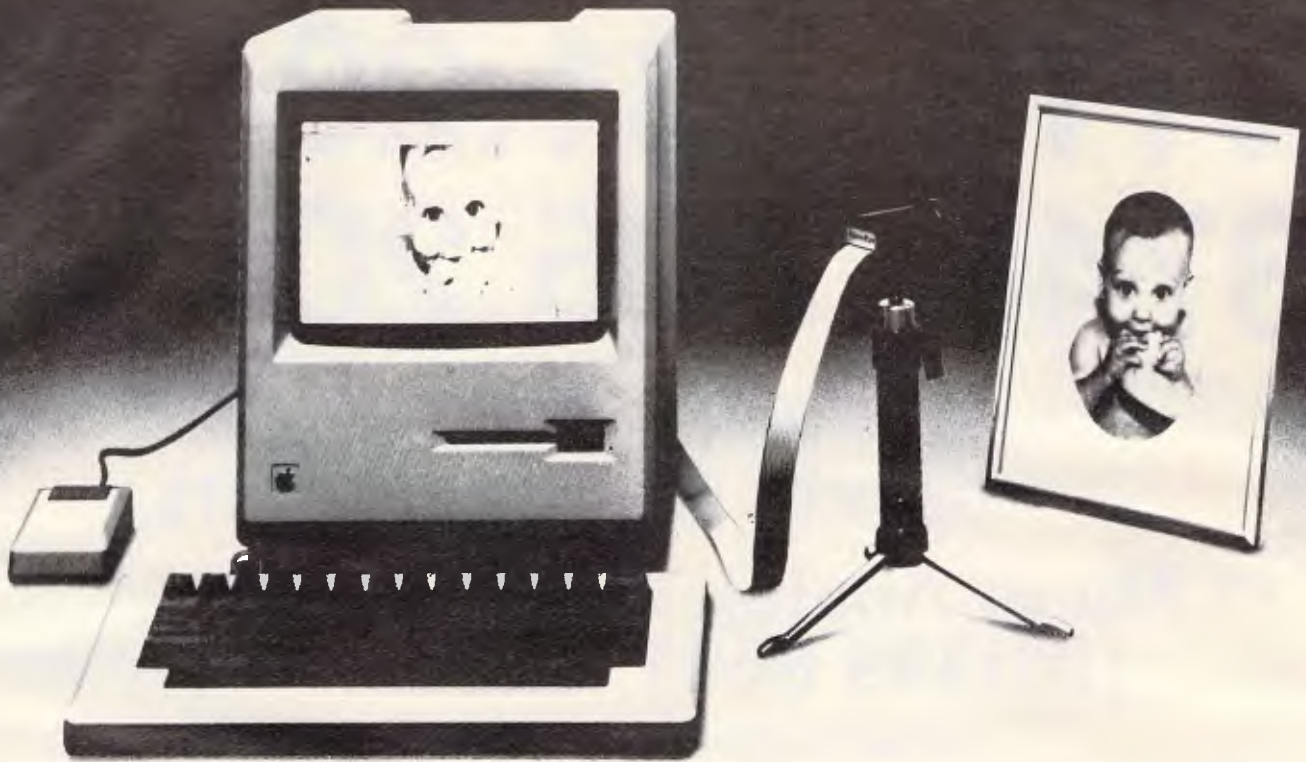








# START A NEW LIFE



## ... for your computer

With a piece of hardware that'll keep you awake at night . . . finding more applications for this exciting new visual tool which puts visuals onto your computer screen.

\$795 at all good computer shops.

Combine the Micron Eye camera/digitiser with Apple's Macintosh and Macpaint and then unleash your imagination!

Micron Eye models are also available for IBM PC, Apple 2, Commodore 64 and Tandy TRS 80 Colour Computer.

**Software Source Pty Ltd**

Return this coupon for more information on the Micron Eye & your local Software Source dealer list.

Name .....

Address .....

Postcode .....

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

APC/0185



<b>4164</b>	150 ns	<b>\$3.99</b>	EA, EX. S.T. QUOTED 10/84 (10K qty, or \$4.28 1K)
<b>4116</b>	150 ns	<b>\$1.20</b>	EA, EX.S.T. QUOTED 10/84 (1K qty)
<b>8748</b>		<b>\$25.20</b>	EA, EX.S.T. QUOTED 10/84 (100's qty)

*If you want to* **SAVE MONEY ON VOLUME,  
OR NEED HARD TO GET PARTS,**

*call* **Micro Analog General**

**(02)398 8601** Telex: AA135042 AUSBEG. "ATTN. MICANGEN".

Our Worldwide Purchasing will Cure all your problems.

# For Those Who Seek

Bible study aids from Datacare include the complete KJV Bible text on disks. THE WORD processor can search the Scriptures for any word or phrase. Any portion of the Bible can be printed or displayed. Create your own library of research materials or use ours, called TOPICS.

TOPICS contains cross-reference indexes on over 200 of the primary subjects discussed in Scripture.

THE WORD processor applies computer technology to personal study of the Scriptures.



THE WORD processor and TOPICS available from

**datacare** pty ltd

(07) 892 4318, 892 4121 Working together with you

FREEPOST 2, P.O. Box 50, Yeronga, Q 4104.

**specialising in software  
for Christian service**

Requires APPLEII+, IBM-PC, TRS80-III, MSDOS or CP/M 80 (Z80). THE WORD and TOPICS are products of Bible Research Systems.



Peter Vernon explains how to build your own voice synthesiser which can be connected to any computer.

Would you like a talking computer? Voice output adds to the excitement of computer games, emphasises messages from the computer (imagine your computer shouting "Hey, I've finished" after a long printing job!) and helps visually handicapped people who may otherwise be unable to use a computer. With appropriate software this project can be used in all of these applications, and many more. It's a basic version of a speech synthesiser based on the Votrax

## How it works

All spoken languages are made up of a limited number of basic sounds called 'phonemes' which when put together produce words. The English language uses about 42 different phonemes, depending on the accent of the speaker.

The SC-01 is a single chip phoneme based speech synthesiser which accepts a coded value between 0 and 63 and pro-

# DIY voice synthesiser

duces one of 64 sound units (silences of various lengths are also considered 'sound units'), as shown in table 1. Programming the SC-01 is a matter of breaking down the words to be spoken into individual phonemes, then converting these phonemes into appropriate data codes according to table 1. These codes are sent to the speech synthesiser with an LPRINT CHR\$( ) or OUT statement to the parallel port to which the synthesiser is connected. In response, the synthesiser sounds the phonemes which make up the programmed word.

SC-01 integrated circuit speech synthesiser, designed for minimum cost. The Votrax SC-01 chip has been around for a while now, as microelectronics go, and some very advanced voice synthesisers have been developed around it. The "Personal Speech System", for example, from Votrax itself, is controlled by an on-board Z80 microprocessor with "text-to-speech" translation software. It includes a sound generator chip and a clock too, so all sorts of special effects are possible.

This project is nothing like that. In keeping with one of the basic themes of the Compucircuits series, the circuit shown here is the simplest working design in which the SC-01 can be used to provide speech output from a microcomputer. So that the circuit can be used with as wide a range of computers as possible, it is designed so that it connects to a centronics-type parallel printer port.

(That's not to say it's cheap. While the handful of other parts costs around \$20, the SC-01 chip itself costs \$82.95. It's also a fragile chip, sensitive to static electricity and very intolerant of a reversed supply voltage. Handle it carefully . . . )

## The circuit

The speech synthesiser project is designed to connect to a centronics-type parallel port. Only six data bits are required to specify the 64 phoneme sounds which the SC-01 can produce. Data bits D0 to D5 are connected to the inputs of a buffer, ICI, which passes them directly to the data inputs of the Votrax chip. A STB (strobe) signal instructs the SC-01 that the data is ready.

The strobe signal for the SC-01 has special timing requirements which may

not be met by all computer printer ports. For this reason IC2 is included, a monostable which 'stretches' the length of the strobe pulse from the computer before it is applied to the SC-01 itself.

When a phoneme is being sounded by the SC-01 the A/R (Acknowledge/Ready) signal from the Votrax chip will be at '0', indicating that the voice synthesiser chip is busy. Transistor TR1 inverts this signal (so that a '1' means busy) in order that the voice synthesiser interface will match the specifications of standard centronics input ports.

Sending data to the voice synthesiser is thus a matter of putting the data on the lower six bits of the data port and activating the STB pulse. The A/R signal will go to '1' for as long as the SC-01 is producing a sound and then return to '0', indicating that the chip is ready to accept the next phoneme code. In most cases the LPRINT statement of Basic will automatically take care of these timing requirements.

The remaining sections of the circuit provide a timing clock for the SC-01 and amplify the audio output of the chip. The

## Parts list

### Integrated circuits

- 1 74LS376 hex bus driver
- 1 74LS121 monostable multi-vibrator
- 1 SC-01A speech synthesiser
- 1 LM386 audio amplifier

- 1 BC547 NPN transistor
- 1 7805 +5V voltage regulator

### Capacitors

- 1 1000uF/25VW electrolytic
- 1 220uF/25VW electrolytic
- 1 100uF/25VW electrolytic
- 1 10uF tantalum
- 4 0.1uF greencap
- 2 .01uF greencap
- 1 150pF ceramic

### Resistors (1/4W, 5%)

- 1 x 100k, 1 x 22k, 1 x 10k
- 1 x 6.8k, 1 x 4.7k, 1 x 10 ohms
- 2 x 10k trimpots

### Miscellaneous

- 15cm length of 10-way ribbon cable
- 1 loudspeaker
- 1 22 pin socket for SC-01 chip

Standard TTL types may be substituted for the 'LS type specified, eg., you may use the 74121 rather than the 74LS121



# Another new model

AMERICA'S SUCCESS STORY  
THOUSANDS SOLD!

## BONDWELL 14 portable

NEW!



CP/M PLUS  
128K RAM

### • FULLY PORTABLE

Unbelievable value for such a magnificent computer system! The Bondwell 14 portable is one of America's top selling computers: it's received rave reviews from the magazines, and users have been equally enthusiastic! This incredibly powerful portable operates from the world-standard CP/M system - with the huge range of software available to suit. That's if you ever need any more than the software supplied: it's more than enough for most business and commercial applications.

### And the Bondwell 14 includes:

- Ergonomically designed durable cabinet for complete portability.
- CP/M 3.0 with its own set of utility software
- 9in amber, non-glare display inbuilt!
- 16 user-definable keys for easy operation
- Built-in voice synthesiser - it speaks English!
- And all this Bundled Software: Micropro Wordstar, Calstar, Mailmerge, Datastar, Reportstar plus system utility and Speech!

OVER \$1200 WORTH OF SOFTWARE FREE!

All this for \$ **2295**  
only

Cat X-9000

Available at these stores

NSW. Sydney, Bridge St. 27 5051 ● York St. 267 9111 ● Gore Hill 439 5311  
Parramatta 689 2188 ● North Ryde 88 3855 ● Newcastle 61 1896  
QLD. Toowoomba 38 4300 ● Brisbane City 229 9377 ● Buranda 391 6233  
VIC. Melbourne Elizabeth St. 67 9834 ● Brighton 592 2366 ● Springvale 547 0522  
Richmond 428 1614 ● WA. Perth, Hay St. 321 4357 ● SA. Wright St. 212 1962

\*Of from \$233 deposit and \$18.23 per week over 48 months to approved applicants. Commercial Leasing also available!

LIST OF APPLE II PROGRAMS  
AVAILABLE IN ALL OUR STORES.



The fantastic

1000's SOLD - CHECK  
LOCAL STORES FOR STOCKS!

THE  
**cat**™  
DICK SMITH PERSONAL COMPUTER

Australia's best value 64K Computer. That's the CAT. It's the best of both worlds: the very latest and most powerful hardware, plus the ability to run a very broad range of tried-and-proven software. And because we import direct, there's no middleman to force up the price. It really is outstanding value for money. If you want a machine which is software compatible with thousands of popular programs and which is supported by a reputable dealer, our CAT with emulator is good value. Check the CAT out at your nearest Dick Smith Electronics Computerstop. It purrs.

Save \$230.90 on CAT system!

	Cat. No.	Normally
Basic CAT Computer	X-7500	\$ 699.00
Disk Drive	X-7505/6	\$ 349.00
Disk Controller	X-7510	\$ 149.00
RF Modulator	X-7550	\$ 34.90
		<b>\$1231.90</b>

SPECIAL OFFER!  
VALUE AT \$ **999**  
ONLY

\*Or \$81 deposit and \$8.31 per week over 48 months to approved applicants.

### AND MORE FOR THE CAT:

Emulator Cartridge Cat X-7530	\$ 34.50
Dual Joysticks Cat X-7520	\$ 34.50
RS 232C Serial Adaptor Cat X-7515	\$129.00
Utilities Disk Cat X-7513	\$ 39.95
Cat RGB Cable Cat X-7560	\$ 39.00



# from Australia's No 1

**"AMAZING SCOOP PURCHASE!  
AUSTRALIA'S GREATEST  
EVER COMPUTER  
VALUE!"**

— Says Little Dick

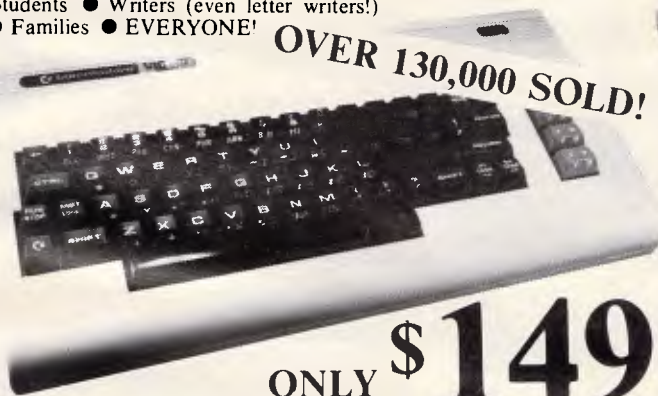


## commodore VIC-20

Yes! It's unbelievable but true. Dick Smith Electronics has purchased the entire Australian stock of the fantastic Vic 20 computer from Commodore Australia. Our huge scoop purchase means low, low prices for you: **YOU REAP THE BENEFIT!**

Yes — the computer with probably more software available than any other — probably the largest single model seller anywhere in the world — is now available from Dick Smith Electronics at a never-to-be-repeated price. With its superb touch keyboard (full size) and large range of peripherals available, it's the perfect computer for ● Small Business ● School Students ● Writers (even letter writers!) ● Families ● EVERYONE!

**OVER 130,000 SOLD!**



**ONLY \$149**

Plus big savings on these package deals:

### STARTER PACK NORMALLY

VIC-20 Cat X-2000	\$149.00	<del>\$270.75</del>
JOYSTICK Cat X-2004	\$ 19.95	
DATASETTE Cat X-2005	\$ 49.95	
PROGRAMMERS REF. GUIDE Cat B-2004	\$ 22.00	
PLUS Choice of 3 Program Cartridges @ \$9.95 each	\$ 29.85	
		<b>\$249</b>

### FAMILY PACK NORMALLY

VIC-20 Cat X-2000	\$149.00	<del>\$383.65</del>
JOYSTICK Cat X-2004	\$ 19.95	
DATASETTE Cat X-2005	\$ 49.95	
PROGRAMMERS REF. GUIDE Cat B-2004	\$ 22.00	
INTRO TO BASIC PART 1 Cat B-2002	\$ 26.60	
INTRO TO BASIC PART 2 Cat B-2001	\$ 26.60	
PLUS 9 PROGRAM CARTRIDGES @ \$9.95 each	\$ 89.55	
		<b>\$349</b>

## And Peripherals:



### Colour Monitor

Take advantage of your colour computer with this low cost colour monitor. Cat X-1195

**ONLY \$389**

### Monitor Swivel Base

Tilt up, down, sideways to suit you! Cat X-1195

**ONLY \$29<sup>50</sup>**



### TP-40 Printer Plotter

Will work with virtually any computer with standard Centronics-type interface. Cat X-3245

**NOW ONLY \$149**

~~WAS \$249~~

### Daisywheel Printer

A high performance letter quality printer from UCHIDA at a value price! Centronics compatible. Its quiet and can use standard QUME print wheels and ribbon cartridges ● 18 cps ● 13" maximum paper width. Cat X-3270

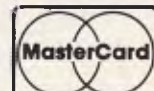
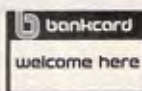
**ONLY \$699**



### New 'STAR' DP515 Dot Matrix Printer

Suits Centronics interfaces. Has both back and bottom paper feed. 9x9 dot matrix ● 100 cps ● Sprocket or friction feed ● 15½" maximum paper width. Cat X-3285

**ONLY \$875**



\* Terms available to approved personal applicants through  
**Custom Credit**

Dick Smith Electronics Pty Ltd

# COMPUTERSTOP



Your one stop computer shop.

A875/JL



# MAILWARE SOFTWARE AND HARDWARE DISCOUNT WAREHOUSE

"Our prices speak for themselves ..."

## SUPER SPECIALS FOR THIS MONTH ONLY:

Apple: PFS Write/File/Report/Graph - \$175.00 this month only \$129.00  
 IBM: Framework from Ashton-Tate - \$795.00 this month only \$569.00

Macintosh: Main Street Filer - \$299.00 this month only \$219.00  
 Commodore: Wordpro 3 - (disk) - \$160.00 this month only \$129.00

### Software (sales tax included) R.R.P.

#### IBM

	R.R.P.	Our Price
Lotus 123 IBM/DEC/Wang	745.00	565.00
Symphony	995.00	785.00
Open Access	940.00	765.00
Attache	call	call
dBase III	795.00	625.00
Spellbinder	795.00	635.00
dBase II w/lessons	540.00	451.00
Wordcraft	call	call
Friday	360.00	253.00
Harvard Project Manager	649.00	486.00
Carpe acc. package	1200.00	999.00
Sybiz accounting	call	call
Concurrent CP/M 86	call	call
Concurrent PC DDS	call	call
Multimate	595.00	380.00
Rbase	630.00	520.00
Microsoft Word + Mouse	685.00	577.00
Wordstar Propak	795.00	595.00
Vision paks	call	call
Sargon III	74.95	69.96
Crosstalk	299.00	155.00
Corporate MBA	1200.00	999.00
Flight Simulator	87.95	67.95
Smart Key	79.95	65.95
Turbo Pascal	135.00	77.95
Perfect software	call	call
SuperCalc 3	445.00	359.00
Multiplan	395.00	315.00
Microsoft Word	499.00	395.00
Zork I/II/III	59.95	47.95
Access Manager	450.00	395.00
Software not listed	call	call

### Hardware (plus sales tax)

#### IBM

Plug in modem (approved)	call	call
64K upgrade chips	110.00	89.95
Microsoft Mouse	259.00	215.00
Quadboards fr	550.00	call
Persyst boards fr	375.00	call
AST boards	call	call
Hercules	660.00	550.00
Microfazer 64K ser	490.00	406.00
Hard disks 5mb - 32mb	call	call
Hardware not listed	call	call

### Macintosh

Mac Multiplan	315.00	247.00
Mac File	315.00	247.00
Mac Zork I/II/III	89.95	79.95
Mac Manager	79.95	63.95
Mac PFS File + Report	320.00	265.00
Mac Hard Disk	call	call
Mac floppy disks (10)	96.00	65.20
Mac more Mac bargains	call	call

### Apple

dBase II	540.00	395.00
Friday	360.00	253.00
Zardax	324.00	248.00
Sandy's W/P	225.00	189.00
Bank Street Writer	99.95	82.95
Championship Lode Runner	49.95	39.95
Microsoft Basic Compiler	659.00	510.00
Wordstar CP/M - 64KB	595.00	485.00
Infostar CP/M - 64KB	666.00	535.00
Flashcalc II/IIe/IIc	165.00	135.00
Turbo Pascal	135.00	78.95
Visifile	428.00	285.00*
Choplifter	49.95	37.95
Wizardry II/IIe/IIc	79.95	64.95
Beyond Castle Wolf	54.95	46.95
Educational software	from	22.50
PFS School Record	195.00	169.00
Hard Disks	call	call
S.A.M. voice synth	120.00	69.95*
Vision 80 128KB	499.00	275.00*
Vision 80 256KB	699.00	395.00*
Auto Ice printer card	130.00	82.50
Auto Ice smart modem	call	call
10 mb Hard Disk	call	call

### Commodore

Bank Street Writer	79.95	69.95
Multiplan	149.00	119.00
Flight Simulator	79.95	69.95
Zaxxon	59.95	49.95
Lode Runner	39.95	34.95

### Atari

for Atari software	call	call
--------------------	------	------

### Sinclair

for Sinclair products call

### CP/M software

Infostar	666.00	535.00
Nevada languages	59.95	49.95
Suspended (DEC)	69.95	59.95
more CP/M 80 & 86 s/ware	call	call

### Hardware

Kaypro computers with dBII, DataStar, WordStar, more  
 Fox - runs IBM software with free Lotus 123 256KB, more  
 Columbia MS DOS, CP/M with Perfect S/ware, hard disk  
 Apricoat 4th generation super micro thats easy to use

call in for the best prices in town

### Disks

Verbatim SSDD (10)	49.95	38.95
Verbatim DSDD (10)	80.00	47.95
Memorex SSDD (10)	49.95	37.95
Memorex DSDD (10)	80.00	45.95
Microflopies 3.5	96.00	65.20
SSDD 5 1/4 (10)	45.00	35.95
other disks	call	call

### Modems and Acoustic Couplers

Cicada 300	250.00	189.00
Sendata 700 a/c	286.00	call
Videotex compt. modem	call	call
for more modem bargains	call	call

### Printers (sales tax incl.)

Silver Reed 770 daisy wh	1770.00	1399.00
Silver Reed 500 daisy wh	787.00	599.00
Star Gemini 10X	539.00	419.00
Star Gemini 15X	795.00	649.00
Epson RX80F/T	649.00	565.00
Epson FX100	1333.00	1199.00
Epson LQ1500	2130.00	1839.00
more printer bargains	call	call

Prices current at the time of printing, subject to change without notice.

**For all products not listed, Call (02) 212 1622**

Call for sales tax exempted prices. Call for specials: (02) 212 1622



Order by phone, or send cheque or money order to:  
**MAILWARE, P.O. BOX K109, HAYMARKET, NSW, 2000. TLX: 70208**

All products are latest release versions. All products carry full manufacturers warranty and support.

Software from Arcom Pacific, Imagineering, Microsoft, Sourceware, Digital Research, Sorcim, MicroPro, Ashton-Tate and others.

Should there be any price reductions since the printing of this magazine, we will pass these onto our customers. Please do not hesitate to call us and confirm the latest prices, and we will do our best to better any genuine price quoted by our competitors.

# SOFTWARE AND HARDWARE DISCOUNT WAREHOUSE MAILWARE



components connected to pins 15 and 16 of the SC-01 set the overall timing of the chip, and consequently the pitch of the sounds produced. Potentiometer VR1 (marked 'Pitch Control') on the circuit

diagram varies the pitch of the speech produced. However, since the clock rate also affects the rate at which phonemes are processed, a high pitch means rapid speech (a sort of Donald Duck effect),

while a low pitch means slow speech. The middle range gives the most satisfactory effects for everyday use.

Audio output from the SC-01 is amplified by IC4, an LM386 integrated circuit amplifier. Potentiometer VR2 controls the gain of the amplifier and hence the volume of the sounds produced. The amplifier can produce a maximum output of 1 watt, quite enough to drive a loudspeaker.

The SC-01 and audio amplifier sections of the circuit require a 12V DC power supply and the TTL logic requires 5V. Power for the speech synthesiser is provided by a 12V DC plugpack, with an LM7805 voltage regulator to provide the 5V supply. This regulator may become quite hot in use, and should be fitted with a heatsink (metal fins which bolt onto the metal tab of the regulator package to improve heat dissipation).

## How to build it

Printed circuit boards and other components for this project will be available from Mike Boorne Electronics, PO Box 8, Turramurra, NSW, 2074 or Geoff Wood Electronics Pty Ltd, 656A Darling Street, Rozelle, NSW, 2039. There may be a short delay, as many manufacturers do not work over Christmas, but PCBs should be ready in January. SC-01 chips are immediately available.

If you do not wish to use the printed circuit board the speech synthesiser can be built on strip board, which consists of copper strips plated onto circuit board material with a grid of holes at 0.1 inch intervals. Building the circuit in this way requires cutting the copper strips of the board (with a craft knife or similar) and soldering wire links from one track to another so that connections are made as shown on the circuit diagram, and no other connections exist between the pins of the chips, the individual components and the power supply lines.

No matter which method of construction you choose, be sure to use a socket for the SC-01. Wire the circuit as shown, and without inserting the SC-01 in its socket, connect the power supply and switch on. Use a multimeter to check that the power supply voltages are correct for each IC, paying particular attention to pins 1 and 18 of the SC-01. You should be able to measure 12V on pin 1, with pin 18 as ground, or zero volts, and 5V on pin 16 of IC1 and pin 14 of IC2. Pin 6 of the amplifier, IC4, is also connected to 12V.

When you are sure that the power supply voltages are correct, switch off the circuit and then insert the SC-01 in its socket, making sure that it is oriented correctly. When you switch on the circuit

```

10 CLEAR 100:CLS
20 DIM B0$(50), B(50)
30 PRINT "Enter phoneme codes separated by spaces."
40 PRINT "Press RETURN to see ASCII codes."
50 PRINT "To exit program type 'QUIT'"
60 C=0:PRINT
70 INPUT A0$
80 IF A0$="QUIT" THEN END
90 A0$=A0$+" "
100 IF LEN(A0$)=0 THEN GOTO 170
110 C=C+1
120 FOR I=1 TO LEN(A0$)
130 IF MID$(A0$,I,1)<>" " THEN NEXT I
140 B0$(C)=LEFT$(A0$,I-1)
150 A0$=MID$(A0$,I+1,100)
160 GOTO 100
170 REM find corresponding ASCII code
180 FOR A=1 TO C
190 READ A1$,D
200 IF A1$="OUT" THEN GOTO 300
210 IF A1$<>B0$(A) THEN GOTO 190
220 B(A)=D:RESTORE:NEXT A
230 PRINT "The ASCII codes are;"
240 FOR A=1 TO C
250 PRINT CHR$(B(A));
260 LPRINT CHR$(B(A));:REM sends sound to
    synthesiser connected to printer port
270 NEXT A
280 LPRINT "?";:REM stops all sound
290 GOTO 60
300 PRINT "ERROR - NO ";B0$(A);" CODE":END
400 DATA "EH3",64,"EH2",65,"EH1",66,"PA0",67
410 DATA "DT",68,"A2",69,"A1",70,"ZH",71
420 DATA "AH2",72,"I3",73,"I2",74,"I1",75
430 DATA "M",76,"N",77,"B",78,"V",79
440 DATA "CH",80,"SH",81,"Z",82,"AW1",83
450 DATA "NG",84,"AH1",85,"OO1",86,"OO",87
460 DATA "L",88,"K",89,"J",90,"H",91
470 DATA "G",92,"F",93,"D",94,"S",95
480 DATA "A",32,"AY",33,"Y1",34,"UH3",35
490 DATA "AH",36,"P",37,"O",38,"I",39
500 DATA "U",40,"Y",41,"T",42,"R",43
510 DATA "E",44,"W",45,"AE",46,"AE1",47
520 DATA "AW2",48,"UH2",49,"UH1",50,"UH",51
530 DATA "O2",52,"O1",53,"IU",54,"U1",55
540 DATA "THV",56,"TH",57,"ER",58,"EH",59
550 DATA "E1",60,"AW",61,"PA1",62,"STOP",63
560 DATA "OUT",64
    
```

*Listing 1: this program converts Votrax phoneme codes to ASCII symbols which can be sent to the voice synthesiser.*



again you should hear some sound from the voice synthesiser, based on the random state of the input lines.

If all is correct so far, switch off the power again and connect the speech synthesiser to the printer port of your computer. Switch on the voice synthesiser, then the computer and try the

program shown in listing 1.

## Software

Writing text-to-speech translation software is a non-trivial task. The best reference on the subject is Steve Ciarcia's article in the October 1982

issue of BYTE magazine. Basically the process relies on coding a number of rules which determine which phoneme patterns will be substituted for the incoming ASCII character. The rules are based on look-tables, the context of the character and punctuation, and the more rules you encode into your program, the more accurate your text to speech translation software will be. To be of use, the program must also run quickly enough to simulate real speech, and that means using assembly language.

We've made no attempt to produce a text-to-speech translator. The Basic program shown here is designed to assist you in constructing your own vocabularies for the voice synthesiser, but you will also need a copy of the Votrax "Phonetic Speech Dictionary for the SC-01 Speech Synthesiser", which should be supplied with the chip. The dictionary supplies a list of commonly used words and the Votrax phoneme codes required to produce the sounds for each word. Constructing a vocabulary is a matter of looking up each word and then converting the phoneme codes into values to be sent to the synthesiser. The program in listing 1 assists in this part of the process by automating the conversion of phoneme codes into data values. With the program running, simply type in a series of phoneme codes separated by spaces. On pressing 'Return' the program will display a series of ASCII symbols corresponding to the codes you have typed. Copy these symbols into DATA statements in your own program to permanently store the codes for each word which you want the voice synthesiser to speak.

If you use the LPRINT statement to drive the voice synthesiser, you should be aware that in some versions of Basic the code for LPRINT actually translates some ASCII codes into other values. The Apple II, for example, restricts the ASCII codes which can be sent to a printer, and the TRS-80 Model 1 translates the code for a carriage return into multiple linefeed statements. If you experience problems using LPRINT, try the more direct OUT statement.

Note also that in using LPRINT you should end each statement with a semicolon to suppress the carriage return sent by Basic. Carriage return (CHR\$(13)) is the Votrax code for the 'n' sound and unless suppressed will produce a sort of hum between each spoken word.

## Conclusion

The SC-01 circuit shown here is the minimum working design for a voice synthesiser based on the Votrax chip.

Hexadecimal phoneme code	Votrax Phoneme Symbol	As in;	ASCII character
00	EH3	jacket	@
01	EH2	enlist	A
02	EH1	heavy	B
03	PA0	(47ms pause)	C
04	DT	butter	D
05	A2	make	E
06	A1	pail	F
07	ZH	pleasure	G
08	AH2	honest	H
09	I3	inhibit	I
0A	I2	inhibit	J
0B	I1	inhibit	K
0C	M	mat	L
0D	N	sun	M
0E	B	bag	N
0F	V	van	D
10	CH	chip	P
11	SH	shop	Q
12	Z	zoo	R
13	AW1	lawful	S
14	NG	thing	T
15	AH1	father	U
16	OO1	looking	V
17	OO	book	W
18	L	land	X
19	K	trick	Y
1A	J	judge	Z
1B	H	hello	!
1C	G	get	\
1D	F	fast	]
1E	D	paid	↑
1F	S	pass	<
20	A	tame	(space)
21	AY	jade	!
22	Y1	yard	"
23	UH3	mission	#
24	AH	mop	\$
25	P	past	%
26	O	cold	&
27	I	pin	'
28	U	move	(
29	Y	any	)
2A	T	tap	*
2B	R	red	+
2C	E	net	,
2D	W	win	-
2E	AE	dad	.
2F	AE1	after	/
30	AW2	salty	0
31	UH2	about	1
32	UH1	uncle	2
33	UH	cup	3
34	O2	bold	4
35	O1	aboard	5
36	IU	you	6
37	U1	tune	7
38	THV	the	8
39	TH	thin	9
3A	ER	bird	:
3B	EH	ready	;
3C	E1	be	<
3D	AW	call	=
3E	PA1	(185ms pause)	>
3F	?	(stop speech)	?

Table 1 shows the hexadecimal code and ASCII character corresponding to each phoneme that the SC-01 chip can produce. In each case the code makes the sound shown highlighted in the sample word.



# CHRISTMAS & NEW YEAR OFFERS!!

## OFFER #1:

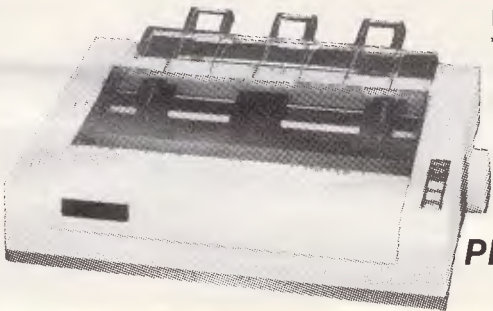
### BI-XT-88 16 Bit Computer

The **ULTIMATE** Personal Computer that gives you **IBM™ PC/XT compatibility** at a fraction of the cost.



PC 88 COMPLETE SYSTEM **\$3500.00\***

- (a) 256K RAM memory with twin floppy DSDD disk drives. 16 bit 8088 CPU with interrupt control (8259) and direct access controller (8237). Colour graphic card multifunction card. Disk drive card and mainboard & keyboard 100 watt fan.
- (b) TAXAN Colour vision III monitor — RGB.
- (c) **PLUS — FREE — 120 CPS dot matrix printer 'PX-120'**



COURIER SERVICE AVAILABLE  
Free delivery in Sydney Metropolitan area.  
\* 6 months warranty for parts and labour.



## OFFER #2:

One Diskette box containing 10 x 5 1/4" DDSS diskettes.

**PLUS — One 50 Floppy diskette 5 1/4" Storage Box (plastic casing with diskette free) \$35.00\***

Certified and error free.

## BI COMPUTER PTY. LTD.

Suite 23 (2nd flr.), Minton House,  
2A Bayswater Rd., Kings Cross, N.S.W. 2011.  
Telephone: (02) 356-2388



\* Postage & handling extra  
\* WHILE STOCKS LAST!

Name: ..... OFFER 1: qty  I wish to pay by Bank Cheque..... Bankcard.....  
 Company: ..... OFFER 2: qty  Card No..... Expiry Date.....  
 Address: .....  
 Postcode: ..... Signature.....  
 Telephone ( ) ..... Post & handling  Courier

OPTION: Computer Training Services available,  
Incl. Word Processing, Lotus 123 — CALL NOW FOR DETAILS.

**TRADE ENQUIRY  
WELCOME**



# COMPUCIRCUITS

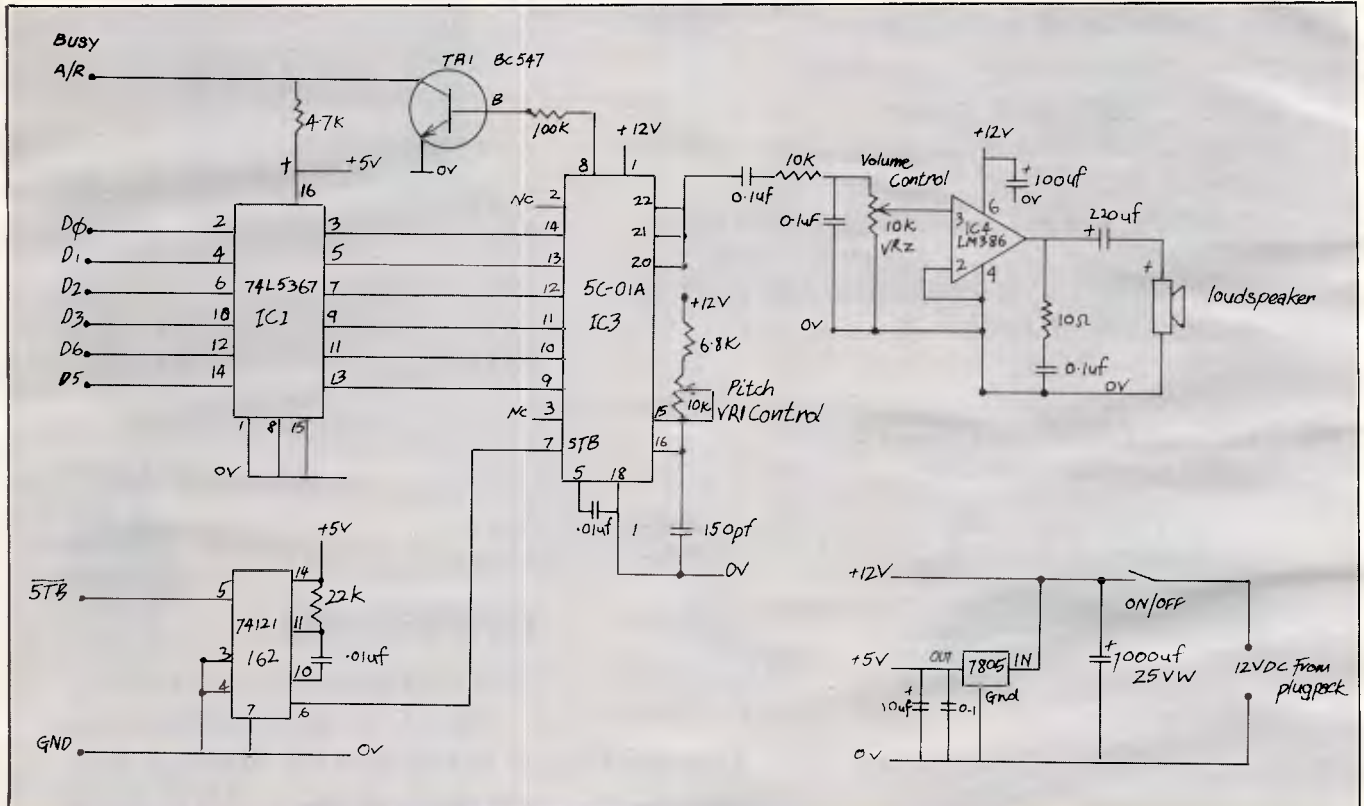
Software to drive the voice synthesiser is the first limiting factor in getting your computer to talk. Listing 2 is a simple demonstration, using DATA statements compiled with the help of the phoneme code converter program of listing 1.

The circuit and software shown here are a starting point only. They allow you to incorporate speech into your computer programs with a minimum of expense and are capable of further development. Please keep us informed of any novel applications or developments of the voice synthesiser.

```

10 FOR C=0 TO 4
20 READ A$:LPRINT A$;
30 NEXT C
40 LPRINT "??";
50 DATA "9KIRCC", "KIRCC", " ) 44+CC"
60 DATA "Y2L%67*:", " _ %<YJT"
    
```

Listing 2: a program to say 'This is your computer speaking'



Voice synthesiser circuit

# Wordprocessing to Typesetting

Do you prepare documents for typesetting on a wordprocessor? Then you're already half way there! We typeset from your computer's floppy disk. No retyping, no mistakes. You get your job much sooner and save money too.

Call Chris Jackson or David Glover on 923 1934 for further information.

**GLOVER &  
ASSOCIATES  
DESIGN  
GROUP**

Palm Court, 8/281 Pacific Highway, North Sydney 2060

Apple // (inc E and C), Adler: Bitsy 5 1/4" (DOS80), Bitsy 8" (DOS80)  
 Amtext 425 CPT 6000, 8000, 8500 Convergent Technology 8" or 5 1/4"  
 Burroughs, NCR, Sigma, Prime Digital Equipment WD78 (RX01) WPS-8  
 (RX01) WS78 (RX01) WT78 (RX01) DECmate II-RX50 5 1/4" Rainbow  
 Gestetner SX100 8" Honeywell OAS 5 1/4" OAS 8" SSSD or DSDD  
 IBM Displaywriter I or 2D (SSSD or DSDD) Office System 6 3730 3740 8" data  
 exchange diskette 8110 PC MS-DOS WordStar, Multimate Z/Word-34 8" (SSSD or  
 DSDD) ICL 7700 Wordskill 8" 8800 5 1/4" INTERTEC Superbrain 5 1/4" Jacquard  
 J100, J500 Lanier NPET (LTD-3) Remington NBI 3000/4000 levels C, F and G  
 or 8.1 Olivetti ETS1010, TES501 8" Philips P5000 series Rank Zerox 850, 860  
 Ricoh TX330 Tandy TRS-80 Model I/II/III Scripsit or Lazywriter Toshiba EW-  
 100 Wang Archive diskette 8" OIS40/50 Archive diskette Archive diskette 5 1/4"  
 Professional (PC) Wordplex Models 1, 2  
 WordStar and Spellbinder Standard 26 sector x 128 byte CP/M format, Data  
 General LDC 1000 Archive 2 Datamax DEC Rainbow Heath H89 5 1/4" IMS8000  
 Intertec Kaypro MicroBee MicroMation Morrow NEC APC Otrana Osborne  
 Pulsar 8" Sanyo MBC-1000 Sharp MZ-3500 Televideo 802 Systel Zenith MS-DOS  
 Wordstar IBM-PC (160K or 320K) Panasonic JB3000 8"



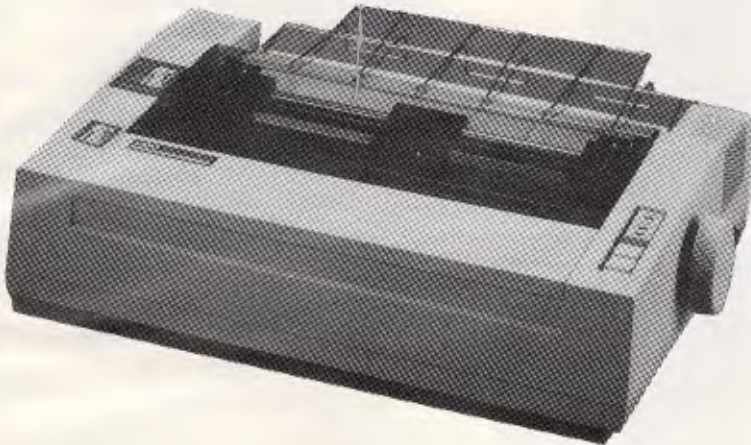
# TWO NEW PRINTERS FROM PORCHESTER

1. LOGITEC FT5002 FROM KANTO DENSHI CORP.
2. ADMATE DP100 FROM CORTON CORP.

DEALER ENQUIRIES WELCOME AS WE ARE THE AUTHORISED AUSTRALIAN DISTRIBUTORS

SEE FOLLOWING PAGES FOR OUR OTHER **SPECIALS** AND ORDERING DETAILS

## LOGITEC FT-5002 WITH NLQ only \$399 inc \$359 ex



## FT-5002

### DOT MATRIX PRINTER

**OUR INSTANT BEST SELLER . . . with NLQ**

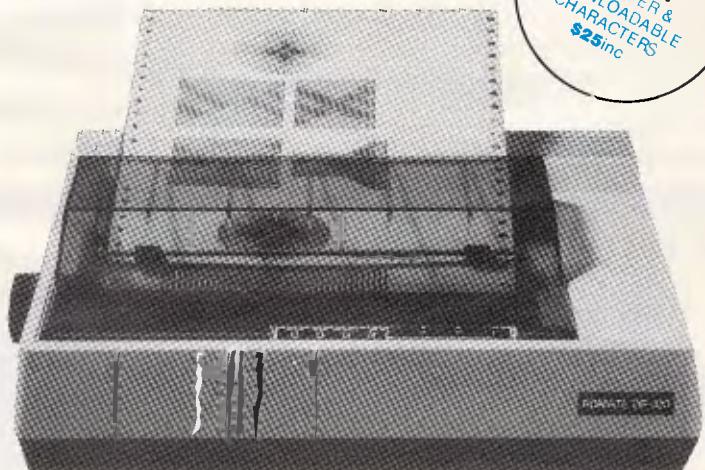
NLQ means Near Letter Quality, almost the same as a Daisywheel. Seeing is believing with this printer. Also: 120 CPS. Epson MX80 compatible. IBM matrix and graphics compatible. 1.6K buffer, proportional spacing, 10 pitch, 12 pitch, fabric or carbon ribbons.

### LOGITEC FT-5002 FEATURES

Print Rate	120 cps (59 LPM)
Line Feed Speed	100 msec
Print Direction	Bi-directional with logic seeking
Input Buffer	1 KB
Character set	Standard Mode 96 ASCII characters with descenders 11 semi graphics, 8 international characters Italic characters
	IBM-PC Matrix Printer Mode 96 ASCII characters with descenders 64 block characters, 9 international characters.
	IBM-PC Graphic Printer Mode Additional ASCII contain European, Graphic, selected characters, math and extra symbols.
Font Registration	Up to 40 characters
Character Structure	9 x 9
Character Size	Ordinary characters 1.99(W) x 2.24(H) mm Superscript/ subscript characters 1.9(W) x 1.36(H) mm
Characters per line	Ordinary (pica/elite) 80/96 Double width elongated (pica/elite) 40/48 Compressed (pica/elite) 132/158 Compressed and elongated (pica/elite) 66/79 Superscript, subscript (pica/elite) 80/96
Paper Feed	Friction feed, Sprocket feed
Paper Width	Fanfold 4-10 inches Cut sheet 4-9 inches
Copies	3 max.
Interface	Standard Centronics-style 8 bit parallel Optional RS232C with 2K buffer (X/ON-X/OFF and ETX/ACK protocol)
Ink Ribbon	Cassette (Service life: 3 mil characters)
Head Service Life	Over 100 mil characters

### 100DP — FEATURES

Printing format	Alpha-numeric — 7 x 8 in 8 x 9 dot matrix field. Semi-graphic (character graphic) — 8 x 8 dot matrix. Bit image graphic — Vertical 8 or 9 dots parallel. Horizontal 640 dots serial/line.
Character size	Normal size — 2.22(W)x2.8(H)mm=0.087"x0.11" Condensed size — 1.11(W)x2.8(H)mm=0.044"x0.11" Enlarged size — 4.44(W)x2.8(H)mm=0.175"x0.11" ELITE size — 1.8 (W)x2.8(H)mm=0.07" x0.11" Enlarged ELITE — 3.6(W)x2.8(H)mm=0.14"x0.11" Super/subscript — 2.22(W)x1.4(H)mm=0.087" x 0.0055" Semi-graphic unit — 2.54(W)x2.8(H)mm=0.1" x0.11"
Character sets	ASCII characters — 192 (96 normals and 06 italics). JIS characters — 160 (64 katakanas and 96 alpha-numerics). Semi-graphic units — 103. International Specials — 2 for U.S.A., 1 for UK, 8 for German, 8 for French, 4 for Swedish, 2 for Italian, 6 for Spanish, 48 for Greek, 6 for Danish and 2 for Japan.
Printing Speed	100 C.P.S. for normal size print, 200ms for line feed.
Columns/line	Normal — 80 columns. Condensed — 142 columns. Enlarged — 40 columns. Condensed/double width — 71 columns ELITE — 96 columns. Enlarged 'ELITE' — 48 columns.
Printing direction	Text and semi-graphic — Bidirectional, logic seeking, (programmable) Super/subscript and bit image graphic — Unidirectional left to right.
Line spacing	6 L.P.I. — 4.23mm. 8 L.P.I. — 3.18mm. Programmable in increments of 0.35mm (1/72) and 0.118mm (1/216")
Paper feed	Adjustable sprocket feed and friction feed.
Paper type	Fanfold, Single sheet, Roll paper. Thickness — 0.05mm (0.002") to 0.25mm (0.01") Paper width — 101.6mm (4") to 254.. (10")
Number of copies	Original plus 2 copies by normal thickness paper.



**SPECIAL FEATURE!**  
2K BUFFER & DOWNLOADABLE CHARACTERS  
**\$25 inc.**

### NEW MODEL! 100DP PRINTER

Many more features than 80DT/BX80! Now has 100 CPS, 10 Pitch, 12 Pitch, Proportional Spacing, 8 Character Sets, etc., etc.

**\$325 inc.**  
**\$289 ex.**





# PORCHESTER Computers

A MULTI-MILLION DOLLAR AUSTRALIAN COMPANY

• MAIL ORDER • PHONE ORDER • CALL-IN



DEALER ENQUIRIES WELCOME

## LOGITEC 16 Bit PC

### BEST FEATURES AND VALUE IN IBM PC COMPATIBILITY

The LOGITEC is a high quality fully-featured 16 bit computer which runs the IBM PC compatible operating systems, and applications software.

We have run a wide range of compatible software on this system, including the popular Lotus 123, and Flight Simulator and it all runs perfectly. Network (optional) hardware and software also runs on this incredible packaged system so that you can cope with that multi-user requirement.

### INCLUDED STANDARD WITH LOGITEC

- PC DOS operating system
- 256K RAM
- RS-232 port
- Centronics Parallel port
- Real Time Clock
- RGB color 80 x 25 text  
640 x 200 graphics  
Monochrome output
- 130 watt power supply (with fan)
- 2 Floppy Disk Drives (720 Kb)
- Quality control for 72 hours on every system

### OPTIONS

- XT 10 Mb Hard Disk
- Network
- Hi-res Color and Monochrome monitors
- MSDOS and CPM-86

## LOGITEC PC-1600

Direct from KANTO DENSHI CORPORATION in JAPAN

PC-1600 dual floppy system ..... **\$2995 inc.**

XT-1600 10Mb hard disk system ..... **\$4995 inc.**

PORCHESTER provides technical advice and consulting on all aspects of your business requirements. Specialised software is available for Real Estate, Insurance Broking, Accounting, Word Processing etc. Call in or phone!

## \*\*\*\*\* XMAS SPECIAL! \*\*\*\*\*

The EXECUTIVE 816 PORTABLE only **\$2995 inc.**

Up until 24th December you can buy this complete business system for this very special price.

The EXECUTIVE 816 in either 1.6 mB or optional 10 mB is a powerful business system and comes to you complete with a large range of ready-to-run business software including: Debtors, stock control, creditors, general ledger word processing, database, mail merging, supercalc spreadsheet, membership, office costing, job costing, & communications.

The standard 816 has twin floppy disk drives with a large 1.6 Mbytes AND NOW!

The 816-10 has a full 10 Megabytes Hard Disk PLUS an 800K floppy . . .

**COMPLETE WITH SOFTWARE AND TRAINING!**

**DESK TOP MODEL only \$3555 inc.**

**1.6 MB TWIN FLOPPY AND 10 MB HARD DISK AND NEW DESK-TOP MODELS**

**FREE 12" Monitor on desktop model**



EXECUTIVE 816 BUSINESS DESK-TOP AND PORTABLES

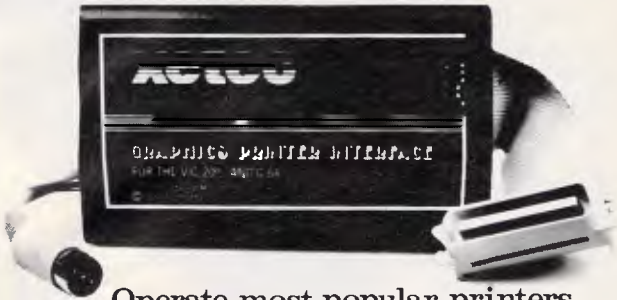




# PORCHESTER Computers

DELIVERY AUSTRALIA WIDE

• MAIL ORDER • PHONE ORDER • CALL-IN



Operate most popular printers from your Commodore serial port.

**XETEC graphic interface: \$125 inc.**

- \* Total compatibility!
- \* Performs Commodore's test / demo printer test faultlessly.
- \* 2 K buffer \* 7 printing modes \* 22 additional commands.
- \* Set device number with switch or software.
- \* list with graphic symbols OR mnemonics OR ASCII.
- \* Hi-res screen dump software.
- \* 29 page instruction book.

## NEW MODEL! 100 DT PRINTER.

Many more features than 80DT/BX80! Now has 100 CPS, 10 Pitch, 12 Pitch, Proportional Spacing, 8 Character Sets, etc., etc.

**\$325 inc.  
\$289 ex.**



We supply cables and interfaces to suit most micros!

## XMAS SPECIAL FOR COMMODORE 64.

Xetec Interface and 100 DP Printer. Together for only **\$399 inc.**

## TWO GREAT HIGH QUALITY MONITORS!

HI-RES AMBER & GREEN

VERY HI-RES AMBER



20MHz



30MHz

... for Apple, Microbee, Executive, Kaypro, Osborne, etc.

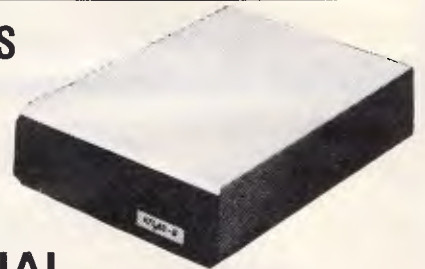
... for IBM PC/XT, Tilt/Swivel IBM Connec.

**\$149 inc. XMAS SPECIALS \$249 inc.**

## DISC DRIVES

ATLAS 8 FOR YOUR APPLE

**\$245 inc.  
\$209 ex.**



## NATIONAL

FOR: IBM PC, Challenger, Columbia, Tandy, Eagle, Kaypro, Osborne, etc.

FOR: Apricot, Excalibur, Executive, Kaypro 4, etc.



40 TK DSDD  
**\$219 ex.**



80 TK DSDD  
**\$239 ex.**

## IC's TO SAVE YOU MONEY!!

2764 EPROMS  
**\$5.90 ex.**

6164 RAM  
**\$8.50 ex**

IBM 64K PAK  
**\$75 ex**

## • LOWEST PRICES

## • FAST DELIVERY

First Floor  
169 Victoria Parade,  
Fitzroy, Vic 3065

Both locations open:  
10-6 Weekdays  
9-1 Saturday

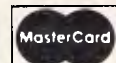
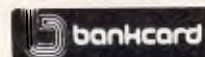
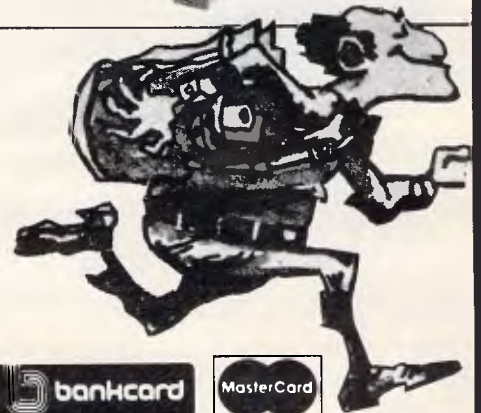
Also NOW at:

**68 Punt Road,  
Windsor, Vic 3181**  
(NEAR ST. KILDA JUNCTION)

**(03) 417 6999 (03) 51 7647**

MAIL ORDERS • Send Cheque/Postal Order, or Bankcard details. PHONE ORDERS to above numbers.

**6 MONTHS WARRANTY ON ALL PRODUCTS**



DEALER ENQUIRIES WELCOME







Peter Toothill and Steve Withers keep you up to date on the bulletin board world.

## *Viatel*

By this time you've probably heard that Telecom has chosen the British Prestel standard for its public viewdata service. Apparently the system will run on GEC computers in Melbourne, with a live service starting next February.

Australia is the tenth country to buy a national viewdata system from GEC and Prestel, and there are already some private systems of this type running here. Viatel will have several enhancements including a keyword search facility — this news is already making Prestel users in the UK feel envious!

## *System Listings*

We received several letters recently concerning new systems that have come on-line as well as various other corrections to our list. This information has been incorporated into this month's listing — special thanks to David Downs, Michael Cooper and Petar Nikolich.

## *Sydrug*

The Sydney TRS-80 Users Group operates a 24 hour BBS on (02) 332 2494 which is accessible by subscribing members, with limited access for visitors. This BBS features full facilities for messages, group news, discussion groups and the exchange of public domain software.

## *Australian systems*

### *Micro Design Lab RCPM*

Telephone: (02) 663 0150. Hours: 5pm-7am weekdays. 24 hours weekends.

### *MI Computer Club BBS*

Telephone: (02) 662 1686. Program downloading. Hours: 24 hours daily.

### *Sydney Public Access RCPM*

Telephone: (02) 808 3536. System Operators: Barrie Hull and David Simpson. Membership required. Hours: 24 hours daily.

### *Prophet RBBS*

Telephone: (02) 628 7030. Operator: Larry Lewis. Hours: 24 hours daily.

### *TISHUG BBS*

Members only. Write to TISHUG, PO Box 149, Pennant Hills, NSW 2120 for information.

### *AUGABBS*

Telephone: (02) 451 6575.

### *AUSBOARD*

Telephone: (02) 955 377.

### *CLUB-80 RTRS*

Telephone: (02) 332 2494. System Operator: Michael Cooper for Sydrug.

### *OMEN I*

Telephone: (02) 498 2495. Hours: 4.30pm-9am weekdays, 24 hours weekends.

### *ORACLE*

Telephone: (02) 960 3641.

### *PARIS RADIO*

Telephone: (02) 344 9511.

### *Dick Smith Electronics RIBM*

Telephone: (02) 888 2002. System Operator: Ian Lindquist. Hours: 24 hours daily.

### *Sorcerer Users Group RCPM*

Telephone: (02) 387 4439. System Operator: John Woolner. Hours 6pm-8am weekdays, 24 hours weekends. Ring back system.

### *Ausborne Users Group RCPM*

Telephone: (02) 568 2791. System Operator: Milton McGlynn-Worthington. Hours: 24 hours daily.

### *Newcastle Microcomputer Club RCPM*

Telephone: (049) 68 5385. System Operator: Tony Nicholson. Hours: 5pm-8.30am weekdays, 24 hours weekends.

### *MICOM RCPM CBBS*

Telephone: (03) 762 5088. System Operator: Peter Jetson. Hours: 24 hours daily.

### *Sorcerer Computer Users Association CBBS*

Telephone: (03) 836 4616. System Operator: Bruce Alexander. Program downloading for SCUA members. Hours: 24 hours daily.

### *Melbourne PC User Group*

Telephone: (03) 528 3750. System Operator: LLoyd Borrett. Hours: 24 hours daily.

### *Telebraille*

Telephone: (03) 755 1341. (Austpac ?237520000). Operator: Jim Eadie. Hours: 24 hours daily.

### *Omen IV*

Telephone: (03) 846 4034. System Operator: Philip Westh. Hours: 24 hours daily.

### *Gippsland RCPM*

Telephone: (051) 34 1563. System Operator: Bob Sherlock. Hours: 24 hours daily.

### *Mail-Bus*

Telephone: (051) 27 7245. System Operator: Max Moore. Person-to-person mail. Multi-player games and bulletin board coming. Membership required for virtually all facilities. Write to M Moore, PO Box 234, Newborough, Vic 3825. Hours: 24 hours daily.

### *Software Tools RCPM*

Telephone: (07) 378 9530. System Operator: Bill Bolton (OK, Bill?)

### *Adelaide Micro User Group BBC*

Telephone: (08) 271 2043. Hours: 10am-10pm, weekends and public holidays. 9am-9pm weekdays.

### *Computer Ventures CBBS*

Telephone: (08) 255 1946. System Operator: Daniel Schumacher. Hours: 24 hours daily.

### *Omen II*

Telephone: (089) 27 4454. System Operator: Terry O'Brien. Hours: 24 hours daily.



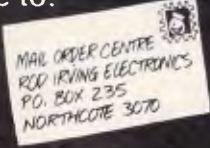
# rie

Rod Irving Electronics

425 HIGH STREET,  
NORTHCOTE VICTORIA.  
Ph:(03)489 8866 489 8131  
48-50 A'BECKETT STREET,  
MELBOURNE VICTORIA.  
PH:(03)347 9251  
Mail Order and  
correspondence:  
P.O. Box 235  
NORTHCOTE 3070

**YOU WON'T GET  
BORED OVER  
THE HOLIDAYS  
WITH THESE  
GREAT  
SPECIALS!!  
GREAT 'IN  
STORE' BAR-  
GAINS TOO!**

Call in at either 2  
of our convenient-  
ly located stores:  
48-50 A'Beckett  
St., Melbourne  
425 High St.,  
Northcote.  
Or take advantage  
of our Mail  
Order Department.  
Write to:



or phone ...

**MAIL ORDER  
HOT LINE**



**481 1436**



**POSTAGE RATES**

\$1-\$9.99	\$1.50
\$10-\$24.99	\$2.00
\$25-\$49.99	\$3.00
\$50-\$99.99	\$3.50
\$100-\$199	\$5.00
\$200-\$499	\$7.50
\$500 plus	\$10.00

"We wish you a  
Merry Christmas  
and a Happy New  
Year!"  
from all at Rod  
Irving Electronics.

## PRINTERS GALORE



**Juki printer**  
Professional daisy wheel  
printer 18 CPS full incremental  
mode Diablo 630 emulation  
Large range of daisy wheels  
8K internal buffer available.  
**Was \$950 Now \$790**



**Star Gemini 10**  
120 CPS logic seeking  
Italics, graphics and down-  
loadable characters sets  
Friction and tractor  
9 x 9 matrix, Hi res. graphics  
Low cost typewriter ribbon  
**Was \$499 Now \$430**



**Star Gemini 15**  
120 CPS logic seeking  
Italics, graphics and down-  
loadable characters sets.  
Friction and tractor  
9 x 9 matrix, Hi res. graphics.  
Low cost typewriter ribbon.  
**Was \$899 Now \$729**



**Star Radix 15**  
Excellent fast printer  
200 CPS eats up the pages  
With an amazing 16K internal  
buffer you won't waste any  
time.  
Has near letter quality mode.  
graphics, and font variation.  
**\$1,395**



**CPA80**  
The next generation of "80"  
type printers. 100 CPS, internal  
buffer expandable to 4K, Greek  
as well as italics. Dip switches  
accessible at the top. The print  
quality is the same as its  
forerunner. Square pins and  
film ribbon make it unbeatable.  
**Was \$475 Now \$395**



**ENP1091**  
The latest addition to our range.  
Has a near letter quality mode.  
120 CPS. Down loadable  
character set. Graphics, Italics,  
emphasized etc.  
**Was \$500 Now \$420**

## COMPUTER PAPER



Top quality at a very affordable  
price. Blank 11x9 1/2", 2,000  
sheet, quality 60gsm bond  
paper.

Cat. C21001 **\$29.50**



APRICOT...please phone  
(03) 347 8066

## MICRON DATASETTE



For data loading and saving,  
this Micron Datasette suits  
most home computers and  
features tape counter, monitor  
function for audio verification  
and slide volume control for  
output level.  
Cat. C14900 **\$39.50**

## BLANK DATA CASSETTES



Brings out the best in any  
micro! Perfect for the Micron  
Datasette above!  
1-9 10-99 100+  
**\$1.10 \$1.00 \$0.90**  
Cat. D11141

## MONITOR MADNESS ONE MONTH ONLY ...

### RITRON 1



**SAVE UP TO \$60!!**

Our most popular model in a  
steel cabinet to minimise R.F.I.  
interference. Prices include tax.  
Make sure you get in early.

1-4	5-9	10+	
Cat. X14500 (Green)	<b>\$149</b>	<b>\$145</b>	<b>\$139</b>
Cat. X14500 (Amber)	<b>\$159</b>	<b>\$155</b>	<b>\$149</b>

### RITRON II



Swivel base monitor in stylish  
case.  
1-9 10+

Cat. X14506 Green	<b>\$179</b>	<b>\$169</b>
Cat. X14508 Amber	<b>\$189</b>	<b>\$179</b>

### RITRON III



Great resolution, swivel base,  
Amber only. Prices include tax.  
Buy now for Xmas.  
1-4 5+

Cat. X14510	<b>\$179</b>	<b>\$169</b>
-------------	--------------	--------------

## COLOUR IS HERE IN A BIG WAY!!

### PHOENIX IV

- ★ Suits IBM® R.G.B. input
- ★ R.G.B., TTL
- ★ High Resolution
- ★ 13" CRT Dot Pitch 0.31mm
- ★ Horiz. Resolution 720 dots
- ★ Vert. Resol. 240 T.V. Lines
- ★ Display Characters 2000 Ch. (80 x 25)
- ★ Display Colours 8 Colours and Intensity
- ★ Green Text Display

Cat. X14520 **\$690**



### PHOENIX V

Available late November. Order  
now for Xmas!

- ★ Pal. Suits Apple, Commodore  
even your V.C.R.!
- ★ Pal and R.G.B.
- ★ Normal Res.
- ★ 13" CRT Dot Pitch 0.65mm
- ★ Horiz. Resol. 320 TV Lines
- ★ Vert. Resol. 560 TV Lines
- ★ Display Characters 1000 Ch. (40 x 25)
- ★ 16 Colours (Pal)
- ★ Green Text Display

Cat. X14522 **\$449**

Errors and Omissions Excepted



**MultiModem only \$399.00 inc. phone**  
*Down the street or across the world, MultiModem speaks the language*

- 300 baud full duplex, 1200 baud half duplex or 600 baud half duplex, answer or originate
- CCITT and Bell standards
- Autoanswer and connect ability
- Plugs straight in (hardwired phone)
- Superior VLSI chip performance works reliably with -43dBm signal with S.N ratio of 6dB. Error rate on this level is 10<sup>-4</sup>
- Telecom Approval C84-37 1135



**MiniModem only \$199.00 inc. phone**

- 300 baud full duplex
- Answer/originate
- Plugs straight in (hardwired phone)
- Superior VLSI chip performance (identical to MultiModem)
- Telecom Approval C84/37/1173

## DISK STORAGE BOXES

**25's or 50's**  
Efficient and practical!  
Protects your disks from being  
damaged or lost. Solves all  
those hassles of finding "that"  
disk.  
A must at these prices  
Cat. C16025 25 Disk Box **\$29.50**  
Cat. C16050 50 Disk Box **\$49.50**

## SWIVEL BASE

Makes life easier, normally  
**\$29.50.**  
Cat. D11100 **\$22.50**

## VERBATIM DISKS

**"Lowest" price possible for  
"Highest" quality**  
10-99 100+  
MD525-01 **\$3.25 \$3.00**  
MD550-01 **\$4.75 \$4.00**

## ADD ON DISK DRIVES FOR 6502 SYSTEM

Makes life easier, normally  
**\$195.**  
1-9 10+  
**\$195 \$189**



## Outback RCPM

Telephone: (089) 27 7111. System Operator: Phill Sampson. Hours: 24 hours daily.

## Omen III

Telephone: (09) 279 8555. System Operator: Greg Watkins. Hours: 24 hours daily.

## New Zealand Systems

### NZ Micro Club RBBS

Telephone: 0011 64 9 762 309. System Operator: Chris Cotton. Hours: 24 hours daily. Software up/downloading.

This information is correct and current to the best of our knowledge. Please send corrections and updates to: Steve Withers, C/- Australian Personal Computer, 77 Glenhuntly Road, Elwood, Victoria 3184.

## Overseas systems

### North America

#### SYSTEM

#### NUMBER

#### NOTES

SPACE Citadel	0011 1 206 839 4759	
Ckcms Citadel	0011 1 206 329 0436	
Eskimo North Minibin	0011 1 206 527 7638	
Conn-80	0011 1 212 441 3755	

TRS-80 Color Computer

### EUROPE

ELFA ABC-MONITOR, Sweden	0011 468 730 0706	
ABC-Banken, Sweden	0011 463 511 0771	
ABC-MONITOR, Sweden	0011 468 801 523	
CBBSD Gothenburg	0011 463 129 2160	
CBBS Sweden*	0011 463 169 0754	
BUG, Sweden	0011 468 463 528	
XD-BBS Helsinki	0011 358 072 2272	
Commodore BBS, Finland	0011 358 116 223	
Tedas, Munich	0011 49 89 596 422	
Decates, Germany	0011 49 66 154 51433	

Half Duplex

Password required  
75/1200 baud

BBC Micro

### UK

CBBS South West	0011 44 626 890 014	
Liverpool Mailbox	0011 44 51 428 8924	
BASUG	0011 44 742 667 983	
Computer Answers	0011 44 1 631 3076	
CBBS Surrey	0011 44 4862 25174	
Blandford Board	0011 44 258 54494	
Microweb TBBS	0011 44 61 456 4157	
Stoke Information Technology Centre RCPM	0011 44 782 265 078	

BBC Micro

### Africa

Connection 80, Cape Town	0011 27 21 457 750	
TRShop, Cape Town	0011 27 21 5367	
Clan Computers, Durban	0011 27 31 66356	
Peters Computers, Johannesburg	0011 27 11 834 5134	
Peters Computers, Johannesburg	0011 27 11 834 5135	
War Games, Johannesburg	0011 27 11 642 3722	

\* After receiving the tone and connecting your modem, either type <C/R> or <COM C/R>. The system then asks for a password which is 'cbbs' in lower-case letters. If you only get a '>' from the system, it needs resetting, so type <I> C/R.



**SPECIAL SERVICE**  
TO  
**Australian Personal Computer READERS**



**24 HR 365 DAY A YEAR SHOPPING**

If its for  
**COMMODORE** or  
**ATARI** Computers  
and in

**Australian Personal Computer magazine**

IT IS GENERALLY  
AVAILABLE THROUGH

**(008) 777 130**

(STD at the price of a local call  
anywhere in AUSTRALIA)

**JUST RING NOW AND  
ORDER IT. WHY WAIT  
TILL THE SHOPS OPEN?**

If you don't know the price give us a limit and we will notify you if your order is in excess of that limit, or product availability etc.



MASTERCARD

**THE VIC CENTRE**  
416 LOGAN ROAD, STONES CORNER, QLD. 4120  
TELEX. 40811 PO BOX 18, STONES CORNER 4120  
Local and enquiries (07) 397 0888.

## COMMODORE HEAVEN

No games, but everything else at discount prices. We directly import 100 different lines and deal with all the usual warehouses. Let us show you how your 64 can become a powerful business machine. Phone (03) 700 2451 at any time.

Argus Tape Computing magazines ..... \$10 ea  
Dec air copies in stock now. 64 Tape Computing, VicTape, Atari Computing, Spectrum Computing and Model B Computing.  
Commander II single disk drive \$495  
MSD single \$475 MSD dual \$1195  
Rabbit \$75 Arrow \$79  
64K Exp \$299 256K Exp \$950  
Numeric key \$129 Super utility \$45  
Supabasic \$29 Ultrabasic \$79  
Simon's \$75 Master 64 \$85  
CodePro \$89 200M! \$49  
Sprintmaster \$35 Blitz! \$149  
Pelspeed \$95  
6502 Program Develop Cass \$29  
CSM Disk Alignment Kit \$69  
Cassette interface/duplicator  
Commodore Auto-modem (Bell) \$199  
Commodore modem (CCITT) \$250  
Protek Acoustic Coupler \$150 \$69  
Cheat Bds \$5 VoiceMaster \$139  
US daisy wheel printer \$495  
H/ware i/face \$139 R232 i/face \$79  
VicTree \$149 Eprom cart. \$35  
VIC m/bds \$89 ROM exp. \$49

### SPECIAL PROGRAMS

Family Tree \$85 PET-I-GREE \$175  
Astrology (also Apple/IBM) \$85 Computer Mechanic \$19  
Ivan Berg Educ Software \$29 Calisto Revis Programs \$19  
Educ Tapes \$12 Touch Type \$24  
Sargon II/Colossus \$19 ea Bridge \$25  
Synthy-64 \$19

### ELECTRONIC HOME SERIES

T \$19, D \$22. Colorful graphs, detailed printouts. Letter Writer, Budget, Diary, Bank Manager, Expense Manager, Bill Payer.

### WORD PROCESSORS

Textpro \$29 Softsmith \$49  
Omniwriter/Omnispell \$75 Heswriter \$55  
Easyscript \$89 Easymail \$69  
TDTL (enhanced) \$59 Speller \$45  
Cross Ref \$45 Wordpro \$95  
Homeword \$69

### SPREADSHEETS & DATABASES

Datapro \$29 Autocalc \$45  
Easy Calc \$85 Basicalc 1 \$59  
Basicalc 2 \$105 Basicalc 3 \$149  
Superbase \$159 Step Stones \$19  
OFM Database/Mail Label \$45  
TOTL (Top rated in USA) \$79

### BUSINESS & ACCOUNTING

TOTL Bookkeeping (compiled) \$159  
General Ledger \$69 Time Manag \$29  
SD 64 Accounts \$125 Home Account \$69  
Personal Acct \$34 Cash Control \$29  
MGR Home Acct \$45

**FREIGHT, Packing, etc is a flat \$3 per order, irrespective of items, or weight**

## Chambers Computer Supplies

BANKCARD, VISA and MASTERCARD ACCEPTED

**(03) 700 2451**

**48-50 MONKHOUSE DRIVE,  
ENDEAVOUR HILLS, MELBOURNE 3802**

SHOP HOURS: Mon-Fri 8 am-11 am and 4 pm-7 pm.  
Phone orders taken at all hours.

## MAILSOFT COMPUTER SOFTWARE

Next VODAC ADVENTURE SERIES  
*The Alpine Encounter*



**THE ONLY INTERACTIVE COMPUTER ADVENTURE GAME THAT GIVES YOU**

- \* 93 full colour, highly detailed locations
- \* 28 fascinatingly alive characters
- \* realistic (and breathtaking) arcade ski sequences
- \* and more!!

**R.R.P. \$57.95**

### SPEEDLOADER J&M SOFTWARE

This is an amazing disk utility!!  
Speedloader 3.0 will LOAD, BLOAD, RUN, and/or BRUN a 130 sector program in less than 3 seconds!!

### SPEED COMPARISON CHART

	Speedloader	DOS 3.3
Bload a Hi-Res picture	.7 seconds	9 seconds
Load or run a 100 sector Applesoft program	2.2 seconds	23.5 sec.
Bload or Brun a 100 sector binary program	2.0 seconds	24.5 sec.
Boot, install DOS basic and then Run Colour Demo	3.9 seconds	19 sec.

System requirements: Apple II, II+, IIe, or IIc (or compatibles), with at least 48k and one disk drive.

**R.R.P. \$54.95.**

**5 Ulm Avenue, Turrumurra,  
NSW 2074 Australia  
P.O. Box 225, Wahroonga,  
NSW 2076 Australia**

**Telephones: (02) 499 2456  
(02) 449 2804**

**Telex: AA20149 - ST15**





# How to write great software

## Part III

Mike Bolan in his previous articles in this series showed ways to develop and test a functional user interface and defined some important design features for successful software. Using these strategies you will have a good definition for a program which meets the needs of your target market group.

As your program (coding in whatever language you have chosen) is completed, it must be rigorously tested for function. As many bugs as possible must be found and corrected and everything tested over again under all possible operating conditions. Such "alpha" and "beta" site testing systems are pretty well understood and it's tempting to assume that's the end of it. However, the target user group has to test the product also and this cannot be done until the package is closer to completion with draft manuals written etc.

The entire process of selling a software solution, from conception of idea by the developer to a user successfully solving a problem with the software, should be understood by the developer. Many tough decisions have to be made about support, returns, sales staff training, manuals, demonstration disks, packaging etc. It is better to make those decisions during the design stage than to face incessant difficulties later.

### Documentation

If you've followed my advice so far your manuals are already halfway to completion, but don't forget that documentation describes that which is not obvious in the software itself and in that sense can be viewed as a list of failures! There is enough truth in this definition to be instructive: keep the manuals as small and accessible as possible; make them graphic if you can; consider printing reduced screen dumps of your software to explain key points; make sure that there is an overview of your system and how to get

it all going and *remember that the manual is a critical sales tool*. If it's too technical or confusing for the buyer there's a good chance that he or she won't buy your software. A person is also unlikely to buy if your manual looks cheap, ie. printed on a dot matrix printer. Resist the temptation and have your manual professionally printed.

Write your manual so that people who look at it want to use the software to solve their problems. Include applications tips and examples so that your manual becomes part of the entire problem solving tool that you are offering. Perhaps the most important thing about the manual is to test it on your target market before you go to print. Instructions which make sense to programmers are often incomprehensible to human beings! This testing process is also a key part of development ... if you cannot interest anyone in testing your manual it's going to be very hard for a dealer to interest people in paying money for it. Now is the time to learn how to describe accurately the advantages of your system in words that the target user understands and can relate to.

### Demonstrations

If other people will be selling your product, and that really is the only way to achieve good market penetration, then you must consider their needs too. Your target buyer is probably working most of the day and is likely to be shopping around for solutions during lunch or during late night shopping when many of the more skilled retail sales staff are out and part timers are staffing the counters. It is

unreasonable to expect them to be able to represent the advantages of your system accurately to any potential buyer without major help from you.

Produce a good, relevant demonstration disk which can be simply inserted and run to show the benefits of your software. Design this disk with as much care as you used in designing your program. Such a demonstration is probably your main chance to impress the browser. Also make certain that there is enough information for the salesperson to choose to show your demonstration disk. Your demo disk can be just a series of screens presented in order by a simple program, it doesn't have to be a copy of your software.

Computer retailers are bombarded with information every day and you need to make certain that your product catches their eye and that they know when to show it. This is tough in a country like Australia with hundreds of widely scattered sales outlets, but it is an issue which you must address.

### Designing for Distribution

I liken software distribution to a chain, with the developer at one end and the user at the other. Between them are other people and businesses, each with individual needs, and these are like the chain's links. If any of the links is broken then sales of the package may well stop altogether. Figure 1 shows the distribution chain and some of the needs of the people in the chain. Design your package to help all of them and you will be helping yourself tremendously.

The publisher needs a package which is easy to maintain. Replacing faulty disks and answering queries is expensive and totally unprofitable. Good documentation, provision for users to make back-up disks or providing an extra master disk makes the publisher's business more profitable. Good packaging helps by increasing demand and lowering other



marketing costs. Naturally if the software helps round-out the publisher's whole product line then other business may result which will motivate the publisher to remember and concentrate on your product.

The distributor has similar requirements to the publisher and also needs good supplies of the product when demand picks up (another reason to make production of reliable disks as easy as possible). Software packaging designed for storage efficiency and easy identification is also a help.

The retailer has additional needs and will want to display the product in the retail store. Here you need to concentrate on package design. Consider the "record sleeve" style currently in use by electronic arts and others which has many visible surfaces full of exciting information and attractive graphics as an alternative to the "3 ring binder in a box" style. Remember many of the retail sales staff may have no familiarity whatsoever with the applications of your software and they will need an accurate features/benefits list of your product. The retailer also needs other business and if your software works with a large range of peripherals it will make that business easier. A well prepared system overview section is important to help sales staff demonstrate the product, find appropriate vertical markets and point out major features to customers. It should also define the minimum amount of equipment needed to use the product successfully. Visit some of the outlets which you hope will carry your software and design solutions for them to help them sell for you.

The buyer wants a complete solution to a problem, not something which introduces other problems. Describe how all supported peripherals are hooked up, what other software your package is integrated with, how many pages (not k) of data they can expect to store on disk, what mathematical rules and so on the program uses to arrive at a result. Buyers also want to feel that they have bought a reasonable bargain and here is where you will start to price your package.

## Pricing

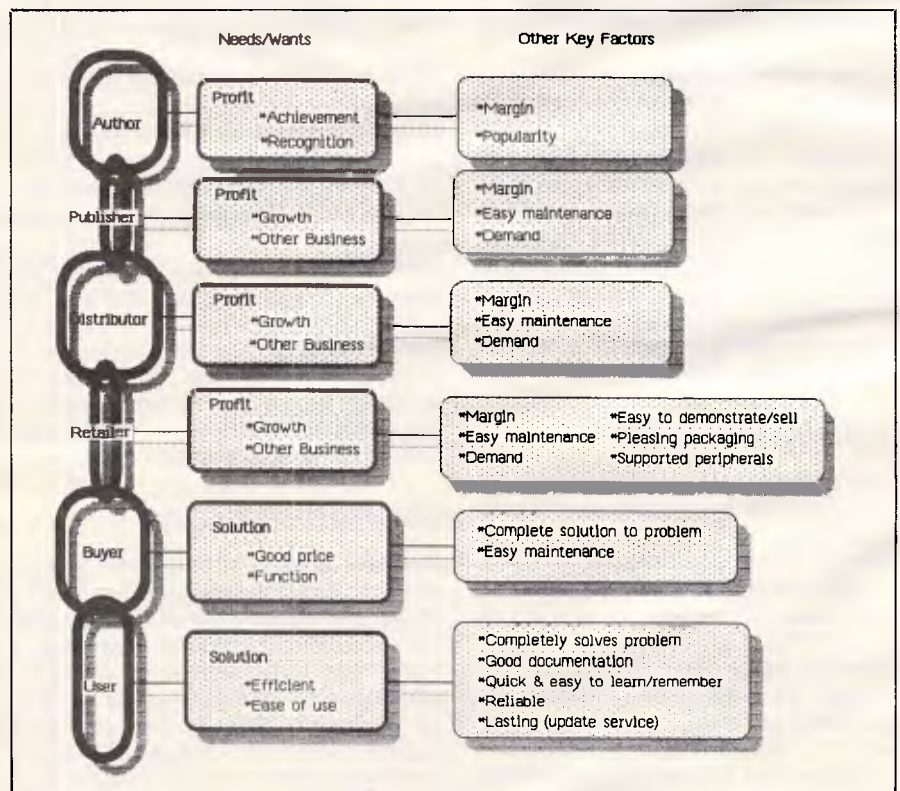
Everyone in the chain is going to want money for handling your package but the bottom line is "what is a solution to this problem worth to the end-user"? If your solution is sufficiently worthwhile to justify buying a computer then you must add that into the price (you might be able to interest the computer

manufacturer in helping market your product). If you have designed a system for managing a medical practice, you need to establish what that system is worth to the doctor ... \$5,000? ... \$10,000? If we conclude that \$10,000 is about tops, we can then deduct the cost of the computer and associated peripherals. If peripherals etc. will cost \$8,000 then we have \$2,000 to play with for our software package. That's \$2,000 retail, don't forget, so we can knock off a component for sales tax straight away, at 20% that's around \$400, leaving \$1,600 for us. The dealer will need a margin of around 35% to make it worthwhile so that's another \$560 accounted for, leaving \$1,040. We've still got the publisher and distributor to consider (now you see why so many people want to cut out the middle men!) and just figuring one at 35% puts us down to about \$680 so we can expect to get say \$650 from our \$2,000 retail package after incidentals. We've got to pay our costs to date from this revenue as well as providing on-going support. Since our package is one which will be critical to the doctor once in use, we will probably decide to support it with a "hot-line" telephone service or perhaps we'll offer modem connect support. In any case this will cost us money and needs to be figured into the value of the package.

Now we have a revenue that we can use for sales requirements to provide various levels of profit. Looking at a range of such projected prices will allow us to settle on a suitable retail price. We also need this information to allow us to plan packaging and documentation. Glossy colours cost an awful lot to print and we shouldn't do it unless we believe that the market will pay the proposed retail price.

## Conclusion

In this brief series I have described some of the issues which must be addressed if you really want your software to be great. The micro world is characterised by change. The plain software offerings which sold until fairly recently are being totally replaced with more sophisticated packages as the microcomputer buyer becomes demanding. Launching a package has become an expensive business and many companies find — too late — that their planning was inadequate. Your software will be compared with the best on the retailer's shelf. You don't have to spend a fortune to compete but you do have to be very well prepared. Use the information in these articles as a guide, research your market well, design your package to sell and your solution will be truly great.



The software distribution and sales chain







# THE *MINDER* TAKES CARE OF YOU AND YOUR BUSINESS

Not only is the Minder compatible but its advanced design features make it superior. It offers more performance, more service and support than any other personal computer in the IBM PC class. The Magic Video Display Card is at home with both colour and monochrome monitors and supports a variety of screen modes. The re-set switch is located in the front — where you need it. Re-boot the system without turning off the complete unit. Why pay more, when you can get more for less — Minder makes life difficult for the opposition.

## STANDARD EQUIPMENT

### MAIN BOARD

- 16 Bit Intel 8088 4.77 MHZ processor
- 256K RAM standard (expandable to 704K RAM)

### DISK CONTROLLER AND I/O BOARD

- Controls two floppy disk drives
- Serial RS 232 port
- Parallel centronics port
- Games port
- Clock and calendar (battery backed)

### MAGIC DISPLAY CARD

- Monochrome display mode
- Colour graphics display mode
- Suits most types of monitors

### FLOPPY DISK DRIVES

- Two doublesided, doubledensity 5¼ inch floppy
- Formatted capacity 360K bytes (9 sectors)

### KEYBOARD

- Ergonomic design sculptured keys, low profile
- 83 keys, 10 function keys, LED caps-lock and num-lock keys
- Functionally IBM-PC compatible

### MAGIC VIDEO MONITOR

- Green or amber
- Tilt and swivel
- Totally compatible with magic display card

### OPERATING SYSTEM

- MS-DOS 2.11 licensed by Microsoft

**\$2995**  
inc. tax



Special introductory offer of \$2995.00 (inc. tax) includes all standard equipment and Open Access Software. Available till 31 December 1984.

*Dealer enquiries welcome*

## Plus O-P-E-N ACCESS

- OPTIONAL ACCESSORIES**
- 10M byte Hard Disk Drive
  - Local Network System
  - Colour Monitor
  - Intelligent Modem

OPEN ACCESS takes its name from the source of its power — a relational data-base manager that gives you access to more data in more ways than any comparable software.

OPEN ACCESS includes an electronic spreadsheet, 3-D graphics, word processor, appointment scheduler and telecommunications module — all revolving around the powerful information manager.

The beauty of it is, all that capability resides on a single program. You don't have to re-enter data. Or spend time trying to get unmatched programs to work together.

To:  
**Consultech Australia Pty. Ltd.**  
271 Blackburn Rd.,  
Mt. Waverley, Vic. 3149  
**Phone: (03) 233 8273**  
**(03) 233 8999**

**Yes! Please send more information on the Minder.**

NAME .....

ADDRESS .....

..... P/CODE .....

TEL: .....





# Of might and men

The recently released Colossus Chess 2.0 for the Commodore 64 claims to be the best home computer chess program on the market. An impressive statement and one which Tony Harrington cannot dispute.

It is good to see that the drive for faster and better chess programs is not just restricted to dedicated chess computer suppliers.

Colossus for the Commodore 64 is the second home computer chess program by Martin Bryant. It's nice to see that Bryant hasn't been resting on his laurels and has gone on to write a program which thrashes White Knight (his first program) by 11.5 to 5.5 over a 16-game match.

Although this result is taken from the manual, where Bryant claims to have played Colossus against just about every home computer program around, I have found no reason to dispute it. Colossus is definitely better and stronger than White Knight.

For a start, the manual consists of 14, clearly and concisely laid-out pages. The board graphics are neat, and the colours of the squares and the background border can be set by the user. This is something of a double-edged benefit. Beginners should note that this feature needs to be used carefully. My first attempt to vary the colours — provoked by the fact that with the default values, with black as the colour of the dark squares, the black pieces didn't show up well — created an illegal chessboard.

As the old adage has it, chessboards should always be set up with 'white in the right' — that is, a white square in the bottom right-hand corner. My attempt to redesign the colour scheme switched the dark and light squares. The result was that the set looked as if I was playing with the black pieces on an incorrectly set up board. For a moment or two I thought Bryant had got so involved with the program that he'd forgotten what a chessboard looked like!

As well as the graphics display, there is an excellent 'status' screen, which

has a number of very good features. It shows the time elapsed on both clocks and — an intriguing feature — during Colossus's thinking time, it shows the number of positions currently examined. The two left-most figures on this counter revolve at an amazing rate. More usefully, perhaps, this screen also shows the best line found so far by the program, up to its current look-ahead level (also displayed). You toggle between the board display and the status screen by pressing the space bar.

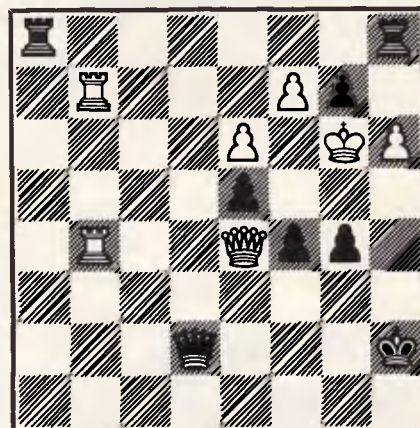
There are six playing modes, ranging from tournament level to problem mode. In practice, since mode 3 allows any clock setting, from blitz upwards, there is an endless set of playing levels. The program clock can be set independently, so weak players can give the computer a time handicap. Strong players can try handicapping themselves.

One of the good things about the design of this program — aside from its playing strength — is that all the commands are easily input. Compared to the highly complex command sequences we saw in last month's review of the Fidelity Elite, the commands are all of the single-key, capital letter type. All numerical input, even the clock setting, is done by pressing the up-arrow key to increase the default number, and the down-arrow key to decrease it. Position set up is the easiest I have come across yet and takes all the sting out of setting up complex positions.

Like several other home computer programs, it enjoys an advantage over dedicated chess computers in that games can be replayed on the screen at any stage from the beginning. Unlike all other home computers though, the replay is done automatically, with any move interval between one and 20 seconds. There are also backward move and forward move commands for

stepping manually in either direction, for as many moves as you like (though there is an upper limit, imposed by the 64's memory, of around 120 moves).

Colossus has an excellent problem-solving mode (mode 6). Its strategy is to search all logical moves, beginning with the King and proceeding down through the pieces until it has found all possible mates. When one mate is found it asks 'Continue?' and goes on to check for others which, of course, there shouldn't be in a good chess problem. The manual claims that it can solve mate-in-seven problems. I tried it on



mate-in-two problems, which it solved almost instantly, and on the above mate-in-three problem, from Donald Bloss's book, *Rate your own Chess*.

The program took 104 seconds to find the correct solution, which is 1) f4-f5+ e6xf5 2) Qd2xh6+ g7xh6 3) Ra8-g8 mate. In terms of speed, this performed on a par with a US Chess Federation rating of around 1740, according to Bloss's rating chart, but not too much should be made of this since: a) the ratings only begin to mean something over a series of problems; and b) Colossus's cast-iron technique of starting all its problem-solving by looking



# How about these Christmas Specials from

## COMANDGLEN PTY LTD

### COMMODORE

Commodore Family Pack	460.00
Commodore 64	385.00
Commodore SX64	1250.00
1541 Disk Drive	380.00
802 Printer	450.00
1701 Colour Monitor	430.00
Plus more!	

### STAR PRINTERS

Gemini 10X 120CPS	399.00
Gemini 15X 120CPS	630.00
Delta 10 160CPS	600.00
Delta 15 160CPS	850.00
Radix 10 200CPS NLQ	1300.00
Radix 15 200CPS NLQ	1400.00
Powertype Daisywheel 18CPS (incl. Tractor)	650.00

### MEMOREX

SSSD 5.25 inch	25.00
SSDD 5.25 inch	30.00
DSDD 5.25 inch	40.00
SSSD 8 inch	45.00
SSDD 8 inch	50.00
DSDD 8 inch	55.00
3.5 inch	65.00

### STORAGE BOXES

DX50 5.25 inch	20.00
DX85 5.25 inch	28.00
3.5 inch box cap. 40	25.00
5.25/8 inch library boxes	6.00

### PAPER

9.5 x 11 60 gsm 2000 sheets	35.00
9.5 x 11 70 gsm 2500 sheets	50.00
True A4 70 gsm 2500 sheets	55.00
15 x 11 BMO 2500 sheets	35.00
Plus multiform carbon incl. and carbon less	

### MISCELLANEOUS

Monitor amber/sound 35 mhz	190.00
Printer Interface for Commodores to suit most parallel printers	100.00
Smart Cable Instant RS232 Connection	140.00
Data Cartridges	from 40.00
Printer Cables parallel or serial custom built	from 30.00

### SOFTWARE

#### COMMODORE

Flight Simulator	70.00
Beach Head	40.00
Lode Runner	36.00
Basic St Writer	70.00
80 Col Card	230.00
Home Entertainment	

#### APPLE

Flight Simulator	70.00
Basic St Writer	80.00
Load Runner	42.00
Zaxxon	55.00
Plus Apple Hardware	

#### ATARI

Mastertype	60.00
Castle Wolfenstein	35.00
Zaxxon	40.00
Pooyan	34.00
Plus Other Home Entertainment	

\* All prices include sales tax

**811 Warringah Rd, Forestville 2087.**  
**Ph: 452 4867**

Phone 7 days a week or mail orders to the above address

*Also Distributors for*

MEMOREX — DISKETTES/TAPES  
CASE COMMUNICATIONS — PRINTERS  
COMMODORE  
SNAP APART. — PAPER SUPPLIES  
ADVANCE — PRINTER RIBBONS  
IMAGINEERING — SOFTWARE SUPPLIES







# For \$99, we'll deliver 'Easy Desk' right to your door.

Then you can put your computer system right in its place.

No matter where you're operating a computer – at home, at work or in the classroom – "Easy Desk" is just what you've been waiting for ... a mobile computer desk at a price that makes other computer desks look ridiculously expensive. "Easy Desk" is built to last with strong steel legs, solid casters and teak-laminated shelves. It's oh-so-easy to assemble, too ... just a few minutes' work and you're ready to go. "Easy Desk" is the perfect place for your computer system and we can deliver it right to your door for just \$99. Fill in and post the order form now.



Peripherals not included

## POST THIS ORDER FORM NOW

To: Home Computers Pty. Ltd.  
160 Burwood Hwy, Upper Ferntree Gully. 3156.  
Tel: (03) 758 2124

- Please dispatch my "Easy Desk" Mobile Computer Desk.
- I require more information.  
(Tick which applicable)

Name .....

Address .....

.....State.....Postcode.....

- I enclose a cheque/money order for \$99
- Please charge Bankcard/Visa Card/  
Mastercard No:

--	--	--	--	--	--	--	--

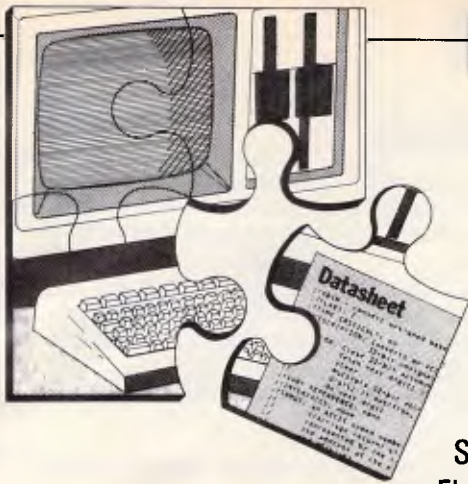
Signature .....

# EASY DESK

## MOBILE COMPUTER DESK



# SUBSET



David Barrow presents more documented machine code routines and useful information for the assembly language programmer. If you have a good routine, an improvement or conversion of one already printed, or just a helpful programming hint, then send it in and share it with other programmers. Subroutines for any of the popular processors and computers are welcome but please include full documentation. All published code will be paid for. Send your contributions to Sub Set, APC, 77 Glenhuntly Road, Elwood, Victoria 3184.

## Z80 listed options

To save you having to continually type in execute commands, MENU from Geoffrey Ticehurst lists the options available to you. It

prompts your selection with a moving arrow and passes control to the program of your choice.

Although written for the TRS-80 keyboard input system, you should find that it will easily convert to the system used by your own computer.

## DATASHEET

```

=====
: = MENU      Menu option select routine.
=====
: JOB         To display options, seek user choice and pass
:             control to option program.
: ACTION      Print options and address top option.
:             REPEAT UNTIL space bar pressed:
:             [ Highlight current option.
:             IF down-arrow pressed THEN:
:             [ De-highlight current option and address
:             next wrapping from bottom to top option. ] ]
:             Jump to chosen option through jump table.
=====
: CPU         Z80
: HARDWARE    TRS-80 Model 1 Keyboard buffer, and display.
:             Memory containing option list.
: SOFTWARE    "UNKEY" - local subroutine, to wait key release.
=====
: INPUT       HL addresses screen RAM options destination.
:             DE addresses the first byte of the option list.
:             B = number of options.
:             Each option must have bit 7 of the end byte set.
:             Option jump table of 3-byte JP instructions must
:             follow immediately after CALL MENU.
: OUTPUT      All registers changed. Control is passed to the
:             program section dealing with the wanted option.
: ERRORS      No check for option list running off screen.
: REG USE     AF BC DE HL
: STACK USE   10
: RAM USE     None.
: LENGTH      B1
: CYCLES      Not given.
=====
: CLASS 2     -discreet *interruptable *promable
:             -**--- -reentrant -relocatable -robust
=====

```

```

MENU  PUSH BC      :Save option count and      C5
      PUSH HL      :screen address.                E5
MENUA PUSH BC      :Save option count & screen  C5
      PUSH HL      :address for option display. E5
PDPTS LD  A,(DE)   :Get option character      1A
      INC  DE       :and address next.        13
      BIT  7,A      :Test for option end,    CB 7F
      PUSH AF      :saving test flag.        F5
      AND  7FH     :Clear possible end flag, E6 7F
      LD  (HL),A   :store to screen and      77
      INC  HL       :address next screen place. 23
      POP  AF      :Restore option end test  F1

```

```

JR  Z,POPTS      :flag & loop if not end.    2B F4
POP  HL          :Restore screen address    E1
LD  BC,40H      :and move HL to address    01 40 00
ADD  HL,BC       :next line down.         09
POP  BC         :Restore option count and   C1
DJNZ MENUA      :repeat for all options.   10 EA
POP  HL         :Restore top line address  E1
DEC  HL         :Address place 2 chars to  2B
DEC  HL         :left for arrow position.  2B
POP  BC        :Restore option count,     C1
LD  C,B         :saving it in C.         4B

```

```

:
:
MENUB PUSH HL     :Save top line address.    E5
MENUC LD  (HL),5EH :Display right arrow and    36 5E
      LD  A,(3B40H) :get any keyboard input.  3A 40 3B
      BIT  7,A      :Test for space-bar and  CB 7F
      JR  NZ,MENUD  :exit MENUB if pressed.  20 13
      BIT  4,A      :Test for down arrow and  CB 67
      JR  Z,MENUC   :repeat if not.         2B F3
      CALL UNKEY    :Wait down arrow release. CD 10 hi
      LD  (HL),20H  :Clear right arrow from  36 20
      LD  DE,40H   :display and address next  11 40 00
      ADD  HL,DE   :line down, repeating if  19
      DJNZ MENUC   :bottom option not passed. 10 E8
      POP  HL      :Else get top line address E1
      LD  B,C      :and option count then    41
      JR  MENUB    :restart on top option.   1B E3

```

```

:
:
MENUH CALL UNKEY  :Wait space-bar release.  CD 10 hi
      POP  HL      :Tidy up stack.          E1
      LD  A,C      :Compute: options - options 79
      SUB  B        :missed = option index.   90
      LD  B,A      :Multiply option index    47
      SLA  A        :by 3 for 3-byte JP      CB 27
      ADD  A,B      :instructions.          80
      LD  B,0      :Move offset to required JP 06 00
      LD  C,A      :into BC, get return address 4F
      POP  HL      :as jump table base address, E1
      ADD  HL,BC   :add offset to address JP  09
      JP  (HL)     :instruction and jump to it. E9

```

```

:
: ...Wait for release of key being pressed.
UNKEY LD  A,(3B40H) :Get key store and test if  3A 40 3B
      OR  A         :any bit set = key pressed. B7
      JR  NZ,UNKEY  :Repeat until none pressed 20 FA
      RET          :then return to MENU.      C9
=====

```

## 6502 control listing

Code dump routines sometimes print the ASCII characters alongside the hex, in case data and not machine code is coming through.

Control codes are usually skipped or printed as spaces.

CTRPRT intercepts these codes on their way to the print routine, and prints the standard two- or three-letter abbreviations. The result — readable hex dumps.



## DATASHEET

```

=====
:= CTRPRT Control character name print.
=====
:JOB To intercept an ASCII control code destined for
: a print routine, converting it to its three
: letter abbreviation enclosed in brackets.
:ACTION IF character is a control code, THEN:
: [ Use code * 3 as index to abbreviation table.
: Copy abbreviation to stack. Put "<" on stack.
: FOR count of 4:
: [ Pull byte. IF NOT "*" THEN: [ Print. ] ]
: Set character = ">".
: Exit to Print routine.
=====

```

```

:CPU 6502
:HARDWARE None.
:SOFTWARE "WRCHAR" - subroutine to print ASCII char. in A.
=====

```

```

:INPUT A contains ASCII character or control code.
:OUTPUT If input is a character ($20+), A is unchanged.
: If input is a control code, output A = ">".
:ERRORS None.
:REG USE A P
:STACK USE 4
:RAM USE M0
:LENGTH 146 (Code: 50. Data: 96).
:CYCLES Not given.
=====

```

```

:CLASS 2 -discreet *interruptable *promable
:--***-* *reentrant -relocatable *robust
=====

```

```

CTRPRC CMP #32 :Pass straight through if C9 20
BCS CPEND :not a control code. B0 2B
STA M0 :Else code table offset B5 M0
ASL A :is 3 * code number. 0A
ADC M0 : 65 M0
STX M0 :Save X and move offset B6 M0
TAX :to X as code index. AA
LDA CTAB+2,X :Get last letter BD lo hi
PHA :to stack. 4B
LDA CTAB+1,X :Get middle letter BD lo hi
PHA :to stack. 4B
LDA CTAB,X :Get first letter BD lo hi
PHA :to stack. 4B
LDA #3C :Get LESS-THAN symbol A9 3C
PHA :to stack. 4B
LDX M0 :Restore X. A6 M0
LDA #4 :Set count of stacked A9 04
STA M0 :letters in M0. B5 M0
=====

```

```

CPLP PLA :Get character off stack 6B
CMP #42 :but if "*" space filler C9 2A
BEQ CPLTST :then miss printing it. F0 03
JSR WRCHAR :Go print character. 20 lo hi
=====

```

```

CPLTST DEC M0 :Repeat for four stacked C6 M0
BNE CPLP :characters. D0 F4
LDA #3E :End with GREATER-THAN. A9 3E
CPEND JMP WRCHAR :Exit to print last char. 4C lo hi
=====

```

```

:
:CTAB .BYTE 7B,85,76,B3,79,72 :NUL SOH 4E 55 4C 53 4F 4B
: .BYTE 83,84,8B,69,84,8B :STX ETX 53 54 5B 45 54 5B
: .BYTE 69,79,84,69,7B,81 :EDT ENQ 45 4F 54 45 4E 51
: .BYTE 65,67,75,66,69,76 :ACK BEL 41 43 4B 42 45 4C
: .BYTE 66,83,42,72,84,42 :BS* HT* 42 53 2A 4B 54 2A
: .BYTE 76,70,42,86,84,42 :LF* VT* 4C 46 2A 56 54 2A
: .BYTE 70,70,42,67,82,42 :FF* CR* 46 46 2A 43 52 2A
: .BYTE 83,79,42,B3,73,42 :SD* SI* 53 4F 2A 53 49 2A
: .BYTE 68,76,69,68,67,49 :DLE DC1 44 4C 45 44 43 31
: .BYTE 68,67,50,68,67,51 :DC2 DC3 44 43 32 44 43 33
: .BYTE 68,67,52,7B,65,75 :DC4 NAK 44 43 34 4E 41 4B
: .BYTE 83,89,7B,69,84,66 :SYN ETB 53 59 4E 45 54 42
: .BYTE 67,65,7B,69,77,42 :CAN EM* 43 41 4E 45 4D 2A
: .BYTE 83,85,66,69,83,67 :SUB ESC 53 55 42 45 53 43
: .BYTE 70,83,42,71,83,42 :FS* GS* 46 53 2A 47 53 2A
: .BYTE B2,83,42,B5,83,42 :RS* US* 52 53 2A 55 53 2A
=====

```

## 6502 squash

Routines to compress and expand Z80 data held to 12-bit accuracy were given in the August issue.

David Heale has converted them to 6502 code. David's SQSH preserves the source data, unlike the Z80 version.

As both routines use post-indexed addressing, the pointers (in M0 to M3) are unchanged. Any loop repeatedly calling them to deal with a long list will have to increment them to the next four- or three-byte block.

## DATASHEET

```

=====
:= SQSH Squash Data.
=====

```

```

:JOB To compress two 16-bit words of numerical data,
: held to 12-bit accuracy, into 3 bytes.
:ACTION Move source byte 1 to destination byte 1.
: Discard s2-hi. Move s2-lo to d2-hi.
: Move s3-hi to d2-lo. Move s3-lo to d3-hi.
: Discard s4-hi. Move s4-lo to d3-lo.
=====

```

```

:CPU 6502
:HARDWARE RAM: 4 bytes source, 3 bytes for destination.
:SOFTWARE None.
=====

```

```

:INPUT M0,1 addresses first byte of 4-byte source.
: M2,3 addresses first byte of 3-byte destination.
:OUTPUT M0,1 & M2,3 and source data are unchanged.
: Y = 3. A = last squashed byte.
:ERRORS No check for destination overwrite of source.
:REG USE A Y P
:STACK USE None.
:RAM USE M0 M1 M2 M3
:LENGTH 41
:CYCLES 9B
=====

```

```

:CLASS 2 -discreet *interruptable *promable
:--****- *reentrant *relocatable -robust
=====

```

```

SQSH LDY #0 :Index first bytes. A0 00
LDA (M0),Y :Move source 1 B1 M0
STA (M2),Y :to destination 1. 91 M2
INY :Index second bytes. CB
LDA (M0),Y :Get source 2, B1 M0
ASL A :lo-nibble 0A
ASL A :into A 0A
ASL A :hi-nibble 0A
ASL A :and store 0A
STA (M2),Y :in destination 2. 91 M2
INY :Index third bytes. CB
LDA (M0),Y :Get source 3, B1 M0
LSR A :hi-nibble 4A
LSR A :into A 4A
LSR A :lo-nibble 4A
LSR A :and merge 4A
DEY :(indexing second byte) 8B
ORA (M2),Y :with s2 lo-nibble 11 M2
STA (M2),Y :and store in destination 2. 91 M2
INY :Index third bytes. CB
LDA (M0),Y :Get source 3, B1 M0
ASL A :lo-nibble 0A
ASL A :into A 0A
ASL A :hi-nibble 0A
ASL A :and merge 0A
INY :(indexing fourth byte) CB
ORA (M0),Y :with s4 lo-nibble. 11 M0
DEY :Index third byte and store 8B
STA (M2),Y :in destination 3. 91 M2
RTS :Exit, data compressed. 60
=====

```

```

:= EXPD Expand Data.
=====

```

```

:JOB To expand 3 bytes of numerical data, compressed
: by "SQSH", back to two 16-bit words with the
: four most significant bits of each set to zero.
:ACTION Move source byte 1 to destination byte 1.
: Move s2-hi to d2-lo. Clear d2-hi.
: Move s2-lo to d3-hi. Move s3-hi to d3-lo.
=====

```



# Three teachers for Sinclair ZX Spectrum, BBC Commodore C64 now available in Melbourne

**Arnold Wheaton, Sulis and Widgit**

These three established educational software publishers have seen the light and have selected Micro-Allsoft to manufacture and distribute their excellent ranges of teaching software throughout Australia.

Programs available now, for classroom or home use, are designed for all student ages. Many come with varying degrees of difficulty.

There are even pre-school 'starters' for two-year-olds, and packages for adults.

These software packages are ideal for youngsters as the learning content is varied with lighthearted games to keep attention and interest.

Our educational programs cover a lot of subjects like . . .

- Alphabet • Spelling • Vocabulary • Reading
- Punctuation • Grammar • Shakespeare
- History • French • Time • Counting
- Angles • Logical Thinking • Spatial Reasoning
- nature studies • weather station
- tell the time analog-digital • animal-vegetable-mixed
- shape sorting

\* Trade Enq welcome

Micro-Allsoft is the new name in educational software. It will pay you to phone us or mail the coupon below for more information.



## micro-allsoft

P.O. Box 6205, St Kilda Rd, Central 3004  
 Telephone 10am-5pm: 240 0156  
 Hello, Micro-Allsoft. Please send me details on Sinclair ZX Spectrum, Commodore 64 or BBC educational software.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 \_\_\_\_\_ postcode \_\_\_\_\_ 'phone \_\_\_\_\_

APC

# Top Fifteen!

## TOP-OF-THE-CHART

COMPUTER SOFTWARE

UK.  
NOV 84

## HIT PARADE

UK.  
NOV 84

1	JET SET WILLY	COMMODORE 64	\$24.95
2	ELITE	BBC	\$39.50
3	COMBAT LYNX	SPECTRUM	\$22.50
4	SPITFIRE ACE	COMMODORE 64	\$24.95
5	ZAXXON	COMMODORE 64	\$24.95
6	SHERLOCK	SPECTRUM	\$39.95
7	BRAXX BLUFF	SPECTRUM	\$19.95
8	TRAVELS WITH TRASHMAN	SPECTRUM	\$19.95
9	DALEY THOMPSON DECATHALON	SPECTRUM	\$20.50
10	KENTILLA	SPECTRUM	\$18.50
11	PYJAMARA	SPECTRUM	\$18.50
12	EDDIE KIDD JUMP CHALLENGE	SPECTRUM	\$18.50
13	QUO VADIS	SPECTRUM	\$24.95
14	AVALON	SPECTRUM	\$24.95
15	BEACHEAD	SPECTRUM	\$24.95

## TOP OF THE CHART

### COMPUTER SOFTWARE

## HIT PARADE

P.O. Box 6205  
 St Kilda Rd 3004  
 Melbourne Vic.

#### MAIL ORDER — FREE POSTAGE!

BBC  CBM 64  SPECTRUM

PLEASE SEND ME

BANKCARD NO

NAME

ADDRESS

P CODE

PAYMENT ENCLOSED

CHEQUE

MONEY ORDER

CREDIT CARD NO



# SUBSET

```

:           Move s3-lo to d4-lo. Clear d4-hi.
-----
:CPU       6502
:HARDWARE  RAM: 3 bytes source, 4 bytes for destination.
:SOFTWARE  None.
-----
:INPUT     M2,3 addresses first byte of 3-byte source.
:          M0,1 addresses first byte of 4-byte destination.
:OUTPUT    M0,1 & M2,3 and source data are unchanged.
:          Y #4. A = last expanded byte.
:ERRORS    No check for destination overwrite of source.
:REG USE   A Y P
:STACK USE None.
:RAM USE   M0 M1 M2 M3
:LENGTH   42
:CYCLES   100
-----
:CLASS 2   -discreet *interruptable *promable
:*****   *reentrant *relocatable -robust
-----
:
EXP0  LDY  #0      :Index first bytes.           A0 00
      LDA  (M2),Y  :Move source 1 to             B1 M2
      STA  (M0),Y  :destination 1.              91 M0
      INY                    :Index second bytes.  CB
      LDA  (M2),Y  :Get source 2,                B1 M2
      LSR  A        :hi-nibble into              4A
      LSR  A        :lo-nibble A,                4A
      LSR  A        :clearing hi-nibble          4A
      LSR  A        :and store in                4A
      STA  (M0),Y  :destination 2.              91 M0
      LDA  (M2),Y  :Get source 2,                B1 M2
      ASL  A        :lo-nibble                   0A
      ASL  A        :into                         0A
      ASL  A        :hi-nibble A,                0A
      ASL  A        :clearing lo-nibble A,        0A
      INY                    :(index third bytes)  CB
      STA  (M0),Y  :and store in destination 3.   91 M0
      LDA  (M2),Y  :Get source 3,                B1 M2

```

```

LSR A      :hi-nibble           4A
LSR A      :into                 4A
LSR A      :lo-nibble A         4A
LSR A      :and merge with      4A
ORA (M0),Y :s2-lo, then store   11 M0
STA (M0),Y :in destination 3.   91 M0
LDA (M2),Y :Get source 3 lo-nibble, B1 M2
AND #$0F   :clearing hi-nibble, 29 0F
INY        :(index fourth byte)  CB
STA (M0),Y :and store in destination 4. 91 M0
RTS        :Exit, data expanded.  60
-----

```



## 14 FREE PROGRAMS

with each G-Pascal Compiler purchased on disk for the Commodore 64. \*

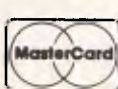
DEMO - G-Pascal demonstration program.  
 SUB HUNT - example arcade game (joysticks, paddles or keyboard).  
 MODEM64 - data communication program.  
 ADVENTURE - Pascal adventure game.  
 SPRITE EDITOR - create sprite shapes easily!  
 SOUND EDITOR - experiment with the synthesizer chip.  
 RUNTIME - create stand-alone programs written in Pascal.  
 CENTRONICS PRINT - print G-Pascal programs via parallel port.  
 BITMAPPED TEXT - mix text and hi-res graphics!  
 NUMBER GAME - a simple Pascal game.  
 PRIME NUMBERS - calculate prime numbers quickly.  
 PAINT SINGLE - 'fill in' landscapes quickly in single colour hi-res.  
 PAINT MULTI - 'fill in' landscapes in multi colour hi-res graphics.  
 WORD WRAP - wraps words around at the end of the line.

All of the above programs are supplied free with each purchase of G-Pascal on disk. G-Pascal is available from your local Commodore dealer, Commodore Information Centre Pty. Ltd., or Gambit Games. Recommended retail: \$79.50

\* excludes existing older dealer stocks.

If you have already purchased G-Pascal these extra programs may be ordered by sending \$20 direct to Gambit Games.

Gambit Games P.O. Box 124, Ivanhoe, Vic. 3079  
 Phone: (03) 497 1283.



## MicroProfessor MPF-III

- ★ Runs Apple IIe + CPM
- ★ Programs - Games
- ★ Educational or Business
- ★ At \$1000\* less than Apple IIe. With the latest Technology in 64k Micro Computers - 6502 + Z80 Processors

\* Based on RRP  
 Apple IIe Pro System \$2650



## COMPUTER MEDICS

Suite 5/647 Princes Highway  
 Blakehurst. N.S.W. (02) 546 5175



# RUN STOP ENTER RETURN...

## TO THE FINEST COMPUTER STORES IN SYDNEY...

Whatever you need this Christmas, you'll find it at any one of our 3 conveniently located stores. We have the best values this Christmas and a large selection of quality Peripherals, Software and Computers.

**commodore** 

**FAMILY COMPUTER**



EASY SET: Consisting of a C64 Computer, Dataset, Joystick and 4 selected programs PLUS reference guide.


"SPOT" PRICE **\$499**

**SPOT ON SAVINGS**

**SUPER SKETCH**

The easiest to use Graphics tablet of them all. Create super Video Graphics in colour. For C 64. A new art medium. A helpful business tool Plug in Cartridge Software. **\$109.50**

**OziSoft**



**GIFT IDEA**

**INCREDIBLE MUSICAL KEYBOARD WITH SOFTWARE**

A 'Top of your List' Gift item. Every Commodore C64 deserves one. **\$69.95**

NOW AVAILABLE

EDUCATIONAL · ENTERTAINING · CREATIVE



**SANYO**

**\$2995 SURPRISE!**

Complete word processing hardware and software 'to go'. Complete with Hi-Res Monitor, 16 Bit Computer, 360KD drive. Sanyo ergonomic keyboard, PLUS 15 cps typewriter/printer. Also Included: MS/DOS, Basic, Wordstar, Calcstar software.

\*Whilst stocks last.



**GEMINI PRINTER**

With Interface for your Commodore C64, Apple and most popular computers. 132 character per line Friction tractor feed 120 c.p.s. Dot addressable. **\$549**



**STAR**

**SPOT ON SAVINGS**

**NEW NOW AT SHOP 21A GREENWAY ARCADE CHURCH ST. PARRAMATTA**

*the Computer Spot*

### EASY PARKING

<b>CITY</b> In the MLC Centre King Street	<b>BONDI JUNCTION</b> Eastgate Shopping Centre	<b>PARRAMATTA</b> Council Carpark Horwood Place
---	--	---

**MAIL ORDER DEPARTMENT:**  
Write to: PO BOX 309  
BONDI JUNCTION NSW 2022

**CITY:** MLC CENTRE  
TEL: 235 2971

**PARRAMATTA:** SHOP 21A  
GREENWAY ARCADE  
TEL: 635 6020

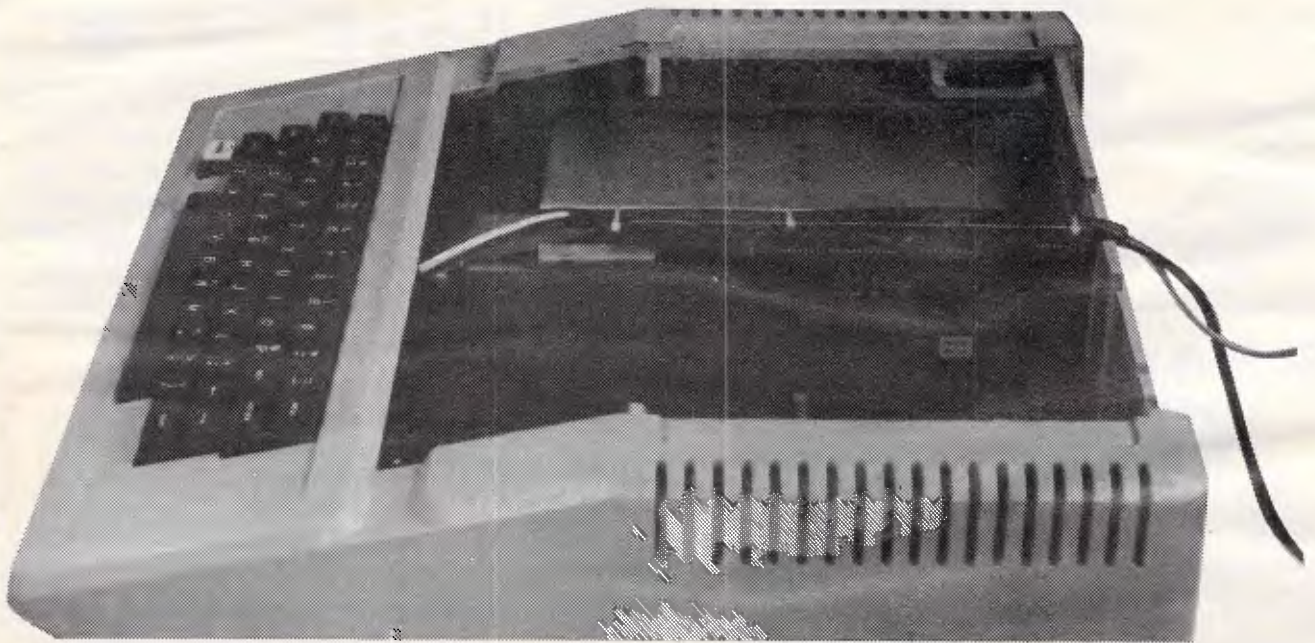
**BONDI JUNCTION:** EAST GATE CENTRE  
TEL: 387 5208



# DIRECT CONNECT M

- Super Intelligent direct connect modem for Apple II and IIe fully contained on a single card — plugs into slot #2 — does not require separate serial card or external line isolation device.
- 300 Baud full duplex or 1200/75 and 75/1200 with automatic line turnaround. Provision for expansion to CCITT Type V22 operation (1200 Baud full duplex) and V26 (2400 Baud half duplex) with a piggyback expansion board available early 1985.
- A fully monochrome version of Prestel Videotext is implemented in EPROM as well as a limited colour version within the Apple colour display capabilities. A separate Videotext display card with the full colours and features of Prestel as well as an extended high resolution format will be available early 1985. A

single keystroke entry immediately turns the Apple into a Prestel Terminal as required by the Telecom Viatel system coming on line in 1985. The modem can operate as a full editing and composing terminal to generate and transmit pictures as an information provider as well as receiving pictures, saving or retrieving to disc and operating under a user written program, making intelligent decisions on pictures received or sending pictures from memory or disc. Pictures can be dumped to a printer and the Apple Scribe printer will dump colour pictures. The firmware transmits the user ID automatically from the battery backed CMOS Ram and the ID can be remotely programmed as required by Viatel. Prestel dialling is also automatically done from the phone numbers stored in the CMOS Ram.



***Recommended Retail Price***

**\$395.00**

includ. tax

**automatic  
ice  
company**

10 SMITH ST., CHARLE



# MODEM FOR APPLE IIE

- A complete comprehensive communications program contained in EPROM allows easy and immediate transmission and reception of Binary files, Text files and Basic programs to memory or disc — No other communications software is required. All modem firmware is backswitched into the \$C200 space and does not interfere with other program memory.

- Asynchronous or synchronous operation. Supports Bisynch, HDLC, SDLC and X25 at the link level. Flag generation, CRC error code generation and checking are all done by hardware. All registers and operating parameters are fully software programmable.

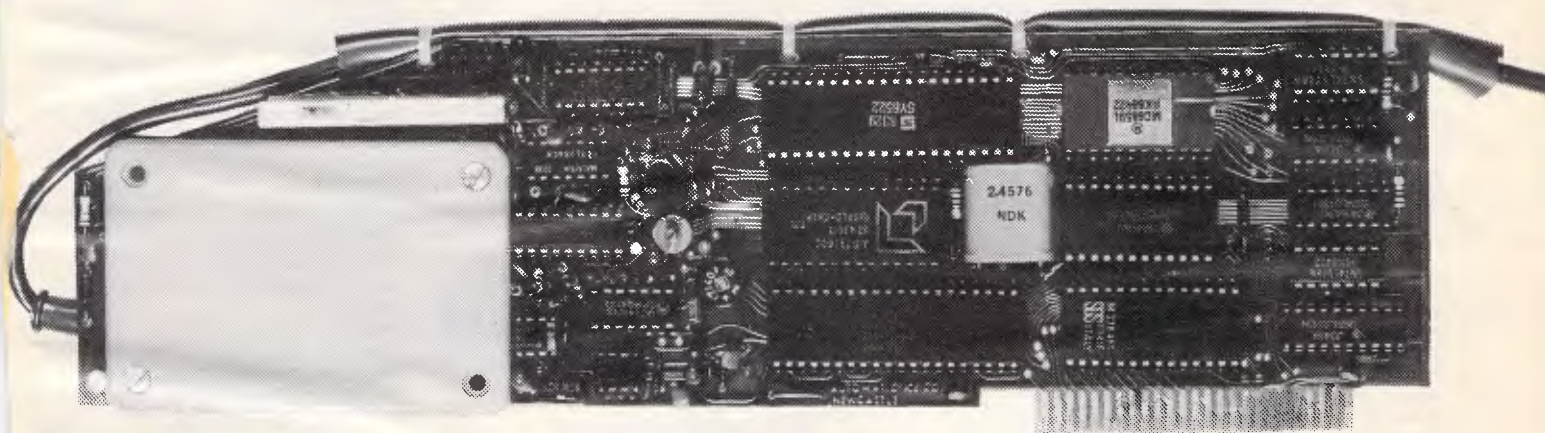
- Auto Answer — Auto dial. Senses true dial tone, ring tone, busy tone and acts intelligently, returning status messages. Automatically selects pulse or DTMF (tone) dialling. When used with DTMF exchanges the connection to the called party can be established in less than a second. On answered, it

- Can emulate Hayes Micromodem, Hayes Smartmodem, Apple serial card and Prestel terminal as well as its own modes. — Conforms to the published "Firmware" standard for Apple peripheral cards and is compatible with Basic, Pascal, C/PM and machine language programs which obey the Apple standard. A fully transparent mode is available.

- 2K x 8 battery powered CMOS RAM stores default parameters, phone numbers and log on strings, allowing single keystroke call establishment. The full telephone list can be displayed from a program or the keyboard with logons/passwords selectively not visible. A further keyboard or program input can establish the link automatically and return a status message.

- The Firmware is contained in a 64K EPROM. There is provision for an additional 64K for future expansion or special user written routines.

- Onboard battery backed calendar clock can time and initiate



automatically searches and sets to the incoming baud rate and word format. It can act as an automatic telephone dialler with multiple redial and "dial alternate number" features. A software switched audio amplifier and speaker audibly monitor call progress. Programmable digital and analogue outputs are provided to interface to radio or other devices.

calls or keep an activity log. The lock is ProDos compatible and is automatically recognised. It is also accessible for other uses.

- Optional standard telephone connection on the modem allows easy installation into existing phone plug. When the modem is not engaged the telephone acts in the normal manner.

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

**IBM version available January 1985**

**STOWN 2290 (049) 63 3188** *dealer enquiries invited*



**SOFTWARE**  
15% OFF  
INCLUDES R BASE  
LOTUS 1.2.3

**C64**  
GAMES  
**\$10**

**LOOK!**

PRICES YOU USED TO DREAM ABOUT

**FREE CATALOGUE!**  
C64 ATARI TI APPLE  
IBM MAC CP/M MSDOS  
MICROWARE

**XIDEX**

- 5 1/4" SSDD 5012 **36**
- 5 1/4" DSDD 5022 **45**
- 8" SSDD 8012 **49**
- 8" DSDD 8022 **53**
- 5 1/4" SSDD 5014 BULK-NO BOX **29**
- 5 1/4" DSDD 5024 BULK-NO BOX **38**

QUALITY XIDEX ARE AN OVERSPEC DISK DESIGNED FOR CRITICAL DATA APPLICATIONS. DETAILS OF FULL RANGE OR SPECS CALL US.

**APPLE BARGAINS**

**Hardware**

- VISION 128K APPLE II 262
- VISION 256K 367
- 64K RAM MASTER 391
- 128K RAM MASTER 525
- ACCELERATOR II+ 725
- CLEAR TOP APPLE 34
- VENT TOP 58
- CURSOR III 59
- 5 MB D/DRIVE 2400
- 10 MB DRIVE 3200
- 15 MB DRIVE 3600

**Software**

- BUSINESS FORECAST MODEL 80
- DESK TOP PLAN II 178
- VISIDEX 178
- VISIFILE 178
- VISIPLLOT 143
- VISISCHED II 220
- GRAPHMAGIC 64
- HOW TO USE IIE 45
- HOW TO OPERATE IIE 38
- PFS SERIES Each 146
- BANK ST WRITER II+/E/C 87
- ZARDAX 270
- AIRSIM III 62
- SPLITFIRE SIMULATOR 51
- FLIGHT SIMULATOR II 72
- KOALA PAD - APPLE 148!**

**Datalife**

by Verbatim

- 5 1/4" SSDD 525-01 **30!**

**HEAD CLEANING**

- 5" KIT **10** EA
- 8" KIT **10** EA
- 5" C/DISKS **2** EA
- 8" C/DISKS **2** EA

**DISK STORAGE**

*Australian Made!*  
TOP QUALITY

**DISK MINDER**

Brown or beige base, smoke-tinted cover, Aussie-made lock with REPLACEABLE keys Holds 60 diskettes

**21!**

Swedish made ABA storage (Volvo quality)

- 40 x 5" disks 30
- 90 x 5" 45
- 40 x 8" 40
- 90 x 8" 58

**RUBYCLIFFE 10 DISK**

LIBRARY CASE  
NO PLASTIC HINGES -  
JUST CLEVER DESIGNING  
GREY OR BLACK

**3 Each**

**PRINTER RIBBONS**

- EPSON MX80 9.38
- EPSON MX100 15.38
- SP80 EPS LOOKALIKE 15.00
- COMMODORE MT80 15.00
- TANDY LP6 & LP8 6.38
- OTHERS CALL

**CONTROL DATA**

- 5 1/4" SSDD **28!!**

**LABELLING**

WARNE'S WIP 'N WRITE LABELS REUSABLE, JUST WIPE WITH DAMP TISSUE. SPECIAL PEN

**45 LABELS & PEN**

- DW5 - FOR 5" DISKS 10.13
- DW7 - FOR 8" DISKS 14.10

**SENSATIONAL MAWAREX LABELLING GUN**

— Replaces Dymo —

Prints, not embosses, on flexible waterproof, fade-resistant, white, coloured or colour-fringed, stick-to anything 10 mm tape.

**39**

**CP/M BARGAINS**

- R BASE HEWLETT PACKARD 393
- ADA 175
- C COMPILER CP/M 86 159
- DIAGNOSTICS 2 CP/M 86 8' 103
- DIAGNOSTICS II 73
- DISK DOCTOR CP/M 86 1' 59
- DISK DOCTOR 59
- FORTRAN 8087 SUPPORT DISK 28
- FORTRAN IV CP/M 86 8' 240
- FORTRAN IV 240
- FORTRAN IV IBM CP/M 86 5' 240
- RATFOR 81
- STATS-GRAPH 163
- TERM II 163
- SCRATCHPAD 2.0 CP/M86 8' 168
- SCRATCHPAD 2.0 168
- PROF OPTIONS 225
- WORDSTAR PROFESSIONAL 510

**3.5" Sony**

**MICRO DISKS**

- S/SIDE D3320 **8** EA **69** TEN

- D/SIDE D4440 **10** EA **89** TEN

**MAC SOFT**

- DB MASTER 288
- FILEVISION 222
- HELIX 450
- MAC MANAGER 64
- MAIN ST FILER 238
- MULTIPLAN 228
- PFS FILE 162
- PFS REPORT 162
- PFS FILE/REPORT 258
- PROF MUSIC COMPOSER 522
- THINKTANK 168
- CLICKART 56
- MAC THE KNIFE 51
- DEADLINE 80
- DOLLARS & SENSE 144
- HOME ACCOUNTANT 118
- LEGACY 64
- ZORK I 56
- ZORK II, III EA 71

**C64 LOOK! C64**

SLAKE BYTE, SQUISH'EM, FAST EDDIE, BENJI SPACE, GHOST MANOR, THE PIT, MOTOR MANIA, SHAFT RAIDER . . . . **10** EA

- DFM D/BASE-MAIL LABEL
- DFM DATABASE (D) **25**
- HOME ACCOUNTS MGR (D) EA
- STOCK AID (D) EA

- BANK ST WRITER 68**
- KOALA PADS 117**
- MULTIPLAN (SPREADSHEET) 123
- CREATIVE FILER C64 (D) 49
- ARITH/ALGEBRA (D. CASS) 67
- ENGLISH (D. CASS) 67
- MATH BLASTER (D) 58
- WORD ATTACK (D) 58

**FREIGHT**

SOFTWARE \$2 ANY ORDER  
DISKETTES \$2 PER 10  
DISK STORAGE BOXES \$3

RIBBONS, CLEANING KITS, WIPE 'N WRITES \$1  
MAWAREX \$2  
MAXIMUM FREIGHT \$5 — SENT O'NITE COURIER

**ORDERING INFORMATION**

CHEQUES, MONEY ORDERS TO 'IMMEDIA'  
NO STAMP NEEDED FOR OUR FREEPOST ADDRESS  
SCHOOL PURCHASE ORDERS WELCOME  
AUST WIDE COURIER - PAY \$5 FREIGHT

ALL PRICES TAX INCL

NO CHARGE FOR CREDIT CARDS

BANK VISA MASTER

**immedia**

BOOKS COMPUTER EDUCATION  
FREE POST 3AP  
IMMEDIA SOFT  
8 LYNDRHURST ST, DUDLEY 2290

NATIONAL ORDER DESK 7D/8AM-8PM  
STD FREE

**008-025-241**

BUSINESS & LOCALS CALL  
(049) 497-546



APC is interested in programs written in any of the major programming languages for all home and small business micros. When submitting programs to APC please include the following:

- (a) A cassette or disk of the program. (b) A listing on plain white paper (typewritten if no printer available). (c) Comprehensive but brief documentation.
- (d) A suitable SAE if you would like your materials to be returned after use. Please mark (a), (b) and (c) with your name, address, program title, machine (state minimum RAM where appropriate) and — if possible — a daytime number. All programs are paid for at the rate of \$20 per page of published listing. Send contributions to:  
APC Programs, 77 Glenhuntly Road, Elwood, Vic 3184.

This month's selection has a utilities flavour and covers a wide range of machines.

Spectra-draw is a program for the Spectravideo SV318 and SV328. Two simple changes listed with the program will enable it to run on MSX machines. It's well worth the effort and rivals some commercial paint-box programs in quality.

Basic programmers who want to gain an insight into the speed and power of machine code should try 'Life' for the

Sinclair Spectrum. This 13-line program is a complete version of the popular computer game and produces new generations at a rate of nine per second — try doing that with Basic. Any machine code experts who think they can write a faster and shorter version please send a copy.

Finally, there's a utility which adds two graphic commands to the Commodore 64, a cassette indexer for the TRS-80/System 80, the first part of a Tandy Color Computer/Dragon adventure, a 'day fin-

der' written in Lisp and a (mostly) machine language game for the '64.



*Games*

*Scientific/mathematic*

*Business*

*Toolkit/utilities*

*Educational/Computer Aided Learning*



## Spectravideo Spectra-draw

by Graham Bland

Spectravideo 'Spectra-draw' is a program for the SV318 and SV328 machines. It allows you to design custom screens using the cursor as a paint-brush. While the idea of a paint-box program is not original, this version has some excellent features and rivals most of the commercially available programs of

this nature. Features include:

- 1 Multi-coloured screen design.
- 2 Magnification of an area for intricate detailed design.
- 3 Paint-brush, eraser, pencil and mirror drawing styles.
- 4 Line, box and circle drawing.
- 5 Fill and air brush routines.

One nice little feature is the cursor character which looks like a paint-brush when paint-brush is used, a spray can when the air brush is used, and so on. The program contains all the necessary instructions within it.

```

10 REM *****
20 REM *
30 REM *   SPECTRA-DRAW   *
40 REM *
50 REM *   G. BLAND 1984   *
60 REM *
70 REM *****
80 CLEAR
90 REM *
100 REM * Disable CTL-C with dummy
110 REM * interrupt routine
120 STOP ON 1 ON STOP 80SUB 4580
130 DEFINT A-Z
140 RESUME
150 REM *
160 REM *
170 REM *   Main Menu
    
```



# PROGRAMS

```

180 REM *
190 SCREEN 0,0 : COLOR 15,4 : CLS
200 LOCATE 14,1,0 : PRINT 'SPECTRA-DRAW':LOCATE 14,2:PRINT"....."
210 LOCATE 8,7 : PRINT "1. Run SPECTRA-DRAW"
220 LOCATE 8,9: PRINT "2. List Instructions"
230 LOCATE 8,11: PRINT "3. Exit to BASIC"
240 LOCATE 8,15:PRINT "Enter Option [ J]"
250 T$="+" : R$ = " "
260 LOCATE 22,15:PRINTT$;
270 A$=INKEY$ : IF A$ = "" THEN SWAP T$,R$: GOTO 260
280 IF ASC(A$)<49 OR ASC(A$)>51 THEN GOTO 260
290 LOCATE 22,15:PRINT A$
300 LOCATE 8,20 : PRINT "Proceeding..."
310 FOR I = 1 TO 5000 : NEXT
320 IF A$="1" THEN GOTO 350
330 IF A$="2" THEN GOTO 4150
340 IF A$="3" THEN GOTO 4630
350 REM * Enable Spacebar Interrupt
360 REM *
370 SIRIG(0) ON: ON STRIG GOSUB 1960
380 REM *
390 REM * Set Function Key Traps
400 REM *
410 KEY ON : ON KEY GOSUB 2430,2570,2660,2920
420 DIM Z(8,2): REM * Joystick offsets
430 DIM GC(8,8):REM * Edit Colours
440 DIM IK(2,7):REM * Icon Ref. Table
450 DIM LP(2,14): REM * Icon Placement reference Table
460 REM *
470 REM * Define Pythagorus Function
480 REM *
490 DEF FNC(M,N,D,P)=SQR((ABS((M-D)**2)+(ABS((N-P)**2)))
500 REM *
510 REM * Initialise Joystick Offsets
520 REM *
530 FOR I = 1 TO 8: FOR J = 1 TO 2
540 READ A : Z(I,J) = A
550 NEXT J : NEXT I
560 DATA 0,-1,1,-1,1,0,1,1,0,1,-1,1,-1,0,-1,-1
570 REM *
580 REM * Initialise Icon Array
590 REM *
600 FOR I = 0 TO 1
610 FOR J = 0 TO 6
620 READ A : IK(I,J)=A
630 NEXT J
640 NEXT I
650 REM *
660 REM * Initialise Icon Placement Table
670 REM *
680 FOR I = 1 TO 14
690 READ A : CP(I,1)=A
700 READ B : CP(2,1)=B
710 NEXT I
720 REM *
730 REM * Array Data
740 REM *
750 DATA 1,3,5,7,9,11,13,2,4,6,8,10,12,14
760 DATA 38,4,54,4,37,20,52,20,36,36,52,36
770 DATA 37,52,52,52,36,68,54,68,37,84,54,84
780 DATA 38,100,54,100
790 REM *
800 REM * Screen Initialisation
810 REM *
820 SCREEN 1 : CLICK OFF
830 COLOR 15,15 :CLS
840 S=12 : IC= 12 : T=1 : CC=1
850 GOSUB 1340:GOSUB 1600: GOSUB 1260: S = 0
860 REM *
870 REM * Main Loop
880 REM *
890 UL=1:RL=255:BL=190:LL=67
900 KA = 4 : X=140 : Y = 96 : S=12: IC=12 : BC = 1 : PC=1 : BH = 0 : PH = 0
910 EC = 1 : EH = 0 : T = 1 : TH = 15
920 MC = 1 : MH = 0
930 REM *
940 REM * Place Current Cursor
950 REM *
960 PUT SPRITE 0,(X,Y),T,S
970 REM *
980 REM * Poll Joystick
990 REM *
1000 IF STICK(0) = 0 THEN 960
1010 REM *
1020 REM * Add offsets and validate
1030 REM *
1040 X=X+Z(STICK(0),1):Y=Y+Z(STICK(0),2)
1050 IF X<LL THEN X=LL
1060 IF X>RL THEN X=RL
1070 IF Y<UL THEN Y=UL
1080 IF Y>BL THEN Y=BL
1090 REM *
1100 REM * If Pen selected - Draw
1110 REM *
1120 IF S=12 AND PC=1 THEN PSET(X,Y),CC
1130 REM *
1140 REM * If Brush Selected - Paint
1150 REM *
1160 IF S = 1 AND BC = 1 THEN GOSUB 2990
1170 REM *
1180 REM * If Eraser Selected - Erase
1190 REM *
1200 IF S =11 AND EC = 1 THEN PSET(X,Y),15
1210 REM *
1220 REM * Mirror Mode Plot
1230 REM *
1240 IF S=4 AND MC = 1 THEN PSET(X,Y),CC:PSET(256-(X-66),Y),CC:PSET(256-(X-66),192-Y),CC:PSET(X,192-Y),CC
1250 GOTO 960
1260 REM *
1270 REM * Place Sprite "Icons"
1280 REM *
1290 FOR I = 1 TO 14

```



BEST OF APC

# SOFTWARE FOR THE COMMODORE 64

**\$19.95** rrp

25  
HIGH-QUALITY  
PROGRAMS

BOOK AND  
CASSETTE

# FREE IF YOU SUBSCRIBE!

plus a **free**  
cassette containing the  
programs listed in  
"Software for the Commodore 64"

For the past four years  
"Australian Personal  
Computer" has led the market  
in microcomputer magazines  
and has a reputation for  
publishing *the* very best  
software for all the most  
popular micros. "Software  
for the Commodore 64" is  
mostly a compilation of  
programs for the '64 plus  
some commissioned specially  
for this publication.

If you subscribe to *APC* before  
the year is out, we'll throw  
in "Software for the  
Commodore 64" (retail price:  
\$19.95) as well as deliver the  
next 12 issues of *APC* to  
your door *and* we'll provide free  
of charge a cassette of the  
listings in the book. Just fill out  
the coupon below and you'll  
be sure you get at least one  
Christmas present!

The **BEST OF APC** series contains the finest programs  
written for each machine plus a wealth of hints, tips and utilities  
which will prove essential reading for all serious programmers.

## SUBSCRIPTION ORDER FORM

I would like to subscribe to *APC* plus receive a free copy  
of "Software for the Commodore 64" and a free cassette  
of the programs contained in the book.

- I enclose my cheque for \$35 made payable to  
'Computer Publications', 77 Glenhuntly Road,  
Elwood, Victoria 3184.
- Please charge my Bankcard.

Account number .....

Expiry date..... Signed.....

Name .....

Address .....

..... Postcode.....

(PLEASE USE BLOCK LETTERS)



# PROGRAMS

```

1300 PUT SPRITE I,(CP(1,I),CP(2,I)),1,I
1310 NEXT
1320 RETURN
1330 REM *
1340 REM * Screen Definition Routine *
1350 REM *
1360 LINE (0,0)-(64,112),1,B:LINE (66,0)-(254,192),1,B
1370 LINE (32,0)-(32,112),1:LINE (0,114)-(64,126),1,B
1380 LINE (32,114)-(48,126),1,B
1390 LINE (2,116)-(30,124),1,BF
1400 REM *
1410 REM * Draw colour palette
1420 REM *
1430 C=1
1440 FOR I = 2 TO 18 STEP 14
1450 FOR J = 2 TO 98 STEP 14
1460 LINE (I,J)-(I+12,J+12),C,BF
1470 C=C+1
1480 NEXT J
1490 NEXT I
1500 REM *
1510 REM * Draw Icon Lattice
1520 REM *
1530 FOR I = 16 TO 112 STEP 16
1540 LINE (32,I)-(64,I),1
1550 NEXT I
1560 LINE (48,0)-(48,112),1
1570 LINE (0,128)-(64,192),1,B
1580 RETURN
1590 REM *
1600 REM * Sprite Definition
1610 REM *
1620 FOR N = 0 TO 15
1630 S# = ""
1640 FOR S = 1 TO 8
1650 READ A# : S# = S# + CHR$(VAL(A#))
1660 NEXT S
1670 SPRITE$(N)=S#
1680 NEXT N
1690 RETURN
1700 REM *
1710 REM * Sprite Definition Data
1720 REM *
1730 DATA 240,192,160,144,8,4,2,1
1740 DATA 240,240,240,000,240,96,96,96
1750 DATA 224,64,64,64,64,64,64,224
1760 DATA 60,66,129,153,153,129,66,60
1770 DATA 60,126,255,231,231,255,126,60
1780 DATA 254,146,146,254,146,146,254,0
1790 DATA 255,129,129,129,129,129,129,255
1800 DATA 255,255,255,255,255,255,255,255
1810 DATA 254,170,170,170,170,170,170,254
1820 DATA 255,129,255,129,255,129,255,0
1830 DATA 255,255,255,255,129,129,129,255
1840 DATA 224,62,34,250,136,136,136,248
1850 DATA 255,195,165,153,153,165,195,255
1860 DATA 128,64,32,16,8,4,0,0
1870 DATA 112,136,128,128,128,136,112,0
1880 DATA 112,136,136,136,168,144,104,0
1890 DATA 64,224,64,0,0,0,0,0
1900 REM *
1910 REM * Spacebar Interrupt Routine
1920 REM *
1930 REM * Determine Current Screen
1940 REM * Area and Branch
1950 REM *
1960 IF KA = 1 THEN GOTO 2030
1970 IF KA = 2 THEN GOTO 2130
1980 IF KA = 3 THEN GOTO 2340
1990 IF KA = 4 THEN GOTO 3120
2000 REM *
2010 REM * Colour Selection Routine
2020 REM *
2030 IF PDINT(X,Y)=15 THEN PLAY "v1011602c":RETURN
2040 PLAY "12405c06c":CC=PDINT(X,Y)
2050 REM *
2060 REM * Update Colour Indicator
2070 REM *
2080 LINE (2,116)-(30,124),CL,BF
2090 RETURN
2100 REM *
2110 REM * Icon Selection Routine
2120 REM *
2130 PLAY "12405c06c":V=INT((X-32)/16):W=INT(Y/16)
2140 IF W<6 THEN IC=IK(V,W):EG=0:FG=0:ST=0:GOSUB 2280:RETURN
2150 REM *
2160 REM * Handle CLS function
2170 REM *
2180 IF V=0 AND EG=1 THEN LINE (66,0)-(254,192),15,BF:LINE (66,0)-(254,192),1,B
:EG=0:FG=0:GOSUB 2280:RETURN
2190 REM *
2200 REM * Handle Exit to Main Menu
2210 REM *
2220 IF V=1 AND FG=1 THEN GOTO 80
2230 REM *
2240 REM * Set Status Indicators
2250 REM *
2260 IF V=0 THEN EG=1:LINE (34,116)-(46,124),8,BF:FG=0:GOSUB 2280:RETURN
2270 IF V=1 THEN FG=1:LINE (50,116)-(62,124),8,BF:EG=0:GOSUB 2280:RETURN
2280 REM *
2290 REM * Reset CLS and Exit Status
2300 REM *
2310 IF EG=0 THEN LINE (34,116)-(46,124),15,BF
2320 IF FG=0 THEN LINE (50,116)-(62,124),15,BF
2330 RETURN
2340 REM *
2350 REM * Handle Edit Update
2360 REM *
2370 V=INT(X/8):W=INT((Y-128)/8)
2380 IF GC(V,W)=15 THEN GC(V,W)=CL:GOTO 2400
2390 IF GC(V,W)<15 THEN GC(V,W)=15
2400 PLAY "12405c06c"
2410 PSET(AX+V,AY+W),GC(V,W)

```

# PROGRAMS

```

2420 LINE ((V*8)+2, (W*8)+130)-((V*8)+6, (W*8)+134),GC(V,W),BF: RETURN
2430 REM *
2440 REM * Handle Function Keys
2450 REM *
2460 REM * (F1) : Colour Select
2470 REM *
2480 IF KA = 3 THEN EX=X : EY=Y
2490 IF KA = 1 AND EF = 1 THEN X=EX : Y = EY : PUT SPRITE 0, (X,Y),T,S : KA = 3: S
=0 : LL=1 : UL=129:BL=190:RL=63: RETURN
2500 IF KA = 1 AND EF = 0 THEN X=AX : Y = AY : PUT SPRITE 0, (X,Y),T,S : KA = 4:
S=IC :LL=67 : UL=1:BL=190:RL=254: RETURN
2510 IF KA = 3 AND EF=1 THEN X=24 : Y =104 : PU: SPRITE 0, (X,Y),T,S : KA = 1: S=
0 :LL=1 : UL=1:BL=112:RL=31: RETURN
2520 IF KA<4 THEN RETURN
2530 KA = 1
2540 LL=1 : UL=1:BL=111 : RL = 31 : AX=X : AY = Y
2550 X = 16 : Y = 64 : S = 0
2560 PUT SPRITE 0, (X,Y),T,S : RETURN
2570 REM *
2580 REM * (F2) : Icon Select
2590 REM *
2600 IF KA = 2 THEN X=AX : Y = AY : PUT SPRITE 0, (X,Y),T,S : KA = 4: S=IC :LL=67
: UL=1:BL=190:RL=254: RETURN
2610 IF KA<4 THEN RETURN
2620 KA = 2
2630 BL=111 : RL = 63 : LL = 33: UL=1: AX=X : AY = Y
2640 X = 48 : Y = 64 : S=0
2650 PUT SPRITE 0, (X,Y),T,S : RETURN
2660 REM *
2670 REM * (F3) : Editing Screen
2680 REM *
2690 IF KA = 3 THEN X=AX : Y = AY : PUT SPRITE 0, (X,Y),T,S : KA = 4: S=IC :LL=67
: UL=1:BL=190:RL=254: EF = 0 : RETURN
2700 IF KA = 4 THEN RETURN
2710 KA = 3 : EF = 1
2720 BL=190 : RL = 63 : LL = 1: UL=129: AX=X : AY = Y
2730 X = 60 : Y = 132 : S=0
2740 PUT SPRITE 0, (X,Y),T,S
2750 REM *
2760 REM * Set up Edit Array
2770 REM *
2780 FOR I = 0 TO 7
2790 FOR J = 0 TO 7
2800 GC(I,J)=POINT(AX+I,AY+J)
2810 NEXT J
2820 NEXT I
2830 REM *
2840 REM * Plot Edit Area
2850 REM *
2860 FOR I = 0 TO 7
2870 FOR J = 0 TO 7
2880 LINE ((I*8)+2, (J*8)+130)-((I*8)+6, (J*8)+134),GC(I,J),BF
2890 NEXT J
2900 NEXT I
2910 RETURN
2920 REM *
2930 REM * (F3) Switch Cursor Colour
2940 REM *
2950 SWAP T,TH : RETURN
2960 REM * MMMM
2970 RETURN
2980 MM = 1 : RETURN
2990 REM *
3000 REM * Paintbrush Routine
3010 REM *
3020 PW = 3
3030 IF X + PW > RL THEN PW = PW - 1 : GOTO 3030
3040 FOR I = 0 TO PW
3050 PBE1 (X+I,Y),CC
3060 NEXT
3070 RETURN
3080 REM *
3090 REM * Service the interrupt
3100 REM * by currently selected icon
3110 REM *
3120 ON IC GOTO 3130,3170,3220,3270,3470,3520,3570,3700,3830,3900,4070,4110
3130 REM *
3140 REM * Lift / Put down Paintbrush
3150 REM *
3160 SWAP BC,BH : RETURN
3170 REM *
3180 REM * Draw A Line
3190 REM *
3200 IF ST = 1 THEN LINE (P1,P2)-(X,Y),CC: ST = 0 : PUT SPRITE 15, (0,209),I,15 :
RETURN
3210 P1 = X : P2 = Y : ST = 1: PUT SPRITE 15,STEP (-1,-1),I,15 : RETURN
3220 REM *
3230 REM * Plot Plain Circle
3240 REM *
3250 IF ST = 1 THEN GOSUB 3310 : ST=0 : PUT SPRITE 15, (0,209),0,15 : RETURN
3260 P1 = X : P2 = Y : ST = 1 : PUT SPRITE 15, STEP (-1,-1),I,15 : RETURN
3270 REM *
3280 REM * Toggle Mirror Status
3290 REM *
3300 SWAP MC,MH : RETURN
3310 REM *
3320 REM * Calculate Radius
3330 REM *
3340 R = FNC(X,Y,P1,P2)
3350 REM *
3360 REM * If the circle arcs beyond
3370 REM * the screen boundary then
3380 REM * redraw all outside the
3390 REM * drawing area.
3400 REM *
3410 IF P1 - R < LL THEN RD = 1
3420 IF P2 + R > BL THEN RD = 1
3430 IF P2 - R < UL THEN RD = 1
3440 CIRCLE (P1,P2),R,CC,,8/7
3450 IF RD = 1 THEN LINE (0,0)-(64,192),15,BF : GOSUB 1260 : GOSUB 1330 : GOSUB
1400 : RD = 0
3460 RETURN
3470 REM *

```



# PROGRAMS

```

3480 REM * Draw A Box
3490 REM *
3500 IF ST = 1 THEN LINE (P1,P2)-(X,Y),CC,B: ST = 0 : PUT SPRITE 15,(0,209),1,15
:RETURN
3510 P1 = X : P2 = Y : ST = 1: PUT SPRITE 15,STEP (-1,-1),1,15 : RETURN
3520 REM *
3530 REM * Draw A Box And Paint Fill
3540 REM *
3550 IF ST = 1 THEN LINE (P1,P2)-(X,Y),CC,B: ST = 0 : PUT SPRITE 15,(0,209),1,15
:RETURN
3560 P1 = X : P2 = Y : ST = 1: PUT SPRITE 15,STEP (-1,-1),1,15 : RETURN
3570 REM *
3580 REM * Box with vertical fill in
3590 REM *
3600 IF ST = 1 THEN LINE (P1,P2)-(X,Y),CC,B: GOSUB 3620 : ST = 0 : PUT SPRITE 15
,(0,209),1,15 :RETURN
3610 P1 = X : P2 = Y : ST = 1: PUT SPRITE 15,STEP (-1,-1),1,15 : RETURN
3620 REM *
3630 REM * Vertical Box Fill
3640 REM *
3650 STP = 2 : IF X-P1<0 THEN STP = -2
3660 FOR I = P1 TO X STEP STP
3670 LINE (I,P2)-(I,Y),CC
3680 NEXT I
3690 RETURN
3700 REM *
3710 REM * Box with horz. fill in
3720 REM *
3730 IF ST = 1 THEN LINE (P1,P2)-(X,Y),CC,B: GOSUB 3750 : ST = 0 : PUT SPRITE 15
,(0,209),1,15 :RETURN
3740 P1 = X : P2 = Y : ST = 1: PUT SPRITE 15,STEP (-1,-1),1,15 : RETURN
3750 REM *
3760 REM * Horizontal Box Fill
3770 REM *
3780 STP = 2 : IF Y-P2<0 THEN STP = -2
3790 FOR I = P2 TO Y STEP STP
3800 LINE (P1,I)-(X,I),CC
3810 NEXT I
3820 RETURN
3830 REM *
3840 REM * Paint Enclosed Area
3850 REM * Redraws Border in Current
3860 REM * Colour
3870 REM *
3880 LINE (66,0)-(256,192),CC,B
3890 PAINT (X,Y),CC : RETURN
3900 REM *
3910 REM * Air Brush Routine
3920 REM *
3930 REM * Establish A Spray Area
3940 REM *
3950 SW = 8
3960 IF (X-SW)<LL THEN SW=SW-1 : GOTO 3960
3970 SW = 8
3980 IF (X-SW)<KL THEN SW=SW-1 : GOTO 3980
3990 SR = INT(RND(1)*6) : IF SR<2 THEN 3990
4000 REM *
4010 REM * Spray Area in Curr. Colour
4020 REM *
4030 FOR I = 1 TO SR
4040 PSET (X-INT(SW*RND(1)),Y-INT(SW*RND(1))),CC
4050 NEXT I
4060 RETURN
4070 REM *
4080 REM * Toggle Eraser Value
4090 REM *
4100 SWAP EC,EH : RETURN
4110 REM *
4120 REM * Lift/Place Pencil
4130 REM *
4140 SWAP PC,PH : RETURN
4150 REM *
4160 REM * User Information
4170 REM *
4180 CLS
4190 PRINT "Function Keys":PRINT "....."
4200 PRINT : PRINT
4210 PRINT "[F1] Colour Selection":PRINT
4220 PRINT "Position the Cursor over the desired"
4230 PRINT "colour and press the space bar.":PRINT : PRINT
4240 PRINT "[F2] Object Selection":PRINT
4250 PRINT "Position the Cursor over the desired"
4260 PRINT "object and press the space bar."
4270 PRINT "to (C)lear the Drawing Screen, or "
4280 PRINT "(Q)uit to the Main Menu, press the"
4290 PRINT "space bar TWICE. In both cases, a"
4300 PRINT "warning will be given in the form of"
4310 PRINT "a red box."
4320 LOCATE 0,23: PRINT "Press a Key for More.:"
4330 AS=INKEY$: IF AS="" THEN 4330
4340 CLS:PRINT : PRINT "[F3] Local Screen Edit " or 'FAT BITS": PRINT
4350 PRINT "An 8x8 area local to the cursor is ":PRINT "Displayed in the edit field."
4360 PRINT "Pressing the Spacebar will alternately"
4370 PRINT "remove and replace specific pixels on":PRINT "the main screen."
4380 PRINT "Colour selection is available during":PRINT "a local edit.":PRINT
4390 PRINT "[F4] Cursor Switching":PRINT
4400 PRINT "This key will change the cursor from"
4410 PRINT "Black to White or Vice Versa."
4420 LOCATE 0,23: PRINT "Press a Key for More.:"
4430 AS=INKEY$: IF AS="" THEN 4430
4440 CLS
4450 PRINT "Object Summary":PRINT ".....":PRINT : PRINT
4460 PRINT "Paint Brush, Eraser, Pencil, Mirror ":PRINT
4470 PRINT "Pressing the space bar will lower or":PRINT "raise the Object.": PRINT
4480 PRINT "Line, All Boxes, Circles ":PRINT
4490 PRINT "One press of the space bar determines"
4500 PRINT "the startpoint of a box or line or the"
4510 PRINT "centre of a circle. A second press ":PRINT "defines the end point of"
4520 PRINT "or the object."
4530 PRINT "and the article is drawn."
4530 PRINT: PRINT "Air Brush, Paint Filler ":PRINT

```

# PROGRAMS

```

4540 PRINT "One press sprays or fills in an area":PRINT "of the screen."
4550 LOCATE 0,23:PRINT"Press any key to return to menu...":
4560 AS=INKEY$: IF AS="" THEN 4550
4570 GOTO 160
4580 REM #
4590 REM # Dummy CTRL Trap
4600 REM #
4610 RETURN
4620 REM # Terminate
4630 SCREEN 0,0:LOCATE 0,0:CLS
4640 END

```



## Hi-res Plot

by H Herbert

'Hi-res Plot' is a graphics utility for the Commodore 64. The 64 has no graphics commands, and the usual PEEK and POKE method is both slow and clumsy. Hi-res Plot adds two graphics commands to the 64's vocabulary: INIT sets the machine in hi-res graphics mode and clears both screen and colour memory; and PLOT(X),(Y) sets any

pixel on the screen. X must be in the range 0 to 319 and Y in the range 0 to 199. The routine is in machine code with no checksum done when POKEing it in, so type in and save the program *before* you run it — any error in the machine code may cause the machine to crash and lose the program.

Lines 310 to 450 are a demonstration

program using these new commands, so should be omitted when the commands are used in your own programs.

For programmers using Hi-res Plot with a large Basic program, or Basic and machine code programs, the routine is located at \$C000 and can be easily relocated if necessary.

```

10 A=49152:PRINT"000"TAB(10)"ENTERING HI RES PLOT"
20 READA$: IFA$="" THEN 310
30 FORI=1TO16:D=ASC(MID$(A$,2*I-1,1))-48
40 IFD>9 THEN D=D-7
50 P=D*16:D=ASC(MID$(A$,2*I,1))-48
60 IFD>9 THEN D=D-7
70 P=P+D:POKEA,P:P=0:A=A+1:NEXT
80 GOTO20
100 DATA59DF0034CEDF6A57A85F8A57B85F920
110 DATA7900C93AD01F207300C950F00FEAEEEA
120 DATAEEEEEAEAEAC949D00C4C1DC14C0BC1EA
130 DATAEEEEEAEAEAA5F8857AA5F9857B4CEIF6
140 DATA20730020F1AE20BFB1A56485FBA56585
150 DATAFA20F1AE20BFB1A56585FC2062C0D0A7
160 DATAFA5A92085FEA90085FDA5FC29F84A4A
170 DATA4A8F01018A5FD694085FD9002E6FEE6
180 DATAFE88D0F066FBA5FA6A4A4A0A0A2A9003
190 DATAE6FE1865FD85FD9002E6FEA5FC290718
200 DATA65FD85FD9002E6FEA900A885FBA5FA29
210 DATA07AAE83866FBCAD0FBA5FB11FD91FD60
220 DATAA9200D11D08D11D0A9080D18D08D18D0
230 DATAA92085FEA90085FDA000A90091FDC8D0
240 DATAFBE6FEA5FEC940D0F1A90085FDA90485
250 DATAFEA000A92791FDC8D0FBE6FEA5FEC908
260 DATAD0F12073004C07C04C35C0A000207300
270 DATAD92FC1D0F3C8C003D0F34C40C0A00020
280 DATA7300D932C1D0E1C8C003D0F34CC0C04C
290 DATA4F544E495400000000000000000000
300 DATAEND
310 REM*START OF DEMONSTRATION PROGRAMME*
320 PRINT"0000000000"AT THE END OF PLOT HIT 'B' TO RETURN TO"
330 PRINT"00"TAB(17)"BASIC"
340 FORN=1TO5000:NEXT
350 POKE53280,0
360 POKE808,0:POKE809,192:REM*CHANGE STOP VECTOR*

370 A=49396:POKEA,39:REM*SET COLOUR*
380 INIT:REM*NEW COMMANDS MUST FOLLOW COLON*
390 FORX=0TO319:STEP.5:Y=90:PLOT(X)(Y)
400 Y=INT(90+80*SIN(X/50)):PLOT(X)(Y)
410 NEXT
420 GETA$: IFA$="" THEN 420
430 POKE53265,155:POKE53272,21:REM*RETURN FROM BIT MAP MODE*
440 PRINT"0":REM*CLEAR SCREEN OF COLOUR DATA*
450 END

```

READY.





## System 80/TRS-80 Automatic Cassette Indexer

by Alan Kirk

All you have to do is run the program, insert the cassette to be indexed and leave it for 30 minutes.

On your return, the program will produce a catalogue of the programs it

found which can then be printed out to form a cassette inlay.

The program differentiates between Basic, machine code, Basic data files, assembler and rubbish. It will add the

type to the entry for each program it finds, together with the program's name and position on the tape.

```

5 REM *****
6 REM + GENIE/TRS-80 Automatic Cassette Indexer +
      + By Alan Kirk +
      + 1984 (C) Version 1.2 +
      *****

10 CLEAR 300:DEFINT A-Z:DEFSTR B,D,E,L,M,N,P:DIM PN(40),PK(40):CLS
20 POKE 16526,0:POKE 16527,125:F=1:DF=STRING$(3,211):LI=STRING$(16,45):EA=CHR$(2
11):NA=STRING$(2,176)
30 FOR I=0 TO 16:READ A:POKE I+32000,A:NEXT
40 PRINT#16,"Automatic Cassette Indexer":PRINT#02,STRING$(26,131)
50 PRINT " Press :- 'F' for internal cassette, ':PRINT TAB(18)'Or for ext
ernal, just play."
60 IF INP(255)=127 THEN 40 ELSE PRINT "Reading tape.....":PRINT#325,LI
70 X=USR(0):FOR I=0 TO 9:NA=NA+CHR$(PEEK(32832+I)):NEXT
80 IF LEFT$(NA,3)=DF THEN NA=MID$(NA,4,1):M="BASIC":GOTO120
90 IF LEFT$(NA,1)="U" THEN NA=MID$(NA,2,6):M="MACHINE CODE":GOTO120
100 IF LEFT$(NA,1)=EA AND MID$(NA,6,2)=NA THEN M="ASSEMBLER":NA=MID$(NA,2,6):GOT
0120
110 IF LEFT$(NA,3)<>DF THEN NA="????":M="DATA FILE"
120 GOSUB 350:PRINT"File no. "I:PRINT"Name "M:PRINT"The name of this "M" file is
: "I:NA:":PRINTLI:PN(F)=NA:PK(F)=M
130 OUT 255,0:IF INP(255)=127 THEN C=C+1
140 IF C=17 THEN 100
150 OUT 255,0:IF INP(255)=255 AND (C>1 AND C<15) THEN C=C-
160 IF PEEK(14400)=120 THEN 200
170 GOTO 130
180 F=F+1:C=0:OUT 255,0:OUT 255,1:OUT 255,0:POKE 15422,32:POKE 15423,32:NA="":GOT
O 70
190 DATA 243,205,150,2,33,32,125,6,9,205,53,2,119,35,16,249,261
200 CLS
210 PRINT#0,1:INPUT"do you wish to print out a catalogue?B:IF B="N"THEN 330 ELSE
IF B(">Y" THEN 210
220 IF PEEK(14891)=0 THEN 240
230 IF PEEK(14312)<>63 GOSUB 320:GOTO 210
240 IF INP(253)<>63 GOSUB 320:GOTO 210
250 INPUT"Enter TABULATION value":TA:IF TA<1 OR TA>50 THEN 250
260 LPRINT TAB(TA)"CATALOGUE FOR TAPES"
270 LPRINT TAB(TA);STRING$(10,42):LPRINT:LPRINT
280 LPRINT TAB(TA)" File no. Name. Type.":LPRINT TAB(TA);STRING$(39,45)
290 FOR I=1 TO F:LPRINT TAB(TA);I:TAB(TA+31);I:TAB(TA+12);PN(I);TAB(25);PK(I);T
AB(TA+30);I:
300 NEXT I
310 LPRINT TAB(TA);STRING$(39,45);STRING$(3,13):GOTO210
320 PRINT:PRINT### PRINTER NOT ON-LINE ###:RETURN
330 CL0:INPUT"do you wish to scan another tape (B), or finish (F)"B
340 IF B="B" THEN RUN ELSE IF B="F" THEN END ELSE 330
350 IF PEEK(14416)+PEEK(14417)*256 =>16192 THEN PRINT#304,1
360 RETURN
    
```



## Brimstone Part One

by Paul Gallagher

Brimstone is a three-part adventure game for the Dragon 32/Tandy Color; parts two and three will be published in the next two issues of APC. Part one will be of particular interest to Advanced Dungeons and Dragons players, as it provides a means of evolving new characters by closely following the AD+D format. It was designed by an AD+D player to generate new characters, and also allows preparation of the characters' subsequent development when group AD+D sessions are not in session. It's so comprehensive that it represents a game in its own right, as well as being a useful

tool for AD+D players.

The program creates and equips a single character at a time, and then allows the final result to save as a file. No knowledge of Dungeons and Dragons' character formation is required as full instructions are given in the program. Several characters can be thus generated and combined into a variety of adventure parties.

Next month we'll publish the first scenario for your newly-developed character. This will be a traditional dungeon which uses the basic AD+D rules and 'dice' percentages. Up to four

characters can adventure together, so you may like to get a team of characters together with friends to tackle the 75-room, seven floor dungeon that's coming. Alternatively, one person could control between one to four characters making up an adventure party. Survivors of that dungeon can progress to part three, 'The Tavern', in two months' time.

It's also easy to create your own dungeons, so if the following scenarios are a success we'll publish more dungeons sent in by other 'Dungeon masters'.

# PROGRAMS

```

5 'BRIMSTONE PART I:copywrite P.Gallagher 1984
10 DIM E$(22),F$(1,22):GOTO50
20 K0=INKEY$:IFK0=""THEN20ELSERETURN
30 PRINT@257,STRING$(31,32):PRINT:PRINT:PRINT:PRINT:PRINT:RETURN
40 '*****
50 CLS:PRINT@167,"DUNGEON & DRAGONS":PRINT@230,"CHARACTER GENERATOR"
60 GOSUB20 'DELAY*
70 PRINT:PRINT"THIS SUB-PROGRAM GENERATES SIX INITIAL CHARACTERS FOR YOU TO
CHOOSE ONE & THEN ADAPT IT TO YOUR REQUIREMENTS."
80 PRINT:PRINT"THIS PROCESS CLOSELY FOLLOWS THEA.D.& D.PLAYER'S HANDBOOK."
90 PRINT:PRINT"YOU CAN THEN SAVE YOUR CHARACTERFOR SUBSEQUENT ADVENTURES IN A
PARTY OF UP TO FOUR."
100 '***BASIC ABILITIES ROUTINE**
110 FORI=1TO3
120 S(1)=S(1)+RND(6):S(2)=S(2)+RND(6):S(3)=S(3)+RND(6):S(4)=S(4)+RND(6):S(5)=S(5)
+RND(6):S(6)=S(6)+RND(6)
130 I(1)=I(1)+RND(6):I(2)=I(2)+RND(6):I(3)=I(3)+RND(6):I(4)=I(4)+RND(6):I(5)=I(5)
+RND(6):I(6)=I(6)+RND(6)
140 W(1)=W(1)+RND(6):W(2)=W(2)+RND(6):W(3)=W(3)+RND(6):W(4)=W(4)+RND(6):W(5)=W(5)
+RND(6):W(6)=W(6)+RND(6)
150 C(1)=C(1)+RND(6):C(2)=C(2)+RND(6):C(3)=C(3)+RND(6):C(4)=C(4)+RND(6):C(5)=C(5)
+RND(6):C(6)=C(6)+RND(6)
160 D(1)=D(1)+RND(6):D(2)=D(2)+RND(6):D(3)=D(3)+RND(6):D(4)=D(4)+RND(6):D(5)=D(5)
+RND(6):D(6)=D(6)+RND(6)
170 R(1)=R(1)+RND(6):R(2)=R(2)+RND(6):R(3)=R(3)+RND(6):R(4)=R(4)+RND(6):R(5)=R(5)
+RND(6):R(6)=R(6)+RND(6)
180 NEXT:GOSUB 20 'DELAY*
190 CLS:PRINT"CHARACTER 1 2 3 4 5 6"
200 PRINT:GOSUB740'***ABILITIES**
210 FORX=1TO6
220 PRINT@74+X*3,"":PRINTUSING"##"S(X)
230 PRINT@106+X*3,"":PRINTUSING"##"I(X)
240 PRINT@138+X*3,"":PRINTUSING"##"W(X)
250 PRINT@170+X*3,"":PRINTUSING"##"C(X)
260 PRINT@202+X*3,"":PRINTUSING"##"D(X)
270 PRINT@234+X*3,"":PRINTUSING"##"R(X)
280 NEXTX
290 PRINT@304,"CHOOSE ONE SET OF ABILITIES":INPUTA
300 IFINT(A)<1ORINT(A)>6THEN290
310 S=S(A):I=I(A):W=W(A):C=C(A):D=D(A):R=R(A)
320 CLS:PRINT"CHARACTER ";A:" BASIC ABILITIES"
330 GOSUB740'***ABILITIES**
340 GOSUB830'***ABILITY VALUES**
350 GOSUB970'***RACE ADJUSTMENT**
360 PRINT@15,R0
370 GOSUB830'***ABILITY VALUES**
380 GOSUB30 '***CLEAR**
390 GOSUB1060'***CHARACTER CLASS**
400 PRINT@10,R0:"":CLS
410 GOSUB30 '***CLEAR**
420 PRINT@320,"WHAT IS THIS CHARACTER'S NAME" INPUTN:PRINT@0,"":N$="":R$:"
":CLS
430 GOSUB30 '***CLEAR**
440 PRINT@352,"DO YOU WISH TO CONVERT ANY OF ";N$;"S ABILITIES.(Y/N)" INPUTQ0
450 GOSUB30 '***CLEAR**
460 IF Q0=""THEN ON A1 GOSUB 1150,1240,1330,1460 'ABILITY TRADE*
470 GOSUB1870'*** GOLD & HP **
480 ON A1 GOSUB 1630,1690,1750,1810 'SUB-CLASS ROUTINE*
490 LL=1:PRINT@0,N0:"":R0:"":C0:"":LEVEL:"LL:"")
500 IF S>17 THEN B$=RIGHT$(STR$(B),2):PRINT@20,"/";B$
510 PRINT@114,"GOLD";G0;"G":
520 IF C0="RANGER"THEN HP=HP+RND(8)
530 IF C<7 THEN HP=HP-1
540 IF C=15 THEN HP=HP+1
550 IF C>15 THEN HP=HP+2
560 PRINT@146,"BASIC";HP;"HP"
570 GOSUB1930*STR. ADJUSTMENTS*
580 PRINT@178,"HIT +";STR$(SB);
590 PRINT@210,"DAMAGE +";STR$(DB);
600 PRINT@242,"CARRY:";WA;
610 GOSUB30:PRINT@263,"*** WEAPONS ***" PRINT@0,"": YOU MAY CHOOSE FROM:"
620 ON A1 GOSUB 2060,2140,2240,2380,2060,2480,2610,2240,2240,2240 '*** WEAPONS
****
630 AC=9:GOSUB30 '***CLEAR**
640 ON A1 GOSUB 2730,2820,2820,3110,2730,2730,3110,2820,2820,3110 '*** ARMOUR
& AC ****
650 GOSUB20 '***DELAY**
660 GOSUB3190 '***EQUIPMENT**
670 IFA1=1THEN GOSUB3940 '*** MU SPELLS **
680 IFA1=2THEN GOSUB4350 '*** CLERIC SPELLS **
690 IFA1=5THEN GOSUB4240 '*** ILLUSIONIST'S SPELLS **
700 IFA1=7THEN GOSUB4460 '*** DRUID'S SPELLS **
710 GOSUB3740'FINAL CHARACTER*
720 GOSUB4560 'SAVE ROUTINE*
730 END
740 '***** ABILITIES*****
750 PRINT@64,"STRENGTH ";
760 PRINT@96,"INTELLIGENCE ";
770 PRINT@128,"WISDOM ";
780 PRINT@160,"CONSTITUTION ";
790 PRINT@192,"DEXTERITY ";
800 PRINT@224,"CHARISMA ";
810 RETURN
820 '*****
830 '**** ABILITY VALUES ****
840 IF S>18 THEN S=18
850 PRINT@70,"":PRINTUSING"##"S;
860 IF I>18 THEN I=18
870 PRINT@110,"":PRINTUSING"##"I;
880 IF W>18 THEN W=18
890 PRINT@142,"":PRINTUSING"##"W;
900 IF C>18 THEN C=18
910 PRINT@174,"":PRINTUSING"##"C;
920 IF D>18 THEN D=18
930 PRINT@206,"":PRINTUSING"##"D;
940 IF R>18 THEN R=18
950 PRINT@238,"":PRINTUSING"##"R:RETURN
960 '*****
970 '***RACE ADJUSTMENT ROUTINE**
980 PRINT@257,"WHAT RACE DO YOU WISH TO BE:"PRINT" HUMAN":PRINT" ELF":PRINT"
DWARF":PRINT" HALF-ELVEN ";:INPUTR$
990 IF R0="HUMAN"THEN RETURN
1000 IF R0="ELF"THEN D=D+1:C=C-1:RETURN
1010 IF R0="DWARF"THEN C=C+1:R=R-1:RETURN

```



# PROGRAMS

```

1020 IF R0="HALFLING" THEN S=S-1:D=D+1:RETURN
1030 IF R0="HALF-ELVEN" THEN D=D+1:RETURN
1040 GOTO970 'CHOOSE AGAIN
1050 '*****
1060 '*****CHARACTER CLASS*****
1070 PRINT@257,"WHAT CHARACTER CLASS DO YOU";PRINT" WISH TO BE:  MAGICIAN";PRINT
@334,"CLERIC";PRINT@366,"FIGHTER";PRINT@398,"THIEF";INPUTC0
1080 IFC0="MAGICIAN"AND C0="HUMAN"OR R0="ELF"OR R0="HALF-ELVEN">AND I>8 AND D>5 T
HEN A1=1:RETURN
1090 IFC0="CLERIC"AND C0="HUMAN"OR R0="HALF-ELVEN">AND W>8 THEN A1=2:RETURN
1100 IFC0="FIGHTER"AND S>8 AND C>6 THEN A1=3:RETURN
1110 IFC0="THIEF"AND D>8 THEN A1=4:RETURN
1120 GOSUB30:PRINT@290,"YOUR PRIME ABILITIES ARE TOO  LOW OR YOUR RACE IS INEL
IGIBLE FOR THIS CLASS.";PRINT" PLEASE CHOOSE AGAIN.";GOSUB20:GOSUB30:GOTO1060
1130 '*****
1140 'XABILITY VALUE TRADE*
1150 'X* MAGICIAN *X
1160 PRINT@299,"1) 2 WISDOM."
1170 PRINT@331,"2) 3 STRENGTH."
1180 FORX=1TO2STEP0:GOSUB1550
1190 IF 0=1 AND I<18 AND W>10 THEN I=I+1:W=W-2:GOSUB830: XABILITY VALUES*
1200 IF 0=2 AND I<18 AND S>11 THEN I=I+1:S=S-3:GOSUB830
1210 IF 0=3 AND I<17 AND W>10 AND S>11 THEN I=I+2:W=W-2:S=S-3:GOSUB830
1220 IF 0=4 THEN RETURN
1230 NEXTX'*****
1240 'X* CLERIC *X
1250 PRINT@299,"1) 3 STRENGTH."
1260 PRINT@331,"2) 2 INTELLIGENCE."
1270 FORX=1TO2STEP0:GOSUB1550
1280 IF 0=1 AND W<18 AND S>11 THEN W=W+1:S=S-3:GOSUB830
1290 IF 0=2 AND W<18 AND I>10 THEN W=W+1 I=I-2:GOSUB830
1300 IF 0=3 AND W<17 AND S>11 AND I>10 THEN W=W+2:S=S-3:I=I-2:GOSUB830
1310 IF 0=4 THEN RETURN
1320 NEXTX'*****
1330 'X* FIGHTER *X
1340 PRINT@299,"1) 2 INTELLIGENCE."
1350 PRINT@331,"2) 3 WISDOM."
1360 FORX=1TO2STEP0:GOSUB1550
1370 IF R0="HALFLING"AND S>16 THEN RETURN
1380 IF R0="ELF"AND S>17 THEN B=RND(75)
1390 IF R0="HALF-ELVEN"AND S>17 THEN B=RND(90)
1400 IF (R0="HUMAN"OR R0="DWARF") AND S>17 THEN B=RND(100)
1410 IF S>17 OR 0=4 THEN RETURN
1420 IF 0=1 AND S<18 AND I>10 THEN S=S+1:I=I-2:GOSUB830
1430 IF 0=2 AND S<18 AND W>11 THEN S=S+1:W=W-3:GOSUB830
1440 IF 0=3 AND S<17 AND I>10 AND W>11 THEN S=S+2:I=I-2:W=W-3:GOSUB830
1450 NEXTX'*****
1460 'X* THIEF *X
1470 PRINT@299,"1) 2 INTELLIGENCE."
1480 PRINT@331,"2) 1 WISDOM."
1490 FORX=1TO2STEP0:GOSUB1550
1500 IF 0=1 AND D<18 AND I>10 THEN D=D+1:I=I-2:GOSUB830
1510 IF 0=2 AND D<18 AND W>9 THEN D=D+1:W=W-1:GOSUB830
1520 IF 0=3 AND D<17 AND I>10 AND W>9 THEN D=D+2:I=I-2:W=W-1:GOSUB830
1530 IF 0=4 THEN RETURN
1540 NEXTX'*****
1550 'XGENERAL ABILITY TRADE*
1560 PRINT@257,C0: ", YOU MAY CONVERT:";
1570 PRINT@363,"3) BOTH. ";
1580 PRINT@395,"4) NONE. ";
1590 PRINT@416,"YOU CANNOT DECREASE ANY ABILITY BELOW NINE.";INPUT0
1600 RETURN
1610 '*****
1620 'X** SUB-CLASS CHOICE **
1630 'X* ILLUSIONIST *X
1640 IF R0<>"HUMAN"OR I<15 OR D<16 THEN RETURN
1650 GOSUB30 'XCLEAR*
1660 PRINT@288,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTURE AS AN ILLUSIONIST.
DO YOU WISH TO CONVERT TO THIS  SUB-CLASS.";INPUTQ@1670 IF LEFT@Q@,1)="Y" THEN
C0="ILLUSIONIST":A1=5
1680 RETURN'*****
1690 'XDRUID/MONK*
1700 Q0="" IF R0="HUMAN"AND S>14 AND W>14 AND C>10 AND D>14 THENGOSUB30:PRINT@2
88,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTURE AS A MONK. DO YOU WISH TO CONV
ERT TO THIS CLASS.";INPUTQ0
1710 IF LEFT@Q0,1)="Y" THEN C0="MONK":A1=6:RETURN
1720 IF (R0="HUMAN" OR R0="HALF-ELVEN">AND W>11 AND R>14 AND LEFT@Q0,1)<>"Y" THE
N GOSUB30:PRINT@288,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTURE AS A DRUID.DO
YOU WISH TO CONVERT TO THIS CLASS.";INPUTQ0
1730 IF LEFT@Q0,1)="Y" THEN C0="DRUID":A1=7
1740 RETURN'*****
1750 'XRANGER/PALADIN*
1760 Q0="" IF R0="HUMAN"AND S>11 AND I>8 AND W>12 AND C>8 AND R>16 THENGOSUB30:
PRINT@288,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTURE AS A PALADIN.DO YOUWISH
TO CONVERT TO THIS CLASS.";INPUTQ0
1770 IF LEFT@Q0,1)="Y" THEN C0="PALADIN":A1=8:RETURN
1780 IF (R0="HUMAN"OR R0="HALF-ELVEN">AND S>12 AND I>12 AND W>13 AND LE
FT@Q0,1)<>"Y" THEN GOSUB30:PRINT@288,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTU
RE AS A RANGER.DO YOU WISH TO CONVERT TO THIS CLASS.";INPUTQ0
1790 IF LEFT@Q0,1)="Y" THEN C0="RANGER":A1=9
1800 RETURN'*****
1810 'X* ASSASSIN *X
1820 IF R0="HALFLING"OR S<12 OR I<11 OR D<12 THEN RETURN
1830 GOSUB30 'XCLEAR*
1840 PRINT@288,"YOUR ABILITIES ARE HIGH ENOUGH TO ADVENTURE AS AN ASSASSIN.
DO YOU WISH TO CONVERT TO THIS  SUB-CLASS.";INPUTQ@1850 IF LEFT@Q@,1)="Y" THEN
C0="ASSASSIN":A1=10
1860 RETURN'*****
1870 'X* INITIAL MONEY & HP *X
1880 IF C0="CLERIC" THEN GP=(RND(6)+RND(6)+RND(6))*10:HP=6+RND(2)
1890 IF C0="FIGHTER" THEN GP=(RND(4)+RND(4)+RND(4)+RND(4)+RND(4)+RND(4))*10:HP=8+RND(2)
IF C=17 THEN HP=HP+1ELSE IF C=18 THEN HP=HP+2
1900 IF C0="MAGICIAN" THEN GP=(RND(4)+RND(4))*10:HP=4
1910 IF C0="THIEF" THEN GP=(RND(6)+RND(6))*10:HP=6
1920 RETURN'*****
1930 'X*STRENGTH ADJUSTMENTS*
1940 IF S<12 THEN SB=0:DB=0:WA=500:RETURN
1950 IF S=12 OR S=13 THEN SB=0:DB=0:WA=600:RETURN
1960 IF S=14 OR S=15 THEN SB=0:DB=0:WA=700:RETURN
1970 IF S=16 THEN SB=0:DB=1:WA=850:RETURN
1980 IF S=17 THEN SB=1:DB=1:WA=1000:RETURN
1990 IF S=18ANDB<1 THEN SB=1:DB=2:WA=1250:RETURN
2000 IFB<51 THENSB=1:DB=3:WA=1500:RETURN

```

# PROGRAMS

```

2010 IFB<75THENS=2:DB=3:WA=1750:RETURN
2020 IFB<90THENS=2:DB=4:WA=2000:RETURN
2030 IFB<100THENS=2:DB=5:WA=2500:RETURN
2040 IFB<100THENS=3:DB=6:WA=3500:RETURN
2050 '*****
2060 '**** WEAPONS ****
2070 '***MAGICIAN/ILLUSIONIST**
2080 PRINT@352,"1. DAGGER(2) 2. 2DARTS(1) 3. STAFF(2)";PRINT"YOU MAY PURCH
ASE ANY ONE.";INPUTW1
2090 IFW1=1THENW@C(1)="DAGGER":GP=GP-2
2100 IFW1=2THENW@C(1)="2DARTS":GP=GP-1
2110 IFW1=3THENW@C(1)="STAFF":GP=GP-2
2120 PRINT@114,"GOLD";GP;"GP";
2130 RETURN'*****
2140 '***CLERIC**
2150 PRINT@320,"1. FLAIL(3) 2. HAMMER(1) 3. MACE(8) 4. STAFF(2)"
2160 FORX=1TO2:PRINT@448,"YOU MAY PURCHASE ANY TWO.";INPUTW1
2170 IFW1=1THENW@C(X)="FLAIL":GP=GP-3
2180 IFW1=2THENW@C(X)="HAMMER":GP=GP-1
2190 IFW1=3THENW@C(X)="MACE":GP=GP-8
2200 IFW1=4THENW@C(X)="STAFF":GP=GP-2
2210 PRINT@114,"GOLD";GP;"GP";
2220 NEXT:RETURN
2230 '*****
2240 '***FIGHTER CLASS & ASSASSIN**
2250 PRINT@320,"1. DAGGER(2) 2. BATTLE-AXE(5) 3. SPEAR(1) 4. BROAD-SWORD(10)
5. MACE(8) 6. SHORT-SWORD(8) 7. LONG-BOW(12) 8. CROSS-BOW(12)";
2260 FORX=1TO3:PRINT@448,"YOU MAY PURCHASE ANY THREE.";INPUTW1
2270 IFW1=1THENW@C(X)="DAGGER":GP=GP-2
2280 IFW1=2THENW@C(X)="BATTLE-AXE":GP=GP-5
2290 IFW1=3THENW@C(X)="SPEAR":GP=GP-1
2300 IFW1=4THENW@C(X)="BROAD-SWORD":GP=GP-10
2310 IFW1=5THENW@C(X)="MACE":GP=GP-8
2320 IFW1=6THENW@C(X)="SHORT-SWORD":GP=GP-8
2330 IFW1=7THENW@C(X)="LONGBOW":GP=GP-12
2340 IFW1=8THENW@C(X)="CROSS-BOW":GP=GP-12
2350 PRINT@114,"GOLD";GP;"GP";
2360 NEXT:RETURN
2370 '*****
2380 '***THIEF**
2390 PRINT@320,"1. DAGGER(2) 2. 2DARTS(1) 3. SLING(2) 4. SWORD(8)"
2400 FORX=1TO2:PRINT@448,"YOU MAY PURCHASE ANY TWO.";INPUTW1
2410 IFW1=1THENW@C(X)="DAGGER":GP=GP-2
2420 IFW1=2THENW@C(X)="2DARTS":GP=GP-1
2430 IFW1=3THENW@C(X)="SLING":GP=GP-2
2440 IFW1=4THENW@C(X)="SWORD":GP=GP-8
2450 PRINT@114,"GOLD";GP;"GP";
2460 NEXT:RETURN
2470 '*****
2480 '***MONK**
2490 PRINT@320,"1. CROSSBOW(12) 2. DAGGER(2) 3. HAND-AXE(1) 4. JAVELIN(1)
5. POLE-ARM(6) 6. SPEAR(1) 7. STAFF(2) 8. CLUB(2)";
2500 PRINT@448,"YOU MAY PURCHASE ANY ONE.";INPUTW1
2510 IFW1=1THENW@C(1)="CROSSBOW":GP=GP-12
2520 IFW1=2THENW@C(1)="DAGGER":GP=GP-2
2530 IFW1=3THENW@C(1)="HAND-AXE":GP=GP-1
2540 IFW1=4THENW@C(1)="JAVELIN":GP=GP-1
2550 IFW1=5THENW@C(1)="POLE-ARM":GP=GP-6
2560 IFW1=6THENW@C(1)="SPEAR":GP=GP-1
2570 IFW1=7THENW@C(1)="STAFF":GP=GP-2
2580 IFW1=8THENW@C(1)="CLUB":GP=GP-2
2590 PRINT@114,"GOLD";GP;"GP";
2600 RETURN'*****
2610 '***DRUID**
2620 PRINT@320,"1. DAGGER(2) 2. 2DARTS(1) 3. HAMMER(1) 4. SCIMITAR(15)
5. SPEAR(1) 6. STAFF(2)";
2630 FORX=1TO2:PRINT@448,"YOU MAY PURCHASE ANY TWO.";INPUTW1
2640 IFW1=1THENW@C(X)="DAGGER":GP=GP-2
2650 IFW1=2THENW@C(X)="2DARTS":GP=GP-1
2660 IFW1=3THENW@C(X)="HAMMER":GP=GP-1
2670 IFW1=4THENW@C(X)="SCIMITAR":GP=GP-15
2680 IFW1=5THENW@C(X)="SPEAR":GP=GP-1
2690 IFW1=6THENW@C(X)="STAFF":GP=GP-2
2700 PRINT@114,"GOLD";GP;"GP";
2710 NEXT:RETURN
2720 '*****
2730 '***ARMOUR & ARMOUR CLASS**
2740 '***MU/ILLUSIONIST/MONK**
2750 PRINT@320,"YOU ARE NOT ALLOWED TO WEAR ANY ARMOUR.YOUR ARMOUR CLASS = 9":AC
=9
2760 IFD<7THEN AC=AC+1:PRINT" DEXTERITY PENALTY -1: AC=";AC;
2770 IFD<15THEN AC=AC-1:PRINT" DEXTERITY BONUS +1: AC=";AC;
2780 IFD<16THEN AC=AC-2:PRINT" DEXTERITY BONUS +2: AC=";AC;
2790 IFD<17THEN AC=AC-3:PRINT" DEXTERITY BONUS +3: AC=";AC;
2800 IFD<18THEN AC=AC-4:PRINT" DEXTERITY BONUS +4: AC=";AC;
2810 RETURN'*****
2820 '***CLERIC/FIGHTER CLASS**
2830 CLS:PRINT"YOU MAY PURCHASE ANY ARMOUR:"
2840 PRINT" 1.LEATHER OR PADDED(5)"
2850 PRINT" 2.LEATHER + SHIELD(17)"
2860 PRINT" 3.RING MAIL(30)"
2870 PRINT" 4.RING MAIL + SHIELD(42)"
2880 PRINT" 5.SCALE MAIL(45)"
2890 PRINT" 6.SCALE MAIL + SHIELD(57)"
2900 PRINT" 7.CHAIN MAIL(75)"
2910 PRINT" 8.CHAIN MAIL + SHIELD(87)"
2920 PRINT" 9.SPLINT OR BANDED MAIL(90)"
2930 PRINT"10.SPLINT/BANDED + SHIELD(102)"
2940 PRINT"11.PLATE MAIL(400)"
2950 PRINT"12.PLATE MAIL + SHIELD(412)"
2960 PRINT@450,"GOLD";GP;"GP";INPUTAA
2970 IFAA=1ANDGP>5THENAI@="LEATHER":GP=GP-5:AC=8
2980 IFAA=2ANDGP>17THENAI@="LEATHER+SHIELD":GP=GP-17:AC=7
2990 IFAA=3ANDGP>30THENAI@="RING MAIL":GP=GP-30:AC=7
3000 IFAA=4ANDGP>42THENAI@="RINGMAIL+SHIELD":GP=GP-42:AC=6
3010 IFAA=5ANDGP>45THENAI@="SCALE MAIL":GP=GP-45:AC=6
3020 IFAA=6ANDGP>57THENAI@="SCALEMAIL+SHIELD":GP=GP-57:AC=5
3030 IFAA=7ANDGP>75THENAI@="CHAIN MAIL":GP=GP-75:AC=5
3040 IFAA=8ANDGP>87THENAI@="CHAINMAIL+SHIELD":GP=GP-87:AC=4
3050 IFAA=9ANDGP>90THENAI@="SPLINT MAIL":GP=GP-90:AC=4
3060 IFAA=10ANDGP>102THENAI@="SPLINTMAIL+SHIELD":GP=GP-102:AC=3
3070 IFAC=9THEN2960
3080 PRINT@450,"GOLD";GP;"GP. ARMOUR CLASS=";AC

```





# PROGRAMS

```

4210 IFF(5)=1ANDF(6)=1ANDF(7)=1THENF(5)=0:F(6)=0:F(7)=0
4220 IFS(3)="1"THENF(S3)=1:PRINT@448,"UNSUCCESSFUL-TRY ANOTHER SPELL.":GOTO4170
4230 PRINT@416,S(3)": SUCCESSFUL."
4240 GOSUB20 'XDELAYX
4250 RETURN 'XXXXXXXXXXXXXXXXXXXX
4260 '** ILLUSIONIST'S SPELLS**
4270 CLS:PRINT@96," XILLUSIONIST'S SPELL-BOOK*"
4280 S(1)="COLOUR SPRAY":S(2)="HYPNOTISM":S(3)="DETECT MAGIC":PRINT:PRINT
4290 PRINT@200," 1.":S(1)
4300 PRINT@232," 2.":S(2)
4310 PRINT@264," 3.":S(3)
4320 PRINT:PRINT@329,"-----XXX-----"
4330 GOSUB20:RETURN
4340 'XXXXXXXXXXXXXXXXXXXXXXXXXXXX
4350 '** CLERIC'S SPELLS **
4360 CLS:PRINT@100,"**CLERIC'S SPELLS**"
4370 IF W(13) THENPRINT@160,"YOU ONLY HAVE SUFFICIENT WISDOM TO CARRY ONE SPELL..
..
4380 IF W=13 THENPRINT@160,"YOUR WISDOM GIVES YOU A BONUS.. ENABLING YOU TO CARR
Y TWO SPELLS"
4390 IF W(13) THENPRINT@160,"YOUR WISDOM GIVES YOU A BONUS...ENABLING YOU TO CARR
Y..... THREE SPELLS."
4400 S(1)="CURE LIGHT WOUNDS"
4410 PRINT@262,"1.":S(1)
4420 IF W=13 THENPRINT@294,"2.COMMAND(h)":S(2)="COMMAND(h)"
4430 IF W(13) THENPRINT@294,"2.COMMAND(h)":S(2)="COMMAND(h)":PRINT@326,"3.DETECT
MAGIC":S(3)="DETECT MAGIC"
4440 PRINT:PRINT@390,"-----XXX-----":GOSUB20
4450 RETURN'XXXXXXXXXXXXXXXXXXXX
4460 '** DRUID'S SPELLS **
4470 CLS:PRINT@100,"**DRUID'S SPELLS**"
4480 IFW(13)THENPRINT@160,"YOUR WISDOM ALLOWS YOU TO CARRY TWO SPELLS...."
4490 IF W(12) THENPRINT@160,"YOUR WISDOM GIVES YOU A BONUS.. ENABLING YOU TO CARR
Y..... THREE SPELLS:"
4500 S(1)="ENTANGLE":S(2)="DETECT MAGIC"
4510 PRINT@262,"1.":S(1)
4520 PRINT@294,"2.":S(2)
4530 IFW(12)THENS(3)="CURE LIGHT WOUNDS":PRINT@326,"3.":S(3)
4540 PRINT:PRINT@390,"-----XXX-----":GOSUB20
4550 RETURN'XXXXXXXXXXXXXXXXXXXX
4560 '**SAVE CHARACTER ROUTINE**
4570 NB(1)=NB:RB(1)=RB:CB(1)=CB:MB(1)=LEFT(NB,B)
4580 BB(1)=BB:AB(1)=AB:LB(1)=LL:WB(1)=W(1):W2(1)=W(2):W3(1)=W(3)
4590 SS(1,1)=S(1):SS(1,2)=S(2):SS(1,3)=S(3)
4600 S(1)=I:I(1)=W(1):W(1)=C(1):D(1)=D(1):R(1)=R
4610 GP(1)=GP:HP(1)=HP:SB(1)=SB:DB(1)=DB:WA(1)=WA:AC(1)=AC:SP(1)=SP:SM(1)=SM:LI
(1)=LI
4620 CLS:PRINT@5,"*DO YOU WISH TO SAVE*":PRINT@39,"*THIS CHARACTER*"
4630 PRINT@77,"":QB=INKEY#
4640 IFQB="N"THENEND
4650 IFQB="Y"THEN4670
4660 GOTO4630
4670 PRINT:PRINT" PREPARE TAPE & THEN PRESS ANY KEY....."
4680 KB=INKEY#:IF KB="":THEN4680
4690 PRINT@234,"**SAVING**":PRINT@260,NB(1):OPEN"O",#-1,MB(1)
4700 PRINT@-1,NB(1),RB(1),CB(1),LB(1),B(1),I(1),W(1),C(1),D(1),R(1)
4710 PRINT@-1,B(1),GP(1),HP(1),HP(1),DB(1),WA(1),WB(1),W2(1),W3(1),A(1),AC
(1),LI(1),E(1),Q(1)
4720 FORX=1TOB:PRINT@-1,F(1,X),SS(1,X):NEXTX:FORX=1TO5:PRINT@-1,T(1,X):NEXTX
4730 CLOSE#-1:PRINT@234,"**DONE**":RETURN

```

## Spectrum Life by ITR and JH

This must be the shortest and fastest 'Life' program ever written for the Spectrum. For anyone who hasn't yet seen the game of Life, here are two simple rules:

- 1) A cell dies if it has more than three or fewer than two neighbours.
- 2) A cell is born if an empty space has exactly three neighbouring cells.

A random screen of cells is generated first, then successive colonies. Eventually, a colony will either die out, become stable and static or stable and dynamic. Pressing any key at any time will return the routine to Basic. To re-start the program, type in the following two lines and RUN the program:

```

10 RANDOMIZE USR 32768
20 GOTO 10

```

The machine code routine is 159 bytes in length, residing at address 32768. The 'playing area' uses the attribute area onscreen, with each generation built up in a 768-byte table, then block loaded onto the screen. The program produces approximately nine generations per second; the code is simple and interesting to disassemble and modify.

```

10 CLEAR 32767
20 FOR F=32768 TO32926
30 READ N: POKE F,N:NEXT F
40 BORDER 0: PAPER 0:CLS
50 RANDOMISE USR 32768: GOTO 50
100 DATA 4,17,6,3,33,-2,-1,58,252,-1,31,
31,31,31,174,15,203,22,43,203,22,43
110 DATA 203,22,43,203,22,58,-2,-1,230,
1,237,68,2,3,27,122,179,32,219,221,33,0
120 DATA 88,33,0,129,17,0,88,1,0,3,237,176,
219,-2,238,-1,192,38,88,17,0,91

```



# PROGRAMS

- 130 DATA 14, 32, 237, 176, 33, 224, 90, 17, 224, 87, 14, 32, 237, 176, 38, 129, 1, 0, 3, 221, 126, 1
- 140 DATA 237, 68, 221, 86, 33, 146, 221, 86, 32, 146, 221, 86, 31, 146, 221, 86, -1, 146, 221, 86, 223, 146
- 150 DATA 221, 86, 224, 146, 221, 86, 225, 146, 221, 86, 0, 245, 122, 167, 40, 23, 241, 54, 0, -2, 4, 48
- 160 DATA 6, -2, 2, 56, 2, 54, -1, 35, 221, 35, 11, 120, 177, 32, 194, 24, 148, 119, 241, 254, 3, 32
- 170 DATA 240, 54, 255, 24, 236



## Dayfinder by Mark Needham

Following the APC Teach yourself Lisp series (August - October issues), here is a short Lisp program to determine which day of the week any given date in history was on, or will be on in the future. The program will run on practically any Lisp system as it's written using common Lisp commands. Dayfinder allows you to find out what day you were born on, what day your next birthday will be on, or what day it will be on in a hundred ears' time. The program will work out the

day for any given date based on the current calendar system. Also submitted with the program was a Basic version, which graphically illustrated that Lisp can be very readable and understandable, unlike most Basics.

To run the program, type:  
(WHAT-DATE '(dd mm yy yy))  
where dd is the day, mm is the month, and yy yy is the year. So, for example, to find the day for the 16th of September 1984, type:

(WHAT-DATE '(16 9 19 84))

The day, month and two parts of the year must be separated by spaces, and the whole date must be surrounded by brackets as shown with an apostrophy in front. The number entered is checked for illegal dates.

As Lisp is an extensible language, it would be easy to incorporate this routine into any Lisp program.

```
(DEFUN WHAT-DATE (DATE)
(FIND-DATE DATE)
(SETQ DATE-OK T)
(COND
((OR (GREATERP MONTH 12) (LESSP MONTH 1)
(GREATERP YEAR1 99) (LESSP YEAR1 0)
(GREATERP YEAR2 99) (LESSP YEAR2 0)
(GREATERP DAY 31) (LESSP DAY 1))
(SETQ DATE-OK 0)))
(COND
((EQ DATE-OK T)
(SETQ MONTHS (LIST 31
(COND ((EQ (REMAINDER YEAR2 4) 0) 29)
(T 28)) 31 30 31 30 31 31 30 31 30 31))
(SETQ TEMP MONTHS)
(SETQ A MONTH)
(LOOP
(SETQ B (CAR TEMP))
(SETQ TEMP (CDR TEMP))
(UNTIL (ZEROP (SETQ A (SUB1 A))))))
(COND
((GREATERP DAY B) (SETQ DATE-OK 0))))))
(COND
((EQ DATE-OK 0) (PRINC 'ERROR)))
(T
(SETQ DAYS (QUOTE (SUN MON TUE WED THU FRI SAT)))
(SETQ MONS (QUOTE (JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC)))
(SETQ A (QUOTE (5 4 3 2 1 0 6)))
(CALC-DATE)
(PRINT-DATE)
)))

(DEFUN FIND-DATE (DATE1)
(COND ((EQ DATE1 NIL) (SETQ DATE1 (QUOTE (-1)))))
(SETQ DAY (CAR DATE1))
(COND ((LISTP (CDR DATE1)) (SETQ DATE1 (CDR DATE1)))
(T (SETQ DATE1 (QUOTE (-1)))))
(SETQ MONTH (CAR DATE1))
(COND ((LISTP (CDR DATE1)) (SETQ DATE1 (CDR DATE1)))
(T (SETQ DATE1 (QUOTE (-1)))))
(SETQ YEAR1 (CAR DATE1))
(COND ((LISTP (CDR DATE1)) (SETQ DATE1 (CDR DATE1)))
(T (SETQ DATE1 (QUOTE (-1)))))
(SETQ YEAR2 (CAR DATE1)))

(DEFUN CALC-DATE ()
(SETQ T1 (ADD1 (REMAINDER YEAR1 7)))
(LOOP (SETQ D1 (CAR A))
```

# PROGRAMS

```

(SETQ A (CDR A))
(UNTIL (ZEROP (SETQ T1 (SUB1 T1))))
(SETQ T1 (REMAINDER (TIMES 5 (QUOTIENT YEAR2 4)) 7))
(SETQ O1 (SKIP (PLUS O1 T1)))
(SETQ T1 (REMAINDER YEAR2 4))
(COND ((GREATERP T1 0)
(SETQ O1 (SKIP (PLUS O1 T1 1)))))
(SETQ N 0)
(SETQ L MONTH)
(COND ((GREATERP L 1)
(SETQ L (SUB1 L))
(LOOP (SETQ N (PLUS N (CAR MONTHS)))
(SETQ MONTHS (CDR MONTHS))
(UNTIL (ZEROP (SETQ L (SUB1 L))))))
(SETQ N (REMAINDER (PLUS N DAY -1) 7))
(SETQ O1 (AOD1 (SKIP (PLUS O1 N))))
(LOOP (SETQ TODAY (CAR DAYS))
(SETQ DAYS (CDR DAYS))
(UNTIL (ZEROP (SETQ O1 (SUB1 O1))))))

(DEFUN PRINT-DATE ()
(PRINTC)
(PRINC TODAY BLANK (QUOTE THE) BLANK DAY BLANK
(COND ((OR (EQ DAY 1) (EQ DAY 21) (EQ DAY 31))
(QUOTE ST))
((OR (EQ DAY 2) (EQ DAY 22))
(QUOTE ND))
((OR (EQ DAY 3) (EQ DAY 23))
(QUOTE RD))
(T (QUOTE TH)))
BLANK
(QUOTE OF) BLANK)
(LOOP (SETQ MON (CAR MONS))
(SETQ MONS (CDR MONS))
(UNTIL (ZEROP (SETQ MONTH (SUB1 MONTH))))
(PRINC MON BLANK YEAR1 YEAR2))

(DEFUN SKIP (X)
(COND ((GREATERP X 6)
(DIFFERENCE X 7))
(T X)))

```



## Commodore 64 Gremlin's Garden

by Tony Crowther

Gremlin's Garden features some brilliant sprite animation and user defined graphics, and the action is machine code controlled for speed and smooth motion.

It's an update of an old favourite, Snake — in which you guide a caterpillar round a garden, collecting butterflies and avoiding mushrooms. To complicate matters, every time you pick up a butterfly, another mushroom grows and if that isn't enough, you have the option of adding an extra hazard in the form of a bird which sets after you in non-stop pursuit.

Average scores should be around 4,000 points — high scorers should look for 8-10,000 points.

### How it works

0 Sets screen and border colours to blue, sets up four user defined graphics for the mushrooms. Calls set-up routine at line 3050.

1-9 Switch to user defined graphics, set volume to maximum, select multicolour sprites and set sprite pointers.

10 Sets all sprite positions to 0, calls title screen.

11-16 Set initial positions.

18 Prints mushroom and updates score

20 Calls machine code routine for movement.

30 If nothing happens then loop.

35 If butterfly collected then update score, print another mushroom.

40-110 Print collision message, check for high score and update, restart game.

500-711 Data for redefined characters and sprites.

800-853 Data for machine code routines.

1000-1004 Define screen and colour strings and take a slice for random position.

2110-2130 Get input for bird option and check joystick for start.

3000-4001 Set up sprites and machine code.

```

0 POKES3280,6:POKES3281,6:FORI=0TO31:REA
DA:POKE1228B+192*8+I,A:NEXT:GOTO3050
1 SYS49152:POKE53248+24,29:POKE53275,255
2 PRINT"(CLR)":POKE54296,15
3 POKES3286,0:POKES3285,1
4 POKE2040,201:FORI=0TO4:POKE2041+I,200:
NEXT:POKE2047,210

```



# PROGRAMS

```
5 POKE53248+21,255
6 POKE53264,0
7 POKE53248+28,255
8 POKE53288,3:POKE53289,5:POKE53290,3:PO
KE53291,5:POKE53292,3
9 POKE53287,2
10 SYS49225:FORI=0TO11:POKE53248+I,0:NEX
T:GOSUB2000
11 POKE53262,150:POKE53263,150
15 A=RND(1)*200+40:POKE2046,209:POKE5329
3,2
16 B=RND(1)*170+50:POKE53260,A:POKE53261
,B
17 FORI=1TO10:A=PEEK(53278):A=PEEK(53279
):NEXT
18 GOSUB1000
20 SYS49253
30 IFPEEK(1022)=0THEN20
35 IFPEEK(1022)=2THENGOSUB150:GOTO15
40 PRINT"(HOME) (CUR DN) (CUR DN) (CUR DN) (
CUR DN) (BLK)          YOU ARE HIT"
50 FORI=0TO100:POKE54276,0:POKE54273,I:P
OKE54277,2:POKE54276,33:NEXT
60 GOTO100
100 IFSC>HITHENHI=SC
105 PRINT"(HOME) (CUR DN) (WHT) (CUR DN) (CU
R DN) (CUR DN) (CUR DN) (CUR DN) (CUR DN) (CU
R DN) (CUR DN) "TAB(31)HI
110 GOTO9
150 POKE54276,0:POKE54273,200:POKE54277,
27+32:POKE54276,17:RETURN
500 DATA3,15,15,31,31,31,63,63
501 DATA192,240,240,248,248,248,252,252
502 DATA9,1,1,3,3,7,28,0
503 DATA184,128,128,192,192,96,184,0
600 DATA0,0,0,2,160,0,10,168
601 DATA0,10,168,0,42,170,0,42
602 DATA170,0,42,170,0,42,170,0
603 DATA10,168,0,10,168,0,2,160
604 DATA0,0,0,0,0,0,0,0
605 DATA0,0,0,0,0,0,0,0
606 DATA0,0,0,0,0,0,0,0
607 DATA0,0,0,0,0,0,0,0
608 DATA0,0,0,48,3,0,14,172
609 DATA0,11,184,0,42,170,0,42
610 DATA170,0,42,170,0,37,150,0
611 DATA41,154,0,10,168,0,2,32
612 DATA0,0,0,0,0,0,0,0
613 DATA0,0,0,0,0,0,0,0
614 DATA0,0,0,0,0,0,0,0
615 DATA0,0,0,0,0,0,0,0
616 DATA0,48,0,2,176,0,10,176
617 DATA0,38,184,0,41,170,0,38
618 DATA175,192,42,154,0,10,102,0
619 DATA42,168,0,2,160,0,2,0
620 DATA0,0,0,0,0,0,0,0
621 DATA0,0,0,0,0,0,0,0
622 DATA0,0,0,0,0,0,0,0
623 DATA0,0,0,0,0,0,0,0
624 DATA0,0,0,2,160,0,10,168
625 DATA192,10,107,0,41,110,0,10
626 DATA170,0,10,170,0,41,110,0
627 DATA10,107,0,10,168,192,2,160
628 DATA0,0,0,0,0,0,0,0
629 DATA0,0,0,0,0,0,0,0
630 DATA0,0,0,0,0,0,0,0
631 DATA0,0,0,0,0,0,0,0
```

# PROGRAMS

632 DATA0,0,0,2,0,0,2,160  
633 DATA0,42,168,0,10,102,0,42  
634 DATA154,0,38,175,192,41,170,0  
635 DATA38,184,0,10,176,0,2,176  
636 DATA0,0,48,0,0,0,0,0  
637 DATA0,0,0,0,0,0,0,0  
638 DATA0,0,0,0,0,0,0,0  
639 DATA0,0,0,0,0,0,0,0  
640 DATA0,0,0,2,32,0,10,168  
641 DATA0,41,154,0,37,150,0,42  
642 DATA170,0,42,170,0,42,170,0  
643 DATA11,184,0,14,172,0,48,3  
644 DATA0,0,0,0,0,0,0,0  
645 DATA0,0,0,0,0,0,0,0  
646 DATA0,0,0,0,0,0,0,0  
647 DATA0,0,0,0,0,0,0,0  
648 DATA0,0,0,0,32,0,2,160  
649 DATA0,10,170,0,38,104,0,41  
650 DATA170,0,254,166,0,42,154,0  
651 DATA11,166,0,3,168,0,3,160  
652 DATA0,3,0,0,0,0,0,0  
653 DATA0,0,0,0,0,0,0,0  
654 DATA0,0,0,0,0,0,0,0  
655 DATA0,0,0,0,0,0,0,0  
656 DATA0,0,0,2,160,0,202,168  
657 DATA0,58,104,0,46,90,0,42  
658 DATA168,0,42,168,0,46,90,0  
659 DATA58,104,0,202,168,0,2,160  
660 DATA0,0,0,0,0,0,0,0  
661 DATA0,0,0,0,0,0,0,0  
662 DATA0,0,0,0,0,0,0,0  
663 DATA0,0,0,0,0,0,0,0  
664 DATA3,0,0,3,160,0,3,168  
665 DATA0,11,166,0,42,154,0,254  
666 DATA166,0,41,170,0,38,104,0  
667 DATA10,170,0,2,160,0,0,32  
668 DATA0,0,0,0,0,0,0,0  
669 DATA0,0,0,0,0,0,0,0  
670 DATA0,0,0,0,0,0,0,0  
671 DATA0,0,0,0,0,0,0,0  
672 DATA0,0,0,12,12,0,43,58  
673 DATA0,150,229,128,149,149,128,149  
674 DATA149,128,37,150,0,37,150,0  
675 DATA9,152,0,37,150,0,150,37  
676 DATA128,150,37,128,40,10,0,0  
677 DATA0,0,0,0,0,0,0,0  
678 DATA0,0,0,0,0,0,0,0  
679 DATA0,0,0,0,0,0,0,0  
680 DATA0,0,0,0,0,0,0,0  
681 DATA0,0,32,0,0,32,0,0  
682 DATAB4,0,4,84,64,21,17,80  
683 DATA21,85,80,85,85,84,85,85  
684 DATAB4,81,85,20,64,84,4,0  
685 DATAB4,0,0,16,0,0,16,0  
686 DATA0,84,0,0,84,0,0,68  
687 DATA0,0,0,0,0,0,0,0  
688 DATA0,0,0,0,0,0,0,0  
689 DATA0,0,32,0,0,32,0,0  
690 DATAB4,0,4,84,64,5,17,64  
691 DATA21,85,80,21,85,80,21,85  
692 DATAB0,17,85,16,16,84,16,0  
693 DATAB4,0,0,16,0,0,16,0  
694 DATA0,84,0,0,84,0,0,68  
695 DATA0,0,0,0,0,0,0,0  
696 DATA0,0,0,0,0,0,0,0  
697 DATA0,0,32,0,0,32,0,0  
698 DATAB4,0,4,84,64,5,17,64  
699 DATA5,85,64,5,85,64,5,85



# PROGRAMS

700 DATA64,5,85,64,4,84,64,4  
701 DATA84,64,0,16,0,0,16,0  
702 DATA0,84,0,0,84,0,0,68  
703 DATA0,0,0,0,0,0,0,0  
704 DATA0,0,0,0,0,0,0,0  
705 DATA0,0,32,0,0,32,0,0  
706 DATA84,0,0,84,0,1,17,0  
707 DATA5,85,64,5,85,64,21,85  
708 DATA80,17,85,16,16,84,16,0  
709 DATA84,0,0,16,0,0,16,0  
710 DATA0,84,0,0,84,0,0,68  
711 DATA0,0,0,0,0,0,0,0  
800 DATA120,169,51,133,1,169,0,133  
801 DATA250,169,204,133,251,169,0,133  
802 DATA252,169,44,133,253,160,0,152  
803 DATA41,7,201,5,144,8,177,250  
804 DATA10,145,252,76,54,192,201,2  
805 DATA176,8,177,250,74,145,252,76  
806 DATA54,192,177,250,145,252,200,208  
807 DATA222,230,251,230,253,165,253,201  
808 DATA50,208,210,169,55,133,1,88  
809 DATA96,162,0,169,50,157,80,195  
810 DATA169,150,157,81,195,232,232,224  
811 DATA100,208,240,96,1,2,4,8  
811 DATA100,208,240,96,1,2,4,8  
812 DATA16,32,64,128,173,173,0,220  
813 DATA41,2,240,3,206,80,195,173  
814 DATA0,220,41,1,240,3,238,80  
815 DATA195,173,0,220,41,4,240,3  
816 DATA238,81,195,173,0,220,41,8  
817 DATA240,3,206,81,195,173,0,220  
818 DATA73,127,24,141,255,3,234,234  
819 DATA234,162,100,189,79,195,157,81  
820 DATA195,202,208,247,162,0,160,0  
821 DATA185,80,195,157,1,208,185,81  
822 DATA195,157,0,208,232,232,152,24  
823 DATA105,12,168,224,12,208,233,173  
824 DATA255,3,240,40,160,201,201,2  
825 DATA240,31,200,201,6,240,26,200  
826 DATA201,4,240,21,200,201,5,240  
827 DATA16,200,201,1,240,11,200,201  
828 DATA9,240,6,200,201,8,240,1  
829 DATA200,140,248,7,76,241,192,0  
830 DATA234,238,239,192,173,239,192,201  
831 DATA3,144,54,162,0,142,239,192  
832 DATA173,0,208,56,237,14,208,141  
833 DATA252,3,173,1,208,56,237,15  
834 DATA208,141,253,3,201,128,144,6  
835 DATA206,15,208,76,33,193,238,15  
836 DATA208,173,252,3,201,128,144,6  
837 DATA206,14,208,76,49,193,238,14  
838 DATA208,173,239,192,201,1,208,15  
839 DATA238,255,7,173,255,7,201,214  
840 DATA144,5,169,210,141,255,7,169  
841 DATA0,141,254,3,173,30,208,141  
842 DATA251,3,41,128,240,13,173,251  
843 DATA3,41,64,208,6,169,1,141  
844 DATA254,3,96,162,200,160,230,200  
  
845 DATA208,253,232,208,248,173,251,3  
846 DATA41,64,240,13,173,251,3,41  
847 DATA128,208,6,169,2,141,254,3  
848 DATA96,173,31,208,141,249,3,41  
849 DATA128,240,9,173,249,3,56,233  
850 DATA128,141,249,3,173,249,3,41  
851 DATA64,240,9,173,249,3,56,233  
852 DATA64,141,249,3,173,249,3,240

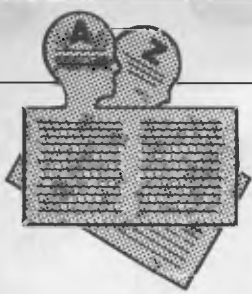
# PROGRAMS

```
853 DATA6,169,1,141,254,3,96,76,101,192
1000 A$="{RVS DN}{^*}{^A}{CUR DN}{CUR L}
{CUR L}{^B}{^C}":B$="{CUR RT}{CUR RT}{CU
R RT}{CUR RT}{CUR RT}{CUR RT}{CUR RT}{CU
R RT}{CUR RT}{CUR RT}{CUR RT}{CUR RT}{CU
R RT}{CUR RT}{CUR RT}{CUR RT}{CUR RT}{CU
R RT}{CUR RT}{CUR RT}{CUR RT}{CUR RT}{CU
R RT}{CUR RT}{CUR RT}"
1001 D$="{HOME}{CUR DN}{CUR DN}{CUR DN}{
CUR DN}{CUR DN}{CUR DN}{CUR DN}{CUR DN}{
CUR DN}{CUR DN}{CUR DN}{CUR DN}{CUR DN}{
CUR DN}{CUR DN}{CUR DN}{CUR DN}{CUR DN}"
1002 C$="{OR}{BRN}{LT RED}{GY 1}{GY 2}{L
T GRN}{GY 3}{LT BLU}{BLK}{WHT}{RED}{CYN}
{PUR}{GRN}{YEL}":A=INT(RND(1)*14)+1:PRIN
TMID$(C$,A,1)

1003 A=INT(RND(1)*12)*2:PRINTLEFT$(D$,A+
1);
1004 A=INT(RND(1)*14)*2:PRINTLEFT$(B$,A+
1);A$="{HOME}"
1005 SC=SC+(L*10):L=L+1
1006 PRINT"{HOME}{CUR DN}{CUR DN}{CUR DN}
{CUR DN}{CUR DN}{CUR DN}{WHT}"TAB(31)SC
1010 RETURN
2000 POKE53269,0:GOSUB3000:L=0:SC=0:POKE
198,0
2010 PRINT" {GRN} GREMLIN'S GARDEN
2020 PRINT"{CUR DN} {WHT} WRITTEN BY A
.CROWTHER
2030 PRINT"{CUR DN}{CUR DN}{CUR DN}{YEL}
COLLECT BUTTERFLIES
2040 PRINT" AVIOD MUSHROOMS AND BIRD
2050 PRINT"{CUR DN}{LT BLU} OPTIONS
'A' 'B'
2060 PRINT" BIRD YES NO"
2065 PRINT"{CUR DN}{CUR DN}{CUR DN}{CYN}
JOYSTICK PORT IC"
2070 PRINT"{HOME}{CUR DN}{CUR DN}{CUR DN}
{CUR DN}{CUR DN}{CUR DN}"TAB(32)"{BLK}SCORE"
2080 PRINTTAB(31)SC"{CUR L} "
2090 PRINTTAB(32)"{CUR DN}HIScore"
2100 PRINTTAB(31)HI
2110 GETA$
2111 IF(PEEK(56320)AND16)=0THENA$="A"
2120 IFA$="A"THENPOKE53269,255:L=20:GOTO
3000
2130 IFA$="B"THENPOKE53269,127:GOTO3000
2135 GOTO 2110
3000 PRINT"{HOME}";
3001 A$=" "
3002 FORI=1TO24:PRINTA$:NEXT:PRINTA$"{HO
ME}"
3003 RETURN
3050 PRINT"{CLR}LOADING DATA FOR PROGRAM
"
3060 PRINT"PLEASE WAIT!!"
4000 FORI=0TO895:READA:POKE12800+I,A:NEX
T
4001 FORI=0TO433:READA:POKE49152+I,A:NEX
T:GOTO 1
```

READY.





# USER GROUPS INDEX

**DIRECT  
ACCESS**

Below is a complete list of User Groups known to us in Australia and New Zealand. User Groups' Secretaries are asked to provide us with alterations, additions and corrections as promptly as possible to avoid a longer than necessary delay before publication. During the next five months these changes will be published and the next complete listing will appear in the May 1985 issue of APC.

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
<b>NEW SOUTH WALES</b>			
A.P.F. User Group	A.P.F.	—	Norm Mc Mahon 288 Kissing Point Road, Turramurra, 2074 (02) 44 2645
Apple User Group	Apple	2nd Monday of each month at the Sydney Grammar School Science Auditorium, College Street, City at 6.30pm.	Apple User Group PO Box 505 Bankstown 2200
Ausborne User Group	Osborne	Every 3rd Wednesday of the month at 6.30pm at the North Sydney Council Chambers, 200 Miller Street.	Ian Stretton Napier Box C530 Clarence Street, Sydney 2000
Australian Unix User Group	Unix	—	Chris Campbell P.O. Box 324, Pymble 2073 (02) 449 4400
Australasian ZX User Group	Sinclair Computers — ZX80, ZX81 and Spectrum	—	Send S.A.S.E. to: P.O. Box 397, Dapto 2530 (042) 615 451
Broken Hill MicroBee Users Group	MicroBee	—	Peter Cotter 533 Radium Street, Broken Hill 2880 (080) 88 1621 After Hours
Compucolor User Group	Compucolor	—	President NSW CCI User Group Tony Lee 52 Cowan Road St Ives 2075
Compu-tech Computer Club	Commodore VIC 20, C-64 and PET	VIC-20 chapter meets 1st Tuesday of every month. C-64 and PET chapter meets 4th Tuesday of every month.	Geoff Rayner P.O. Box 115, Mayfield 2304
Hunter User Group	General	Meets at University of Newcastle, Room W308 Education Building on the 2nd Wednesday of each month at 7.30pm.	Secretary, P.O. Box 39, Broadmeadow 2292
Illawarra Apple Core	Apple computer	Meets on the 4th Monday of each month at Holy Spirit College, Bond Street, Bellambi at 8pm.	Bob Williams (042) 96 6115
Illawarra Super 80 User Group	Super 80	Meets on the 1st Monday of each month at 5.30pm at 86 Market Street, Wollongong	P.O. Box 1775, Wollongong 2500
MicroBee User Group	MicroBee	—	Eric Eulenstein 202 Kooba Street, Albury 2640 (060) 25 1601
Newcastle Microcomputer Club	General	Meets on the 2nd and 4th Monday of each month at 7.30pm in Room G12, Physics Building, University of Newcastle.	P.O. Box 293, Hamilton 2303 or Anthony Bliss (049) 67 2433 Tony Nicholson (049) 52 6017

# USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
NSW Peach User Club	Hitachi Peach	Monthly meetings are held on the 1st Saturday of each month. Contact them for location details	Daniel Soussi 37 Mooramie Street, Kensington 2033
PC User Group	IBM PCs and compatibles	Meeting on 17 December at the training rooms of Deloitte Haskins and Sells, Level 7, 18 Bent Street, Sydney.	
Southern Districts Commodore User Group	Commodore	Meets on the 1st and 3rd Wednesday of every month.	A Toms President 3 Lucille Crescent Casula 2170
Sydney Apple User Group	Apple	Meets at the Sydney Grammar School Science Auditorium on the 2nd Monday of each month at 6.30pm	Frank Reville (047) 36 448
Sydney Forth Group	General	Meets at Room LG19, John Goodsell Commerce Building, University of NSW on 2nd Friday of each month at 7pm	Peter Tregear 10 Binda Avenue, Yowie Bay 2228 (02) 524 7490 (AH)
Sydney MicroBee User Group	MicroBee	Meets on the 3rd Saturday of each month at the McMahon's Point Community Centre, Blues Point Road, North Sydney from 1pm to 5pm, and the 1st Tuesday of each month at the Auburn Girls High School, Braemar Street, Auburn from 7pm to 9pm.	President/Editor Colin Tringham S.M.U.G. PO Box C233 Clarence Street Sydney 2001
T.I.S.H.U.G.	Texas Instruments TI-99/4 and other 16 bit TMS 9900-based personal computers	—	John Robinson P.O. Box 149, Pennant Hills 2120
Texas Instruments User Group	Texas Instruments	Meetings are held on the 1st Saturday of each month at St John's Hall, Victoria Street, Darlinghurst.	Shane Anderson Editor TISHUG PO Box 595 Marrackville 2204
The Blue Mountain Computer Club	General	Meetings are held at Springwood Civic Centre on the 2nd and 4th Friday of each month at 7.30pm	Eric Lindsay 6 Hillcrest Avenue, Faulconbridge (047) 512 258 (AH)
The Central Coast Apple User Group	Apple and Apple compatible	Meetings are held on the 1st Tuesday of each month at the Niagara Park Public School from 7.30pm.	662 The Entrance Road Warmbernal 2260
Wollongong Computer Club	General	—	P.O. Box 397 Dapto 2530 (042) 615 451
<b>VICTORIA</b>			
Apple User Society of Melbourne	Apple	Meetings are held on the first Saturday of each month at the Burwood Regional Community Education Centre, Burwood Highway, Melbourne.	Graham Willis AUSOM PO Box 43 Forest Hills 3131
Compucolor User Group	Compucolor	Meets on the second Wednesday of each month at the Community Centre, Surrey Hills, Victoria.	CUVIC PO Box 420 Camberwell 3124
Forth Interest Group	Forth	Meets on the 1st Friday of each month at 8pm. Contact secretary for details	Lance Collins, P.O. Box 103, Camberwell 3124 (03) 29 2600
Geelong Commodore Computer Club	Commodore	—	D Gerrard Geelong Commodore Computer Club C/- 15 Jacaranda Place Belmont Geelong 3216
Lap Computer User Group	All lap computers	—	The Secretary Lap Computer User Group Box 2884DD GPO Melbourne 3001



# USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Melbourne Atari Computer Enthusiasts Group	Atari	Usually held at the Rotunda at Monash University on the 1st Sunday of each month at 11.40am	Peter Coleman M.A.C.E. Secretary, P.O. Box 133, Mulgrave North 3170
Melb PC User Group	IBM and compatibles	Next meeting to be held on December 12, 5.15pm at Clunies Ross Hall, 191 Royal Parade, Parkville.	Stephen Wagen C/- Pannell Kerr Forster 14th Floor 500 Bourke Street Melbourne 3000
Melbourne VIC 20 User Group	VIC-20	Meetings are held on the 4th Wednesday of every month at Box Hill TAFE Building No 4, 465 Elgar Road at 7.30pm	John Ruddock P.O. Box 252 Northcote 3070
NEC Portable User Group	NEC 8201A	Meetings are held on the 2nd Wednesday of each month at Myers Computer Centre, Lonsdale Street, Melbourne, 7.30pm.	D Green (03) 611 3380 (BH)
Osborne User Group	Osborne	—	Osborne User Group PO Box 169 Camberwell 3124
Otrona Attache User Group	Otrona Attache	—	David Broadbent Chairman (03) 528 2792
Peninsula Group	General	Meets at the Frankston Library on the 2nd Tuesday of each month	M.G. Thompson (03) 772 2674
RCA VIP, ETI 660, Dream 6800 or Comx 35 Micros	RCA VIP, ETI 660, Dream 6800, Comx 35	—	Frank Rees 27 King Street, Boort 3537
Sorcerer Computer Users (Australia)	Sorcerer	—	Gordon Ohlenrott GPO Box 2402 Melbourne 3001
Spectravideo User Group	Spectravideo	—	Mitch Raitt Fernhill Tidals Road Warrandyte 3113
The Color Computer Club	TRS-80 Color Computer	Meets on the 1st Friday of each month at Geelong College at 8pm	Andrew Gay 3 Quamby Avenue, North Geelong 3215 (052) 78 3424
The Eastern Suburbs Eighty User Group	TRS-80/System 80	Meets on the 4th Wednesday of each month at the Junior Science Lab, Kingswood College, 355 Station Street, Box Hill, Victoria	Cameron McKern ESEUG 8 Chestnut Street Surrey Hills 3127 (03) 288 1713 (AH)
TI-99/4 Users Group Melbourne	TI-99/4	Meets monthly at Victoria College, Burwood	Wayne Worlidge 123 Ashburn Grove, Ashburton 3147 (03) 25 1832
<b>ACT.</b>			
ACT Apple	Apple	Meets on the 2nd Thursday of each month	Eddie Tsui, Secretary P.O. Box 1231, Canberra City 2601
ACT VIC 20 User Association	VIC 20	Meets each month. Details available from Association	Chris Groenhout 25 Kerferd Street, Watson 2602 (062) 412 316
ASUG	Sirius (Victor 9000)	—	Rob Judd 31 Altree Crescent, Phillip 2605
Atari User Group of Canberra	Atari	Meetings are held on the first Monday of each month at 8pm. 1st Floor, Building A, Canberra TAFE College, Reid.	ACTARI PO Box E112 Old Canberra ACT 2600
Canberra Micro-80 Users Group	TRS-80, System 80 and any other Z80 based microcomputers	Meets on the 3rd Monday of each month in the large lecture theatre of Building J, Canberra Technical College, Constitution Avenue, Reid at 7.30pm	M.J. Cottee 33 Crawford Crescent, Flynn 2615 (062) 58 8822

# USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
MICSIG	General	Meetings held on 2nd Tuesday of each month at the Oliphant Building, Australian National University at 7.45pm.	Registrar, MICSIG, P.O. Box E237, Old Canberra ACT 2600
NEC User Group of Canberra	NEC	Meets on the 1st Tuesday of each month at the Main Conference Room, CSIRO Headquarters, Limestone Avenue, Canberra at 7.30pm.	Mal Smith PO Box 173 Belconnen 2616 (062) 541 614
The Australian ZX Users Association	ZX80, ZX81 and Zx Spectrum Microcomputers	—	AZUA 19 Godfrey Street, Campbell 2601
<b>QUEENSLAND</b>			
Adventure Club	General	—	Ms Christine Ogden 37 Samford Road Leichhardt, Ipswich Queensland 4305
Apple-Q Brisbane User Group	Apple	Meets every 3rd Sunday of the month at Hooper Education Centre, Kuran Street, Wavell Heights 8.30am — 4.30pm	David Bourne P.O. Box 721, South Brisbane 4101
Australian Computer Education Association	General	—	Guy Coppens, ACEA PO Box 4075 (07) 379 9365 John Egan P.O. Box 274, Springwood 4127 (07) 287 2705
Commodore Computer Users Group Queensland	Commodore	Meetings are held on the 1st Tuesday of the month at 7.30pm at Milton State Primary School, Bayswater Road, Milton	Chris Lucey 34 Lawless Street, Blackwater 4717
Cranium Computers	General	—	Medfly User Group 120 Highgate Street Coopers Plain 4108
Medfly User Group	Medfly	—	Ed Richardson 146 York Street, Nundah 4012
Ohio Superboard User Group	Ohio Scientific Microcomputers	—	Glen McBride (07) 371 4243 (AH) (07) 377 2763 (BH)
Osborne Users Group	Osborne	—	Leo Burke (07) 356 6080 or Brian Williams 19 Patrick Street, Norman Park
Peach Computer Users Group Queensland	All MB6890 users	Meets every 4th Tuesday at 7.30pm, Taringa Primary School, Brisbane	Mark Tischler P.O. Box 3, Wavell Heights, Brisbane 4012
PC 1500/PC 2 Club	PC 1500 and PC 2 users	—	Bill Fitzpatrick 5/19 Huth Street, Labrador 4215 (075) 32 0061 Mrs V Lewis Secretary 37 Samford Road Leichhardt Ipswich Queensland 4305
S.C.C.U.G.	Commodore	Every Monday night at 7pm (ex school holidays), Labrador State School, Turpin Road, Labrador	R Saunders P.O. Box 57, Aspley 4034
Sinclair Computer Club	Sinclair Spectrum	Meets every third Sunday of each month, 2.00pm at Everton Park State High School, Brisbane.	John Johnson (077) 79 5628 After Hours
T.I.B.U.G.	TI 99/4 users	Meets 1st Friday every month	
Townsville MicroBee User Group	MicroBee	Meets at 7.30pm on the 2nd Monday of each month at Town & Country Computers, CTL Centre, Anne Street, Aitkenvale	



# USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
The Brisbane Spectravideo User Group	Spectravideo	Meetings are held every 3rd Wednesday of each month at the Logan City Education Centre, Block G, Woodridge Primary School, Wembley Road, Woodridge.	Peter Daunton Computer Connection Shop 10 Logan City Centre Pacific Highway Underwood 4119 (07) 341 3466 (BH)
TRS-80/System 80 Computer Group	TRS-80/System 80	Meets on the 1st Sunday of each month, 2pm, at Lindum Hall, Lindum Road, Lindum.	W Allen Secretary 16 Laver Street Macgregor 4109 (07) 343 5771
User Group for the TRS-80 Model I and III, MC-10, COCO, System 80, Apple and Commodore 64	TRS-80 Model I and III, MC-10, COCO, System 80, Apple and Commodore 64	—	Chris Lucey 34 Lawless Street Blackwater Queensland 4717 (079) 826 146
<b>SOUTH AUSTRALIA</b>			
Commodore User Group	Commodore	Meets on the 2nd Tuesday of each month at the Royal Caledonian Hall, 379 King William Street at 7.30pm.	Commodore User Group PO Box 427 North Adelaide
Kaypro User Group	Kaypro	—	Ralph Engler Kaypro User Group 16/34 John Street Payneham SA 5070
MicroBee Users Group of South Australia	MicroBee	—	Brian Uren GPO Box 767, Adelaide 5001 (08) 260 5038
Sorcerer User Group of South Australia	Sorcerer	Meetings are held on the 2nd Wednesday of every month at Adelaide University in the Eric Russel room of the Lower Napier Building	Don Ide 14 Scott Road, Newton 5074
IBM PC SA User Group	All 8088 users are welcome	Meets on the first Thursday of each month at the location advertised in the newsletter	Don Richards P.O. Box 68, Walkerville 5081 (08) 261 9590
SA Foundation for Computer Literacy	Caters for children aged from six years of age with special emphasis on the needs of handicapped, educably disabled and socially disadvantaged children.	—	SA Foundation for Computer Literacy PO Box 210 Norwood SA 5067
SA Microprocessor Group	General	Meetings are held on the 2nd Friday of each month at the Adelaide Archery Club Rooms, Cnr Bundeys and War Memorial Drive, North Adelaide.	Secretary (08) 793 445
TRS-80 User Group	TRS-80	—	R.G. Stevenson 36 Stuart Street, Adelaide 5000 (08) 51 5241 (BH) (08) 337 6682 (AH)
Adelaide Atari Computer Club	Atari	Meets at Gilles Street Primary School on 1st Monday of each month (2nd if 1st is on a public holiday)	N Pearce P.O. Box 333, Norwood 5067
Beebnet Inc	BBC & Econet users	—	P.O. Box 262 Kingswood 5062
Hitachi User Group	Hitachi	—	Geoff Drury 27 Creslin Terrace, Camden Park 5038 (08) 295 2778 After Hours

## SPECTRAVIDEO ADD-ONS

AUSTRALIAN DESIGNED AND BUILT

### PARALLEL PRINTER INTERFACES—

**SP101:** Plugs into SV318, 328.

Accepts Centronics cable.

Price: **\$70** inc tax.

**SP102:** Plugs into SV601, 602

Expander—includes printer cable. Price: **\$95** inc tax.

**SP102:** With reset button.

Price: **\$100** inc tax.

Add \$2 P&P—Airmail \$1 extra.  
Send Chq/MO or SAE for details.

### New Products Under Review—

RS232 Card, Eprom Burner, Modem, Eprom Card, Memory Expansion, Serial Printer Card, Games and Small Business software.

Send Name & Address, indicating products of interest, and we will keep you informed.

Software Authors...Contact us for marketing your SV software.

**FORREST DATA SERVICES**  
**(09) 339 5087**

P.O. Box 71, Palmyra, W.A. 6157.  
\*DEALER ENQUIRIES INVITED\*

## SOFTWARE FOR LAP COMPUTERS

NEC PC-8201A

Tandy Model-100

Olivetti M-10

- Integrated Software in 32K ROM for NEC PC-8201A Spreadsheet, database, wordprocessing, schedule all in one
- MPLAN Spreadsheet program
- JOURNALIST Wordstar compatible text formatter program
- Other programs available.

Call (02) 670 1610

**SILICON CRAFTS**

## VZ-200

**VZ-Star Trek — \$8.00** — Take Captain Kirk's position on the USS Enterprise, can you beat the klingons on the features of the original main frame game & more.

**The Enchanted Princess — \$9.00** — a well written vocabulary adventure and venture for the VZ-200. Can you save the princess.

**10-pin bowling — \$7.00** — a high resolution, graphic game of ten pin bowling. On screen scoring and up to five players.

**Graphic golf display — \$8.00** — high res game and graphics, green shrubs, bunkers and water hazards. Quite frankly it leaves Uncle Dick's lesson in the game for dead.

All the above games run on the VZ-200 with 16k Ram expansion. Buy all together as the challenging pack for **\$25.00**. Christmas Special 12 great games for the unexpanded VZ-200 at an amazingly low **\$29.95**.

If you have written a VZ-200 program of marketable quality and would like to earn a generous 25% commission on gross sales please submit program on cassette or write for full terms.

**LYSCO**

P. O. Box 265  
Bunbury, W.A. 6230  
TRADE ENQUIRIES WELCOME

## COMMADORE WHOLESALE SOFTWARE

P.O. Box 177  
Coolangatta, Qld 4225

We provide top quality 64 software direct from the programmers

GAMES	
GDBBLER 64	\$9.99
PULSAR 64	\$9.99
GALAXY INVADERS 64	\$9.99
BEEZ 64	\$9.99
SUPA LANDA 64	\$9.99
All games are 100% machine language, great sound, action & colour. Tape only.	
CDVERS. Disk, Printer	\$6.99
Computer & Cassette	\$7.99
SIMPLE WILL	\$9.99
RESIDENTIAL LEASE	\$9.99
COMMERCIAL LEASE	\$9.99
BILL DF SALE GDDDS	\$9.99
BILL DF SALE R.E.	\$9.99
MAIL LIST	\$9.99
DATA BASE	\$9.99
PAYROLL*	\$19.99
REAL ESTATE TRUST*	\$39.99
inc rent roll & sales.	

All programmes on tape. Disk version \$4.00 extra, all for the 64. \*Disk only.

EDUCATION packs for 4 prog available for \$5 per pack. Maths, Grammar, Reading, Spell.

RESET SWITCH \$7.89  
Include \$1.50 per item for post & handling. No extra charge for more than 4 items.

\*\*\* PROGRAMMERS WANTED \*\*\*  
\*\* WRITE FOR FREE CATALOGUE \*\*  
\* COMMERCIAL S/W 20-30% DISC \*

## IBM COMPATIBLES

PC-301 (128K) computer	\$ 2600
PC-301 (256K) computer	\$ 2800
64 K memory kit	\$ 85
Floppy disk drive 360Kbytes	\$ 395
Hercules graphics card	\$ 595
Hard disk adaptor board. IBM PC	\$ 350
Blossom multi-function card 64K	\$ 450
AST sixpack	\$ 445
AST Megaplus. 64K	\$ 445
AST Megapak 256K	\$ 585
PC-NET Card	\$ 900
PC-Net Kit. (2 PCnet + Cluster kit)	\$ 2040
Cluster kit-2 termin.20' cable.soft	\$ 160
PC-Net-Blossom-384 (384kbytes) card	\$ 1800
PC-Net-Blossom-64 (64 K) card	\$ 1240
Monitor for IBM PC	\$ 250
Floppy drive for PCterminal	\$ 820
Printer. CP-80. 80 cps	\$ 360
Printer. EN-P1091. 120 cps	\$ 490
Printer ribbon for CP-80 printer	\$ 11
Printer cable. IBM PC compatible	\$ 45
Winchester hard disk+controller 10M	\$ 2350
Dbase II	\$ 545
Dbase III	\$ 910
Symphony	\$ 800
Lotus 1-2-3	\$ 575
Revelation	\$ 1450
PC DOS 2.0	\$ 150
Knowledgeman	\$ 595
Rbase 4000	\$ 595
Dbase II upgrade	\$ 235
Dutil	\$ 300
Dgraph	\$ 150
Quickcode	\$ 300
TK Solver	\$ 475
Open Access	\$ 760
ATI Training Lotus	\$ 85
ATI Training Dbase II	\$ 85
Multimate	\$ 495

## APPLE COMPATIBLES

Base 64a computer	\$ 600
Computer. SUPERCOM 1000. no drive	\$ 620
Computer. SUPERCOM 1000. 1 Id drive	\$ 950
Computer. SUPERCOM 1000. 2 Id drives	\$ 1290
EPROM writer card	\$ 83
PROM writer card	\$ 309
Floppy disk drive	\$ 350
Floppy disk drive	\$ 330
Floppy disk drive controller card	\$ 54
RS-232C serial card	\$ 162
A/D + D/A card. 12 bit. 16 channels	\$ 334
IEEE-488 card + cable	\$ 176
6522 VIA card	\$ 75
Wild card	\$ 94
Music card	\$ 86
RS-232 serial card	\$ 75
Joystick	\$ 30
80 column switch box	\$ 8
Clock card	\$ 125
Hard disk adaptor board. Apple II	\$ 350
Hard disk adaptor board. Apple III	\$ 350
80 column soft switch	\$ 50
PAL card (with sound)	\$ 95
80 column card with soft switch	\$ 108
80 column card (hard switched)	\$ 84
RGB card	\$ 90
Ram card 16K (NO cable needed)	\$ 89
Ram card. 128K	\$ 257
Monitor. 20Mhz green + base	\$ 220
Monitor. 20Mhz Amber. + base	\$ 235
Monitor. 20Mhz amber. no base	\$ 195
Switching power supply (Taiwan)	\$ 114
Switching power supply (Japan)	\$ 150
EPSON compat. printer card + cable	\$ 70
Microbuffer card (32K) + cable	\$ 195
Buffer printer card (16K) + cable	\$ 220
Z-80 CP/M card	\$ 54
S/ware h.d. driver. Apple II Prodos	\$ 75
S/ware h.d. driver. Apple II CP/M	\$ 75
S/ware h.d. driver. Apple II CPM ALS	\$ 75
S/ware h.d. driver. Apple II Pascal	\$ 75
S/ware h.d. driver. Apple III DOS/SOS	\$ 75

Prices include Sales Tax.  
and are subject to change without notice.

Free Delivery for orders over \$100

\*\*\* Complete system development and consulting for small and medium applications.  
We provide solutions to problems.  
networks and configurations \*\*\*

## PC SOURCE

P.O. Box 362, Matraville, N.S.W., 2036, Aust.  
Phone: (02) 344-8532

## SONFAT Computer & Information Systems,

P.O. Box 103, Artarmon, N.S.W., 2064, Aust.  
Phone: (02) 437-6623



# Everything a personal micro should be



**microbee  
16K Educator  
makes homework  
interesting and stimulating**

Designed to serve the needs of education combining high quality graphics and sound effects capability, microbee 16K Educator has been chosen by the NSW, QLD, and the Australian Schools Commission as a recommended computer for use in schools. Now with Wordbee wordprocessing.

microbee 16K Educator . . . \$449





# microbee Series III now with Built-in Silicon Disk . . .

The best selling microbee is the new 32K Communicator Series III and it is no wonder. The Series III has now been expanded to include 32K of battery backed memory (programs are saved when the power is switched off), 40K of software built-in ROM including Microworld Basic, Wordbee wordprocessor, Telcom 3 with real time clock/alarm, machine code monitor, self testing and full communications capability. Additional 32K of software on ROM can be added to the built-in ROM board to make the Series III 32K microbee the only low cost personal computer on the market with a built-in silicon disk.

The microbee is widely used in Homes, Schools and Business in Australia, New Zealand and worldwide. The features that have made it popular are the functions such as programmable serial and parallel ports, sound effects, high resolution PCG graphics with 512 by 256 bit resolution, programmable 80 by 24 or 64 by 16 screen character display, terminal emulation and communications capability.

The new Telcom ROM which has been added to the Series III turns your microbee into a real time clock with alarm features. It has full communications capability so your Microbee can become a home terminal and talk to other computers across the world via the telephone lines using the BEEMODEM. The new Telcom now has built-in testing, machine code monitor and even a calculator!

microbee has a large range of proven peripherals such as a fast low cost dot matrix printer, a new low cost daisy wheel printer and the new high quality 8401 XY plotter. A large range of software and other accessories means that you will always be able to use your microbee to meet virtually any need.

**microbee 32K Communicator Workstation . . . \$599.00**  
includes 32K microbee Series III and Hi-res Green Monitor.

Available separately:  
microbee 32K Series III . . . \$499.00  
Hi-res.Green Monitor . . . \$149.50  
Hi-res.Amber Monitor . . . \$169.50  
Swivel Base . . . . . \$24.50



**DIRECT ORDERS**  
PHONE (02)487 2711  
TELEX AA72767  
**APPLIED TECHNOLOGY**  
RETAIL PTY LTD

**microbee technology centres**

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

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

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

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

**QLD.**  
455 Logan Road,  
Stones Corner, Qld 4120  
Phone (07) 394 3688

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



# microbee®

Designed and manufactured in Australia



# USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
<b>TASMANIA</b>			
Devonport Computer Interest Group	General	Meets 4th Thursday of each month. Contact group for location details	John Stevenson RSD 422, Sheffield 7306 (004) 92 3237
Tandy Hobart User Group	All Tandy Computers	—	Kristen Rees Secretary GPO Box 127IN Hobart Tasmania (002) 72 1426
Tasbeeb	BBC	Meets on the 1st Monday of each month, 8pm at the Elizabeth Matriculation College, D Block (entrance off Warwick Street) Hobart.	John Hannon PO Box 25 North Hobart Tasmania 7000 (002) 342 704
Tasmanian Computer Group	General	Meets 1st Tuesday of each month. Contact group for location details	Allan Appleby 17 Ninabah Street, Howrah 7018 (002) 30 2386 (BH)
TI 99/4 User Group	TI 99/4 users	Monthly meetings at the University of Tasmania, room 373, on every 3rd Sunday	Rex C. Shepherd 1 Benboyd Court, Rokeby 7019

## NORTHERN TERRITORY

NT Computer Club	Commodore 64, VIC 20 and other machines	Meetings are held at Wulagi Primary School on the 1st and 3rd Thursday of each month at 7.30pm.	Ian Diss NT Computer Club 349 McMillans Road Anula NT 5793 (089) 27 9208
------------------	---	---	--

## WESTERN AUSTRALIA

Osborne User Group (OSWEST)	Osborne and other machines running CP/M	Meetings are held on the first and third Wednesday of each month at the Palmyra Recreation Centre (first Wednesday), Subiaco Exhibition Hall (third Wednesday). Meetings are held at 7.30pm.	The Secretary Oswest PO Box 199 Mundaring 6554
-----------------------------	---	--	---

## NEW ZEALAND

ACES (Auckland Computer Education Society): C/- Director, Computer Centre, Secondary Teachers College, Private Bag, Symonds Street, Auckland. Meets 3rd Thursday, Teachers College, Epsom Avenue, Auckland.

ATARI Microcomputer Users Group: Ian Mason, 25 Manutara Avenue, Forrest Hill. Telephone: 467 347 (H). Meetings: 2nd Tuesday, Western Suburbs Radio Club, Gt North Road, New Lynn.

EPSON HX20 Users Group: C W Nighy. Telephone: 774 268. Meetings: 1st Wednesday, 231 Khyber Pass Road, Auckland.

HP41C Users Group (AK): Grant Buchanan. Telephone: 790 328 (W). Meetings: 3rd Wednesday, Centre Computers, Great South Road, Epsom.

NZ TRS-80 Microcomputer Club: Olaf Skarsholt, 203a Godley Road, Titirangi. Telephone: (09) 817 8698 (H). Meets 1st Tuesday, OSNZ Hall, 107 Hillsborough Road, Mt Roskill.

OSI Users Group (AK): Ken Hartley, 77 Boundary Road, Blockhouse Bay. Meets 3rd Tuesday at the VHF Clubrooms, Hazel Avenue, Mt Roskill.

Christchurch '80 Users Group: Brendon Thompson, P.O. Box 4118, Christchurch. Telephone: (03) 370 381 (A.H.).

Nelson Commodore Users Group: Peter Archer, P.O. Box 860, Nelson, NZ. Telephone: (054) 79 362.

NZ PC 1500 User group: Allan Thomas, P.O. Box 155, Napier, NZ.

Taranaki Microcomputer Society: Keith Smith, P.O. Box 7003, Bellblock, New Plymouth, NZ. Telephone: Waitata 8556.

NZ Microcomputer Club Inc: P.O. Box 6210, Auckland. Monthly meetings the 1st Wednesday of each month at 7.30pm at the OSNZ Hall, 107 Hillsborough Road, Mt Roskill.

OSI/BBC User Group Inc. Gary Plumpton, 15 Reiman Street, New Lynn, Auckland, New Zealand.

*The following User Groups are part of the NZ Micro Club, all meetings start at 7.30pm.*

APPLE Users Group: Ross Bryon. Telephone: 761 670 (H). Meetings: 3rd Tuesday each month at the OSNZ Hall, 107 Hillsborough Road, Mt Roskill.

BBC Users Group: Dave Fielder. Telephone: 770 630 Extn 518 (W). Meetings: 2nd Wednesday at the VHF Clubrooms, Hazel Avenue, Mt Roskill.

BUSINESS Users Group: Cathy Arrow. Telephone 491 012 (H).

Meetings: 4th Tuesday each month. Even months at the VHF Clubrooms, Hazel Avenue, Mt Roskill. Visits to business computer establishments are arranged for odd months.

CP/M Users group: Kerry Koppert. Telephone: 695 355 (H). Meetings: 1st Wednesday 9pm (after the Club meetings) each month at the OSNZ Hall, 107 Hillsborough Road, Mt Roskill.

IBM PC Users Group: Terry Bowden. Telephone: 452 639 (H), 778 910 (W). Meetings



NOW there is a REASON to buy a computer. Introducing . . .

# Meta-4

## the Australian data base adventure

### A WINNER

WINNER of 1st PRIZE in the Business Division of the 1983 AUSOM\* Challenge programming competition sponsored by VERBATIM (Australia)

Pty. Ltd.  
\*Apple Users Society of Melbourne

META4 is a revolutionary new data base system which gives YOU full control of your computer with NO PROGRAMMING. No other data base system even comes near it. Now you can have an integrated Data Base system for your business for only \$395.00. META4 may be the only program you need to buy for your computer.

### 1. MONEY-BACK GUARANTEE

If you are not satisfied with META4, return it within 14 days for a cheerful refund. If you buy from a dealer, check he is prepared to do this before you buy.

### 2. TELEPHONE CONSULTING

If there is something you want clarified after you have purchased META4, ring us up. Maximum time for any one call 15 minutes.

#### BASIC FACILITIES

META4 is a comprehensive Data Base Management system, including:

- FULL DATA BASE
- SIMPLE SPREAD-SHEET
- SIMPLE WORD-PROCESSING
- MAILING LISTS
- STANDARD LETTERS
- LABELS

#### THINK OF AN APPLICATION

META4 is suitable for a very wide variety of business, professional, academic and personal applications, such as

- |                     |               |                |
|---------------------|---------------|----------------|
| <b>BUSINESS</b>     | CUSTOMERS     | QUOTES         |
|                     | ORDERS        | SALES          |
|                     | INVOICES      | ACCOUNTS       |
|                     | CREDITORS     | NAMES          |
|                     | LETTERS       | ADDRESSES      |
|                     | FINANCIAL     | LABELS         |
|                     | SUPPLIERS     | PRODUCTS       |
|                     | CATALOGUES    | PERSONNEL      |
|                     | DRG STRUCTURE | DEPTS          |
| <b>PROFESSIONAL</b> | MEDICAL       | DENTAL         |
|                     | LEGAL         | PHARMACEUTICAL |
|                     | INSURANCE     | FARMING        |
| <b>ACADEMIC</b>     | LIBRARY       | STUDENTS       |
|                     | TIMETABLES    | SCORES         |
|                     | BOOKS         | BORROWERS      |
|                     | PAPERS        | AUTHORS        |
|                     | REFERENCES    | LECTURES       |
|                     | FORMULAE      |                |
| <b>INDUSTRY</b>     | VEHICLES      | REPAIRS        |
|                     | MAINTENANCE   | PRODUCTION     |
| <b>REAL ESTATE</b>  | PROPERTIES    | ENQUIRIES      |
|                     | ADVERTISING   | CLIENTS        |
|                     | RENT          | COMMISSIONS    |
| <b>PROJECT</b>      | TASK LISTS    | SCHEDULES      |
|                     | DIARY         | MEETINGS       |
|                     | MANUALS       | DOCUMENT'N     |
|                     | TIMESHEETS    | ESTIMATING     |
|                     | BUDGETS       |                |

Information from any or all of the above applications can be AUTOMATICALLY LINKED & CROSS-REFERENCED, since META4 is a true Data Base system.

#### BASIC CONCEPTS

META4 uses familiar concepts to aid you in it's use.

**ROOMS** — META4 has many rooms in it. Each room is used to store information about a different type of thing.

**QUESTIONS & ANSWERS** — when you go into a ROOM META4 asks you QUESTIONS about the type of thing (e.g. CUSTOMER INVOICE, PRODUCT etc) held in the ROOM and stores away your ANSWERS.

**RECORDS** — META4 stores the ANSWERS to a set of QUESTIONS in a room as a RECORD. There can be many RECORDS in a room.

**DOORWAYS** — You can move from ROOM to ROOM through DOORWAYS. META4 automatically relates information in one ROOM to information in the rest.

**BUILDINGS** — A building is a collection of related ROOMS and DOORWAYS. A BUILDING corresponds to the traditional concept of a Data Base.

#### META4 IS PORTABLE

Any application you develop under META4 will run without change on any computer that META4 runs on.

#### EASE OF USE

- SIMPLE AND CONSISTENT
- HELP — 3 levels for the current
  - BUILDING you are in
  - ROOM you are in
  - QUESTION being asked
- 3 TUTORIALS
  - USING META4
  - DESIGNING WITH META4
  - META4 EXAMPLES

Designed from the ground up to be totally consistent and as easy to install, learn and use as possible.

#### META 4 IS EXTENDABLE

All the features of the system are fully extendable to your own applications. You can add your own BUILDINGS, ROOMS, DOORWAYS, and QUESTIONS. You can define your own maps, HELP text and tutorials.

#### SELLING YOUR META4 APPLICATIONS

If you wish to sell your application you will have the widest possible market. We will evaluate your application and may assist in marketing it.

#### DETAILED FACILITIES

- Menu drives
- True DATA BASE — RELATIONAL/NETWORK
- Variety of Answer-types e.g. CALCULATED, DATE, YES/NO, NUMERIC, TEXT, LIST
- FULL PROMPTING
- Automatic VALIDATION
- Powerful Selection & Reporting
- All facilities fully EXTENDABLE to user's own applications
- No programming
- Full DATA DICTIONARY defined as a META4 application
- Automatic TOTTALING of lists
- Automatic COPYING of ANSWERS from one room to another
- Automatic MAINTENANCE of records in other rooms (Secondary Index facility)
- Copying of information to and from other products such as WORDSTAR
- B-Tree ISAM Source Code

#### DISK FORMATS AVAILABLE

- 5 1/4" IBM-PC DOS 320K
  - 5 1/4" APPLE-II CP/M 126K
  - 8" CP/M SS/SD 256K
- Other formats by request

#### MINIMUM HARDWARE REQD.

- CP/M — Minimum 56K System
- IBM PC-DOS, MS-DOS — Minimum of 128K RAM
- APPLE-II — 64K RAM, 80-Column Card, CP/M card, 2 diskette drives

#### Prices (inc. Sales Tax)

- |                              |       |          |
|------------------------------|-------|----------|
| Manual alone                 | ..... | \$30.00  |
| META4 (CP/M)                 | ..... | \$395.00 |
| META4 (IBM-PC)               | ..... | \$395.00 |
| META4 (MS-DOS)               | ..... | \$395.00 |
| Non-Standard Disk Conversion | ..... | \$50.00  |
| Post & Packaging             | ..... | \$10.00  |



BACK A WINNER! GO FOR META4. ORDER DIRECT FROM: **SYSTEM SOLUTIONS PTY. LTD., 28-30 PALMERSTON ST, BERWICK VIC (03) 707 2851** OR FROM ANY OF THE FOLLOWING DEALERS:

- |      |  |
|------|--|
| VIC: | ALPHA R & D (AUSTRALIA) 789 4658. COMPSOFT MICROCOMPUTER SERVICES (03) 428 5269. COMPUTERS 2000 (03) 781 4244.       |
|      | METROPOLITAN BUSINESS MACHINES (03) 383 2222. PRESIDENT COMPUTERS (03) 529 1788. ROBCOM (AUSTRALASIA) (03) 429 6233. |
| NSW: | J.T. MICROCOMPUTERS (02) 848 0452. THE COMPUTER WORKS (065) 53 5485  |
| QLD: | MERMAID COMPUTERS (075) 35 5511  |
| WA:  | COMPUTER AGE (09) 384 1111   |
| SA:  | COMPUTER MARKETING HQ (08) 260 2444. GENERAL BUSINESS MACHINES (08) 42 0031  |



# WESTERN TECHNOLOGY

Shop 3 — 2 Clark Terrace, Seaton, S.A. 5023  
Tel. (08) 45 8777

## IBM-PC Compatible Computers and Cards

		Tax Exempt	Tax Incl.
ASI102	— Aquarius PC — 16 Bit Personal Computer 128K. IBM Compatible, Superboard, Twin Drives	\$1995.00	\$2299.00
ASI603	— Aquarius PC — 16 Bit Personal Computer 256K. IBM Compatible Dual 327K. Drives	\$2295.00	\$2699.00
ASI604	— Aquarius PC — 16 Bit Personal Computer 256K. IBM Compatible 327K. Drive and 10 Mbyte. Hard Disk	\$3950.00	\$4740.00
CGB001	— Colour/Graphics Board NTSC and RGB output, RS120, Light Pen Interface	\$ 375.00	\$ 445.00
MGB001	— Monochrome/Graphics Board high resolution, graphic capability, single parallel port	\$ 375.00	\$ 445.00
SDD541	— Slimline Disk Drive, Double Sided, Double Density 327K. Formatted	\$ 325.00	\$ 385.00
DCB541	— Disk Drive Controller Board	\$ 135.00	\$ 155.00
HSA712	— 10 Megabyte Winchester Hard Disk, Slimline	\$1450.00	\$1725.00
HDA001	— Hard Disk Adaptor, Connects Winchester Drive and CPU, controls maximum two 5.25" hard disks	\$ 600.00	\$ 720.00
MFB256	— Multifunction Board with 256K. Ram, RS232 port, parallel port and real time clock	\$ 520.00	\$ 625.00
RM512	— 512K. Ram Expansion Board	\$ 595.00	\$ 720.00
GMB001	— Games I/O Board	\$ 65.00	\$ 77.00
JYS612	— IBM Compatible Joystick, auto centering switchable	\$ 45.00	\$ 55.00
SPS135	— Switching Power Supply — cooling fan built in, 135 Watts	\$ 160.00	\$ 190.00
AKI600	— IBM Compatible Keyboard, Detachable, ASCII, rated 50 million Keystrokes, 10 Function Keys etc.	\$ 195.00	\$ 235.00

## Monitors

	Tax Exempt	Tax Incl.		Tax Exempt	Tax Incl.
Kaga Green/Amber 12" Monitor	\$ 195.00	\$ 220.00	Zenith Green/Amber 12" Monitor	\$ 195.00	\$ 220.00
Kaga Denshi RGB Monitor Type 1	\$ 440.00	\$ 500.00	Kaga Denshi RGB Monitor Type 2	\$ 550.00	\$ 620.00
Kaga Denshi RGB Monitor Type 3	\$ 750.00	\$ 875.00	Kaga Denshi RGB Interface	\$ 30.00	\$ 35.00

## Printers

DT80/2-DT100	— 80 Column Printer 100cps Friction/Tractor/Graphics	\$ 345.00	\$ 415.00
P88/2-FT5002	— 80 Column Printer 100cps N.L.Q., Proportional Friction/Tractor/Graphics	\$ 399.00	\$ 460.00
Star Gemini 10X	— 80 Column Printer 120cps Friction/Tractor/Graphics	\$ 440.00	\$ 530.00
C. Itoh 8510 BPI	— 80 Column Printer Friction/Tractor Feed 120cps Graphics	\$ 625.00	\$ 790.00
Printer cable		\$ 35.00	\$ 40.00

## Software Specials

DBase II	\$ 450.00	\$ 450.00	DBase III	\$ 640.00	\$ 640.00
Lotus 1.2.3	\$ 585.00	\$ 585.00	Lotus Symphony	\$ 785.00	\$ 785.00
Multimate	\$ 390.00	\$ 390.00	Wordstar Professional	\$ 595.00	\$ 595.00
Electric Desk	\$ 425.00	\$ 425.00	Supercalc III	\$ 375.00	\$ 375.00

## Diskettes

DX-050 Diskette Box —			DX-085 Diskette Box —		
50 Disks Cap.	\$ 25.00	\$ 30.00	Capacity 85	\$ 34.60	\$ 41.50
Diskettes (Per Box 10) — Le Disc	\$ 29.00	\$ 34.00	Diskettes (Per Box 10) — Xidex	\$ 32.00	\$ 38.00

**TERMS — PAYMENT WITH ORDER — BANKCARD WELCOME**

# TANDY ELECTRONICS DEALER

# BIG DISCOUNTS ON ALL TANDY COMPUTERS AND ACCESSORIES

Free delivery throughout Australia.  
90 day Warranty  
Bankcard & cheque orders accepted.

**Bayne & Trembath**  
3 Boneo Rd., Rosebud, Vic 3940  
Ph: (059) 86-8288, A/H (059) 85-4947  
(TANDY DEALER 9320)

## PUBLIC DOMAIN SOFTWARE HOUSE

### Supporting Commodore 64 Computer

• Games • Utilities • Education •

We would like to introduce you to the World of "Public Domain Software" for the Commodore 64.

"Public Domain" are programs written for users by users of the Commodore 64. And not Pirated Commercial Programs.

These are quality programs to provide you with hours of fun and entertainment.

**Collection 1 + 2:** Games: Adventure Games, Mazegrower, Startrek and more.

**Collection 3:** Education: Hangmaths, Geography, etc.

**Collection 4:** Utilities: Like Monitors, Copy Programs for 1 or 2 Diskdrives, Sprite Editor and more.

**Collection 5:** Science: Find out How a Computer Works.  
1st Prog per Collection

Each Collection cost \$12.50 each on Disk or Tape Including P&H.

If you order all 5 collections you get a Basic Tutor with 7 lessons absolutely free: Disk/Tape

All our Disks are Guaranteed for 3 months

Send cheque or money order to:  
Public Domain Software House  
P.O. Box 451  
Spit Junction NSW 2088

For more information ring (02) 922 4893

*P.S. If you have written any Programs and you think they might be useful to others. Please send them to us so we all can share them.*

# USER GROUPS INDEX

3rd Thursday each month at the OSNZ Hall, 107 Hillsborough Road, Mt Roskill.

NZ COMMODORE Users Group (AK): John Walker. Telephone 8339 589, P.O. Box 5223, Auckland. Meetings: 3rd Wednesday each month at the Remuera Primary School Hall, Dromorne Road, Remuera.

NZ Microcomputer Club Inc: Selwyn Arrow (Chairman). Telephone: 491 012, P.O. Box 6210, Auckland, (See above for full details).

NZ OSBORNE Users Group (MZOG): Brian Jones. Telephone: 659 738 (H). Meetings: 1st Thursday each month at 20 Kingsley Street, Grey Lynn.

POCKET COMPUTER Users Group: Peter Taylor, 14 Gollan Road, Mt Wellington, Auckland 6. Telephone: 576 618 (H).

SINCLAIR Users Group: Doug Farmer. Telephone 567 589 (H). Meetings: 4th Wednesday at the VHF Clubrooms, Hazel Avenue, Mt Roskill.

SORCERER Users Group (NZ): Selwyn Arrow. Telephone: 491 012 (H). Meets 1pm at Saturday Micro Workshop (see above).

SORD Users Group (NZ): Graeme Hall, 5 Brouder Place, Manurewa. Telephone: 266 8133 (H).

TI 99/4A Users Group: Ray Tucker. Telephone: 568 155 (H).

ToMorrow Users Group: Chris Cotton. Telephone: 789 153. Meetings: 3rd Thursday, 20 Kingsley Street, Grey Lynn. BYO floppy disk.

WIZZARD Users Group: Richard McFadgen, 11 Hilling Street, Titirangi. Telephone: 8178 219 (H).

1802 Users Group: Brian Conquer. Telephone: 695 669 (H).

2650 Users Group: Trevor Sheffield. Telephone: 676 591 (H).

68xx(x) Users Group: John Kucernak. Telephone: 606 935 (H).

All the above use the Micro Club's postal address.

## Program Your Own EPROMS

VIC 20 \$199.00  
C 64



PLUGS INTO USER PORT.  
NOTHING ELSE NEEDED.  
EASY TO USE. VERSATILE.

- Read or Program. One byte or 32K bytes!

OR Use like a disk drive. LOAD, SAVE, GET, INPUT, PRINT, CMD, OPEN, CLOSE—EPROM FILES!

Our software lets you use familiar BASIC commands to create, modify, scratch files on readily available EPROM chips. Adds a new dimension to your computing capability. Works with most ML Monitors too.

- Make Auto-Start Cartridges of your programs.
- The *promenade*™ C1 gives you 4 programming voltages, 2 EPROM supply voltages, 3 intelligent programming algorithms, 15 bit chip addressing, 3 LED's and NO switches. Your computer controls everything from software!
- Textool socket. Anti-static aluminum housing.
- EPROMS, cartridge PC boards, etc. at extra charge.

• Some EPROM types you can use with the *promenade*™

2758	2532	462732P	27128	5133	X2816A*
2516	2732	2564	27256	5143	52813*
2716	27C32	2764	68764	2815*	48016P*
27C16	2732A	27C64	68766	2816*	

▶ \*Commodore Business Machines

\*Denotes electrically erasable types

Australian Distributor - LION ELECTRONICS

314 Great Eastern Highway MIDLAND W.A. 6056

Phone (09) 274 4519 Dealer Enquires Welcome

Bankcard - Mastercard - Visa accepted

# Jacaranda Electronics

## EXTENSION PROCESSORS BBC MICROCOMPUTERS

### • Z80 — TORCH ZEP100

The brilliant combination of the ROM based operating system installed on the BBC board and the ZEP100 added internally gives access to the vast range of software available to all CP/M™ micros.

TECHNICAL — 4 MHz Z80A, residue 63K usable RAM (after operating system), formats discs at 400K, 8K CCP ROM on ZEP100 card, 16K MCP ROM for BBC board.

SOFTWARE — PROVIDED FREE — TORCH CPN CP/M™ compatible O/S, disc utilities, music system, misc. utilities, Perfect Writer, Perfect Speller, Perfect Calc, Perfect Filer, and BBC Basic (Z80).

PRICE — \$999.00, including tax.

### • 8088 — TORCH GRADUATE

MS-DOS™ operating system customised to IBM compatibility. Compact and tidy, simply plug Graduate into 1 MHz bus on Model B. ZAP!!!! an IBM PC compatible system that really means business!

TECHNICAL — 8088 16-bit processor running at 5 MHz, 256K RAM, MS-DOS™ to IBM compatibility, twin double sided drives formatting at 320K each, 2 IBM PC compatible hardware expansion buses, software compatibility allows Lotus 1-2-3 and all popular IBM PC business programs to run without modification, subject to any constraint of the BBC keyboard and display. Disc interface is not required. Keyboard text and graphics supplied by BBC.

PRICE — \$2490.00, including tax.

### PLACE YOUR ORDER NOW!!

ALL items currently available ex-stock.  
Note: Sydney residents may purchase the ZEP100 from

### The Logic Shop

330 Pacific H'way, Crows Nest.

### Jacaranda Electronics Pty Ltd

27 Colbee Court, Phillip, ACT 2606.

Phone (062) 82 2271

### To: Jacaranda Electronics Pty Ltd.

Please despatch by URGENT freight the following:

ZEP100       GRADUATE       HDP68K

Name .....

Address ..... P/Code .....

Telephone .....

CHEQUE      AMOUNT \$.....

BANKCARD NO. 496 .....

Expires ..... Signature .....



# MAKE AN IMPRESSION THIS XMAS



A Daisywheel printer with proportional spacing  
at an unheard of price

- ★ 18 CPS
- ★ Front panel selection for spacing
- ★ Standard Diablo codes
- ★ 2K Buffer
- ★ Drop in Daisy wheel
- ★ IBM Selectric ribbons at around \$3 each

**\$720**  
incl tax

**JUKI**  
Model 6100

**\$290**  
incl tax

**CP80**

The classic  
dot matrix workhorse

- ★ 80 CPS
- ★ Excellent quality print
- ★ Multiple character sets
- ★ Tear Bar



**\$340**  
incl tax

**DT 100**

- ★ Enhanced version of DT 80
- ★ Excellent quality print
- ★ 100 CPS
- ★ Multiple character sets

IF THERE IS A LOWER PRICE IN THIS MAGAZINE FOR THESE PRINTERS

— PHONE US. WE WILL

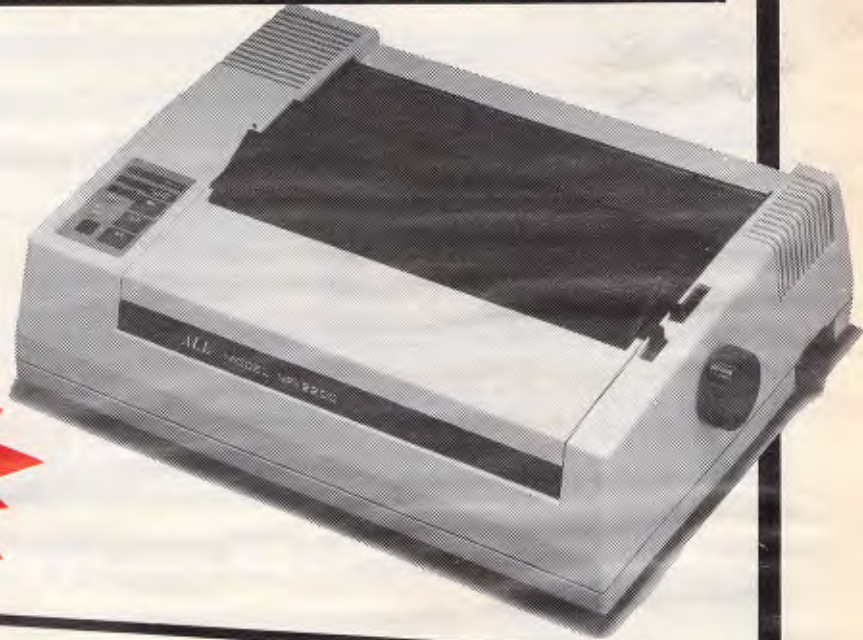


# COME TO COMPAK — AND CHOOSE FROM THE BEST

## NAKAJIMA NP 2200

- ★ Max speed 165 caps
- ★ Superb "Near letter quality mode"
- ★ Sound proofed! You can use it in a busy office or in the middle of the night!
- ★ 2K buffer

**\$500**  
inc tax



## LETTER WRITER SP2000

**\$600**  
inc tax

**Mercedes quality for  
the price of a Holden**

- ★ High range of Daisy Wheels (Diablo)
- ★ 18 CPS
- ★ Choice of ribbons incl Brown/Black Carbon/Fabric (Qume)



**COMPAK**  
Compak Computer Centre

350 SOUTH ROAD,  
MOORABBIN 3189  
Telephone: (03) 855 9844

MEET IT OR BEAT IT.



## NEW

### INCREDIBLE MUSIC KEYBOARD AND SYNTHESIZER

- Piano type keyboard for your C64
- Beginners synthesizer included
- Compose your own tunes
- Advanced synthesizer processor available
- Teach yourself program

## NEW

### SEGA

We now have stock of the new 3000H professional keyboard computer

- 48K • Colour • Sound • Sprites
- Includes advanced basic & free computer course

Come in for a demo now

## NEW

### STAR PRINTERS

The range of star printers starts with the Gemini 10X a 120CPS quality dot matrix and extend through to the power type daisy wheel printer

## NEW

### COMMODORE DAISY WHEEL PRINTER

- 17 characters per second
- Bidirectional
- Plugs straight into your C64
- Uses low cost ribbons
- 13" wide platen

Less than \$750.00

## NEW

### COMMODORE BUSINESS SOFTWARE FOR YOUR C64

- Debtors and creditors
- Stock control
- General ledger
- Invoicing/sales analysis

Come in for a demo now

## NEW

### SOFTWARE! SOFTWARE!

Our huge range of software has just been supplemented by a shipment of brand new releases from the U.S.A. Come in and see these great programs now. New releases from ACME just in too.

## NO. 1 FOR COMMODORE

## AUTHORISED SERVICE CENTRE

Free Catalogue Available — Mail Orders Welcome: Send to P.O. Box 3, Brighton North 3186



## HIGH TECHNOLOGY COMPUTER SYSTEMS PTY. LTD.

290 Bay Street, Brighton. 3186 Phone: 596 6211  
87 Swan Street, Richmond. 3121 Phone: 429 1966

HIGH TECHNOLOGY

APPROVED EDUCATION SUPPLIER



## Microbee disks

Up to 800k of fast reliable disk storage from ROM BASIC, WORDBEE, EDITOR ASSEMBLER and MITEK WORD PROCESSOR \*\* PLUS \*\* ability to read and write over 130 CP/M disk formats in 32 and 64k microbees, from \$299.

Dreamdisk Controller Card	\$299
Complete 400k drive system	\$799
Complete 800k drive system	\$880
Dual 400k drive system	\$1000
Dual 800k drive system	\$1200
Add on 400k drive	\$270
Add on 800k drive	\$340
Mitsubishi Hi-res green screen	\$170
Mitsubishi Hi-res amber screen	\$180

Call for information on our new 1600k drives, BBC drives, 3.5 inch drives and Spectravideo peripherals.

## DREAMDISK PTY. LTD.

171-173 MORAY STREET  
SOUTH MELBOURNE 3205  
PHONE: (03) 690 8283



## SPEEDY SOFTWARE SUPPLIES

### CHRISTMAS SPECIALS

	COM 64	APPLE
(Sublogic)		
Flightsimulator II	\$62	\$62
Nightmission Pinball	\$30	\$40
ZAXXON	\$40	\$50
CHOPLIFTER	\$48	\$44
SARGON III	—	\$60
LODERUNNER	\$36	\$44

### NEW! Championship Loderunner

Raid on Bungling Bay	\$53	\$45
The Alpine Encounter from IBIDING		

### COMMODORE 64

	Cassette	Disk
The Institute	N.A.	\$34.95
Pogo Joe	\$24.95	\$29.95

The Incredible Music Keyboard \$60.00

To order send cheque, money order, Bankcard or Visa No.

to

SPEEDY SOFTWARE SUPPLIES  
177 Campbell St, Toowoomba 4350

OR Phone — 076-382022

FULL Catalogue on REQUEST

FREE Freight & Handling Charges

## BENCHMARKS

A list of Benchmarks used when evaluating micros is given below.  
An explanation can be found in the February '84 issue.

```

100 REM Benchmark 1
110 PRINT "S"
120 FOR K=1 TO 1000
130 NEXT K
140 PRINT "E"
150 END

100 REM Benchmark 2
110 PRINT "S"
120 K=0
130 K=K+1
140 IF K<1000 THEN 130
150 PRINT "E"
160 END

100 REM Benchmark 3
110 PRINT "S"
120 K=0
130 K=K+1
140 A=K/K*K+K-K
150 IF K<1000 THEN 130
160 PRINT "E"
170 END
    
```

```

100 REM Benchmark 4
110 PRINT "S"
120 K=0
130 K=K+1
140 A=K/2*3+4-5
150 K<1000 THEN 130
160 PRINT "E"
170 END

100 REM Benchmark 5
110 PRINT "S"
120 K=0
130 K=K+1
140 A=K/2*3+4-5
150 GOSUB 190
160 IF K<1000 THEN 130
170 PRINT "E"
180 END
190 RETURN

100 REM Benchmark 6
110 PRINT "S"
120 K=0
    
```

```

130 DIM M(5)
140 K=K+1
150 A=K/2*3+4-5
160 GOSUB220
170 FORL=1 TO 5
180 NEXTL
190 IF K<1000 THEN 140
200 PRINT "E"
210 END
220 RETURN

100 REM Benchmark 7
110 PRINT "S"
120 K=0
130 DIM M(5)
140 K=K+1
150 A=K/2*3+4-5
160 GOSUB 230
170 FOR L=1 TO 5
180 M(L)=A
190 NEXTL
200 If K<1000 THEN 140
210 PRINT "E"
    
```

```

220 END
230 RETURN

100 REM Benchmark 8
110 PRINT "S"
120 K=0
130 K=K+1
140 A=K^2
150 B=LOG(K)
160 C=SIN(K)
170 IF K<1000 THEN 130
180 PRINT "E"
190 END
    
```

# PC PRO

"The last word in compatible value"

## LOOK AT THESE FEATURES

- 256K RAM
  - CLOCK/CALENDAR WITH BATTERY BACKUP
  - TWIN 360K FLOPPIES
  - PC WRITE (WORD PROCESSOR) INCLUDED
  - TWIN PARALLEL PORTS
  - CPM86 AND MSDOS INCLUDED
  - TWIN SERIAL PORTS
  - FREE DISK STORAGE WITH 20 DISKS
- COMPATIBLE WITH IBM PC

**\$2500** INCLUDING TAX  
EXCLUDING MONITOR

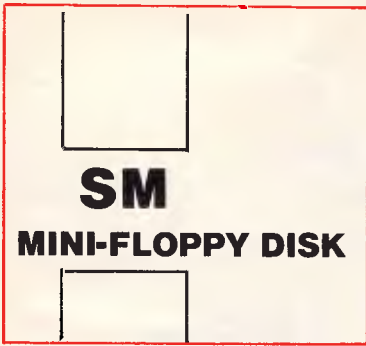
## Last Word

38 Waratah St, Oatley, 2223

Tel. Syd (02) 570 5197

Mel (03) 277 7754





**SM**  
**MINI-FLOPPY DISK**

**2 FOR 1**  
**YES!**

**FOR THE PRICE OF 1 BOX**  
**YOU GET 2 BOXES**  
**FULLY CERTIFIED AND**  
**TESTED WITH RING-HUP**  
**RE-INFORCEMENT**

**SPECIAL OFFER**  
**OFFER EXPIRES**  
**31st December 1984**  
**or while stocks last**

**SPECIFICATIONS**

**PRINTING MECHANISM**

Print Method: Impact Dot Matrix  
Print Rate: 160 characters per second  
Print Direction: Bidirectional in text mode  
Unidirectional in bit graphics  
Number of Pins in Head: 9  
Line Spacing: 1/6", 1/8", n/72", n/216"  
Programmable

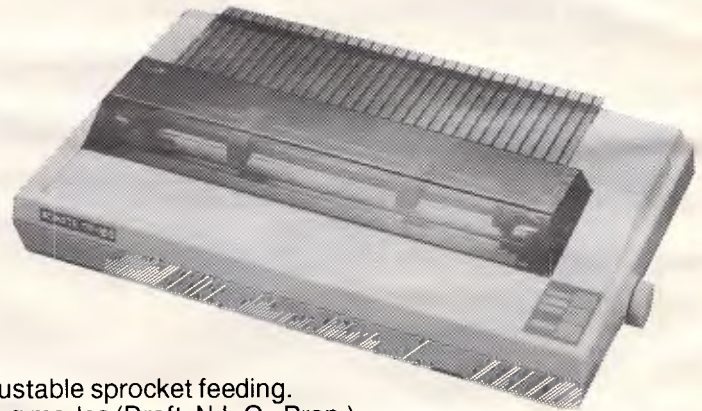
**PRINTING CHARACTERISTICS**

Character Set: 96 ASCII Characters, with descenders, plus 9 International Character Sets and 96 Italic Characters 128 Downloadable Characters  
Printing Modes: 9 x 9 matrix standard  
(10 CPI) 11 x 18 double strike (advance paper 1.216" and repeat line)  
18 x 9 emphasized (shift right dots)  
18 x 18 double strike emphasized

**INTERFACE**

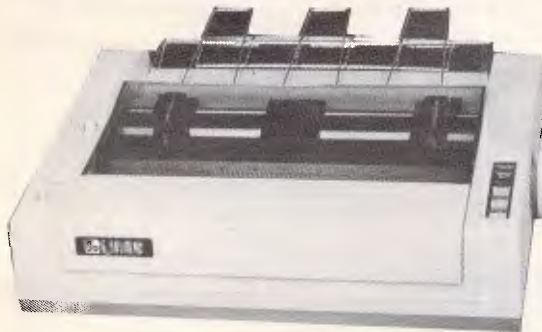
Standard: Centronics-style 8 bit parallel  
Multi-Font Interface  
Word Processing Card  
Optional: RS-232C Intelligent Serial w/2K Buffer or 32K Buffer and XON/XOFF protocol  
Centronics Parallel w/2K Buffer or 32K Buffer  
Intelligent IEEE-488 Interface  
Simple IEEE-488 Interface

**PERSONAL AND YET PROFESSIONAL**



**PX120 NEAR LETTER QUALITY PRINTER**

Friction and adjustable sprocket feeding.  
Variety of printing modes (Draft, N.L.Q., Prop.).  
User Font registry command.  
Automatic paper insertion.  
Multi-printer modes (STD, IBM Matrix, IBM Graphic).  
On board memory buffer.



**COMAX MD22**

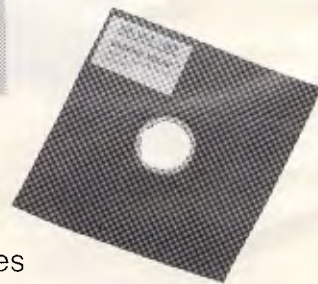
**Increase your storage capacity with 160 trackdrive**

★ Fully Compatible with Apple Soft\* ★  
Double sided 80 Tracks/Side ★ Storage Capacity: 640 KBytes (Formatted) ★  
Track to Track Access Time: Less than 3 mSec. ★ Encoding Method: MFM ★  
Number of Heads: 2 ★ Complete with Disk Controller Card ★ New feature — switch select 40/80 Tracks



**Midasonic**

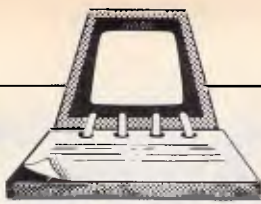
- ★ Newly developed
- ★ Complete with graphic softwares
- ★ Menu driven
- ★ Compatible with Apple II and Apple IIe
- ★ Choice of many shapes, sizes and colours
- ★ Load and Save pictures created



Please send me  
 boxes of SM discs  
 D/D S/SD \$38.00 for 2 boxes  
 D/D D/S \$48.00 for 2 boxes  
Name .....  
Address .....  
Phone No .....

**DIGITAL SOURCE INT'L PTY, LTD**

169 Phillip Street, Waterloo N.S.W. 2017. Telephone: (02) 690 1268, 690 1540.  
Telex: AA 75406



# DIARY DATA

Readers are strongly advised to check details with exhibition organisers before making travel arrangements to avoid wasted journeys due to cancellations, printer's errors, etc.

Singapore	Instrumentasia '85 Contact: Singapore Exhibition Services Pty Ltd, 11 Dhoby Ghat 15-09, Cathay Building, Singapore 0922 Tel: 338 474	Jan30-Feb2, 1985
Sydney	4th <i>Australian Personal Computer Show</i> Contact: Australian Exhibition Services Pty Ltd, Suite 3.2 Illoura Plaza, 424 St Kilda Road, Melbourne 3004. (03) 267 4500	March 13-16, 1985
Perth	Computers '85 Computer Exhibitions International, 190 Hay Street, East Perth 6000	May 1-4, 1985
Sydney	Data '85 Contact: Graphic Directions, 28 Foveaux Street, Surry Hills, 2010. (02) 212 4199	May 22-25, 1985
Melbourne	5th <i>Australian Personal Computer Show</i> Contact: Australian Exhibition Services Pty Ltd, Suite 3.2 Illoura Plaza, 424 St Kilda Road, Melbourne 3004. (03) 267 4500	July 17-20, 1985

## SMALL BUSINESS COMPUTER SYSTEMS

### OSBORNE

EXECUTIVE, complete with —  
 CP/M 3.0  
 WORDSTAR  
 SUPERCALC  
 PERSONAL PEARL  
 3 Disks of Utilities ..... \$3198

C BASIC  
 M BASIC  
 PASCAL



ON APPLE COMPATIBLE PERIPHERALS

*Super 5* TEAC D/DRIVES \$275

Interface cards from \$60  
 RAM cards from \$66  
 XIDEX disks from \$38/box

ONLY WHILE STOCKS LAST

### brother

HR-15 Daisywheel 13cps, 110 column ..... \$750  
 HR-25 Daisywheel 23cps, 132 column ..... \$1230  
 HR-35 Daisywheel 32cps, 132 column ..... \$1500  
 M1009 Dot Matrix, 50cps 80 column ..... \$270  
 M2024 Near Letter Quality Dot Matrix  
 160cps, 132 column ..... \$1710

### star

DOT MATRIX PRINTERS

GEMINI 10x 120cps, 80 column ..... \$510  
 GEMINI 15x 120cps, 136 column ..... \$725  
 DELTA 10x 160cps, 80 column ..... \$795  
 DELTA 15x 160cps, 136 column ..... \$1110  
 POWERTYPE 18cps Daisywheel ..... \$810

MAIL AND PHONE ORDERS WELCOME

461 PACIFIC HWY ARTARMON NSW 2064  
PH (02) 427 3099

## SOUTHERN CROSS RESOURCES



# Sinclair ZX Spectrum

**16K or 48K RAM...  
full-size moving-  
key keyboard...  
colour and sound...  
high-resolution  
graphics...**

**From only**

**\$249!** Incl.  
Sales Tax

First, there was the world-beating Sinclair ZX80. The first personal computer for under \$249.

Then, the ZX81. With up to 16K RAM available, and the ZX Printer. Giving more power and more flexibility. Together they have sold over 500,000 so far, to make Sinclair world leaders in personal computing. And the ZX81 remains the ideal low-cost introduction to computing.

Now there's the Sinclair ZX Spectrum! With up to 48K of RAM. A full size moving-key keyboard. Vivid colour and sound. High-resolution graphics. And a low price that's unrivalled.

## **Professional power — personal computer price!**

The Sinclair ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASIC ROM dramatically increases your computing power.

You have access to a range of eight colours for foreground, background and border, together with a sound generator and high-resolution graphics.

You have the facility to support separate data files.

You have a choice of storage capacity (governed by the amount of RAM). 16K of RAM or a massive 48K of RAM.

Yet the price of the Sinclair ZX Spectrum 16K is an amazing \$249! Even the popular 48K version costs only \$359!

## **Ready to use today, easy to expand tomorrow**

Your Sinclair ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the Sinclair ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of Sinclair ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer — available now — is fully compatible with the Sinclair ZX Spectrum. And later there will be Microdrives for massive amounts of on-line storage, plus an RS232/network interface board.



## **Key features of the Sinclair ZX Spectrum**

- Full colour — 8 colours each for foreground, background and border, plus flashing and brightness-intensity control.
- Sound — Beep command with variable pitch and duration.
- Massive RAM — 16K or 48K.
- Full size moving-key keyboard — all keys at normal typewriter pitch, with repeat facility on each key.
- High resolution — 256 dots horizontally and 192 vertically, each individually addressable for true high-resolution graphics.
- ASCII character set — with upper and lower case characters.
- Teletext compatible — user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE — 16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASIC — incorporating unique 'one-touch' keyword entry, syntax check, and report codes.



# am



## The ZX Printer available now

Designed exclusively for use with the ZX range of computers, the printer offers Sinclair ZX Spectrum owners the full ASCII character set—including lower case characters and high-resolution graphics. A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your Sinclair ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied along with full instructions. Further packs of paper are available in packs of five rolls.



## The ZX Microdrive \$149 available now

The new Microdrives, designed especially for the Sinclair ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100Kbytes using a single interchangeable storage medium.

The transfer rate is 16Kbytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Sinclair ZX Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price.



## Sinclair ZX Spectrum Software on cassette — available now

The Sinclair software library is growing every day, and they all make use of the Sinclair ZX Spectrum's colour, sound and graphics. Choose from: Space Raider, Planetoids, Embassy Assault, Raiders, Backgammon—each \$19.50; Planet of Death, Inca Curse, Ship of Doom, Espionage Island, Club Record Controller, Collectors Pack, Biorhythms—each \$22.50; Chess, Flight Simulation, Vu-Calc Spreadsheet, Vu-3D Graphics, Reversi—each \$25.00; View File Data Base, Cyrus-is-Chess—each \$27.70; Scrabble, ZX Forth—each \$44.00. ORDER NOW WITH YOUR SINCLAIR ZX SPECTRUM.

## ZX Interface 1 \$149

This interface incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Sinclair ZX Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, as it adds to the versatility of your Sinclair.

## How to order your Sinclair ZX Spectrum

Use the coupon order form below. You can pay by cheque, postal note, or Bankcard. Either way, please allow up to 14 days for delivery.

Your Sinclair ZX Spectrum and Printer carry a 3 month warranty, with service provided by S.T.C.'s national service network.

Order to **BARSON COMPUTERS, 335 Johnston St., Abbotsford, Vic. 3065**

Qty	Item	Item Price \$	Total \$
	Sinclair ZX Spectrum — 16K RAM version	249.00	
	Sinclair ZX Spectrum — 48K RAM version	359.00	
	Sinclair ZX Printer	169.00	
	Sinclair ZX Micro Drive	149.00	
	Sinclair ZX Interface 1	149.00	
	Postage and packing: orders under \$350	5.00	
	orders over \$350	10.00	

**Software:** select from list at left, fill in below, and show price:

.....

.....

\*I enclose cheque/money order payable to TOTAL \$  
Barson Computers Pty Ltd for \$ .....

\*Please charge my Bankcard No.

Name ..... Signature .....

Address .....

..... P/code.....





commercial and professional microsystems

9th Floor, 505 St Kilda Road, Melbourne 3004, Aust.

Telephone (03) 267 7829

## C.P.M. MINI CONQUEROR

### THE COMPLETE DESKTOP SOLUTION — POWERFUL, EASY-TO-USE, FRIENDLY, RELIABLE

#### COMPRISING:

- 12in green screen terminal, on swivel base with detachable keyboard. 95 keys, separate numeric key pad, 10 function keys, built-in graphics capability.
- Z80A running at 4MHz.
- 64K bytes of RAM, 4K bytes of ROM.
- 2-RS232 serial ports.
- 2 RS232 serial ports. Software selectable baud

rates to 38.4K baud.

- Mass storage: two double sided, 80 track disk drives, 800K bytes (formatted) per diskette. 1.6M-bytes total internal storage.
- CP/M 2.2 with enhanced BIOS & CCP.
- Integrated accounting software: General Ledger, Accounts Receivable, Accounts Payable, Stock Control & Invoicing.
- Reads/writes other popular computer formats.

**OPTIONAL:** 16 bit "Attached Processor" upgrade now available, enabling you to run both 16 bit software, like Lotus 1-2-3, and your existing 8 bit software. (For details see below).

**SPECIALISED BUSINESS SOFTWARE:** For nearly all fields, e.g., motel, insurance, real estate, medical/dental, farming, video shops, etc., etc., also available.



### STOP PRESS

We now include: At a price you can not refuse, WordStar vers. 3.3, MailMerge, CalcStar, DataStar, ReportStar

### COMPUTER MEDIA TRANSCRIPTION/COPYING

- Software duplication, copying and formatting for virtually all popular computers.
- Downloading 8" CP/M formats to over 60 5¼" CP/M formats.
- Conversion and downloading from CP/M to MS-DOS/PC-DOS.
- Copy protection for most popular formats.
- Rapid turn around.
- Reasonable charges.

**WE ALSO OFFER 80 TRACK DSDD DRIVE UPGRADES FOR IBM PC-S AND COMPATIBLES, GIVING A MORE REALISTIC DATA STORAGE FOR BUSINESS USES.**

### SPECIAL IBM PC (AND COMPATIBLES) UTILITIES

- **OPERATING SYSTEM CONVERTERS:**  
CP/M 80 to MS-DOS/PC-DOS — Run your 8-bit software on the IBM PC without any modifications.  
CP/M-86 to MS-DOS/ PC-DOS — Permits execution of object code written for CP/M-86 under MS-DOS/PC-DOS.  
MS-DOS PC-DOS to CP/M-86 — As above in reverse.  
Z80/8086 Cross Assembler. 8086/8087/8088 Assembler.
- **DATA/TEXT FILE CONVERSION:** Convert any data/text files from CP/M xx to MS/PC-DOS. CP/M xx to CP/M xx. MS/PC-DOS to CP/M xx. running on MS-DOS 2.0
- **TRANSCRIPTION UTILITY:** Copy, Format, Read/Write dozens of different formats in your PC.
- **FORMATTING SOFTWARE FOR ALMOST ALL ADD-ON DRIVES:** From DSDD 80 track 96 TPI drives to the whopping 2.5M-byte 5¼" floppy drives.

**WE CAN NOW READ, WRITE AND FORMAT APPLE DISKS IN THE IBM PC OR ELSE TRANSFER APPLE DOS FILES TO IBM PC-DOS FILES.**

### THE 8086 "ATTACHED PROCESSOR"

#### The low cost entry into 16 bit microcomputing

#### PRINCIPAL FEATURES OF THE CO1686

- 8086 processor
- Easily upgrades your 8 bit Z80 microcomputer which runs CP/M 2.2 to a 16 bit system.
- Pre-implemented MSDOS 2.11 operating system is included with the 8086 version of CO1686.
- All existing 8 bit hardware and software can be used without alteration.
- 256 RAM expandable to 768K.
- Can be used as an intelligent RAM disk for either 8 bit or 16 bit operating systems.
- Single Key toggle between 8 bit and 16 bit operating system — boot load not required.
- MSDOS and CP/M can share common data storage devices.
- 6 MHz clock rate.
- Available in circuit card form or in an attractive desktop enclosure.
- I/O module containing IBM PC compatible bus available for 8086 version.
- Comprehensive documentation is supplied.

### SOFTWARE AUTHORS/DEVELOPERS & DEALERS

At last a computer that lets you read/write/format virtually all soft-sectored CP/M formats, whether single or double density, single or double sided, 5" or 8" 48 TPI or 96 TPI.

- INCLUDES:**
- Z80A at 4MHz.
  - 2 serial ports for printer/modem/ & terminal.
  - 1 5¼" DSDD 40 track 48 TPI drive.
  - 2 5¼" DSDD 80 track 96 TPI drive.
  - 1 8" DSDD 77 track drive.
  - CP/M 2.2 & all disk format conversion software and utilities.

And now available with the 16 bit "Attached Processor" upgrade, giving access to MS-DOS 2.11 and CP/M-86 as-well-as CP/M 2.2.

- Including:**
- 8086 processor at 6MHz
  - 256 to 768K expandable RAM

(For details see left)

## LAZING AROUND



by J J Clessa

### Quickie

Here is a remark attributed to that famous geometer, Pithagorus: 'Now I have a rough predictor of circle areas and volume.'

### Prize Puzzle

And now one for the micros.

In the annual festival games held at the town of Little Dingbat, the main event is the marathon.

This year, all the entrants were numbered sequentially (1, 2, 3...)

By coincidence, all those who completed the race carried numbers which were either exact primes or exact powers of other numbers. Furthermore, the total of the race numbers of the finishers was exactly equal to the total of the race numbers of those who dropped out.

How many entrants were in the race?

Answers, on postcards only or backs of envelopes, to APC Prize Puzzle, December 1984, 77 Glenhuntsly Road, Elwood, Victoria 3184, to arrive not later than 28 December 1984.

### August Prize Puzzle

The problem was quite easily cracked by micro and several people sent in their programs and printouts.

The winning entry came from Peter Sutton of St Lucia. Congratulations Peter, your prize is on its way.

The solution to the problem was that the Dawsons and Firths were the RC families — the children of these families were given \$31.25 each.

Keep puzzling.

### SOFTWARE SPECIALS!

**LOTUS** \$549 inc tax

OVER 500 other Hardware and Software specials

### MARKETEERING DATA DISCOUNTS

IBM SPECIALISTS (02) 238 2195

### GAMES WORLD

8/427 Hampton Street,  
Hampton, 3188. Ph 598 1014

### SOFTWARE SPECIALISTS

Programs for  
Apple, Atari,  
Commodore 64,  
Coleco-Adam.  
Visit our shop or  
**ORDER BY MAIL**  
See Coleco-Adam  
— amazing home  
computer system.

Cassettes, Disks  
and Cartridges  
from all the  
leading software  
suppliers.

Free gift — to  
purchasers. Just  
mention this ad.

### 5¼" FLOPPY DISK DRIVE FB 503

#### FEATURES:

- 40 track double side.
- 500K byte unformatted.
- Direct drive DC motor.
- Taut band head positioner.
- 6 milliseconds track to track.

**SPECIAL THIS MONTH ONLY!**

\$199.00

(Including tax) \$225.68

### FB 504

#### FEATURES:

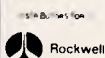
- 80 track double side.
- 1M byte unformatted.
- 3 milliseconds track to track.

\$245.00

(Including tax) \$278.92

FREIGHT FREE TO MAJOR CITIES  
BANKCARD WELCOME

**energy  
CONTROL**



P.O. BOX 6502, GOODNA, QLD, AUSTRALIA, 4300.  
TELEPHONE: (07) 288-2455/TELEX: AA 43778 ENECON

### COMMODORE 64 and VIC20 owners.

Let your computer help you to make CASH with our racing selections analyser. This program is a must. It is serious punters aid to sensible betting, easy to operate with excellent results. **ORDER ONE NOW!**

**On tape only. \$28.00 + \$2.00 postage.**

We also have LOTTO-ANALYSER which will analyse the chances of your selected number to win. This program is a great aid when choosing your winning numbers.

**On tape only. \$15.00 + \$2.00 postage.**

This one for CBM64 only. Do you need a simple to operate WORD PROCESSOR? Then this one is for you. Will work with Commodore printer or 1520 plotter. Will not write a book but will write up to 500 lines, transfer, insert, delete, rearrange text and more.

**On tape only. \$18.00 + \$2.00 postage.**

Send Cheque, Money order or SAE.  
for details to

**QUEENSLAND  
COMPUTER OFFICE**

P.O. BOX 288 GOODNA QLD. 4300

## COLECO VISION \$149.00



### Video Game System

- Unsurpassed Graphics
- Unusually Low Price
- Expansion Capability

#### FULL RANGE OF CARTRIDGES

Mouse Trap .. \$14.95	Looping .... \$29.95
Cosmic .....	Pepper II ... \$24.95
Avenger .... \$14.95	Space Panic . \$29.95
Carnival .... \$14.95	Donkey Kong
Smurf Rescue \$14.95	Jnr. .... \$29.95

**WE STOCK ALL COLECO  
ITEMS INC. ADAM  
COMPUTER & SOFTWARE**

### COMPUTER GAMES

100's available for Apple Comm 64,  
Atari, TRS 80, IBM PC, VIC 20, etc.

(Mail Order Specialists)

## COMPUTER SIMULATIONS

134 Cochranes Rd, Moorabbin 3189





Once upon a time, Tony Heatherington was an ordinary home computing editor.  
Now he's *The Incredible Hulk*, *Hercules*, and a fighter on a war-torn beach.  
All because of this month's great selection of games for the Commodore 64 and Spectrum.



## Guaranteed to leave your brain unhinged

**TITLE:** *Psytron*  
**COMPUTER:** Spectrum  
**SUPPLIER:** International Software Distributors  
**PRICE:** \$19.95

*Psytron* is another step in an encouraging trend away from pure arcade games towards a new breed of arcade strategy games. You'll need arcade skills, but



these will be utilised as a means to a more tactical end. In other words, the days of mindlessly zapping aliens are thankfully numbered.

Here, you are the *Psytron* — a half-human, half-computer being whose mission is to defend the massive Beta-5 installation from attacking aliens.

You must continually scan the base's 10 sectors and destroy any attacking spacecraft. However, some of these attacking craft will drop saboteurs, so you must be ready to switch to droid mode to chase and destroy them before they do any damage. You must monitor damage reports, allocate repair crews,

and order supplies from the orbiting supply ship.

The advertising blurb claims that this is enough to leave a human brain unhinged, and I agree. Luckily, there is a series of training levels that you must complete successfully before progressing to the next level.

To complete a level, you must attain a pass mark in your last five attempts. This means that there are six different games, as each level is sufficiently challenging to stand on its own.

Level six is called the Final Conflict, and is the accumulation of all the game's aspects that were introduced gradually in previous levels — it's time to unhinge your brain and hang on for as long as possible. The object of the Final Conflict is to survive as long as possible, an hour being the ultimate goal.

The graphics are efficient and smooth, the action frantic as you attempt to monitor ten screens simultaneously.

A point to remember is that you are judged on your ability to restrict damage to the base, not on the number of aliens destroyed. It's pointless zapping aliens over the power plant while they're taking apart the pleasure dome.

## Oh no, it's Jade Jaw

**TITLE:** *The Incredible Hulk*  
**COMPUTER:** Commodore 64  
**SUPPLIER:** Ozi Soft  
**PRICE:** \$29.95

*The Hulk* is the first in the Questprobe adventure series, based on and starring the superhero characters from the Marvel comics.

You are the thin, bespectacled nuclear physicist Bruce Banner who, if provoked, turns into the green superhero the Hulk. You possess immense strength and muscular power, and can leap tall buildings, stop charging rhinos and tear a copy of *APC* in half.

It's a typical Scott Adams adventure which features excellent graphics, but



the text is written in comic book style which may deter some potential Hulks.

It's supplied with an instruction book which contains descriptions of the game's major characters, including a friendly Ant man called Hank and Ultron, a super-robot that improved its own design and has an obsessive hatred of mankind.



The game falls squarely into the problem solving group of adventures, so perhaps it's just as well that Adventure International will sell you a hint book if you're really in trouble.

I used these hints but still got stuck — this made me so angry that I . . . aagh! . . . No! . . . Not again . . .



## SCREENPLAY

### 'We'll fight them on the beaches ...'

**TITLE:** Beach-head  
**COMPUTER:** Commodore 64  
**SUPPLIER:** International Software  
**Distributors**  
**PRICE:** \$29.95

*Beach-head* is a multi-level arcade war game which will stretch your abilities to the limit. To succeed in your mission to destroy the fortress of Kuhn Lin, you must survive four levels and retain sufficient forces to proceed to the next stage.

The first stage is optional but recommended as it cuts down the number of aircraft that attack you in the second stage. All you have to do is steer your fleet of nine ships through a cavern littered with mines and torpedoes. The surviving ships are then attacked by aircraft



which you must shoot down before they inflict too much damage. The enemy ships then open fire and you're thrown into a duel where the survivor is the one to fire first at the correct elevation. The elevation is controlled with the joystick and a message reporting the result of the shot appears at the bottom of the screen.

The favoured few ships that survive this onslaught will land two tanks on the beach. They must advance one by one up



to the fortress negotiating enemy tanks and gun positions *en route*. To win the game you must destroy 12 targets on the fortress but you'll do well to take out three targets with one tank. Subsequent tanks have a harder journey up the beach, so the game should keep its appeal for some time.

The screen shots illustrate the game's graphics but you'll have to play it to sample the superb sound effects.

### Diamonds are a meanie's best friend

**TITLE:** Boulder Dash  
**COMPUTER:** Commodore 64  
**SUPPLIER:** International Software  
**Distributors**  
**PRICE:** \$24.95

*Boulder Dash* is a multi-scrolling screen game in which you must dig your way through rock in an attempt to find diamonds. Once you have collected enough diamonds, a doorway appears and you can progress through to the next screen.

However, also in this rock are a num-



ber of boulders which will fall on your head if you dig under them, but if you're quick enough you can get out of the way.

This is more than a little reminiscent of an arcade game called *The Pit*, but

*Boulder Dash* takes that simple idea to its limits. For example, the boulders don't just plummet straight down: they collide and bounce off each other. Knocking one boulder can start an avalanche. Every screen is different and therefore each requires a new set of tactics.

Some screens have diamonds guarded by meanies in enclosed areas, others have free-roaming meanies, and one doesn't appear to have any diamonds. All you can see is a huge green amoeba that's getting bigger by the second, and lower down the screen a trapped group of meanies.

It's up to you what you try, but I'm sure whatever you pick you'll enjoy the challenge.

### Labour of love

**TITLE:** Hercules  
**COMPUTER:** Commodore 64  
**SUPPLIER:** Mailsoft  
**PRICE:** \$24.95

*Hercules* is a platform game in the now familiar *Manic Miner* style but taken to its limits.

To complete the 12 labours of *Hercules* you must solve 50 screens. These screens are allocated to each of the labours and success in one screen leads to the next. Completion of every screen in the first 11 labours is the only route to the twelfth and final labour.

To complete a screen successfully you



must get *Hercules* from the start position to the doorway of the next screen.

Unfortunately it's not that simple, as you have to cope with disappearing platforms, breaking ropes and critters out to get you. You don't have much time to

plan your moves as it's quite likely that the platform you are standing on will burst into flames losing you one of your three lives.

Trial and error is the name of the game until you've been through many levels (and lives), at which time you may begin to anticipate what will happen. A suicidal urge may also be of assistance, as on several levels the only course of action open to you is to leap into oblivion in the hope that a platform will appear to break your fall.

One interesting feature of the game is that you tackle the labours in a random order so that you don't get stuck in one place — you get stuck in several places instead.



# Upgrade to suit

Are you thinking of upgrading your VIC 20 to a Commodore 64 but afraid of losing your existing programs? Andrew Bennett suggests a quick and painless method of converting your old VIC programs.

If you've upgraded from a VIC 20 to a Commodore 64, or intend to, you may have wondered if you'll lose the use of your existing programs. This article will help you to convert your programs for the '64, which in turn will give you a better understanding of both machines.

Programs usually consist of one, or a mixture, of the following five parts:

- 1 The usual Basic keywords (PRINT, for example).
- 2 POKEs and PEEKs into areas of memory.

3 User-defined character sets and high resolution graphics.

4 Sound effects and music.

5 Machine code, either as full length programs or as subroutines for Basic.

If you use a disk drive with your VIC you'll have no problems loading your programs into the '64, but if you use a cassette, life is a little more complicated. Although the VIC and the '64 use very similar cassette systems, VIC programs will not load off tape into the '64. The only solution is to get a friend (or a friendly dealer) with a disk drive to

transfer your programs to disk and then into the '64, where you can save them to tape ready to convert at home.

## Basic keywords

The '64 and the VIC use the same Basic as Commodore's first computer, the PET. Each machine has the same Basic keywords which perform in exactly the same way.

On the VIC, you can type program lines up to 88 characters long, but on the '64 you're restricted to 80 (the '64 will run lines over 80 characters but they then become difficult to edit).

The command most affected by the change of machines (excluding the above) is the PRINT statement. The '64 has a 40-column by 25-line screen compared with the VIC's miserly 22 columns by 23 lines. This means that your neatly formatted VIC screens will now fill only the left half of the '64's screen. It's a straightforward if time-consuming job to move the text around within your program's PRINT statements to achieve a good layout, changing TABs and SPCs to take into account the bigger screen size.

While doing this you might be able to use the '64's eight extra colours; these are accessed using the Commodore key and the number keys. (It's best to leave re-doing the screen formatting parts of your VIC programs until last as it's a purely cosmetic operation.)

## POKEs and PEEKs into areas of memory

The memory maps in Figs 1 and 2 show how different the memory maps of the two machines are. Fig 3 shows the differences in greater detail.

The screen and colour memories of the two computers work in the same way: you have to set the colour on the colour screen before a character will show up on the normal screen. On the VIC, the contents of location 36879 dictate the border and screen colours,

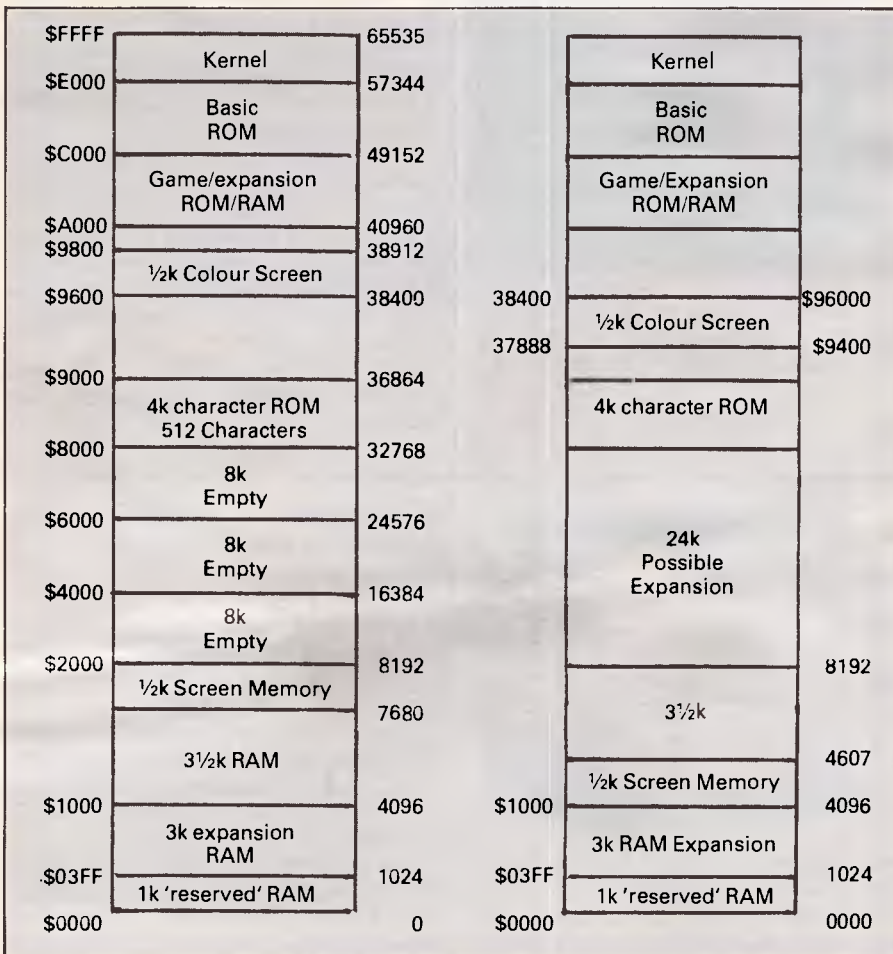


Fig 1 VIC 20 memory maps

Good News...

gametronics

# sinclair ZX SPECTRUM

## \$149



for a sensational

Xmas prices tumble for the greatest spectrum sale ever.

## GREAT BRITAIN'S BIGGEST SELLING MICROCOMPUTER

16k version ..... an incredible

(both with six free programs)

### \$149

48k version ..... an amazing

### \$199

### BUY NOW WHILE STOCKS LAST

#### SPECTRUM SOFTWARE

##### \* 48k Computer Required

3D Painter 20.00	Jet Pack 25.00	*Terror Daktil 22.50
*3D Tanx 12.50	*Jet Set Whilly 24.95	*Tranz Am 25.00
*3D Combat Zone 12.50	Jaws 12.50	The Snowman 25.00
*Ad Astra 22.50	Laserwarp 12.50	*Wheely 25.00
*Ah Diddums 19.50	*Luna Crabs 12.50	*Xadom 12.50
*Armageddon 20.00	Light Cicle 12.50	*Zipzap 22.50
*Aquaplane 12.50	*Laser Zone 12.50	*Zoom 25.00
Astroblaster 19.50	*Lunar Jetman 25.00	Cosmic Cruiser 25.00
*Avenger 19.50	Maze Death Race 20.00	*Alchemist 25.00
*Android II 25.00	*Moon Alert 20.00	*Abyss 19.50
*Blade Alley 20.00	*Manic Miner 24.95	*Atic Atac 25.00
*Beetlemania 12.50	*Molar Maul 20.00	*Camelot 19.50
Blind Mice 12.50	Meteoroids 12.50	*Clasic Adventure 22.50
*Bugaboo the Flea 12.50	*Munch Man 12.50	*Dungeon Master 25.00
*Bear Bovver 12.50	Millimon 12.50	*Devils of the Deep 22.50
*Coochie 25.00	Meteor Storm 12.50	*Dragonsbane 25.00
*Chequered Flag 22.50	Micro Mouse 12.50	*Espionage Island 12.50
Centibug 12.50	Mummy Mummy 12.50	Embassy Assault 19.50
Cosmic Raiders 12.50	Mined Out 12.50	*Fred 25.00
Cruise Attack 12.50	*Monkey Bizness 12.50	Gold 12.50
*Crazy Balloons 12.50	Naanans 12.50	*Golden Apple 12.50
Colomata 12.50	Over the Spectrum 1 19.50	*Hulk 27.50
Cosmic Debris 12.50	Over the Spectrum 2 19.50	*Hobbit 39.95
Chopper XI 19.50	Over the Spectrum 3 19.50	*Inca Curse 12.50
Digger Dan 20.00	Orion 12.50	Invisible Island 19.50
Dodge the Demon Driver 15.95	Dmetron 12.50	*Jack and the Beanstalk 25.00
Defendar 12.50	Pat the Postman 12.50	*Jungle Adventure 19.50
Deep Space 12.50	Paradroids 12.50	*Lords of Midnight 25.00
Devil Birds/Digger Man 12.50	*Pitman Seven 12.50	*Lords of Time 25.00
Dragon Maze 12.50	*Push Df 12.50	*Les Flicks 25.00
Dimension Destructors 12.50	*Psytron 25.00	*Land of Sagan 12.50
*Earth Defence 12.50	*Pogo 20.00	*Mad Martha 12.50
*Electro Storm 20.00	*Pinball Wizard 20.00	*Maziacs 22.50
*Frenzy 22.50	*Pedro 20.00	Planet of Death 12.50
Frog 5/Show Down 12.50	*Penny 20.00	Pyramid 20.00
*Frogger 19.50	*Paratrooper 20.00	*Smuggler's Cove 25.00
Ghost Revenge 20.00	Panic 19.50	*Sas Assault 12.50
Gnasher 19.50	*Penetrator 22.50	*Sabre Wulf 35.00
*Galactians 12.50	Planetroids 20.00	*Ship of the Line 19.50
Gold Mine 12.50	*PSSST 25.00	*Ship of Doom 12.50
*Grid Patrol 12.50	Road Racers 12.50	*The Forest 25.00
*Galaxians 12.50	Space Zombies 12.50	The Valley 25.00
Gulpman 12.50	Spawn of Evil 12.50	*Transylvanian Tower 19.50
*Galactic Patrol 20.00	Sheer Panic 12.50	*Trader 25.00
Games 1 19.50	Snake 12.50	*Time Quest 22.50
Games 2 19.50	Space Rescue 12.50	*Urban Upstart 25.00
Games 3 19.50	*Speed Dual 12.50	*Valhala 35.00
Games 4 19.50	*Schizoids 20.00	*Velnor's Lair 25.00
Games 5 19.50	Space Raiders 19.50	*2003 Space Oddity 12.50
Gobblerman 19.50	Space Intruders 19.50	Alphabet 19.50
Horace and the Spiders 20.00	Sentinel 20.00	*Adding & Subtracting 19.50
Horace Goes Skiing 20.00	*Snooker 25.00	*Grammer Tree-Nouns 35.00
Hungry Horace 20.00	*Scuba Dive 25.00	*Learn to Read 35.00
Hopper 19.50	Spectipede 19.50	*Learn Basic 49.95
Hard Chees 12.50	*Traxx 12.50	*Tense French 35.00
*Haunted Hedges 12.50	*Two Gun Turtle 12.50	*O-Level Chemistry 35.00
Invaders 12.50	*Trog 12.50	*Master File 39.95
*I'm in shock 12.50	*Time Gate 12.50	*Small Business Accounts 39.00
Invasion Force 12.50	*Trashman 25.00	*Tasword II 42.00
*Jumping Jack 19.50	*Tutankhamon 20.00	*Omnicalc II 39.95

Ask for catalogue for more titles

#### COMMODORE 64 SOFTWARE \$12.50 ea

Annihilator	Starter Word Splits	Dixie Pete
Demon Knight	Word Power	Lord of Balfog
Egbert	Stock Market	3D Gloopor
Escape MCP	The Fabulous Wanda	Forest Land
Arcadia	Galleons	Armageddon
Xanagrams	Death Star	Cosmic Cruiser
The Valley	Monster Munch	Time Traveller
Blue Moon	3Deep Space	Beseiged
Music 64		
Styx		
Xerons		
Super Spy		
Just a Mot (French)		
Open Sesame		
Space Raider		
Detective		
Condor		
Pakacuda		
Pedro		
Siege		
Crazy Cave Man		
Crazy Kong		
Cosmic Capers		
Halls of Death		
Gusher		
Everest Assent		
Airline 12.50	Weather Station 35.00	
Pedro 12.50	Micro Bug 35.00	
Pengwyn 12.50	Alpha Graph 35.00	
Snakepit 12.50	Animal Veg. Min. 35.00	
3Deep Space 12.50	Angle Turner 35.00	
Stock Market 12.50	Drum Kit 25.00	
Demon Knights 12.50	Gate Crasher 25.00	
Dallas 12.50	Cosmic Cruiser 25.00	
Xanagrams 12.50	The Hobbit 39.95	
Shadowfax 12.50	Roman Empire 22.00	
Siege 12.50	Paras 22.00	
Fire Hawks 12.50	Battlezone 2000 22.00	
Detective 12.50	Johnny Reb 35.00	
The Valley 12.50	Wordpower 35.00	
Beat the Clock 35.00	Tense French 35.00	
Open Sesame 35.00	Just a Mot 35.00	
Grammer Tree 35.00	Time Traveller 35.00	
Starter Words 35.00	Confrontation 25.00	

#### BBC SOFTWARE

gametronics  
6/177 Toorak Road, South Yarra 3142. (03) 241 3031

Mail Order/Cheque or any credit card.

Please send me  your Spectrum catalogue  
 your Commodore catalogue  
 your BBC catalogue  
 your Electron catalogue.

ITEMS ..... @ \$ .....

Add \$8.50 P&P H/ware of \$2.50 S/ware: \$ .....

Name .....

Address .....

Signature .....

Card No. .... Exp. Date .....



# CONVERSION

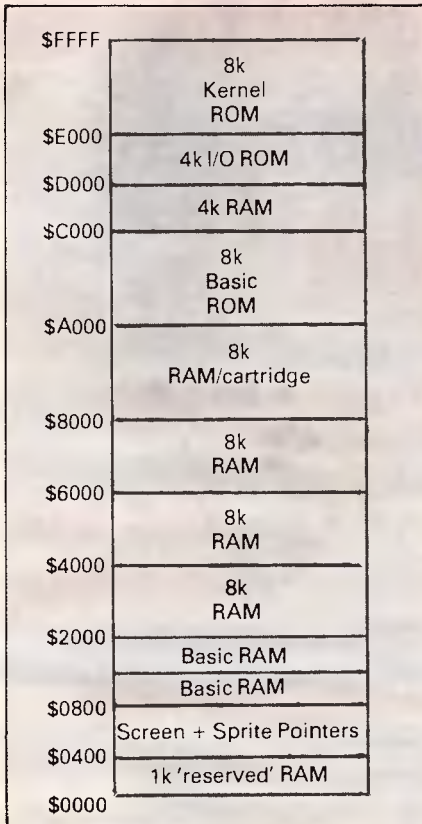


Fig 2 Commodore 64 memory map

while on the '64 they are handled separately by location 53280 for the border colour and location 53281 for the screen colour. These take a value between 0 which is black and 15 which is grey 3. Any program that POKEs and PEEKs to and from the screen (a game, for example) will have to be considerably rewritten to take into account the '64's bigger screen. On the '64, any moving character which wrapped round onto the next line on the VIC will continue moving on the same line for some 18 characters.

Further problems stem from the fact that the VIC's memory map changes depending on the amount of expansion that has been added. A program for a VIC with 3k expansion will have to be converted slightly differently from one for an 8k expanded VIC (Fig 1 should be of assistance here).

User-defined character sets are handled in much the same way by both computers. On the '64, however, the ROM which holds the '64's normal character set co-habits with the '64s I/O ROM at 53248 (\$D000). If your program has its own characters stored as data statements at the end of the program, you'll simply have to convert the part of the program that reads in the data. Even if your program accesses the VIC's character machines for the VIC's char-

Computer	Extent of Basic memory	Position of Screen	Position of Colour Screen
Unexpanded VIC	4069-7679 (\$1000-\$1DFF)	7680-8191 (\$1E00-\$1FFF)	38400-38911 (\$9600-\$97FF)
VIC + 3k	1024-7679 (\$0400-\$1DFF)	7680-8191 (\$1E00-\$1FFF)	38400-38911 (\$9600-\$97FF)
VIC + 8k (or more)	4608-???? (\$1200-\$????)	4096-4607 (\$1000-\$11FF)	37888-38399 (\$9400-\$95FF)
Commodore 64	2048-40959 (\$0800-\$9FFF)	1024-2023 (\$0400-\$07E7)	55296-56319 (\$DB80-\$DBFF)

(????—upper limits depend on amount of expansion)

Fig 3 Breakdown of differences between VIC and Commodore memory

acter set, very few changes will have to be made. The '64's character ROM starts at location 53248 (\$D000) but before it can be accessed your program must 'turn off' the I/O ROM. This is done with two simple POKEs:

POKE 56334, PEEK(56334) AND 254

POKE 1, PEEK(1) AND 251

The '64's character set can now be extracted from the ROM. As on the VIC, the letters are first with @ at the beginning (at 53248 on the '64). After the required number of characters have been read in, two more POKEs put the I/O ROM back in place in the '64's memory map:

POKE 1, PEEK(1) OR 4

POKE 56334, PEEK(56334) OR 1

New character sets can be placed in any one of seven places on the '64 but when used with Basic location 14336 is the best place for them. To switch from a character set in ROM to one at 14336, simply POKE location 53272 with 30. To protect your character set at 14336 from being overrun by your Basic programs, the top of Basic must be set to 14080. This is done by POKING locations 52 and 56 with 55, which leaves about 12k of memory available for your Basic program.

On the VIC, high resolution graphics

Bit Pattern	VIC	Commodore 64 Hi-Res	Commodore 64 Characters
00	Screen Colour	Screen Colour	Screen Colour
01	Character Colour	Upper 4 Bits of Screen Memory	Background Colour #1 (53282)
10	Border Colour	Lower 4 Bits of Screen Memory	Background Colour #2 (53283)
11	Auxiliary Colour (36878)	Colour Memory	Colour Memory

Fig 4 Multi-colour mode bit patterns



# ATLANTIS INTERNATIONAL COMPUTERS

32 GWYNNE STREET, MT. WAVERLEY, VIC. 3149. AUST.

Telephone 277 3139

IMPORTERS, SUPPLIERS, DISTRIBUTORS & SALES

## Base 64-A

- 6502 Processor
- Numeric Keypad
- User Definable Keys
- 64K Ram 28K Ram
- 32 fundamental sounds
- Auto Line Number
- Wordsaver
- 7 slots for modem printer etc.

**\$620** tax paid

## Atlas 8 Drives

**\$205** ex tax      **\$230** tax paid

## BMC-BX80

**\$250** ex tax      **\$275** tax paid

## Super 5 ENP-1091 120 c.p.s.

**\$360** ex tax      **\$390** tax paid

## Power Pad and Software

**\$169** ex tax      **\$190** tax paid

other Software available.  
Also Available for Atari and Commodore

A.I.C. has a wide range of monitors: BMC, Ritron, Taxan, Sanyo Sony, Zenith. Come in green, amber, and we have the Taxan color monitors.

*Ring for prices.*

## MONITORS AT \$134

## DX85A Storage Boxes \$24.50

Includes Delivery Anywhere

Peripheral Cards  
Pal Cards  
16K Cards  
80 Column Cards  
Z80 Cards

Voice cards **\$35**  
other Prices Phone AIC

## Brother Brother

**HR 15**  
**HR 25**

Dot Matrix  
M1009 50 c.p.s.  
M2024 160 c.p.s.

**\$279**  
**\$1700**

Ring for HR 15 & HR 25 prices

**Delivery Anywhere in Australia \$10.00**

## PRINTERS GALORE AT SPECIAL PRICES

Amust DT80/2	100 c.p.s. 80 col	<b>\$295</b> ex tax	<b>\$325</b> inc tax
BMC 80 (BX80)	80 c.p.s. 80 col	<b>\$250</b> ex tax	<b>\$275</b> inc tax
Mitsui MC2100	120 c.p.s. 132 col	<b>\$450</b> inc with serial and Parallel I/F	
Juki 6100	Daisy Wheel 18 c.p.s.	132 col	<b>\$725</b> inc tax
Microline 84P	200 c.p.s. 50 NLQ	132 col	<b>\$1165</b> inc tax
Microline 92P	160 c.p.s. 40 NLQ	80 col	<b>\$645</b> inc tax
Seiko SHA BP 5420	420 c.p.s. 104 NQL	132 col	<b>\$2795</b> inc tax
Seiko SHA BP5420I	many other features As above but IBM PC Compatible <b>\$2795</b> inc tax		

## THIS MONTH'S SPECIAL

Super 5 En-P1091 120 c.p.s. 22 NLQ 75 Pro space switch and program selectable speed special modes IBM PC with full graphics.

**\$360** ex tax      **\$390** inc tax

Printers Delivery \$10.  
Microline 84 and Seiko SHA extra.

## RIBBONS

For most Printers and Typewriters. Adler, Amust, Centronics, Citoh, Data Products, Diablo, DEC, Epson, IBM, Oki/Microline, Qume, Mawnesmann Tally, NEC, Olivetti, Texas, Wang and many more.

### Special This Month

For Admate: Amust DT80, BMC80, CP80, PX80, FAX80 etc.  
**\$7.50** ex tax \$9 inc tax & postage.

## SUPREME COMPUTER SUPPLIES

P.O. BOX 31 NUNAWADING,  
VIC. 3131.  
TEL (03) 233 8652  
TELEX AA 151183



# CONVERSION

are achieved by filling half the screen with a blank user-defined character set and then doubling the character size so that 256 characters fill the entire screen. On the '64, things are slightly easier in that you put aside 8k of memory for the 320 x 200 high resolution screen. High resolution mode is entered with the following:

POKE 53265, PEEK(53265) OR 32

POKE 53272, PEEK(53272) OR 8

The last of these POKES tells the '64 where to find the hi-res screen, in this case 8192 (\$2000). On the '64, the colours for this mode are given by the contents of the screen matrix (1024-2023), whereas on the VIC the colours for points which are plotted come from the colour screen. Like the VIC, the '64's high resolution screen is laid out as rows of characters. To plot a point (X,Y) on the '64 the following should be used:

BYTE = 8192 + 320\*INT(Y/8) +

8\*INT(X/8) + (Y AND 7)

POKE BYTE, PEEK (BYTE)

OR 2 ↑ (7-(X AND 7))

This is similar to the method used on the VIC.

Another mode that both computers have in common is multi-colour mode, which allows up to four colours to be shown in each character square. On the VIC, this is enabled by placing a colour code greater than seven in the colour square corresponding to the required character. The same method is used on the '64 but the mode must first be 'turned on' with the following:

POKE 53270, PEEK(53270) OR 16

After the above the mode is almost the same as both computers. On both, the resolution of the screen is halved so that bit pairs represent the four colours; the main difference being the location from where the computers access the colours. Fig 4 shows the differences.

## Sound effects and music

One of the main advantages the '64 has over the VIC is sound. The VIC has three tone and one white noise channel, giving a range of five octaves. The '64 has three channels offering nine octaves. Each of the '64's channels can take a different waveform from a selection of triangle, sawtooth, pulse and white noise. The '64's SID (Sound Interface Device) chip also offers enveloping (where the note's shape is changed by setting Attack, Decay, Sustain and Release) and various filters. Of course, when you are converting from the VIC you'll want your program to sound the same as it did on the VIC. You'll be able to enhance your VIC sounds later by using more of the SID's facilities.

A 10	K 37	U 30	/ 55	6 19	* 49
B 28	L 42	V 31	£ 48	7 24	@ 46
C 20	M 36	W 94	+ 40	8 27	↑ 54
D 18	N 39	X 23	- 43	9 32	← 57
E 14	O 38	Y 25	0 35	= 53	SP 60
F 21	P 41	Z 12	1 56	f1 04	
G 26	Q 62	, 47	2 59	f3 05	
H 29	R 17	. 44	3 84	f5 06	
I 33	S 13	; 50	4 11	f7 03	
J 34	T 22	: 45	5 16	RET 01	

Fig 5 Machine code value locations

## Volume control

Both computers handle the volume control of their sound in the same way. This is done by POKEing a certain memory location with a value between 0 and 15 (15 being the loudest). On the VIC, this location is 36878 and on the '64 it's 54296.

Each of the VIC's three channels or voices is pre-set to give notes in a certain range depending on the voice. On the '64, any note in a nine octave range can be played through any of the three channels. Playing a note on the VIC is simply a matter of setting the volume and then POKEing a number between 128 and 255 into one of the three channels.

This process is slightly more complicated on the '64 in that the SID chip has to know which waveform is to be used and the shape of the note to be played before any sound can be heard. To enable the '64 to have a larger range than the VIC, two locations must be set for the pitch of each note. I suggest that you first set the Attack/Decay register of the voice you are using to 136, for example, and the Sustain/Release register to zero. You should also set the waveform of the voice to either triangle or sawtooth. These values will give a note that sounds almost like that of the VIC. If your VIC program uses white noise (location 36877) then set the waveform to noise.

## Machine code

Converting machine code from the VIC to the '64 is not as hard as it might at first appear if you have a working knowledge of machine code; both computers use one of the 65XX family of CPUs. Like the Basics of the two machines the machine codes are exactly the same, and if you've learnt 6502 on the VIC you'll find 6510 familiar.

You'll find that illegal calls to the VIC's ROM will not work on the '64 but legal ones will, since Commodore has left the

Kernel jump table alone. The first 1k of memory is exactly the same on both machines except for locations 0, 1, 2, 784, 785, 786, 197 and 203 decimal.

On the VIC, locations 1 and 2 hold the start address for programs called by the USR command in the conventional lo-hi 65XX fashion.

On the '64, the two lowest locations are used by the 6510 in the memory paging system. USR calls on the '64's user locations 784-786 so when you're converting programs with USR in them, remember to POKE the address of the machine code subroutine into locations 785 and 786 on the '64.

Any VIC programs that use locations 784 - 787 for storage will have to use alternatives. If your programs use location 197 or 203 to find which key is being pressed, you should note that the '64 reads the keyboard in a different way to the VIC. These locations now have the values shown in Fig 5.

Remember that on the '64 you have 4k of memory (at \$C000 or 49152 decimal) set aside for your machine code programs or data. If you have a simple monitor/assembler you should find that this will work on your new '64 but the X command (exit to Basic) will cause the '64 to crash.

## Conclusion

With the information and tables in this article you should be able to convert most machine code utilities to the '64, but games and most full-length programs will be beyond all but the most determined 'assemblerites'.

As the '64 is a much 'bigger' machine than the VIC in more aspects than memory, you should try to keep in mind when converting your programs that you now have available a much larger screen resolution, sprites and the advanced SID chip.

You'll find that converting your old programs will help you adapt quickly to your new machine.

# IBM – PC

## WHY PAY MORE

### COMPARE OUR PRICES

#### SOFTWARE

Lotus 1-2-3	\$595
DBase II	\$595
Wordstar Propak	\$495
Knowledgeman	\$595
RBase 4000	\$475
Open Access	\$695
Quickcode	\$259
Crosstalk	\$199
pfs-file	\$125
pfs-report	\$125
flt simulator	\$65
Multimate	\$495
ATI training	
for Lotus	\$85
for DBase	\$85
Revelation (8087)	\$1200
Symphony	call
DBase III	call

#### HARDWARE

AST 6 pack	\$469
AST Megaplus	\$469
AST Megapack (256K)	\$585
64K chips	\$85
PC Net	call
Orchid Multifunction	
64K, S,P,Clock	
Disk cache	\$450
Floppy disk	
Tandon	\$395
Mouse	call
PCox	\$1325
IRMA	call
IRMALINE	call
Hard disk	call
IBM PC/XT	call

Further quantity discounts for  
Corporate Government Users/Dealers

**MC-P Applications**  
**2nd Floor**  
**156 Pacific Highway**  
**St Leonards 2065**  
**439 7500**  
**439 7043**

All prices subject to change

Cheque, Bankcard, Cash

Delivery costs extra

\*Lotus also for Dec, Wang, TI



# NOT ALL FLOPPY DISKS ARE CREATED EQUAL

**maxell**<sup>®</sup>

MINI-FLOPPY DISK  
MINIDISKETTE  
MINI-DISQUE SOUPLE



## MD2-D

**maxell**<sup>®</sup>

OF JAPAN



### SETS A NEW STANDARD OF EXCELLENCE

# maxell®

## FLOPPY DISKS

### Maxell meets or exceeds all the world's standards.

ANSI, DIN, JIS, ECMA, IBM and Shugart set the standards for the world's floppy disks. When any of them issue a 'spec' you can be sure it is meaningful and important. You can be just as sure that Maxell meets or exceeds every one of these standards.

### Japanese 'Know how' and strict quality control is built into every Maxell disk.

Hitachi Maxell Ltd have set up a factory at Tsukuba, just out of Tokyo, to specialise in the manufacture of Maxell floppy disks.

The critical first step in making a disk is the coating of the polyester film.

Every step of the Maxell coating process, from the blending of the computer-grade magnetic powder to the preparation of the sheets of base material, is under the strictest control.

Each magnetic particle on a disk must be within certain very strict dimensions and the particles must also coat the base material with the exact dispersion and density.

The ideal thickness of the magnetic coating is 2.5 micromillimeters. Maxell are very proud to achieve that dimension with plus or minus 0.1 micromillimeters on every disk.

It's the most difficult, time consuming, and at times, expensive way there is to produce a quality disk. But it's the only way to make floppy disks that really stand up to heavy demands.

And the quality control goes on –

- \* Bumishing is done in special 'clean rooms'.
- \* Unique Maxell lubricants are applied to give the least possible headwear and provide a completely stable output.
- \* The rolls of magnetic material are cut and punched into precise 8", 5¼" and 3½" (Microfloppy) disks. If a hole is misaligned by even a tiny fraction of a millimeter the disk won't work perfectly.
- \* The disks are carefully placed in a non-woven rayon fabric liner and a black PVC jacket. This protection 'package' receives an antistatic treatment before its permanently sealed.

### That's just the beginning – then the testing starts.

At the Maxell Technical Centre disks are run under accelerated test conditions actually designed to make them fail. After 10 million passes Maxell disks show no sign of wear, no sign of dropouts, no sign of data loss. None!

Each and every disk is tested for dropout certification light transmission and magnetic retention. It is measured in every possible way. For shape, thickness and exact hole diameter. Jackets and liners are tested as well.

### A new standard of excellence deserves a new guarantee. You've got it... 10 YEARS.

No ifs. No buts. No arguments. Compumedia Systems guarantee every Maxell Floppy Disk (including the new 3½" Microfloppy Disk) for all normal disk drive operations for 10 years.

### Maxell disks are available now in Australia & New Zealand for every major brand of disk driven computer and word processing system.

Maxell make it easy. Dealers have a Floppy Disk Reference Manual. You can tell at a glance exactly which Maxell Disk you need. Maxell Floppy Disks – From your authorised dealer or contact

The logo for Compumedia Systems features a stylized 'C' symbol on the left, followed by the words 'Compumedia' and 'Systems' stacked vertically in a bold, sans-serif font.

Compumedia Systems Pty. Ltd.  
Melbourne: P.O. Box 242, Oakleigh 3166, Tel (03) 568 5929  
Compumedia Systems Ltd.  
Auckland: P.O. Box 3273, Tel (09) 444-6085. Tlx 60835  
Wellington: P.O. Box 11-091, Tel (04) 851-548. Tlx 3909.



# LOCKABLE DISK BOXES

**LOWEST PRICE EVER!**



These same boxes are still sold for \$80.00 elsewhere

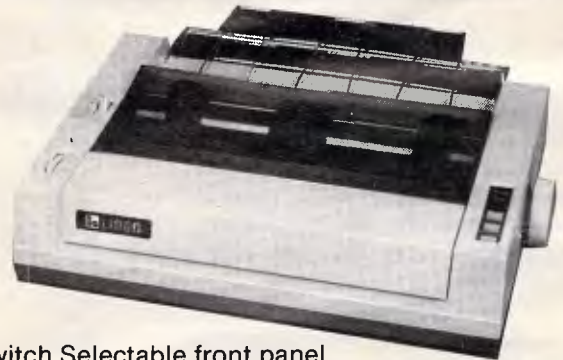
**ONLY \$24.00**  
including tax

Postage and Packaging \$4.00



Holds 85 Disks and is fitted with Tilt Dividers with Index Tab

## LINGO PX120 DOT MATRIX PRINTER



Switch Selectable front panel  
Fast 120 cps for drafts. Quality for final copy. Italics, superscript/subscript, graphics, 1k buffer, 5, 6, 8.5, 10, 12, 17 CPI. Definable characters. Special long life ribbon (3 million characters rating)  
A brilliant new technology creating a fabulous new printer.

Mode 1 120 CPS  
Mode 2 Near letter quality  
Mode 3 Proportional

We will not be undersold.



Suitable for Apple/IBM/NEC

Swivel stand + \$20 inc. Tax  
CRISP resolution when using 80 characters on screen.

**\$150 OFF**

**ONLY \$745**  
INC. TAX

**ONLY \$429**  
INC. TAX

**350 South Road, Moorabbin, Vic. 3189. Tel.: (03) 555 9844**



## CHIP CHAT

Most people think Futuretronics went into receivership because it ran out of money. Mr Alpar, a director of Futuretronics states, in a report on the front page of the Financial Review on November 22, that the National Bank had no reason to appoint receivers. To quote the Fin Review: 'According to Mr Alpar . . . no circumstances have arisen which would entitle the bank to appoint receiver managers to run the affairs of Futuretronics . . .

' "We're saying that the appointment (of receiver managers) is null, ineffective, and void." he (Mr Alpar) said last night.'

Clearly Mr Alpar is not impressed. He is reported in the paper to have also said: "It was like a military takeover. You would have loved it."

So, general opinion is that Futuretronics ran out of money and Mr Alpar reckons the National Bank shouldn't have moved in.

Chip Chat isn't going to offer an opinion (preferring to sit safely on the fence and avoid any possibility of falling foul of either party in this matter). But Chip Chat has used all this by way of introduction to its suggestion that Futuretronics may have been heading for hot water anyhow with its teany, weany bit naughty advertisements. Now it's time to direct your attention to the picture of 'Mr T' elsewhere on this page. Remember seeing him on your TV screen? Remember Mr T telling you about those other turkeys and how absolutely terrific Atari graphics are (were?)? Futuretronics kindly provided us with a purported demo on disk to plug into our Atari. And to none's great surprise, Mr T appeared to



have lost his sparkle. In fact, he even lost his ability to move. The demo, Chip Chat assumes, was the best that could be achieved on the Atari. It bore, however, virtually no resemblance (in terms of animation) to what was being shown on TV ostensibly from the Atari micro also shown on TV. The advertisement was not aimed at computer literates who might know to question the ability of an Atari to produce the animation shown on TV (and it was implied to be directly out of the Atari shown in front of the monitor on the commercial, wasn't it?) It was aimed at novices, who might bolt down to the local Atari outlet and purchase a machine with the express purpose of creating something akin to the Mr T animation and who would likely be bitterly disappointed/annoyed to find it can't.

*Guess who?:* Here's a Chip Chat quiz courtesy of our American correspondent David Ahl. There are no prizes, so, on with the questions.

- (1) Who used to be in charge of the largest microcomputer manufacturer (some years ago), and is now farming and taking courses in medicine?
- (2) Which Hollywood film editor wrote a word processing package with customisation for 72 different hardware configurations?
- (3) Which expert blackjack player is now making a living writing computer books?
- (4) Who held key positions at Commodore, Apple, and Victor, and is now with NNA?
- (5) Who founded or financed Chuck E. Cheese Pizza Time Theater, Sente Software Distribution, Androbot, and one other company?

And now the answers:

- (1) Ed Roberts — founder and chief executive officer of MITS, maker of the

VZ 200      VZ 200      VZ 200  
**MONITOR/DEBUGGER  
FOR VZ 200**

Save, load M/L tapes  
Set break points, set flag reg's  
Mem. dump's to printer and more  
\$14.95 only  
Renummer, merge basic programs  
(M/L tape) \$12.50

(Both programs need mem. expansion)

by

**W. OBRIST**

P.O. Box 56 St. Kilda 3182

VZ 200      VZ 200      VZ 200

## ROYAL EASTER SHOW 1985



### Computer Software Competition

The Royal Agricultural Society of N.S.W. with the support of a number of major suppliers in the data processing field, is introducing a computer software competition in conjunction with the 1985 Show.

The objectives of the competition are to present and publicise the best original programme relating to rural, pastoral or agricultural activities and to encourage the development of computer skills particularly amongst those living outside the major metropolitan centres.

Prize winning entries and others considered of sufficient merit will be demonstrated in an appropriate environment at the Show.

**The competition will be conducted in two Sections:**

- (i) programmes for rural/pastoral or agricultural management or other similar activities;
- (ii) other programmes with a significant educational content.

Further information may be obtained by writing to

**The Director  
RAS of N.S.W.**

**Computer Software Competition**

G.P.O. Box 4317  
Sydney N.S.W. 2001  
or by telephoning

**Miss Carol Rowan on (02) 331 9122**



# CHRISTMAS SPECIALS

## BOARDS FOR APPLE II/IIe

Z80 Card	\$50
Wild Card	\$59
16K Ramcard	\$63
Printer Graphics Card	\$70
Clock Card	\$75
80 Col Card	\$89
Eprom Writer	\$99
Micro Buffer	\$149
128K Ramcard	\$225

## BOOKS

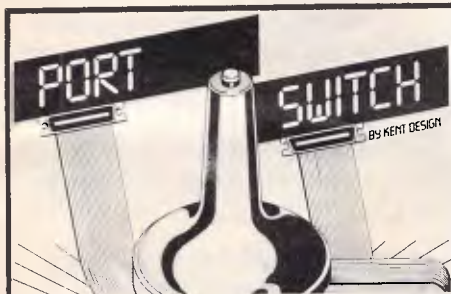
Beneath Apple DOS	\$25
Bag of Tricks	\$50
Understanding Apple II	\$35

All Prices Include Tax  
Add \$2 P&P For Each Item

## RAM SUPPLY

PO BOX 950 PARRAMATTA 2150  
TELEPHONE (02) 636 8248

Prices good for December or until stock sold



Peripheral selector — 2 way  
Complete with all cables (2 m long)  
\$149.95 all models-serial or parallel.  
**KENT DESIGN, 27 ARTHUR ST**  
Nth Caulfield, 3161. Ph: (03) 509 8751  
Add \$5 P&P ex. Melb.

## CHIP CHAT

Altair 8800, the first mass-produced microcomputer (1975).

(2) Michael Shroyer — the Electric Pencil package had to be customised for different processors, video boards, and memory sizes.

(3) Ken Uston — he is banned at most casinos throughout the world and turned to computers two years ago.

(4) Chuck Peddle — his brief stint at Apple in 1980 didn't work out; now he has founded NNA (No Name Available, so called because every name he tried to get was already registered).

(5) Nolan Bushnell — after founding Atari and selling out to Warner in 1980, his later ventures haven't fared so well.

The November 'Prize Crossword' winner is T Robinson and the solutions are:

### ACROSS

3Negation 6Firmware 7Stores 8Set  
9Blow 10Director 12Parity 13Program  
15Failure 17Wafers 18Magnetic  
22Read 23End 24Divide 25Computer  
26Generate

### DOWN

1Writer 2Tablet 3Network 4Automation  
5Operator 6Fused 11Card reader  
14Real time 16Embrace 19Grammy  
20Twenty 21Coder

## BLUDNERS

For those of you trying to run Connect-Four for the Commodore 64, you might find this subroutine useful which was omitted from the August issue of APC.

```
1749 :
1750 REM: EVALUATE X,Y
1760 E=EC (X)
1770 FOR D=0 TO 3:Q=X (D) :R=Y (D)
1780 FOR C1=1 TO 2:N=0:
      I=X+Q: J=Y+R
1790 IF B(I,J) <> C1 THEN 1820
```

And from Chris Stamboulidis who submitted the program 'Mini Calc' published in the October issue of

```
970 INPUT "HIT <RETURN> TO SAVE"; NA$:FOR T % = 1 TO 9: FOR Y%=
      1 TO 43
980 PRINT#"MIN",CHR$(34)$(T%, Y%),CHR$(34)$(T%,Y%): NEXT:NEXT
990 GOTO 170
```

APC: "There was one point which I omitted to mention in the documentation.

When writing numerical constants during the entry of functions, ensure that they are enclosed by '<' and '>'.

For example, to multiply the contents of cell 2,4 by 0.3, you would write:

```
"[2,4]*<.37>"
```

Also, the SAVE routine should be modified to prevent possible problems with 'INPUT#'ing strings with commas inside them. The following lines should now read:

**C** 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.  
(Near Collingwood Football Club)

**Maxwell**

TELEPHONE: 419 6811  
OFFICE EQUIPMENT (VIC) PTY. LTD.  
162 - 164 NICHOLSON ST. ABBOTSFORD

## IBM COMPATABLE

2 Drives 256K RAM  
1 Serial 1 Parallel  
1 Monochrome Monitor  
Free Software

**\$3066**

(tax included)

Ph: Young on (03) 578 9289 AH

## VZ-200 SOFTWARE

**WORD PROCESSOR.** A simple menu driven programme outputs multiple copies to printer in letter format or text only. Features insert, delete, alter, tape save & retrieve. Requires 16K exp. please indicate 40 or 80 column printer.

**DATA MASTER.** Data base for cataloguing books, record collections etc. Full editing, fast sort & search routines. Outputs to printer all or part of files. Requires 16K exp.

**ADDRESS BOOK.** Stores up to 200 names, addresses and telephone numbers. Outputs to printer and saves on tape. Field search and fast sort routines. Requires 16K exp.  
\$8.00 each P&P inc. or all 3 for only \$20.00

**L. DAWSON**

BOX 718F G.P.O. MELBOURNE 3001

# Electric Desk

An integrated multi-tasking productivity program that combines four business functions: word processing, database management, spreadsheet analysis, and communications. Electric Desk features a window function, a macroprogramming language, and context-sensitive help screens.

## Database

- Instantaneous access to any record by index value
- Powerful search capability. Search criteria can include complex Boolean logic and wildcard search
- Automatically dials phone numbers with a single key stroke
- Maximum of 50 fields per record
- Maximum of 1000 characters per record and 1000 characters per field
- Maximum of 65,000 records per database
- Maximum of 5 index fields per database
- Record layout can be "painted" on the screen
- Data and field names can be displayed in normal, bold, underline, or reverse video
- Edit criteria can be defined to minimize entry errors
- Full screen editor to enter and change data
- Screen can be divided into windows
- Work on up to nine different databases simultaneously (system memory permitting)

## Communications

- Log on two different information services or host computers simultaneously
- Divide the screen into windows
- Define keyboard macros to execute several commands with one key stroke
- User definable baud rate, parity, stop bit, and word length
- Log in scripts for automatically dialing host computers and information services and entering password information
- Send and receive ASCII files
- Edit files that have been received using the word processor

Introducing Electric Desk™ from Alpha Software. It's the first software ever that works exactly like you do.

With Electric Desk you can have word processing, spreadsheet, data base and communications all going at the very same time, all in a single software program. So you can switch instantly from a letter to a memo to a budget over to a stock report and back again, in seconds. Or work on two tasks at once, and shoot information from one to another, all with a few keystrokes.

Stop in for a personal demonstration. It could be the best business decision you'll make all year.

## Word Processor

- Automatic line wrap
- Continuous reform of text as new text is inserted
- Paragraph indentation
- Search and replace
- Delete block of text
- Insert block of text
- Cut and paste
- Automatic chapter, table and page numbering
- Right justify text
- On-screen ruler, with user selected left, right, top and bottom margins, and tab stops
- Normal, bold, italics, bold italics and two user definable type styles
- Superscript and subscript
- Single line, double line, or triple line spacing
- User selected headers, footers and page numbering style
- Information from the spreadsheet and database can be merged into a document prepared using the word processor
- Keyboard macros can be defined to automatically type common phrases or execute several commands with one key
- Screen can be divided into windows
- Work on up to nine different documents simultaneously (system memory permitting)
- Move text from one document to another or from one window to another
- Move text from document to the spreadsheet
- Any ASCII file can be edited using the word processor



# SIMPLY POWERFUL.

- Demo disk available introducing main functions of program
- Menu driven
- On screen help— Context sensitive help to assist user. Help screens also contain user-guide page references
- Users can customize screen colors

## Spreadsheet

- 255 rows by 255 columns
- Variable column widths
- Edit, copy, delete, and move a cell or range of cells
- Insert or delete rows and columns
- Import ASCII files into the spreadsheet
- Overlay one spreadsheet on top of another spreadsheet
- Number formats: 0 to 6 decimal places, exponential and percent
- Label formats: Right, Left, and Center justification
- Cells can be protected to prevent accidental editing
- Spreadsheet titles can be locked so that they do not disappear from view when the spreadsheet is scrolled
- Vertical and horizontal windows (viewports) can be defined to view different portions of the same spreadsheet simultaneously
- Screen can be divided into windows
- Work on up to nine different spreadsheets simultaneously (system memory permitting)
- Embedded printing commands can be used to print out portions of the spreadsheet using different type styles
- Spreadsheet functions:

### Mathematical Functions

ABS (x)	Absolute Value
EXP (x)	Exponential
INT (x)	Integer Part
LN (x)	Log base e
ROUND (x,n)	Round a number to n digits
SQRT	Square Root

### Logical Functions

IF (condition, true value, false value)

### Special Functions

CHOOSE (x, v0, v1, ..., vn)	Select argument value
HLOOKUP (x, range, row#)	Horizontal table lookup
VLOOKUP (x, range, col#)	Vertical table lookup

### Financial Functions

IRR	Internal Rate of Return
NPV	Net Present Value
FV	Future Value
PV	Present Value
PMT	Mortgage Payment

### Statistical Functions

COUNT	Number of items in a list
SUM	Sum of all items in a list
AVG	Average of all items in a list
MIN	Minimum of all items in a list
MAX	Maximum of all items in a list

Distributed in Australia exclusively by

Software Corporation of Australia Pty. Ltd.

449 Swanston Street Melbourne, Victoria 3000  
Telephone: (03) 347 7011 (02) 328 7074





# ADVERTISERS INDEX

<b>A</b> ACT..... OBC AED..... 16 Amust Computer Corporation..... 50,51 Applied Technology..... 186,187 Archive Computer Services..... 90 Arcom Pacific..... 9,84,95 ASP Microcomputers..... 140 Atlantis International Computers..... 207 August Computer Services..... 83 Austor..... 105 Automatic Ice Co..... 158,159 Australian Exhibition Services..... 74 Australian Micro Network 11111107 Australian Software Library..... 36 Avtek..... 100 AWA Computers..... 81 AWA Thorn..... 26,27	Consultech..... 148 Continental Publications..... 147 CW Electronics..... 144  <b>D</b> Data Care..... 128 Dataflow..... 28 Data Media..... 115 Data Parts..... 121-124 Data Peripherals..... 107 Dick Smith..... 130,131 Digital Source..... 196 Dolphin Computer..... IBC Dr Kremer..... 114 Dreamdisks..... 194	<b>K</b> Kent Design..... 214  <b>L</b> L Dawson..... 214 Last Word..... 195 Lion Electronics..... 191 Logo..... 119 Lintek..... 96 Lysco..... 185	<b>R</b> Ram Supplies..... 214 Robs Computer Centre..... 98,99 Rod Irving Electronics..... 142 Rose Music..... 66,67 Rosser Communication..... 96 Royal Agricultural Society !..... 213
<b>B</b> Barson Computers..... 14,15, Bayne and Trembath..... 190 BI Computers..... 135 Brother Industries..... 82	<b>E</b> Eastern Micro Electronics..... 41 Energy Control..... 201 Epson..... 89	<b>M</b> Mailsoft..... 144 Mailware..... 132 Marketeering..... 201 Maxwell Office Equipment..... 214 MCP Telecomputing..... 209 Megatron Computer Industries..... 110 Memorex..... 54 Micro Allsoft..... 155 Micro City..... 30 Micro General..... 128 Micro Mail..... 11 Mountain Valley Software..... 113 Microsoft..... 4,6,7	<b>S</b> Sample Software..... 37 Silicon Crafts..... 185 Smith Corona..... 25 Software Corporation of Australia..... 215 Software Source..... 127 Software Specialist..... 147 Software Supplies..... 40 Southern Cross..... 197 Speedy Software Supplier..... 194 Sperry..... 2 Sunshine State Software..... 114 System Solutions..... 189
<b>C</b> Calypso..... 140 Case Communications..... 52 Cash and Carry..... 102,103 Caulfield Business Computers..... 107 Centre Industries..... 96 Cerebral Solutions..... 58 Chambers' Computer Supplies..... 144 City Personal Computers..... 20 Comandglen..... 150 Commercial and Professional Microsystems..... 200 Commodore..... 64 Compak..... 192,193,212 Comsoft..... 88 Computer Medics..... 156 Computer Print and Paper Company..... 216 Computer Resources Co..... 79 Computertime..... 85 Computer Simulation..... 201	<b>F</b> Format Computers..... 106 Forrest Data Services..... 185 Futuretronics..... 76,93	<b>N</b> Natwick Management..... 63 Netcomp..... 126	<b>T</b> Tedita..... 185 The Byte Shop..... 116 The Computer Spot..... 157 Texas Instruments..... 57
<b>G</b> Gambit Games..... 156 Games World..... 201 Gametronics..... 205 Glover and Associates..... 136	<b>H</b> Hanimex..... 68 Hitachi..... 22,23 High Technology..... 194 Hi-Tech Software..... 90 Home Computers..... 152	<b>O</b> Osborne..... IFC,1 Ozisoft..... 45	<b>U</b> Unlimited Computer Solutions..... 109
<b>I</b> IMA Computer Co..... 70,71 Immedia..... 160 Infocom..... 36,140 ISD..... 47	<b>J</b> Jacaranda..... 191	<b>P</b> PC Games..... 96 Source..... Pace Computer Services..... 185 Paragon Educational Distributors..... 115 Pick Information..... 43 Porchester..... 137-139 Portable Computer Co..... 13 Public Domain Software House..... 190	<b>V</b> Venue Music..... 83
<b>Q</b> Queensland Computer Office..... 201	<b>W</b> W Obrist..... 213 Warburton Franki..... 46 Western Technology..... 190	<b>Y</b> Young Lim Computers..... 214	<b>W</b> Western Technology..... 190

# Computer Paper

**IN MINI & MICRO PACKS AVAILABLE FROM LEADING COMPUTER STORES NOW**

**11 x 9 1/2 /70  
WORD PROC. PAPER**

W250 Pack — \$7.85  
 W500 Pack — \$15.39  
 W1000 Pack — \$29.50  
 Also available in boxes of 2,000 & 2,500

**A4 WORD PROC. PAPER**

A4 250 Pack — \$8.28  
 A4 500 Pack — \$16.40  
 A4 1000 Pack — \$31.15  
 Also available in boxes of 2,500

**11 x 15 PLAIN OR B.H.S.**

LP 250 Pack — \$8.45  
 LP 500 Pack — \$16.60  
 LP 1000 Pack — \$31.50  
 Also available in boxes of 2,500

**COMPUTER ADDRESS LABELS**

37 x 102 — 2000 Labels — \$35.00  
 24 x 89 — 2000 Labels — \$23.15  
 Also available in boxes of 10,000

**COMPUTER BINDERS**

11 x 9 1/2 — \$3.60  
 11 x 15 — \$3.60

**For  
Quality  
Computer Paper  
Look For  
This Label**

**PHONE (03) 584 5488**

**DEALER ENQUIRIES WELCOME**

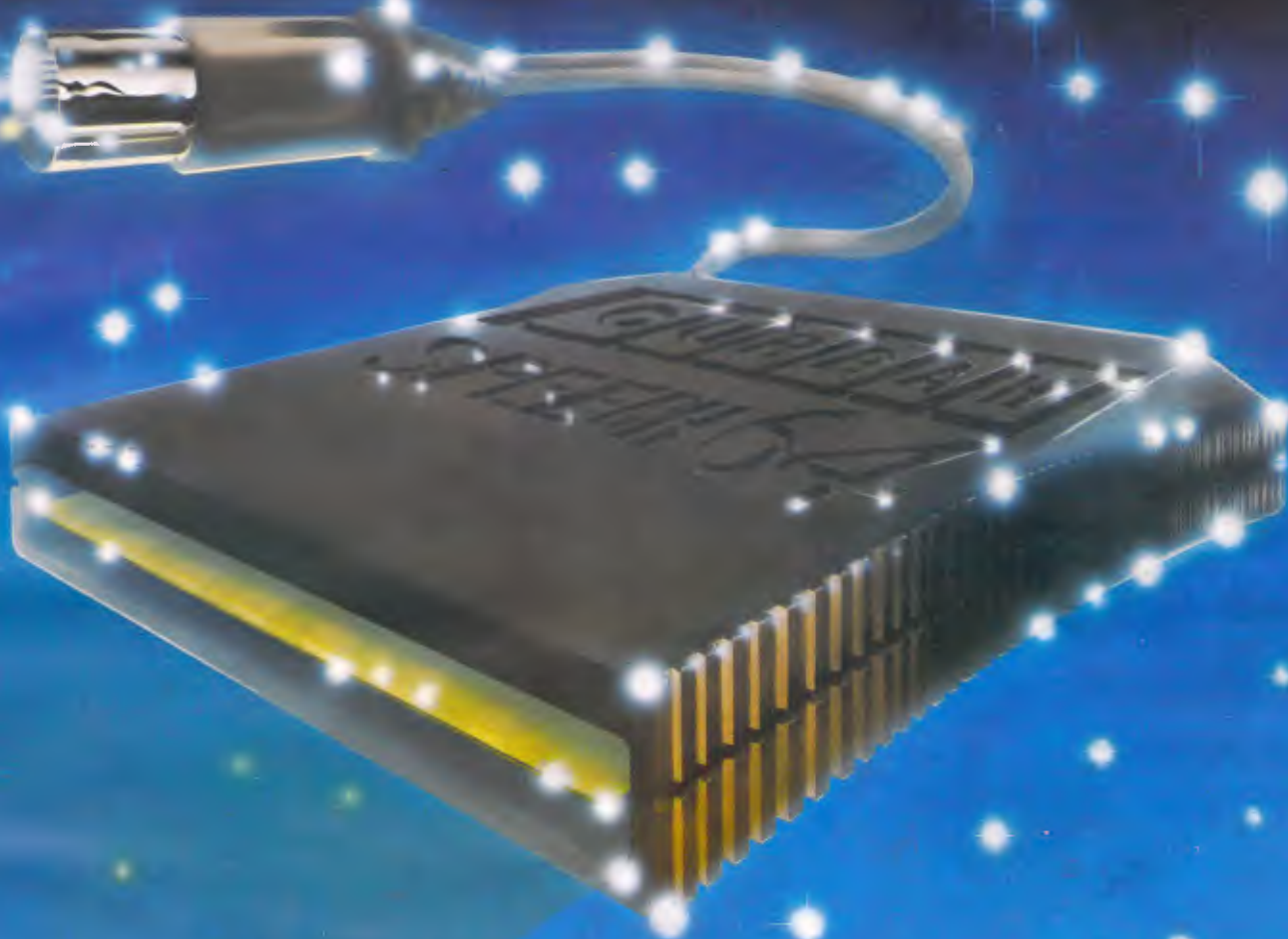
**96B Herald Street,  
Cheltenham 3192**

All prices R.R.P.

*(Also pre printed STD inv/stat formats. All prices include S.T. — Plus packing & postage)*



# FUN WITH SPEECH 64!



## Speech Synthesiser for the Commodore 64

**SPEECH 64** for the Commodore 64 is ready to talk immediately on power-up, has an infinite vocabulary and extra BASIC commands. Retailing at only **A \$69.00**, **SPEECH 64**'s advanced features will give you, your family and friends lots more fun with your computer! Its sister unit  $\mu$ SPEECH — for the Sinclair Spectrum — is a smash hit in the UK and over 10 other countries, and has been awarded the CTA 'Product of the Year' accolade.

**SPEECH 64** is easy to use! It needs no software to be loaded, it does not steal RAM from the BASIC operating system, or stop arcade style action.

With extended BASIC commands like SAY and its Text to Speech facility **SPEECH 64** can be programmed in plain English, just like this: **SAY "to say anything you want"**

You can choose from two different voices, each with programmable intonation, and other commands control the voicing of keys as they are pressed — a useful educational aid.

**SPEECH 64** comes complete with full documentation and two free full colour posters. Watch out for **SPEECH 64** as it appears in retail outlets nationwide — or use the order form below, at no extra cost.

**CURRAH**

Distributed in Australia by



dolphin  
computers

99 Reserve Road  
ARTARMON NSW 2064

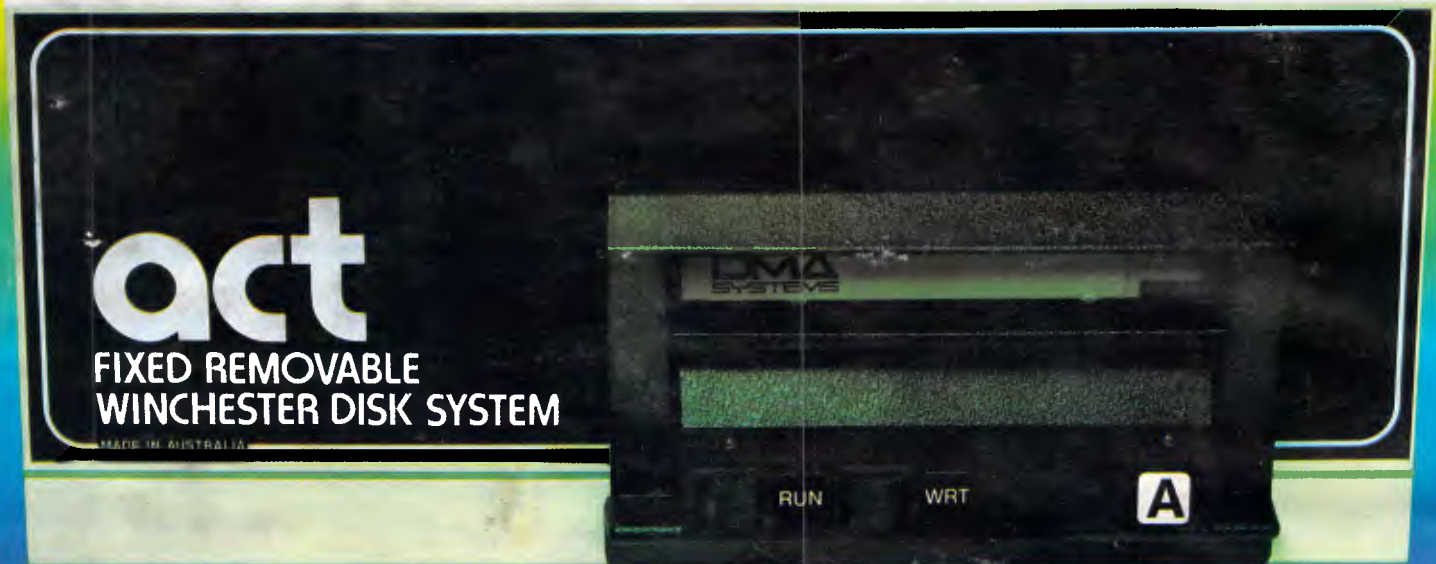
Telephone: (02) 438 4933  
Telex: AA20677 eedaust

Mailorder from Dolphin p & p \$1.00 Bankcard, Visacard, Mastercard accepted by mail or phone, otherwise send cheque or money order. Price includes sales tax. Six months guarantee.

Dealer enquiries welcome.



# ANOTHER HARD ACT TO FOLLOW!



## Act's fixed removable disk systems give you MEGABYTES IN THE PALM OF YOUR HAND

### COMPATABILITY

No matter which micro you have, you can make it ACT. The ACT fixed removable winchester is compatible with most micros —

- APPLE I & III • COLUMBIA P.C.
- CORONA/WORDPLEX • DEC RAINBOW 100
- HEATH/ZENITH H89/Z89 • HITACHI PEACH
- IBM P.C. • KAYPRO • MICROBEF
- MORROW MICRO-DECISION • NEC APC
- NORTHSTAR ADVANTAGE & HORIZON
- OSBORNE I & EXECUTIVE
- SANYO MBC-1000 & 555 • SIGMA/OKI MODELS 20 & 30
- SIRIUS • SUPERBRAIN I/II
- TANDY II & III • TIME OFFICE
- TOSHIBA T-300 • XEROX 820
- PANASONIC JB-3001 • AND OTHERS.

### A GREAT STORAGE SYSTEM

Combine the best of two storage systems — the speed and capacity of a hard disk and the mobility of a floppy.

You can backup the days data, remove the disk and store it safely or carry it interstate in your briefcase — a great storage system!

### AUSTRALIAN

You don't have to pay more to buy Australian!

ACT is manufactured in Australia and supported by an Australian organisation committed to backup support and service. It's a professional ACT.

A DIVISION OF AUSTRALIAN PROTECTION INDUSTRIES

**act**

Australian Computer and Telecommunications  
75 Willoughby Road, Crows Nest, NSW 2065.  
Telephone 02 439 6300, Telex AA 24816

### DISTRIBUTORS.

Direct Data, 1357 Malvern Road, Malvern, Victoria 3144. Telephone (03) 209 9045.

Computer Mart, 356A King William Street, Adelaide, South Australia 5000. Telephone (08) 51 5363.