

4

# Australian Personal Computer

APPLE  
INTERFACING

REGISTERED FOR POSTING AS A PUBLICATION - CATEGORY B  
REGISTRATION NO. VBP 3691. ISSN 0725-4115 NZ \$3.50 FEBRUARY 1984

\$2.95

**AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE**



**Will Brainstorm make you brilliant?/IBM made friendly/Spreadsheet machine  
— first look/Commodore business machine reviewed/Z80 disassembler.**



# OSBORNE

- YES OSBORNE IS GOING STRONGER THAN EVER**
- YES OSBORNE U.S. HAS REORGANISED**
- YES OSBORNE IN AUSTRALIA HAS NEVER BEEN IN A BETTER POSITION**
- YES NOW IS THE TIME TO BUY**

Recent unprecedented demand for Osborne Computers in Australia has made this machine the leading seller. This is your opportunity (limited offer) to purchase The Executive for even better value.

## OSBORNE EXECUTIVE



**\$2750<sup>00</sup>**

(Plus Freight to your Destination)

### STANDARD HARDWARE SPECIFICATIONS

- Z80A™ 4 M Hz CPU with 128K RAM, bank switched.
- Dual floppy disk drives with 200K bytes storage each. Ability to read/write with IBM PC, DEC VT 180-, Xerox, 821, Cromemco, and UCSD p-System Universal Disk Format.
- 7" amber display CRT with reverse video, underscoring blinking, two character sets, half intensity.
- 24 lines of 80 characters each.
- Business keyboard with numeric keypad and cursor keys.
- Front panel on-off reset switches.
- Video brightness and contrast controls on front panel.
- Two RS232 ports for modem and printer plus serial printer port.
- Z80A S10 serial communications controller.
- Weather-resistant, portable housing.
- Self-test diagnostics on power-up.
- Safety certification IEC UL FCC VDE CSA
- Dual voltage switch: 240/120 volts 50hz/60hz 55 watts Max.

**YES**

Full National 90 days warrantee from Hills Industries in your capital city. Spares, Contracts Service and Full Support also available.

# OSBORNE

## SIMPLY AUSTRALIA'S BEST VALUE COMPUTER

**Software worth  
\$2,600  
all included in price**

- CP/M Plus (3.0) and UCSD p-System Operating Systems
- WordStar™ word processing with MailMerge™
- SuperCalc™ electronic spreadsheet
- Personal Pearl™ database system
- CBASIC™ programming language
- MBASIC™ programming language

**Includes Complete & Simple Instructions  
for all Hardware & Software**

**ALWAYS LEADING THE WAY  
LIMITED OFFER ON EXECUTIVES**

~~\$3,995~~ **\$2,750**

Full price includes tax

**SEE YOUR  
DEALER NOW**

**LIMITED  
OFFER**

**OSBORNE 1, \$2,185**

Full price includes tax



### AUTHORISED OSBORNE DEALERS

**AUSTRALIAN CAPITAL TERRITORY**  
Boulevard Business Services, CANBERRA  
(062) 485 411

R.C. Electronics, CANBERRA  
(062) 547 608

**NEW SOUTH WALES**

City Personal Computers, SYDNEY  
(042) 233 8992

Complete Solutions, SYDNEY  
(02) 331 6799

Computer Connection, MIRANDA  
(02) 526 1404

Computers Galore, NEUTRAL BAY  
(02) 908 2355

Computer Spectrum, WOLLONGONG  
(042) 271 666

Data Parts, ALBURY  
(060) 218 080

Delta, BANKSTOWN  
(02) 705 6636

Direct Computer Sales, HURSTVILLE  
(02) 570 8344

Grace Bros Computer Centre, SYDNEY  
(02) 238 9111

Orana Cash Registers, DUBBO  
(068) 825 833

S.C.C. Computing, SYDNEY  
(02) 290 3344

Typewriter City Discounts, SYDNEY  
(02) 267 8847

**QUEENSLAND**

Archive Computer Centre, CLAYFIELD  
(07) 262 2911

Cairns Computer Centre, CAIRNS  
(07) 518 010

Compsoft, SPRING HILL  
(07) 229 0066

Computers & Peripherals, KEDRON  
(07) 350 2611

Electronic Warehouse, FORTITUDE VALLEY  
(07) 528 455

Myer Computer Centre, INDOOROOPILLY  
(07) 378 5111

Scarborough Fair Computers, SOUTHPORT  
(075) 325 133

Toowoomba Computer Centre, TOOWOOMBA  
(076) 327 542

The Byte Shop, NEWMARKET  
(07) 352 6621

Town & Country Computers, TOWNSVILLE  
(077) 754 000

**SOUTH AUSTRALIA**

Micro-80 Computing Centre, ADELAIDE  
(08) 211 7244

Myer Computer Centre, ADELAIDE  
(08) 217 0123

The Copy Centre, WHYALLA  
(086) 457 755

**VICTORIA**

Almer Distributors, OAKLEIGH  
(03) 569 0169 or 569 6911

Data Parts Pty Ltd, ALBURY  
(060) 218 080

Data Parts Pty Ltd, SHEPPARTON  
(058) 217 155

Data Parts Pty Ltd, BENDIGO  
(054) 434 866

Data Parts Pty Ltd, BALLARAT  
(053) 313 399

Direct Data, Armadale  
(03) 206 949

Geelong Computing Centre, GEELONG  
(052) 222 844

IMA Computer Centre, SURREY HILLS  
(03) 560 2974

**WESTERN AUSTRALIA**

Amity Computers, ALBANY  
(098) 416 060, 413 792

Computer Country, PERTH  
(09) 328 4644

Merton Scott Business Machines, PERTH  
(09) 328 6522

Myer Computer Centre, PERTH  
(09) 321 0151

Ossie Computers, CLAREMONT  
(09) 384 5511

**NORTHERN TERRITORY**

Davioics, ALICE SPRINGS  
(089) 523 517

The Computer Shop, DARWIN  
(089) 814 893, 812 712

**TASMANIA**

Strawberry Enterprises, BERRIEDALE  
(002) 491 814

**OSBORNE SALES CENTRE (AUST) (02) 290-3344**



## REGULARS

### 4 PRINTOUT

Highlights from Comdex in Las Vegas . . .  
Apple's MacIntosh released in Sydney . . .  
VisiOn (finally) arrives in Australia . . . up-to-date news from *APC*.

### 24 COMMUNICATIONS

Lively and controversial letters from the *APC* fraternity.



### 60 LAZING AROUND

Flex the grey matter on these brain teasers.

### 62 SCREENPLAY

Our first ever look at games for the Sinclair Spectrum.



### 69 YANKEE DOODLES

Stateside news of IBM compatibility for Apple and Tandy users plus rumours of Unix type operating systems from Commodore and Texas Instruments.

### 101 NUMBERS COUNT

Mike Mudge presents his latest medley.

### 102 BIBLIOFILE

Trying to work out the best book for your needs? Let Steve Withers do the hard work.

### 113 TJ'S WORKSHOP

Stacks of readers' hints and tips about how to make the most of your micro.

### 147 NEWCOMERS START HERE

User-friendly version of our familiar introduction to the jargon.

### 148 BANKS' STATEMENT

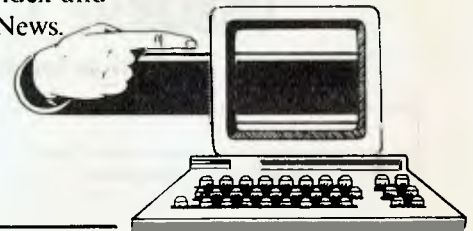
Could speech synthesisers do long-term damage to the language? Banksey has some disturbing ideas.

### 154 SUBSET

The intricacies of assembler language are revealed in routines contributed by readers.

### 157 DIRECT ACCESS

Includes Transaction File, Diary Data, User Groups Index and Network News.

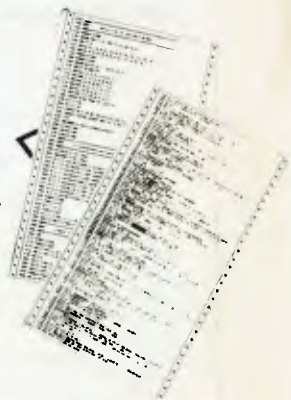


### 161 PROGRAMS

A selection of games, education and practical applications for TRS-80/ System 80, Commodore 64, Atari, PET and VIC-20.

### 184 ADVERTISERS' INDEX

Need to find that ad in a hurry? Here's a breakdown of all advertisers in handy alphabetical order.





## FEATURES AND SERIES

### 34 INTERFACING THE APPLE

Build yourself an Apple interface to control electronic circuits. Try this one to add a flash to your games.

### 46 Z80: READ ONLY SECRETS

PEEK inside your ROM and learn a little about how machine code works.

### 59 BENCHMARKS SUMMARY

Special for readers with an over-active sense of competition. The big league table of how micros perform, the *APC* Benchmarks, presented by Peter Rodwell.

### 132 SHOW PREVIEW

How not to get lost at the forthcoming micro extravaganza.

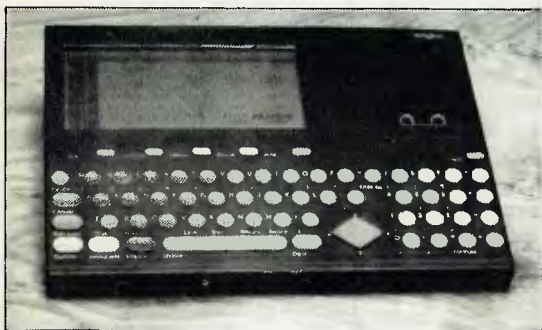
### 140 A BEGINNER'S GUIDE TO PROGRAM CONVERSION

We continue our series on how to convert one dialect of Basic to another.

### 143 MUSIC MICRO, PLEASE

Practical guidance on how to make your BBC computer simulate an orchestra.

## BENCHTESTS & REVIEWS



### 105 WHICH SPREADSHEET?

#### SORD's FALC

Mums, dads and kids: get your money matters in order. This spreadsheet works on the Sord M5 home computer.

### 121 WRITING WITH VIZA

Trevor Jones reports on a quality word processor at a modest price — Vizawrite for the Commodore 64.

### 77 WORKSLATE

We're first in Australia with an in-depth look at this portable computer which has the sole purpose of handling spreadsheets.

### 122 BRAINSTORM

Full review of this revolutionary software — an 'ideas processor'.

### 88 VISUALL

The IBM PC looks more friendly with this 'visual shell' to camouflage the operating systems.

### 134 COMMODORE 720

After a long wait this elusive machine has finally arrived. We take a look at this, the upper end, of Commodore's range.

*APC delivers its monthly package of micronews.*

## Live from Las Vegas . . .

Comdex has become the biggest computer show in the world. It started out five years ago as a place for people who build small systems to meet people who would like to sell them. It is still that, despite the fact that the 'small' systems on show this year included small IBM and DEC mainframes. And it has to be said that the shows which the establishment knows, like the Hanover Fair, still attract the big names. But this is mere ignorance. Comdex has only been really big for two years, and the power of the big retail chains has still not dawned on many established computer companies. So they still don't come.

Earlier this year, at the National Computing Conference in Anaheim, the place was thick with journalists.

There was barely anything of note to report – and what there was had been announced a couple of weeks previously. That is, it had appeared at Comdex Spring.

Here in Las Vegas, where I am writing this report in a Sunset Strip hotel, there are nearly 100,000 delegates from all over America, looking at the market for business micros.

What follows is a brief look at some of the more interesting presentations at Comdex.

*Guy Kewney*

## Natural language

The arrival of a 'natural language' option for Microrim's R:Base database could make data storage systems usable by casual operators.

The product is needed. It is easy for an expert driver to park a car; impossible for a beginner.

Similarly, a beginner finds it

practically impossible to formulate questions for a database.

The information is all in there, and only two or three, simple queries will set the program to work, digging out the name or list of numbers or summary of expenses that you want.

But if the information is stored under 'title' and you ask for 'names' then you will get nowhere for a long time.

What Microrim's Clio aims to do, is to learn (by asking the user questions) what the enquirer has in mind. It uses 'expert systems' techniques to do this.

'Clio enables the user to query the database in his own language, rather than in "computerese"', said Wayne Erickson, who is president of Microrim.

The way the company publicity sheet put it: 'Clio allows the user to build a dictionary of synonyms for words or operations associated with a database.'

This dictionary building process is invoked whenever the user queries the database with a word or series of words not already in the database vocabulary.

Clio 'then responds with a series of questions to the user, to define the unfamiliar terms. Through this conversation, "the statement continues," new words are built into the database vocabulary.'

Clio also has the ability to search through the database to retrieve records based on adjectives, or other qualifiers.

'Where Clio becomes even more valuable,' Erickson claims, 'is when the user wants to define a word which is not related to something in the database. It allows the user to define words which are the result of computation.'

An example quoted by Erickson: if you ask for profit for a particular period, and profits not actually entered into the database.

'The user would define profit

as "sales minus expenses" where both sales and expenses are listed in separate parts of the database, to come up with the answers.'

Next step from Microrim is nothing if not ambitious: after adding graphics, Erickson wants to see Clio become 'the user's interface to the computer.'

What users of the future need to get them involved in computers is a system which has enough sense to work out what it is meant to do ahead of time.

There are many parts to this, but a vital one is the ability to see that the command D and the command Delete might be the same, while the command DI might be either 'directory' or 'display'.

Current systems which will accept single letter commands will reject two-letter commands starting with the same letter as unknown.

And it is quite clear that Gary Kiddall of Digital Research has never quite grasped how many enemies his bureaucratic operating system, CP/M, has made.

I will always think of CP/M as the sort of clerk who makes you fill out the form in triplicate, without carbon, and only when you have finished points out that the date is wrong on the top of the first page. And then he won't let you rub it out, but makes you fill out the whole form again.

Clio costs under \$200. The R:Base it reads costs \$495.

Details from Microrim on (206) 453 6017 in Bellevue, Washington (nice and handy for Microsoft).

*Guy Kewney*

## Popular portables

Portable computers, a novelty two years ago, are now attracting serious research and development money, producing the 16-line, 80-column liquid crystal screen.

Everybody at Comdex seemed to have one. They ranged from nearly complete prototypes to nearly available systems.

The surprising thing was that some people with these ultra low-power screens didn't have them fitted to low-power computers.

Visual Computer's Commuter, for example, looks very like the Gavilan which is a battery-powered portable.

But the Commuter turned out to have standard dual IBM-standard disk drives, and needed a proper mains power supply. This seemed a bit strange: with power available from the mains, there are compact flat screens which give much better visibility and much more detail than liquid crystal technology.

Both Gavilan and Sharp had caught on to the low power benefits of the big screen, and both had upgraded their eight-line displays to 16-line size.

Gavilan's is by far the more sophisticated and exciting design, apart from its 'mouse' pointing pad.

First of all, it has an 'integrated software environment' which means that programs run hand in hand with each other, as on the Lisa.

The machine includes a single Sony 3.5 in micro-diskette, is battery powered, and the \$4000 price includes three applications modules – test editor, spreadsheet, and comms.

The original Gavilan is now a cut-down version, at a reduced \$3000 price, without the software, without the built-in modem and without Basic and Pascal.

Both machines do acknowledge the need for a bigger display (something none of its rivals will stop to) by having a video output for a monochrome monitor, giving a full computer page. And both include MX-DOS as the operating system.

*Guy Kewney*



# PRINTOUT



The Teleram range of 16-line LCD micros: the T-5000 8-bit machine costs \$2500 and uses the Zilog Z80L and CP/M-80.



The STM portable personal computer weighs less than 17lb and includes 256k of RAM (expandable to 512k).



The Chameleon micro, weighing 28lb, is marketed by Seequa as a low-cost IBM running 8-bit CP/M software.

In June, when first demonstration units appeared, they were 'don't touch' machines: at Comdex, the Gavilans were freely available for finger-poking.

And software from outside vendors is available: WordStar, SuperCalc 2, PFS (personal filing system) Report, PFS File and Acculink are available now, and EasyWriter, Multiplan, SuperWriter, SuperComm, SuperPlanner, SuperTool and Business Manager are planned for mid-year.

Weight of the Gavilan is nine pounds: an optional printer can be carried together or separately. And first production models are expected any day now.

The Sharp is the same model that appeared in the December issue of APC, and it uses bubble electronics, rather than diskettes, as its extension storage.

But though bubbles do give more storage, they can't be plugged into the computer the way disks can, so for a lot of potential users the lower price of the Sharp will be seen as a true measure of its quality.

The big LCD also appeared on a machine which looks so much like the Archives PC that at first sight it looked like STM Electronics had copied the thing. It turns out that it is the Archives PC's big brother, with MS-DOS, an IBM compatible disk, but a much faster 80186 processor inside than the IBM's 8088.

This machine (like so many American computers, like so few Australian computers) includes a direct-connect phone interface - an auto-dial, auto-answer modem, which can switch from slow 300 baud to faster 1200 baud standards.

Cost of the STM is \$3000, and a desk-top version at \$2500 will also be released when the final design becomes available in April.

The last of the 16-line LCD machines was shown by Teleram, which had another bubble-based machine, the T-5000, at \$2500.

Unlike the other portables, this one is an 8-bit design, using

the Zilog Z80L and CP/M-80.

What makes the Teleram special is the fact that it can be used as a keyboard for the T-3500 desk-top computer, with lots of ordinary CP/M disk-based features (such as the ability to format Osborne single-density diskettes, or IBM CP/M-86 format diskettes) and software.

Another portable which attracted attention last year, the Corona, is now turning up for test with an interesting new feature - no carrying handle. This, given its impressive weight, was no bad thing. It may be more compact than an ordinary multi-unit desk-top computer, but not much smaller.

Texas Instruments also weighed in (ho! ho!) with a 33lb colour Professional portable. It is entirely compatible with the ordinary Professional.

Somewhat easier to carry (28lb), the Chameleon from Seequa, launched a year ago, is now distributed through some 300 US outlets as a low-cost IBM with a difference - it can run 8-bit CP/M software, too.

Like the DEC Rainbow, the Chameleon has a Zilog Z80 chip inside it, as well as a 16-bit 8088.

The base price of the Seequa range is \$2000, which is pretty competitive, except for the fact that it buys a single-disk, no-screen box. Software available is mainly Perfect Software's range, plus the Condor database manager.

Price details were not available on the new hard disk system, just launched at Comdex, but Seequa promises to be 'aggressive'.

However, the US press appears not to have been totally smitten with the design, since it varies fairly radically from the IBM PC design, and compatibility is not its main feature.

Teleram is in New York on (914) 694 9270. Gavilan is on the US West Coast on (408) 379 8000. Chameleon is on (301) 672 3600. Visual is on (617) 480 0000. STM is in Menlo Park, on (415) 326 6226.

**Guy Kewney**

# PC 84

# Inside: Int

The wonderful world of the personal computer opens up again at PC84 The 2nd Australian Personal Computer Show.

And, like the previous Show, it's the one and only place for the newest, biggest, smallest, costliest, cheapest, finest, micro hardware, software, bolt-ons and books.

**Where the big news breaks first.**

At The 2nd Australian Personal Computer Show you'll see the launch of some astonishing new kit, fascinating software and vital peripherals.

And you can discover it all first hand, scooping all the magazines.

**Know the world of personal computers.**

Just about every micro manufacturer, software vendor, and goodie supplier will be at the Show.

There'll be special deals on offer, too, as well as the chance to win a personal computer and to see how good you really are on a game of chess against a computer.

Plus Computer Clubs, Free Seminars and more.

**The time and place for everything.**

Make sure you visit PC84 The 2nd Australian Personal Computer Show. It's on from 14 - 17 March, at the Centrepoint Exhibition Centre in Sydney, easy to reach by train, bus or car.

Admission \$4.00 — but to you \$3.00. Clip and keep this voucher to save \$1.00 when you buy a PC84 Show ticket on the day.

**Remember Wednesday is business day.**

You'll need a business card to gain admission.



# The 2nd Australian Personal Computer Show

Centrepoint  
Sydney

14-17 March 1984

# formation.

Sponsored by Australia's top selling  
computer magazine



Organised by

**aes** Australian Exhibition  
Services Pty Ltd, Suite 3.2 Illoura, 424 St  
Kilda Road, Melbourne 3004.  
Tel: (03) 267 4500

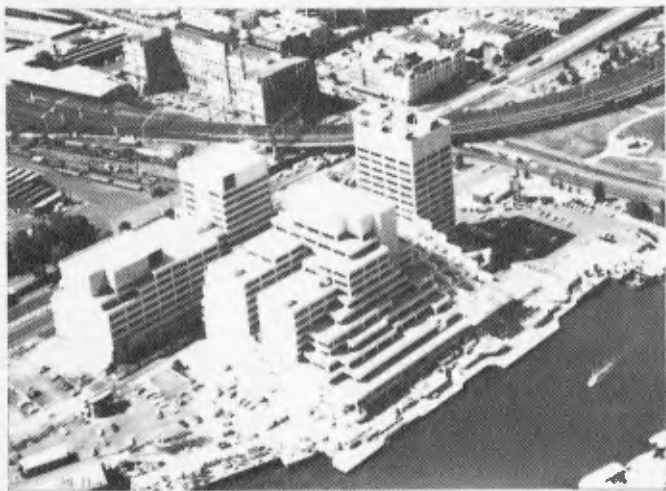
## PC84 \$1.00 DISCOUNT VOUCHER

This voucher entitles the bearer to a  
\$1.00 discount on the full \$4.00  
entrance fee to PC84 The 2nd  
Australian Personal Computer Show.

The organisers reserve the right to admission. Only one voucher per person.

**SAVE  
\$1.00**

# MAKE AN EXHIBITION OF YOURSELF..



Where? At The 3rd Australian Personal Computer Show World Trade Centre Melbourne.

This will be the first time you have the opportunity to participate in the largest specialised microcomputer show in Melbourne.

Four days provides you with more selling time and more time to be a part of the current microcomputer revolution.

With many of the largest computer companies already participating the benefit of securing your place in this show is obvious.

Discount admission to special interest groups, free admission to the trade and \$4 admission to the public. Free seminars and free catalogues for all visitors.

Phone Fleur Michael now to secure the best possible choice of sites and your place in the future of the microcomputer industry.

Organised by Australian Exhibition Services Pty Ltd in association with the London based Andry Montgomery group, the largest specialist exhibition organiser in the world.

Further details:

**AES** Australian Exhibition Services Pty Ltd  
1250 Malvern Road Malvern Victoria 3144  
Telephone (03) 20 1208 Telex AA39329  
SPONSORED BY AUSTRALIAN PERSONAL COMPUTER

**PC  
84**

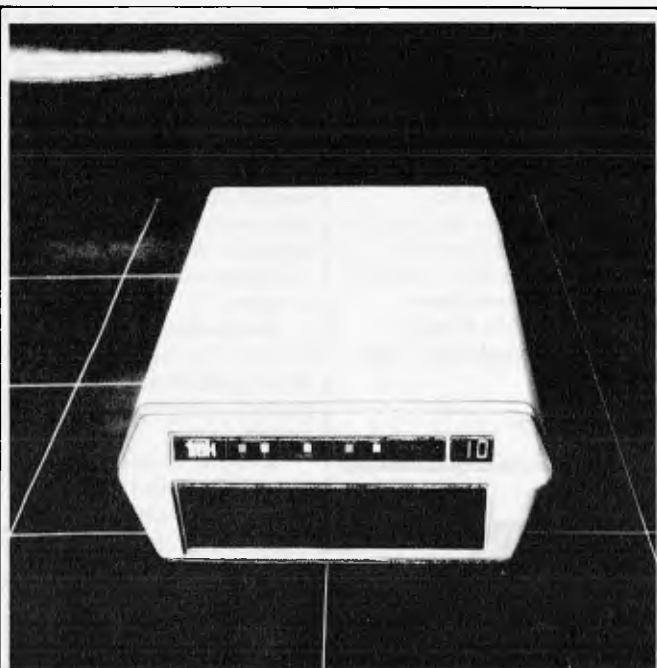
The 3rd Australian  
**Personal  
Computer Show**

World Trade Centre  
**Melbourne**

18-21 July 1984



## PRINTOUT



*Not many people use Atari computers for business, and Comdex was definitely a business show. So, I stopped short at the sight of an Atari on the Trak minicomputers stand.*

*Trak was selling an add-on diskette which (it said) had enough processing power to do lots of things that ordinary Atari diskette drives cannot do.*

*What struck me, however, was less disk-based: the thing has a deluxe version that includes a parallel interface, so you can plug your favourite parallel printer directly into the back of your disk drive - you do not need to buy an expensive interface module from Atari, a saving of at least \$200!*

*Trak is in Illinois on (312) 968 1716.*

## Window on the world

It has finally dawned on computer and software designers that Apple wasn't just tying pretty ribbons on Lisa when those windows were built in. They work. And everybody is now rushing to do the same thing.

At Comdex the windows were all there, and everybody was in agreement that it was 'The Right Thing To Do'.

Where the offerings differed, however, was on what you would see through the windows.

As usual, the world is divided into two. There are those who say that people want to run their existing programs under windows - and to run more than one program in the same machine, you need a

sophisticated supervisor.

And on the other side, there are those who say that this isn't enough. They say that several large, complex programs will get in each other's way, and that you must, rather, re-write the programs in such a way that they fit together well.

Digital Research's Concurrent C/P/M and Quarterdeck's DesQ are the two main 'run it as it is' programs. VisiOn and MS Windows are the main protagonists of the 'slice them up smaller' approach.

MS Windows, however, does propose to allow the option of running existing applications, but Microsoft people stress that this will be less than optimum.

There were others, glimpsed in passing, showing only enough to make it clear that they were working on the same lines, and that nobody has to make their

minds up yet.

This column is not the place to attempt the absurd prank of a serious comparison: let somebody else make a fool of himself trying to compare the relative weights of fire and air.

What can be said is that MS Windows does not exist. When asked why so many people had joined in announcing 'support' for MS Windows, but IBM had

not, Bill Gates, Microsoft's chairman of the company, cheerfully retorted: '...because IBM doesn't pre-announce products. But we can. We won't have to wait until the end of April, and if IBM is going to announce support for windows, IBM would not announce it until then.'

It seems that even Concurrent C/P/M, although the

## PUBLIC NOTICE

Please Be Advised that

**AMUST COMPUTER  
CORP AUST P/L  
350 South Road,  
Moorabbin**

IS NO LONGER  
DISTRIBUTING THE  
"AMUST-COMPAK  
EXECUTIVE 816  
COMPUTER"

and has no current or  
past financial  
involvement with  
the company trading as

**AMUST-COMPAK  
MANUFACTURING P/L  
50 Keys Road,  
Moorabbin**

# PRINTOUT

company was able to demonstrate software running in all four windows, is not yet entirely foolproof. The evidence is the release of a new version of WordStar, the best-known text processing program, in a version for Concurrent CP/M.

Quarterdeck, like Digital Research with Concurrent CP/M, reckons that the users of DesQ will not want to run only one program at a time, and that while there may be an 'active' window, and other 'hidden' windows, the active window is not the only one where something is happening.

MS Windows, however, firmly aims to have no concurrency. Yet.

Interestingly, MS Windows has one thing going for it which couldn't have been easily foreseen. It is a 'standard' microcomputer product which ordinary computer companies like Honeywell can adopt (Honeywell demonstrated MS Windows at Comdex) without

swallowing their pride. They do not have to follow IBM, which hasn't announced 'windows'. And they do not have to use CP/M, which they all denounced as a silly microcomputer thing in the days before there were many micros.

VisiOn, since it requires Visicorp to re-knit the applications, is restricted in the number of programs it has. Not theoretically (the company says) but simply in terms of what programs they have so far got around to re-knitting.

The average Australian computer user is likely to meet windows first in an Apple Lisa tutorial session in a version of Concurrent CP/M supplied for the ACT Apricot.

All the rest will come when they are ready.

That, I'm afraid, will be some time after they are officially announced by distributors in this country.

The good news there is that Visicorp has held a press

conference through its Australian distributor, Imagineering, to show the thing working (see Steve Wither's report elsewhere in Printout).

When I hear of a distributor for DesQ, I'll mention it. And as for Microsoft, given the company's terrible reputation as a supplier of boxes (a problem which executives tell me will be put right 'Real Soon Now'), when I hear of MS Windows actually reaching dealers, I'll be surprised.

Guy Kewney

## Pointing devices

In the wake of the windows crept hundreds of mice. Also on show were variants of other pointing devices - light pens, touch screens, graphics pads and the like.

The most original mouse was a verb. 'To mouse' means to stop using the Pencept Penpad as an input device, and to use it to control a screen icon, instead.

'Touch the pad with the point of the pen to select graphics,' said the Pencept demonstrator to his audience. 'Then put the point over the word, click it once mouse over to the new position...'

As an editing tool this one is the best. The movements of the pen are interpreted, not just as graphics squiggles, but as writing.

So if you 'mouse' over to an incorrectly spelled word (for instance, touch the 'correct' marker on the pad, and then write the new word on the sensitive pad), the computer will pick up your handwriting as if you had typed the word at the keyboard.

The drawback of the Penpad is the \$700 price - and that is the 'discount' price asked for a development tool for software

## It isn't hard to find the right soft!

Just tell you computer dealer Ozi Soft!

With an ever increasing range of innovative software that will be available for demonstration and inspection at the 1984 AUSTRALIAN PERSONAL COMPUTER SHOW, to be held on March 14 through to March 17 at Centre Point, Sydney.

Games, educational, programming, home management and business systems for Commodore 64, VIC20, Atari and Sinclair Spectrum - All detailed in a big bright new full colour catalogue. So if there is more you'd like to know we'll see you at the show!

P.S. If you haven't heard... Ozi Soft has reduced all the VIC20 programs up to 50% that's right they now sell from as low as \$9.95... we thought you'd like that!



50 Clarence Street, Sydney 2000. Tel: (02) 296338.

# FLEXIBLE DISCS

**Question:** *Is your Data safe?*

**Answer:** *It is with*

# MEMOREX

# MEMORY EXCELLENCE

Stand No. 304

PC  
84

The 2nd Australian  
Personal  
Computer Show  
Centrepoint  
Sydney  
14-17 March 1984

SYDNEY: 02-9082211

MELB: 03-2672955



# PRINTOUT

vendors interested in modifying their existing packages to use the Penpad, or in writing new packages which take advantage of the Penpad.'

Included in this price is the technical documentation needed to program the Penpad. And included also, free, is a copy of the Pencommand utility, with documentation. This does the very important, inconspicuous but technically very challenging, work of creating 'command areas' for any software package you may be writing.

The company has already picked up one customer: Ocean Data Systems Inc (OSDI). This software group 'will initially develop time-keeping and billing software, targeted at the legal market-place' and will also distribute this new software 'over a unique electronic distribution service, reaching over 200 speciality computer dealers, via OSDI's satellite communications network, which allows dealers to demonstrate the latest in software to their customers,

without having to stock or purchase demonstration disks.'

This order is for 1000 Penpad units. Pencept describes itself as 'a supplier of artificial intelligence products that provides a more natural way for people to use computers'. The company is based in Waltham, Mass on (617) 893 6390.

Apple announced a mouse for the IIe. Everybody got very excited about this, but you needn't think just because you have an Apple II, you can start running integrated windows on your micro.

All this mouse does is draw. It's a nice-enough graphics program, which lets you plot points, fill spaces, and draft shapes, like LisaDraw does. It even gives you graphics control of words - new fonts can be picked and printed in varying sizes.

A touch screen for the IBM micro was shown by Micro Touch Systems. 'Learning times are greatly reduced for novice users, while operating efficiency is increased for more

experienced users,' says its publicity.

I remain to be convinced. I note that the warm welcome given by the micro industry to Hewlett Packard's HPI50 has been taken universally as proof that users like touch-screens. In fact, the HPI50 is the first HP product to sell for rather less than the competition; normally the company charges very considerably more.

I suspect this may have a lot to do with the warm response. And I have been watching ladies with long finger-nails trying to make the touch-screen work, and watching people with greasy fingers trying to clean the marks off...

Following Microsoft, the Mouse Systems Corporation has announced that its Optical Mouse (which needs a special mirror to run on) works with all Microsoft mouse-driven programs, and also with VisiOn. Apparently it also works with Lotus 1-2-3, and WordStar too, and all I can say to that is: if this works as 'well' with 1-2-3 as it

does with WordStar, then I don't want one with my 1-2-3. Mouse Systems is in Santa Clara on (408) 988 0211.

Guy Kewney

## Sixth sense

Your plan is to write a program, in Pascal, or in 'C' and you are dreading the first pass through the compiler. There will be a million simple syntax errors, of the sort that any half-baked Basic interpreter wouldn't let you type.

You must immediately get Entry System for Programmers, ES/P.

It understands the syntax of the language you are typing. It won't let you type in upper-case letters where the compiler is going to want lower-case ones. It knows you meant to close the quotes that you opened at the beginning of the line. Brackets, too. And of course, in Pascal, you were going to type a semicolon just there, weren't you? It puts it in.

Actually, it's a pretty neat text editor. It lets you edit five different windows, so you can keep the top of your text on screen, and write on a different page without constantly flicking back and forwards.

Price of the ES/P package from Bellesoft Inc in Bellevue (near Microsoft), Washington 98004, tel: (206) 828 7282 is \$249. For each additional language, you pay \$100 to \$200. You get a demo, a keyboard template, and one language free with the initial package. Fortran, Pascal, Ada and PL/M are on the way 'Real Soon Now', they say.

Yes, IBM micros only.

Guy Kewney

## INFORMATION BUSINESS MANAGER



### FULLY INTEGRATED ACCOUNTING

- SYSTEM including:
- ★ DEBTORS
  - ★ CREDITORS
  - ★ STOCK CONTROL WITH INVOICING
  - ★ GENERAL LEDGER

**\$4160.00** (including tax)

### A COMPLETE BUSINESS SYSTEM

- ★ 2.6 MEGABYTES OF DISK STORAGE (HARD DISK OPTIONAL)
- ★ CP/M 2.2
- ★ REAL TIME CLOCK
- ★ AUSTRALIAN DESIGN, LOCAL SUPPORT AND SERVICE
- ★ Z80A 64K CPU EXPANDABLE TO 832K
- ★ 80 x 24 GREEN SCREEN TERMINAL WITH DETACHABLE KEYBOARD
- ★ NETWORKING UP TO 256 USERS
- ★ 12 MONTHS WARRANTY

**DEALER ENQUIRIES WELCOME**

**A & M COMPUTER SOLUTIONS PTY. LTD** (Incorporated in Victoria)  
2 PROSPECT HILL ROAD, CAMBERWELL 3124. Telephone: (03) 813 3022

## IBM XT plug-in

I suppose the only surprise should be that nobody else did it first: from Ann Arbor, Michigan, PC Technologies has

# Progressive Software Publishers

with..

Sole Australian Distributor for

PANDASOFT



bubble bus

LLAMASOFT

## MORE FOR 84 GAMES

### VIC-20

	<i>Cassette Suggested Retail</i>
<b>Metagalactic Llamas</b>	
<b>Battle at the Edge of Time</b> .....	\$22.95
<b>Abductor</b> .....	\$19.95
<b>Gridrunner</b> .....	\$19.95
<b>Matrix (8K Exp.)</b> .....	\$21.95
<b>Laser Zone (8K Exp.)</b> .....	\$21.95
<b>Andes Attack (8K Exp.)</b> .....	\$19.95
<b>Traxx (8K Exp.)</b> .....	\$17.95

### commodore 64

	<i>Cassette Suggested Retail</i>
<b>TITLES ON CASSETTE TAPE - AVAILABLE FOR C64 ON DISC NEXT MONTH</b>	
<b>Hover Bovver</b> .....	\$29.95
<b>Hustler</b> .....	\$22.95
<b>Matrix</b> .....	\$22.95
<b>Laser Zone</b> .....	\$22.95
<b>Attack of the Mutant Camels</b> .....	\$22.95
<b>Gridrunner</b> .....	\$21.95

Games Coming Soon **MASTERPIECE ★ KICK OFF ★ THE CAMELS REVENGE**

### NEW GAMES SUMMARY

**METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME** — A fast and original game for the unexpanded VIC 20. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago.

**HOVER BOVVER** — A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the Gardener. Try not to plough through the neat flower beds or overheat your mower.

**HUSTLER** — Unquestionably one of the best games available on the COMMODORE 64. Written in machine code and using sprite graphics to the full, HUSTLER takes game playing to new heights with its mixture of six games, for one or two players, and superb computer generated music. From Bubble Bus by Nick Strange.

**MASTERPIECE** — An intriguing game of logic from Pendasoft by Brett Merriman. Inspired by a famous board game. Take the challenge and break the computers colour code . . . Think you can win? . . . Don't bet on it! . . . This game proves that computers think! Available on DISK ONLY for the COMMODORE 64.

**KICK OFF** — From Bubble Bus by Nick Strange. Written entirely in machine code. A brilliant computer simulation of Table Football for 1 or 2 players. With 6 levels of play. Superb computer music. COMMODORE 64.

**THE CAMEL'S REVENGE** — Jeff Minter's latest game. His brilliant sequel to Mutant Camels with a twist. You're the Camel. Multiple levels of play. COMMODORE 64.

### STATE ENQUIRIES

SOUTH AUSTRALIA/NORTHERN TERRITORY: **Universal Software**, P.O. Box 583, Cowandilla, South Australia, 5033. Telephone: (08) 219 4391 VICTORIA: **High Technology Computer Wholesale** 290 Bay St., Brighton, Victoria. Telephone: (03) 596 7130. ALL OTHER STATES: **Progressive Software Publishers** P.O. Box 436, Pymble, N.S.W. 2073. Telephone: (02) 44 6393

### AVAILABLE FROM YOUR LOCAL COMPUTER RETAILER:

#### N.S.W. — Sydney City:

The Computer Spot (02) 235 2971  
 Computerwave (02) 231 5791  
 Castle Hill: Fairstar Electronics(02) 634 7183  
 Chatswood: Computer Time (02) 411 5757  
 Hornsby: Computer Dynasty (02) 477 6886  
 Hurstville: Direct Computer Sales(02) 570 8344  
 Camden: Seahorse Computers (046) 66 6406  
 Cessnock: Moads Electrical (049) 90 1968  
 Kingsford: Microvisions (02) 662 4063  
 Wagga: Computer Logic (069) 21 5505  
 Liverpool: Fairstar Electronics (02) 601 3039  
 Parramatta: Fairstar Electronics(02) 633 4864  
 Fairfield: Fairstar Electronics (02) 727 8343  
 Grafton: Grafton Computer Centre(066) 42 6790  
 Wollongong: Computer Spectrum(042) 27 1666  
 Pymble: Micromail (02) 449 5600  
 Toll Free: 088 0200

#### VICTORIA

Richmond: High Technology (03) 429 1966  
 Greensborough: Greensborough Computers (03) 434 6166  
 Abbotsford: Maxwell O.E. (03) 419 6811  
 Cheltenham: L & S Educational(03) 584 6311  
 Malvern: Computer Bytes (03) 500 0861  
 Morwell: Morwell Electronics (051) 34 6133  
 Ballarat: Frank Day & Assoc. (053) 31 5511  
 Greynorth: Ultraphase (03) 857 4233  
 Grankston: Computers 2000 (03) 781 4244  
 Bendigo: Cartridge, Disk & Tape(054) 43 7341  
 Glen Waverley: Computer Deli (03) 561 7511  
 A.C.T.  
 Dalton's Book Shop (062) 49 1844  
 Fyshwick: Steve's Communication Centre (062) 80 4339

#### SOUTH AUSTRALIA

Rundle Mall: Computers 'R' Us(80) 223 2857  
 Metropole Business Machines (08) 223 5538  
 Richmond: Computers 'R' Us (08) 352 7911  
 Adelaide: Mad Max (08) 212 7936  
 Galaxy Computers (08) 51 4173  
 Blackwood: Data Punch (08) 278 8662  
 Edge's Electrical (08) 278 1254  
 Everard Park: Talking Computers(08) 279 1919  
 Keswick: Sargent Electronic (08) 294 6188  
 Toorak Gardens: Cydex Computing (08) 333 0711  
 QUEENSLAND  
 Brisbane: C. W. Electronics (07) 397 0888  
 Complete Computers (07) 350 1255  
 Computer Age (07) 229 0993

#### Southport: Scarborough Fair Computers

Telair Electronics (075) 32 5133  
 (075) 31 2302  
**Rockhampton:** Rockhampton Sound Centre (079) 27 3618  
 Purely Electronics (079) 2 1058  
**Townsville:** Northern Computer Sales (077) 724 2222  
**Toowoomba:** Toowoomba Computer Centre (076) 38 2021  
**WESTERN AUSTRALIA**  
 Leederville: Bruining Headlam Computers (09) 381 2070  
 Osborne Park: Vic. West (09) 444 2932  
**TASMANIA**  
 Hobart: Quantum Computers (002) 31 0222



announced a plug-in system to turn the IBM XT into a multi-user system. PC says it is 'needed' but I suspect what it means is that there are lots of people silly enough to want it. Details on (313) 996 9690.

## Japanese giants play chequers

By Serge Powell in Japan

It seems to me that there could be room in these fun-packed game-crazy days for a modern version of an ancient game.

Let's call it Japanese Chequers - it's an updated form of the Chinese Chequers that you might remember or still play. The object, for those who do neither, is to manoeuvre your pieces from one corner of a six-pointed star to the opposite corner. In the tangled centrefield area you proceed by jumping over your own or other players' pieces. The winner is the first to get all his pieces home.

In Japanese Chequers the layout of the board is the same but the object is subtly different. Instead of moving across the board with all his/her pieces, each player simply moves into the central area and stays put, or at most moves in apparently purposeless feints to either side, with the result that the area of no-man's land begins to look like a writhing snake-pit.

The players may as well be named: they are Sharp, Fujitsu, Toshiba, Matsushita, Sanyo and Hitachi. For the sake of variety an occasional game might include Sord or Sony or one of the others - the players needn't always be the same. The board

represents the personal computer business.

But it doesn't often happen that a player drops out altogether - as a number have done in US tournaments - so you have to think of Japanese Chequers as a sort of circulating event.

Why do none of them drop out? The short answer is that they can stand a loss - home computers (or computers of any kind) are rarely the be all and end all of their existences. Sharp for example, has recently launched three new models in the PC line, but the press handout that trumpeted their merits also covered a new microwave oven, an office copier and a couple of solar-powered calculators.

Or take Toshiba. This company has a respectable range of 8-bit micros, some more powerful office systems and some Japanese word processors. Even so it is hardly a dominant force in the personal computer market.

But if you want a power plant it's the one to call on: or how about rolling stock for your electric train (not the one in the basement, the one that links Sydney and Gosford). For entertainment you could order your own TV station with all the trimmings - cameras, monitors, lighting, broadcasting equipment, even a satellite. If you fall ill Toshiba can supply the most sophisticated medical appliances, and to speed the get-well cards on their way it provides the post offices with automatic sorting equipment.

But I'm labouring the point. I could go on, or take another manufacturer or five; but let's get down to the PC and look what goes into it - memory chips, processor chips, peripherals and the rest. Most of the micro makers make their

own - Sharp, for example, is using bubble memory chips where the likes of National Semiconductor gave up with the technology years ago.

This self-sufficiency adds another string to their bow, gives them greater control over quality, and reduces prices by cutting out the middle man.

If sales are slow to take off they usually have plenty of fat to live off from their other endeavours (Fujitsu is an exception, being almost exclusively a computer manufacturer, but even so it spans the entire range from micro to mainframe). They can afford to operate for longer on less, because the chances are that business will be strong in some other area in which they are active.

As operating systems bring us closer to a tolerable level of compatibility the main difference between suppliers will be value for money - that will go with economies of scale, reliability, and the range of models offered. The m le e on the Japanese Chequers board will go on and the names will probably not change, but it's far from futile activity, especially if you're a customer - they all tend to be there from one day to the next.

## American dream gone sour

By Chris Rowley in the U.S.A.

Silicon Valley, the land of hot tubs and Ferraris for the electronic tribe, right? Right indeed, but something's amiss.

No longer does every young

chip designer worth his substrate hanker for the Promised Land. For a start he can't afford a house in the Valley; secondly, the Valley is taking on a darker reputation that is more the stuff of nightmares than the good life.

House prices in sought-after sections like Los Altos Hills and Portola Valley have gone through \$300,000 for the basic Californian ranch house with three acres. This is at least twice what you'd pay in the most expensive suburbs back East. Nobody can afford that unless they're earning \$100,000 or so, and thus companies in the Valley find it hard to recruit: to one former Valley-dweller it looks this way: 'The engineer who had a \$75,000 place by a lake in Minnesota can't buy anything here.'

Meanwhile those already there are producing the sort of statistics to make sadistic psychologists drool. The divorce rate is among the highest in the country. Child abuse, drug abuse and alcoholism have become commonplace. Dads come home from 80 hour weeks working on the next generation of wonder machine in an atmosphere of entrepreneurial excitement and 'it's like coming down off a cloud,' to quote Judith Larsen, who has interviewed hundreds of Valley women. 'They just can't handle the boredom.'

'It's killing most of them,' asserts a psychologist familiar with the scene. Everyone is driven to succeed by the news of neighbours who just went public on Wall Street and made millions. They're caught up in the Silicon Gold Rush. Nobody can sleep as a result.

Life-style emulation has \$60,000 a year engineers out on spending sprees on the strength of the millions they know they



## MAX FOR MICROS

Naturally our prices are competitive and our range of computers and peripherals suit both home hobbyists and business persons. BUT our biggest selling feature is STILL the service we give both before and after every sale... TRY US!



PH (02) 93 1383

AH 908 1718

539 PITTSWATER RD, BROOKVALE 2100



# PRINTOUT

will make in just a couple of years. Speaking of this phenomenon Dr Regina Kriss, a family therapist in Palo Alto, says: 'They are spending \$500 on a night out - the best wines, perfect children, perfect dress ... Meanwhile at home, they're fighting like dogs.'

Even worse for many is the cloud of paranoia and suspicion that has settled over the Valley in the wake of sundry spy sensations. Who's bugging whom? In some companies employees regularly de-bug their own offices - big companies that grew from small firms founded by defectors from older companies are wary of allowing the same thing to happen to them. They demand loyalty and will enforce it in court. Nobody knows who they can trust. IBM and Intel, among others, have taken vengeful action against insider traitors.

Anyone involved in a breakthrough project these days must move cautiously indeed.

Nor is there much safety outside the office. Spies are everywhere, serving everyone from the KGB to the Japanese computer concerns, and where there are spies there is the FBI. In addition, all manner of hustlers and con-artists float through the Valley social scene seeking their prey. The rule might be expressed thus: the

more cocaine in the room, the more likely it is that some of the parties are not who they seem ... and that someone is filming the proceedings.

One ID that many Silicon Valley people love to know is that of 'The Shadow' - the perpetrator of the micro industry's first chain letter which boasts the AIBMUGO (Anti IBM Underground Guerilla Organisation) that exhorts its readers to 'contaminate IBM's database' and claims that 'if the PC Jr is a rifle aimed at Apple's He Cash Cow, then networked 68000s are cannons aimed at IBM's mainframe dogs'. To join AIBMUGO write to Fourth Court, Hermosa Beach, California 90254.

But if Silicon Valley people face formidable obstacles in their pursuit of wealth and happiness they are also the first to be offered a computer driven sensory deprivation tank as a life-style aid. Psykon of Palo Alto charges \$20 an hour for a two hour session lying in a brine-filled tank while an Apple II drives a video system floating in the dark above your head, to feed your brain such images as the perfect backhand over and over, in video and slowmo, with compugraphics - until you get it right.

## VisiOn

After all the advance publicity, VisiOn finally hits the streets. Now we know it's for real, will it actually live up to its promise, or will there be an expectation gap as wide as the one experienced by many pioneering managers when they took delivery of their first microcomputer? After all, that gap was the reason that VisiCorp invested \$10 million in the development of VisiOn. Unfortunately, that question must go unanswered for the time being - it would be a braver man than I that would be prepared to offer an opinion based on a couple of hours use.

It was clear from an afternoon spent at the offices of Imagineering (VisiCorp's Australian distributor) that VisiOn has potential. Whether or not that potential will be realised will depend largely on the amount of applications software that is produced for it. At the time of launch, the spreadsheet (VisiOn Calc) and graphics (VisiOn Graph) programs were the only ones available. A pre-release version of the word processor (you guessed it, it's called VisiOn Word) was demonstrated, and apparently a database system is in an advanced stage of development. Virtually all VisiOn users will rely on

commercial software, as it is not possible to develop applications on a personal computer. Development is carried out on either a VAX supermini, or a very expensive 68000-based system. This has its advantages for software houses, as the development systems can easily produce versions for any machine running VisiOn, but it means that only large organisations will stand much chance of developing their own software.

A further problem is that moving data into or out of VisiOn isn't possible, except for using VisiOn Calc to read a VisiCalc file, etc. On the other hand, transferring data from one VisiOn machine to another is supposed to be relatively easy.

Part of VisiOn's promise is that it offers a simple, consistent user interface, and (so far as I could tell), it does. For example, it is always possible to abort a command sequence by pointing to the word STOP at the bottom of the screen. All windows have the same layout, with a menu at the bottom, the prompt line immediately above, and the name at the top (see the photographs). You get to know your way around very quickly.

There is one aspect of VisiOn that does not show this consistency - a given operation does not always take the same amount of time because VisiOn

ANNOUNCING ...

## THE CONQUEROR

Business/Scientific microcomputer  
FOR UNDER \$3000 - Including Software

## A COMPLETE SOLUTION



FREE!

Now we also include "Business Master" full accounting system - (A/R, A/P, G/L, Stock/Invoicing)



... THAT INCLUDES THE CONQUEROR COMPUTER WITH A DISK DRIVE AND ALL THE SOFTWARE YOU NEED TO WORK BETTER AND FASTER WITH WORDS, WITH NUMBERS, AND WITH IDEAS, NOW.

### POWERFUL NEW MICRO

280A CPU, 4MHz  
64K RAM  
2 SLIMLINE 5 1/4" DSDD DRIVES  
2 RS232 SERIAL PORTS  
COMPACT 6" X 6" X 12" CABINET  
\*OPTIONAL: 256K RAM, PARALLEL PORT, ADDITIONAL SERIAL PORTS WILL READ/WRITE MOST POPULAR MICRO FORMATS

### POWERFUL SOFTWARE

COMPLETE SOFTWARE PACKAGING INCLUDING  
-CP/M COMPATIBLE OPERATING SYSTEM  
-PBASIC  
-SYSTEM UTILITIES  
-SPELLBINDER WORD PROCESSORS  
-DBASE II FROM ASHTON TATE  
-A TOTAL OF OVER \$3000 WORTH OF POPULAR SOFTWARE - FREE

### MULTI-USER

YOU CAN EASILY UPGRADE WITH ADDITIONAL DRIVES OR HARD DISK STORAGE AND GROW TO A MULTI-USER SYSTEM  
DATA LOGGING SYSTEMS ALSO AVAILABLE

Commercial and Professional Microsystems  
9th Floor 505 St Kilda Road Melbourne 3004  
Telephone: (03) 267 4755  
Branch: 18 Park Rd Warburton 3799. (059) 66 2037



DEALER ENQUIRIES WELCOME

**FOR THE SOFTWARE,  
UTILITIES AND  
ACCESSORIES YOU'LL  
ONLY FIND RELEASED  
THROUGH OZI SOFT,  
CHECK THE DEALERS  
LISTED FOR THE ONE  
NEAREST YOU.**

**New South Wales**

**L & B RADIO T.V. & HI FI**  
250 CROWN STREET, WOLLONGONG 2500  
**COMPUTER LIGHTHOUSE**  
320/4 HIGH STREET, PENRITH 2750  
**THE COMPUTER SPOT**  
SHOP C4 M.L.C. CENTRE, MARTIN PL., SYDNEY 2000  
**TOMORROWS ELECTRONICS**  
68 WILLIAM STREET, GOSFORD 2250  
**PARRY'S OFFICE SUPPLIES**  
25 MOLESWORTH STREET, LISMORE 2480  
**COMPUTER FOCUS**  
224 GEORGE STREET, LIVERPOOL 2170  
**WEBBS ELECTRONICS**  
1074 MATE STREET, ALBURY 2640  
**COLONIAL COMPUTER**  
UNIT 7, THE TERRACE, TINDALE ST., PENRITH 2750  
**M & W ELECTRONICS**  
173 SUMMER STREET, ORANGE 2800  
**LEETON RECORD CENTRE**  
121 PINE AVENUE, LEETON 2705  
**JAYKEL COMPUTERS**  
SHOP 3/221 PACIFIC HWY., CHARMHAVEN 2263  
**THE COMPUTER SHOP**  
10/14 BOSWORTH STREET, RICHMOND 2753  
**CHANTRONICS**  
740 HORSLEY DRIVE, SMITHFIELD 2164  
**NORTHSIDE HOBBIES P/L**  
SHOP 56, CARLINGFORD CRT., CARLINGFORD 2118  
**GLENROSE VIDEO & BOOKS**  
51 GLENROSE SHP. CENTRE, GLEN ST., BELROSE 3085  
**THE SHOP 4 HOME COMPUTERS**  
WATERS WALKWAY, PRINCES H., CORRIMAL 2518  
**COMPUTER SPECTRUM**  
SHOP 14, 110 CROWN ST., WOLLONGONG 2500  
**THE COMPUTER SPOT**  
EAST GATE SPRING ST., BONDI JUNCTION 2022  
**COMPUTER DYNASTY**  
4/15 FLORENCE STREET, HORNSBY 2077  
**CUSTOM COMPUTERS**  
226 QUEEN STREET, ST. MARYS 2160  
**COMPLETE CBM SYSTEMS**  
38 PRESIDENT AVE., CARINGBAH 2229  
**GRIFFITH COM-DATA SYSTEM**  
3/447 BANNA AVENUE, GRIFFITH 2680  
**CLOVELLY COMPUTERS**  
315 CLOVELLY ROAD, CLOVELLY  
**B. J. STEPHENS**  
6TH FL., 85 SMITH STREET, WOLLONGONG 2500  
**FOTO RIESEL**  
McARTHUR SQUARE, CAMPBELLTOWN 2560  
**COMPUTERTIME**  
345 VICTORIA AVENUE, CHATSWOOD 2067

**Victoria**

**THE COMPUTER DELI**  
10/1 KINGSWAY, GLEN WAVERLEY 3150  
**GIPPSLAND COMP. BUS. SERV**  
167 PRINCES HIGHWAY, BAIRNSDALE 3875  
**HIGH TECHNOLOGY**  
87 SWAN STREET RICHMOND 3121  
**ULTRAPHASE COMPUTERS**  
264A DONCASTER ROAD, GREYTHORN 3104  
**C & G COMPUTERS**  
165 9TH STREET, MILDURA 3500  
**MAXWELL OFFICE EQUIPMENT**  
162-164 NICHOLSON STREET, ABBOTSFORD 3067  
**PANATRONICS**  
691 WHITEHORSE ROAD, MONT ALBERT 3127  
**COMPUTERS 2000**  
14 YOUNG STREET, FRANKSTON 3199  
**MINI COMPUTER SERVICES**  
119 McCRAE STREET, BENDIGO 3550  
**COMPUTERLAND MELBOURNE**  
123 LONSDALE STREET, MELBOURNE 3000  
**RAY CROSS ELECTRONICS**  
151 BORONIA ROAD, BORONIA 3155  
**THE MORWELL COMPUTER SHOP**  
42 BUCKLEY STREET, MORWELL 3840  
**L & S EDUCATIONAL SUPPLY**  
99 ARGUS STREET, CHELTENHAM 3192  
**DATAPARTS**  
11 EDWARDS STREET, SHEPPARTON 3630  
**Q COMPUTER BUSINESS SYS.**  
1138 BOURKE STREET, NTH. BALWYN 3104  
**COMPUTERBIZ**  
ARMSTRONG STREET, NORTH BALLARAT 3350  
**VLAINÉ STUDIOS**  
VICTORIA STREET, WARRAGUL 3820

**COMPUTER BYTES**

248A GLENFERRIE ROAD, MALVERN 3144  
**HOME COMPUTERS**  
160 MAIN ROAD, UPPER FERNTREE GULLY 3156  
**GANCE THE CHEMIST**  
SHOP G9, NORTHLANDS CENTRE, MURRAY ROAD,  
PRESTON 3072

**South Australia**

**DATAPUNCH COMPUTER CENTRE**  
6/168 MAIN ROAD, BLACKWOOD 5051  
**GULF COMMUNICATIONS**  
6 WALLS STREET, WHYALLA 5600  
**ABRAXAS COMPUTERS**  
151 HUTT STREET, ADFLAIDF 5000  
**CYBEX COMPUTING**  
381 GREENHILL ROAD, TOORAK GARDENS 5065  
**SRN COMPUTER CENTRE**  
19 BEACH ROAD, CHRISTIES BEACH 5165  
**KEY COMPUTERS**  
1060 SOUTH ROAD, EDWARDSTOWN 5039  
**COMPULING DATA CENTRE**  
25 WASHINGTON STREET, PORT LINCOLN 5606  
**YORK & EYRE PEN COMPUTERS**  
44 MILNE TERRACE, MOONTA 5558  
**SARGENT ELECTRONICS**  
6 MOSELEY STREET, GLENELG 5045

**Queensland**

**TEL AIR ELECTRONICS**  
90 SCARBOROUGH STREET, SOUTHPORT 4215  
**DOWNES HOME COMPUTING**  
SHP.4 TOOWOOMBA INN ARC., MARGARET ST.  
TOOWOOMBA 4350  
**TEDITA PTY. LTD.**  
116 GRIFFITH STREET, COOLANGATTA 4225  
**THE BYTE SHOP**  
SHOP 5/93 ENOGGERA ROAD, NEWMARKET 4051

**SCARBOROUGH FAIR COMP. CT.**

5 SCARBOROUGH FAIR, SOUTHPORT 4215  
**TOOWOOMBA COMPUTER CTRE.**  
180B HUME STREET, TOOWOOMBA 4350  
**COMPUTER AGE**  
131 ELIZABETH STREET, BRISBANE 4000  
**UPSHOT ELECTRONICS**  
135 ABBOTT STREET, CAIRNS 4870  
**COMPLETE COMPUTER CENTRE**  
805 GIMPY ROAD, CHRINSIDE 4031

**Tasmania**

**ADVANCED ELECTRONICS**  
5A THE QUADRANT, LAUNCESTON 7250  
**QUANTUM COMPUTERS**  
198 LIVERPOOL STREET, HOBART 7000  
**THE LOGIC SHOP**  
120 MURRAY STREET, HOBART 7000

**ACT**

**ATCOM COMPUTER CENTRE**  
SHOP 141 BELCONNEN, BELCONNEN 2617  
**STEVES COMMUNICATION CEN.**  
57 WOLLONGONG STREET, Fyshwick 2609



**Ozi Soft.**

**50 Clarence Street, Sydney.  
Dealer enquiries invited  
Telephone (02) 211 1266**



# PRINTOUT

**MEMO**  
 TO: All Department Managers  
 SUBJECT: Cash Flow Forecast  
 Based on end-of-year revenue and expense provided to this office (shown below) highlights

	A	B
7 Cash on hand		63,450
8 Receipts		335,000
9 Disbursements		265,484
10 Interest		555
11 Taxes		10,001
12 -----		
13 Cash flow		\$60,069

**TREND**  
 A line graph showing fluctuations over time with labels M, H, J, S, N on the x-axis.

**FORECAST**  
 A menu with options: Calc, Graph, Word, Query, Tutorial, Services, start install.

delete Cut&Paste  
 Calc  
 Graph  
 Word  
 Query  
 Tutorial  
 Services  
 start install

HELP CLOSE OPEN FULL FRAME OPTIONS TRANSFER STOP

VisiOn showing its "windowing" capability.

swaps code and data in and out of memory as necessary. If a required routine isn't in RAM VisiOn may need to write a chunk of memory to disk to make room for it. I found this more annoying than you might expect, probably because of the generally consistent behaviour of VisiOn.

The particular species of mouse adopted by VisiCorp is the two-button optical variety. Having two buttons makes scrolling a simple task (press the 'scroll' button and move the mouse), providing you remember which button is which! I watched several other people using the system, and a fair proportion seemed to be having the same problem as I did. The optical nature of the mouse means that it can't run around your desk like the mechanical types - instead you need a striped reflective plate about the size of this magazine. The long-term question is

# WE ARE THE COMMODORE EXPERTS



## HIGH TECHNOLOGY

- Victoria's No. 1 Commodore Computer dealer
- ★ Victoria's largest range of Commodore programs and accessories
  - ★ Victoria's only Commodore Authorised Service Centre
  - ★ Victoria's only FREE regular Commodore Newsletter
  - ★ Victoria's only Commodore telephone database
  - ★ Victoria's oldest Commodore dealer

## SOFTWARE

- Hundreds of programs from
- ★ Abacus ★ Acme
  - ★ Commodore ★ HES
  - ★ Rabbit ★ Ozisoft
  - ★ Llamasoft ★ Romik
  - ★ Bubble Bus
  - ★ Imagineering many
  - ★ And many more

**DEALER ENQUIRIES INVITED ON 596 7130**

## SERVICE

Our new larger facilities with the latest equipment and U.S. trained technicians allow us to now offer fast and efficient repairs to all your Commodore equipment.

**We are Victoria's ONLY Authorised Service Centre.**

## COURSES

Our new training facility offers the right course for your needs.

- ★ Intro to Computers
- ★ BASIC Programming
- ★ Assembly Language
- ★ Business Applications

MAIL ORDERS WELCOME  
 CALL OR WRITE FOR  
 FREE CATALOG

MAIL ORDER DEPT: P.O. Box 3, BRIGHTON NTH 3186

# HIGH TECHNOLOGY COMPUTER SYSTEMS PTY. LTD

87 SWAN STREET, RICHMOND 3121. Telephone: (03) 429 1966  
 290 BAY STREET, BRIGHTON 3186. Telephone: (03) 596 6211





## ALL PRICES INCLUDE SALES TAX

### Tandy Model III

Available as either a 16K cassette based system, with integrated screen at **\$1,000** or our superb model with 48K of user memory and two inbuilt disk drives giving 1.4 MB disk capacity, 5mHZ clock speed (instead of 2 mHZ) and a crystal controlled real-time clock. Compare these specs with competitive computers. Twice the speed and twice the disk capacity of the standard Radio Shack version for **\$2,499**.

### C. Itoh 1550.

120 cps, Dot Matrix friction and tractor feed, includes proportional type and spacing for near letter quality printing, pica, elite, condensed type, plus double width in all sizes. Tractors are behind the platen so no paper loss **\$1,350**.

### C. Itoh F-10 Daisywheel.

A 40 CPS heavy duty computer letter-quality printer. Parallel **\$2,100**.

## PRINTERS

### DT80

— See separate advertisement for extra special deal.



### Amust P88

Dot Matrix, 80 CPS Bidirectional logic seeking, incredible new technology using 18 inch print ribbon with rating for 4 million character life. Epson compatible looks. **\$525** inc tax.

### Amust 113 PD.

A daisy-wheel printer that is also an electronic typewriter, fitted with a centronics interface, and types at 13.5 CPS **\$950**.

## MONITORS

### AMUST RGB Colour Monitor.

Suitable for APPLE, IBM and can be plugged directly into computers that give out an NTSC signal.

At last we have been able to get our hands on a reasonably priced monitor from Japan. It gives crisp colour and a usable screen in 80 characters.

It's sharper and clearer than the Kaga 2 and it's a whole heap cheaper at **\$575**.

### Ritron 18 + M/HZ

Green **\$210**. Orange **\$230**  
Swivel Base Green **\$250**.

## Apple Compatible Joysticks

No hype . . . they are great. You can measure them on the Apple Cillin diagnostic disk. Top corners to bottom corners show zero to 255. Exactly. Adjustable centering position is exactly in the middle of the screen and rock steady. Only **\$33** . . . plus **\$4** freight.

## Disk Boxes

100 plus Disks **\$9.95**  
Perspex lid **\$10.00**. **\$5.50** Postage.

## Verbatim Datalife or Xidex Disks

Your choice . . . they are both top quality. ONLY **\$38** A BOX OF 10, Postage **\$3**. **\$340** for 10 boxes, Postage **\$10**.

© C. ITOH  
 © NATIONAL  
 © AMUST  
 © MEDFLY  
 © DISCOVERY

**COMPAK**  
 Compak Computer Centre

# KOMPUTERS FOR YOUR KIDS?

Puzzled, confused and bewildered about what computer to buy for your children. I am not surprised.

Every week a new computer. Every advertisement a new hype that tells you everything and nothing about the latest gee whiz machine.

When you meet a computer salesman who boondoggles you with jargon about RAM, ROM, BITS and BYTES drag him back to earth. Don't be ashamed to say you don't understand. More often than not he doesn't either . . . it's a con.

Tell him what you want. A machine your children can use for their education. Find out if he knows how computers can really be used for educational purposes. If he squirms or doesn't give a sensible answer then don't take any notice of his advice. If he doesn't know anything about education how can he advise you whether his computer is good for educational purposes?

**WE RECKON WE KNOW BECAUSE THATS OUR JOB.**



I suggest that you nextask each of the salesmen whether they will show you a catalogue of educational programmes for their machine. Ask each one of them whether their machine has more than 20% of the programmes written for the Apple and Apple compatible computers.

If they say that their computer does have more than 20% of the educational programmes written for the Apple, then I suggest you visit us and look at our catalogues and draw your own conclusion as to whether you can trust that salesman.

We carry a number of computers that run programmes designed for the Apple. We stock inexpensive cards and accessories to make them work better too. We know how teachers rank computers and we know how to give you a good deal.

**WE CAN GIVE YOU THREE CHOICES.**

First comes a the Redstone TR002D —

A brand new 64k computer that not only runs Apple programmes but also has a second Z80 computer on board that uses the same monitor and drives. Unlike the Apple II it also has built in lower case and a separate numeric keyboard. It gives you 66 function keys, a user defined keyboard and auto repeat too. Quality? We reckon it's tops and to show that we mean it we give a 6 months guarantee. That's twice as long as Apple.

It will cost you **\$699** inc tax and **\$639** ex tax  
 10% off for schools.

Your second choice is the TR007. Same as the machine above except that it has the same features as the more recent Apple IIe. Full cursor keys and automatic repeat on all keys.

That costs **\$999** inc tax and **\$891** ex tax  
 10% off for schools.

Finally there's the Prince of Apple workalikes . . . the Medfly.

You can of course take a basic Apple II and add on an 80 column card, a Z80 card, an extra 64k of banked memory, a serial port and a parallel printer card. Then you could replace the traditional Apple styling with a new slimline keyboard with function keys and full cursor keys and stick a fan on the side.

Maybe you would run the same programmes but it would cost you a heck of a lot more and you wouldn't have a machine that could hold a candle to the Medfly.

Funny name the Medfly until you think about what kills Apples . . . You got it! The Mediteranean fruit fly.

The fully optioned up Medfly computer with 128k memory will cost you **\$1575** inc tax and **\$1390** ex tax. On top of that you have to add the cost of a monitor and a disk drive controller and if the budget will stand it, a printer. The 64k Medfly will save you **\$1375** inc tax and **\$1222** ex tax.

350 South Road, Moorabbin,  
 Vic 3189. Tel: (03) 555 9844



# PRINTOUT

whether the claimed improvement in reliability over mechanical designs is enough to outweigh the inconvenience in use.

Transferring data from one application to another is a simple matter. Basically you select the material you wish to move, choose the transfer function, and then indicate the destination. An obvious application is the production of graphs from a spreadsheet. Something you can't do at present is copy a graph into a word-processed document, although this is promised in later releases of the software. In the meantime the windows make it very easy to gauge the amount of space to leave in the text in order to cut and paste (the real scissors and glue method) the printed output.

For all its advantages, I think VisiOn has two main drawbacks. The first is that a potential buyer is looking at a

relatively large investment. On the hardware side, you're looking at a machine with at least half a megabyte of memory plus a five megabyte hard disk, graphics, and a mouse. Say you already own an IBM PC, and it's fitted with the graphics adaptor. Imagineering's price list shows the Quadram 512k memory board at \$1240, the Davong 5Mb winchester at \$2620, and the VisiOn mouse at \$445. Having spent well over \$4000 on top of the cost of the computer itself, you are able to run VisiOn, which costs a mere \$165.

Trouble is, you still can't do anything - first you must buy the applications programs you need. List prices here are \$630 for Calc, \$595 for Word, and \$395 for Graph. There are two package deals, VisiOn with Calc and Graph for \$1099, or VisiOn plus all three applications for \$1499. Can VisiOn save a manager enough hours over a couple of years to

repay the investment? You must do your own sums.

The other problem is the difficulty of producing custom applications. Big corporations will be able to cope, and apparently several software houses are investigating the possibility of producing specific applications for the vertical markets they already serve, but if you currently use a specially written program for a task that doesn't fit the spreadsheet or database mould, forget it. If the hardware was cheaper, perhaps it wouldn't matter so much.

*Steve Withers*

## Macintosh

Considering the number of rumours about Apple's Macintosh project, it isn't surprising that many of them were wrong. The people who

suggested it would be a cut-down Lisa were the closest, but those who predicted MS-DOS compatibility were way off line.

One thing that I didn't bargain for was the ballyhoo with which Apple launched the Macintosh - stirring music, videos, slideshows, artificial smoke, rap dancers ('We are Apple' sung to the music of 'What a Feeling'), and a TV celebrity acting as front man. Decidedly over the top, but presumably for the benefit of the mainstream press and the TV cameras.

For me, the most cringe-inducing part of the proceedings was a slogan to the effect that the Macintosh is one reason why 1984 won't be like '1984'. Being told that the signatures of the design team were moulded into the Macintosh case had a

## AT ARCHIVE WE NOW SUPPLY AN UNSURPASSED RANGE OF SOFTWARE, INCLUDING:

★ SuperCalc 2.....	\$373.40	★ SuperCalc 3.....	\$534.20	★ VisiCalc 256K.....	\$423.00	★ Desktop/Plan.....	\$423.00
★ DUtil.....	\$128.50	★ Multiplan.....	\$350.00	★ KnowledgeMan.....	\$635.00	★ Lotus 1-2-3.....	\$885.00
★ VisiFile.....	\$423.00	★ VisiDex.....	\$423.00	★ D-Base II.....	\$820.00	★ Friday.....	\$350.00
★ DataStar.....	\$354.20	★ Card Box.....	\$304.40	★ Quickcode.....	\$368.40	★ GraphWriter.....	\$690.00
★ InfoStar.....	\$595.00	★ StarBurst.....	\$290.00	★ WordMaster.....	\$190.60	★ WordStar.....	\$595.00
★ WordStar Pro.....	\$870.00	★ SpellStar.....	\$315.80	★ SpellBinder.....	\$649.00	★ Statpak.....	\$625.80
★ Multi-Tool Word.....	\$501.00	★ Fastgraphs.....	\$390.00	★ Milestone.....	\$378.00	★ VisiTrend/Plot.....	\$525.00
★ Access Manager-80.....	\$382.52	★ Display Manager-80.....	\$507.20	★ Personal BASIC.....	\$187.80	★ BASIC-80.....	\$530.00
★ CBASIC 2-80.....	\$187.00	★ CB-80.....	\$639.40	★ APPLE SOFTWARE.....		★ COMMODORE 64 SOFTWARE.....	

(NOTE - ALL PRICES ARE INCLUSIVE OF SALES TAX & EXCLUDE DELIVERY)

... AND A HOST OF OTHER PACKAGES FOR INTEGRATED ACCOUNTING & STOCK CONTROL, FINANCIAL PLANNING AND MODELLING, DATA BASE MANAGEMENT, CRITICAL PATH ANALYSIS, STATISTICAL ANALYSIS, GRAPHICS, & EVEN MORE.

... IF IT'S AVAILABLE **ANYWHERE**, & ARCHIVE DON'T STOCK IT, WE WILL FIND IT FOR YOU.

At ARCHIVE we supply for all common (& many uncommon) micro-computer operating systems including:

★ CP/M-80 ★ CP/M-86 ★ MP/M-II ★ MP/M-86 ★ MS-DOS ★ PC-DOS ★ TurboDos ★ UNIX ★ XENIX

At ARCHIVE we also have Compilers & Interpreters for all the most common micro-computer languages including:

★ BASIC ★ COBOL ★ FORTRAN ★ PASCAL ★ PL/1 ★ C

& UTILITY software to suit all operating systems!!!

We are able to supply, service and support complete computer systems ... BOTH HARDWARE & SOFTWARE.

PLEASE WRITE OR CALL FOR OUR COMPLETE PRICE LIST.

**ARCHIVE COMPUTER SERVICES SYDNEY . . . AUSTRALIA'S PROFESSIONAL SOFTWARE TEAM.**

**ARCHIVE COMPUTER SERVICES SYDNEY PTY. LIMITED**  
(INCORPORATED IN N.S.W.)

*Microcomputer Products - Sales & Specialists*

SHOP 13, MOUNT STREET PLAZA, MOUNT & WALKER STREETS, NORTH SYDNEY, NSW 2060

Telephone: (02) 923 1200

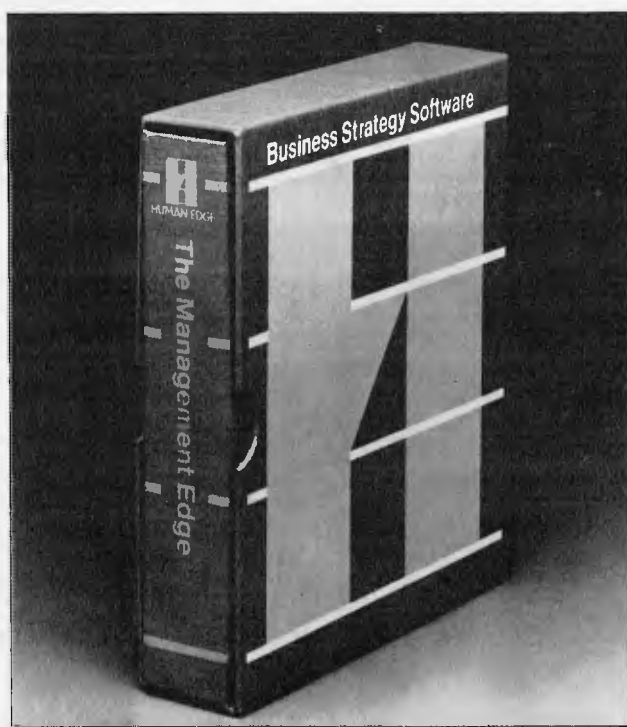
*Please address mail to:*

P.O. Box 959, Crows Nest, N.S.W. 2065





# PRINTOUT



*You're not going to believe this.*

*The Human Edge has launched a program 'which develops a problem-solving strategy tailored to the personalities of the superior/subordinate/peer triad, and to the culture of the work environment.'*

*Translated, this means that you go to the program with the following problem:*

*'Dear Aunt Computer, my boss is a mean old bully, and he wants me to get five thousand labels printed by Thursday. But my colleague Peter is using the computer to play Space Invaders, and he thinks the mailing list isn't really that urgent. Now I'm a very quiet little thing, and I can't tell Peter what I think of him, and anyway, in this stupid company you have to be the chairman's nephew or a beautiful person to get on, so how are we going to get the labels printed? What am I going to tell the boss?'*

*To use the program, you turn the machine on and choose from six assessment selections: self-assessment, interactions with others, compatibility with the organisation, problem-solving with subordinates, determining your management skills and assessing a superior.'*

*After the user answers a series of questions, says the company, 'the machine assimilates information from a bank of proven management tactics, and selects those most appropriate to the situation'.*

*Dr James Johnson, president and founder of Human Edge Software, and the author of over 100 articles and books on personality assessment, says 'The Management Edge offers a new method of understanding and communicating with co-workers, subordinates and superiors, by presenting expert management advice that can enhance a manager's overall performance.'*

*Not greatly to my astonishment, friends who tried this out report that its print-outs are pure nonsense.*

*If Americans will buy this sort of stuff, then no wonder they all see psychiatrists. They're all mad! And no, I am not making it all up, and yes, you can buy it, for \$250, from Human Edge Software Corporation, 2445 Faber Place, Palo Alto, California, on (415) 493 1593.*

similar effect on other people, but it struck me as being a nice touch.

Enough of all the hype, what about the machine itself. The biggest surprise was Mac's small size, the footprint being just 24cm square. As with the Apple II, there is even a padded carrying case available as an accessory item, but this time everything fits inside, even disks and manuals.

Macintosh is very Lisa-like, with the now familiar 'electronic desktop' display and mouse-driven software with so-called pull down menus (to me, they seem to pop up on demand). The big difference seems to be that Macintosh can only do one thing at a time: as far as I could find out, it is necessary to put one application away before another one can be activated. This makes the transfer of data from one program to another a little more time consuming than it would otherwise be, but it is still a simple process.

While Mac's system software includes a calculator and notepad, you can't really do anything without some applications programs. Fortunately, Apple are throwing in the MacWrite and MacPaint programs (word processing and free-hand graphics) as an introductory offer. I can't see that offer lapsing, somehow.

Further application programs should be fairly easy to find. Apple themselves have several on the way (project planning, terminal emulation, and structured graphics), as well

as programming languages (Pascal, Basic and Assembler). Microsoft predict that 50% of their 1984 retail sales will be for the Macintosh. They already have Multiplan running, with other programs under development. Lotus 1-2-3 is well on the way, along with programs from a considerable number of other software houses.

What's the big attraction of the Macintosh? It's just so easy to use. When I wasn't playing with one myself, I watched other people working on a Mac. We all made mistakes at the beginning, but it looks like Apple's claim of a very steep learning curve is justified. Macintosh is also competitively priced at \$3445 including tax. Most buyers will probably want the Imagewriter printer so they can print documents containing all those nifty typestyles and graphics, and that takes the price to \$4195.

Oh, for those who really care about such things, Macintosh has a 68000 processor, 128k RAM, 64k ROM, a 9" 512 by 342 bit-mapped display, one 3½" 400k microfloppy disk drive, a detached keyboard, a mouse, two serial ports, and a sound synthesiser capable of producing speech. Provision has also been made for a second (external) disk drive and a number pad. If you want to know more, there will be a full benchtest of Macintosh in the next issue of APC.

Steve Withers

END



'Well WHO won'

## THE EXECUTIVE 816 . . . . A REAL COMPUTER IN A REAL BRIEFCASE MORE THAN TWICE THE DISK CAPACITY OF THE BASIC 2 DRIVE IBM PC ONLY \$3395 INC TAX. INCLUDES ALL SOFTWARE

We think the two most important features to look for in a small business computer is the quality of the software and the capacity of it's drives. Let's take these two points one at a time and look at the Executive 816.

Why is the drive capacity so important? Well for instance, it is usually most efficient to adjust your stock and debtors records as you write up your customer invoices. That needs them all to be on in the drives at the same time. Then again with good sized disk storage your database can be a usable size, or you can store a really substantial amount of text from your word-processor as well as a good sized dictionary to check your spelling. Unless you have a midget business you are unlikely to be able to do this with less than 1,500 kilobytes of storage. The Executive 816 has nearly 1,600 kilobytes of storage built in to two slimline drives. As a comparison, the Model 3 or 4 TRS 80 have 384 kilobytes, the basic 2 drive IBM PC has 750 kilobytes. The 2 drive Apple 2e has a measly 286K storage.

So what does it all mean? Simply that even though it comes in a small portable package the 816 is one of the most powerful computers available on the market at anywhere near it's price bracket.

The second issue is the quality of the software. The 816 comes with an enhanced CP/M 2.2 operating system developed by Mark Henry of Compak Microcomputer Products. It is menu driven. You don't need to understand A> or PIP or Stat or any of the other built in CP/M commands. Just choose the option from the menu and the computer tells you what to do. Follow the yellow brick road. You can copy, format, look at the directory, run programmes, set up communications or even get into CP/M itself. The 816 can read 5" disks from the DEC Rainbow 100, IBM PC (CP/M 86), Kaypro, Cromemco, Osborne, HP 125, Morrow Micro Decision, Televideo 802/803, Archives 2 and soon even more disk formats.

**THE 816 COMES WITH THIS QUALITY SOFTWARE. FREE WITH NO HIDDEN CHARGES.**

### ACCOUNTING . . . FOR THE BUSINESSMAN

The fully integrated Debtor, Creditors and Stock. The General Ledger has a pre-defined chart of accounts or you can define your own. Several departments? No problem. You can have separate reports for up to 99 departments, and the Debtors and Creditors will automatically transfer totals to the General Ledger.

Reports include — month by month and year-to-date totals for Trial balance, Profit & Loss Account and Balance Sheet. For regular items — use the standing journal. Comparative Profit & Loss — of course. Slow debtors — automatically send collection letters. Update stock items as the customer's invoice is printed. Automatic Creditor payments. Aged Trial balance, etc. etc.

**IF YOU ARE THINKING OF BUYING IMS IN ITS OWN RIGHT — DON'T — GET A FREE COMPUTER AS WELL FROM US.**

### OFFICE COSTING ANALYSIS SYSTEM . . . . FOR THE ACCOUNTANT SOLICITOR ARCHITECT etc

OCAS is a system for keeping records of office costs and providing various reports regarding these costs. Costs can be either time related or fixed cost.

Normal monthly reports cover client reports detailing client jobs, and the associated time and costs; staff reports covering the jobs performed for individual clients; and task reports listing the staff involved.

Client accounts can be maintained, producing statements of any time and ageing reports to keep track of overdue accounts. With the 816's disk capacity, it is possible to keep 2000 entries in each of staff, tests, and transactions per month.

### MEMBERSHIP MAINTENANCE SYSTEM . . . . FOR THE CLUB SECRETARY

Instead of being limited to primitive, labour intensive and slow management systems which are prone to error, you now can move into modern cost effective methods to handle on line telephone and over counter enquiries, as well as accounting and mailing, and has the flexibility to adapt to your needs while requiring less skill than a manual system.

You can print address labels, with selective mailing, membership renewal notices suitable for window faced envelopes, cash summaries for banking, etc, while information stored for each member can include home and business telephone number, age, sex, marital status, date joined, date paid up to, current financial standing, etc, as well as your own special requirements.

Membership records can be accessed by the alphanumeric code or by surname. With the 816's enormous disk capacity, one disk can hold, if needed, records for approx. 2,500 members!

### PROJECT COSTING SYSTEM . . . . FOR THE BUSINESSMAN

Need to track jobs as they move through your organisation?

No need to create a special programme as the ARM Data Base has been specially configured to cover the project costing.

As in the Database itself, everything is menu driven and there are no complex commands to learn; sample files are also provided for a "hands-on" demonstration.

**ALMOST EVERY BUSINESS NEEDS THREE TYPES OF SOFTWARE. A WORD PROCESSOR, A DATABASE AND A SPREADSHEET.**

### THE 816 COMES WITH:

#### SUPERWRITER (including spelling checker)

The newest in Word Processing from the creators of the famous Super Calc programme, also incorporates a full on-screen help function, and an integrated dictionary of over 20,000 words, which customises itself to your vocabulary.

Form letters or mailing lists are also included in the package — no need for expensive extra programmes.

A Print Spooler is also on-line. Print while you type the next document. Above all, Super Writer is very easy to learn and use.

#### A DATABASE

From Australia comes the ARM Data-Base, with forms management. It is not just a file management system.

There are no complex commands, and the quality and sophistication of the data-base make the system easy to use; everything is menu driven and a demonstration data-base is supplied.

#### SUPERCALC

One of the best known and supported spread-sheet programmes is also supplied free with the 816.

The work space available is a massive 29K, compared with some others at 11K.

You have 64 columns and 256 rows to use.

Vary the width of individual columns at will; headings automatically extend across vacant cells; a help function is always available on screen; and of course, all the usual spread sheet functions.

Cash flow, budgets, and 'what if?' situations are a breeze using Super Calc. The only limitation is your own imagination, and we have several books on Super Calc to help you with ideas.

**And finally the 816 comes complete with two utilities:**

**COMMUNICATIONS SOFTWARE XMIT/RECV**, to permit files or programmes to be transmitted from one machine to another at up to 9600 baud through the RS232 port. (Of course, the "other" computer needs it's correct XMIT/RECV programme to make it work.)

**DISK EDITOR AND DIAGNOSTIC . . . .** to repair clobbered disks.

#### SPECIFICATIONS

Z80A, 4MHZ, 64K RAM, 2 x 5/4 D/S D/D disk drives of 1.6 megabyte approx. Provision for 2 more 8" or 5 1/4" drives, Centronics printer port, 2 RS232 serial ports, CPM 2.2, 5" 80 x 25 CRT Green Phosphor, RCA external monitor connection, 110/240 volt, 5 function keys, cursor keys, Mouse Capability.

**NOT ONLY IS THE AMUST EXECUTIVE 816 ONE OF THE MOST  
POWERFUL SYSTEMS AVAILABLE TODAY — BUT THE MOST PORTABLE,  
FASHIONABLE AND EASIEST TO USE**

**COMPLETE WITH ANTI-GLARE SCREEN — ONLY AVAILABLE FROM COMPAK COMPUTER CENTRE**

**COMPAK**  
Compak Computer Centre  
THE HOME OF THE 816

**350 SOUTH ROAD,  
MOORABBIN 3189  
Telephone: (03) 555 9844**



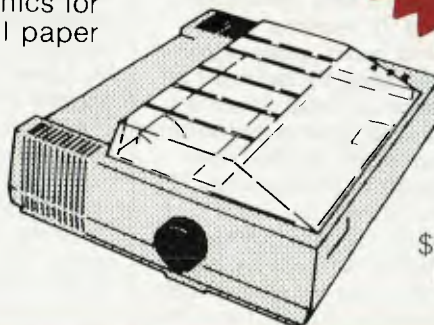


## AMUST DT 80 PRINTER

Includes bidirectional printing... logic seeking function... 80 CPS... 9 x 8 matrix with full descenders... 96 ASCII characters... Italics and international symbols... normal/emphasised/double-strike/double/emphasised modes... subscript, superscript and underline... 10 or 5 or 17.6 or 8.58 CPI dot graphics for both line drawing or bit image... full paper handling functions.

**LOW — LOW — LOW — PRICE!**

**\$325** (ex tax)  
**\$375** (inc tax)



\$8 COURIER  
 DELIVERY



# COMMUNICATIONS

*APC welcomes correspondence from its readers but we must warn that it tends to be one way! Address letters to: 'Communications', APC, P.O. Box 298, Clayton, Vic 3168.*

## Comparing processors

Your recent review of the Tandy MC-10 (APC December) states that the 6803 processor is almost identical to the 6809. In fact, the 6803 is almost identical to the basic 6800 CPU in software terms and not the enhanced 6809 CPU. I suspect that one of the reasons for choosing this processor is that Tandy may be considering putting the Basic on-chip with the processor in the form of a mask, programmed 6804 CPU.

Here is a brief summary of the 6800 processor family:

- 6800 original CPU (requires separate clock)
- 6802 6800 with on-chip close+128 bytes RAM
- 6801 6800 single-chip microcomputer ie CPU+clock+128 bytes RAM+ mask programmed ROM+i/o ports
- 6803 6801 with no ROM ie 6800 CPU+clock 128 bytes RAM+i/o ports
- 6809 greatly enhanced version of 6800 with on-chip clock (no RAM or ROM)
- Others
  - 6808 as 6802 with no RAM
  - 6804/5 special mask programmed single chip microcomputers
  - 6301 CMOS versions of 6801
  - 68701 EPROM version of 6801

This above is an over simplification, in that 6802/6808, 6801/6803 may contain a few extra instructions over the basic 6800 instruction set.

It is not always realised that comparing clock speeds between the 68xx range of processors and the 8080/8085/Z80 processors is not

very informative, since many 6800 instructions are executed in two or three cycles, as opposed to instructions which take many more cycles on the 8080/Z80 processors.

*Simon Sondergaard*

## Understanding Basic

Don Milne's (APC December, 'Basic challenge') comments on my letter (APC October, 'Back to Basics'), merely repeat some of the cliches about the superiority of Pascal without showing, in any way, that he understands the nature of the problem previously described.

High level languages and operating systems are designed to ease the work of programmers. By their use much time and money may be saved in the writing of programs. This ease is normally at the expense of added run time costs which is balanced against the saving in software costs. However, language and system designers tend to assume that they know all the ways their software may be used and often, deliberately or by omission, bar the full use of the CPU. Pascal is such a language, and whilst excellent for many purposes is very inflexible and inefficient for others.

I write critically of Pascal because I have tried it and found it wanting. I had several years using Algol which allegedly had some influence on Pascal. It too is a compiled language but suffers from some of the same difficulties. Programs ran *100 times faster* when a few time critical routines were optimised in machine code.

My 'long winded' remark referred to running time. The Pascal code may well be

shorter. It certainly was in the Algol program, due to each bit having to be handled separately. In addition the arrays were many times larger, which led to memory difficulties. One run might take several days even with an efficient program and perhaps months otherwise.

The published routine has been simplified to show the essential problems. In practice it would have many extras such as loops to repeat parts.

The routine is designed to sum sequences of 16 bit 'integers' but without permitting any carries between bits of higher or lower significance. Each bit is an independent data item which must be kept unaffected by any other bits. In line 1000 S1, S2, S4 and S8 are counters for each power of 2 in the total. For the example, they are preset at -6 and total up to 12 'integers'. A wide range of values would be possible in practice and S16, S32 etc might be used.

Lines 1010-1030 take pairs of 16 bit 'integers' from an array S( ). Each pair is masked with R and NOTR (does Pascal allow Masks?) and ORed to give a single 16 bit word. R is produced by other routines to complex rules and is highly variable.

If S8 is non zero this indicates that some bit counts have negative values. Lines 1190-1280 convert any negative values to positive absolute values. Lines 1210-1225 separate positive and negative counts by masking to the sign bit. Lines 1230-1250 convert negative counters to their 2's complements. Line 1260 masks any spurious bits and line 1270 combines the counters again. Other masking code, not given, would access the counter totals whenever required.

In Pascal these 16 counters would have to be handled in

sequence rather than in parallel and the lack of masking facilities would also make the value extraction time consuming. The bits would have to be treated as 16 separate variables.

I would repeat my earlier remarks that I would be pleased to see the problem written in effective Pascal.

I would also like to point out that compiled Basic is frequently used in business programs with some success. Since many smaller systems do not support Pascal, life would otherwise be difficult for any business with such an installation.

*R. G. Silson*

## Spectrum command

I read somewhere recently that the following direct command returns the amount of memory used by a program on the ZX Spectrum. PRINT PEEK 23627 + 256 PEEK 23628 - 23755.

Since I have a 16k machine, memory space is fairly important. When writing a program recently I discovered I had used all the available memory, but this direct command only returned approximately 8000 bytes. Is it the way that I only have 8k RAM and 8k ROM, or that the value returned should be doubled - I have been unable to discover which. Could you help?  
*Kevin Barrett*

*Your 16k Spectrum has in fact 32k of memory, but the first 16k of this is the ROM and includes the Basic interpreter. The other 16k is called the RAM but not all of this is available to you for your programs. This is*



## COMMUNICATIONS

because the Spectrum needs this space to store the contents of the display file (the screen picture), the printer buffer and the system variables. These are the machine's own variables and store information which describes the current state of the system. Some of these variables are pointers to the start of the flexible areas of memory, for example, the area set aside for your program.

Incidentally, the names of these variables are meaningless to the machine and shouldn't be used in programs, and only exist for our benefit since it's easier to refer to VARS than PEEK 23627 + 256 PEEK23628.

Taking into account all these overheads the amount of RAM available for your programs is about 9k.

To find out just how much of this precious memory you have used, you PEEK the values of the relevant system variables. To determine the memory used by a program = PRINT (PEEK23627 + 256 PEEK 23628) - (PEEK23635 + 256 PEEK 23636).

To determine the memory used by a program and its variables PRINT PEEK23641 + 256 PEEK23642) - (PEEK23635 + 256 PEEK 23636).

Finally, to discover how much memory is spare use the command PRINT 65536 - USR 7962.

This is, in fact, a routine in the ROM memory and is used because there is no convenient system variable.

Tony Hetherington

## Which typewriter?

Can you please advise me which typewriters to consider buying as part of a basic word processor? - Permit me to expand on my own require-

ments; I know they come close to those of many other small users.

My small business handles a lot of multi-page texts and I need a robust electric typewriter, which will mildly impress customers and not drive me up the wall with servicing problems. We have budgeted about fifteen hundred dollars to buy a good keyboard typewriter, and will buy a basic microcomputer and floppy disk unit to drive it when the money becomes available later. We don't want a turn-key word processor system with opaque software and non-adaptable hardware, so we shall probably go for a PET, Tandy, Apple or such market leaders, plus a commercial work processing program package. Therefore, the typewriter must be readily connectable to such machines.

Please interpret typewriter to include daisywheel machines, but to exclude dot-matrix printers.  
Anthony Durham

There are any number of typewriter/printers available. One which would seem to meet your requirements is the Olympia Compact, which uses a daisywheel, has a choice of serial or parallel interface and has the option of a 64 or 128k print buffer. There are, however, many other machines which would prove equally suitable; just look through the ads in APC! As with any computer equipment, I recommend going to an independent dealer who will be able to offer unbiased advice on your particular requirements.

Surya

## Software copyright

Attached is a copy of a draft letter sent for consideration to Senator Gareth Evans,

## TANDY ELECTRONICS DEALER

### 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)

## NEW ATARI 800XL



**ATARI 1050 DISK DRIVE** available and **1020 COLOUR PLOTTER** also available

PHONE NOW AND PLACE YOUR ORDER WITH AUSTRALIA'S OLDEST ATARI DEALER.

FOR SUPPORT GO WITH THE EXPERIENCED DEALER

**CALCUTRONIC PTY LTD**  
CALCULATOR AND COMPUTER CENTRE  
**797 GLENFERRIE ROAD,  
HAWTHORN, VIC 3122**  
**Telephone: (03) 818 6631**

## COMMUNICATIONS

Attorney General from the Victorian Council of Social Service (Phone 03-419 3555):

VCOSS is currently working, together with other concerned organizations, on a detailed submission against proposals for computer software to be made subject to copyright.

This letter is just advance notification that we wish to be heard before any decisions are made. We are concerned at a trend in press comments to assume that there is simply a "loophole" which the Government will "have" to fix through special legislation.

At this stage all we are asking is for you to refrain from any public commitment to that position until you have had the opportunity to consider arguments against it, and to decide whether such arguments merit further public enquiry.

Briefly, our view is that copyrighting computer software would not be merely protecting the status quo by closing a loophole, but would amount to seizing a substantial amount of what is presently public property and enforcing a private monopoly over it. If such a step can be justified in the interests of some alleged, future, potential Australian software industry, then it should at least be publicly shown to be justified through the usual process of a public inquiry by the Industries Assistance Commission. Other forms of public inquiry may be appropriate, but certainly there can be no justification for emergency legislation in support of one side of a dispute without giving the other side an opportunity to be heard.

The "other side" includes not just the small handful of distributors of "fake Apples" and the like, but the much larger number of consumers of computer software — both those who are already treating it as "public domain" anyway, and those who have

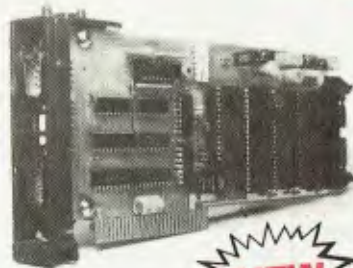
up to now paid monopoly prices through ignorance, but will now be able to benefit from free competition, unless prevented by new legislation.

We doubt whether continuation of the present situation would actually harm any existing Australian industry and note that the concern expressed so far appears to reflect a fear of Australia becoming an international centre for low cost uncopyright software. This would in fact be a new industry that should be encouraged rather than legally suppressed. Fear of competition from a new industry is not so overwhelmingly obvious a ground for legal protection that it should be accepted without inquiry. Particularly when the fear expressed is that an Australian industry might develop to meet the domestic market for, and to begin substantial export of, goods that are presently only available in Australia as imports. Usual claims for protection start from somewhat different, or even opposite assumptions.

The main argument however, is not the potential for new industry, but the benefit to consumers from continuing the present situation. As we understand it, the main benefits likely to flow from new technology, including computer software, do not relate to the existence of industries producing that new technology, but to the advantages of improved productivity etc. for those using it. If it could be shown that failure to provide copyright protection for computer software would in fact so inhibit its production that the opportunity to use it would itself be harmed, then that would be an argument in favour of copyright — an argument which should be justified by adequate evidence at a public inquiry. But if, as appears obviously the case in Australia at present, copyright would have more effect inhibiting consumption than it would

## ROBS COMPUTE

### RC — MULTICARD



AVAILABLE SOON

**\$220**  
inc tax

FREE DONKEY KONG  
with first 100 sold  
New Sound & Joystick  
features implemented

#### FEATURES

- ★ DUAL JOYSTICK INPUTS — standard Atari or Commodore type
- ★ TWO ADVANCED SOUND CHIPS giving six channels and eight octaves
- ★ REAL TIME BATTERY BACKED UP CLOCK supported in basic
- ★ VOICE SYNTHESIS CHIP — let your programs speak
- ★ 16 REAL WORLD Input/output channels. Buffered TTL Level. Now you can control lights, alarms, etc
- ★ SOFTWARE — All the software you need to implement these routines in Basic or Machine Code



### BROTHER HR15 DAISY WHEEL PRINTER

#### SPECIAL

**\$725** ex PARALLEL  
**\$395** ex SHEETFED  
**\$295** ex KEYBOARD  
**\$165** ex TRACTOR

## ON CONSTANT SALE (DUE TO POPULAR DEMAND)

COMPUMATE PRINTER CP80  
Compatible with Epson FT type III



NOW ONLY

**\$395** ex tax

**NEW LOW  
PRICE**  
QUOTE THIS AD.



# R CENTRE—HITACHI PRODUCTS

## AMAZING HITACHI PACKAGE



**\$1995** inc tax  
(even less with a green screen)

- HITACHI MB6890 (the Peach)
- HITACHI HIGH RESOLUTION COLOUR MONITOR
- HITACHI 3" POCKET FLOPPY DRIVE
- FREE — TYPING TUTOR  
— GRAPHICS PACKAGE  
— BASIC TUTOR  
— LETTER WRITER  
— DISK UTILITIES  
— 10 GAMES  
— TELEPHONE INDEX

CP-80  
PRINTER  
**\$395** with  
above package

### ALSO AVAILABLE

- 5" DS/DD DRIVES
- 8" DS/DD DRIVES
- CPM
- Please Phone for details

### HITACHI 3" POCKET FLOPPY DISK DRIVE (Includes Controller)

- Yes they have arrived
- SS/SD Pocket Floppy Disk can be flipped over to write on both sides (i.e. 160K per disk)
- Free Demo and Games Disk

WAS \$950

NOW **\$450** inc tax

### GENUINE HITACHI LIGHT PENS



MP-3700

WE HAVE NEW STOCKS, SO IF YOU MISSED OUT LAST TIME THEN THIS IS YOUR CHANCE

WAS \$330 NOW **\$125** inc tax

### RC 3550 DUAL 5" DS/DD DISK DRIVES

- Equivalent to Hitachi MP 3550
- Includes Controller (RC1802)
- 320K per Drive
- Free Games Disk
- Uses Hitachi Bare Drives in Australian Package

**\$1395**

### RS 232 CARD

ADDITIONAL RS232 CARD FOR HITACHI MB6890 (PEACH)

WAS \$386 NOW **\$125**

### CENTRONICS CARD

ADDITIONAL CENTRONICS PRINTER CARD FOR THE HITACHI MB6890

WAS \$358 NOW **\$135**

### HI-STAR DISK (For HITACHI PEACH DS/DD)

- GRAPHICS AID (HI-DRAW)
- TYPING TUTOR (HI-TYPE)
- BASIC TUTOR (Teaches you BASIC)
- QUICK WRITER (Simple On-Screen Letter Writer)
- DISK UTILITIES (Easy to use Disk Utilities in English)

**ALL ON ONE DISK \$49.50** inc tax

**nots**  
COMPUTER CENTER

We'll put you in touch with the best brain in the business

**295 Thomas Street,  
DANDENONG, 3175 Phone: (03) 791 2900**

# T.N.L. COMPUTERS.

Phone and Mail Order Printer Warehouse.

## RETAIL PRICE BREAKTHROUGH.

Incredible Price Reduction on Australia's Top  
Selling Printers.

**Amust DT80 Dot Matrix**  
80 CPS/80 Col Parallel      **\$ 350.00** Inc Tax

**C.ITOH 1550 Dot Matrix**  
120 CPS/136 Col Serial/Parallel      **\$1150.00** Inc Tax

**Brother HR15 Daisywheel**  
13 CPS/13.5" Carriage Parallel  
Ask about Accessories and Prices      **\$ 795.00** Inc Tax

**C.ITOH F-10 Daisywheel**  
40 CPS/136 Col Parallel      **\$1885.00** Inc Tax

**90 Days Warranty**

**You Know The Product**

**Now You Know Where To Get The Best Price.**

**13 Tarawara Avenue,  
TALLAI 4213.**

**Ph: (075) 30 4777.**

# COMMUNICATIONS

have stimulating production, there are no grounds for even bothering to inquire into the matter - who needs it?

Our own organization for example, makes use of a considerable amount of uncopyrighted computer software which has been made available to us entirely free of any direct or indirect charge. Although this software displays messages asserting that it is copyright, and although we have seen advertisements making similar claims and charging thousands of dollars for "licences" to use this public property, we have not thought it appropriate to take any action under the Trade Practices Act or the Copyright Acts s.202.

We have been content to rely on the fact that there is no copyright for computer software in Australia, and on the assumption that we would have the opportunity to present our case if any serious moves were made to change that situation. This situation is obvious to anyone perusing the Copyright Act, which explicitly restricts "writing" to works in a "visible form", and is a fact which must be well known within both the legal profession and the computer industry, since long before the recent Apple case. Comments have been made on this situation in legal textbooks and journals (see Lahore, J. "Intellectual Property in Australia" and the associated update service from Butterworths), and submissions have been made against it from the computer industry to the Attorney-General Department's review of audiovisual copyright laws. Accordingly, nobody can pretend that there is some new, "emergency" situation that would justify urgent action without a public inquiry.

If other people want to make *ex gratia* payments to encourage the production of further high quality software that may be very commendable on their part, although

our own orientation, as you know, is towards public funding of social services rather than private charity. If software suppliers wish to make misleading statements to encourage donations, that is less commendable, but perhaps understandable, given the absence of an acceptable system of public funding such as is used to finance scientific research, literature, the arts etc. (Our own obligations to properly account for our funds have prevented us making any such donations, without compelling us to do anything further about it.)

But if someone wants to actually make it *illegal* for us to continue using what was previously in the public domain, then we have no choice but to fight back.

Our organization simply cannot afford to pay the thousands of dollars that would become due if software we are using was to be taken out of the public domain. Current plans for an expansion of computer usage among our many affiliated organizations would be severely retarded. At the very least we would expect compensation to cover our present and future losses. If such compensation were not provided, it would create requirements for additional funding just to cover the same level of activities that we are able to sustain at present.

We know a similar situation is widespread in the education sector, where the "fake Apples" that Apple has been trying, unsuccessfully to stamp out, have enabled schools to buy something like two or three times as many computers as they would be able to afford if they had to pay Apple's monopoly prices. As for software, schools simply don't have the funds to buy it, and have therefore had no choice but to permit or encourage widespread copying (whether they knew this was legal or not).

If new legislation is con-

## PRESENTING — EASY DESK

### THE LOW COST MOBILE COMPUTER DESK

A quality product at a price you can afford

- ★ Made in AUSTRALIA      ★ Easy assembly
- ★ For use in the home, office, at work or in the class room.      (IDEAL GIFT!!)

- ★ Packed in cardboard box
- ★ Laminated in teak
- ★ Sturdy steel construction
- ★ Solid castors
- ★ Courier delivers to your door
- ★ Dealers' enquiries welcome
- ★ Cheques,
- ★ Bankcard
- ★ Money orders, payable to:



### HOME COMPUTERS

**160 MAIN ROAD (BURWOOD HWY) UPPER  
FERNTREE GULLY 3156 Telephone: 758 2124**

Name .....  
 Address ..... State ..... Postcode .....  
 Bankcard ..... Signature .....  
 Cheque enclosed       Bankcard



# Learning is a snap!



## **Microcomputer software that makes learning fun for all ages.**

Fast action and colourful animated screen displays motivate children of all ages to learn fundamental maths, reading and language skills.

Our DLM Skill Builders in Maths and Language Arts combine computer game fun with sound educational principles. Each of the twelve programs allows for variable levels of difficulty, speed and running time, and the content is all-Australian. A child never outgrows DLM software!

The DIRECT Helper Remedial Reading Scheme is our very special contribution to the large percentage of Australian children with a reading disability. The DIRECT Helper Scheme is highly motivating for the child and is now acclaimed in schools and homes throughout Australia.

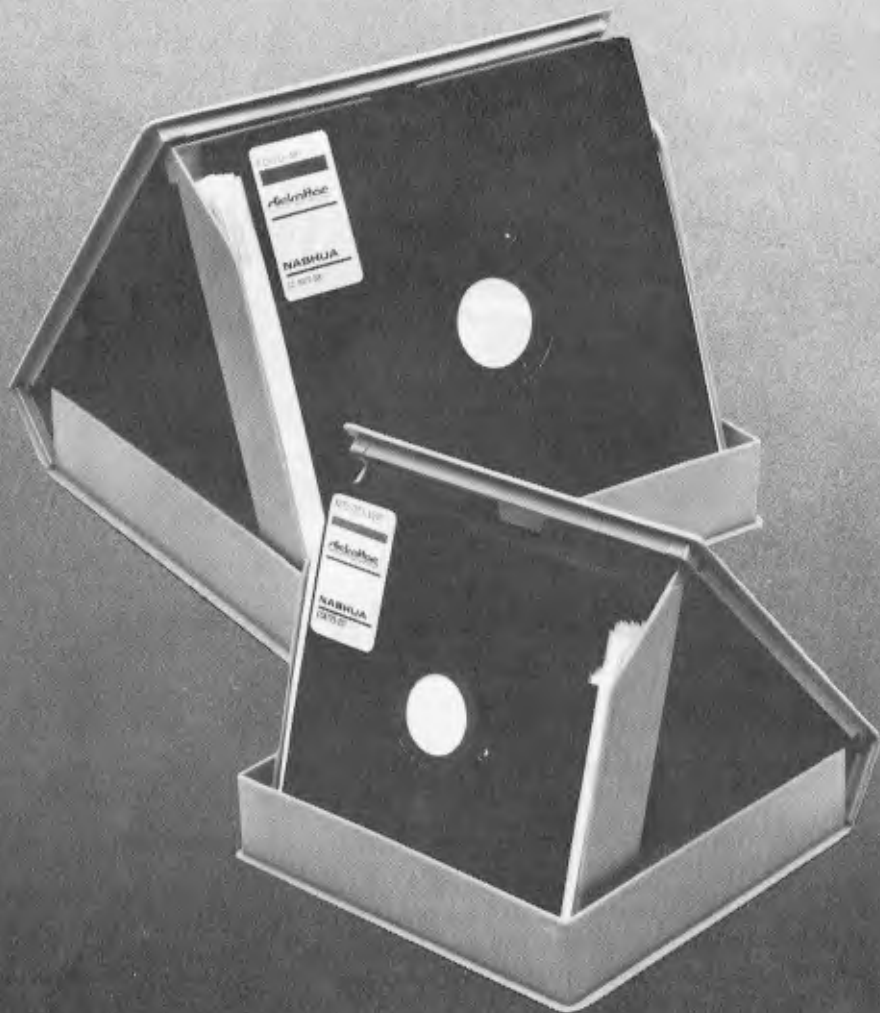
If you have an Apple II/Ile, Commodore 64, Atari or IBM-PC (with disk drive) you should take a close look at our DLM and DIRECT Helper programs. See your local computer store or contact Dataflow for a free colour brochure and the address of a supplier near you.

# **dataflow**

Computer Services Pty. Ltd.

6-8 Elizabeth Street, BURWOOD N.S.W. 2134 Phone: (02) 745 3303

# "Quality Circle" Diskettes



# NASHUA

## Computer Disc Division

Sydney: (02) 439 5966, Melbourne: (03) 428 0501,  
Brisbane: (07) 369 4244, Adelaide: (08) 42 0021,  
Perth: (09) 325 5722, Darwin: (089) 81 6204,  
Auckland: 33193, Port Moresby: 21 2277



# COMMUNICATIONS

templated, it would at least be necessary to provide appropriate exemptions for educational institutions, community organizations etc, and to set up appropriate machinery as has been done in the present Act to cover photocopying and broadcasts. We would of course wish to be consulted in framing any such legislation, to ensure that the restrictive regime now being imposed in the United States does not get imported here without discussion, as though it were something "uncontroversial".

No doubt the temptation would exist to resolve these problems by groups concerned simply ignoring any new legislation, but that is hardly an argument in favour of adopting such legislation, and it may not be practical in view of the aggressive attitude currently displayed by Apple.

Finally, we are not unsympathetic to the problems faced in establishing an Australian software industry without copyright protection, and we are prepared to support some form of assistance to the industry. Our concern is that the form of assistance currently being proposed is totally inappropriate, while other forms of assistance, such as public funding of software research and development, could actually be more beneficial to any software industry itself, as well as imposing no penalties on users.

The kind of assistance currently being demanded by "industry representatives" is equivalent to an extremely high rate of tariff protection, which would not usually be considered appropriate in a situation where the overwhelming bulk of a product consumed in Australia is imported, and the overwhelming bulk of that same product produced in Australia is produced for export. Our own experience is that software packages we find useful are all produced outside Australia, and no equivalent

Australian packages exist - protected or otherwise.

Most industries would think it rather breathtaking to get a 100% tariff since that means that Australian consumers are being compelled by law to pay twice as much for goods they would otherwise be able to get for half the price. Imposing a substantial monopoly price on goods that would otherwise be virtually free, amounts to a record tariff protection of several thousand percent (indeed theoretically, an infinite tariff rate).

No doubt a decent size Australian air bottling industry could be established if laws compelled people to breathe only Australian bottled air by prohibiting the inhalation of free air that may have blown in from elsewhere, but fairly compelling arguments would be needed to convince many people of the need for such an industry.

## Interconnecting Apple

Dear Sir,  
I read with interest the report by Guy Kewney on "Apple expander" (page 7, November, Printout).

Both Apple Australia and NetComm are still maintaining a fairly low profile on the interconnectability of the Apple II (II+, IIe) and Apple III. However as of Comdex Fall in Las Vegas last week, the "Apple Communications Protocol Card" (ACPC) is a live announced product. "ACPC" is the official Apple name for our NetComm card.

You can thus now expect to see more details of Apple to Apple connection (using the IBM 2780/3780 protocol).

However, and please tell Guy, there certainly *is*, right now, a way of passing information from one Apple to any other Apple (II or III) (using

# DATASCAPE

— "The Printer Specialists"

For Sales and Service of

 **Anadex**

**NEC**  
**NDK**

Printers Australia wide



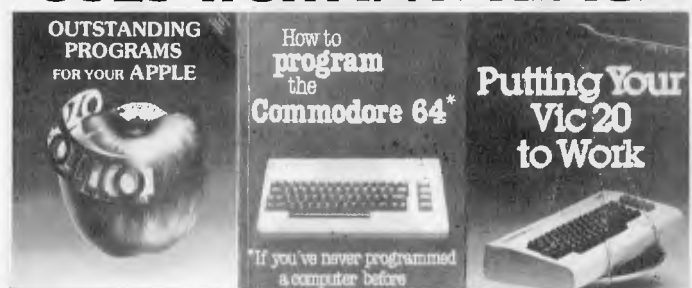
**Datascap Int. Pty. Ltd.**

**Sydney Office:**  
33 Grosvenor Street, Neutral Bay Junction N.S.W. 2089  
Telephone: (02) 909 1233, Telex: AA71150

**Melbourne Office:**  
27 Raglan Street, South Melbourne, Vic. 3205.  
Telephone: (03) 890 3622, Telex: 30458.

**Brisbane:**  
(07) 371 7366  
**Adelaide:**  
(08) 332 8666  
**Canberra:**  
(062) 80 5283  
**Hobart:**  
(002) 72 8622

## MORE GREAT COMPUTER GAMES & USES from INTERFACE



Available from your bookseller or direct from Pitman Publishing.

APPLE

COMMODORE 64

VIC 20

- |  |             |
|--|-------------|
| How to Program the Apple*  | rrp \$18.95 |
| Designed for the novice, this book can teach you how to program in just a few hours. |             |
| Outstanding Programs for Your Apple  | rrp \$18.95 |
| Games, education, utilities and dazzling graphics demonstrations.                    |             |
| Putting Your Vic 20 to Work  | rrp \$14.95 |
| Fifteen major programs for home and business applications.                           |             |
| How to Program the Commodore 64*   | rrp \$15.95 |
| A simple guide to programming which assumes no prior knowledge of computing.         |             |

# LOAD 80

FOR TRS-80\* MOD I & III  
AND SYSTEM 80

**NEW**

# + INSTANT COCO

FOR TRS-80\* COLOR  
COMPUTER

Replacing **COLOR LOAD 80**  
Available from January 1984

YOU HAVE READ  
80 MICRO AND HOT COCO  
FOR THE UNIQUE PROGRAMS

★ ★ **NOW** ★ ★  
**USE A CLOAD**

AND SAVE HOURS OF TYPING  
AND FRUSTRATION  
ALLOW 14 DAYS DELIVERY

**CASSETTE**  
**LOAD 80**  
**OR INSTANT COCO**  
**ONLY**

**\$19.95** EA.

(Back issues avail-  
able on request)

\*TRS-80 & Color Computer are Trademarks of Radio Shack, Tandy Corp.

### I WISH TO ORDER

**Load 80**     Nov 83     Dec 83     Jan 84     Feb 84

**Instant Coco**     Jan 84     Feb 84

My Cheque/Money Order is enclosed \$.....

Name: .....

Address: .....

Phone: .....

Post & Packing \$1.00 Per Cassette

## AUSTRALIA COMPUTER SOFTWARE

P.O. BOX 450, MALVERN, 3144 VICTORIA

PHONE: (03) 20 4947    DEALER ENQ WELCOME

## THE DROUGHT HAS BROKEN



Formats available  
for most CPM  
Computers

### PLUS:

CASHBOOK 2.0 - Cashbook Accounting Programme  
with Cheque Writer only \$300.

INFO MANAGE 1.4 - Easy to use powerful new Data Base  
only \$279.00

Available from:

## Country Soft Pty Ltd

U6/62 Burswood Road, Victoria Park, W.A. 6100

Phone: (09) 362 6416

## COMMUNICATIONS

the above protocol), either by local or remote telephone connection. Any DOS 3.3 file may be sent, and stored, on Apple ///s under SOS and vice-versa.

Quite what one would do with Applesoft under SOS or a SOS.KERNEL file under DOS 3.3 is for the user to decide. Text file transfer is far more probable.

Please don't let your users get the wrong idea. There is a way to pass information from Apple II to Apple ///. Finally, keep up the excellent quality of your magazine.

C.E. Howells,  
Managing Director,  
Data NetComm.

Unfortunately, matching up TVs and micros is very much a hit-and-miss affair. In my experience, Sony sets seem to work with just about any machine.

A colour monitor would undoubtedly give a better picture than a television set since monitors accept a direct video input, whereas a TV set needs to be tuned in. Monitors give a steadier picture, sharper definition and more accurate colours. And TV sets are - after all - designed for use as TV sets, not as computer monitors.

Not all machines have a video-outline for use with a monitor, so you will need to check whichever machines you have in mind. There are also TV sets with a direct video input as well, these having a 'monitor channel'.

## Colour display

I am considering buying my first home computer which would be used for games and hobby, but it must be capable of giving sharp, clear, steady display on the screen, preferably in colour.

Could you please advise if my Sony 18in colour TV - which gives excellent definition - would give equally good display from, say, an Atari games program (if available in colour), or colour graphics.

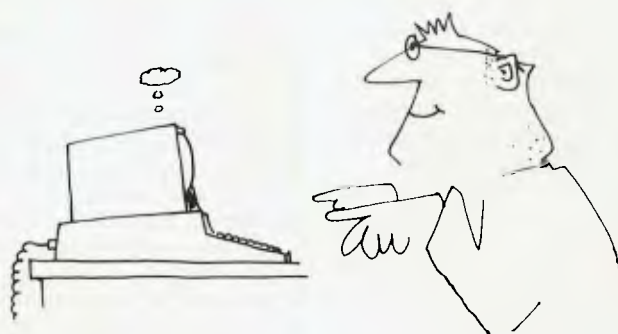
Alternatively, would a 12in VDU give a higher quality display than a 12in TV in the same price range?

DF Kerr,

You need to tread carefully here, however, since some TV sets have a channel marked 'video' or 'monitor' which turns out to be nothing more than an extra TV channel.

Assuming your machine has a video output, the choice is very much a personal one. Try your TV set first, and if you're not happy with the quality then try a monitor. Monitors do not, however, come cheap. They generally start at around \$500 and cannot - of course - double as TV sets.

Surya



'A penny for your program.'



# AUTOCAD\*

## COMPUTER AIDED DESIGN



### On The NEC Advanced Personal Computer

AutoCAD is a general purpose system, suitable for a wide variety of applications, including architectural and landscape drawings, drafting for mechanical, electrical, electronic, chemical, structural and civil engineering, and printed-circuit design. A sketch facility allowing free-hand drawings via a digitizer makes the system most suitable for graphic artists as well.

**NEC**

NEC Information Systems Australia Pty. Ltd.  
99 Nicholson Street, St. Leonards, NSW 2065. Tel: (02) 438 3544  
11 Queens Road, Melbourne, VIC. 3004. Tel: (03) 267 5599  
307 Queen Street, Brisbane, QLD. 4000. Tel: (07) 229 6777

**ENTERCOM**  
COMPUTER CO.

ENTERCOM COMPUTER CO. is the authorised distributor of AUTOCAD.  
136 Bridge Road, Richmond, VIC. 3121. Tel: (03) 428 5714, (03) 429 5883

Official AutoCAD software for the NEC APC must be registered through ENTERCOM COMPUTER CO. to protect the copyright conditions of the originating supplier being AUTODESK.

\*AUTOCAD is a registered trademark of AUTODESK INC.

# INTERFACING THE APPLE

*RC Baker presents his design for an interface unit which makes full use of the games input/output socket on the circuit board given here for the Apple II. All the components are listed, together with a program to demonstrate the interface in action.*

The Apple II has a number of inputs and outputs which are dedicated to 'games' purposes. These I/O facilities are provided on a 16 pin DIL socket on the top right of the Apple's PCB and are as follows:—

**Apple Reference**

- 3 off push button (single-bit) inputs  
PB0, PB1, PB2
- 4 off variable (analogue) inputs  
GCO, GC1, GC2, GC3
- 4 off switch outputs  
AN0, AN1, AN2, AN3

The single-bit inputs can be used with switches to provide inputs to the Apple; the analogue inputs can be used with

switches to create more single-bit inputs, or with variable resistors to provide games paddles. The switch outputs are TTL signals, and change from high to low or low to high when the output memory locations are referenced. These will drive lamps, relays, etc, via a simple transistor interface.

I have devised an interface unit which tries to make the most flexible use of these inputs and outputs for games and other 'non-keyboard' software. The circuitry used in my interface is more complex than necessary, for a number of reasons, and hence a simplified circuit diagram (Fig 1) is

given which is adequate for the program described below.

The interface plugs into the DIL socket on the Apple, and provides the following on its facia panel:

- 3 push button switches A, B, and C
- 4 illuminated push button switches 1, 2, 3, and 4,
- 1 DIN 5 pin socket for connecting three games paddles
- 1 DIN 6 pin socket for driving external relays, etc.

The lamps in the illuminated switches are driven from the outputs AN0-AN3.

The circuit diagram shows the layout of

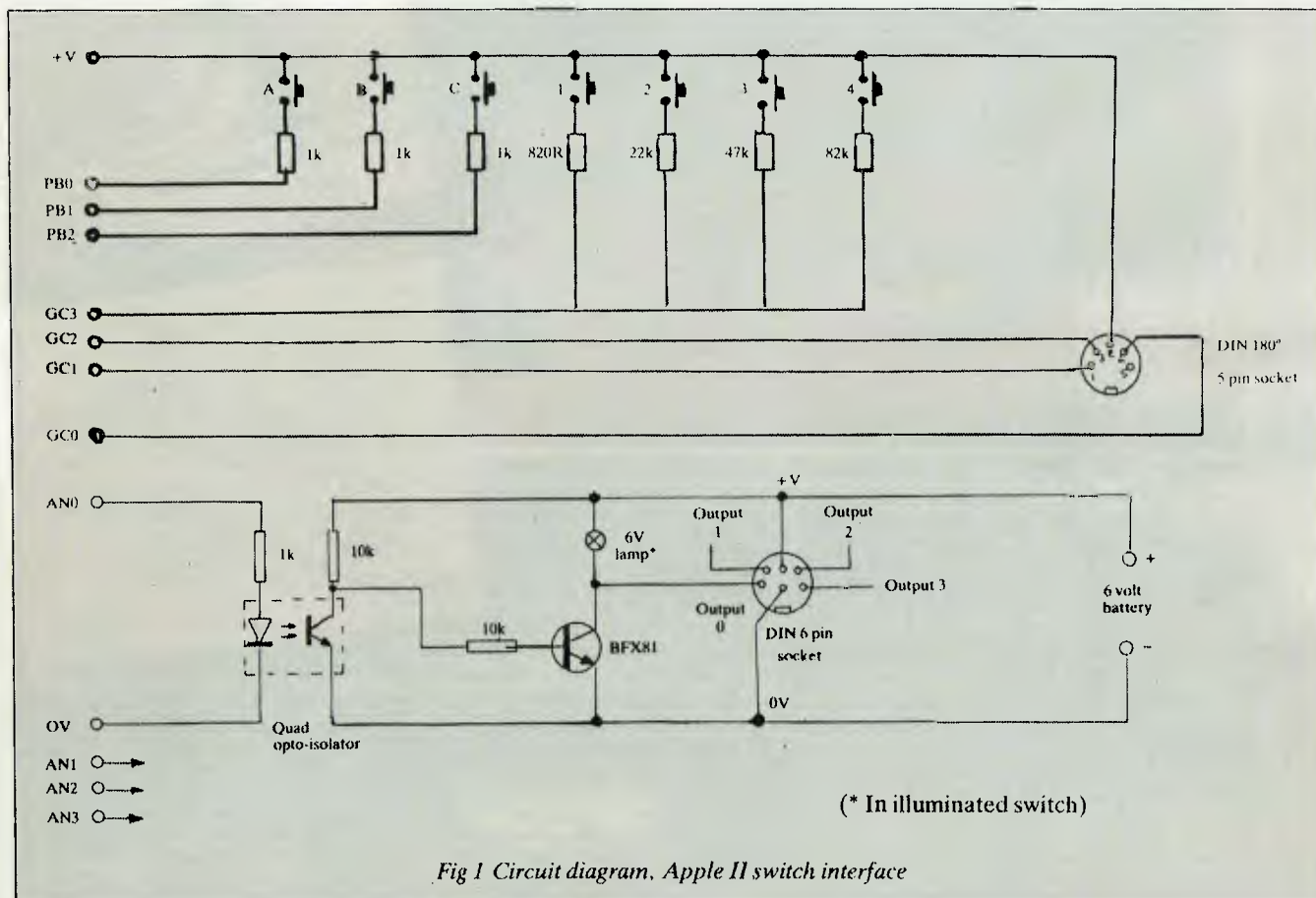


Fig 1 Circuit diagram, Apple II switch interface



the interface, from the 16 pin DIL Apple socket to the front panel switches. The circuit may be battery powered (6 volt) or driven from a mains power supply as in my unit. This is shown in Fig 2. Fig 3 shows a front panel layout which can be used, although this can be varied to suit the individual, and may be dependent on the box used to contain the interface.

The switch inputs A, B, and C, are straightforward, being connected directly to the appropriate Apple inputs. The 1k resistor provides a suitable current-limiting device between the Apple's five volt supply and the input. Analogue input GC3 is used to provide the switch inputs 1, 2, 3, and 4. Each switch has a different value resistor and hence presents a different value on the analogue input. The only drawback with this is that the Apple cannot correctly interpret two or more of these switches if pressed simultaneously — this does not present a problem in the program described below.

Games paddle inputs GC0, GC1 and GC2 are taken to the 5 pin DIN socket, together with the +5 volt supply from the Apple. Games paddles and/or joysticks

can now be plugged in at this point. Note that the normal value of variable resistor is 150k, which gives readings from 0 to 255 depending on its setting. Larger values than 150k will have no effect (ie, 255 will be returned), whereas smaller values will reduce the upper limit (for example, a 10k variable resistor will present a maximum reading of 23 to the Apple).

The outputs from the Apple are optically isolated to prevent possible damage to the computer if a peripheral device were to short circuit or fail. A quad opto-isolator IC is used to provide this protection — for clarity only one of the outputs is shown — the others are identical, using the other channels of the opto-isolator and a driver transistor each. The transistor chosen will switch several hundred milliamps without difficulty.

The unit described here can be easily constructed by anyone who has some familiarity with electronic assembly, and there should be no difficulty in obtaining components and a suitable case. Note that the construction method and layout is not important — a small piece of veroboard will take all the components, and ribbon

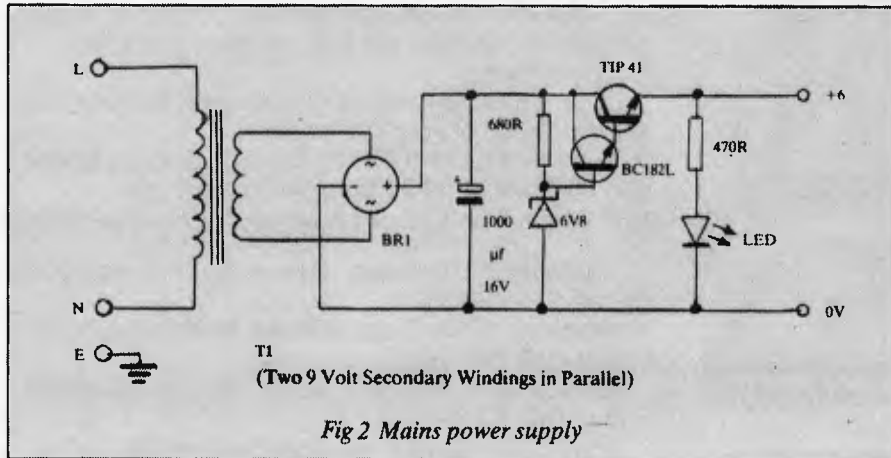


Fig 2 Mains power supply

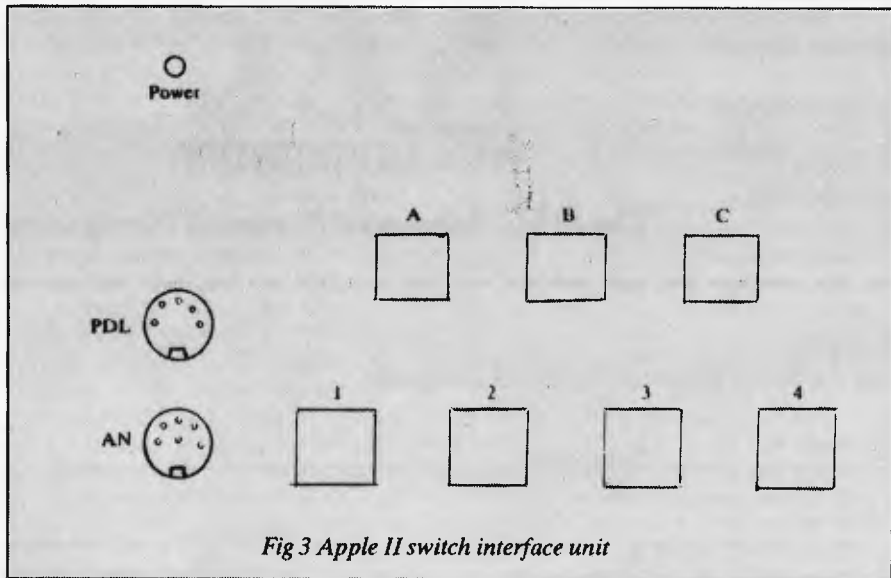


Fig 3 Apple II switch interface unit

# Zygotech

now offers  
at a special introductory rate

## BOOK KEEPER

A Brilliant new Australian designed, developed and supported Small Business System

## BOOK KEEPER

A comprehensive, fully integrated package incorporating

- Accounts Receivable
- Accounts Payable
- General Ledger
- Stock Control

## BOOK KEEPER

- Brilliant new design
- Full of new concepts
- Easy to use documentation
- Proven and already in use

Spend more time on your business and less time with your books

Available for all CP/M MP/M CP/M86 MP/M86 & MSDOS systems and all popular 5 and 8 inch formats

Orders received by 30 April 1984

\$700

Normal price \$850

For more information and a demonstration of

## BOOK KEEPER

call 762-7103  
or write

Zygotech Pty. Ltd.  
GPO Box 2647X  
Melb 3001

Name .....  
Company .....  
Address .....  
Phone No. ....



# THE BRAIN.



The NEC Advanced Personal Computer comes complete with both MS-DOS and CP/M-86 operating systems. It features advanced business processing capabilities with a wide range of application software available – excellent communications and superb graphics in colour or mono. We believe it has no true competitors.

The NEC Advanced Personal Computer is very simply the "State of the Art" personal computer. The Brain.

Use yours right now and arrange a demonstration to stay ahead of your competition.

Phone toll free (008) 22 6344 (in Sydney phone 438 2322) or send the coupon below.

**NEC Information Systems Australia Pty. Ltd. (Inc. N.S.W.)**  
— NEC COMPUTERS —

*Sydney:* 99 Nicholson Street, St. Leonards 2065.  
Phone (02) 438 3544.

*Melbourne:* 11 Queens Road, Melbourne 3004.  
Phone (03) 267 5599.

*Brisbane:* 8 Campbell Street, Bowen Hills 4006.  
Phone (07) 52 8544.

*Perth:* 67 Adelaide Terrace, Perth 6000.  
Phone (09) 325 6988.

ONLY NEC COULD DO IT. The thinking business-man's personal computer. It's so smart we call it The Brain.

And if you want to get ahead in business all you need do is use your Brain.

It does things that are the envy of other personal business computer makers.

All for an extraordinarily competitive price. It has 16 bit processing ability, that's just become the industry standard of comparison.

# NEC

## NEC Corporation

Tokyo, Japan

*The NEC Advanced Personal Computer*

---

To NEC Information Systems Australia Pty. Ltd.  
Please send me more information about the NEC Advanced Personal Computer.

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

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

Garland, Farwagi & Shillington NEC 1389C



# NEC'S ADVANCED PERSONAL COMPUTER SOFTWARE

**BUSINESS SOLUTIONS  
AVAILABLE NOW.**

## Financial Modelling & Statistical Analysis

MICROMODELLER	MS-MULTI-TOOL BUDGET
MICROPLAN	MS-MULTI-TOOL FINANCIAL STATEMENT
SCRATCHPAD-86	MASTERPLANNER
SUPERCALC 86	ABSTAT
MARS	
MS-MULTIPLAN	

## Accounting

IMS (Ascent) & (Executive)	CARPE
DAVIDSON	SYBIZ
I.A.L.	PADMEDE
ATTACHE	AKKOUNTANT

## Industry Specific

Restaurant Accounting System	Insurance
Real Estate Management	Service Station
Management Simulation	Accounting
Taxation Preparation	Auctioneers
Swimming Pool Chemical	Newsagents
Retailing	Travel Agents
Medical Billing & Accounting	Smash Repairers
Video Rental	Builders
	Retail Stores
	Spare Parts Dealers

## Word Processing

BENCHMARK	SPELLBINDER-86
WORDSTAR 86	OK EDITOR

## Data Management

dBASE II	RESCUE
DATAFLEX	FMS-86
DMS-DELTA	FRIDAY
CONDOR-86	

## Graphics

AUTO-CAD	GRAPHWRITER
GRAPHPLAN	VIDEOGRAPH

## Operating Systems

MS-DOS	Concurrent CP/M-86
CP/M-86	UCSD p-System

## Programming Languages

Personal Basic, R.M. COBOL, C BASIC-86, C.B.-86, PASCAL M.I.F.-86, Speed Programming Package for Pascal M.I.F.-86, CIS COBOL-86, DRI C-86, PL-1-86, SSS FORTRAN-86, CONTROL C BASIC, SUPER SOFT C-86, PASCAL M-86, LANUS ADA-86, Computer Innovations C-86, MS-BASIC, MS-BASIC COMPILER, MS-BUSINESS BASIC COMPILER, MS-PASCAL, MS-FORTRAN, MS C, MS-COBOL

**PHONE TOLL FREE 008 226344  
(IN SYDNEY PHONE 438 2322)**

# NEC

FOR MORE INFORMATION ABOUT SOFTWARE FOR YOUR APPLICATION

**NEC Corporation**  
Tokyo, Japan

Australian Personal Computer Page 37

STAND  
700  
Australian  
Personal Computer  
Show, March 14-17, 1984

# Only an Atari® 800XL™ Supercomputer™ can give you all this...

- Built-in Memory: 64K RAM
- Programs available\*: More than 2,000
- Programming Languages: 8
- Full-size, Full-stroke Keyboard
- Help Key
- Processor Bus
- Text Modes: 5
- Text Display 40 x 24
- International Characters
- Graphics Modes: 11
- Graphics Resolution: 320 x 192
- Colours: 256
- Graphics Characters
- Sound Voices: 4
- Music Synthesis
- CP/M\*\*\* Option
- Self Test
- Full Range of Atari Peripherals available.

## ATARI® 800XL™ Home Computer



### We'll show you the way

Available from leading Atari stockists.



Atari 800XL is distributed by Futuretronics Australia Pty. Ltd.

Victoria/Tasmania (03) 579 2011 New South Wales (02) 517 2300 N.S.W. Hamilton (049) 69 6733  
Queensland (03) 579 2011 South Australia (08) 297 5388 Western Australia (09) 478 2044

\*All products may not be available in Australia at time of printing. ® & TM are trademarks of Atari or Futuretronics Australia Pty. Ltd. \*\*\*CP/M is a trademark of Digital Research Group. †Tentative title.

CONCORD 8998



```

1 REM * SIMON SAYS *
2 REM * BY *
3 REM * R.C.BAKER *
4 REM * C.1983 *
5 HOME : VTAB (5): PRINT TAB (15)"SIMON SAYS": PRINT TAB (15)"-----"
6 VTAB (20): PRINT "YOU MUST FOLLOW SIMON'S SEQUENCE OP": PRINT "LIGHTS AND SOUNDS TO WIN!!"
7 FOR A = 1 TO 5000: NEXT : GOSUB 10100
10 DIM X(40): LC = - 16290:LN = - 16289:B1 = - 16287:B2 = - 16286:B3 = - 16285
12 DEF FN A(X) = 2 * (X - 1)
13 CL = 49264
15 FOR A = 1 TO 4: POKE LC - FN A(A),0: NEXT
20 HOME : PRINT "SIMON SAYS USES THE APPLE SWITCH UNIT.": PRINT : PRINT "BUTTONS A, B, AND C DETERMINE THE SPEED": PRINT : PRINT "AND SEQUENCE LENGTH - A IS SLOWEST/"
21 PRINT : PRINT "SHORTEST, AND C THE FASTEST/LONGEST ": PRINT : PRINT "TO START THE GAME, PRESS EITHER A, B, OR": PRINT "C WHEN THE RED 'LENGTH?' LAMP COMES ON"
22 PRINT : PRINT "AND THEN AGAIN WHEN THE YELLOW 'SPEED?": PRINT : PRINT "LAMP COMES ON. THE GREEN LAMP WILL THEN": PRINT "COME ON, WHICH MEANS THAT YOU "
23 PRINT : PRINT "GOOD LUCK!"
30 POKE LO - 6,0: GOSUB 250:LN = X * 10: POKE LC - 6,0
33 FOR X = 1 TO 500: NEXT
35 POKE LO - 4,0: GOSUB 250:G = X: POKE LC - 4,0
38 FOR X = 1 TO 500: NEXT
40 POKE LO,1: IF PEEK (B1) < 128 THEN 40
45 SPD = 255: POKE LC,0: FOR X = 1 TO 100: NEXT
50 SPD = 255:X = INT ( RND (1) * LN): IF X < .5 * LN THEN 50
70 FOR A = 1 TO X
80 X(A) = INT ( RND (1) * 5): IF X(A) < 1 OR X(A) > 4 THEN 80
90 AS = AS + STRS (X(A)): NEXT
100 FOR A = 1 TO LEN (AS):SPD = SPD - G * 3
110 FOR B = 1 TO A:C = VAL ( MID$ (AS,B,1))
120 POKE LO - FN A(C),1: POKE 769,SPD: POKE 768,C * 20 + 100: CALL 770: POKE LC - FN A(C),0
130 NEXT B: FOR B = 1 TO A:C = VAL ( MID$ (AS,B,1)): POKE = 16368,0
140 POKE CL,0: IF PDL (3) > 250 THEN 140
142 POKE CL,0:Z = PDL (3)
144 IF Z < 30 THEN Z = 4: GOTO 150
145 IF Z < 60 THEN Z = 3: GOTO 150
146 IF Z < 110 THEN Z = 2: GOTO 150
147 Z = 1
150 IF Z = C THEN 200
160 POKE 768,240: POKE 769,250: CALL 770: HOME : PRINT "YOU GOOPED!!!!!"
165 PRINT : PRINT "YOU GOT TO NOTE 'A,' OUT OF "; LEN (AS)
170 VTAB (20): PRINT "DO YOU WANT ANOTHER GO? (X) ";: POKE = 16368,0: GET Z
180 IF Z < > "Y" THEN PRINT : PRINT CHR$ (4);"RUN HELLO"
190 CLEAR : GOTO 10
200 POKE 768,C * 20 + 100: POKE 769,SPD: POKE LO = FN A(C),1: CALL 770: POKE LC - FN A(C),0
210 NEXT B: FOR Z = 1 TO 1000: NEXT : NEXT A
220 FOR X = 1 TO 10: POKE 768,80: POKE 769,20: CALL 770: POKE 768,120: POKE 769,20: CALL 770: NEXT
230 HOME : PRINT "YOU DID IT!! WELL DONE!"
240 PRINT : PRINT "THE SEQUENCE LENGTH WAS ";A - 1: GOTO 170
250 IF PEEK (B1) > 127 THEN X = 1: RETURN
260 IF PEEK (B2) > 127 THEN X = 2: RETURN
270 IF PEEK (B3) > 127 THEN X = 3: RETURN
280 GOTO 250

10100 POKE 770,173: POKE 771,48: POKE 772,192: POKE 773,136: POKE 774,208: POKE 775,5: POKE 776,206: POKE 777,1: POKE 778,3: POKE 779,240: POKE 780,9: POKE 781,202
10110 POKE 782,208: POKE 783,243: POKE 784,174: POKE 785,0: POKE 786,3: POKE 787,76: POKE 788,2: POKE 789,3: POKE 790,96: POKE 791,0: POKE 792,0
10120 RETURN

```

**NEW  
TO  
AUST!**

# THE BEST DEAL IN YEARS

★ THE USA'S No. 1 WORD PROCESSING PACKAGE  
FOR COMMODORE 64™ COMPUTERS SPECIFICALLY  
DESIGNED FOR THE INEXPERIENCED USER.

★ FEATURING A 16,000 WORD BUILT-IN DICTIONARY  
★ PLUS 4 FREE MACHINE LANGUAGE GAMES

1. ROAD TOAD 2. CHICKEN CHASE 3. BUG BLAST 4. ZOMPY STOMP (VALUE \$80)

Over 30,000 of the WORDPRO PLUS wordprocessing packages have been sold WORLDWIDE. They are a proven product and are unquestionably the NO. 1 selling software package for Commodore Computers. With a built-in dictionary of 16,000 words the WORDPRO PLUS will turn your Commodore Computer into a sophisticated time-saving word processing tool and yet has been SPECIFICALLY DESIGNED FOR THE INEXPERIENCED USER. It has ALL THE FEATURES FOUND IN MORE SOPHISTICATED EQUIPMENT including: Auto page numbering, headers and footers, math functions, global search and replace, can create multiple personalised letters, underlining, boldface, super and subscripts. With 4 FREE, top quality games this really is THE BEST DEAL IN YEARS.

DEALER ENQUIRIES WELCOMED

**LIMITED SUPPLY ONLY! ORDER NOW!**

NORMAL RETAIL — \$260.00!

**YOUR PRICE**  
**\$160**

To receive this special offer  
by **RETURN MAIL**  
Send Cheque, Money Order or  
Bankcard Number (with expiry date  
and signature) to:  
**MICRO INTERNATIONAL P/L**  
**G.P.O. BOX 2427**  
**ADELAIDE, S.A. 5001**  
Tel. (08) 333 0110  
(Please add \$5.00 for post)

# LOOK



## AT LAST! A quality portable at the right price!

**That's right, a professional,  
quality portable at the right  
price – just look at  
the reasons why.**

- A huge 9 inch High Resolution amber phosphor screen with 80 column as a standard feature.
- Two high capacity 500K slim line floppy disk drives.
- Integral ports for printer, modem and mouse.
- Detachable, low profile IBM-style keyboard.

The TeleVideo Professional Portable computer comes with all the software needed by the businessman on the move – CP/M® 2.2 Operating System with Digital Research GSX-80™ graphics extension, word processor, spreadsheet and business graphics.

Only TeleVideo can offer you a growth path – 64K of user RAM expandable to 128K with CP/M+® and an optional RS422 port to connect to a TeleVideo multi-user network system.



**“Who else can offer you a portable with such a big future for \$3445 including tax.”**

P.S. You should see the brilliant graphics!!

 **TeleVideo Systems, Inc.**

For more information and the name of your nearest dealer, contact Data Peripherals Pty Ltd.

9 Avon Road, North Ryde NSW 2113. Phone (02) 888 5733

Victoria (03) 598 5111

Queensland (07) 287 1200

New Zealand (09) 49 1303



Components	Recommended supplier	Part number	
3-off Push Button Switch	RS Components	336-602	
4-off Illuminated Push Button Switch	Verospeed	63-22189L	Switch
	Verospeed	63-22199F	Pack 5 coloured inserts
	Verospeed	63-22511k	6 Volt Lamps
	Verospeed	89-21767C	
1-off Quad Opto-Isolator IC	RS Components	294-659	
4-off BFX85 Transistor	RS Components	131-255	Pack 10
7-off 1k Resistor, 5%	RS Components	131-378	Pack 10
8-off 10k Resistor, 5%	RS Components	131-249	Pack 10
1-off 820R Resistor, 5%	RS Components	131-457	Pack 10
1-off 47k Resistor, 5%	RS Components	131-485	Pack 10
1-off 82k Resistor, 5%	RS Components	131-413	Pack 10
1-off 22k Resistor, 5%	RS Components	478-295	
1-off 6 Pin Din Socket	RS Components	478-273	
1-off 5 Pin 180° Din Socket	RS Components	433-826	
Veroboard			
Case with or without Battery—To Suit			
<b>Power Supply (Optional)</b>			
1-off Mains Transformer, 9 Volt Secondary	Verospeed	89-21550D	
1-off Bridge Rectifier 50V Lamp	Verospeed	253-25508F	
1-off Zener Diode, 6.8 V, 500mW	Verospeed	253-26015H	
1-off TIP41 Transistor	RS Components	294-839	
1-off BC182L Transistor	RS Components	294-277	
1-off Resistor 22k 5%	RS Components	131-413	Pack 10
1-off Resistor 470R 5%	RS Components	131-211	Pack 10
1-off LED	RS Components	586-475	
1-off Capacitor, 1000µf 25V	RS Components	103-610	

Fig 4 Components and suppliers. Note that the BFX85 transistor is available from Rod Irving Electronics. An equivalent to the BFX85 is a BSW66.

Pin	Function	Pin	Function
1	+5v from Apple power supply	9	no connection
2	PB0 Input	10	AN0 Output
3	PB1 Input	11	AB1 Output
4	PB2 Input	12	AN2 Output
5	not used by Switch Interfaced	13	AN3 Output
6	GC0 Input	14	GC3 Input
7	GC1 Input	15	GC1 Input
8	0v Ground connection	16	no connection

Fig 5 Pin-out's from Apple game I/O socket

cable is recommended to connect from the Apple to the switch unit. A complete list of components and a recommended supplier (and his type nos) is given in Fig 4. The

pin-out numbers from the DIL socket are given in Fig 5, and the memory locations which relate to the inputs and outputs are given in Fig 6.

The outputs AN0-AN3 can be toggled on and off by an instruction such as POKE xxxx, 1 where xxxx is the appropriate memory location. The push button inputs

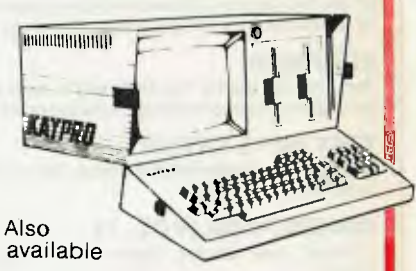
The exciting Brother HR-15 letter quality daisy-wheel printer has optional low profile plug-in keyboard, Tractor Feeder for Data Processing, and Auto Cut Sheet Feeder for Word Processing.

Amongst the wide selection of typewriters is the brother CE-60 electronic typewriter with interface from Olivetti.

**CAULFIELD BUSINESS COMPUTERS**

(A division of Caulfield Typewriters)  
874 Glenhuntly Road, Caulfield South 3162  
Telephone: (03) 528 4555

**Oh brother!**



Also available

**KAYPRO II KAYPRO IV & 10**

**COLUMBIA** 16 bit IBM PC compatible

# MELBOURNE HOUSE SOFTWARE

by Veronika Megler & Philip Mitchell

Visit JRR Tolkien's Middle Earth with The Hobbit, the most amazing adventure yet devised for any microcomputer.

Based on the fantasy land described in Tolkien's classic masterpiece, you assume the role of Bilbo, The Hobbit. It is you alone who can and must overcome all the dangers that overtake you in your attempt to steal the Dragon's treasure.

This revolutionary super program brings to life one of the most exciting mystical fantasies ever written and is a milestone in microcomputer software.



## HUNGRY HORACE

Just when you thought microcomputer games had nothing more to offer, here comes Horace for your Commodore 64! Horace is a cute, lovable, animated character who races through adventures, creating havoc wherever he goes. The Horace series games brings you splendid graphics, addictive games and a lovable mischievous character. Hungry Horace is the original Horace adventure. Horace creates havoc in the park as he picks the flowers, annoys the guards and steals their lunch.



## GALAXY

Commodore 64 Your fighter is under attack by a formation of fighters who attack only when the formation is complete giving you a chance to wipe them out. The mother ship will form a convoy to attack or capture you with its laser traction beam. If captured the other fighter in your formation continues the battle and if he shoots down the mother ship the captured fighter is released and combines with the other fighter to create double firing capacity.



## COSMONAUT

VIC 20 Unexpanded You are a cosmonaut and your task is to free your spacecraft from the tractor beam which holds it in thrall on the barren planet. You must go with care, because almost all objects will electrocute you if you touch them — even your spaceship if it is held by the tractor beam. You can jump over obstacles, and move between levels by jumping onto the lifts which connect them. This fantastic new game works with joystick or keyboard and features moving elevators, stormtroopers, laser guns and more!



## VIC 20 UNEXPANDED

### MINI KONG

Kong has abducted a young maiden and has trapped her at the top of his lair. You have to climb the ladders and use the lift to rescue her.

### FROGRUN

Dodge the fast moving traffic on the freeway, the frog-eating snakes and get the frogs across the river to the frog-holes alive.

### DOTMAN

An exciting version of the arcade maze game in which you control the DOTMAN as he goes around the maze gobbling all the dots.

### SLAP DAB

Sam, the little painter has been told to paint a very large area. As he paints, he disturbs the woodworms which come out of hiding and start chasing him.

### TINY TOTS SEVEN

A fun games cassette which includes, Simon, O's & X's, Bombs Away, Super Snap, Duck Shoot and Santa.

### GAMES PACK (VOL. 1)

Includes Lunar Docker, Slalom, Bounce Out, Snake, Bomber, Memory and Othello.

### CRAWLER

Armed with a laser cannon in a mushroom garden you must fend off the crawly centipedes, spiders and fleas.

## FOR THE VIC 20 16K

### KRAZY KONG

Kong has abducted a young maiden and trapped her at the top of his lair. You have to climb the scaffolding and ladders to rescue her.

### PHAROAH'S TOMB

The Pharaoh's Tomb abounds with evil. Death will stalk you on your quest for the key which has the power to end the reign of evil.

### THE DUNGEONS

Enter the fantasy world populated by ferocious monsters and a fire breathing red dragon that would deny you possession of the magic basket containing the secrets of the LOWER DUNGEONS.

### 3D TIME TREK

You are the only survivor of the planet 'Corillian' and have vowed to destroy those responsible for the destruction of your planet and rid the galaxy of the alien tyranny.

### ZOK'S KINGDOM

When your starship encounters a meteor storm it is forced to crash land on the nearest planet which is ruled by Zok, a distant relative of Dracula. Dare you enter his kingdom.

### XENO II

A space thriller to delight all arcadians. This game has four action packed stages and your mission is to destroy the power sources of XENO II.

### GALACTIC ABDUCTOR

Your defenceless satellites are under relentless attack by ferocious armoured space hawks. An exciting arcade game with brilliant graphics and unusual sound effects.

# FOR COMMODORE 64 & VIC 20

## FROGRUN



In this game you have to get five frogs from the bottom of the screen to their frog-holes at the top of the screen.

Unfortunately, this is not all that easy, because first you have to dodge the fast moving cars and lorries on the freeway, then the hungry frog-eating snakes on the river banks and then you must hop on the logs, crocodile's tails and turtles to get to the frog-holes.

## KONG



Kong has abducted the beautiful starlet FAY RAY and has trapped her in his lair. There are four screens, as soon as you finish one screen, Kong removes FAY RAY to the next level. You have to finish all four screens and destroy KONG's lair before you can rescue the beautiful lady.

## SKRAMBLE



In the year 2184, after years of constant bombardment, the planet earth has been taken over by Cobrons who have now departed but left the government in the hands of super intelligent command module. It requires a steady hand and accurate control to guide the fighter plane that has undertaken the suicidal mission of destroying the base!

## HEXPERT



Bert is a small, charming furry creature who has been captured by an evil witch who forced him to play on her games pyramid. This three dimensional pyramid is constructed from hexagons. Bert has to change the top faces of all the hexagons to different colours by jumping from one face to another avoiding the rubber balls and snakes.

## MOON BUGGY



While your moon buggy is out on routine patrol it is heavily attacked by fighters operating from a star-cruiser. You must skillfully manoeuvre your moon buggy over the lunar rocks, across the craters and destroy the alien attackers. This machine code program provides thrilling experience of driving across constantly changing landscape combined with fast and furious arcade action.

## 3D TIME TREK



You are the only survivor of the planet 'Corillian'. As your last act you have vowed to destroy all of those responsible for the destruction of your planet and rid the galaxy of the alien tyranny. Your mission is also a race against time, as you were wounded in the attack on your planet.

TO: MELBOURNE HOUSE, Suite 4, 75 Palmerston Crescent, South Melbourne, 3205. Telephone (03) 690.5336.

I have a \_\_\_\_\_ K Microcomputer. Please send me \_\_\_\_\_

I enclose cheque/money order for \$ \_\_\_\_\_ PLUS \$2.00 for postage

Please debit my bankcard A/C for \$ \_\_\_\_\_ A/C No. \_\_\_\_\_

Commencement date \_\_\_\_\_ Expiry date \_\_\_\_\_

Name \_\_\_\_\_  
Address \_\_\_\_\_ Postcode \_\_\_\_\_

Signature \_\_\_\_\_  
Melbourne House guarantees to replace any faulty tapes immediately. Dealer enquiries welcome.

### Commodore 64

- The Hobbit ..... \$39.95
- Hungry Horace ..... \$20.00
- Horace Goes Skiing ..... \$20.00
- Horace & The Spiders ..... \$20.00
- Super Cassette A ..... \$20.00
- Super Cassette B ..... \$20.00
- Frogrun ..... \$20.00
- Galaxy ..... \$20.00

- Kong ..... \$20.00
- Skramble ..... \$20.00
- Hexpert ..... \$20.00
- Moon Buggy ..... \$20.00
- 3D Time Trek ..... \$20.00

### VIC 20

- Cosmonauts ..... \$20.00
- VIC 20 Games Pack ..... \$20.00
- The Wizard & The Princess ..... \$20.00
- Mini Kong ..... \$20.00
- Frogrun ..... \$20.00

- Dotman ..... \$20.00
- Slap Dab ..... \$20.00
- Tiny Tots Seven ..... \$20.00
- Games Pack (Vol. 1) ..... \$20.00
- Crawler ..... \$20.00
- Krazy Kong 16K ..... \$20.00
- Pharaoh's Tomb 16K ..... \$20.00
- The Dungeons 16K ..... \$20.00
- 3D Time Trek 16K ..... \$20.00
- Zok's Kingdom 16K ..... \$20.00
- Xeno II 16K ..... \$20.00
- Galactic Abductor 16K ..... \$20.00



# MELBOURNE HOUSE

APC2





# AGC

## The NEC Advanced Personal Computer FROM **COMPUTER GALERIE**

By now your friends will have recommended NEC.  
Here are 10 good reasons to finally buy from Computer Galerie.

- You need the programs to suit you. Computer Galerie has a program range beyond your dreams. MSDOS and CP/M 86.
- You need programs to suit your industry. Computer Galerie employ men with more than 15 years experience to tailor to your industry.
- You need stationery with free delivery.
- You need a 12 month warranty.
- You need reliability.
- You need convenience.
- You need manufacturer standard servicing.
- You need a proven Award Winning System.
- You need an established dealer you can trust.

### AGC NEC ■ COMPUTER GALERIE

SEND COUPON TO: 66 WALKER STREET, NORTH SYDNEY 2060.

I need more information & prices.

Name .....

Telephone .....

Street .....

Suburb ..... Post Code .....

Industry .....

I need to do .....

OR CONTACT  
DAVID DIPROSE  
ON (02) 929 5497.



-16296	Turns	AN0	On	When Referenced
-16295	Turns	AN0	Off	When Referenced
-16294	Turns	AN1	On	When Referenced
-16293	Turns	AN1	Off	When Referenced
-16292	Turns	AN2	On	When Referenced
-16291	Turns	AN2	Off	When Referenced
-16290	Turns	AN3	On	When Referenced
-16289	Turns	AN3	Off	When Referenced

-16287 PB0 : If button A pressed, value will be > 127  
-16286 PB1 : If button B pressed, value will be > 127  
-16285 PB2 : If button C pressed, value will be > 127

-16284 GC0 : Value from 0 to 255  
-16283 GC1 : Value from 0 to 255  
-16282 GC2 : Value from 0 to 255  
-16281 GC3 : Value from 0 to 255

-16272 Analogue input strobe—reference time location to reset inputs GC0~GC3

Fig 6 Memory locations associated with game I/O

PB0 PB2 can be 'tested' by the instruction IF PEEK (xxxx) > 127 then yyy, whereupon the branch to yyy will occur if the button is being pressed. The analogue inputs can be referenced by PDL (x) Basic command, x being 0, 1, 2, or 3. It is worth resetting the 'Analogue Clear' location -16272 before

reading a game controller, by issuing the command X = PEEK (-16272). A number of game programs will be published which use the game interface unit in future issues.

Given here is a demonstration program using the Apple switch unit described

above. The program is the old Simon game which tests your reflexes and short-term memory retention by asking you to memorise and mimic a random sequence of lights and sounds. Instructions are contained within the program.

END

Prentice-Hall

# BOOKWARE

Stand No. 234  
Personal Computer Show  
Centrepoint Mar 14-17 '84

## The 3-D Animated Apple <sup>New!</sup> Phil Cohen

This new Australian book will interest both the game player and the art/draughting student. For the games-oriented user, the book covers the use of the Apple's high-resolution graphics. For those interested in CAD or animation, the Apple's ability to handle two and three-dimensional figures is explored, and programs are provided in each case. The appendices include an introduction to the binary system and some tips on attaching a printer.

208 pp/\$14.95 rrp

## The BBC Microcomputer for Beginners Seamus Dunn & Valerie Morgan

This comprehensive new book provides computer novices with a detailed description of the special features of the BBC machine, and a complete introduction to programming in its enhanced version of BASIC. Each step is illustrated with sample programs and screen responses. Suitable for both the Model A and the Model B versions of the machine, with cassette or disk drive.

312 pp/\$19.25 rrp

## Commodore 64: Getting The Most From It Tim Onosko

A concise guide specifically designed for users with little or no computer experience that explains all about the Commodore 64 and how to use it. Provides step-by-step instructions for BASIC programming, as well as important information on a variety of applications, including Word processing colour, graphics and games, music and sound.

303 pp/\$23.95 rrp

## The C Programming Language <sup>New Stock Just Arrived!</sup> Brian Kernighan & Dennis Ritchie

Co-authored by the original designer of the C programming language, this book contains a tutorial introduction to get new users started as soon as possible, separate chapters on each major feature, and a reference manual. Examples are complete, real programs that have been tested directly from the text. Written for the programming novice who has some familiarity with basic programming concepts.

228 pp/\$22.95 rrp



Available from all good bookshops and computer retailers.

In case of difficulty, send your cheque to:

Prentice-Hall of Australia Pty Ltd 7 Grosvenor Place, Brookvale NSW 2100

APC/84

# Z80:READ ONLY SECRETS

*A good way to further your knowledge of machine code programming (which to many of us means learning the first principles) is to examine the instructions in a computer's read only memory or ROM. Geoff Lohrere, a specialist on the Z80 processor has written a disassembler for the Z80 based TRS-80/System 80 micro which, with a bit of perseverance can be used to lay bare the secrets of other Z80 based micros.*

The program accompanying this article is a Z80 disassembler written for the TRS-80/System 80 micro. It should be easy to convert to most other Z80 based micros. The main purpose of a disassembler program is to convert machine code (possibly back) to assembler instructions. Machine code is a set of numeric instructions that the processor (Z80) can directly execute as a program. These numeric instructions usually take the form of a list of bytes in computer memory and can be very difficult to program without making numerous mistakes. To overcome this problem it is usual to use a substitute code known as the assembler language of the processor. This assembler language is far more meaningful from a programmer's point of view. For example, the hexadecimal (HEX) form of the machine code to load the Z80 C register with the value 24 (HEX) would be in two bytes OE 24. This is represented in assembler language as LD C,24H (LD for LOAD) which is far more meaningful to us.

To convert the assembler language instructions to machine code we would use an assembler program. If however we have machine code instructions available such as in the ROM of the computer, we can convert these to

assembler language instructions by using a disassembler program and discover what the code does.

The assembler language of the Z80 processor consists of a set of instructions that can be split into three parts: the mnemonic; the first field operation code or 'opcode'; and the second field 'operand'.

In the above example LD is the mnemonic, C is the first field and 24H is the second field or OE is the opcode indicating to the Z80 a value has to be loaded into the C register, and 24H is the operand the value to be loaded. Some instructions only have the mnemonic, for instance RLA (Rotate Left Accumulator), and some only have the mnemonic and the first field, for instance INC H (increment the H register). The missing fields can be thought of as being empty. The disassembler works by forming these three fields and putting them together. The number of bytes of machine code needed to completely form the instruction varies for different instructions as for another example, LD A, (4000H), (Load the A register with the contents of memory location 4000H). The brackets around the Hex value 4000H, mean 'the contents of'. LD is the mnemonic, A is the first field, and

(4000H) is the second field. The machine code bytes for this instruction are 3A, 00,40. 3A is the opcode, and 4000H is the operand. The least significant and most significant bytes of an address or 16 bit value are stored in memory in the order of least significant followed by most significant. With a bit more perseverance, the average person can quite easily learn the deep dark secrets of Z80 machine code. Happy disassembling!

## Using the program

Utilizing this program is very straight forward. When RUN, the program will simply ask for a start and end address. These should be input as a one to four digit Hex address. On entering the end address the program will display each address in decimal and hex, followed by the hex and ASCII contents of that address, and then the opcode and operand. The byte or bytes of the operand if present will be displayed on the next line or lines with their decimal address. At the end of each displayed page you will be prompted for 'Spacebar' to continue, or 'Newline or Enter' to start a fresh disassembly.

```
10 DEFSTRB,F-H:Q1=65536:GOTO100
20 Z=0:IFLEN(A#)<4THENA#=STRING$(4-(LEN(A#)),0)+A#
30 A1#=LEFT$(A#,1):GOSUB80
40 Z=V*4096:A1#=MID$(A#,2,1):GOSUB80
50 Z=Z+(V*256):A1#=MID$(A#,3,1):GOSUB80
60 Z=Z+(V*16):A1#=RIGHT$(A#,1):GOSUB80
70 Z=Z+V:RETURN
80 IFASC(A1#)<58THENV=VAL(A1#)ELSEV=(ASC(A1#)-55)
90 RETURN
100 CLS:PRINT"*** Z80 DISASSEMBLER ***":PRINT:INPUT"Start Address (SSSS)";
A#:GOSUB20
```



# EMERALD HILL COMPUTER BROKERS

294 Kingsway South Melbourne, Vic. 3205. Phone. (03) 690 8095

## BARRISTERS PACKAGE

**\$3000.00**

Includes:

- IQ150
- Monitor
- 2 disk drives
- Typewriter/Printer
- Sandys word processor
- Full accounts package



**archives<sup>™</sup> pc**

### CP/M Computer with

- ★ 1 Megabyte Storage
  - ★ Perfect Writer
  - ★ Perfect Speller
  - ★ Perfect Calc
  - ★ Perfect Filer
- \$2394.00**  
inc tax

## STAR PRINTERS

Gemini 10X ,	120 CPS	549
Gemini 15X ,	120 CPS	954
Delta 10	160 CPS	954
Delta 15	160 CPS	1434

## 16 Bit Computer

Compatible with IBM

Includes:

- 2 Disk Drives
- Green Monitor
- MS DOS

Only **\$2294.00** Complete  
inc tax

## DATA BASE

— Filing System

Throw away your filing cabinet!

Only **\$100.00** inc tax

**NETWORK YOUR APPLES**  
with the Maclagan Wright  
**DIGICARD NETWORK**

## DISK DRIVES

WITH  
CONTROLLER CARD

JUST **\$379.00** inc tax

SUITABLE FOR USE  
WITH APPLE



## IQ 150

**Features:**

- ★ Dual processors
- ★ 64K RAM
- ★ Upper & lower case
- ★ 12K ROM
- ★ Led warning lamp
- ★ Casing can hold 2 slimline disk drives
- ★ 95 Keys, 24 Programmable
- ★ Full cursor control
- ★ Color graphics
- ★ RUNS APPLE SOFTWARE

## APPLE COMPATIBLES

FROM

**\$500.00** ex tax

**\$987.00** inc tax

Includes Sandy Word Processing and a Financial Package

## VIDEO LIBRARY SYSTEM

- ★ Cassettes can be checked in and out in less than 10 seconds.
- ★ Facility for Mail Outs.
- ★ Reservation of Movies.
- ★ Movie Catalogue Printout.
- ★ Hire Charges and Return Dates automatically calculated.
- ★ Overdue cassettes controlled by loans listing.

Under **\$5000.00**  
Complete System

Disk Controller Cards .....	<b>\$85.00</b>
80 Column Cards .....	<b>\$89.00</b>
Disk Drives .....	<b>\$320.00</b>
BMC Green Screens .....	<b>\$299.00</b>
NEC Green Screens .....	<b>\$239.00</b>
80 Column Printers .....	<b>\$400.00</b>
Printer/Typewriters .....	<b>\$799.00</b>
Typewriters	
Digicard Products	
Softsmith Software	
Brother Printers	

## COMPLETE ACCOUNTING PACKAGE

Includes:

- Debtors
- Creditors
- Invoicing
- Stock Control
- General Ledger

```

110 Y=Z-4:X=4:INPUT"End Address (EEEE)";A#:GOSUB20
120 E=Z:GOSUB150:GOTO180
130 PRINT"SPACEBAR To Continue - NEWLINE Or ENTER To Return";
140 K#=INKEY#:IFK#=""THEN140ELSEIFK#=CHR$(13)THEN10ELSEIFK#<>" "THEN140
150 CLS:W=0:PRINT
160 PRINT" ADDRESS","CONTENTS","OPCODE","OPERAND"
170 PRINT" DEC HEX","HEX ASCII":RETURN
180 IFE<Y+XTHENPRINTTAB(16)"END":GOSUB130ELSE200
190 GOTO10
200 Y=Y+X:P0=Y:P1=Y+1:P2=Y+2:P3=Y+3
210 IFP0>32767THENP0=-1*(Q1-P0)
220 IFP1>32767THENP1=-1*(Q1-P1)
230 IFP2>32767THENP2=-1*(Q1-P2)
240 IFP3>32767THENP3=-1*(Q1-P3)
250 ONXGOTO260,270,280,290
260 J=K:K=L:L=M:M=PEEK(P3):B=F:F=G:G=H:A=M:GOTO300
270 J=L:K=M:L=PEEK(P2):M=PEEK(P3):B=G:F=H:A=L:GOTO300
280 J=M:K=PEEK(P1):L=PEEK(P2):M=PEEK(P3):B=H:A=K:GOTO300
290 J=PEEK(P0):K=PEEK(P1):L=PEEK(P2):M=PEEK(P3):A=J
300 GOSUB360
310 ONXGOTO350,340,330
320 B=Z#:A=K:GOSUB360
330 F=Z#:A=L:GOSUB360
340 G=Z#:A=M:GOSUB360
350 H=Z#:GOTO480
360 Z#="" : IFA<=255THEN390ELSEIFFA<=4096THEN380
370 C=INT(A/4096):A=((A/4096)-C)*4096:GOSUB410
380 C=INT(A/256):A=((A/256)-C)*256:GOSUB410
390 C=INT(A/16):A=((A/16)-C)*16:GOSUB410
400 C=A
410 IFC<=9C#=STR$(C)ELSEC#=CHR$(C+55)
420 Z#=Z#+RIGHT$(C#,1):RETURN
430 IFK=>127THENK=K-256
440 IFK<0THEN450ELSEPRINT"+";
450 PRINTK;:RETURN
460 IFL=>127THENL=L-256
470 IFL<0THENRETURNELSEPRINT"+";:RETURN
480 X=1:A=Y-DI:GOSUB360
490 PRINTY;TAB(8)Z#,B;" ";:IFJK=191ANDJ=>32THENPRINT("<CHR$(J)>");:ELSEPRINTTAB
(32);
500 IFJK>253THEN520ELSEIFK<>203THEN510ELSEX=4:ON(M/64)+1GOTO1350,1690,1700,1710
510 IFJK>253THEN520ELSEIFK<=57THENX=2:GOTO1280ELSEX=3:IFK<=110THEN1650ELSEIFK<=1
19THEN1670ELSE1320
520 IFK<>237THEN530ELSEX=2:GOTO1200
530 IFK<>221THEN540ELSEIFK<=57THENX=2:GOTO1100ELSEIFK=203ANDM=>6THENX=4:ON(M/64)
+1GOTO1180,1620,1630,1640,ELSEIFK<=110ANDK=>70THENX=3:GOTO1580ELSEIFK<=119ANDK=>
112THENX=3:GOTO1600ELSEIFK<=249ANDK=>126THENX=3:GOTO1140
540 IFK<>203THEN550ELSEX=2:IFK<=63THENON((K/8)+1)GOTO1480,1490,1500,1510,1520,15
30,1720,1540ELSEON((K-63.9)/64)+1GOTO1550,1560,1570
550 IFK<=63THEN840ELSEIFK<=127THEN1370ELSEIFJ=>192THEN990ELSEON((J-120)/8)GOTO14
00,1410,1420,1430,1440,1450,1460,1470
560 GOTO1720
570 ONHNGOTO590,600,610,620,630,640,650,660
580 ONHGOTO670,680,690,700,710,720,730,740
590 PRINT"B,";:RETURN
600 PRINT"C,";:RETURN

```

**"CHOOSING THE  
RIGHT MONITOR,  
DISC DRIVE  
AND PRINTER  
FOR YOUR MICRO  
ISN'T JUST  
IMPORTANT..."**



# ... IT'S AMUST™

With so much uncertainty in the world of computing, it's reassuring to know the Amust Computer Corporation make a complete range of computer hardware backed by a world wide service and parts network.

Fully warranted Amust computers and peripheral items are sourced in Japan, ensuring the highest quality, and excellent value for money.

## AMUST DT80 DOT MATRIX PRINTER

Australia's largest selling printer with letter quality printout, speed capability of 80 cps and a very low purchase price. The Amust DT80 is covered with a 6 month factory warranty and backed by a national service division.



## AMUST ATLAS 8 DISC DRIVE

Over 5,000 already sold in Australia!

The disc drive that's more than comparable to the Apple – but at a very realistic price. The Amust Atlas 8 Disc Drive takes 5¼ in. discs and controller cards are readily available ex-stock.



Right now your Amust Dealer is offering special incentives on this selected Amust hardware. There has never been a better time to make the correct decision on a monitor, disc drive or printer.

## AMUST RGB/V12 – V14 COLOUR MONITORS

Two remarkable monitors (12in. and 14in.) that offer the highest resolution available in Australia and do not require a colour card to interface with most popular computers including Apple II, IIE, III and IBM PC.

Japanese built to the highest standards and fully covered by warranty the Amust monitors are exceptional value for money in a quality colour monitor.



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



# Amust COMPUTER CORP.

350 South Road, Moorabbin 3189. Telephone: (03) 555 3644.

For full details contact the Amust Distributor in your state.

**VIC: Compak Computer Shop** 350 South Road, Moorabbin.  
Telephone: (03) 555 9844

**SYDNEY & SOUTHERN NSW: Andy Stenberg** 7 Arcadia Street, Coogee.  
Telephone: (02) 260 1249

**NEWCASTLE & NORTHERN NSW: Micro-Educational** 17 Park Road,  
Garden Suburb. Telephone: (049) 43 6805

**ACT: Computech Shop** 7 Benjamin Way, Church Centre, Belconnen.  
Telephone: (062) 51 2525

**S. AUST: Amust Computers (S.A.)** 73 Manton Street, Hindmarsh.  
Telephone: (08) 46 9329

**W. AUST: Microbase Computers** 422 Newcastle Street, West Perth.  
Telephone: (09) 328 9544

**QLD: Amust Computer (Qld)** 2/6 Harvon Street, Stafford. Telephone: (07) 352 6355

```

610 PRINT"D,";RETURN
620 PRINT"E,";RETURN
630 PRINT"H,";RETURN
640 PRINT"L,";RETURN
650 PRINT"(HL),";RETURN
660 PRINT"A,";RETURN
670 PRINT"B":GOTO1720
680 PRINT"C":GOTO1720
690 PRINT"D":GOTO1720
700 PRINT"E":GOTO1720
710 PRINT"H":GOTO1720
720 PRINT"L":GOTO1720
730 PRINT"(HL)":GOTO1720
740 PRINT"A":GOTO1720
750 PRINT"< IY";GOSUB460
760 GOTO820
770 PRINT"< IY";GOSUB460
780 GOTO830
790 PRINT"< IX";GOSUB460
800 GOTO830
810 PRINT"< IX";GOSUB460
820 PRINTL;");";RETURN
830 PRINTL;");":GOTO1720
840 IFJ=0PRINT"NOP"ELSEIFJ=1PRINT"LD", "BC", "G+F"H":X=3ELSEIFJ=2PRINT"LD", "(BC), A"
ELSEIFJ=3PRINT"INC", "BC"ELSEIFJ=4PRINT"INC", "B"ELSEIFJ=5PRINT"DEC", "B"ELSEIFJ=6P
RINT"LD", "B", "F"H":X=2ELSEIFJ=7PRINT"RLCA"ELSEIFJ=8PRINT"EX", "AF, AF' "
850 IFJ=9PRINT"ADD", "HL, BC"ELSEIFJ=10PRINT"LD", "A, (BC)"ELSEIFJ=11PRINT"DEC", "BC"
ELSEIFJ=12PRINT"INC", "C"ELSEIFJ=13PRINT"DEC", "C"ELSEIFJ=14PRINT"LD", "C, "F"H":X=2
ELSEIFJ=15PRINT"RRCA"
860 IFJ=16PRINT"DJNZ", "#";X=2:GOSUB430
870 IFJ=16PRINTELSEIFJ=17PRINT"LD", "DE", "G+F"H":X=3ELSEIFJ=18PRINT"LD", "(DE), A"EL
SEIFJ=19PRINT"INC", "DE"ELSEIFJ=20PRINT"INC", "D"ELSEIFJ=21PRINT"DEC", "D"ELSEIFJ=2
2PRINT"LD", "D, "F"H":X=2ELSEIFJ=23PRINT"RLA"
880 IFJ=24PRINT"JR", "#";X=2:GOSUB430
890 IFJ=24PRINTELSEIFJ=25PRINT"ADD", "HL, DE"ELSEIFJ=26PRINT"LD", "A, (DE)"ELSEIFJ=2
7PRINT"DEC", "DE"ELSEIFJ=28PRINT"INC", "E"ELSEIFJ=29PRINT"DEC", "E"ELSEIFJ=30PRINT"
LD", "E, "F"H":X=2ELSEIFJ=31PRINT"RRA"ELSEIFJ=32PRINT"JR", "NZ, #";X=2:GOSUB430
900 IFJ=32PRINTELSEIFJ=33PRINT"LD", "HL, "G+F"H":X=3ELSEIFJ=34PRINT"LD", "< "G+F"H",
HL":X=3ELSEIFJ=35PRINT"INC", "HL"ELSEIFJ=36PRINT"INC", "H"ELSEIFJ=37PRINT"DEC", "H"
ELSEIFJ=38PRINT"LD", "H, "F"H":X=2ELSEIFJ=39PRINT"DAA"
910 IFJ=40PRINT"JR", "Z, #";X=2:GOSUB430
920 IFJ=40PRINTELSEIFJ=41PRINT"ADD", "HL, HL"ELSEIFJ=42PRINT"LD", "HL, (< "G+F"H)":X=3
ELSEIFJ=43PRINT"DEC", "HL"ELSEIFJ=44PRINT"INC", "L"ELSEIFJ=45PRINT"DEC", "L":ELSEIF
J=46PRINT"LD", "L, "F"H":X=2ELSEIFJ=47PRINT"CPL"
930 IFJ=48PRINT"JR", "NC, #";X=2:GOSUB430
940 IFJ=48PRINT
950 IFJ=49PRINT"LD", "SP, "G+F"H":X=3ELSEIFJ=50PRINT"LD", "< "G+F"H), A":X=3ELSEIFJ=5
1PRINT"INC", "SP"ELSEIFJ=52PRINT"INC", "(HL)"ELSEIFJ=53PRINT"DEC", "(HL)"ELSEIFJ=54
PRINT"LD", "(HL), "F"H":X=2ELSEIFJ=55PRINT"SCF"
960 IFJ=56PRINT"JR", "C, #";X=2:GOSUB430
970 IFJ=56PRINTELSEIFJ=57PRINT"ADD", "HL, SP"ELSEIFJ=58PRINT"LD", "A, (< "G+F"H)":X=3E
LSEIFJ=59PRINT"DEC", "SP"ELSEIFJ=60PRINT"INC", "A"ELSEIFJ=61PRINT"DEC", "A"ELSEIFJ=
62PRINT"LD", "A, "F"H":X=2ELSEIFJ=63PRINT"CCF"
980 GOTO1720
990 IFJ=192PRINT"RET", "NZ"ELSEIFJ=193PRINT"POP", "BC"ELSEIFJ=194PRINT"JP", "NZ, "G+
F":X=3ELSEIFJ=195PRINT"JP", "G+F":X=3ELSEIFJ=196PRINT"CALL", "NZ, "G+F":X=3ELSEIFJ=197P

```



```

RINT"PUSH", "BC"ELSEIFJ=198PRINT"ADD", "A, "F"H":X=2
1000 IFJ=199PRINT"RST", "0H"ELSEIFJ=200PRINT"RET", "Z"ELSEIFJ=201PRINT"RET"ELSEIFJ
=202PRINT"JP", "Z, "G+F:X=3ELSEIFJ=204PRINT"CALL", "Z, "G+F:X=3ELSEIFJ=205PRINT"CALL
", "G+F:X=3ELSEIFJ=206PRINT"ADC", "A, "F"H":X=2ELSEIFJ=207PRINT"RST", "8H"
1010 IFJ=208PRINT"RET", "NC"
1020 IFJ=209PRINT"POP", "DE"ELSEIFJ=210PRINT"JP", "NC, "G+F:X=3ELSEIFJ=211PRINT"OUT
", "F"H,A":X=2ELSEIFJ=212PRINT"CALL", "NC, "G+F:X=3ELSEIFJ=213PRINT"PUSH", "DE"ELSE
IFJ=214PRINT"SUB", "F"H":X=2ELSEIFJ=215PRINT"RST", "10H"ELSEIFJ=216PRINT"RET", "C"
1030 IFJ=217PRINT"EXX"ELSEIFJ=218PRINT"JP", "C, "G+F:X=3ELSEIFJ=219PRINT"IN", "A, "F
"H":X=2ELSEIFJ=220PRINT"CALL", "C, "G+F:X=3ELSEIFJ=222PRINT"SBC", "A, "F"H":X=2ELSEI
FJ=223PRINT"RST", "18H"ELSEIFJ=224PRINT"RET", "PQ"ELSEIFJ=225PRINT"POP", "HL"
1040 IFJ=226PRINT"JP", "PQ, "G+F:X=3
1050 IFJ=227PRINT"EX", "(SP), HL"ELSEIFJ=228PRINT"CALL", "PQ, "G+F:X=3ELSEIFJ=229PRI
NT"PUSH", "HL"ELSEIFJ=230PRINT"AND", "F"H":X=2ELSEIFJ=231PRINT"RST", "20H"ELSEIFJ=
232PRINT"RET", "PE"ELSEIFJ=233PRINT"JP", "(HL)"ELSEIFJ=234PRINT"JP", "PE, "G+F:X=3
1060 IFJ=235PRINT"EX", "DE, HL"ELSEIFJ=236PRINT"CALL", "PE, "G+F:X=3ELSEIFJ=238PRINT
"XOR", "F"H":X=2ELSEIFJ=239PRINT"RST", "28H"ELSEIFJ=240PRINT"RET", "P"ELSEIFJ=241P
RINT"POP", "AF"ELSEIFJ=242PRINT"JP", "P, "G+F:X=3ELSEIFJ=243PRINT"DI"
1070 IFJ=244PRINT"CALL", "P, "G+F:X=3ELSEIFJ=245PRINT"PUSH", "AF"ELSEIFJ=246PRINT"O
R", "F"H":X=2ELSEIFJ=247PRINT"RST", "30H"ELSEIFJ=248PRINT"RET", "M"ELSEIFJ=249PRIN
T"LD", "SP, HL"ELSEIFJ=250PRINT"JP", "M, "G+F:X=3ELSEIFJ=251PRINT"EI"
1080 IFJ=252PRINT"CALL", "M, "G+F:X=3ELSEIFJ=254PRINT"CP", "F"H":X=2ELSEIFJ=255PRI
NT"RST", "38H"
1090 GOTO1720
1100 X=2:IFK=9PRINT"ADD", "IX, BC"ELSEIFK=25PRINT"ADD", "IX, DE"ELSEIFK=33PRINT"LD",
"IX, "H+G"H":X=4ELSEIFK=34PRINT"LD", "( "H+G"H), IX":X=4ELSEIFK=35PRINT"INC", "IX"ELS
EIFK=41PRINT"ADD", "IX, IX"ELSEIFK=42PRINT"LD", "IX, ( "H+G"H)":X=4
1110 IFK=43PRINT"DEC", "IX"ELSEIFK=52PRINT"INC", ; X=3:GOTO790ELSEIFK=53PRINT"DEC"
, ; X=3:GOTO790ELSEIFK=54PRINT"LD", ; X=4:GOSUBS10
1120 IFK=54PRINT" "H"H"ELSEIFK=57PRINT"ADD", "IX, SP"
1130 GOTO1720
1140 IFK=126PRINT"LD", "A, "ELSEIFK=134PRINT"ADD", "A, "ELSEIFK=142PRINT"ADC", "A, "
ELSEIFK=150PRINT"SUB", ;ELSEIFK=158PRINT"SBC", "A, "ELSEIFK=166PRINT"AND", ;ELSEIF
K=174PRINT"XOR", ;ELSEIFK=182PRINT"OR", ;ELSEIFK=190PRINT"CP", ;
1150 IFK=190GOTO790
1160 X=2:IFK=225PRINT"POP", "IX"ELSEIFK=227PRINT"EX", "(SP), IX"ELSEIFK=229PRINT"PU
SH", "IX"ELSEIFK=233PRINT"JP", "(IX)"ELSEIFK=249PRINT"LD", "SP, IX"
1170 GOTO1720
1180 IFM=6PRINT"RLC", ;ELSEIFM=14PRINT"RRC", ;ELSEIFM=22PRINT"RL", ;ELSEIFM=30PRINT
"RR", ;ELSEIFM=38PRINT"SLA", ;ELSEIFM=46PRINT"SRA", ;ELSEIFM=62PRINT"SRL", ;
1190 GOTO790
1200 IFK=64PRINT"IN", "B,(C)"ELSEIFK=65PRINT"OUT", "(C),B"ELSEIFK=66PRINT"SBC", "HL
,BC"ELSEIFK=67PRINT"LD", "( "H+G"H), BC":X=4ELSEIFK=68PRINT"NEG"ELSEIFK=69PRINT"RET
N"ELSEIFK=70PRINT"IM", "0"ELSEIFK=71PRINT"LD", "I,A"ELSEIFK=72PRINT"IN", "C,(C)"
1210 IFK=73PRINT"OUT", "(C),C"ELSEIFK=74PRINT"ADC", "HL,BC"ELSEIFK=75PRINT"LD", "BC
,( "H+G"H)":X=4ELSEIFK=77PRINT"RETI"ELSEIFK=80PRINT"IN", "D,(C)"ELSEIFK=81PRINT"OU
T", "(C),D"ELSEIFK=82PRINT"SBC", "HL,DE"ELSEIFK=83PRINT"LD", "( "H+G"H), DE":X=4
1220 IFK=86PRINT"I+", "1"ELSEIFK=87PRINT"LD", "A, I"ELSEIFK=88PRINT"IN", "E,(C)"ELSE
IFK=89PRINT"OUT", "(C),E"ELSEIFK=90PRINT"ADC", "HL,DE"ELSEIFK=91PRINT"LD", "DE,( "H+
G"H)":X=4ELSEIFK=94PRINT"IM", "2"ELSEIFK=96PRINT"IN", "H,(C)"
1230 IFK=97PRINT"OUT", "(C),H"ELSEIFK=98PRINT"SBC", "HL,HL"ELSEIFK=103PRINT"RRD"EL
SEIFK=104PRINT"IN", "L,(C)"ELSEIFK=105PRINT"OUT", "(C),L"ELSEIFK=106PRINT"ADC", "HL
,HL"ELSEIFK=111PRINT"RLD"ELSEIFK=114PRINT"SBC", "HL,SP"
1240 IFK=115PRINT"LD", "( "H+G"H), SP":X=4ELSEIFK=120PRINT"IN", "A,(C)"ELSEIFK=121PR
INT"OUT", "(C),A"ELSEIFK=122PRINT"ADC", "HL,SP"ELSEIFK=123PRINT"LD", "SP, "H+G"H":X=
4ELSEIFK=160PRINT"LDI"ELSEIFK=161PRINT"CPI"ELSEIFK=162PRINT"INI"

```

**DICK SMITH  
OPENS THE  
DOOR TO  
COMPUTING  
with the**

# VZ-200

**Come and  
see the  
incredible VZ-200  
at the 2nd Australian  
Personal Computer  
Show, Stand 609**



**look at this great  
range of educational, financial  
& games software**

### **SPEED READING\***

Ideal for improving reading and comprehension skills—written by an experienced Australian primary school teacher! Cat X-7257.

### **TYPING TEACHER**

Even if you're a complete newcomer, this program will quickly get you familiar and confident with the keyboard. Cat X-7258.

### **ELEMENTARY GEOMETRY\***

Not too strong on geometry? This program should help. It uses a friendly explanation/quiz approach. Cat X-7256.

### **STATISTICS 1**

A great introduction to the basic principles of statistical analysis. Tests your knowledge with examples! Cat X-7251.

### **STATISTICS 2\***

Following on from Stat. 1, this program views more advanced concepts (eg: the Chi square test). Cat X-7252.

### **MATRIX\***

Working out mathematical matrices can be a real chore. Use this program to help develop your skills. Cat X-7253.

### **TENNIS/GOLF LESSON\***

Challenge your computer to a game of tennis or golf. It plays by the rules, so you'll learn about the game. Cat X-7254.



### **Exciting New Programs**

POKER—Cat X-7233  
SLOT MACHINE—Cat X-7234  
BLACK JACK\*—Cat X-7235  
CIRCUS—Cat X-7236 BIORHYTHM—  
Cat X-7237 HORSE RACING\*—Cat X-7238  
VZ INVADERS—Cat X-7239 DYNASTY  
DERBY\*—Cat X-7240 VZ GHOST HUNT—  
Cat. X-7242 HOPPY\*—Cat. X-7243  
SUPER STAR BUSTER\*—Cat X-7247  
ASTEROIDS\*—Cat. X-7248 INTRO TO  
BASIC—Cat X-7255  
HANGMAN\*—Cat. **\$1250**  
X-7233 MATCHBOX **EA**  
—Cat. X-7231\* FI-  
NANCIAL RAT\* — Cat. X-7263

### **Sky-high action & thrills!**

Amazing! Try your hand at Lear Jet\* (Cat X-7241) It's fast, furious and lots of fun.

Air traffic controller X-7249 **\$2995**

\*Requires 24K of memory



### **There's a great range of books too!**

#### **Getting Started**

Impress your friends, instruct your kids & create your own utility and games programs in a matter of hours! Step-by-step instructions show you how simple it is to operate your new computer!

Cat B-7206 ..... **\$995**

#### **VZ-200 Introduction to Computing**

Are you lost when it comes to computing? Try this—written just for you in a language you can understand. It'll have you conversant with Dick's VZ-200 computer in just a few days!

Cat B-7200 ..... **\$995**

#### **First Book of Programs**

Tried, trusted and true programs for your VZ-200. There's something for everyone—and remember, they're all written in BASIC so you can save these on cassette—you only have to key them in once!

Cat B-7202 ..... **\$695**

#### **Further Programming**

After mastering BASIC, what comes next? It's all in this book—moving graphics, using MODE(1), music and PEEK & POKE. As well as lessons, there are also 15 or so games which you're sure to enjoy.

Cat B-7208 ..... **\$995**

#### **VZ-200 Technical Manual**

Want to get the most from your VZ-200? This technical manual explains all the ins and outs, ups and downs. For the real computer enthusiast or the beginner who wants to know more!

Cat B-7204 ..... **\$950**

#### **The Giant Book of Games**

An exciting collection of some favourite computer games guaranteed to provide you with hours of fun. There's even a section devoted entirely to games ideas which you can convert into computer games.

Cat B-7210 ..... **\$995**

# The brilliant personal computer

# Now only \$169 WAS \$199

With all the personal computers around these days, you're probably wondering which one is the best value.

Before you buy any computer, take a look at three things: its power (or usefulness), its back-up and its price/future.

The Dick Smith VZ-200 features an 8K Microsoft BASIC, PLUS an additional 8K 'enhancements'. Compare that to the Tandy MC-10! And it has 8K user memory inbuilt: compare that to the VIC 20!

The Dick Smith VZ-200 is backed, of course, by the Dick Smith Electronics organisation. Complete technical and service facilities, program development, etc — all guaranteed.

The Dick Smith VZ-200 sells for only \$169 — the first personal colour computer in Australia to sell below \$200! There are many other computers now being unloaded around this figure — but be careful! You could be buying an 'orphan'!

## look at these exciting ways to expand your system



### Low-Cost Colour Monitor

Don't want to tie up the family's colour TV? This high quality, 36cm colour video monitor gives bright, crisp pictures — sound too! Cat X-1195.

## \$389

### **NEW** Joystick Controllers AND INTERFACE!

A pair of sturdy, super-responsive joysticks that add a whole new dimension to action games! Cat X-7212. **\$39<sup>50</sup>**



### National Cassette Recorder

Get optimum performance from your VZ-200! How? By storing programs and data on this deluxe recorder! This Quality National Cassette Recorder is ideal: Works perfectly with the VZ-200. Cat. A-4093

value at **\$55<sup>00</sup>**

Want more memory? Just plug this in & you've got it!

### 16K Memory Module

It couldn't be simpler. Add this module, and expand the VZ-200's RAM memory to a generous 24K! Cat X-7205. **\$79**

### Use a Centronics type printer! Printer Interface

Lets your VZ-200 talk to almost any Centronics-type printer. Top quality! **\$49<sup>50</sup>** Cat X-7210.

### PRICE/TECHNOLOGY BREAKTHROUGH! Four-colour Printer/Plotter

Don't buy just a printer — here's a fantastic NEW 4-colour printer that's an X-Y plotter as well! Produce graphs, pie charts, printing in many different sizes and colours. It's all so easy to do, using simple commands in your BASIC programs! Cat X-7208 **\$299**

# DICK SMITH Electronics

## Stores throughout Australia and New Zealand

Head Office & Mail Orders: P.O. Box 321, North Ryde, NSW 2113. Tel: 02.888 3200. Telex: AA20036. 7 day satisfaction guarantee: If you're not completely happy with your purchase, return it within 7 days in original condition and packing for a full refund!





```

1250 IFK=163PRINT"OUTI"ELSEIFK=168PRINT"LDD"ELSEIFK=169PRINT"CPD"ELSEIFK=170PRIN
T"IND"
1260 IFK=171PRINT"OUTD"ELSEIFK=176PRINT"LDIR"ELSEIFK=177PRINT"CPIR"ELSEIFK=178PR
INT"INIR"ELSEIFK=179PRINT"OTIR"ELSEIFK=184PRINT"LDDR"ELSEIFK=185PRINT"CPDR"ELSEI
FK=186PRINT"INDR"ELSEIFK=187PRINT"OTDR"
1270 GOTO1720
1280 IFK=9PRINT"ADD", "IY,BC"ELSEIFK=25PRINT"ADD", "IY,DE"ELSEIFK=33PRINT"LD", "IY,
"H+G"H":X=4ELSEIFK=34PRINT"LD", "( "H+G"H), IY":X=4ELSEIFK=35PRINT"INC", "IY"ELSEIFK
=41PRINT"ADD", "IY, IY"ELSEIFK=42PRINT"LD", "IY, ( "H+G"H)":X=4
1290 IFK=43PRINT"DEC", "IY"ELSEIFK=52PRINT"INC", ; ; X=3:GOTO770ELSEIFK=53PRINT"DEC"
; ; X=3:GOTO770ELSEIFK=54PRINT"LD", ; ; GOSUB750
1300 IFK=54PRINT" "H"H":X=4ELSEIFK=57PRINT"ADD", "IY, SP"
1310 GOTO1720
1320 IFK=126PRINT"LD", "A, " ; ELSEIFK=134PRINT"ADD", "A, " ; ELSEIFK=142PRINT"ADC", "A, "
; ELSEIFK=150PRINT"SUB", ; ELSEIFK=158PRINT"SBC", "A, " ; ELSEIFK=166PRINT"AND", ; ; ELSEIF
K=174PRINT"XOR", ; ELSEIFK=182PRINT"OR", ; ELSEIFK=190PRINT"CP", ;
1330 IFK<=190THEN770ELSEX=2:IFK=225PRINT"POP", "IY"ELSEIFK=227PRINT"EX", "( SP), IY"
ELSEIFK=229PRINT"PUSH", "IY"ELSEIFK=233PRINT"JP", "( IY)"ELSEIFK=249PRINT"LD", "SP, I
Y"
1340 GOTO1720
1350 IFM=6PRINT"RLC", ; ELSEIFM=14PRINT"RRC", ; ELSEIFM=22PRINT"RL", ; ELSEIFM=30PRINT
"RR", ; ELSEIFM=38PRINT"SLA", ; ELSEIFM=46PRINT"SRA", ; ELSEIFM=62PRINT"SRL", ;
1360 GOTO770
1370 X=1:IFJ=118PRINT"HALT":GOTO1720ELSEPRINT"LD", ; ; N=(J-56)/8:GOSUB570
1380 N=(J-(INT(N)*8)+56)+1:GOTO580
1390 GOTO1720
1400 PRINT"ADD", "A, " ; N=J-127:GOTO580
1410 PRINT"ADC", "A, " ; N=J-135:GOTO580
1420 PRINT"SUB", ; ; N=J-143:GOTO580
1430 PRINT"SBC", "A, " ; N=J-151:GOTO580
1440 PRINT"AND", ; ; N=J-159:GOTO580
1450 PRINT"XOR", ; ; N=J-167:GOTO580
1460 PRINT"OR", ; ; N=J-175:GOTO580
1470 PRINT"CP", ; ; N=J-183:GOTO580
1480 PRINT"RLC", ; ; N=K+1:GOTO580
1490 PRINT"RRC", ; ; N=K-7:GOTO580
1500 PRINT"RL", ; ; N=K-15:GOTO580
1510 PRINT"RR", ; ; N=K-23:GOTO580
1520 PRINT"SLA", ; ; N=K-31:GOTO580
1530 PRINT"SRA", ; ; N=K-39:GOTO580
1540 PRINT"SRL", ; ; N=K-55:GOTO580
1550 PRINT"BIT", ; ; INT((K-64)/8); ", " ; ; N=(K-(INT((K-56)/8)*8)+56)+1:GOTO580
1560 PRINT"RES", ; ; INT((K-128)/8); ", " ; ; N=(K-(INT((K-120)/8)*8)+120)+1:GOTO580
1570 PRINT"SET", ; ; INT((K-192)/8); ", " ; ; N=(K-(INT((K-184)/8)*8)+184)+1:GOTO580
1580 PRINT"LD", ; ; N=((K-69)/8)+1:GOSUB570
1590 GOTO790
1600 PRINT"LD", ; ; GOSUB810
1610 N=K-111:GOTO580
1620 PRINT"BIT", ; ; (M-70)/8; ", " ; ; GOTO790
1630 PRINT"RES", ; ; (M-134)/8; ", " ; ; GOTO790
1640 PRINT"SET", ; ; (M-198)/8; ", " ; ; GOTO790
1650 PRINT"LD", ; ; N=((K-69)/8)+1:GOSUB570
1660 GOTO770
1670 PRINT"LD", ; ; GOSUB750
1680 N=K-111:GOTO580
1690 PRINT"BIT", ; ; (M-70)/8; ", " ; ; GOTO770
1700 PRINT"RES", ; ; (M-134)/8; ", " ; ; GOTO770
1710 PRINT"SET", ; ; (M-198)/8; ", " ; ; GOTO770
1720 IFPOS(0)>>PRINTTAB(32)"NOT FOUND":X=1
1730 W=W+1:IFW=12GOSUB130
1740 IFX=>2THENW=W+1:PRINTY+1,F" " ; ; IFK<=191ANDK=>32PRINT"( "CHR$(K) )"ELSEPRINT
1750 IFW=>12GOSUB130
1760 IFX=>3THENW=W+1:PRINTY+2,G" " ; ; IFL<=191ANDL=>32PRINT"( "CHR$(L) )"ELSEPRINT
1770 IFW=>12GOSUB130
1780 IFX=>4THENW=W+1:PRINTY+3,H" " ; ; IFM<=191ANDM=>32PRINT"( "CHR$(M) )"ELSEPRINT
1790 IFW=12GOSUB130
1800 GOTO180

```

**CHECKOUT**

# A LITTLE PRINT

*Bill Davies looks at a new contender in the budget printing field  
— the Tandy TP-10.*

Tandy's recently released TP-10 printer will interest anyone with an RS232 serial interface.

Not only is the TP-10 widely compatible, it is also cheap. \$149.95 will buy you surprisingly good thermal print quality on 4.5 inch paper with 32 characters per line and it is ideal for the production of clear program listings.

Like most Tandy products it comes in a cardboard container with polystyrene supports. Enclosed with the machine is a power cord and a three pin plug.

One look at the instruction book will alert you to the fact that this is an economy machine. The well-written manual is A5 size instead of the normal A4 and contains only 27 pages.

The printer is small, 210mm x 150mm x 80mm, and weighs only 1.5kg. It has an off-white, rigid plastic case with a transparent smoked plastic hinged lid.

The TP-10 has the ability to print a 96 ASCII character set, plus 12 graphics characters. The 4.5in paper width restricts the print width to only 32 characters per line. The TP-10 has software-controlled access to character and graphics, elongation and repeat functions.

The printer has only a serial RS232 interface, but this shouldn't produce too many problems if your computer has the standard connections. Obviously, the

machine is designed to interface with the Tandy computers — the new MC-10 or the older, larger Colour Computer.

The printer should work with many other popular computers with a suitable RS232 interface, so the machine won't be restricted to Tandy computer owners.

The printer's only controls are an on/off switch which is located at the side of the machine and a paper feed touch-sensitive button at the front. There is a power LED on/off indicator.

Loading paper into the TP-10 is fairly simple, although the manual points out some do's and don't's. It warns the user to feed the paper into the machine straight to avoid paper jams and that care must be taken in clearing a paper jam, since any paper remaining in the printer means disassembling the machine to clear it. The white heat-sensitive paper also has to be loaded the correct way round.

To load you must place the roll of paper in the printer, turn the power on, and then use the paper feed button first to feed on, and then to feed the paper through the slot and round the platen. Once in the machine, the paper is protected by a plastic top.

Switching on the power and pressing the paper feed at the same time will give you your first chance to see the character set.

The limitations of the 32 character

width are immediately obvious, but the print is clear and easy to read. The characters produced by the machine are standard 5 x 7 dot matrix which gives you a normal ten characters per inch. The elongated character set is exactly double. The graphics set is made up of a 7 x 12 dot matrix, again with 32 characters per line. If a line contains both elongated and normal characters the printer will not split up an elongated character when it appears at the end of a line.

The printer is limited in its operations to those described above, so it only recognises limited printer control codes, line feed, carriage return, large/normal print graphics etc. Trying to send anything else only causes it to print out some spurious character.

The printing speed of 30 cps is a little slow, but it is unlikely that you will be using it for any serious application which may require a faster print speed. It is almost silent in operation.

Obviously the paper is heat sensitive. Many people must have been caught this summer because they left their printouts near a window and heat of the sun erased all their hard work. As yet no-one has come up with a solution to this.

The TP-10 is very good for limited printing: it's a godsend, for instance, if you don't want to invest in a more expensive, more sophisticated printer just for program listings.

Because it uses white paper the print is easy to read and its quality is good for the price. At \$149.95 the TP-10 is very competitive, but be warned that the special paper rolls can prove expensive — at \$5.95 for two rolls you could soon find yourself paying out lots of money.



# KnowledgeMan.

## The all-in-one software with the data management edge.

A Data Management Package designed for 16 Bit Machines  
 Knowledge Man is much more than just a relational data manager. It's a comprehensive system for desktop information needs..

- \* Third Generation Spreadsheets
- \* Ad Hoc Inquiries (like IBM's SQL/DS)
- \* Screen I/O Management
- \* Forms Management
- \* Structured Programming Language
- \* Statistical Analysis

Some USES are ..... Financial Modelling, Budgeting  
 Sales reporting/analysis, Order entry, Job costing.....etc

An easy to use and powerful decision support system.  
 Also available is,  
 \* Knowledge Manager Reference Guide (a pocket size syntax guide)  
 \* K-RUN (Run Time Module)  
 \* K-GRAPH (high resolution buisness graphics)

Currently available on the IBM PC, IBM PCXT,  
 DEC Rainbow,Olivetti, Sirius, NEC APC, Compaq,

## CALL FOR PRICE

Name.....  
 Address.....  
 .....P/code.....

Machine.....

Operating System:    PCDOS            MSDOS            CP/M 86

Machine/Disk format.....

192K RAM & 500K mass storage recommended

Handling/Shipping: Add \$5.00 for each package ordered

Cheque/Money Order enclosed

Bankcard No: .....

Expiry Date.....Signature.....

Please send me more information on Knowledge Man

Mail this form with payment to :

**MICRO DATA BASE SYSTEMS,**  
 P.O. Box 62, Brighton, Vic 3186  
 (03) 529 6372  
 (03) 523 6311



### \*REDUCES DISKETTE COST 50%!\*

DOUBLES DISKETTE STORAGE SPACE

Owners of 5¼ " single "READ/WRITE" head disk drives can immediately double diskette storage space by using NIBBLE NOTCH I and II. The back of single sided diskettes are burnished. To use it you need a "WRITE ENABLE NOTCH" and some also need in addition, an "INDEX HOLE"? NIBBLE NOTCH I and II are precision engineered tools designed exclusively for this purpose.

#### NIBBLE NOTCH I

(Cuts square Write Enable Notch) For users of APPLE , ATARI, COMMODORE and most other soft sectored systems.

#### NIBBLE NOTCH II

(Cuts square Write Enable Notch and ¼ inch round 'index hole') for owners of IBM, TRS 80 I & III, OSBORNE, KAYPRO and others needing "INDEX HOLE" and all other "HARD SECTORED" Systems.

## ORDER TODAY!

Mail this form with payment to :  
**PROGRAMS UNLIMITED PTY LTD;** 178 High St., Prahran 3181    (03) 529 6372    (03) 523 6311

Please supply me with:  NIBBLE NOTCH I ONLY \$ 29.95     NIBBLE NOTCH II ONLY \$34.95

I enclose Cash/Money Order/Cheque for \$.....

Please debit my bankcard \$.....

No. -----

Expiry date.....

Signature.....

Name.....

Address.....

.....P/code.....

Phone.....

add \$2.50 for postage and handling



# BENCHMARKS SUMMARY

Peter Rodwell presents a roundup of the Benchmark timings used when evaluating computer systems.

Once again it's time to present our Great Benchmarks Summary. As regular readers will know, ever since APC started back in May 1980 we have included Benchmark tests in our evaluation of computer systems and printed here is a list of all the resulting timings we have published.

Well, not quite all. The roundup in fact includes only those machines for which an entire set of timings could be obtained — several machines which we have tested

have been unable to run all the Benchmark tests and as the table is sorted according to the average timings, these incomplete sets had to be excluded. Also, note that timings for some machines which have not been fully benchmarked have been included for interest's sake.

It is important to stress that the APC Benchmarks should not be used as a final criterion for your choice of computer unless you are interested exclusively in running Basic programs as quickly as

possible. Originally, when manufacturers produced their own Basic interpreters, and Basic was the only language available on micros, the benchmarks provided a valuable speed indication, both of the machine and of the Basic interpreter. Now, though, many computers — especially in the business category — run the same Basic (usually Microsoft Basic), and, with other things being constant, tend to show little true variation. Differences sometimes do occur and can usually be put down to one machine's CPU running at a faster speed than another or other technicalities to do with internal construction.

The fastest home machine ever tested remains the BBC with Acorn's new micro, the Electron, pushing its way into second place well above the VIC 20.

It could be reasonably argued that a more meaningful set of Benchmark programs could be devised, particularly to cover areas such as graphics plotting and disk access. In fact we did once have a set of disk benchmarks but the wide variations in the way different Basics handle disk access made these completely impractical. The ideal was to write and read a set number of records, each of a set length, but it proved impossible to arrive at a standard record length which could be applied to every machine. Likewise with graphics: the variations in the way Basics handle graphics, together with the vastly differing graphics capabilities of different machines, made this impractical.

One final note: this year we have placed each machine in one of three categories: Home Business or Portable. H = Home B = Business P = Portable

```
100 REM BENCHMARK 1
110 PRINT "S"
120 FOR K = 1 TO 100
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 + 5 - 5
150 IF 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 GOSUB 220
170 FOR L = 1 TO 5
180 NEXT L
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 NEXT L
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
```

## BENCHMARK TIMINGS

Cat	Machine	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Average
B	Olivetti M20	1.3	4.0	8.1	8.5	9.6	17.4	26.7	16.0	11.5
B	Ti Professional	1.0	4.2	9.3	9.7	10.5	19.0	29.5	31.0	14.3
H	BBC Micro	1.0	3.1	8.2	8.7	9.1	13.9	21.4	51.0	14.6
B	Monroe 8820	2.1	4.2	9.9	10.5	11.0	20.1	32.0	33.0	15.4
B	Vector Graphic VIP	1.0	3.8	10.9	10.7	11.6	20.5	32.7	34.0	15.7
B	ACT Sirius 1 #	1.8	5.3	10.7	11.1	12.9	24.2	37.1	27.9	16.4
B	ACT Apricot	1.6	5.2	10.6	11.0	12.4	22.9	35.4	34.4	16.7
B	Hitachi MB16001	1.5	5.0	10.5	10.5	12.5	23.5	36.0	35.0	16.8
B	Sharp MZ80B	0.6	4.5	8.5	11.5	13.0	19.0	27.5	50.0	16.8
B	IBM Personal Computer	1.5	5.2	12.1	12.6	13.6	23.5	37.4	35.0	17.6
B	Sord M23 (compiled)	2.5	2.5	8.0	8.0	8.0	21.0	25.0	70.0	18.1
B	NEC APC (Compiled CBasic)	2.3	2.3	13.7	17.6	17.8	32.0	34.8	37.1	19.7
B	Osborne 01	1.4	4.4	11.7	11.6	12.3	21.9	34.9	61.0	19.9

H	Electron	1.1	4.0	11.1	11.8	12.4	18.7	28.7	72.5	20.0
B	Tandy TRS-80 Model II	1.0	5.0	13.0	13.0	14.0	23.0	35.0	60.0	20.5
B	Hewlett Packard HP125	1.7	5.0	12.5	12.5	14.0	26.0	40.0	60.0	21.5
B	Intertec Superbrain	1.6	5.2	14.0	13.9	14.8	26.3	43.2	56.0	21.9
B	Apple III	1.7	7.2	13.5	14.5	16.0	27.0	42.5	75.0	24.7
B	Oki i8000	2.2	6.4	16.8	16.8	17.9	31.8	50.7	57.0	25.0
B	Ohio Scientific Challenger C2 4P	1.4	7.8	15.0	16.5	17.8	27.0	39.5	75.0	25.0
B	Epson OX-10	2.3	6.4	15.8	15.8	16.5	31.9	52.9	65.8	25.9
B	Xerox 820	1.7	5.5	15.5	15.1	16.2	28.9	46.1	80.0	26.1
B	NEC PC 8001	1.7	8.3	18.1	17.8	18.6	29.5	49.2	70.0	26.7
H	Commodore VIC 20	1.4	8.3	15.5	17.1	18.3	27.2	42.7	99.0	28.7
B	Sord M23 (interpreted)	2.5	7.2	18.5	18.5	19.3	35.0	52.0	85.0	29.8
B	Apple II	1.3	8.5	16.0	17.8	19.1	28.6	44.8	107.0	30.4
B	Hewlett Packard HP85	1.8	3.8	16.3	16.5	17.7	30.0	44.8	127.0	32.2
H	Exidy Sorcerer	1.8	10.0	20.7	22.2	24.3	37.6	53.7	96.0	33.3
H	Sharp MZ80A	1.5	9.2	16.4	22.8	25.6	37.7	55.0	101.0	33.7
H	MicroBee	2.7	10.0	18.1	17.9	20.9	39.4	67.3	9.5 (est)	33.9
H	Commodore CBM 8032	1.7	10.0	18.4	20.3	21.9	32.4	51.0	119.0	34.3
H	Commodore PET 2001	1.7	9.9	18.4	20.4	21.0	32.5	50.9	123.0	34.7
B	CompuColor II	2.0	10.9	22.4	23.9	25.7	38.7	55.2	102.0	35.1
H	Micro-Professor	2.8	11.0	19.5	21.3	25.0	40.2	61.5	110.6	36.5
H	Hewlett Packard HP86	3.0	5.2	19.4	18.8	20.4	36.5	56.5	134.0	36.7
P	Hewlett-Packard HP-75C	3.0	5.0	22.1	21.8	24.3	40.0	57.3	139.0	39.1
H	Hitachi Peach	2.0	11.0	26.0	26.0	27.0	46.0	78.0	100.0	39.5
B	Panasonic JD700	2.8	9.1	24.6	24.7	26.2	43.9	69.7	118.0	39.9
H	Tandy TRS-80 Color Computer	2.0	11.3	22.2	23.9	27.0	41.5	61.1	130.0	39.9
H	Tandy TRS-80 Model I Level II	2.7	11.6	28.0	28.5	31.3	51.9	81.0	117.0	44.0
H	System 80	2.7	11.6	28.0	28.5	31.3	51.9	81.0	117.0	44.0
B	Cromemco System Three	1.7	4.6	14.9	17.8	19.4	30.2	41.9	229.0	44.9
B	Ohio Scientific Challenger C3 S1	1.7	13.1	21.6	23.7	29.2	39.6	58.3	176.0	45.4
H	Sinclair ZX81 (fast code)	4.5	6.9	16.4	15.8	18.6	49.7	68.5	229.0	51.2
P	Epson MX-20	2.7	15.3	33.1	32.8	35.3	59.1	100.6	133.3	51.5
H	Sinclair Spectrum	4.8	8.7	21.1	20.4	24.0	55.3	80.7	253.0	58.5
H	Oric 1	2.0	17.3	29.4	31.7	38.1	50.1	76.1	233.4	59.8
P	Tandy TRS-80 Model 100	3.5	9.5	26.5	29.5	31.5	43.0	64.0	321.0	66.1
B	Sharp PC3201	4.0	13.5	35.5	35.5	38.5	67.0	108.0	250.0	69.0
B	Casio fx9000	2.5	9.0	24.0	24.0	26.0	42.0	60.0	365.0	69.1
B	Canon CX-1	3.0	6.0	21.0	23.0	24.0	41.0	54.0	390.0	70.3
H	Atari 400/800	2.3	7.4	19.9	23.2	26.8	40.7	61.5	431.0	76.6
H	Texas TI 99/4	2.9	8.8	22.8	24.5	26.1	61.6	84.4	382.0	76.6
H	Texas TI00/4A (standard)	3.0	9.0	24.0	24.8	26.2	61.9	84.6	384.0	77.2
H	Texas TI99/4A (extended)	6.5	18.5	40.0	40.1	42.0	98.4	140.3	240.0	78.2
P	Casio PB-100	8.0	39.0	82.0	80.0	105.0	160.0	220.0	341.0	129.4
P	Sharp PC1500	15.0	70.0	121.0	122.0	178.0	293.0	383.0	510.0	211.5
P	Sharp PC-1251	42.3	70.6	162.5	165.9	197.3	427.8	581.4	980.0	328.5

The original Sirius timings were taken using a pre-release version of Basic-86.  
Three timings have been taken with the production version of the interpreter.

## LAZ G AROUND

### Quickie

If you pay as much percentage income tax as you earn in dollars per week, what is the maximum take-home pay you can get? (For example, if you earn \$100 per week, then income tax is 100% and take-home pay is nil.)

### Prize Puzzle

The divisors of 66 are, 1, 2, 3, 6, 11, 22, 33 and 66. The sum of these is 144, which happens to be a perfect square.

I want you to find a 7-digit number with the

same property — that is, the sum of whose divisors is a perfect square.

### November Prize Puzzle

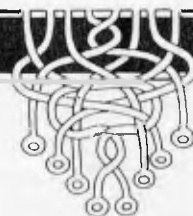
An average response for a puzzle which was not too difficult, but was ideal for solution by micro. Almost 90 entries, of which 8 came from overseas (not including New Zealand).

There were several correct solutions (ignoring the trivial solutions of 1, 2, 3, 4, 5 and

6), and I confess I had overlooked the smallest of these. There may be others, of course.

Base 10	Base 7	Base 9
31	43	34
248	503	305
731445	6134331	1334316
811518	6616641	1466166

Anyway, congratulations T Johnston — your prize will be forthcoming.



# CREATIVE ELECTRONICS

INTRODUCING AN AMAZING VERSATILE COMPUTER SYSTEM  
OUR STANDARD FEATURES ARE OTHERS' EXPENSIVE OPTIONS

★ ★ ★ LIC-3001 ★ ★ ★



Standard features:

- Dual Processor (6502 & Z80)
- 64K RAM
- Numeric keypad
- 40/80 Column Output
- Printer Interface
- Disk Controller
- Runs Apple II & CP/M softwares
- Full 12 months warranty

**LIC-3001 : Home/Education Model**

**ONLY \$995** (inc tax)

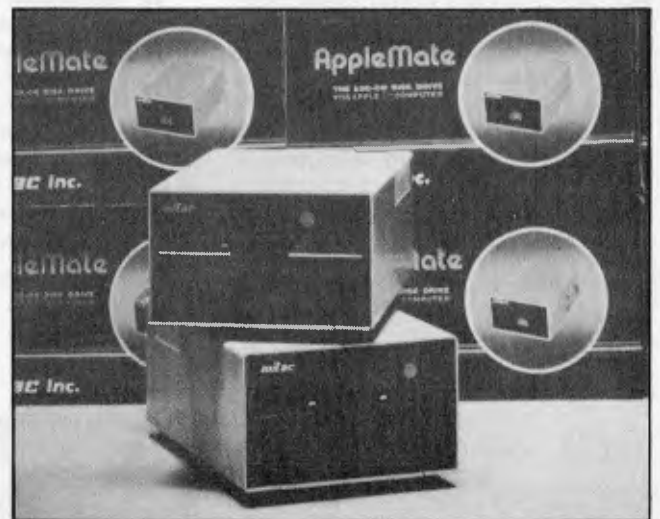
## PRICES ON PERIPHERALS CARDS SLASHED!

16K RAM                      DISK CONTROLLERS  
Z80 CP/M                    PARALLEL PRINTERS  
VIDEX 80 COL.

COMPUTER REFERENCE  
BOOKS ..... **30% OFF!**  
VERBATIM DATELIFE SS/DD  
DISKETTES ONLY..... **\$35!**(incl tax)  
NEW XIDEX SS/DD DISKETTES  
ONLY..... **\$38!**(incl tax)

DEALER ENQUIRIES  
WELCOME

Country and Interstate areas specially catered for.



**MITAC AD-1**

## **DISK DRIVE FOR APPLE**

**LONGEST FULL 2 YEAR WARRANTY!**

**ONLY \$320!** (ex tax)  
**\$380!** (inc tax)

CREATIVE ELECTRONICS

(03) 544 5443

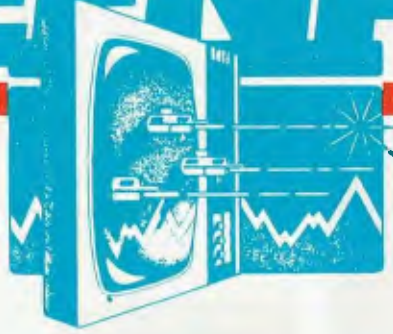
P.O. Box 148, Caulfield East, Vic 3145

(03) 572 2406

Mail Orders Welcome



# SCREENPLAY



*Ian Davies gives his verdict on games for the Sinclair Spectrum.*

## MANIC MINER

**SUPPLIER:** Computer Play  
**PRICE:** \$25.00

Manic Miner, sometimes also known as "Miner '49er", is probably the most delightful, engrossing and amusing non-violent game available on today's market.

Miner Willy goes exploring down an old mine shaft. He rambles from chamber to chamber, gathering the numerous keys necessary to advance to the next chamber. His peril takes the form of manic mining robots, poisonous pansies, spiders and slime. To further complicate matters, some of the floors are rotted through and may be walked over once but not continually stood upon or re-crossed. Willy is capable of walking left or right, and of executing a shoulder high jump, thereby allowing him to leap up to higher levels of the shafts.



To successfully negotiate a chamber, the player must cause Willy to jump over the poisonous pansies, over holes in the floor and over the roving robots. Sounds easy, doesn't it? It's not. A steadily diminishing air supply merely adds to your problems. Unfortunately, the precious keys are usually in difficult locations, such as suspended over a bad section of flooring just underneath a stalactite, or directly next

to a pansy.

Willy meets his doom in numerous ways, always resulting in his repositioning to the bottom left hand corner of the screen. He has three lives, after which a large foot descends to squash him.

The game is of the highest quality construction, and is totally engrossing while still being non-violent. Manic miner is a must for all ZX-spectrum owners with 48K machines. It has justifiably won the game of the year award in the UK.

<b>Use of graphics:</b>	★★★★
<b>Addictive quality:</b>	★★★★★
<b>Use of colour:</b>	★★★★
<b>Use of sound:</b>	★★★
<b>Game speed:</b>	★★★★
<b>Value for money:</b>	★★★★★

## LOCO

**SUPPLIER:** Multicomp Pty Ltd  
**PRICE:** \$22.00

Loco is a non-violent game based on the Rubik cube concept, and runs on 16K ZX-spectrums. The one page instruction sheet explains that the name is derived from the "locomotive" motif used in the game, and also the fact that it has been known to "drive people loco".

The action takes place on a square or rectangular grid, with three to five cells in each direction. The objective is to rotate columns and rows in order to reach a target



configuration. This proves to be very simple for a 3 x 3 matrix, but increasingly more difficult for larger sizes of matrix. The ability for loco to generate rectangular matrices adds an unusual twist. Further,

nine levels of difficulty can be selected by the player.

The game may be interrupted at any point, at which time the player may opt to abandon, give up, reset or continue.

Loco certainly provides mental exercise, but could hardly be called thrilling or addictive. Rubik cube enthusiasts will no doubt take to it with great relish.

<b>Use of graphics:</b>	★★★
<b>Addictive quality:</b>	★★★
<b>Use of sound:</b>	★
<b>Use of colour:</b>	★★★
<b>Value for money:</b>	★



## THE HOBBIT

**SUPPLIER:** Melbourne House  
**PRICE:** \$39.95

"The Hobbit" is a book by the classic author J.R.R. Tolkien, and precedes his "Lord of the Rings", a major work known by many. The scene is set in the land of "Middle Earth, and major characters include Gandalf the wizard and Thorin the dwarf. You play the role of the Bilbo, the hobbit. Your mission is to seek out and destroy the evil dragon, taking his treasure. To provide a background, Melbourne House include a copy of the book with each software package.

This game is extolled as a "super-program that is a milestone in computer software" and "the most sophisticated natural language recognition program yet developed on any microprocessor". I feel that these statements are probably over doing things a trifle. The Hobbit is a souped-up "adventure" style game created in a classic setting and with a slightly better language input than the standard adven-



ture, but it hardly constitutes a breakthrough in artificial intelligence.

The Hobbit is certainly challenging, and is supplied with adequate documentation describing their "ENGLISH" language. Superb graphics adorn each scenario providing a computerised copy of the illustrations from the book. Facilities are also provided to log your movements to the ZX-printer, and to save your current game status to tape. Additionally, the Hobbit provides a "real time" aspect not found in normal adventure. In other words, situations will develop while you are deciding on your next move. A "pause" command

is provided to suspend the game until any key is pressed.

The "ENGLISH" language is certainly an improvement on the trusty old adventure, allowing sentences such as "take the lamp and the rope out of the barrel". It can even resolve certain ambiguities by the use of adjectives, for example, "break all bottles except the green one". ENGLISH is not, however, natural language. This quickly becomes clear as you play the game, as it is often necessary to grope for the correct means of expression. A little experience and the dictionary provided quickly eases this problem.

The Hobbit runs on 48K ZX-spectrums and should be popular with adventure devotees and Tolkien followers.

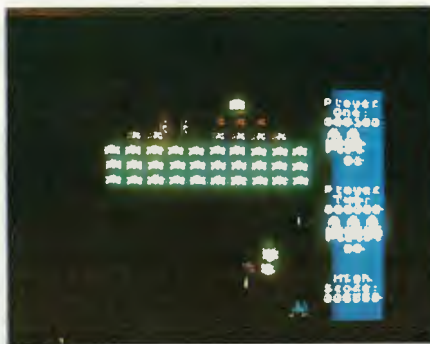
Use of graphics:	★★★
Use of sound:	★
Addictive quality:	★★★★
Game speed:	★★
Use of colour:	★★★
Value for money	★★★

## GALAXIANS

**SUPPLIER:** Gametronics  
**PRICE:** \$22.00

Galaxians by Arctic Software is a particularly pleasing implementation of an arcade game favorite. A bank of standard space-invader types parade across the top of the screen and allow themselves to be shot at by you - the earth defender fearlessly positioned at the bottom of the screen without any shelter from their deadly bombs.

All good earth defenders know that the best defence is a relentless offence, and this is really the name of the game. With your laser cannon only shooting one round at a time, it is necessary to fire and then skillfully dodge the rain of fire until your shot has met its target, at which time you can proceed to send another galaxian to its doom. To make life more difficult, however, the galaxians tend to spiral down towards you - sometimes just one of them, sometimes three or four. As the game progresses, their attacks become more frequent and more accurate.



Points scored vary according to the height of the destroyed galaxian, and swooping galaxians yield double points. The game supports nine levels of difficulty and can be played in one or two player modes. High scores are retained, and each player has three lives before being fatally destroyed.

The keyboard provides controls to move left, right and fire the cannon. Additionally, the "A" button may be used to abandon the current game, or the "S" key can pause the action temporarily until any key is pressed to continue. Unfortunately, keyboard bounce often

means that the game is paused and then immediately continued again, so you may need to be quick with the "S" key to really achieve a pause in the game.

Galaxians is a very challenging game, although hiding in either corner of the screen appears to be a safe tactic when the going gets tough. However, the hiding technique is not always safe, and players quickly learn not to rely on it.

The game runs on a 16K ZX-spectrum, and can utilise the Sinclair joystick. It makes excellent use of colour, graphics and sound, and runs with good game speed.

Use of graphics:	★★★★
Addictive quality:	★★★★
Use of colour:	★★★
Use of sound:	★★★★
Game speed:	★★★★
Value for money:	★★★★★

## SCREENPLAY

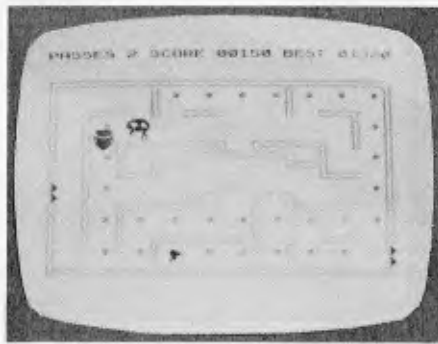
### HUNGRY HORACE

**SUPPLIER: Melbourne House**  
**PRICE: \$20.00**

Hungry Horace is a well implemented re-make of the good old "Pacman" theme. Produced by Psion Software in association with Melbourne House, and running on a 16K ZX-spectrum, the game offers the traditional Pacman objectives in a totally new setting.

The action all takes place in a park, and Horace's job (under your direction) is to eat as many flowers as possible from the paths running throughout the park. Alas, the park's guard will chase Horace and attempt to catch him before he eats too many flowers. In his mad dash, the guard sometimes drops part of his lunch (specifically cherries and strawberries), the eating of which will earn Horace an extra 100 points, ten times that of the lowly flowers.

Horace can extract his gleeful revenge



by eating one of the alarm bells. This throws the guard into a panic, at which time he can be eaten for bonus points. Leaving your vicious attack too long will result in the addition of extra park guards, thereby making it increasingly more difficult to navigate the paths without being caught. Horace may be caught three times before the game is brought to a close.

Each screen includes at least two exits and/or entrances, some of which lead onto the opposite side of the same screen, and

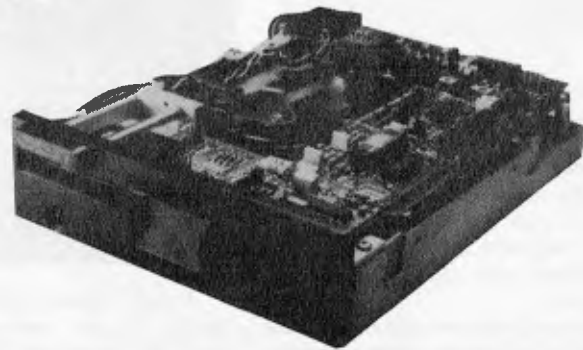
others lead onto completely different sceneries. Judicious use of these exits can save Horace from imminent capture, but may well result in him being delivered into an even worse situation.

Movement control is via the Q, Z, I and P keys which, while unusual, becomes very effective after a small amount of continued usage. Graphics is used to good effect, although screen contrast could be improved (see photo). Horace includes sound effects and the game speed is more than adequate. In summary, another good implementation of Pacman.

<b>Use of graphics:</b>	★★★
<b>Addictive quality:</b>	★★★★
<b>Use of colour:</b>	★★
<b>Use of sound:</b>	★★★
<b>Game speed:</b>	★★★★
<b>Value for money:</b>	★★★★

## \*APPLE COMPATIBLE HIGH PERFORMANCE DISK DRIVES

Hi-Tech Peripherals Corp leads the way with a simple, quiet, more reliable floppy disk drive. It has the fewest mechanical parts and the lowest chip count in the industry. Features include a unique ball-bearing head carriage for optimized head positioning accuracy and low stepping noise, and a brushless DC direct drive spindle motor for low power consumption and cooler operation.



**PRICE \*\$275** – quantity discounts available  
**Optional enclosure and interface cable \*\$30**

Ask about our IBM PC compatible drives.

**DEALER ENQUIRIES WELCOME**

\* Plus 20% sales tax

**Ex-Stock Delivery**

**KENELEC (AUST.) PTY. LTD.**  
(INCORPORATED IN VICTORIA)

48 Henderson Rd, Clayton, Vic. 3168. Telephone (03) 560 1011  
NSW (02) 439 5500 Q'LAND (07) 393 0909 SA (08) 42 6877 WA (09) 322 4542



# GAMETRONICS SOFTWARE EXPLOSION

## for

# SINCLAIR ZX SPECTRUM

### HARDWARE

PROGRAM NAME	PRICE
Spectrum Computer 16K	\$289.00
Spectrum Computer 48K	389.00
ZX Printer	169.00
Printer Paper	5.00
Full Size Printer DT80	595.00
Full Size Printer PX80	650.00
Cent/Interf inc Cable & W. Processor	120.00
Digital Tracer & Software	190.00
Light Pen & Software	99.00
Loading Aid Sure Load Every Time	25.00
Speech Synthesiser Phonic	120.00
Sound Generator 3 Channel	99.00
2 Way Motherboard	75.00
Spectrum Adaptor	40.00
Digital I/O Port Module	120.00
Analog Input Port Module	120.00
Analog Out Port Module	120.00
Realtime Clock Module	59.00
Light Pen Module	140.00
T.V. Sound out of the Spectrum Joystick Interface	50.00
Full Size Keyboard	120.00

### BOOKS

Understand Your Spectrum	\$17.95
Spectrum Machine Lang for Beginner	17.95
Over the Spectrum	15.95
The Complete Spectrum ROM Disassembly	23.95
Spectrum Hardware Manual	17.95
Spectrum Microdrive Book	24.95
Supercharge Your Spectrum	19.95
Exploring Spectrum Basic	16.95
Sinclair User Magazine	5.50
ZX Computing Magazine	6.50
Sinclair Projects Magazine	5.50
Sinclair Programs Magazine	5.50
Sinc Magazine	4.50
Users Book of Tape Recording	19.95

### COMPUTING

Biorhythms 16K	\$22.50
Convert ZX81 to Spectrum 16K	19.95
Display Generator 16K	14.90
Infrared Disassembler 16K	29.00
M-Coder II Compiler 48K	29.95
Machine Language 16K	20.00
Melbourne Draw 48K	29.95
Speakeasy 48K	15.95
Spectrum Forth 48K	39.95
Spectrum Assembler 48K	39.95
Spectrum Print Util's 48K	18.95
Spectrum Bug 2 16K	25.00
Super Draw 16K	22.00
Sys 64 16K	25.00
Ultraviolet Assembler 48K	33.00
Use & Learn 16K	35.00
Viepoint 3D 16K	29.00
VJ-3D 48K	25.00
Games Designer 48K	39.95
Hurg 48K	39.95
Sound FX 48K	22.00
Distron 16K	22.00
Zxed Toolkit 48K	29.00
SPDE 16K	25.00
Dlan 16K	22.00
Pascal Compiler	

### AMES

3D Combat Zone 48K	\$22.00
Arcadia 48K	25.00
Avenger 48K	22.00
Cosmic Raiders 16K	24.00
Cosmic Debris 48K	22.00
Crazy Balloons 16K	25.00
Devil Birds & Digger Man 16K	26.00
Dodge the Demon Driver 16K	26.00
Embassy Assault 16K	19.95
Flight Simulator 48K	25.00
Frog 5 Show Down 16K	22.00
Frogger 16K	25.00
Galactic Patrol 16K	25.00
Galaxians 16K	22.00
Games 1 16K	20.00
Games 2 16K	20.00
Games 3 16K	20.00
Games 4 16K	20.00
Games 5 Star-Trail 48K	20.00
Games 6 16K	20.00
Gobbleman 16K	22.00
Horace and the Spiders 16K	20.00
Horace goes Skiing 16K	20.00

Hungry Horace 16K	20.00
Invaders 16K	22.00
Invasion Force 16K	22.00
Light Cycle 16K	22.00
Maze and Death Race 48K	22.00
Meteor Storm 16K	22.00
Night-Flight 16K	25.00
Nightmare & Dragon Maze 16K	23.00
Over the Spectrum 1 16K	20.00
Over the Spectrum 2 16K	20.00
Over the Spectrum 3 16K	20.00
Penetrator 48K	22.50
Planetoids 16K	20.00
Schroids 48K	25.00
Sentinel 48K	22.00
Space Zombies 16K	24.00
Space Intruders 16K	22.00
Space Raiders 16K	22.00
Space Rescue & Star Quest 16K	23.00
Games Designer 48K	22.00
Terror-Daktii 4D 48K	22.50
Timegate 48K	29.00
Trog 48K	28.50
Monte Carlo 16K	22.00
Night Flight 16K	25.00
Manic Miner 48K	20.00
Panic 48K	20.00
Styx 16K	20.00
Armageddon 16K	20.00
Digger Dan 16K	20.00
Sheer Panic 16K	20.00
Kong 48K	20.00
Chopper Rescue 48K	20.00
Electra Storm 48K	20.00
Break Away 16K	20.00
Luna Crabs 16K	22.50
Mind Out 48K	22.50
Frenzy 16K	22.50
Astro Blaster 16K	22.50
Trader 48K	29.50
Jelpac 16K	25.00
Cookie 16K	25.00
Pssst 16K	25.00
Tranz Am 16K	25.00
Ant Attack 48K	25.00
Bugaboo the Flea 48K	25.00
Traxx 48K	25.00
Velnors Lair 48K	25.00
Xadom 48K	25.00
3-D Strategy 48K	25.00
Smugglers Cove 48K	25.00
Aqua Plane 48K	25.00
Creepy Crawler 48K	25.00
Paradrots 16K	25.00
Pat the Postman 48K	25.00
Naanas 16K	25.00
180 16K	25.00

SAS Assault 48K	25.00
Drax Maze 48K	25.00
Land Fagan 16K	25.00
Cruise Attack 16K	25.00
Time Quest 48K	25.00
Laser Warp 48K	25.00
Mad Martha II 48K	25.00
Defendar 16K	25.00
Knockout 16K	25.00
Hopper 16K	25.00
3D Tanx 48K	22.00
Centi-Bug 16K	22.00
Meteoroids 16K	22.00
Dictator 48K	22.00
Spawn of Evil 48K	22.00
Jawz 16K	22.00
Road Toad 48K	22.00
Maziacs 48K	29.00
Gold Mine 16K	22.00
Hard Cheese 16K	22.00
Star Trek 3000 48K	22.00
Speed Duel 48K	25.00
Munchman 16K	22.00
Apple Jam 16K	25.00
Trom 48K	25.00
2003 Space Oddity 16K	22.00
Slicker Puzzle 48K	29.00
Jumbly 48K	29.00
Blind Mice 16K	25.00
Gulpmen 16K	19.95

### CHALLENGE

Psn Chess 48K	\$25.00
Chess Tutor 16K	25.00
Spectrum Chess 48K	27.00
Spectrum Voice Chess 48K	27.00
Cyrus is Chess 16K	27.70
Cyrus is Chess 48K	27.70
Monte Carlo 16K	22.00
Roulette 16K	22.00
Jackpot 48K	25.00
Backgammon 16K	25.00
Dominoes 16K	22.50
Reversi 16K	22.00
Brainstorm 16K	22.00
Pool 16K	20.00
Pontoon 48K	25.00
Handicap Golf 48K	25.00
Test Match Cricket 48K	25.00
Football Manager 48K	29.00
Airline 16K	25.00
Aulo Chef 48K	25.00
Dallas 48K	25.00
30 Quadracube 16K	22.00
Break Away 16K	22.00
Chess Tutor 16K	25.00
ABC Lift Off 16K	25.00
Count About 16K	25.00
Hot Dot Spotter 16K	25.00
Fruit Machine 48K	22.00

Golf 16K	22.00
Diet 48K	29.00

### ADVENTURES

Adventure in Time 48K	\$14.90
E.T. 48K	23.50
Espionage Island 48K	22.50
Forbidden City 16K	16.95
Gold 16K	26.00
Golden Apple 48K	25.00
Haunted Palace 16K	16.95
Inca Curse 48K	22.50
Spawn of Evil 48K	25.00
Mad Martha 48K	29.95
Mines of Saturn 16K	24.00
Planet of Death 16K	22.50
Rescue 48K	25.00
Ship of Doom 48K	22.50
The Hobbit 48K	39.95
The Orb 48K	25.00
Towers of Doom 16K	16.95
Haunted Hedges 16K	22.50
Pitman Seven 48K	22.50
Johnny Reb 48K	22.00
Privateer 48K	22.00
Roman Empire 16K	22.00
Samurai Warrior 16K	22.00
Paras 48K	22.00
Redweed 48K	22.00
Warlord 48K	22.00
Triant of Athens 16K	22.00

### BUSINESS

Comp-U-Share 48K	\$35.00
Comp-U-Tax 48K	35.00
Home Banking 48K	35.00
Spreadsheet 48K	35.00
Data Base 48K	35.00
Word Processor 48K	42.00
Vu-File 48K	25.00
Vu-Calc 48K	25.00
Stock Control 48K	55.50
S/L Business Accounts 48K	39.00
Critical Path Analysis 48K	55.50
Simple Word Processor 16K	22.50
Collectors Pack 16K	22.50
Club record Controller 48K	22.50
Mat Calc 16K	14.90
Prolet W. Processor 48K	24.90
Eddie A Word Processor 48K	25.00
Personal Finance 48K	29.00
Masterfile 48K	39.95
Masterfile 16K	25.00
Data Base	Mail List

## NEW PRODUCTS

MEET US AT THE 2nd AUSTRALIAN PERSONAL COMPUTER SHOW IN SYDNEY. STAND NO 300 - INTERNATIONAL LEVEL

- ★ MUSIC INTERFACE FOR DIGITAL SYNTHESISERS.
- ★ INTERFACE CARD FOR 5 1/4" OR 3" DISK DRIVE FOR YOUR SPECTRUM!!!
- ★ INTERFACE II FOR CARTRIDGE SOFTWARE WITH JOYSTICK PORTS. A RANGE OF CARTRIDGE SOFTWARE AVAILABLE.

# gametronics

Shop 6/177 Toorak Rd, Sth Yarra 3142  
Telephone: (03) 241 3031

### MAIL ORDER

CHEQUE/MONEY ORDER/BANK CARD/NO.	PRICE	QTY.
PLEASE SEND ME	\$289.00	
SPECTRUM 16K	\$389.00	
SPECTRUM 48K		
TOTAL AMOUNT PAYABLE		
ADD \$8.50 P&P H/WARE ex	ADD \$2.50 P&P S/WARE ex	
NAME	ADDRESS	
CITY	EXP. DATE	
P/CODE		
PLEASE SEND FREE CAT. □		
SIGNATURE		

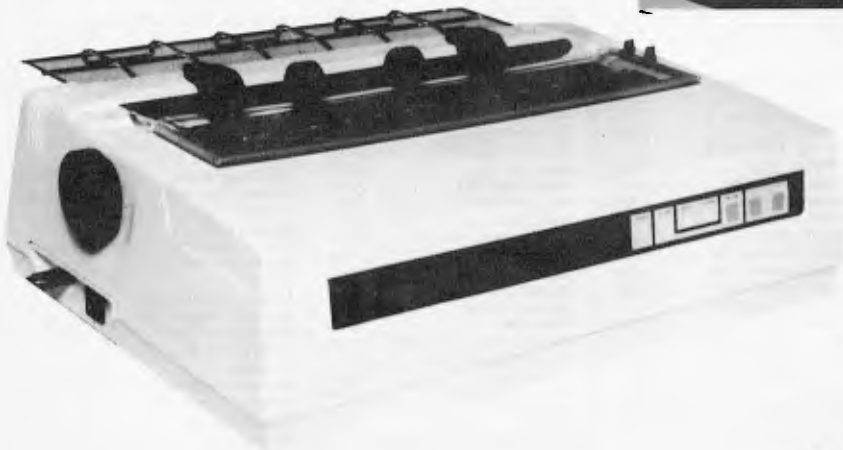
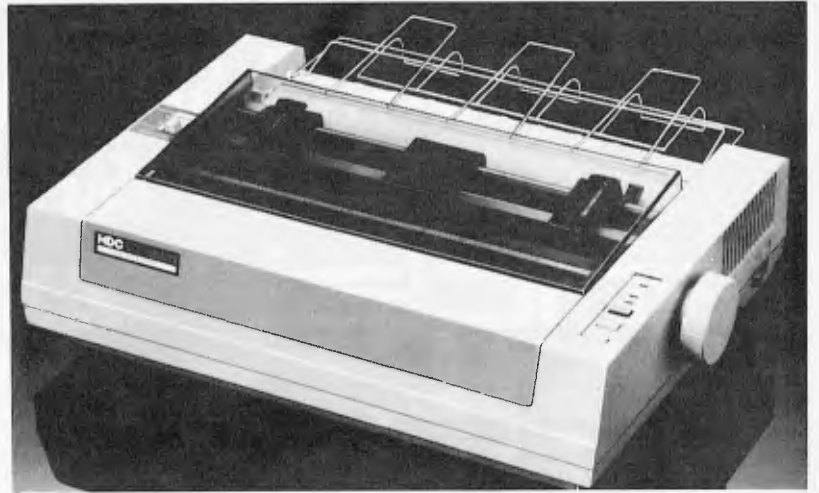
## FT-500 Dot Matrix Printer

Low-cost and reliable  
with graphic capability  
Elite, Pica typefaces  
Enhanced with selectable  
62 characters memory capacity  
100 CPS & MUCH MORE

FOR

VERY  
LITTLE

**\$340 + Sales Tax**  
**(\$408 Inc Tax)**



## WP550 (RS232 & PARALLEL) DAISY WHEEL PRINTER

HIGH QUALITY  
AT A LOW PRICE

**\$590 + Sales Tax**  
**(\$708 Inc Tax)**

INCLUDES FRICTION  
& TRACTOR FEED



## BROTHER HR15 DAISY WHEEL PRINTER

**\$590 + Sales Tax**  
**(\$708 Inc Tax)**



## CP80 (EPSON WORKALIKE)

80 cps; 80 Columns;  
Tractor Feed; Friction Feed

**\$320 + Sales Tax**  
**(\$384 Inc Tax)**



## C ITOH 1550

15" WITH THE LOT  
Tractor & Friction Feed

**\$750 + Sales Tax (\$900 Inc)**

# THE AFFORDABLE

# MICRO

TELEX AA30625ME

TELEPHONE 560 7



# MICRO 64K 6502 & Z80A

APPLE COMPATIBLE — DUAL PROCESSOR

- \* CENTRAL CPU, 6502 & Z80a
- \* 64K BYTE OF USER RAM
- \* 12K OF ROM
- \* FULLY PROGRAMMABLE KEYBOARD
- \* SPECIAL FUNCTION KEYS
- \* UPPER AND LOWER CASE FULL ASCII CHARACTERS
- \* 16 COLOUR GRAPHICS
- \* 7 EXPANSION SLOTS FULLY COMPATIBLE WITH APPLE HARDWARE AND SOFTWARE

\*\* 3 MONTHS FULL GUARANTEE AND SERVICE SUPPORT

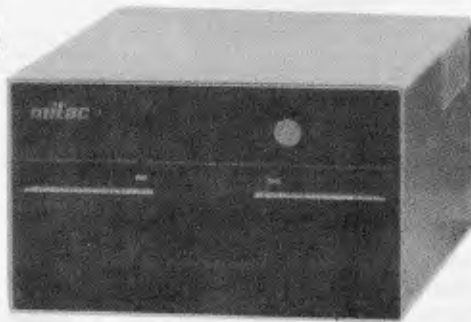


**HI RES  
GREEN  
SCREEN  
18mg  
\$179 Tax Paid**

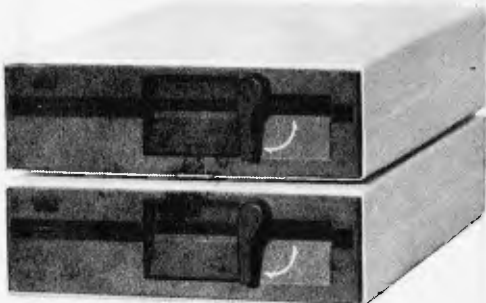


**\$29** + Sales Tax (**\$34.80** Inc)

**SHUGART DISK DRIVE  
\$320.00** Tax Paid



**TEAC DISK DRIVES  
\$320.00** Tax Paid



# MICRO-TUTOR



**\$580** Tax Paid

## SOFTWARE BREAKTHROUGH

**FULL FINANCIAL SOFTWARE PACKAGE  
DEBTORS, CREDITORS, STOCK CONTROL  
INVOICING & GENERAL LEDGER**

**TRUE PROFESSIONAL QUALITY  
DESIGNED IN AUSTRALIA**

**\$500** FOR APPLE, IBM OR  
MOST CPM COMPUTERS

## IRREDUCIBLE PLACE TO SHOP

**BUFF**

**28 MAYLANDS CRESCENT,  
GLEN WAVERLEY 3150  
MELBOURNE, VICTORIA,  
AUSTRALIA**

**537  
416 (ASK FOR RAY POPE)**

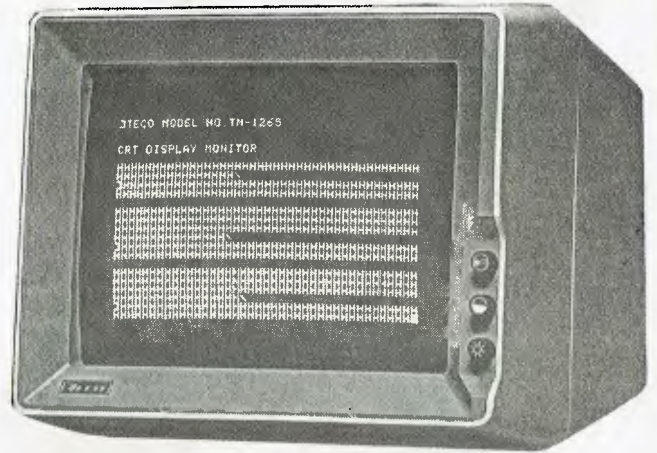
### MICRO-BUFF

P.O. BOX 174 MULGRAVE VIC 3170  
Please find enclosed cheque  
for the amount of \$ .....  
For the following.....  
.....  
.....

Please send me more  
information

Name .....  
Address .....  
Suburb .....  
State .....





**HIGH RESOLUTION GREEN SCREEN MONITOR**

- ★ Low Cost — High Performance
- ★ 12" Non Glare Green Display
- ★ Raster Scan for EIA Composite Input
- ★ Video Bandwidth 18MHZ (-3B)
- ★ Resolution 800 Lines (Centre) @ 20fl
- ★ Normal and Zoom Display
- ★ E.A. of NSW CERT No CS-2460N

**DATATREE DATA CASSETTE**

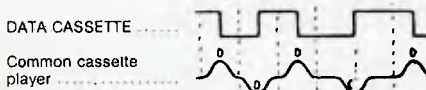
DATATREE offers you a professional cassette unit — DATA CASSETTE — which is specially designed with **SQUARE WAVE OUTPUT** to ensure 100% data transmission.

DATA CASSETTE also have built-in counter, SAVE indicator, PAUSE and AUTO STOP ... etc. All these make your data store/recall an easy thing — fast accurate!

DATA CASSETTE is compatible with **all kinds of home computers**. It's the best choice and it's at incredible low cost!

**SPECIFICATIONS**

- ★ Square wave output, 100% data transmission

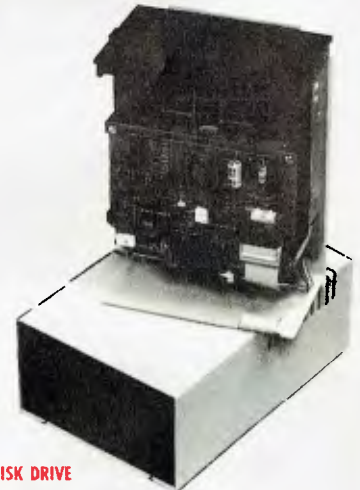


- ★ Stable output voltage 2.5V, no need to adjust
- ★ Frequency response: 100 Hz to 6.3K Hz + dB.
- ★ Input/Output impedance: 10K ohm.
- ★ Tape speed allowance: +3% to -2.5%.
- ★ Wow and flutter: Wrms 0.35%.
- ★ Power: 240V AC 50 Hz.
- ★ Built-in counter, SAVE indicator, PAUSE and AUTO STOP function.
- ★ Size: 198 x 158 x 55 mm, 7-7/8" x 6-1/4" x 2-1/8".
- ★ Weight: N.W. 700g.

**ASTECH 100CPS DOT MATRIX PRINTER**



- ★ Low cost by simplified design
- ★ Fanfold paper, roll paper and cut paper are applicable
- ★ Equipped with both parallel interface (centronics) and serial interface (EIA RS232C)
- ★ 9 x 11 dot matrix high quality print
- ★ Totally 12 validations for character printing within same line, including graphic printing
- ★ High through-put with bi-directional logic seeking
- ★ Maximum 11" of paper back feeding with minimum control pitch of 1/72"
- ★ Longer ribbon life due to oblique run
- ★ Easy detachable print head (detachable/attachable without tool)
- ★ Adjustable pin feed tractors



**AD-201 DISK DRIVE**

- ★ Use Shugart Mechanism
- ★ Run all Apple II\* Software
- ★ Low Cost



**AD-302 SUPER COOLING FAN**

- ★ 1 1/2" Super thin body
- ★ Australian standard 3 pin power plug
- ★ Easy installation, just clip on your Apple II
- ★ Entire system controlled by one front power switch
- ★ Power light indicator
- ★ Dual auxiliary outlets
- ★ Line surge suppression device built-in

**DIGITAL SOURCE INT'L PTY. LTD**  
(AUSTRALIAN IMPORTER)

169 Phillip Street, Waterloo N.S.W. 2017. Telephone: (02) 690 1268, 690 1540. Telex: AA 75406

**DEALER ENQUIRIES WELCOME**



## Random rumours

Commodore is rumoured negotiating with Mark Williams Company, Chicago, Illinois, to use the latter's Unix-like Coherent operating system on Commodore's Z8000-based, 16-bit micro-computer now in development. The minimum system is expected to include 128k of RAM and a 320k disk drive and sell for under \$800. An 8088 plug-in card option is also expected . . . Commodore is also rumoured to be preparing a portable computer employing a 16 line by 80 character liquid crystal display and wafer-tape drive . . . Texas Instruments is rumoured working on a 68000 processor card with Unix-type operating system for its desktop IBM PC compatible system . . . IBM is rumoured to be preparing an optional Selectric-type keyboard for its PC . . . IBM is expected to make 1.2 million PC Junior home computers this year and is reportedly also preparing to introduce an enhanced PC Junior shortly which it expects will be even more popular than the unit recently introduced. There are rumours that it is getting parts quotations to build three million of these units over a one year period . . . Gavilan/Computer, which introduced its radically new portable computer last May, is not expected to start shipping until March, ten months after its introduction. The hang-up seems to be the

*IBM PC Junior under scrutiny . . . personal computers made more user-friendly by new Visicorp package . . . unauthorised use of computers investigated by FBI . . . Sol Libes reports from Stateside.*

software for its integrated operating system and applications software which utilises a mouse-like touch panel . . . Coleco is rumoured to be preparing a new, high-end system that will be upward compatible with its Adam system. This probably means that it will use a disk drive in place of its 'stringy floppy' . . . Morrow Designs is expected to announce transportable and portable machines compatible with the IBM PC . . . the first IBM PC clone from Taiwan is expected shortly from Multitech Electronics. It is already selling an Apple clone . . . North Star is expected to introduce a multi-user system compatible with the IBM PC that supports 12 users . . . There are rumours that IBM is to start building hard disk drives for the XT in house . . . Lotus Development Corp is rumoured negotiating to buy an as yet unannounced Pick-like operating system for the PC/XT . . . IBM is rumoured working on versions of the PC/XT as integrated data/voice workstations and PABX peripherals . . . IBM is expected shortly to start production of the PC and XT in Australia, adding a third plant to the two already in operation in Boca Raton, Florida and Greenock, Scotland . . . Mattel Inc, maker of the Aquarius home computer, is rumoured getting ready to follow in TI's footsteps and exit the home computer business . . . Bank of America is expected to announce a 'Personal Computer Account' for owners of home computers who want to conduct bank transactions using their systems and the phone lines. Open the account and it will deposit \$24 to start it off. Fee will be \$8 a month.

## A look at IBM's PC Junior

The PC Junior is far from the least expensive home computer system on the market.

What it has going for it are those three magical letters on the front 'IBM'. And just as the PC/XT has become the *defacto* standard for office desktop systems, the PC Junior is expected to introduce a standard into the home/educational computer market where no compatibility currently exists. The lack of compatibility between systems is so bad that there is no compatibility between machines made by the same manufacturer (for example, Commodore, Atari, Apple). Thus the PC Junior's contribution to the home business market may be that it will finally bring some level of compatibility among software and peripheral products. It certainly offers nothing new in the way of technology or compatibility.

Companies who wish to compete at the upper end of the home computer market are expected to provide PC Junior compatibility. The companies who succeed here will be the ones who offer a lower cost combined with some additional value over what is offered on the PC Junior. Also, the success of PC Junior clones will depend to a great extent on IBM's ability to meet the market demand. One of the main reasons for the success of the PC/XT clones has been IBM's inability to catch up on demand.

Also, IBM is currently limiting distribution to its existing marketing channels. There is little doubt that later this year IBM will

increase its distribution channels to mass marketing channels. It will be at this point that companies such as Commodore, Atari and Coleco will begin to feel the competition.

It is also expected that this year will see the Japanese entering the home computer market in the US with machines designed specifically for the US market. The Japanese have previously tried entering the US market with machines that have been very successful in the Japanese home market. These attempts have not met with success.

## Apple news

There are also rumours that Apple will soon introduce a colour version of the Lisa computer as well as windowing and mouse capabilities for the II and III . . . and look for Apple to unveil a laser printer. It's also expected that Apple will standardise on the Sony type 3.5in disk drive for all future products.

Apple Computer and Rana Systems Inc have entered into an agreement to provide a disk add-on system for the Apple II which will provide IBM PC compatibility. The add-on will provide two 360k drives, an 8088 processor, 256k of RAM and the MS-DOS operating system for just under \$2000. The success of this product is uncertain since it costs more than the Apple itself.

Apple's Elf transportable computer (rumoured in this column previously) should be announced by the time you read this. The unit is expected to use a 6500-type processor and will have a high level of Apple II compatibility. It should have

**dBASE**

ABC 24  
ACS 1 Amust  
ACS 2 Apple  
Altos Adler-1  
Cromenco C-10  
DEC Rainbow  
DEC VT-180



The 2nd Australian

Personal

Computer Show

Centrepont

Sydney

14-17 March 1984



DRS-20  
DRS-8801  
Eagle III  
ECS 4500  
Epson  
Facom  
Heath

HP125/HP87  
IBM PC 1S  
IBM 3740  
ICL PC 1  
Kaypro II  
LNW80  
Med Fly

Microbee 'A'  
Microdecision  
Micropolis  
MS-DOS  
NEC APC (8")  
NEC PC 8001  
North Star

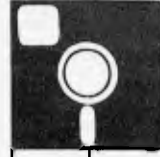


*Friday!*

Novel 2010  
OKI IF 800  
Osborne DD  
Osborne SD  
Otrona  
P'sonic JD740M  
PC-DOS 1.1SS



PC-DOS 1.1DS  
PC-DOS 2.XSS  
PC-DOS 2.XDS  
Sanyo MBC100  
Sanyo MBC555  
Seiko  
Superbrain



Televideo  
Toshiba T100  
Victor (Sirius)  
Wavemate  
Wang  
Wordplex Zenith  
Xerox Zorba



*See you There*

**Stay up-to-date**

**Concurrent CP/M** from Digital Research allows you to work with your computer the way you think, switching rapidly from task to task. Up to four (4) programs can now be run simultaneously. Make your personal computer really work. Concurrent CP/M with windows.

**Logo** from Digital Research is the "hot button" in education. It is the learning language of the future. Students make their own rules, their own syntax. Your microworld is a space for ideas. Intrigued? See it, try it, use it.

**GSX** from Digital Research is currently the only device — independent graphics systems for personal computers. It is available for most 16 bit micro computer systems. GSX opens up graphics to the business world.

**dBASE II** from Ashton-Tate is the industry standard which everyone tries to copy. It is complex and extremely powerful, yet even the novice will feel comfortable. Many software houses are using it to write sophisticated packages for the business market. Endorsement in itself.

**FRIDAY!** from Ashton-Tate is another powerful information manager. Written in dBASE II, it is even easier to use, and is around half the price. The mailing system alone, justifies its use in many situations. FRIDAY! is the office assistant you've been looking for.

**Get with the leaders**

Contact Arcom Pacific for the name of your nearest dealer. Arcom Pacific are Australian Distributors for Digital Research, Ashton-Tate and other leading software companies. Arcom Pacific provide disk formats for over 50 different micros.

**arcom  
pacific**  
software distributors & wholesalers

252 Abbotsford Rd., Mayne Q 4006 • Phone (07) 52 3862  
P.O. Box 13, Clayfield Q 4011 • Telex AA44187 AUSTRALIA  
A division of Sildis Pty. Ltd. trustee for the Archive Unit Trust (incorp in Qld)



## YANKEE DOODLES

64k of RAM expandable to 128k with some expansion slots on the motherboard. It will use a microfloppy drive and so the overall unit will be physically much smaller than the Apple II. RS232 and centronics ports are expected to be standard. A true battery operated portable CMOS version is expected soon.

Many Apple dealers reacted to the introduction of the IBM PC Junior by dropping the selling price of the Apple IIe to under \$1000.

## P-CP/M in beta test

Digital Research of Japan has disclosed that it's beta testing pre-production home computers using the new CP/M-in-ROM operating system. Reportedly, these units use an IC which integrates the system software ROM and processor into one IC, and will make possible the selling of CP/M-based systems for under \$250. This version of CP/M is being referred to by DRI as 'P-CP/M'.

Systems using P/CP/M are expected to compete with home computers using the new Microsoft MSX operating system. Several Japanese personal computer makers have already announced MSX based systems.

## Radio Shack news

Radio Shack has introduced an IBM PC compatible computer called the Tandy 2000. It has 128k of RAM, half height drives that store twice as much as the IBM

PC, twice the colours and pixel density, and it uses the 80186 microprocessor, running at almost twice the clock speed of the IBM PC's 8088 (the result is about four times the processing speed). Selling for \$2750, it is over 20% less costly. One of the most surprising things is that on the day Radio Shack announced the unit, it was demonstrating it in its computer centres.

The Tandy 2000 is representative of the newer IBM PC clones that are coming to market, which are more powerful and faster than the IBM PC and thereby create some compatibility problems. It is expected that IBM will switch to the 80186 and an improved colour display controller for its PC/XT to meet competition. It is also expected that the 80186 will be in short supply and so may cause delivery problems for vendors using it throughout this year.

## Large LCD Screen

Crystalvision, Sunnyvale, CA, is the first company to announce a flat panel LCD display device capable of displaying 25 lines by 80 characters. The company is promising that initial production quantities will be available this month at \$345 in 1000 quantity lots.

The unit will have an 8in diagonal measurement (1in larger than the Osborne Executive) and store permanent images. Thus it will not have to be refreshed as do the current LCD displays. It will provide a pixel density of 640 x 250 (IBM PC has 640 x 200) and a nearly 90 degree viewing angle (currently LCD

# Trade in your accounting machine on a 1984 Computer System.

## AMAZING 1-MONTH MANUFACTURER'S OFFER

### YOU GET:

- \* A superb 16-bit micro with 128K memory.
- \* An 80 column printer.
- \* Plus three brilliant software packages...  
DEBTORS  
INVOICING AND STOCK CONTROL  
WORD PROCESSING OR SPREADSHEET
- \* Free installation!

**LIST PRICE:** \$7,990

**WE GIVE:** \$2,000 trade-in on any accounting machine.

**YOU PAY:** \$5,990 only!

**OR LEASE:** \$39 per week\* (Tax deductible).

\*Average lease figure - 10% residual - 4 year period.

Available February only as Olivetti special promotion.  
Limited units at this price so act now.

Contact...



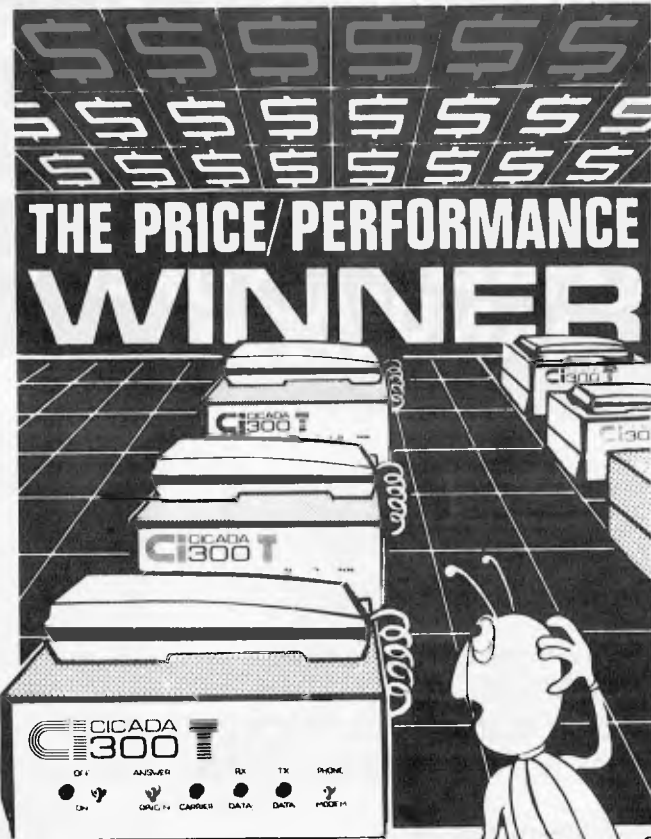
## DEKER BUSINESS MACHINES

Computers — Electronic Typewriters  
Calculators — Photocopiers

**174 Parramatta Road, Auburn  
Phone: (02) 647 2744**

Authorised Olivetti Distributor.

# NEW MODEL!



## CICADA 300T

DATA MODEM  
WITH INTEGRATED TELEPHONE

For user installation to a standard phone socket without Telecom assistance, the new Cicada 300T 300-Baud data modem features fully integrated phone for maximum convenience. With all the legendary performance and reliability of the standard Cicada 300:

Or, buy the continuously improved standard Cicada 300 for use with your own telephone. Now operated by hundreds of government, business and private users, the Cicada series modems carry a full, meaningful warranty.

**Specifications** (Both modems): Compact answer-and-originate units for direct connection to phone lines and for computer interface utilising either RS232C or V24/28 systems. Unit measures 203mm x 152mm x 63.5mm. Telecom approval number C83/37/1011.

Available now from Centre Industries or leading retailers.



187 Allambie Road, Allambie Heights, NSW 2100  
Telephone (02) 451 5555 After Hours (02) 451 6244  
Telex AA 22671

## YANKEE DOODLES

displays have a typical 20 degree viewing angle). The unit is less than 1in thick and is 10in x 7in overall. Crystalvision also claims that the contrast ratio is far better than current LCD displays.

This appears to be a significant jump over LCD devices shown at the recent Japan Electronics Show by Japanese companies, and may put the US back in the running in display technology.

## New computer crime laws

The state of Wisconsin is working on a law that will make unauthorised destruction or alteration of computer records a felony, with a fine of up to \$10,000 and 10 years in prison. Further, it outlaws computer programs that search through local telephone exchanges for computer dial-up tones, and bulletin board systems which include information on how to break into computer systems. About 20 other states already have laws on their books aimed at criminals who break into systems for financial gain, or who damage computer records.

## Victor problems

Chuck Peddle, founder and president of Victor Technologies, has been 'relieved' of the operation of the company and assigned to product development. Chuck, for those who might not

know, was the designer of the 6502 microprocessor and Commodore PET, the first integrated personal computer.

VT, founded only two years ago, now owes about \$50 million and has laid off about half of its 2000 employees.

## FBI traps computer intruders

The Federal Bureau of Investigation has begun investigating unauthorised use of computers using a 'trap and trace' technique. The FBI recently revealed that it had detected unauthorised use of the GTE Telenet system by trapping calls to a certain number and tracing their origin. Correlating this information with the time of the unauthorised entry into the system, it became the basis for the searching of homes around the country for other evidence of the computer break-in.

## Random news bits

Apple has finally released the hardware/software package to allow its Lisa computer to access IBM, Digital Equipment and other computers. This fulfils a rumour which previously appeared here . . . Tandy has finally begun shipping CP/M for its Model IV computer, nine months after it was first announced . . . Panasonic, Sanyo, IT&T and Sperry have finally decided that they too have to jump into

# What do you honestly think when you receive a letter that has been written by a computer?

~~COMPUTER~~

COMPUTER ✓

The letters you send out or the specifications you write are personal messages from your company to its customers or prospective clients.

If they appear to have been written by a computer then you cannot expect people to think of you as a caring, interested company.

Now if a computer does in fact write your letters, well that's your business. But if it looks that way to your clients then that's **bad** for your business.

Isn't that what you want for your business? Shouldn't our P.1350 be matched to your own computer?

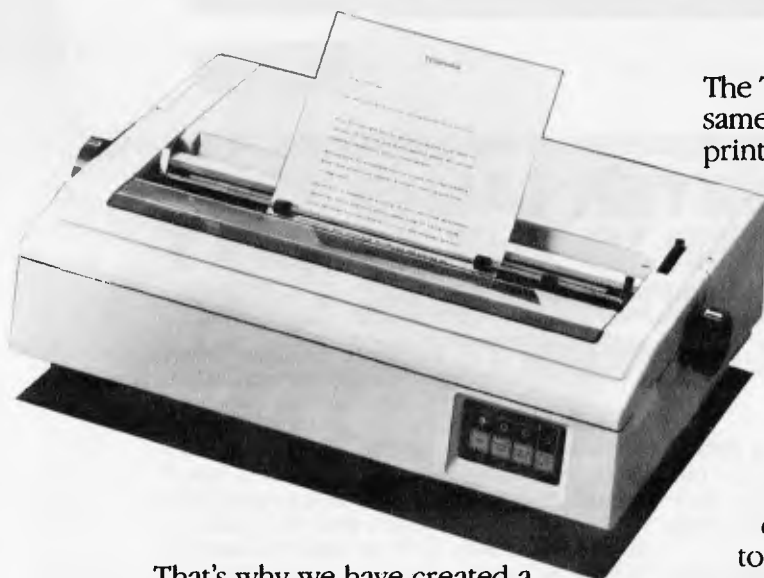
## MATCHING THE TOSHIBA P.1350 WITH YOUR MICRO-COMPUTER

You don't want to start from scratch, so naturally you want a printer that is compatible with the micro-computer you have now. If it's a NEC, IBM, Digital or our own Toshiba (T-300) then you have a perfect match.

## QUALITY ISN'T ALWAYS DICTATED BY PRICE

The Toshiba P.1350 comes with the same service warranty as any of the top printers on the market yet it's superior in performance and generally some hundreds of dollars cheaper. The reason for this is simple, we developed our own system and don't need to buy it from elsewhere. The result is a superior dot matrix system with a printing density that gives you 'normal' letter definition rather than a computer version of conventional typing. Please ask us to demonstrate this to you on your own company letterhead.

You get expert counselling and Toshiba service anywhere in Australia.



That's why we have created a printer, the remarkable P.1350, that produces high resolution graphics and printing that looks as though it could have come from the typewriter of your own secretary.

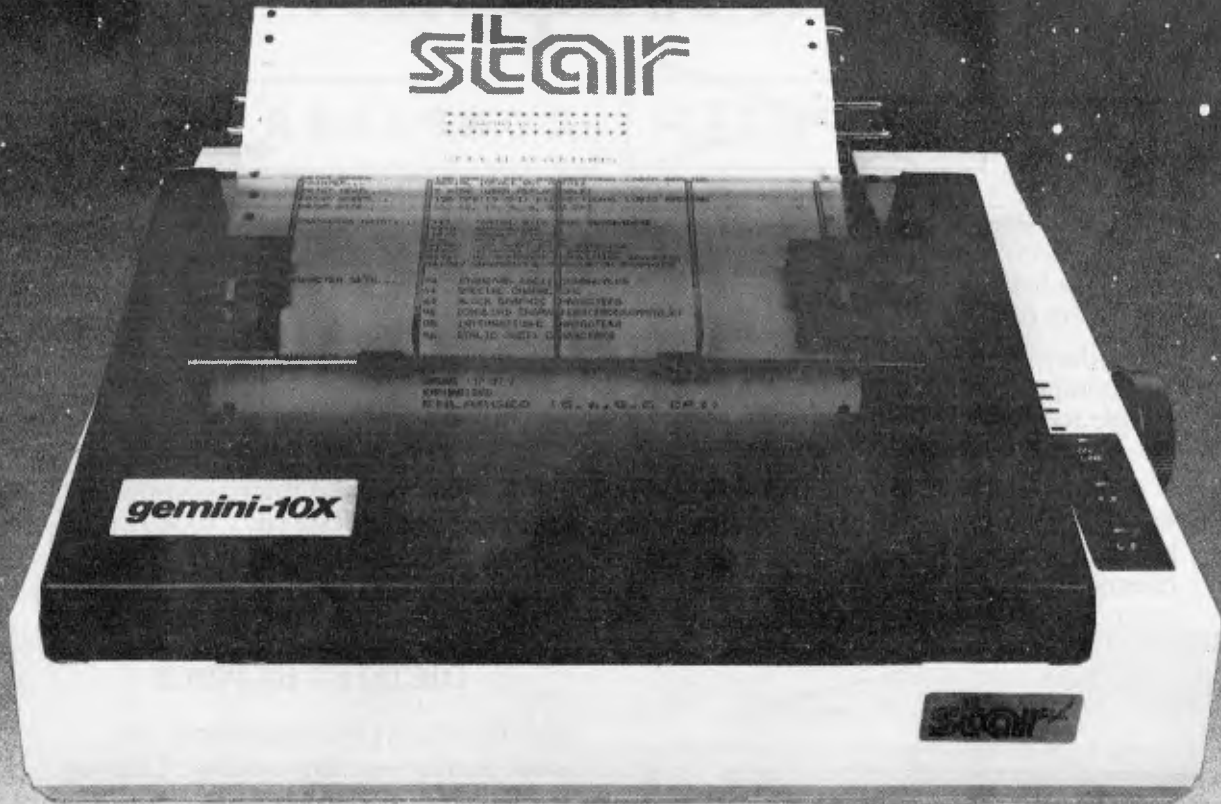


TOSHIBA (Australia) Pty. Ltd., E.O.E. Division,  
82-94 Talavera Road, North Ryde, N.S.W. 2113.  
(02)887 3322. AGENT ENQUIRIES WELCOME.

TEOE2130



# 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

# YANKEE DOODLES

the already crowded IBM PC compatible computer market (good luck!) . . . Digital Research has replaced Microsoft on a project to develop a Unix operating system for Intel's 80286 microcomputer . . . Apple is now offering a 30% discount to schools. IBM generally offers 20% off to schools.

## 16-bit version of 6502

When Commodore scrapped the 16-bit microprocessor it had been developing for several years in favour of the Zilog Z8000, it left the market wide open for an upward compatible 16-bit

version of the 6502. And sure enough, a company has seized the opportunity. Western Design Centre Inc. Mesa, Arizona, has announced a 16-bit microprocessor that runs 6502 software, in an emulation mode, without revision. The CMOS chip can address 16Mbytes of memory compared to the 6502's 64k. It has an 8-bit external bus and internal 16-bit bus. The most amazing feature is that it's pin compatible with the 6502. Just remove the 6502 from its socket and replace it with the W65SC816. Then just set the E bit in the status register and it performs just like the 6502. If the bit is off, the device becomes a 16-bit device.

# TRS-80 Model 4 CPM



## CPM OPERATING SYSTEM INCLUDES . . .

- Disk Interchange Format ability to copy 20 other manufacturers' disk formats.
- Memlink uses extra memory as a solid state disk drive.
- Emulates ADM3A Terminal.
- Full Australian Intergrated Accounting Software available separately for \$600.
- Supplied with all Digital Research utilities.
- Makes the Model 4 able to run all CPM industry standard software.

ONLY **\$250**

### deForest Computers

26 STATION ST., NUNAWADING, VICTORIA 3131.  
TELEPHONE (03) 877 6946 • TELEX AA 30625

## HOME, PERSONAL, SCHOOL and BUSINESS COMPUTERS

 **commodore**

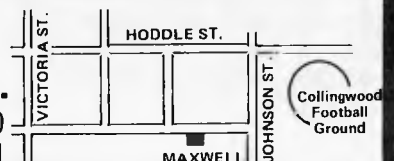
 **sirius**



Melbourne's largest range of programs  
Friendly expert advice and service  
Easy access — plenty of parking

OPEN SATURDAY MORNINGS  
Established 1968 — Member of O.E.I.A.

**Maxwell** OFFICE EQUIPMENT (VIC) PTY. LTD.  
162-164 NICHOLSON ST. ABBOTSFORD  
(near Hoddle Street) Telephone: **419 6811**



# The Best Spot in town for all your personal computing needs.

**SPECIAL  
PACKAGE  
OFFERS**



Spectravideo SV318  
Including Cassette Recorder **\$499\***



Commodore 64  
Triga Command Joystick  
Cassette Recorder  
& 4 Ozi Soft Programs  
**\$569**

**SAVE \$**

VIC 20  
Triga Command Joystick  
Cassette Recorder  
& 4 Ozi Soft Programs  
**\$369**

**SAVE \$**



**NEW!** The remarkable KoalaPad  
High-resolution Computer  
Graphics Touch Tablet from  
**\$149.95.** Includes Software  
Package

Sydney's Largest Stockist of  
Commodore 64 and Vic 20  
Software and Utilities.

**HARDWARE**

**NOW AVAILABLE!**  
The new Atari 600XL (16K)  
**\$399\***  
And the new Atari 800XL (64K)  
**\$599\***

Sinclair Spectrum from **\$299\***  
With complete software range  
available ex-stock.

Spectravideo SV328  
**\$699\***

## NEW SOFTWARE JUST ARRIVED!

### FOR COMMODORE 64

Zork. 1, 2 & 3.....	\$25.00*
Kongo Kong.....	\$24.95*
Home Manager.....	\$39.95*
Master File.....	\$39.95*
Underworld.....	\$24.95*
Bridge.....	\$24.95*
Choplifter (cart).....	\$64.95*

### FOR VIC 20

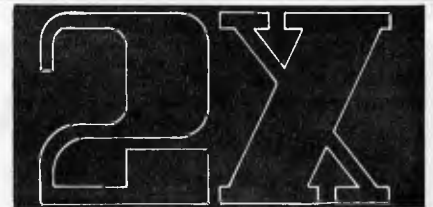
Macpan.....	\$19.95*
Cops & Robbers.....	\$19.95*
Fly Snatcher.....	\$19.95*
Mosquitoes.....	\$19.95*
Curse of the Werewolf.....	\$19.95*
Scramble.....	\$19.95*

### FOR ATARI

Strip Poker.....	\$39.95*
Bridge.....	\$24.95*
Monkey Maths.....	\$29.95*
Draw Pic.....	\$39.95*

Now franchised agent for B.B.C.  
MICROCOMPUTER  
Used by the ABC and  
recommended for use in schools in  
5 out of 6 states in Australia

**EXCLUSIVE**



**Extended  
Warranty**  
*Doubles the Warranty Period*

The Computer Spot now offers an  
Exclusive Extended Warranty that  
doubles the warranty period on  
pre-tested hardware to ensure  
trouble-free operation.

\*Recommended Retail Price

And so much more... from the spot with  
the lot in Home Computing.

# the Computer Spot

Castlereagh Street Level MLC Centre,  
Martin Place, Sydney 2000. Tel: 235 2971

Gallery Level Eastgate Centre, Bondi  
Junction 2022. Tel: 387 5208



# WORKSLATE

*After extensive research among end users who required their micros for spreadsheet tasks, the US company Convergent Technologies came up with the idea of a portable 'huggable not luggable' machine whose main purpose would be to handle spreadsheets. This idea has now become a reality. Robin Webster and Leslie Miner went along to the company's head office to find out how it all came about.*

The last 18 months or so has seen a tremendous upsurge in the development of portable computers of the type that can fit in a briefcase or be easily lost under a pile of magazines.

It was once thought remarkable that a small, hand-held computer terminal could be carried around by an individual for use in the daily work routine. Early devices were typically 'cramped' looking and bothersome to use — there was one that required the regular operation of three shift keys just for the letters of the alphabet. Software was virtually non-existent since the early terminals had only a minimum memory allocation, and data was output to a limited two or four-line light-emitting-diode (LED) display that was maybe 10 or 12 characters wide.

Now, companies like Epson, NEC, Tandy, Sharp and Panasonic have all committed valuable time and effort to the notion of portable computing power. Each of these companies has its own idea of what a portable computer should look like and what it should be able to do for the professional user. As such machines are of greatest use in specific applications, they should not be looked upon as complete replacements for desktop personal computers.

Generally, current portables have the following in common: multi-line, liquid-crystal displays, 40 or more characters in width; full keyboards that are fairly reasonable versions of full-size 'qwerty' equipment; and microcassettes used as a data storage medium. In a few cases, internal modems for communications work and integral printers to record the results of data manipulations are included.

Available software remains generally not very impressive, but the latest company to seek a major share in all the action may have adopted a promising approach.

US West Coast-based Convergent Technologies (better known for its high-quality office workstations) has designed

its WorkSlate portable computer around a single concept.

Software Arts, the developer of VisiCalc, took the green paper spreadsheet that cluttered every financial worker's desk and essentially turned it into a dynamic piece of software that would run on any number of general purpose computers. Convergent has now taken the spreadsheet software idea and turned it back into something tangible — a portable computer with the sole purpose of handling spreadsheets (although it can do a lot more than this).

Convergent went public in 1982 and

---

*'a portable computer with the sole purpose of handling spreadsheets (although it can do a lot more than this).'*

---

decided that it would concentrate on development in very specific areas.

One branch would continue the development of office workstations; another would set up development teams to work on powerful parallel processors — 'mega-frame' machines based around 32-bit chip technology that can run many operating systems concurrently. A third group would work on the development of 'n-generation' products — future products based on Intel chips.

It was still another group, a company within the company, that developed the WorkSlate. It was the brainchild of Convergent's Matt Sanders; he simply walked around a lot of offices and asked people what they used their personal computers for. Invariably, the answer was they used the PC's for doing spreadsheet work.

The problem with all this, as far as Sanders could see, was that in nine out of ten cases a \$4000 or \$5000 machine was being used primarily for one application. Considering that this was probably the most expensive way to go about it, Sanders began to ponder the ways in which a dedicated, but inexpensive, 'VisiCalc machine' could be made.

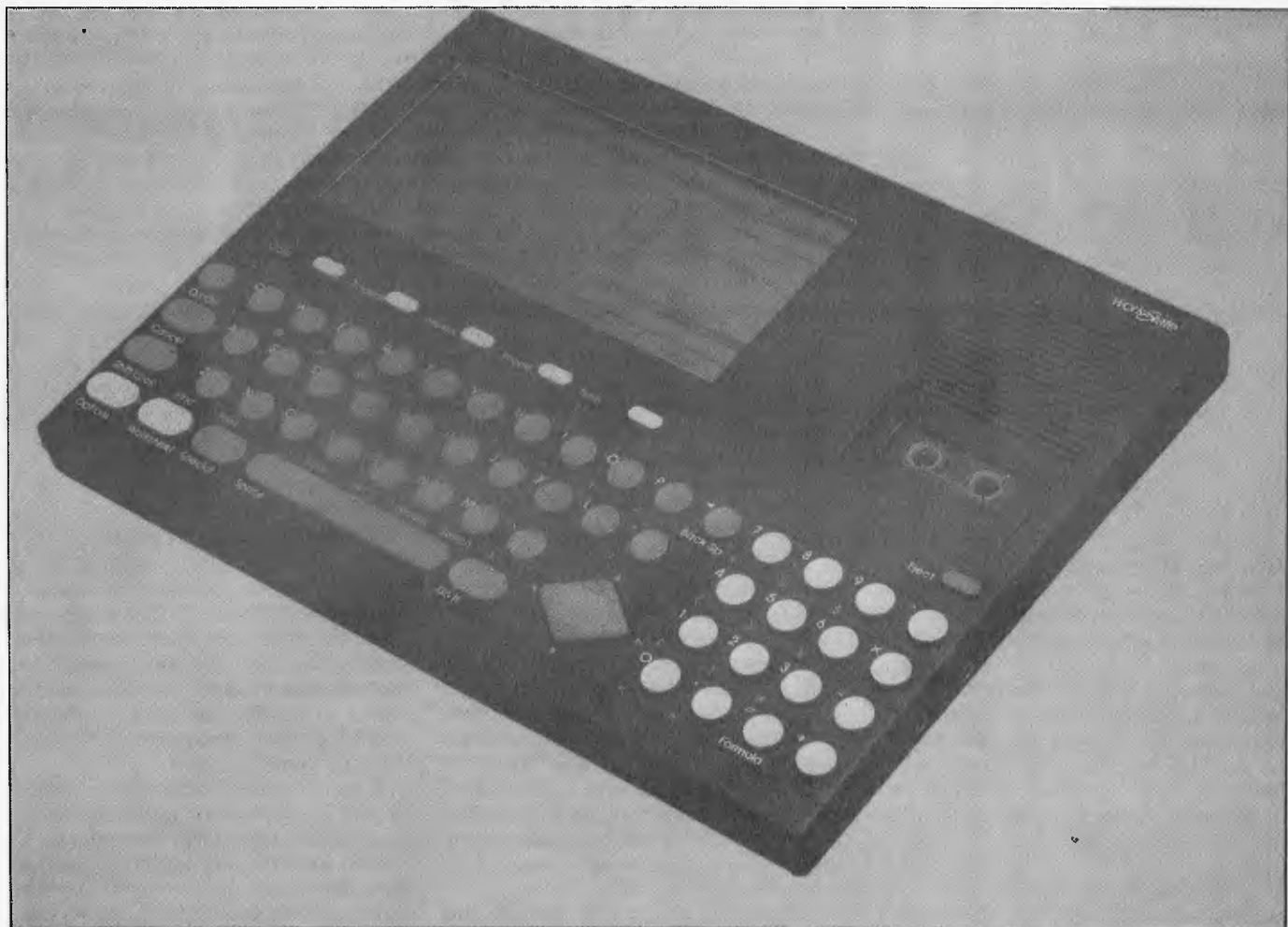
If a large number of the business people in the US — the ten million small business proprietors, one million accountants, six million mid-level managers, and four to five million sales and service personnel — were not doing financial work on personal computers because of their complexity and price, then such a product would be extremely viable.

With a WorkSlate-type product, these people would not have to make 'shot-in-the-dark' decisions about which personal computer to buy, which operating system to run, how much memory to install, and which spreadsheet was the best.

The tempting, but often misleading, vendor promises the claim 'my spreadsheet is better than your spreadsheet' could be more or less ignored, if, besides being easy to use and relatively inexpensive, the new product could incorporate all the best features of current spreadsheet packages.

Having convinced himself, and the necessary Convergent Technologies executives, that a portable spreadsheet computer would find a ready market, Sanders was given a budget with no other specific directives. The project, in development for 14 months or so, was kept a secret from all but a few top people in the corporation. It was given the code name 'Ultra'.

Sanders found a base for the project in an old building in Santa Clara. It was dubbed 'The Vault' because the building had once housed a credit union, and the Ultra team had to handle one unexpected problem: people would leave cash on the



*At first glance, the WorkSlate looks like some kind of grand calculator due to its LCD display*

receptionist's desk and walk out, thinking they could still make deposits to their credit union accounts.

The WorkSlate development team included people recruited from Motorola, Hewlett-Packard, Texas Instruments and Atari. The team obviously benefited from such diverse influences.

Karen Toland, marketing manager in the WorkSlate division, and one of its key designers, worked at Savin for about 10 years in the field of office automation and word processing. 'We knew from the beginning that the WorkSlate had to be portable; it could not be tied to an AC mains plug, and this required that we use CMOS technology. It also had to be a true portable, something that went into a briefcase, but didn't take up all the space. Most of the so-called portable computers on the market are difficult to transport—I liked to point out that we were making a huggable machine, not a luggable machine.'

## **Hardware**

The WorkSlate is indeed a very compact device measuring a mere  $8\frac{1}{2} \times 11\frac{1}{4} \times 1$  in, and weighing less than  $1\frac{1}{2}$  kg. It can

easily be mislaid among a pile of office documents, or in a desk drawer.

A wide range of features are packed in. There is a specially designed LCD display which can show 16 lines  $\times$  46 characters. The machine also features a unique twin-head microcassette drive developed by Olympus for Convergent which can record data in digital form along one edge (track) of a standard microcassette and record verbal messages in analogue form along the other. Other features include a built-in 300 baud, auto-dial, auto-answer modem, 64k of ROM-based software and 16k of user RAM.

At first glance, the WorkSlate does look like some kind of grand calculator, because of its LCD display, its textured black plastic shell and small, circular keys. There is an immediate sense of portability about it. This contrasts with the 'hard' aluminium/stainless steel look of many other portables which appear to be designed heavily in keeping with the standard typewriter keyboard.

In fact the design and subtle colours are quite pleasing, and rather more handsome than is apparent in the photographs. The smooth grey sculpted keys are just ergonomic enough.

The display, after familiarisation, is just large enough to be useful. The key labels—white for alphanumeric, green for special functions and yellow for other functions—are just distinctive enough to be helpful.

## **Display**

Since the WorkSlate was given a relatively large display, Convergent has been able to divide it into a number of distinct areas that keep the user informed of events.

Although the screen can show 16 lines by 46 columns at a time, the top line is used by the system as a 'status' line.

The first eight characters of the top line show the filename. You are allowed to use alphabetical, numeric and punctuation characters. If the box contains the word 'empty' then the worksheet has not yet been named (similar to the 'TEMP' default name given to all unnamed files in the Multiplan spreadsheet system).

The next 16 character space is used to show the contents of the active cell—the cell where the cursor is currently located. If the active cell contains the result of a formula, then the formula will be shown, rather than the formula product.

The area containing the number '79%'

# THE AFFORDABLE PLACE TO SHOP

## MICRO-BUFF HARDWARE SUPPORT PRICE LIST

	tax paid
80 column interface card to suit apple. . . . .	\$99.00
40/80 soft switch to suit above. . . . .	\$20.00
Centronics print I/Face with buffer 16K. . . . .	\$140.00
Grappler interface and cable. . . . .	\$90.00
Z80 interface with manual . . . . .	\$95.00
Z80 cpm interface card . . . . .	\$65.00
16K ram card . . . . .	\$80.00
128k ram card with software. . . . .	\$225.00
256k ram card with software. . . . .	\$650.00
Centronic interface to suit all printers. . . . .	\$65.00
DISK DRIVE CONTROLLER. . . . .	\$65.00
8" disk drive controller cables 1.2mg storage includes software PASCAL CP/M DOSS . . . .	\$1120.00
C ITOH 1550 140cps 15" printer only a few left . . . . .	\$1070



**KAGA GREEN  
TAX PAID \$179**

## MICRO ~ BUFF

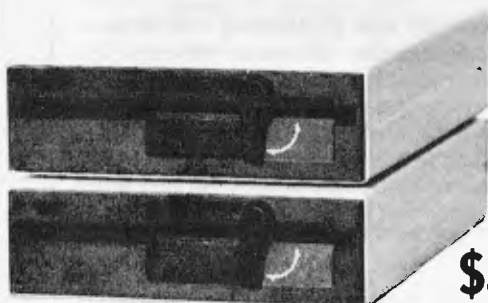
**TELEX AA30625ME537  
TELEPHONE 560 7416 (ASK FOR RAY POPE)**

**28 MAYLANDS CRESCENT,  
GLEN WAVERLEY 3150  
MELBOURNE, VICTORIA,  
AUSTRALIA**

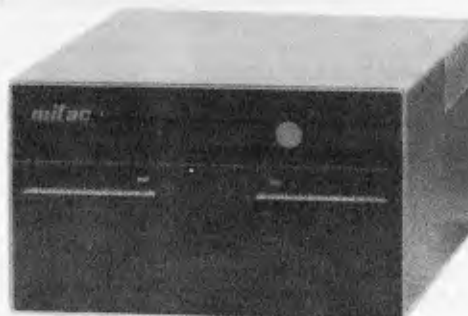


**SHUGART DISK DRIVE  
\$320.00**

**MICRO 64K 6502-Z80A  
DUAL MICRO PROCESSOR  
\$650.00 PAX PAID**



**TEAC DISK DRIVES  
\$320.00 TAX PAID**



### MICRO-BUFF

P.O. BOX 174 MULGRAVE VIC 3170

Please find enclosed cheque  
for the amount of \$ . . . . .  
For the following. . . . .

. . . . .  
. . . . .  
. . . . .

Please send me more  
information

Name . . . . .

Address . . . . .

Suburb . . . . .

State . . . . .



keeps track of the remaining amount of WorkSlate memory available to you (this is set to 100% at the beginning). It also occasionally displays a small square and cell counter which indicates that it is off searching or calculating and has 'X' number of cells to process.

The empty box next to this is used for showing further pictorial symbols; an example is the small picture of a telephone handset when you use the WorkSlate for communications work and the phone is ringing, on hold, or off the hook.

The next two sections are clearly there to show the current date and time, and these can be set and reset by the user through the various menu options.

Column labels (A, B, C, etc) are displayed white on black and stretch from A to Z to AA to DX, and the current column is marked by a small arrowhead shape set to the right of the pertinent label. Similarly, row labels, which go from 1 to 128, are highlighted and use the same arrowhead location marker.

Two lines at the bottom of the screen can display menus, the contents of which depend on whatever task the user is doing. Since they change frequently, from task to task, they are called Action keys.

LCD displays are often difficult to read in varying light conditions, but Convergent has found a satisfactory way around this. Along the left edge of the WorkSlate, there is a display intensity dial that you can adjust.

## Keyboard

There are a total of 60 keys on the WorkSlate. Most allow the user to input more than one character or carry out more than one action when used in conjunction with a 'shift' key. Each key is no more than fingertip size; the relevant symbols are pointed onto the black casing off to the left of each key.

Ordinary alphanumeric input is possible by pressing the circular grey keys alone (the white characters are input). Punctuation and other important symbols and/or actions (marked in green) are invoked by first depressing the green 'Special' key at the bottom left of the keyboard. Keys with yellow markings are often used keys like the space bar, shift and on/off.

*'The WorkSlate comes with a selection of built-in functions and worksheets which Convergent believes will meet the immediate demands of the user.'*

By this means, the WorkSlate can be made to generate the full A-Z, 0-9 range, punctuation marks (! @ # , ? " ;), and symbols such as the Boolean '>' (greater than), or '#' (not equal to).

WorkSlate-specific keyboard functions include keys that will Find, Print, Save,

## Get, Recalc, Switch, and Do It.

'Do It' was the idea of Karen Toland who played a very important role in getting potential end users involved in the design process at a very early stage. She also battled with the programmers and engineers because she wanted the WorkSlate to have a 'Do It' key instead of the usual 'Enter', 'Return', 'Execute', or 'New Line' buttons.

'It was a radical idea to the engineers that users be involved in the design process,' said Toland, 'but I don't think they would have it any other way now.'



Standard printer output is 40 characters wide

The oval **Worksheet** key to the left of the **Special** key is used in conjunction with the five oval buttons just below the display — marked **Calc**, **Finance**, **Memo**, **Phone**, and **Time** — to list the range of worksheets that are built into the WorkSlate.

Each of these worksheet keys brings up a particular set of Action keys on the bottom two rows of the display, as mentioned earlier.

**Calc** is an on-screen calculator feature, and its use with worksheets is explained later.

'**Finance**' produces a specially set-up financial analysis worksheet that guides the user through such tasks as net present value, and future value analyses.

'**Memo**' brings up a memo pad type of worksheet which can be used to store brief textual messages or, if you really need to, up to 3000 words or so of text — although it is not a word processing system (it has no

word-wraparound, for example). The Action keys relating to Memo are concerned with voice recording (Stop, Play, Record, etc).

'**Phone**' is a phone-list worksheet which is set up to store a contact's name, telephone number and address, and the

'Action' keys allow the WorkSlate to function as a phone (Dial, Hang Up, Answer, Speaker Phone). What's rather neat is that the phone number listed in the worksheet can be automatically dialled by the WorkSlate if you wish.

'**Time**' brings up time-related action keys and also displays a personal calendar worksheet. This allows you to enter the details of a future meeting or task and then have the WorkSlate alert you about it nearer to the time by setting off an alarm and displaying a message.

The 'Options' key at the bottom-left

corner of the WorkSlate is a very important addition since many more keys, or more complex set of commands, would be needed without it. Like the Worksheet key, it is also linked with the five buttons underneath the display so that at any point while working with a spreadsheet (built-in or otherwise) you can gain access to built-in commands.

Pressing Options once will reprogram the five buttons so they now offer the ability to: **CHANGE**, or edit, data already on the worksheet; **CLEAR** data that is no longer required (anything from a cell to the whole worksheet can be **CLEAR**ed); **COPY** the data in one cell or area to anywhere else on the spreadsheet (useful for certain kinds of headings or drawing boxes around data); **DELETE** data at all levels; and to change the **DISPLAY** defaults (do you want to have commas in your numbers, or do you want to display the formulas on the worksheet? — for example).

Pressing Options a second and third time lists the commands **DRAW**, **FORMAT**, **INSERT**, **MOVE**, **NAME**, and **SET UP**, **SORT**, **WIDTH**, and **WINDOW**. Suffice it to say that by selecting one of these options further sub-menus with more and more specific key assignments appear.

In between the main key section and the 16 key numeric/special symbol pad occupying the right-hand side of the unit, there is a four-way cursor controller which is rather fun to use. It is a combination of a

joystick and the traditional arrow keys (press the top of the diamond shape and the cursor goes up, etc). Other machines would do well to use this design.

The On/Off button is located at the top left of the keyboard area, just above the CANCEL key, which cancels any operation in progress or eliminates menu displays.

Initially, it was difficult to use the keys accurately, mainly because they are a cross between the standard typewriter layout and a calculator keypad, and also because the complete WorkSlate is actually smaller

used to help to train people to do a particular job with the machine (Convergent itself supplies the narrated Teach Me Now and Teach Me Later microcassette-based learning packages with the WorkSlate).

When a user inserts a cassette, the system puts up the message 'checking for data' to indicate that it is looking at the tape's directory. This directory is located at the beginning of the tape, so the search takes just a few seconds. Once it has completed the search, the WorkSlate returns the user to wherever he left off in an

send worksheets over the telephone network to other WorkSlate's or host computers.

The remaining telephone jack is used to connect the WorkSlate up to all sorts of peripherals, including Convergent's own MicroPrinter — a companion product that measures  $1\frac{3}{4} \times 6\frac{1}{2} \times 8\frac{1}{2}$ in and which runs off batteries or an AC adaptor. It uses  $4\frac{1}{2}$ in wide paper and can print between 40 to 80 characters per line.

For a portable computer to be reliably portable, it must be able to carry its own power source around with it. Convergent has tried to make completely sure that no WorkSlate user will have to see the frustrating sight of a completely 'dead' machine because he forgot to put in a new set of batteries.

You can use the machine off the mains, with the 6 volt AC to DC converter supplied, or you can use four AA size batteries which supply enough power for eight to ten hours. Or you can use the optional rechargeable NiCad battery pack which can be topped up every five hours or so by the 6 volt DC transformer.

If for some reason the power source should fail, there are still two button batteries (digital watch type) which will maintain all worksheets in memory for up to a week. If you get to that point, the WorkSlate displays a message advising that you replace them.

Access to the AA battery and button battery compartments is from underneath the machine. The retaining lids fit snugly, and the batteries are not allowed to rattle around. Also underneath the machine is a small foldaway rest which can be opened up when the WorkSlate is being used on hard surfaces. The flap inclines the machine towards the user, so making its operation and viewing of the display much more comfortable.

If you really get into a jam, or just want to clear the machine's memory, a tiny reset button is situated under the front edge of the WorkSlate. You will need something with a fairly fine point, maybe a ball-point pen, to operate it.

## Using the WorkSlate

The WorkSlate comes with a selection of built-in functions and worksheets which Convergent believes will meet the immediate demands of the user. Those users who require more complex worksheets can, of course, create them as required. Let's take a look at some of the built-in features first.

**The Calc function.** This will be a real boon to those who use conventional spreadsheets and regularly find themselves having to add numbers up on paper (or in an unused cell somewhere off to the right of their work area) whenever a total



*A compact machine with a specially designed LCD, and an ergonomic keyboard.*

than most PC keyboards. The characters are placed off to the left, and the Special key has to be used to enter commas, question marks and quotes. But once accustomed to the layout — a matter of minutes rather than hours — data entry became quite easy.

Probably the most difficult thing to come to grips with is the quick-thinking that has to be done when deciding which of the keys marked Options, Worksheet and Special you need for a task, and subsequently which Action key, or menu selection, you need to accomplish your goal.

## Microcassette drive

At the top right of the WorkSlate is the microcassette recorder/data storage unit. One microcassette can store up to 10 spreadsheets only (five to each side of the tape), or up to 30 minutes of audio information. A powerful use of the WorkSlate's ability to store data in both analogue and digital form is that the two may be used simultaneously — so creating, among other things, the concept of voice annotated spreadsheets. This kind of annotation will be of great importance to the target users since spreadsheets — even well formatted ones — tend to require further explanation when shown to those not involved in their original development. The voice feature could also probably be

application. Those people used to the rapid data access offered by floppy/hard/ RAM disks might find the time it takes to save or load data from the microcassette a bit long, but it is not a big problem.

Loading a 61 row  $\times$  4 column spreadsheet from tape takes about 26 seconds. Rewinding a tape after turning it over (the directory is located at the left hub end of the tape) takes about 70 seconds. These times are acceptable although not impressive.

Just above the cassette drive, hidden by a plastic grille, is the speaker. When the WorkSlate needs to inform the user of some event it emits a beep. And, of course, when there is a verbal message, it will play it on demand. Because of its limited dimensions, the WorkSlate has all its I/O ports set into its sides, which are only one-inch deep. On the right side there is a dial that controls the speaker volume and two small jack-plug sockets — one for an earphone and another for a microphone. The microphone is not completely necessary since an internal IC mike is provided. Along the back edge, to the right, there are three telephone jack sockets and a DC power inlet. Two of the phone sockets are used to connect the WorkSlate 'in line' to a standard telephone to enable it to carry out auto-answer or auto-dial procedures. That is, it can act as a limited telephone answering machine (it will answer with a message, but is currently unable to record phone messages) and will automatically

figure must be input. Totalling company inventories, which tend to vary widely, might be such an occasion.

The WorkSlate offers a far simpler and nicer method of doing such additions. By pressing Special plus Calc, a small window-like area opens up along the bottom of the screen containing what is obviously a calculator display and function keys. All the standard calculator functions can be carried out, with the WorkSlate using its current worksheet as a data storage, or memory, area (shades of Lotus 1-2-3). The result of any calculation can be added to (M+) or subtracted (M-) from the currently active cell in a worksheet.

Values already entered into the worksheet — without the aid of the Calc function, and even if they are the result of a formula — can also be transferred onto the calculator display by selecting the Recall M option. Store M simply places the current calculator display value on the worksheet — it does not record the figure on the column of sub-totals and past calculations that appears at the top of the calculator display like a roll of paper tape. If the MicroPrinter is attached during calculator mode, a hard copy can be obtained with negative numbers automatically printed in red.

**The Finance function/worksheet.** If you have ever been faced with creating and recreating various spreadsheets to do loan amortisation, depreciation, and net pre-

already stored data by first checking the beginning of each tape for a voice or data tape identifier. If it is a new tape, or a voice tape, the WorkSlate displays the message 'Tape has no data'. If data is encountered, the prompt would be 'Data tape: Record will erase'.

To control the microcassette drive, the five action keys are assigned the values of the piano-like keys found on standard cassette equipment: **Record, Play, Stop, Rewind, Forward.** These operate explicitly, but there are some things you don't have to worry about — for example, you don't have to press the Stop key to switch from fast forward to rewind.

**The Phone function/worksheet.** After attaching your WorkSlate to a telephone, or even just a telephone socket, it is possible to use the machine for many communications purposes.

It will allow you to answer phone calls using the built-in speaker phone. It will dial numbers listed in your PhoneList worksheet (accessed by pressing Worksheet and Phone) automatically, or allow you to enter other numbers via the numeric keypad. It will automatically make calls to or receive calls from host computers (such as *Dow Jones* and *The Source*) and other WorkSlates, or send worksheets to and receive worksheets from another WorkSlate (see the section on Data communications).

If you are too busy, the Phone function

calendar period to work with, based on the worksheet principle. By giving the calendar start date, the system updates the following days according to an embedded formula. Messages can be typed in and alarms set for any day within the two weeks.

## Setting up worksheets

Setting up a spreadsheet on the WorkSlate

	A	B	C
1	EXAMPLES OF MATH/LOGIC FUNC		
2			
3		10.00	
4		20.00	
5		30.00	
6		40.00	
7		50.00	
8			
9	AVERAGE =	30.00	
10	MAX =	50.00	
11	MIN =	10.00	
12			
13		10.10	
14		21.25	
15		22.22	
16			
17	TOTAL =	53.58	
18	INTEGER =	53.00	
19	ROUNDED =	54.00	
20			
21	Raise 9 to the sixth power.		
22			
23		9.00 to power 6	
24		equals 531441.00	
25			
26			
27			
28	Truth checking with IF/AND.		
29			
30		22000.00	
31		11000.00	
32			
33	IF cell A30 > 20000 AND cell		
34	A31 < 15000 display "error"		
35	else display "OK".		
36			
37		error	
38			
39			
40			
41	Truth checking with IF VALUE,		
42	VALUE1, ELSE VALUE2.		
43			
44		81.50	
45		125.00	
46			
47			
48	IF cell A44 > cell A45 THEN d		
49	"re-enter data" ELSE display		
50			
51			
52		great!	
53			
54			
55			
56	Date and Time arithmetic usin		
57	US format of month/day/year.		
58			
59	Problem: Find the difference		
60		8/14/46 and 9/12/84	
61			
62		9/12/84	
63	minus		
64		8/14/46	
65			
66	equals	13909 days	
67			
	D	E	
	ONS.		

Examples of maths/logic functions

*'Like the adjustable LCD display and the twin-head cassette drive, the \$249 MicroPrinter is a unique technological development.'*

sent value (NPV) calculations, you'll be relieved to find these functions ready-to-go in the WorkSlate. It's worth taking a cursory glance at one of the depreciation procedures to see how the WorkSlate keeps you on track.

First, you press Special and Finance to obtain a menu listing the functions **Deprec, Loan** and **NPV** and the WorkSlate prompts 'Select an action key'. Selecting **Deprec** lists another menu which offers the choices of **Decline, Straight** and **SumYears** depreciation and the prompt 'Select a method of depreciation'. Pressing **Decline** (which handles declining balance calculations) leads to a really specific menu — **%Rate, Book, Salvage, Period #** — that will be used, in conjunction with the correct responses to WorkSlate prompts, to finish the task. This kind of hand-holding is great, and reduces sensible, but rather tedious, calculations to an easy routine.

**The Memo Worksheet.** The memo key allows you to dictate and record messages onto a microcassette. The WorkSlate protects careless users from recording over

also allows the WorkSlate to act as a one-way answer-phone machine — playing a recorded message to all callers.

**The Time Function/Calendar worksheet.** Naturally, through the time options you can set the system time and date. Pressing **Special** and **Time** gives the menu: **Alarm, Date, Set Time, Timer** and **Reset**.

Selecting **Alarm** displays the prompt 'Type date, time for alarm, then press Do It'. The present time and date is displayed for you to change and then the WorkSlate prompts 'Type message, then Press Do It'. At the pre-set date and time, the WorkSlate turns itself on, sets off an alarm beep seven times, and then indicates which worksheet contains the message to be read.

When **Timer** is selected, the WorkSlate displays a clock icon and counter instead of the current date and time. This feature is pretty much like running a stopwatch to mark elapsed time. The **Reset** option is used to reset the timer.

But you can do much more in the **Time** function mode. It gives you a two-week



# DON'T JUST BUY A NAME

## CP/M Plus

Digital Research's™ enhanced version of the world's most popular operating system. New features include extensive help menus, powerful new system utilities, automatic time and date stamping of files (using the MAX-80's real time clock/calendar), memory bank switching, password protection, and the availability of the world's largest base of applications programs. (Optional CP/M86 & MS/DOS available soon.)

## LDOS

Runs almost all Radio Shack Model III software. Includes: extended disk BASIC that is upward compatible with TRS-80 Model III BASIC; advanced operating system features (input/output [I/O] redirection, filters, job control language, password protection; and many valuable utility programs (high speed backup, direct disk maintenance, a number of filters, and even a modem communications program).

## 3½, 5¼, 8 inch Floppy Interfaces

The built-in controller can read and write single and double sided, and single and double density, formats of 3½ inch, 5¼ inch, and 8 inch floppy drives. The MAX-80 can control eight drives (of mixed sizes, sides and densities) at once.

## Serial and Parallel Ports

Two RS-232C serial ports (full duplex, synchronous or asynchronous) have independent baud rates from 50 to 19,200 baud (bits per second).

## 128K RAM

Twice as much as the "standard" on almost all other inexpensive computers — including the basic IBM PCjr, Apple IIe, TRS-80 Model III, 4 and Kaypro II and IV.

## 5 MHz Z80B CPU

Runs 150% faster than the Apple IIe or Tandy Radio Shack TRS-80® Model III. 25% faster than the Kaypro II, IV and the TRS-80 Model 4. (Optional 16 bit 8088 expansion available soon.)

## SASI/SCSI Winchester Interface

Communicates directly with Winchester controller boards that are either SASI (Shugart Associates™ System Interface) or SCSI (Small Computer Standard Interface) compatible.

## Redefinable Keyboard and Video Characters

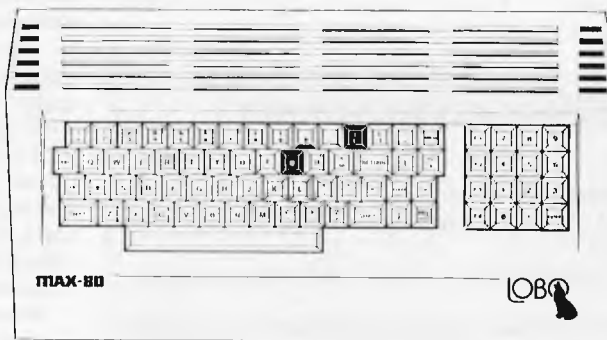
The 76-key professional keyboard (including a numeric keypad, 4 programmable function keys and 4 cursor control keys) is completely software configurable (and reconfigurable).

All 192 video characters may be defined as any shapes that can be generated by an 8 x 8 dot matrix, such as many different fonts, foreign language characters, and video graphics characters.

## Standard Features

- Clock/Calendar with battery backup and internal battery recharger — useful both for real time control and for time and date stamping of files.
- Fully buffered expansion bus, convenient for attaching external device controller boards.
- Composite video screen output, for the most popular type of CRT monitors.
- Software selectable screen format 80 x 24, 64 x 16, 52 x 16.
- Boot selection switch, for booting up from any of the disk drives attached to the computer.

The Centronics™ type parallel printer port matches the most standard printer interface available today — to make printer connection as simple as possible.



## Full Year Limited Warranty

The MAX-80 hardware has a limited one-year parts and labor warranty — which is possible only because of the extreme reliability built in from the start. Call or write for the complete warranty statement.

**BUY A FLEXIBLE, POWERFUL, FAST, VERSATILE, AND EXPANDABLE COMPUTER AT AN AFFORDABLE PRICE OF \$1790.00**

**MARCH AND APRIL SPECIAL INTRODUCTORY OFFER (\$1670.00)**

## INTRODUCING MPS ACCOUNTING SOFTWARE

A Fully Integrated Management and Accounting System Designed in Australia for portable, personal and desktop computers.

This high-quality, reliable software was designed to be very flexible and easy to operate. It is user-friendly, completely menu driven and provides screen help facilities. It is easily adaptable to a wide range of businesses. Feature-for-feature, and dollar-for-dollar it is the best software value on the market! The following modules are currently available at \$490.00 per module.

Accounts Receivable, Accounts Payable, General Ledger, Invoicing and Payroll.

Minimum System Configurations: 8 Bit or 16 Bit CP/M or MS/DOS with 2 Disk Drives and 48K RAM

FOR MORE INFORMATION, OR FOR A DEMONSTRATION, OR TO PLACE AN ORDER, WRITE TO:

## MICROPROGRAMMING

**P.O. BOX 475, MOUNT WAVERLEY, VIC 3149**

**OR CALL 560 7664, 232 8801, 873 2069**

ALL PRICES INCLUDE SALES TAX

TRS-80 is a registered trademark of Tandy Corporation. Apple IIe is a registered trademark of Apple Computer. IBM PCjr is a registered trademark of International Business Machines. MAX 80 is a registered trademark of LOBO Systems, Inc. Kaypro II & IV are trademarks of Kaypro Corp. CP/M Plus & CP/M86 are trademarks of Digital Research, Inc. MS-DOS is a registered trademark of Microsoft Inc. Specifications and prices are subject to change without notice.

follows more or less the same route as might be taken with VisiCalc-type software since the end goal is in essence the same. First, you figure out the application. Then you design a usable format. Then you start entering text and formulas.

With the WorkSlate, formulas are entered into a cell by pressing the button marked **Formula** located on the numeric keypad. This displays the prompt 'Select Action key or Type Formula, then Do It'

and, on the next line, 'Cell xxx ='. It then waits for you to type in the formulas.

You can do this the hard way, by manually typing in the row and column labels in the format:  $A10 = (A1+A2+A3)/(A4+A5+A6) * 0.25$ . Or you can make use of the options: **Average**, **Maximum**, **Minimum**, **Total**, and **Copy Cell**.

Copy Cell is used to copy formulas from cell to cell.

## Configuration commands

ACTION KEY	FUNCTION
Terminal Display	Enables access to configuration options.
Control	Enables access to display control keys Control, EchoPlex, HalfDplx, # Lines.
EchoPlex	Displays control character being received from remote computer system.
HalfDplx	Tells WorkSlate to echo back characters received from another WorkSlate or remote computer.
# Lines	Tells WorkSlate to transmit characters entered at the keyboard to remote system.
Line End	Defines the number of lines of the WorkSlate display to be given over to showing incoming and outgoing communications data.
'R	Allows you to choose the end-of-line character.
'F	Specifies eol as a carriage return.
'R'F	Specifies eol as a line feed.
Modem	Specifies eol as combination of the above.
Parity	Accesses the modem configuration keys: parity, Xon/Xoff, parity, and standard.
Xon/Xoff	Specifies Zero, Ones, Even, Odd or None.
Security	Enables 'handshaking' between remote systems (Workslates and otherwise) and your machine.
Incoming	Enables you to establish security protection.
Outgoing	Sets WorkSlate to receive incoming worksheets.
Password	Sets WorkSlate to transmit worksheets.
	Allows you to set up communications password.

## Technical specifications

CPU	Hitachi 6303 8-bit microprocessor.
ROM	64k of ROM containing diagnostics, and the Phone List, Finance, and Time/Calendar worksheets.
RAM	16k user memory.
Display	16 line x 46 character liquid-crystal display with intensity control set in the left-hand edge of the case.
Keyboard	60 keys, including numeric keypad. Multiple functions available through almost every key.
Storage	Standard microcassettes obtainable from office supply companies. Each cassette can store up to 30 minutes of voice messages or up to 10 worksheets. Worksheets can be voice annotated. The cassette drive mechanism was specially designed by Olympus for Convergent.
I/O ports	The WorkSlate has two ports along the back edge to connect it inline with a telephone. A third port at the rear is used to connect the MicroPrinter or other peripheral devices. An internal IC microphone is supplied, but there is a socket for a bigger external one. For privacy, an earphone socket is supplied.
Communications	Internal 300 baud auto-dial, auto-answer modem.
Power Source	An AC to DC 6 volts converter is included in the purchase price. Removable power comes in the form of four standard AA batteries, or a rechargeable nickel-cadmium pack. Whenever these options fail, two digital watch-type batteries maintain memory contents for up to a week.

## Microprinter

Like the adjustable LCD display and the twin-head cassette drive, the \$249 MicroPrinter is a unique technological development. Although the main printing mechanism is manufactured by a micro printer/plotter company called Alps, the internal circuitry and the method of use has been specially reworked by Convergent.

The printing technology is no more complex than the technology in a ball-point pen. Four ball-point-like cartridges (red, green, blue and black), are arranged in a cylindrical holder; they more or less 'write' symbols onto the 4 1/2 in wide plain paper which the MicroPrinter uses. Standard output is 40 characters wide, but 80 character 'compressed' output, still quite readable, can also be obtained.

Some personal computer users with Epson or Okidata dot-matrix printers have resorted to buying a special software package that prints spreadsheets out sideways to cope with worksheets that are more wide than they are long (that is, the rows come out at right angles to the paper edges). This is immediately possible with the WorkSlate/MicroPrinter combination; no extra software is required.

In use, the MicroPrinter makes little noise — it just clicks a lot. Power is supplied by a mains adaptor or AA batteries.

## Data communications facilities

The WorkSlate can be turned into a communications terminal by means of the SET-UP command. You can, for example, make the machine communicate in half duplex, instead of full-duplex mode. The end-of-line can be set as a line feed instead of a carriage return, and so on.

If you are a regular user of online computer services, then it would probably be worth your while to create an automatic sign-on sequence rather than type in ID, password and service type commands each time.

Sign on sequences are typed directly into a worksheet and take the form of the following example in the WorkSlate user manual:

```
A1 = "XYZSYSTEM" + Dial
      ("792-1234", data) + (GoTo(A2))
A2 = Delay(2) + WaitFor("ENTER
      ID:") + GoTo(A3)
A3 = Send("JOE;r") + GoTo(A4)
A4 = WaitFor("ENTER
      PASSWORD:") + GoTo(A5)
A5 = Send("793AZY702;r") +
      GoTo(A6)
A6 = WaitFor("!") + GoTo(A7)
```

# WORKSLATE

A7 = Send("STOCKQUOTE;" +  
GoTo(A8))  
A8 = Keep(B1...C1,1,1,20) +  
GoTo(A9)  
A9 = HangUp(0)

The left-hand column (A1,A2, etc) are worksheet cell labels. Note that the WorkSlate's sign-on language requires a GoTo (next worksheet cell) statement at the end of each statement.

The fictional sign-on sequence would connect a WorkSlate to a system that required information in the form:

System Query	WorkSlate Response
Enter ID:	JOE
Enter Password:	793AZY702
!	STOCKQUOTE

## Documentation

Convergent has obviously expended a lot of effort in developing its WorkSlate instruction materials. The operation and reference manual is well written, and only gets a little sticky when complicated tasks are encountered.

There is a full index of the contents, and high-quality photographs and illustrations are used to great effect.

The narrated Teach Me Now tape, which is included in the retail price, puts you quickly through the paces of using the cursor to jump around the full size of the worksheet — 128 rows × 128 columns; using the worksheet as a memo pad, recorder, timer, phone and calendar.

Then, in a more complete fashion, it introduces spreadsheet functions, formula creation and explains the knack of using the calculator in conjunction with a spreadsheet. The WorkSlate is in fact capable of a two window display.

Very brief reference is made to 'GETting' worksheets from and 'SAVEing' worksheets to the cassette. This has been made quite simple for the user.

Another tape, called Teach Me Later, will be supplied by Convergent to cover the more advanced WorkSlate operations, but this was not available at the time of review.

Of course in the manual, there are the usual warranty disclaimers. One to watch for is that Convergent says it will not accept charges for mis-dialled calls . . .

## Prices

WorkSlate, complete with AC to DC adaptor, Teach-Me instruction tapes, blank cassette, owner/reference manual, soft carrying case, and a toll-free assistance number: \$895

MicroPrinter, with roll of paper, a set of four coloured pens, carrying case and owner's manual: \$249

Range of optional Taskware tapes, including Personal Tax, Sales Reporter, Loan Analyser, Estate Planning, and Financial Statements: \$29.95 to \$49.95

## Conclusions

Other WorkSlate products are planned for release later this year. Probably the next one to appear will be a portable word processor with a larger screen and a keyboard more suited to writers. But for now there is only the one, designed around the daily work tools used by office managers.

The longer you use the WorkSlate, the more useful it seems to become. It handles many routine chores in an effortless way. Although it is portable, it has sufficient power and flexibility to be more than just

briefcase ballast.

It can act as a telephone and telephone answering machine. When you need it, it can even send worksheets over the telephone network to a colleague in unattended mode (not such an unusual idea — we recently had to arrange such a configuration).

It acts as a recorder, a typewriter, and of course, as a very sophisticated calculator.

It will be interesting to see if the extensive market research, which Convergent carried out prior to manufacture of the WorkSlate, was accurate. This research dictated every detail of the product: user group feedback indicated that managers don't want to type, resulting in a keyboard that is more like a calculator than a typewriter.

Well, anyway, it was the star item in this year's American Express Christmas catalogue.

END

# \$5000

## 'INFORMATION BUSINESS MANAGER'

COMPLETE ACCOUNTING PACKAGE  
FOR ALL 8 AND 16 BIT MICROS

THIS AUSTRALIAN DEVELOPED PACKAGE INCLUDES:

- \* Accounts Payable
- \* Accounts Receivable
- \* Stock Control
- \* Invoicing
- \* General Ledger

ALL FULLY INTEGRATED  
COMPREHENSIVE MANUAL

DEALER ENQUIRIES WELCOME

ALSO AVAILABLE

- \* REAL ESTATE SYSTEM
- \* SERVICE STATION SYSTEM

\* DISK CATALOGUING  
PROGRAM

- \* OTHER CPM SOFTWARE

## A&M Computer Solutions

2 PROSPECT HILL ROAD, CAMBERWELL 3124  
Telephone: (03) 813 3022



# PRINTER PRICE CRASH!

**We've done it again! Every time we drop the price on Australia's top-selling printer our sales double!**

**Oh well, here we go again ...**

You can now buy the runaway-best-selling **AMUST DT80** printer at incredibly low price:



**6 MTHS  
FULL WARRANTY**

**\$325 (ex tax)  
\$375 (inc tax)**

**\$8 COURIER  
DELIVERY**

That is so ridiculously cheap I'll repeat it in case you think it's a misprint: **\$325 ex \$375 inc**. The bad news is that you can't buy this printer as cheaply anywhere else. Only Micro-Educational has this low price because only Micro-Educational has the volume. The good news is that we are the biggest printer retailer in Australia so you can buy from us by phone or mail with **CONFIDENCE**. We will give you great products, lowest prices, friendly service, overnight delivery and 10 day money-back and 6 months service warranties. (We have full service facilities).



*Hello again,*  
Welcome to our fifth year. As any of our 6000 customers will tell you we are about selling computer products **CHEAPLY**. We also sell **NEW** products, in many instances products you can't buy elsewhere. Most of our customers buy by phone or Bankcard for next day delivery knowing they can return most products for a money-back refund and that all hardware enjoys a 6 month warranty. If you are tired of the "retail runaround" why not buy by phone or mail. We know computers and we treat you like a "friend-of-the-family". Besides, we're cheaper than anyone else.

*George*

You can run this printer from virtually all computers and we have cards and cables to connect it to Apple \$110, IBM PC \$40, OSBORNE & TRS-80 \$35, MICROBEE \$45, and A'ARI \$95, T1994A \$35, as well as serial cards for other micros.

The printer features superb quality print, EPSON compatibility, friction and tractor, graphics, 80cps etc etc.

This really is an amazing Japanese printer. We are presently selling over 300 units a month and have every intention of quadrupling that figure this quarter. Consequently we have no intention of being undersold. By anyone!

To order your AMUST DT80 just phone me, George Parry, on one of our lines and quote your Bankcard number for next day, delivery, or else send a cheque/money order to the above address. Include \$8 for courier delivery (\$10 outside capital cities). Delivery is by Wards Express Courier. Grab one NOW!



**17 PARK ROAD GARDEN SUBURB NSW 2288.  
(049) 436805 (049) 430624**



## DISKS



**\$29**

(EX TAX)

**\$32**

(INC TAX)

Delivery  
1 Box \$2  
More than 1 Box \$5  
(Courier Del.)

You'd be crazy to pay more!  
These are the same disks you are presently paying \$55 for. Exactly the same!  
Micro-Educational single-sided double density disks with reinforced hubs in plastic library cases. Manufactured in Australia by Control Data for use in Apple, IBM, Commodore 64 and all popular micros. Take advantage of our massive buying-power discounts:

1 BOX \$32 inc tax/\$29 ex tax  
10 Boxes \$290 inc tax/\$260 ex tax  
BULK: Take \$2 off per pack.

## ATLAS-8 SLIMLINE for APPLE

**\$299**

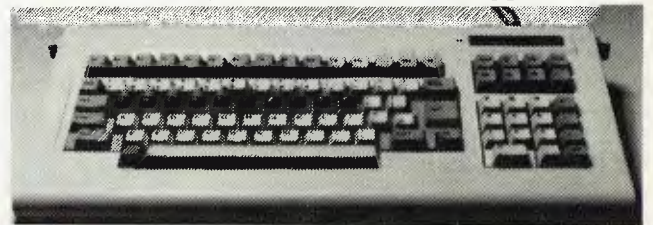
(ex tax)

**\$339**

(inc tax)



## DETACHABLE APPLE KEYBOARD + \$5 COURIER



**\$225** (ex tax) **\$259** (inc tax)

## VISION-80 COLUMN

**\$179**

(ex tax)

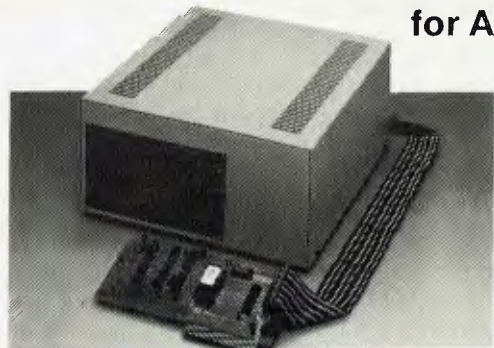
**\$199**

(inc tax)



80 Column Text Card + \$5 COURIER  
for Apple II or IIe (please specify)

## HARD DISK DRIVE for Apple



**\$1995**

### MORE TOP-SELLING PRODUCTS

16K Card for Apple II +	(inc tax) \$90	DT80 RIBBONS	(inc tax) \$12
Z80 Card (Apple)	\$90	ATLAS 8 SLIMLINE	\$365
NEC Green Screen	\$170	VISION 80 128K RAMCARD	\$395
SANYO Green Screen (the Best)	\$275	AUTOMATIC ICE RS-232 MODEM	\$299
MICOM JOYSTICK for Apple	\$45	SPEECH SYNTHESISER	\$75
CHANG-SHING ROBOT ARM for APPLE	\$2295	APPLE MOUSE FUNCTION EXTENDER	\$99

17 PARK ROAD GARDEN SUBURB NSW 2288.

**(049) 436805**

**(049) 430624**

SEND FOR FREE CATALOG

# CHECKOUT

# VISUALL

*The concept of on-screen window display is not new and has been adopted by companies such as Apple and Xerox with some degree of commercial success. Robin Webster examines a less conventional software offering from the three-man Trillian Computer Corporation, which is being marketed as a 'visual shell' between the operating system and the user.*

The idea of allowing a computer user to display and work with more than one application by means of on-screen 'windows' is not new. The most significant work is traced back to Xerox, which started the whole thing with its early, experimental 'Alto' systems and the Small-talk language. Xerox has continued to market the idea of a multi-window applications environment with some degree of success in the form of its commercially available 8010 workstation. Apple recently added its less powerful, but equally impressive, Lisa office system to the effort (see APC August).

The software developers have been busy, too. By the time you read this, VisiCorp should have ironed out most of the problems it was encountering with the Visi On system for MS-DOS machines and Quarterdeck will have launched DesQ (reviewed last month), a windowing system that integrates off-the-shelf applications packages like dBase II, Multiplan and WordStar.

Despite all this feverish activity by such large companies, a small company called Trillian Computer Corporation (a staff of three, including the president, at the time of this review) is trying to make a niche for itself with a rather unconventional window system called VisuALL.

VisuALL is not a window-based system in the same sense as Visicorp's Visi On or Quarterdeck's DesQ. It is instead a package which sets up a so-called 'visual shell' between the operating system and the user — a kind of neat front-end to the MS-DOS command line interpreter. Instead of dealing with the A> prompt directly, the user has VisuALL to do the following:

**"copy example, txt b:\*.\*)"**

at the DOS level or;

**"Control-K, Control-E, from: oldname, Enter, to: newname, Enter"**

to rename a file when using the WordStar word processor, thus minimising the user's keyboard tasks.

## Installing VisuALL

Since VisuALL is not a replacement for the operating system, it must be installed like any other package. However, in contrast to the more complex windowing packages already mentioned, VisuALL can operate without large amounts of memory or a hard disk. The minimum requirements are an IBM Personal Computer, 64k memory, one single or double-sided disk drive, a standard 25 lines by 80 columns monitor and an IBM PC-DOS disk.

If you already have a mouse, a hard disk, an IBM XT or a colour monitor, VisuALL will function that much better.

After booting up the DOS disk, you place the Trillian distribution disk in drive A, a DOS working diskette in drive B and type the command 'INSTALL'. This copies the necessary VisuALL files to the DOS working diskette. If you only have one drive, disk swapping will be necessary.

This installation procedure supersedes the one contained in the VisuALL user manual which asks you to: '1. Have your system work diskette in drive A and the VisuALL diskette in drive B with the DOS A> prompt on the screen . . . 2. After the DOS prompt type: b: INSTALL2 and press Enter . . .'

I encountered two problems with the updated installation method. The first was that my system disk had too many files on it already and consequently it took a while to delete enough files so that everything went smoothly. The second problem was that VisuALL did not start up properly when I reset my computer after the installation.

Instead of auto-loading itself after the reset, VisuALL promptly went into some

kind of loop and never finished loading.

The only way around this the first time was to depress the Ctrl-Alt-Del keys again, load the DOS disk, and 'manually' load VisuALL by typing the 'Visuall visuall.pro' command after the A> prompt appeared. This worked fine.

I was using a Compaq instead of an honest-to-goodness IBM PC and thought this may have contributed to the problem. According to Trillian president Peter Redford, though, VisuALL *did* work on the Compaq and he suggested I go through the installation routine again. I did and, this time, everything went smoothly.

While these problems were easily overcome, the potential user should be aware that the VisuALL system is in fact made up of two fairly hefty files, VISUALL.COM and VISUALL.PRO.

VISUALL.COM is the program that handles everything to do with drawing the pseudo-windows on the display, changing windows and making the necessary translations from window commands to MS-DOS reality. It is 45906 bytes in size. The second file, VISUALL.PRO (25732 bytes) is the window layout library for the VisuALL system. When you initially install VisuALL, a set of window definitions is supplied by Trillian. These include DOS COMMANDS, EDITOR COMMANDS (for the Edlin program), BASIC COMMANDS, WORDSTAR, LOTUS 1-2-3, and PERSONAL EDITOR COMMANDS.

## Initialising 'visual shells'

Once VisuALL is loaded, the familiar A> prompt appears indicating that nothing extraordinary has happened so far.

VisuALL only becomes apparent when you press the mouse or function keys in a



# ANNOUNCING THE COMPLETION OF OUR MODERN SHOWROOM

COME AND SEE OUR FAMOUS **WOMBAT** RANGE

COMPUTER EDGE is now operating from our larger Prahran showroom where we offer complete service and back-up facilities on the premises.

Our sales staff will be pleased to answer any queries and solve any problems that you may have.

**DROP IN AND BROWSE AT**  
**229 CHAPEL STREET, PRAHRAN 3181. Phone: 529 7622**  
(Between the Prahran Town Hall and High Street.)

HOURS: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

## SNAPSHOT



**JUST**  
**\$155.00** (with tax)  
**\$145.00** (excluding tax)

Snapshot is a peripheral card that is **NOW MANUFACTURED IN AUSTRALIA** under licence

- \* Card is for Apple II or compatible range of machines
- \* Makes back-up copies of copy protected programs
- \* Copies programs that baffle other copiers, like Locksmith and Copy II plus, in just 30 seconds
- \* Analyzes and debugs programs

**SNAPSHOT** will probably be one of the most useful cards you will ever put into your micro

**SNAPSHOT PRICES ARE NOW BEING SHOT TO PIECES AT COMPUTER EDGE SO COME ON IN AND SNAP UP A DEAL**

**ALL YOUR COMPUTER NEEDS ARE AVAILABLE FROM:**

Computer Edge Pty Ltd.

**229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622**

Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls ... orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call



DINERS CLUB



bankcard

# ★ ★ WOMBAT ★ ★

Computer Edge is pleased to announce the release of seven WOMBAT models

The standard case WOMBAT range includes:

WOMBAT 1  
WOMBAT 2  
WOMBAT 3

The detachable keyboard WOMBAT range includes:

WOMBAT 1D  
WOMBAT 2D  
WOMBAT 3D  
WOMBAT model PC-101

	WOMBAT 1, 2, & 3 WOMBAT DETACHABLE KEYBOARD	CODE	DESCRIPTION	OUR RETAIL EX. TAX	OUR RETAIL WITH TAX
STANDARD CASE	1. WOMBAT 1	(W1)	Basic unit with 48K RAM, numeral keyboard and upper-and-lower case. Same as Wombat 1 but with 64K RAM. Same as Wombat 1 but with 64K RAM and has a dual processor on the motherboard with both 6502 and Z-80 on board. Can OPERATE CP/M or Applesoft programs.	\$625.00	\$ 695.00
	2. WOMBAT 2	(W2)		\$690.00	\$ 775.00
	3. WOMBAT 3	(W3)		\$765.00	\$ 840.00
	4. WOMBAT 1D	(W1D)	Same as Wombat 1 but comes with detachable keyboard.	\$745.00	\$ 830.00
	5. WOMBAT 2D	(W2D)	Same as Wombat 2 but comes with detachable keyboard.	\$795.00	\$ 870.00
	6. WOMBAT 3D	(W3D)	Same as Wombat 3 but comes with detachable keyboard.	\$890.00	\$ 965.00
	7. PC-101	(WPC)	Has 64K RAM and comes with keytronics IBM-like keyboard. Runs Applesoft programs, has a sound microprocessor on board.	\$950.00	\$1045.00

**NEW!! ENHANCED ORIGINAL FIRMWARE THAT INCLUDES WOMBAT BASIC AND AUTO-BOOT PROGRAMS WRITTEN IN AUSTRALIA AND FULLY COMPATIBLE WITH APPLESOFT PROGRAMS. COPYRIGHTED BY COMPUTER EDGE PTY. LTD**

### Standard features on all models

- ★ Compatible with all APPLESOFT programs
- ★ Typewriter style ASCII keyboard with numeric keypad and function keys
- ★ Upper and lower case
- ★ 8 expansion slots
- ★ Autostart monitor
- ★ New CMOS microprocessor — the 65C02
- ★ Enhanced WOMBAT BASIC



Standard case WOMBAT shown

**RUSH YOUR ORDER TO:**

Computer Edge Pty. Ltd.

229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

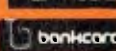
Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls ... orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB





DISCOUNTED PRICE

# DOT WE HAVEN'T LEFT ANYTHING OUT

**DOT** is a totally integrated compact computer system for office, field or home use. It is portable, powerful, reliable and efficient.

## Integrated Hardware

As a self-contained unit, **DOT** supplies all the computing components you need. You can concentrate on putting **DOT** to work for you immediately, instead of worrying about purchasing and integrating components:

- ★ A powerful, 16-bit microprocessor
- ★ Dual floppy diskette storage
- ★ Easy-to-read video display
- ★ Easy-to-use keyboard
- ★ Built-in communications capabilities
- ★ Quiet, reliable inbuilt printer

## Software Too

To complement this hardware, **DOT** also includes the systems software necessary to use a wide range of commercially available application packages.

**\$2,995.00** ex sales tax  
**\$3,594.00** incl sales tax



## ★★ SPECIAL SOFTWARE OFFER ★★

Your choice of three programs from the **DOT** selection for only **\$100.00** for the three.

- |  |   |
|--|---|
| ★ Volkswriter<br>— word processor  | ★ Multiplan<br>— spreadsheet calculation applications |
| ★ Time Manager<br>— schedule applications                                | ★ Record Manager<br>— finder/indexer applications     |
| ★ Report Manager<br>— three dimensional financial modelling applications | ★ Project Manager<br>— finder/indexer applications    |

**DOT** COMES EQUIPPED WITH MS-DOS and GW-BASIC

### Computer Edge Pty. Ltd.

229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

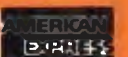
Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat

For toll-free calls . . . orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB







# TELEWRITER BYTEWRITER BYTEWRITER BYTEWR

MASSIVE SAVINGS ON THE BYTEWRITER DAISYWHEEL PRINTER

## LETTER QUALITY PRINTER **AND** TYPEWRITER IN ONE PACKAGE

The bytewriter is a new Olivetti Praxis 35 electronic typewriter with a micro-processor controlled driver added internally.



### Keyboard

Alphanumeric and function keys:

44 alphanumeric keys (100 printable characters) and 17 function keys.

REPEAT KEY (for repetitive use of any key).

Two shift keys.

Shift lock.

Automatic repeating space bar.

Automatic repeating return and vertical spacing.

Return without vertical spacing.

Tabulator setting key.

Tabulator clearing key

Alphabetic tabulation key.

Cancel key (automatic for the last ten characters typed).

Automatic repeating backspace key.

Right-hand margin setting key.

Left-hand margin setting key.

Margin release key

Forward half-space key.

Automatic relocate typing point key.

10, 12 or 15 characters/inch pitch selector.

### FEATURES

- ★ Underlining
- ★ 10, 12 or 15 characters per inch switch selectable
- ★ 2nd keyboard with foreign grammar symbols switch selectable
- ★ Changeable type daisywheel
- ★ Centronics-compatible parallel input operates with TRS-80, Apple, Osborne, IBM and others
- ★ Cartridge ribbon
- ★ Typewriter operation with nothing to disconnect
- ★ Service from any Olivetti dealer
- ★ Self test program built in.

# JUST \$799.00 (inc. s.t.)

## RUSH YOUR ORDER TO US TODAY!

### Computer Edge Pty Ltd.

**229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622**

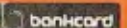
Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls . . . orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB





# SANYO

## MBC 550/555

**Low cost 16-Bit Personal Computer with Colour and Graphic Function  
CHEAPER THAN IBM, DICK SMITH, AND ALL THE OTHERS!!**

### IBM COMPATIBLE

#### FEATURES

- 16 Bit Modular Personal Computer system for multi-purpose application
- 8088 CPU with 128KB RAM memory that can be expanded up to 256KB
- MSDOS operating system with optional CP/M-86
- Standard Centronics Parallel printer interface and optional RS232 serial interface
- Dual 160Kb slim-type mini floppy disk drives reading MSDOS standard format diskettes
- Low profile enhanced ergonomic Keyboard with coiled cable for easy use
- Choice of B/W or Colour monitors with 80 char. x 25 line format
- Graphics function with 640 x 200 dots
- Industry standard joy stick port

#### SPECIFICATIONS

##### HARDWARE

CPU	8088 (3.6MHZ)
RAM	128KB — 256KB (optional) 32KB VRAM
ROM	8KB(IPL/CG)
Speaker	Alarm sound can be used
Keyboard	Detachable with coiled cable ASCII type low profile
Floppy Disk Drive	2 x 5¼" 160KB slim line drives dual 320KB (optional)
Display	8 x 8 dot cell with 80 char x 25 lines, 6 x 7 character font. B/W monitor or 8 colour RGB monitor option.
Communications	RS 232C port (optional)
Printer Interface	Std Joy stick facility Centronics Parallel

##### SOFTWARE

Operating System	MSDOS with CP/M-86 option
Language processor	Basic, Fortran-86, Cobol-86, Pascal MT + 86
Electrical	Local voltage + 10%
Dimensions	Main Unit 360(W) x 110(H) x 365(D)mm. Keyboard 449(W) x 35(H) x 169(D)mm



MBC550 Single Disk Drive	<b>\$1,734.00</b> incl. tax
MBC555 Dual Disk Drive	<b>\$2,234.00</b> incl. tax
WORDSTAR, CALCSTAR	<b>\$195.00</b> incl. tax
MAILMERGE, SPELLSTAR & INFOSTAR	<b>\$295.00</b> incl. tax

Computer Edge Pty. Ltd.

**229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622**

Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls . . . orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.





**SALE SALE SALE SALE SALE SALE**

# INTERFACE CARDS

These peripheral cards are NOW redesigned and manufactured in Australia. Because of competition from overseas it is necessary for the pricings to be very keen.

**COMPUTER EDGE** has a number of cards for you to choose from. Stocks are limited, **SO HURRY TO COMPUTER EDGE FOR THESE BARGAINS!!**

- 1. Z80 Cards** — allow you to run CPM software. **\$110.00** (inc. tax)
  - 2. Parallel Cards** — contain jumper blocks to enable the user to re-configure the interface board for operation with different types of printers. **\$95.00** (inc. tax)
  - 3. Sercom II** — serial interface card. Enables Apple II to communicate with external devices, dumb or intelligent terminals, other computers or another Apple II or Apple III by using couplers, modems or through direct connection. Sercom II makes available power supply connections on its interface cable which enables it to be plugged directly into and operate a Sendata 700 series acoustic coupler. **\$110.00** (inc. tax)
  - 4. 16K RAM Card** — increases the RAM of your machine by an extra 16K RAM and allows **Integer** Basic programs to be run with Applesoft in ROM or Applesoft to run with **Integer** in ROM. Compatible with CP/M 2.2 and 2.3. **\$95.00** (inc. tax)
- 80 Column Card** — allows user to have 80 characters on line, rather than 40 characters. Essential for word processing and CP/M application. **\$110.00** (inc. tax)

## THE PRONET NETWORKING SYSTEM



PRONET provides all the amenities of a "personal computer" with the speed and functionality of larger, more costly systems.

The PRONET links up to 128 of the most popular micro computers at distances over 5,000 feet with speeds at 4 million bits per second.

Select the multi-user operating system that suits you best, featuring **Password Security, Turnkey Command, File and Record Locking, spooling to common printers, electronic mail, educational languages and much more.**

The PRONET system emphasizes computing solutions at an affordable cost. Features found in systems costing far more are STANDARD components of the PRONET SYSTEM making networking a cost effective necessity; not an expensive luxury. The PRONET SYSTEM is a networking solution for the the serious computer user

Central Card: **\$550.00** ex tax. Remote Card: **\$420.00** ex tax

**PRONET AND ROS ARE AVAILABLE FROM:**

**Computer Edge Pty Ltd.**

**229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622**

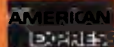
Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls . . . orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB





# THE ROS NETWORKING SYSTEM



**Students using the ROS Network at school**

## FEATURES

- ★ Networking system for the Apple II micro or compatible.
- ★ Replaces floppy disk drives on up to 127 independently run computers.
- ★ Can be expanded for significantly less than the cost of an additional drive.
- ★ TERRAPIN LOGO is available in a multi-user version.
- ★ HARD DISK interfacing also available.
- ★ ROS comes with print spooling software.

**\$395** for central card and software (ex tax)  
**\$270** for each card thereafter (ex tax)

Computer Edge Pty. Ltd.

**229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622**

Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls . . . orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB

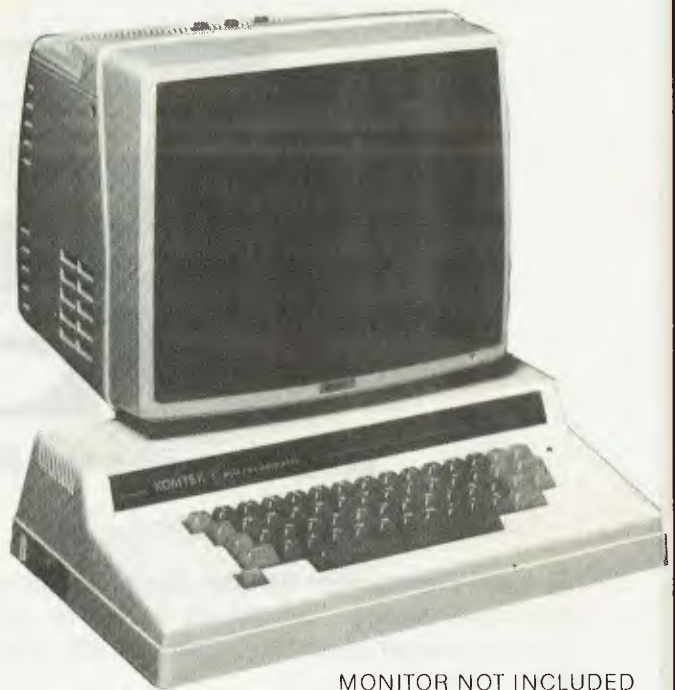


**KOMTEK — KOMTEK — KOMTEK — KOMTEK**  
**— KOMTEK — KOMTEK — KOMTEK —**  
**KOMTEK — KOMTEK — KOMTEK — KOMTEK**  
**— KOMTEK — KOMTEK — KOMTEK —**  
**KOMTEK — KOMTEK — KOMTEK — KOMTEK**

This TRS-80 compatible unit can be inexpensively upgraded to include all facilities normally found in more expensive computers. The compatibility with TANDY BASIC LEVEL II means that thousands of programs are available for the KOMTEK micro.

### FEATURES

- ★ 16k RAM with real typewriter keyboard.
- ★ Expandable to 48K.
- ★ Home control functions.
- ★ Programmable timer.
- ★ Built in VHF RF modulator.
- ★ Graphics capability.
- ★ Built in speaker.
- ★ Auto colour option: For turning your black and white games and graphics into colour automatically.



MONITOR NOT INCLUDED

**ALL THIS IN ONE COMPACT, BUT VERY POWERFUL UNIT  
FOR THE SENSATIONAL PRICE OF JUST \$439.00**

**PHONE US WITH YOUR BANKCARD ORDER RIGHT NOW!!**

Computer Edge Pty Ltd.

229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls ... orders only, ring **008 33 1131**

Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.





predefined way. On a three-button mouse you would press the 'select' and/or 'execute' buttons. On an IBM or IBM work-alike keyboard you would probably press function key 'F1' (depending on how each user customises, or initialises, VisuALL).

The specifications you must supply to initialise shells are as follows:

<b>System</b>	
Baud	=1200
Comm	=2
Mouse	=Speedster
<b>Button</b>	
Select	=Command
Mark	=Ins
Execute	=Enter
User	=“This button has not been defined”
<b>Cursor</b>	
right	=rightarrow
left	=leftarrow
up	=uparrow
down	=downarrow
<b>Keyboard</b>	
Select	=s-F1 ;shift F1
Mark	=s-F2
Execute	=s-F3
User	=s-F4

The first two lines of the System section

the effect of each mouse button: pressing the 'Select' button has the value 'Command'; the 'Execute' button has the value 'Enter', and so on. Similarly, the Cursor and Keyboard sections link key depressions with a specific action. In the Keyboard section, though, you will notice that each function key name is preceded by a lower-case 's'. This signifies that the shift key must be pushed along with the function key so that there are no conflicts with application program assignments of function keys.

If you want to redesign a current window, or create one from scratch, this is possible. In fact, you can create families or 'hierarchies' of windows (with a maximum of 48 separate windows within the bounds of one application) — each window getting more specific as you go deeper and deeper.

For example, you might want to develop one window for each class of operation in an application: with a word processor you would design windows for editing, file handling, text formatting and printing.

The design process is fairly simple, since all you are really doing is writing instructions in a kind of meta-language which can be understood by the VISUALL.COM program. Screenshot 1 shows how Trillian

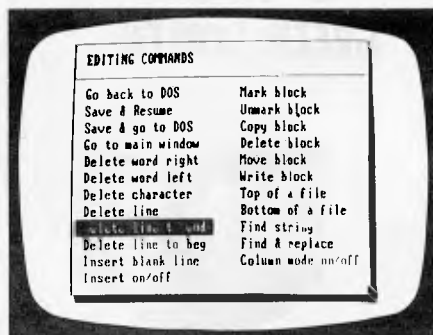
loading (see screenshot 1). Positioning the cursor over a menu option causes the option to be backlit; it can then be activated by again pressing Shift-F1.

Some commands — such as Help, Edit a file, Use Spreadsheet, and Display window directory — will cause other sub-windows to appear listing a range of additional options. As you can put your own choice of text into a window, you can develop foreign language visual shells as evidenced by the 'French DOS' entry (screenshot 2).

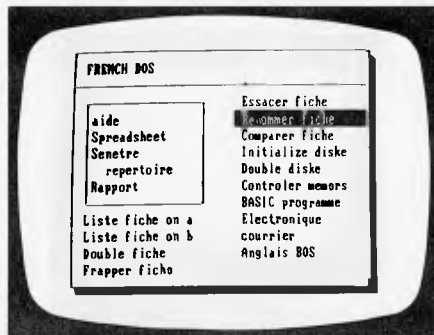
If a filename, or a couple of filenames, are required by DOS, VisuALL displays a prompt (filename:, from:, to:) at the bottom left edge of the open window.

To get an overall idea of what windows are available, you must go to the window directory. This directory contains main headings for the range of possible activities, including Spreadsheet, Choose Editor (most people would prefer the Personal Editor to Edlin), Editing Commands, Basic Commands and Printer Commands (screenshot 3).

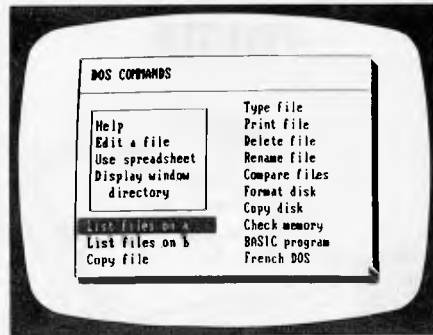
Earlier I mentioned that problems could be encountered when switching from one window type to another. An example is when you select the option to run Lotus



Commands for file maintenance program loading



DOS foreign language visual shells



The window directory shows possible activities

are used to tell VisuALL that the attached mouse can handle data at a rate of up to 1200 baud, and that it will be attached to the second installed serial communications board. 'Speedster' is the name which Trillian has assigned to a specific manufacturer's mouse. Three types are supported at present: the Mouse Systems optical mouse (Sportster), the Logitech mechanical mouse (Speedster), and the USI opto-mechanical mouse (Indian).

All initialisation statements for the Sportster and Indian models must contain a value for the communications port entry since they must be connected to a serial board of some sort. But the Logitech Speedster mouse does not require an entry since it connects to the same port as the keyboard. A 'T-connector' is used to attach both at the same time, although this mouse cannot currently be used with machines like the Compaq which do not feature snap-in cable connectors.

The Button section simply designates

has used the meta-language structure for a WordStar environment.

## In use

All operations were carried out by pressing the four function keys F1 to F4.

At the DOS level you display the DOS COMMANDS window by pressing the F1 (Select) key. The DOS COMMANDS window always appears in exactly the same location but, unlike the windows in Visi On and DesQ, VisuALL windows cannot be moved, re-sized, or set aside on the desk-top.

The distinction is that VisuALL windows are not application program windows — they are essentially pop-up (drop-down?) command menus that can be displayed at any time. These windows can be displayed without the user having to escape from the task at hand.

The DOS COMMANDS window contains all the commands you might need to carry out file maintenance or program

1-2-3. VisuALL presently has no way of knowing whether or not Lotus 1-2-3 is 'out there' somewhere on disk or in memory. It assumes you know what you are doing and have started a valid procedure.

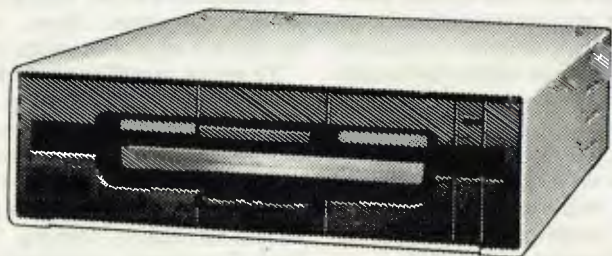
Unfortunately, if Lotus 1-2-3 is not accessible, the operating system will respond to the 'load 1-2-3' command in its normal unfriendly manner and just wait for the next event.

Although it appears that nothing untoward has happened (error messages are displayed in some cases), VisuALL has in fact dumped the DOS COMMANDS window shell and made the Lotus 1-2-3 shell the current one.

The manual goes on to warn the user to be careful not to '... switch shells via the Window Directory ...', since this will cause the VisuALL system to have a skewed idea of what is going on. Yet another mistake is trying to invoke a VisuALL window as information is being scrolled on the display. This can mess

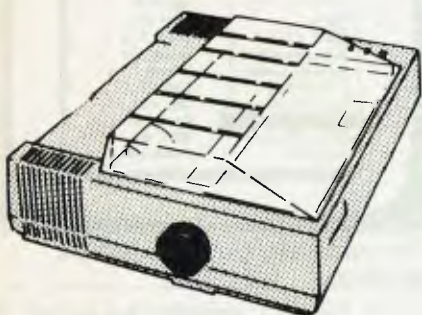


# BEST PRICE EVER ON \*APPLE COMPATIBLE DRIVES



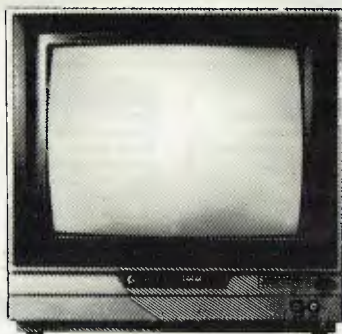
**\$299 INC TAX**  
(\$269 EXC TAX)  
**THIS MONTH  
ONLY**

● **JP 80 F/T  
PRINTER**



**\$389 inc**  
**\$329 exc**

● **BLOCKBUSTER SPECIAL**



**\$389 inc**  
**\$339 exc**

**COLOUR MONITOR**

Suits Commodore, Apple, etc  
Manufacturers suggested retail  
price \$620. RGB or composite  
video similar to unit illustrated.

● **HI RES  
GREEN SCREEN**



20MHZ

**\$199 inc**  
**\$169 exc**

**OTHER BARGAINS:** Commodore '64 **\$389 inc.** OSBORNE 1, with DID drives 100 col **\$1795 inc.**  
MPI DISK DRIVES **\$238 inc.** BIG deals on APPLE\* and BBC. EPSON RX80 **\$489 inc.** EPSON FX80  
**\$899 inc.** MOST APPLE\*/WOMBAT CARDS UNDER **\$100.**

\* Apple is a registered trademark of Apple Computers Inc.

\* ILLUSTRATIONS SHOWN ARE NOT NECESSARILY IDENTICAL TO UNIT SOLD.

TRADE ENQUIRIES WELCOME

CASH/CHEQUE OR BANKCARD WELCOME HERE

# DATA PARTS

**MAIL ORDER CENTRE**  
**11 EDWARDS STREET,**  
**SHEPPARTON VIC 3630**  
**Telephone: 21 7155 (058)**

● **ALBURY 658 Dean Street**  
**Telephone: (060) 21 8080**

● **BENDIGO 27 Bath Lane**  
**Telephone: (054) 43 4866**

● **BALLARAT 307 Mair Street**  
**Telephone: (053) 31 3399**

● **SHEPPARTON (As Above)**  
**Telephone (058) 21 7155**

things up in its own right so that the whole VisuALL system has to be rebooted.

If VisuALL is being marketed as the friendly front-end system for personal computers running MS-DOS, my concern is that these acknowledged loopholes reduce its effectiveness.

You cannot tell PC users they will never have to worry about complex commands ever again, and then go on to expect them to keep track of the exact sequence in which VisuALL windows can and cannot be invoked. Maybe it's a small point, something which 98% of VisuALL customers will breeze through, but it is surely also a small matter to incorporate the right kind of code to keep such concerns out of

immediate view — especially for \$295.

## Conclusions

The manual was generally very good at explaining how you use VisuALL and where you might encounter certain limits. I had no problem in understanding what the VisuALL profiles were doing, and how I could alter them at will.

Apart from the one minor installation problem, VisuALL performed pretty much as stated, and certainly smoothed out some of the rough spots in PC-DOS's user interface by hiding much complexity behind the windows.

I would view VisuALL as a good product for someone who really doesn't understand the kind of dialogue that is necessary between a user and the PC-DOS operating system before anything gets done. Because of this, it is likely that VisuALL will be of the greatest benefit for the first six months after purchase. By then, the user should have figured out what is going on and be ready to handle routine tasks without VisuALL's help. The danger is that a user may remain dependent on VisuALL to such a degree that, without it on another system, the A> prompt and a flashing cursor is all the user is left to work with.

END

# GET MORE OUT OF YOUR 8 BIT COMPUTER EXPAND TO THE WORLD OF 16 BIT SOFTWARE

March & April  
Special  
Introductory Offer

### CP/M 86 & MS-DOS FOR The TRS-80 I, III & IV, MAX-80, LNW

(System 80 option avail soon)

The microMERLIN IS A FULLY SELF-CONTAINED 5MHz 8088 16 bit unit complete with power supply and enclosure. Installation involves connecting a flat ribbon cable externally to the computer. NO ADDITIONAL CONNECTIONS, NO CUTS AND JUMPERS ARE REQUIRED!!!

The microMERLIN contains all the necessary circuitry to run both CP/M-86 and MS-DOS operating systems. Programs are stored on IBM-PC and TI Professional computer diskette format. Expansion options include additional RAM memory, color graphics, and an Intel 8087 numerics processor.

The only requirement of your computer is 48K RAM, and one single-sided, double-density, 5¼" disk drive. Future support will include 8 inch Hard Disk drives, RAM Disk option, and Multi-tasking OS.

CP/M86 or MSDOS

RS232 Serial I/O

Centronics Parallel Port

Complete with Power Supply and Enclosure

128K RAM WAS \$1350 **SPECIAL \$1200**

64K RAM WAS \$1195 **SPECIAL \$995**

### CP/M 2.2 FOR THE ATARI COMPUTERS

The ATR8000 is a 4MHz, Z80 computer with 64k RAM. The AT8000 includes double density CP/M 2.2. The ATR8000 has five ports. COMPUTER IN is for connecting ATARI 1200/800/400 or an RS-232 terminal. ATARI peripherals (like an 810 drive) are connected to PERIPHERAL OUT. The PRINTER port runs a parallel printer. The FLOPPY DISK port runs up to four standard disk drives. Drives can be a mixture of size (5¼" or 8"), density (single, double, or quad), and type (single or double sided). The RS-232 port runs a serial printer or a modem. It can also be used to communicate with another terminal.

The ATR8000 and the ATARI 1200/800/400 run ATARI DOS, OS/A+, MYDOS, and CP/M 2.2. ATARI DOS operates normally, it can be run from an ATARI 810 drive or from a standard disk drive.

64K RAM with CPM 2.2 & MYDOS  
WAS \$995.00 **SPECIAL \$885.00**

### CP/M 86 & MS-DOS for the following computers: Atari using ATR8000, Bigboard, Kaypro, Osborne, Televideo 802, Xerox 820, 820-II and Zorba.

CO-POWER-88 is a powerful 8088, 16 bit coprocessor for the above computers. It is available with 128k or 256k RAM and comes with both CP/M-86 and MSDOS, complete with IBM-PC compatibility.

Single commands move the user between the Z80/CP/M 2.2 system and the 8088/CP/M-86 or MSDOS system. CO-POWER-88 also enhances the CP/M 2.2 system with the M: drive feature that lets CO-POWER-88's RAM be used as a RAM drive during CP/M 2.2 operation.

128K RAM with CP/M 86  
& MS-DOS  
WAS \$1250 **SPECIAL \$1100**

FOR MORE INFORMATION, OR FOR A DEMONSTRATION, OR TO PLACE AN ORDER, WRITE TO:

## MICROPROGRAMMING

P.O. BOX 475, MOUNT WAVERLEY, VIC 3149

OR CALL **560 7664, 232 8801, 873 2069**

ALL PRICES INCLUDE SALES TAX

MicroMERLIN is a registered trademark of Micro Projects Engineering Inc. TRS-80 is a registered trademark of Tandy Corporation. MAX-80 is a registered trademark of LOBO Systems Inc. ATARI is a registered trademark of Atari Inc. ATR8000 & CO-POWER 88 are trademarks of SWP Microcomputer Products Inc. IBM-PC is a trademark of IBM. Kaypro is a trademark of Kaypro/Non Linear Systems. Xerox 820 and 820-II are trademarks of Xerox Corp. CP/M and CP/M 86 are trademarks of Digital Research Inc. MS-DOS is a trademark of MICROSOFT. Specifications and prices are subject to change without notice.

## MONITORS

NEW SWIVEL BASED MONITORS  
HIGH RESOLUTION GREEN SCREEN  
20 MHz BANDWIDTH  
**\$229**



These fine monitors add the finishing touch to your system. Complete with a professional swivel base and flush mounted controls.

### CASE AND KEYBOARD

Give your computer a decent home. Room for two 5 1/4" Drives and power supply. (Drives shown not included).  
**\$295.00**

OUR FAMOUS RITRON MONITORS  
IN AMBER AND GREEN.  
18 MHz BANDWIDTH  
AMBER **\$229** GREEN **\$199**



- High quality, non-glare CRT.
- Compact and lightweight with all Controls inside Front Panel.
- All units 100% Factory Burned-In.
- 800 lines centre resolution.
- Suitable for Apple® — and other computers. (Apple is a registered trademark of Apple Computer, Inc)
- Green or Orange Phosphor available.
- 18MHZ.

## COLOUR MONITORS

GENERAL TELEVISION SETS  
WITH DIRECT VIDEO INPUT



These fine General Sets have been converted for use as colour monitors

14" Rotary Tuner.....	<b>\$389</b>
16" Rotary Tuner.....	<b>\$469</b>
18" Rotary Tuner.....	<b>\$499</b>
20" Rotary Tuner.....	<b>\$549</b>
26" Remote Control.....	<b>\$549</b>

All monitors supplied with circuit modifications in case of service after one year warranty period has expired.



## ROD IRVING ELECTRONICS

425 High St., Northcote Vic. 48-50 A'Beckett St., Melb., Vic.  
Phone (03) 489 8866, (03) 489 8131  
Mail Order Hotline (03) 481 1436  
Mail orders to P.O. Box 235 Northcote 3070 Vic.  
Minimum P & P \$3.00. Errors & omissions excepted.

Please address tax exempt, school, wholesale and dealer enquiries to:

## RITRONICS WHOLESALE

1st Floor 425 High St., Northcote 3070. (03) 489 7099  
(03) 481 1923 Telex AA 38897

## CONSUMABLES

### VERBATIM DISKS

C12501	MD525-01	Single sided, Double density	38.00
C12502	MS525-10	SSDD 10 Sectors 40 Tracks	46.50
C12503	MD525-16	SSDD 16 Sectors 40 Tracks	46.50
C12504	MD550-01	Double sided, Double density	55.00
C12505	MD550-10	DSDD 10 Sectors 40 Tracks	55.00
C12506	MD550-16	DSDD 16 Sectors 40 Tracks	55.00
C12507	MD577-01	SSDD Soft sector 80Tracks	55.00
C12508	MD577-10	SSDD 10 Sectors 80 Tracks	61.50
C12509	MD577-16	SSDD 16 Sectors 80 Tracks	61.50
C12510	MD577-01	DSDD Soft Sector 80 Tracks	68.00
C12511	MD577-16	DSDD 16 Sectors 80 Tracks	68.00

### 8" VERBATIM

C12800	FD32-1000	Single sided, Single density	46.00
C12801	FD32-8000	Single sided, Double density	58.00
C12802	FD32-9000	SSDD Critically Certified	57.00
C12803	FD34-1000	Single sided, Single density	46.40
C12804	FD34-8000	Single sided, Double density	55.00
C12805	FD10-4008	Double sided, Single density	64.00
C12806	FD10-4015	Double sided, Single density	64.00
C12807	FD10-4026	Double sided, Single density	64.00
C12808	FF32-2000	SD FLIPPY FLOPPY	67.00
C12809	FF34-2000	SD FLIPPY FLOPPY	67.00
C12810	DD32-4000	Double sided, Double density	57.00
C12811	DD34-4001	Double sided, Double density	57.00
C12812	DD34-4008	Double sided, Double density	57.00
C12813	DD34-4015	Double sided, Double density	59.40
C12814	DD34-4026	Double sided, Double density	59.40

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

### CONTROL DATA DISKS

5" Control Data			
C13500	1242	Single sided, Double density	30.00
C13501	1244	Double sided, Double density	44.16
8" Control Data			
C13801	1221	Single sided, Single density	34.80
C13802	1223	Single sided, Double density	46.80
C13803	1225	Double sided, Double density	57.60

### Head Cleaners

C12551	5"	Head Cleaner	12.60
C12851	8"	Head Cleaner	11.40

## PAPER

### COMPUTER PAPER

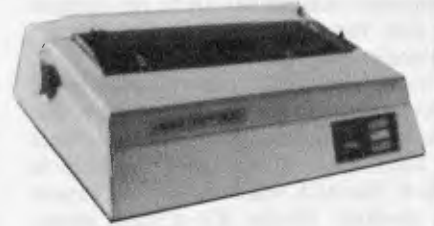
C21001	9" Keen edge tractor feed paper in box of 2000 sheets	\$34.80
C21011	15" Keen edge tractor feed paper in box of 2000 sheets	\$46.80

## RIBBONS

C22001	QUME Daisywheel Printer Multistrike Film	\$6.48
C22003	QUME 4, 7, 9 Daisywheel Printer Multistrike Film	\$12.84
C22022	DIABLO HYTYPE II Daisywheel Printer Nylon, Black	\$8.88
C22041	TANDY TRS80 269-1414 Matrix Printer	\$16.08
C22051	ITOH 8510, 8600, NEC 8000 Matrix Printer	\$13.51
C22002	QUME Daisywheel Printer Nylon, Black	\$8.64
C22021	DIABLO HYTYPE II Daisywheel Printer Multistrike Film	\$8.88
C22031	EPSON M80 Matrix Printer Nylon, Black	\$13.51
C22042	TANDY TRS80 Line Printer VI Matrix Printer	\$15.60
C22061	BURROUGHS 9246-3, 9246-6 Belt Printer	\$27.60

## PRINTERS

JUKI PRINTER WITH 8K BUFFER  
DAISY WHEEL 18CPS  
**\$1045.00**



A high quality daisy wheel printer with a large buffer so it won't tie up your computer. The JUKI uses the wide range of Adler wheels and readily available IBM selectric ribbons. (Selectric is a Registered trade mark of IBM.)

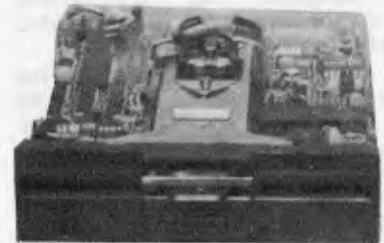


**\$399**

This is the popular 80 column printer we have been selling for six months. Don't be fooled by the one with a cheap mechanism. Ours is a high quality print head and mechanism.

- Low price
- Compact, and Lightweight Designed.
- 640 Graphic Dots Line.
- 80 Column Dot Matrix Printer with a full of Functions.
- Cartridge Ribbon.
- Connectable to the many types of Computers for the Home or Office.

## DISK DRIVES



### THE MITSUBISHI RANGE OF DISK DRIVES

M2896-63  
Slimline 8" Disk Drive Double Sided Double Density No AC Power required, 3ms Track to track, 1.6 Mbytes unformatted, 77 track side 10' bit soft error rate.  
..... **\$575.00**  
Box & Power Supply to suit..... **\$125.00**

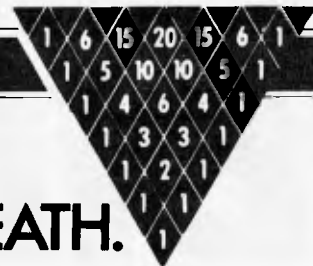
M2894  
Standard size 8" drive. Double sides, double density, 3ms track to track access, 1.6 Mbytes unformatted, 77 track/side, 10' bit soft error rate ..... **\$575.00**  
Box & Power Supply to suit..... **\$125.00**

M4854  
Slimline 5 1/4" disk drive. Double sides, double density, 96 track/inch, 9621 bit/inch, 1.6 Mbytes unformatted, 3ms track to track access, 77 track/side..... **\$375.00**  
Box & Power supply to suit ..... **\$79.00**

M4853  
Slimline 5 1/4" disk drive, Double sides, double density, 1Mbyte unformatted, 3ms track to track, 80 track/side, 5922 bits/inch, Steel band drive system..... **\$355.00**  
Box & Power Supply..... **\$79.00**

MP 5" STANDARD DRIVES		
Drive	Only	Case & Power Supply Inc
B51	\$269.00	\$299.00
B52	\$349.00	\$379.00
B91	\$349.00	\$379.00
B92	\$439.00	\$459.00





## ABSOLUTE DIFFERENCES OF PRIME NUMBERS... AN HYPOTHESIS OF GILBREATH.

*Mike Mudge presents more mathematical mind-benders*

A Prime Number is defined to be a positive integer greater than 1 that is divisible only by itself and 1. Thus the sequence of primes (known since the time of Euclid c 400BC to be infinite) begins  
 $P = (2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, \dots)$ .

The first row of the table of Absolute Differences of Prime Numbers is obtained from P by taking the absolute values of the differences between successive terms: thus  
 $|\Delta_1 P| = (1, 2, 2, 4, 2, 4, 2, 4, 6, 2, 6, 4, 2, 4, 6, \dots)$

This elementary process is repeated to obtain consecutive rows of absolute differences:

$|\Delta_2 P| = (1, 0, 2, 2, 2, 2, 2, 2, 4, 4, 2, 2, 2, 2, 0, \dots)$

$|\Delta_3 P| = (1, 2, 0, 0, 0, 0, 0, 2, 0, 2, 0, 0, 0, 2, 4, \dots)$

For any positive integer n we define  $a_n$  to be the smallest positive integer such that the  $(a_n + 1)$ -th term of  $|\Delta_n P|$  is the first such term to be greater than 2; thus from the above  $a_1 = 3$ ,  $a_2 = 8$ , and  $a_3 = 14$ .

In 1958, NL Gilbreath conjectured that the first term in each row,  $|\Delta_n P|$ , is unity. If we could prove that  $a_n > 2$  for all n then the validity of Gilbreath's conjecture would be established.

\*W Sierpinski, *A Selection of Problems in the Theory of Numbers*, Pergamon Press, 1964, page 35. Empirical evidence suggests that  $a_n$  is indeed a rapidly increasing function of n, but to the best of my knowledge the required result has not been proved.

### Problem

This month's problem is in two distinct parts:

- (i) To generate the first N-terms in the sequence P of Prime Numbers for a given N.
- (i<sup>1</sup>) Alternatively, justify the direct input of P from existing tables or a 'library-tape'.
- (ii) To generate the first M values  $a_1, a_2, a_3, \dots, a_m$  for a given M, verifying in the process that  $a_4 = 14$ ,  $a_5 = 25$ ,  $a_{10} = 59$ ,  $a_{15} = 174$ .

Conjecture the type of function best describing  $a_n$  as a function of n: this work may be aided by the use of a graphical output device if available. A valuable reference could be provided by RB Kilgrove & KE Ralston, *On a conjecture concerning primes*, MTAC vol 13, pp 121-122. 1959.

*Note.* Please include, in addition to the usual program listings, hardware descriptions, run times and output, a count and breakdown by type viz multiplication, addition, etc, of the number of arithmetical and logical operations needed to establish  $a_{64} = 5940$ . This may be precise or an intelligent estimate; its purpose is to compare and contrast the widely differing approaches which are possible to this problem.

Submissions will be judged for accuracy, originality and efficiency (not necessarily in that order), and a suitable prize will be awarded to the 'best' entry received.

Entries to arrive by 15 February, 1984, to: Mr M R Mudge, C/- APC, P.O. Box 298, Clayton, Vic 3168.

*Note.* Submissions will only be returned if suitable stamped addressed envelopes are included.

### Review of n-tuples

The response to this project was most disappointing, whether due to the weather, the title, or some property of the problem is not apparent.

It would be most informative to receive readers' suggestions as to why this problem was found to be particularly unattractive and perhaps to indicate desirable characteristics of number theoretic problems suitable for investigation using a micro-computer.

(i) The smallest common sum of four associated triples is indeed 118, arising from  $(14, 50, 54)a(15, 40, 63)a(18, 30, 70)a(21, 25, 72)$ .

(ii) The smallest common product of four associated triples is indeed 25200, arising

from  $(6, 56, 75)a(7, 40, 90)a(9, 28, 100)a(12, 20, 105)$ .

#### Minimum sum n-tuples.

Triples . . . N	Sum	Product
4	118	37800
5	185	83160
6	400	846720
7	511	1965600

There exists no 8-tuple with sum less than 835.

4-tuples . . . 4	Sum	Product
4	24	720
5	42	7200
6	52	10800
7	51	7200
8	60	20160
9	71	30240
10	80	75600
11	105	100800
12	105	201600

There exists no 13-tuple with sum less than 112.

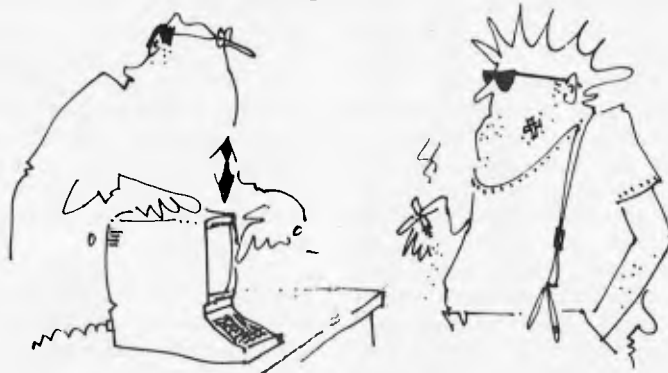
5-tuples . . . 4	Sum	Product
4	20	360
5	25	720
6	30	2160
7	34	2880
8	39	4320
9	47	10080
10	45	8640
11	53	14400
12	54	30240
13	52	20160
14	61	20160

There exists no 15-tuple with sum less than 61.

Many of the above results are due to our recent prizewinner, Mr G Grant.

PS Why is each product listed in the table divisible by 360? Answers on a postcard to GS GG or MM !!

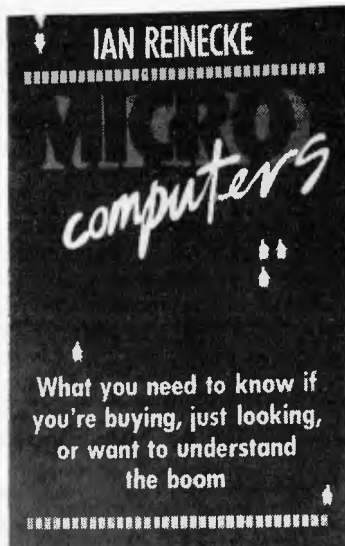
END



*'Let me put it this way — it can remember what was in the charts last year but it can't remember why!'*

# BIBLIOFILE

Once again Steve Withers has been weaving his way through the maze of computer books available.



## Microcomputers

The blurb on the cover of this book reads "What you need to know if you're buying, just looking, or want to understand the boom". This could be misleading, as "Microcomputers" is certainly not a buyers' guide - it is more like an exercise in debunking the mythology created by advertisers. If you believe that a \$200 home computer will help your child get a job or into University, you should read this book.

It is a pity that Ian Reinecke did not find a co-author with some knowledge of computing. Right through the book he erroneously writes about storage media like disk and tape as if they are interchangeable with memory: "For [\$200 or \$300], they receive a keyboard and some of the computer memory necessary to run programs . . . On top of the keyboard, additional memory is needed to store the information you intend to feed into the computer. This may be a separate attachment which contains plastic discs [sic] or it may be an ordinary cassette recorder" (p10). Some of the other errors include the description of a light pen as one "which transmits a beam of light" (p53) rather than a device that detects light from a video screen; and

that "a printer of sufficient quality for letters will cost a minimum of \$2,000" (p70) when they are available for less than \$1,000. These aren't the only mistakes, believe me.

Having ruled out the "buyers" and the "lookers", what about understanding the boom? Reinecke seems to be saying that the micro industry is a giant con trick, that it will not provide any benefits for "ordinary people". Firstly, there are the effects on employment. Will the growing application of microcomputers make people's jobs less rewarding? Other writers have suggested that increased automation will remove the need for people to carry out trivial, repetitive tasks, and that the resulting improvement in productivity will mean our society can afford to turn to truly humanitarian activities as a source of employment. Secondly, he asserts that the cost of computing is so high that it prohibits any useful domestic application. I disagree: for the cost of medium-price VCR you could buy a system which permits fairly simple word-processing and spreadsheets. Why should these be useful at home? Well, the quality of my writing improved when I started using a word-processor (I wish I'd had one when I was at school), and budgeting with paper and pencil is so time consuming that few people bother - a spreadsheet makes this worthwhile job so much easier.

One of the most worrying observations in the book is one that is not really related to microcomputers as such. Several years ago, a group of surveillance and computer experts came to the conclusion that the best way of keeping tabs on the population of a country and any visitors would be the introduction of an electronic funds transfer system.

Despite my (possibly harsh) comments, I believe that "Microcomputers" is worth reading, providing you don't put your faith in the technical content. The descriptions of the way various companies work are interesting, and the book serves to remind us that very little

should be taken at face value. Definitely thought-provoking.

## Microcomputers

Author: Ian Reinecke

Publisher: Penguin Books, Ringwood, Vic.

Price: \$6.95



## All about 1-2-3

At present, Lotus 1-2-3 seems to be the piece of software for managers, so it seems natural that publishers will turn their attention to it. This particular book is an example of a recent phenomenon in publishing, a volume that is little more than publicity material for a product. Although the authors are apparently unconnected with Lotus Development Corporation, they are surprisingly uncritical. Is 1-2-3 really that good?

Quite honestly, "All About 1-2-3" told me little that I hadn't already learned from Mike Liardet's "Which Spreadsheet" report (APC December

1983), and I expect that the majority of APC readers would feel the same. It seems that this book is intended for managers and professional people who aren't already clued up about personal computers, but who have heard about some of the useful things they can do.

Accordingly, the book starts with some background information, intended to answer the most likely questions asked by such people. It explains the meaning of terms like "desktop computer", "spreadsheet", and "data base management", why professionals should consider using word processing or graphics, and the significance of "integrated" software.

The real value of "All About 1-2-3" is that it contains a number of short case studies that show how the program can be used. Various exercises are outlined, including a comparison of the performance of three corporate divisions, keeping farm records, and making investment decisions.

Finally, this book contains one of the best pieces of advice for micro users that I've seen in a long while: "A good rule of thumb is to save your work every quarter hour, every time you think of it, and every time you don't have anything else to do".

#### All about 1-2-3

Authors: Robert Schware and Alice Trembour  
 Publishers: Dilithium Press, Beaverton OR, USA  
 Price: \$16.95

## Instant Arcade Games

Another example of an author and publisher extending the mileage of a good idea – the two editions of this book (covering the ZX Spectrum and the BBC Micro) are very, very similar. The basic idea is that there are two types of arcade games: "shoot-'em-up" and "chase" – and that a variety of different games may be created by plugging different players and backgrounds into a skeleton program. The author likens this approach to Lego bricks; a fair analogy, except that it is possible for a programmer to make his/her own bricks!

Some of the possibilities are quite odd. How about an alien skull chasing a frog down a ski slope? Or would you prefer a spider in pursuit of a sand yacht in front of a city skyline? Of course, there are more conventional scenes, like two cowboys shooting it out in the desert. How bizarre do you like your games?

Sound effects, scoring and all the other elements of an enjoyable arcade



game are given appropriate attention in both editions of the book.

Despite the titles, there are large sections devoted to Adventure games. The same approach is adopted, i.e. a driver program augmented by sub-routines giving the game its particular character. Provision is made for different scenarios ("your mission, should you decide to accept it..."), and of course the objects involved and actions open to the player can be varied according to taste.

One fringe benefit of these books is

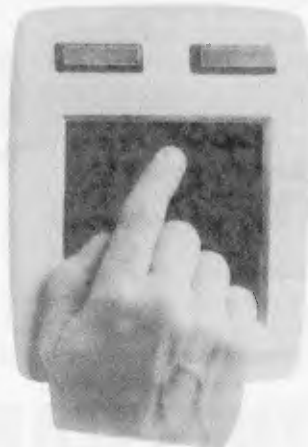
that they encourage good programming techniques, not least the idea of *designing* a program rather than simply throwing it together. In fact, I'm almost tempted to suggest that they are worth buying as first books on Basic programming.

**Instant Arcade Games for the BBC Micro and Instant Arcade Games for the Sinclair ZX Spectrum**

Author: Jean Frost  
 Publisher: Pan Books, Sydney



**MICRO-EDUCATIONAL PTY LTD**  
 AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER



## KOALA PAD

Simply the best graphics tool available!

VIC + C64 Version:  
**\$140** inc tax!  
 APPLE, ATARI, IBM:  
**\$180** inc tax!  
 + \$5 courier

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624

**17 PARK ROAD, GARDEN SUBURB, NSW 2288**





# When is 180 CPS faster than 200 CPS?

**W**hen you have this little beauty on hand. **Throughput speed** is what counts: C.Itoh's new low profile dot matrix printer is a high speed performer, prints out with a throughput of 100 LPM (draft mode with pica character).

You'd expect to lose visual quality? No way! C.Itoh's print resolution is sharp, defined, unbeatable — throughout the print head's 100 million-plus character life.

8510S is rugged, sturdy as it is fast, built to take the punishment with heavy duty castings and high quality metal parts throughout. Plastic parts are all high stress.

It's a colourful character: there's even a colour model which gives you up to seven colours, with high resolution graphics of 144 x 160 dots per square inch on all models.

And if you want to use all the features

of your IBM personal computer, C.Itoh has two special versions designed just for the IBM PC.

So make sure you ask the **throughput** of your new printer. And take a close look at C.Itoh. It answers all the questions.



*For further information contact your Warburton Franki Data Products office.*

## WARBURTON FRANKI

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

- ADELAIDE (08) 356-7333 • BRISBANE (07) 52-7255 • HOBART (002) 28-0321
- MELBOURNE (03) 699-4999 • PERTH (09) 277-7000 • SYDNEY (02) 648-1711
- AUCKLAND N.Z. (09) 50-4458 • WELLINGTON N.Z. (04) 69-3016





**SOFTWARE**  
**WHICH SPREADSHEET?**

# SORD'S FALC

*Mike Liardet takes the lid off a sophisticated spreadsheet system, with an extensive range of facilities, for the Sord M5 home computer.*

Sord is a Japanese company that has previously confined itself to manufacturing business computers. Although virtually a household name in Japan, it has not yet made a great impact in Australia. Recently it launched its first home computer, the M5, which has a superficial resemblance to the Sinclair ZX Spectrum, and is obviously intended to grab a fair slice of this booming area of the computer market.

## Background

One package available for the M5 is rather cryptically named FALC. FALC is a sophisticated spreadsheet system with a surprisingly large breadth of facilities. Sord obviously hopes that everyone will be FALCing about in the near future — the manual's preface claims that it is for 'the working mother, mother at home, working father, father at home, or their children'.

FALC's sophisticated design can be directly attributed to another cryptically named Sord product called PIPS ('Pan Information Processing System'). PIPS is a spreadsheet cum database system, first launched way back in 1980, for the Sord M20/23 and M200 range of business machines. Sord must have missed a great opportunity with PIPS, since at the time of its first release the world had yet to wake up to VisiCalc, and if things had been handled differently we might have had PIPS in the record books and a range of PIPS-clones instead.

Anyway, when Sord decided to try its hand at the home computer market and include a spreadsheet option for the machine, it looked to PIPS for the design ideas. Accordingly FALC was born.

My review system for FALC simply comprised a standard M5 computer with the FALC package itself. The M5 (reviewed in *APC*, September 83) occupies an area slightly smaller than

this magazine, with a qwerty keyboard (rubber keys) and special slot for ROM cartridges. Included with the M5 are all the necessary leads for connecting to a TV and cassette recorder, plus a substantial power supply pack, Basic ROM cartridge and manuals.

It is fairly easy to fit all this lot together, with the manual giving clear instructions on what to do. The M5 has video outlets for both monitors and domestic TVs, a nice feature, but it's easy to get them mixed up. There is no damage done if you do, you just spend a long time fruitlessly tuning your TV with no image appearing.

There are lots of dire warnings in the manual and on the M5 itself that you must switch off before you insert a ROM cartridge. The M5's power-on light is not very bright, so I only felt safe doing this

with the mains-lead unplugged altogether. It's a pity that Sord did not arrange a combined on/off switch with cartridge-lock, then the user would not have this worry, and Sord would not have to deal with all those blown ROM cartridges.

The ROM cartridges are about the size of a cassette-tape box, with a well-protected edge connector at one side. You just press firmly into the socket on top of the M5. If you insert the Basic ROM cartridge, supplied as part of the M5 system, and switch on, then you are free to start Basic programming immediately. There are in fact other optional cartridges available, including more sophisticated Basics. The FALC software is a further cartridge option (\$80). [Since this article was written, Mitsui have been promoting the M5 by including the Basic-G and



**MICRO-EDUCATIONAL PTY LTD**

**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**



## APPLE MOUSE KEYBOARD FUNCTION EXTENDER

91 extra single-stroke function commands for your APPLE II+. Ideal for BASIC programmers

**\$79**

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624

**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



# THE AFFORDABLE PLACE TO SHOP

## MICRO 64K 6502 & Z80A

APPLE COMPATIBLE — DUAL PROCESSOR

\* CENTRAL CPU, 6502 & Z80a \* 64K BYTE OF USER RAM 12K OF ROM \* FULLY PROGRAMMABLE KEYBOARD \* NUMERIC KEYPAD \* SPECIAL FUNCTION KEYS \* UPPER AND LOWER CASE FULL ASCII CHARACTERS \* 16 COLOUR GRAPHICS \* 7 EXPANSION SLOTS FULLY COMPATIBLE WITH APPLE HARDWARE AND SOFTWARE

\*\* 3 MONTHS FULL GUARANTEE AND SERVICE SUPPORT

**\$650 INC TAX \$592 EX TAX**



**SPECIAL THIS MONTH \$1099.00 INCLUDING TAX**

**MICRO 64K** DUAL MICRO PROCESSOR... HI-RES 12" MONITOR... 5¼" DISK DRIVE AND CONTROLLER... TUTORIAL SOFTWARE... MANUALS AND CONNECTING CABLES

## DEALER INQUIRY WELCOME

## 'BASIS' MED-FLY

**SUPER SPECIAL VALUE**

**\$1083 + ST**  
64K with CPM

**\$1150 + ST**  
128K with CPM

### Standard Features

- 6502 and Z80 microprocessors
- 64K RAM Expandable to 128K
- 2K System ROM, plus sockets for 10K additional user ROM
- RGB and Composite (NTSC or PAL) Video
- Selectable 80 or 40 Column Text display
- High Resolution Graphics: Six Colors, 280 x 192 or 280 x 160 with four lines of text
- Color Graphic Mode: 15 Colors 40 x 48 or 80 x 48; 40 x 40 or 80 x 40 with four lines of text
- 8 bit parallel output
- RS-232c Serial I/O
- Detached Keyboard: All standard keyboard functions, Upper/Lower case characters, Numeric Keypad, Cursor Control Block
- Six Apple II compatible slots for plug-in peripherals
- Game paddle I/O
- Built-in loudspeaker
- Mounting slots for up to three DN-25 I/O plugs
- CP/M 3.0

Hardware and Software compatible with Apple II

### MICRO-BUFF

P.O. BOX 174 MULGRAVE VIC 3170  
Please find enclosed cheque for the amount of \$ .....

For the following.....

.....  
Please send me more information

Name .....

Address .....

Suburb .....

State .....

# THE

# ALTERNATIVE:

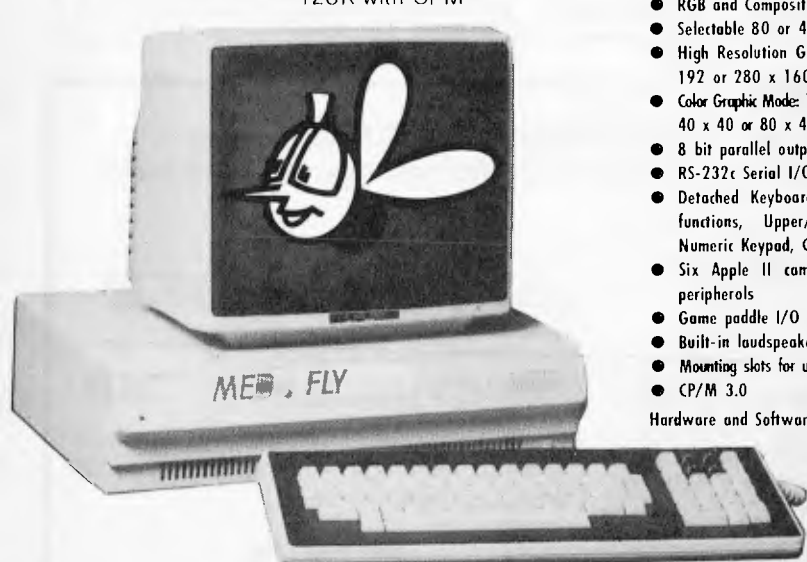
CPM 3 + ONLY **\$140 + ST**

## MICRO ~ BUFF

TELEX AA30625ME537

TELEPHONE 560 7416 (ASK FOR RAY POPE)

28 MAYLANDS CRESCENT,  
GLEN WAVERLEY 3150  
MELBOURNE, VICTORIA,  
AUSTRALIA





FALC cartridges in the price of the computer — Ed.] Press the FALC cartridge in, switch on, and you instantly enter the world of FALC.

FALC is a refreshingly different spreadsheet system. It has quite a number of features in common with VisiCalc but has evolved from a completely different branch of the world's software tree. Its immediate ancestor, PIPS, was developed independently, and presumably without knowledge of VisiCalc. Accordingly, while still being a spreadsheet system, FALC works in a different way from most of the other spreadsheet packages.

Initially these differences are not too apparent. Following switch-on, there is a very brief pause for initialisation, and then a fairly standard type of spreadsheet display appears on screen. Like most inexpensive home computers the M5 does not provide an 80 character by 24 line display, the standard for more expensive machines. Instead we are treated to 24 lines, but a width of only 32 characters. Initially each cell of the spreadsheet is allocated seven characters display space, thus allowing for four columns of cells to be displayed. The very bottom of the screen is reserved as a 'scratch-display', so actually only 20 of the 24 lines are available for the spreadsheet itself.

Of course, at first all the cells are empty, so most of the screen is just blank space. The top row and left hand side of the screen contain the column and row identifiers and at the bottom is the command-line prompt. Both rows and columns are identified by numbers.

Like the Spectrum, which also has a rubber keyboard, the M5 keys are all marked with several symbols, and this can be a little confusing. On the right of the keyboard are four keys which, among other things, are marked with arrows pointing left, right, up and down. These are laid out in the obvious way, like four points of the compass. But it can't be that obvious or more manufacturers would actually manage to do it this way. Anyway, these keys, if pushed in conjunction with the CTRL key can be used to explore the spreadsheet. Unfortunately you need two hands for the keystrokes, since the CTRL and arrow keys are about as far apart as it is possible to be on this keyboard. But before doing this it is necessary to use the WRITE command. WRITE is one of nine commands available, each selected by pushing its initial letter.

## WRITE mode

When in WRITE mode, FALC comes closest to being an orthodox spreadsheet system. WRITE changes the screen colour and a cursor (actually two little arrow symbols at each end of a cell) is displayed. This cursor can be moved from cell to cell

using the arrow keys, with attempts to move off-screen causing a rapid redraw so that the destination cell can be displayed at the expense of a row or column lost at the other side. Unfortunately on my black and white TV the arrow characters, denoting the cursor, were very indistinct and I had to peer quite hard to see them. My guess is that no one in the 'land of the rising sun' has to put up with a monochrome set so Sord was not too concerned with this.

As with most spreadsheet systems, it is possible to enter text or numbers at the current cursor position, simply by typing whatever is required. FALC does not, however, accept formulae in this mode, and neither does it differentiate between text and numbers, so the numbers are left just as typed, and not formatted in any way. The amount of information in each cell is strictly limited to the cell width, but different widths for each column of cells can be specified when using the system initialisation command.

A single keystroke terminates WRITE mode and FALC returns to the command menu. You can use the WRITE command in conjunction with a cell's coordinates, and then the first cursor cell jumped to is the one indicated by the coordinates. This resembles the GOTO command, available on most spreadsheets, and enables you to quickly flick between distant parts of the spreadsheet.

## Initialisation

Unlike some spreadsheet systems, you must specify information about the dimensions of the spreadsheet before you enter any data. For convenience, FALC does an automatic initialisation at switch-on, giving you eight 7-character columns of cells

by 60 rows.

To perform an initialisation the NEW command must be used. FALC needs to know the number of columns and the width of each individual column. It can then allocate as many rows as possible — and the wider the spreadsheet the fewer the rows that it can make available.

Since a cell can only contain as many characters as are allocated to it at initialisation, this exercise may require careful planning. It is rather like designing a record structure for a database system. In fact with highly useful sort and search commands, FALC can be used for very small database-type operations. It shares this distinction with only a few spreadsheet packages like Multiplan and 1-2-3. Unlike them it is severely limited by the M5's low memory capacity — but its hardware is a twentieth of the price!

Implicit in the initialisation process is the ability to allow for some column expansion space, so that there is sufficient room to add new columns of cells later.

Initialisation also permits an area at the top of the spreadsheet to be set aside for headings. The only significance of this is that this area is ignored by calculations, and sorts, etc.

Not all of the initialisation process is irreversible. It is possible to come back later and alter the information on the title area, and also vary the column widths, but the latter does not necessarily work the way you would like: if you enlarge one column at the expense of its neighbour then it simply 'steals' the characters which were in the column next door.

## Calculations

When in command-mode, you can per-



**MICRO-EDUCATIONAL PTY LTD**  
AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER



## AMUST DT80 PRINTER

Australia's top-selling high quality dot-matrix printer for your Apple, IBM, TI994A, MicroBee, Osborne, TRS-80 etc

**\$325** (\$375 inc tax)

+ \$8  
Courier

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624  
17 PARK ROAD, GARDEN SUBURB, NSW 2288



# The incredible BVP 6400.

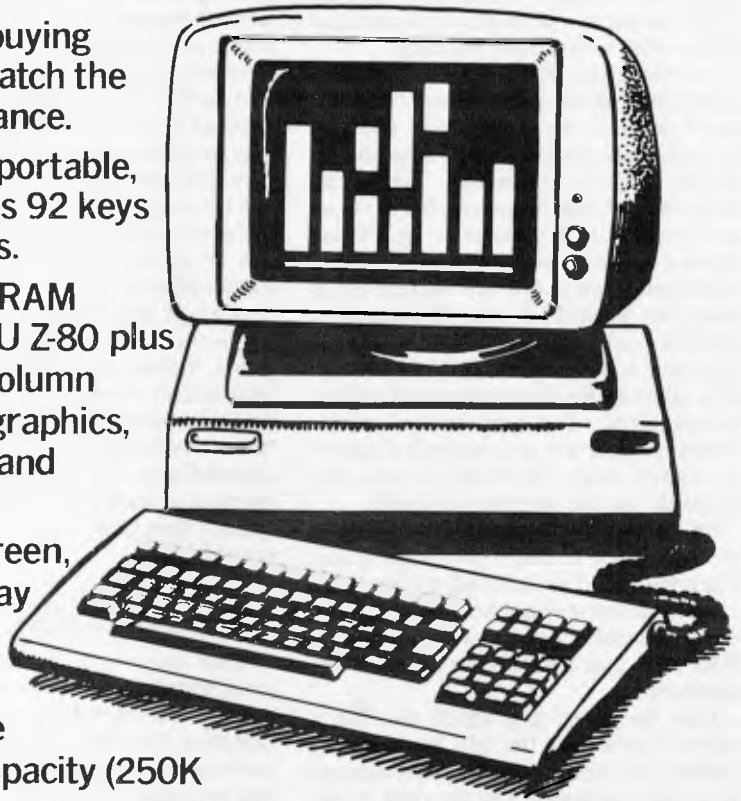
You could spend a lot more buying a personal computer and still not match the BVP 6400 for professional performance.

The Keyboard is completely portable, ergonomically designed and features 92 keys (standard ASCII) and functional keys.

The CPU Unit delivers 64K RAM (Expandable to 128K), has dual CPU Z-80 plus 6502 processor and an inbuilt 80 column display with soft switch plus color graphics, 2 disk driver ports. Runs on CP/M and Apple software.

The Monitor features a 12" green, non-glare CRT high resolution display screen. It will swivel 360° and can be tilted to the angle that suits you.

The Disk Drives are slimline designed and give 500K storage capacity (250K formatted storage each).



## At \$2,395\* no other personal computer can hope to compete.

Special Bonus Offer. You will also receive the Business Master Accounting Package, valued at \$650. (Valid while stocks last).

Total After Sales Care. We will give you all help possible to use and understand the BVP 6400. Just ask, we'll be there.

\* PRICE DOES NOT INCLUDE SALES TAX

# BVP

**The personal computer company.**

Suite 27, 456 St. Kilda Rd. Melbourne 3001 Victoria.  
Tel: (03) 267 5450.

CP/M IS THE REGISTERED TRADEMARK OF DIGITAL RESEARCH.  
APPLE IS THE TRADEMARK OF APPLE COMPUTERS.

form calculations on the numbers in the spreadsheet, by entering formulae directly. For example

$$C2 + C6 = C8$$

would add the numbers in column 2 to those in column 6, and store the result in column 8. Notice that, unlike most programming languages which are less logical in this respect, the calculation is on the left and the destination of the '=' assignment (C8) is on the right. If column 8 does not happen to be on screen at the time this formula is entered, then the answers can be seen by moving to it with the WRITE command.

It is possible to mix constants in with the formulae, so

$$C2 - 1 = C5$$

stores column 2, decremented by 1, in column 5. Other tricks of the trade include the use of '/'

$$R3 + R13 = / R14$$

The '/' causes all rows from 3 to 13 to be summed and entered in row 14. Without it there, just rows 3 and 13 would be summed. We can also specify the display format of the answer:

$$C2 / 7 = C9.0.3$$

would divide by 7 each number in column 2 and store the result in column 9. The '3' in '.0.3' specifies that the answer is to be displayed with two digits after the decimal place (and the decimal point itself consumes one character position:  $1+2=3$ ). The '0' determines how the number should be 'rounded', if the real answer needs more decimal places than are provided for, and the last digit is five. For example, to two decimal places 12.345 can be rounded down to 12.34 or rounded up to 12.35. Moreover, a number like 12.349 could be 'truncated' to 12.34. FALC allows you to specify which of the three options you want.

FALC also provides 'block operators' like average, maximum, and minimum. For example,

$$AVE R5,10 = R11$$

takes the average of the six numbers in column 1 (rows 5 to 10 inclusive) and stores the result in column 1, row 11; then repeats the same operation for all the remaining columns. For completeness, FALC also provides similar block operators for the four main arithmetic operations, but these can also be dealt with by the '/' facility already mentioned. Thus,

$$ADD C2,6 = C8$$

is equivalent to

$$C2 + C6 = / C8$$

So far we have seen that FALC has the facilities of a sort of all-powerful calculator. Instead of a single register display a whole array of numbers can be dealt with, and whole rows and columns can be manipulated at will. However, to be really useful, FALC must store the calculation commands as well. This is the basic facility needed for 'what-if' analysis. It becomes tedious recalculating a matrix, following a

minor change, if a long sequence of calculations has to be re-entered every time. Sord has obviously recognised this fact, and has done something about it, but not as much as I would like to see, and this is my major criticism of an otherwise very good home computer package.

Essentially it is possible to access an alternative screen where 'programmed functions' can be permanently set up, and subsequently selectively re-executed with a couple of keystrokes. These functions, by the way, need not be confined just to calculations on the spreadsheet, but can also include almost any sequence of commands: cassette reading, searches, etc. Actually when they are invoked they flash up momentarily in the area where you normally see your own typing — just as if you were typing them yourself, only at Superman speed!

The major limitation to this facility is that only one screenful of text can be set up in this way, that is, about 600 characters maximum. This is probably not a great disadvantage for command sequences, but would be fairly easy to exceed the limit with a complicated calculation sequence for a model.

## Memory and expansion


In fact memory is very tight on the basic M5, so it is not possible to build up large spreadsheet applications anyway. The situation could be improved by purchasing the 32k RAM expansion pack, which should be available shortly.

However, when the extra RAM does

arrive, FALC will not be making the best possible use of it. As the system stands, there is a basic area of just over 4k reserved for the spreadsheet data and programmed functions. This can be instantly transferred, using the PUT command, into one of two buffer areas numbered 1 or 2. The existing spreadsheet can then be freely modified and the original can be restored at any time using the GET command. Now with an extra 32k of RAM, the number of buffer areas will be increased to 9, but the spreadsheet itself will remain at the same size.

Doubtless Sord has organised things this way because it anticipates that the home user is likely to have lots of small applications, rather than one big one. Certainly, this arrangement will be particularly convenient if this is the case, since it circumvents much of the cassette reading and writing that would otherwise be necessary. All applications can be read in from cassette, in one go at the start of a FALC session, and only need be written out once at the end. (Reading and writing to cassette is achieved by PUTting and GETting with names — filenames, rather than numbers — the buffer identifiers.) In the middle of a session, applications can instantly be changed by PUTting and GETting to buffers.


Since it does not appear to be possible for different buffers to communicate results with one another, memory expansion will just facilitate more different applications to be run, but be of no help to anyone wanting to do larger problems. It is a pity that the user cannot control the number of buffers and size of spreadsheet, then he could have the best of both worlds!




**MICRO-EDUCATIONAL PTY LTD**  
AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER

# FREE DISK!

(Well Almost)



To launch our Micro-Educational brand disks we will send you one free! Just fill in the form and enclose \$2.00 in stamps for postage 

Dear George,  
Please rush me one FREE Micro-Educational diskette. Enclosed is \$2.00 in stamps for your postage.  
I own a ..... computer  
Name .....  
Address .....  
..... P/Code .....

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624  
**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



# **SORT and SEARCH**

So far we have covered four of the nine commands available: WRITE, NEW, PUT and GET. Two other commands are SORT and SEARCH.

**SORT** always sorts rows of the spreadsheet. It can sort using any specified column, or multiple columns, into alphabetical or numerical ascending or descending order. For example, if the spreadsheet contains a list of names, telephone numbers and area codes, by specifying a single sort on the area code column, then on the name column, the list would be rearranged, sorted first into areas, then in alphabetical order for names within an area.

**SEARCH** provides quite a powerful search facility. Like **SORT** it must be given a column to work on, then searches down it for the 'target' of the pattern specified. The pattern can include joker characters, identical as it happens to those used by the CP/M operating system for ambiguous filenames. Thus the search pattern "\*A?C\*E" would match only with a cell whose last character was 'E' and containing the sequence "A"+any character+"C" elsewhere. This would, for example, match "ABCDE", "QQQAXC-QQQE" but not "ABBCDE".

## **Other commands**

There is a **LIST** command provided to give printouts of the spreadsheet. I could not test this as I did not have a printer connected. The M5 provides a Centronics interface through a 16-pin flat-cable connector.

The **MOVE** command allows a rectangular area to be specified as the 'source' of the move, and a possibly different shaped rectangular area for the 'destination'. Single columns or rows are just a limiting case and can be moved with equal facility. The source of a move is not affected, but of course the destination is completely overwritten.

The final command provided by **FALC** is **GRAPH**—to plot graphs on the screen. Sord rather underplays this command, which is quite a rarity even on disk-based spreadsheet systems. Anyway the M5 has a character graphics facility, which can be used to make boxes, and so on. The **GRAPH** command uses these characters, with its colour display facility to build up an attractive bar graph display. The graph is plotted horizontally, not vertically, with each bar corresponding to a row of the spreadsheet. As there are up to 20 rows on display at any one moment, 20 bars can be accommodated. Several columns can be graphed simultaneously, with a bar broken into different colours, to represent the 'contribution' from each column. It is also possible to print this graph, but Sord does

not record what printer will do this.

## **Conclusions**

The **FALC** Package has a feeling of quality about it. As a software package for a home computer it is very good. Perhaps the \$80 price tag will deter some potential users, more accustomed to \$15-\$20 for a games cassette, but it comes supplied as a ROM cartridge with software instantly available at switch-on, and no cassette loading displays. It is also very nicely packaged and clearly documented, taking 100 pages to explain its extensive breadth of facilities. These facilities include sorting, searching and graphics — a rarity even with disk-based software.

Clearly Sord has put its experience at the more expensive end of the micro market to good use and come up with something that is a cut above the usual for the home computer market.

## **Spreadsheet evaluation**

This month I am introducing a new feature to the 'Which Spreadsheet?' series: a 'star' rating for various fundamental aspects of the packages. Actually I shall not be using stars, which could only be positive, but '!'s and '?'s instead. This follows the chess notation where '!' denotes a good move, and '?' a bad one. Each month I will evaluate the spreadsheet under review, in four different categories and anything from three '!'s to two '?'s will be awarded:

- !!! = Excellent
- !! = Good
- ! = Passable
- ? = Poor
- ?? = Bad

To avoid introducing a long checklist of facilities, I will rate the systems on fairly abstract (and therefore subjective) consid-

erations, which manage to cover just about everything between them:

**1. Ease of learning.** If the manual has good tutorial material, aimed at a newcomer who knows nothing about computers, and the software is tolerant of a beginner's mistakes and designed so that the user can quickly build up a model of what is happening 'under the bonnet', then it will be deemed 'easy to learn'.

**2. Ease of use.** This is not the same thing as above. In particular, it is quite difficult to score well on both counts, since easy to use software should work in a fast and concise way, which is generally at odds with being easy to learn. Here the reference documentation is more in question. It should be well indexed, and easy to access information on even the most obscure corners of the system.

**3. Reliability and error handling.** Obviously a system which crashes regularly or corrupts files and loses data must score badly in this department. Rare programming oversights in distant outposts of the system will not be taken so seriously — after all there is not a software package anywhere in the world that does not somewhere have a bug of this nature. To score well the system must be 'positively robust', and by good design prevent the user from making mistakes, and with well thought out explanations when s/he does.

**4. Facilities.** This category will give some limited measure of the facilities available in the system, but if you want to know more, then read the article! Obviously, I will be more generous in my marking when looking at home computer software. You cannot reasonably compare facilities between packages differing in price by a factor of ten or more.

## **FALC scorecard**

<b>Easy to learn:</b>	!(passable)
<b>Easy to use:</b>	!!(good)
<b>Reliability/error handling:</b>	!(passable)
<b>Facilities:</b>	!!!(excellent)

## **Checklist**

<b>Documentation:</b>	100-page manual. Nicely presented and occasionally illustrated. Well indexed. A few minor misprints.
<b>Facilities:</b>	Only simple arithmetic: + - * / , average and mean, but extensive facilities elsewhere; graphing, sorting and searching.
<b>Spreadsheet size:</b>	3600 characters available. Can be configured with up to 100 columns, or up to 100 rows. Defaults to eight columns X 60, each column seven characters wide. Room for two spreadsheets with standard M5, nine with addition of 32k expansion RAM.
<b>Max column width:</b>	30 characters.
<b>Benchmarks:</b>	(see <i>APC</i> April 83) 1. (a) (b) (c) could not be tested. (d) 6 rows per second. (e) 4 columns per second. 2. Max rows of text accommodated: 34. 3. Max rows of numbers: 30.
<b>Price:</b>	\$80 (Currently included with Sord M5 at \$395).
<b>Available from:</b>	Mitsui Computer Systems (Frenchs Forest NSW, Milton QLD, and South Melbourne VIC) and dealers.

# Now "touch-screen"- more power to Uncle Conrad's little finger.

Using a computer—even a so-called personal computer—is by no means second nature to an executive. The keyboard itself can be a barrier to many.

Hewlett-Packard's advanced technology has overcome this barrier for you. The remarkable new 16 bit HP150 desk top computer with its MS-DOS operating system can actually be worked by touching the video screen with your finger.

## Touching aids your productivity

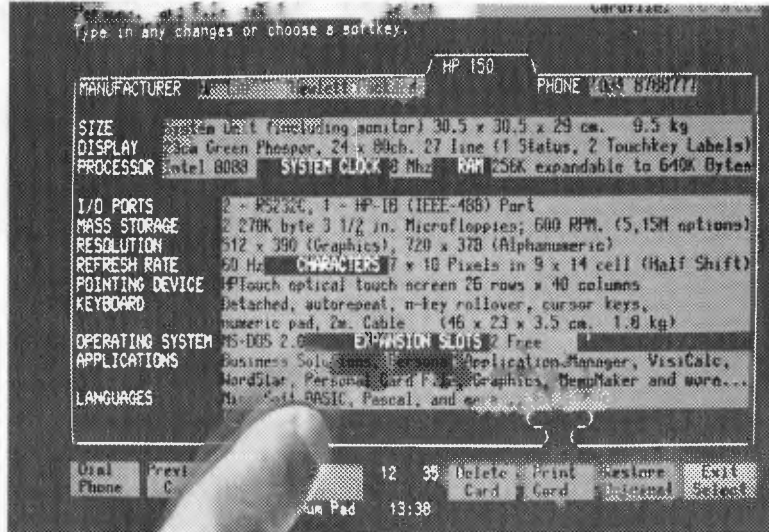
Even Uncle Conrad; who has already been using computers to great advantage in his business; can improve performance with an HP150.

He now has, on his own desk, a powerful computer capable of running a wide variety of practical software. It can produce reports, spread sheets, forecasts, payrolls and confidential data which he alone needs to access rapidly.

The "touch-screen" has enormous advantages.

## Your instincts increase performance

From infancy we learn to point at those things we wish to control, or bring to notice. How often have you heard the phrase "I would like to point out..."



The HP150 computer can be operated by touching the screen itself!

This "pointing" instinct inspired Hewlett-Packard designers to create a computer which truly deserves the adjective, *personal*.

The ability of the HP150 to respond when you simply touch the screen gives rapid access to information more easily than you ever thought possible.

## Power on your desk

The HP150 system is compact and takes up very little space on your desk.

You can operate the system via the keyboard *and or* by touching the screen itself. The degree to which you use either depends on personal preference, and the software involved.

## Touching is believing

To understand how close you are to using a truly *personal* computer, test drive the HP150.

Telephone Hewlett-Packard on one of these numbers to find the HP computer dealer most convenient to you.

Sydney: 888 7202

Melbourne: 878 8777

Adelaide: 272 5911

Perth: 383 2188

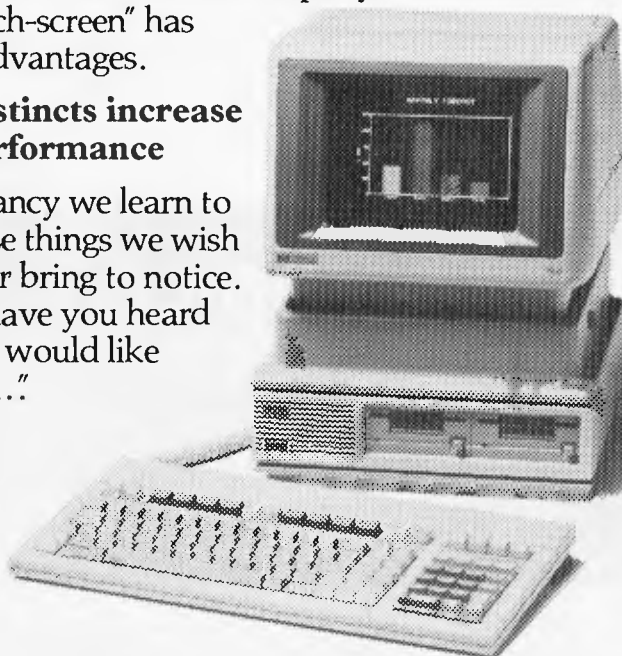
Brisbane: 30 4133

Canberra: 80 4244

Keeping industry, business and Uncle Conrad in touch.



**HEWLETT  
PACKARD**



# MORROW MICRO DECISION

## COMPUTER SPECIFICATIONS.

- Z80A CPU operating at 4MHZ.
- 64K RAM + 4K ROM (MD2 MD3) 128K MD11 + 8K ROM
- 5¼" Floppy Disc Drives (400K MD2 800K MD3)
- 5¼" Hard Drive 11.0 Meg Formatted (MD11)
- 2 x RS232 Serial & 1 x Centronics (MD2, MD3) + High Speed Port MD11
- RFI Inhibiting fabricated metal case with moulded plastic front panel.

## SOFTWARE SPECIFICATIONS.

- CP/M 2.2 Operating System.
- Wordstar word processing MD2, MD3.
- New Word MD11
- Correct-it spelling checker
- Logicalc Electronic Spreadsheet
- Personal Pearl Data Base
- Quest Bookkeeper (Not available with MD2)

**MORROW DESIGNS THE MICRO DECISIONS TO PROVIDE THE BEST VALUE FOR YOUR DOLLAR IN THE PERSONAL COMPUTER MARKET.**

HARDWARE INC. TERMINAL & 80 cps PRINTER

- + TOTAL SOFTWARE PACKAGE
- + TOTAL WARRANTY
- + TOTAL SERVICE
- + TOTAL COMMITMENT
- + TOTAL PRICE MD2 \$2740\*
- MD3 \$3385\*
- MD11 \$4990\*

*\*Plus tax if applicable*

= TOTAL SATISFACTION



# MORROW

## The Professionals Choice

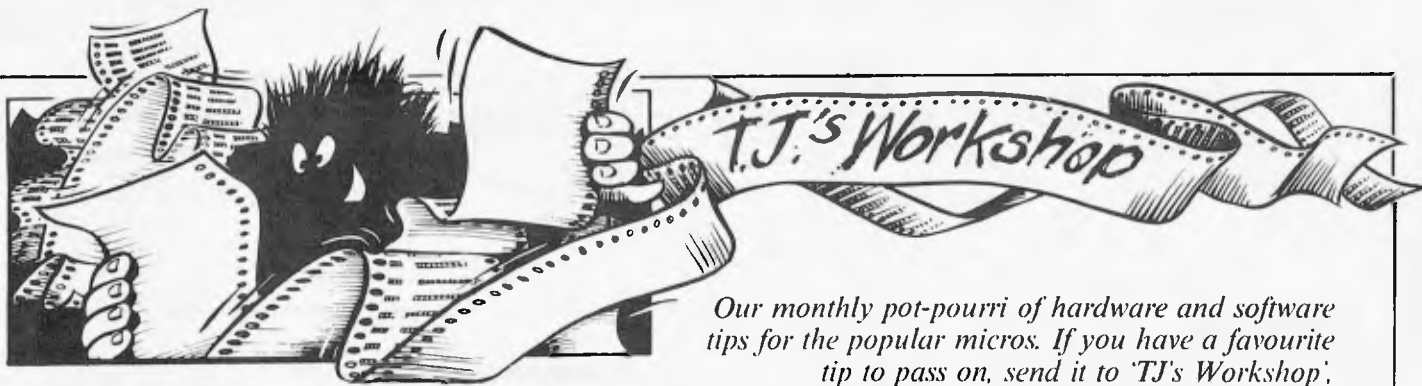
**FULLY SERVICED THROUGHOUT AUSTRALIA BY YOUR MORROW DISTRIBUTOR**

IMPORTED & SUPPORTED BY  
**AUTOMATION-STATHAM PTY. LTD.**  
47 BIRCH ST.,  
BANKSTOWN NSW 2200  
(02) 709 4144

A FULL SERVICE MORROW  
DEALER SINCE 1976  
TRADE ENQUIRIES WELCOME  
S.A. (08) 332 0722

**ASSCO PTY. LTD.**  
153 ELEY RD.,  
BLACKBURN 3130  
VICTORIA  
(03) 233 6355





*Our monthly pot-pourri of hardware and software tips for the popular micros. If you have a favourite tip to pass on, send it to 'TJ's Workshop'.*

*77 Glenhuntly Road, Elwood, Vic 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 any hardware modifications may render the maker's guarantee invalid.*

## VIC accelerator

I have here a little sub-routine for a VIC-20 which will change the operating speed of a program. I recommend it be placed at the start of the program — just after the instructions is usually the best place.

Here is a breakdown of the routine.

Lines 10-60 set up a menu. Line 70 sets up the input and gives it the name K; line 80 checks to see that K is legal.

Line 90 prints an error message if it's not and line 100 POKES the value K into the correct location to control the speed.

```
10 CLR: PRINT "00-32
VERY SLOW"
20 PRINT "33-65 SLOW"
30 PRINT "66-128
```

```
AVERAGE"
40 PRINT "129-190 FAST"
50 PRINT "191-255 VERY
FAST"
60 PRINT:PRINT:PRINT
70 INPUT "HOW FAST":K
80 IF K<0 AND K<256 THEN
100
90 PRINT "CHOOSE
AGAIN":
GOTO 70
100 POKE 37879, K
```

You could also use this POKE code during a program, to make it speed up gradually, such as in a game, that is.

```
1000 IF SCORE 1* 1000
THEN K=K + 100
```

But nothing is perfect. When you change the operating speed of your VIC, the real time clock is no longer real time, so you must decide between time-keeper and speed.

*Kieran Smyth*

```
200 DATA17,0,0,196,13,38,
34,223,64,205,54,25,194,
157,25,43,43,235,237
115,38,65,42
210 DATA38,65,235,229,
175,237,82,68,77,209,33,
16,0,25,235,43,237,184,
237,115,38,65,42,38
220 DATA65,17,17,0,25
249,42,223,64,201
The following additional
program verifies that the new
command has been
implemented correctly:
300 ONERROR GOTO 380
310 For A=1 To10
320 CLOSE B
330 CLOSE
340 NEXT
350 IF A=3 THEN PRINT
"ALL OK":END
360 PRINT "CHECK
ENTERED CODE WITH
LISTING"
370 END
380 A=A + 1
390 RESUME NEXT
A W Sheppard
```

## Simulated 'REPEAT UNTIL' function

Most Basic interpreters, including Microsoft Level II, do not support a REPEAT UNTIL command. One method of simulating this function is to execute a FOR NEXT loop with a very high 'TO' value and to jump out of the loop before it has been completed. For example, the following

program would find the lowest integer with a square greater than 150:

```
10 FOR X=1 TO 100
20 IF X^2 < 150 THEN
NEXT X
30 REM Rest of program
```

Unfortunately this method unbalances the stack and would disrupt outer loops in a nested system. This serious disadvantage may be overcome as follows.

The Basic listing shown loads a machine code routine into the top of memory. This routine is called by the TRS-80 CLOSE command (not used in non-disk systems). When called, it cancels an incomplete

## Freezing your Commodore 64

These days more games include a freeze facility to totally suspend a game for a short while, enabling you to answer the phone, make a cup of tea, etc. This version for the Commodore 64 is very simple to use.

After running the program given, POKE 777,192 will turn the freeze routine on if the F1 key is pressed and off if the F3 key is pressed. The freeze routine can be

```
switched off with POKE
777,167.
10 REM FREEZE—SET UP
THE M/C
20 FOR T=49380 TO 49397
30 READ A: POKE T,A
40 NEXT T
50 DATA 165, 197, 201, 4,
240, 3, 76, 228, 167, 165,
197,201,5,208,250,76,228,
176
60 REM DEMO
70 POKE 777,192: REM
FREEZE ROUTINE ON
80 PRINT B:B=B+1:GOTO
80
```

*David Gristwood*



## Spectrum screenery

Here is a short machine code subroutine to convert the conventional screen POKE into the Spectrum's more exotic version. The m/c can be relocated to anywhere in memory and is used in the following manner:  
Let  $C=N + USR(TV)$

where N is the conventional screen location 0-6143 (0-top left corner). TV contains the starting address of the m/c routine.

What m/c does:

When called as recommended the code removes the last no (i.e. N) from the calculator stack (after first checking it is there), turns it into an integer and swaps the three most and least significant bits shown as B and C on the diagram. The plus sign must be used to separate the variable and the USR command as the value of BC on returning to Basic is zero.

Now for the song and dance: This routine opens up a new aspect to the Spectrum's excellent graphic capabilities.

Ex PET high res users can now convert those PEEK and POKE graphics routines for the Spectrum. Also the full 192 by 256 resolution can now be used directly from a simple m/c call from Basic. Two programs are shown here to demonstrate the new command.

1 "Screen invert"

2 "X, Y Plotter"

These are listed separately.

The conversion routine can also be used as a subroutine in a m/c scroll up, down, left and right (the list is endless).

### Disassembled listing of Screenery

Hex	Z80 Mnemonics	Decimal	
2A 65 5C	ld hl,(STKEND)	42,101,92	
ED 5B 63 5C	ld de,(STKBOT)	237,91,99,92	
A7	and a	167	
ED 52	sbc hl,de	237,82	
7D	lda,l	125	
FE 05	cp 5	254,5	
30 01	jr nc,OK	48,1	
CF	rst 8	207	
<b>CD 99 1E</b>	<b>OK</b>	<b>call UNSTACKBC</b>	<b>205,153,30</b>
60	ld h,b	96	
69	ld l,c	105	
3E 07	lda,7	62,7	
A4	and h	164	
07	rca	7	
07	rca	7	
07	rca	7	
07	rca	7	
07	rca	7	
57	ld d,a	87	
CB 84	res 0,h	203,132	
CB 8C	res 1,h	203,140	
CB 94	res 2,h	203,148	
3E E0	lda,224	62,224	
A5	and l	165	
0F	rrca	15	
0F	rrca	15	
0F	rrca	15	
0F	rrca	15	
0F	rrca	15	
CB AD	res 5,1	203,173	
CBB5	res 6,1	203,181	
CBBD	res 7,1	203,189	
B4	or h	180	
67	ld h,a	103	
7A	lda,d	122	
B5	or l	181	
67	ld l,a	111	
11 00 40	ld de,16384	17,0,64	
19	add hl,de	25	
44	ldb,h	68	
4D	ldc,l	77	
CD 2B 2D	call STACKBC	205,43,45	
01 00 00	ld bc,0	1,0,0	
C9	ret	201	

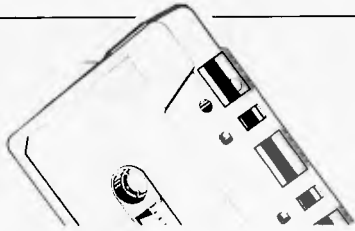
#### Operation:

HL— 010 00 000 000 00000  
A B C D

#### Explanation,

A The group of eight character lines B Pixel row in character C Character row  
D Represents the character column number.

The above routine swaps block B and C to produce the correction.



# ROMIK SOFTWARE

## GAMES THAT ARE HARD TO BEAT

Why? Because every single Romik action game is professionally written in machine code to give you all the thrills and action of a fast-moving arcade game. Every one recorded on top quality tape, most of them playable either from the keyboard or with joysticks.

A lot of thought and development goes into every game – and we guarantee no bugs to drive you mad, no infuriating gaps to interrupt your fun.

Whether pitted against invaders from alien worlds, tracking hungry sharks or frantically stalling the melt-down of a nuclear reactor you can be sure that if it's a Romik game you'll have a battle on your hands. The kind of battle that leaves no room for mistakes or hesitation.

### VIC 20

- ATOM SMASHER
- POWER BLASTER
- TIME DESTROYERS
- MULTISOUND SYNTHESIZER
- PEDES MUTANTS
- ZORKANS KINGDOM
- ZORD OF HAKEL
- GOLDEN APPLE OF ZUS (Adventure)
- QUADRANT
- CATERPILLAR

- ANTHROIDS
- INCESTOR
- DICKERS DIAMOND

### CBM 64

- STELLAR TRIUMPH
- FOOLS GOLD (Adventure)
- ZAPPY ZOOKS
- TOMB OF XEIOPS
- FORTH (language)

## TINY BASIC COMPILER



The TINY BASIC COMPILER is a true compiler for the C64, VIC and PET/CBM micros. Although it does not support the full BASIC language, it has enough features to make it a useful addition to anyone's software library.

The TINY BASIC COMPILER is a compact compiler, yet it can handle floating point operations. Most other 'tiny basics' support only integer arithmetic, but this ingenious package supports the complete floating point mathematics routines available in the full CBM BASIC language.

- ★ Near machine speed from Basic programs
- ★ Easy to use

**\$28.50** disk plus p & p  
**\$24.00** tape

## THE VIC CLUB

- ★ Discount Voucher Scheme
- ★ Club Cartridge Library
- ★ Club Specials

For every dollar spent with the VIC Centre you will receive a credit certificate (CC) for 12 cents in the dollar against future purchases i.e.

VIC-20 \$299 = CC \$35.88  
C64 \$499 = CC \$59.88

NB: This does not apply to orders below \$50, Club Specials, items using Credit Certificates, items marked as having no club discounts and trade-ins.

### RECEIPT & RULES

- (1) Membership fee of \$50.00 (incl. first Commodore cartridge) Non-cartridge member \$20.00, both renewable annually. \$10
- (2) Reduced membership rates are available with additional cartridges purchased at the time of making membership application.
- (3) Exchange of cartridges allowed at the rate of \$7.00 at the time of exchange. (+ \$1 certified postage if applicable).
- (4) The variety and number of cartridges available for exchange will be controlled by The VIC Centre.
- (5) All cartridges returned for exchange must be working and undamaged.
- (5A) A service charge will be incurred on all repairable cartridges.
- (6A) Packaging and instructional material must be returned with the cartridge and in good condition.
- (7) The cartridge returned must be the same cartridge borrowed.
- (8) MAXIMUM time exchange is 1 calendar month, after this time the cartridge is unreturnable and deemed the property of the member.

Date: / /1983.  
SIGNATURES:(Client) .....

(The VIC Centre) .....

Note: The signing of this form indicates agreement to the rules of membership.

**FREE**  
TO ALL EXISTING  
MEMBERS AND NEW  
MEMBERS UPON  
APPLICATION



**VIC CENTRE CLOCK**  
- Value \$19.95

Name: .....

Address: .....

Bankcard: ..... Signature: .....

Expiry Date: .....

CARTRIDGE MEMBER \$50 NOT CARTRIDGE \$20

ENCLOSED \$

CARTRIDGE   
NON CARTRIDGE

## The VIC Centre

416 Logan Road,  
Stones Corner,  
Brisbane Australia.  
P.O. Box 274 Sunnybank  
Q'ld 4109  
Tele: (07) 397 0888

(A division of CW Electronics)

Prices and specifications subject to change without notice.





*Demonstration program*

```

10 REM PROG 1 SCREEN INVERT . . . TV CONTAINS START ADDRESS
20 PRINT "THIS PROGRAM INVERTS SELECTED PARTS OF THE SCREEN"
30 FOR H = 1 TO 19: PRINT "THIS IS A TEXT SAMPLE": NEXT
40 REM
50 INPUT "CHARACTER LINE FOR INVERSION (0-23)": L
60 INPUT "COLUMN (0-31) FROM": S: "TO": F
70 PRINT #1: "XXXXXXX"
80 FOR I = L * 256 TO L * 256 + 256
90 LET C = I + USR(TV): REM CONVERSION MADE HERE
100 FOR J = C + S TO C + F
110 POKE J, 255 - PEEK(J)
120 NEXT J: NEXT I
130 GOTO 50: REM
200 REM PROG 2 THIS PROGRAM DRAWS A SINE WAVE IN THE BOTTOM TWO
    LINES
210 FOR X = 0 TO 255 STEP 5
230 LET Y = 8 + SIN(X/15) * 8
240 GOSUB 9000: REM PLOT ROUTINE
250 NEXT X
260 PRINT AT 11, 5: "Tomorrow the world !!!"
270 PRINT AT 13, 2: "Press any key to end program"
280 PAUSE 0: STOP: REM
9000 REM X, Y PLOTTER (256 * 192) SUBROUTINE (TV CONTAINS START
    ADDRESS)
9010 REM X HORIZONTAL COORDINATE (0-255)
9020 REM Y VERTICAL COORDINATE (0-191)
9030 LET C = (INT(X/8) + INT(191 - Y) * 32) + USR(TV)
9040 LET J = PEEK C + 2 ↑ (7 - (X - INT(X/8) * 8))
9050 POKE C, J * (j <= 255) + PEEK C * (j > 255): REM PSEUDO 'OR' OPERATION
9060 RETURN
  
```

*Machine code loader*

```

10 INPUT "START ADDRESS": S
20 FOR I = STOS + 67
30 PRINT I,
40 INPUT "BYTE?": B
50 POKE I, B: PRINT B
60 NEXT I
70 PRINT "FINISHED"
80 SAVE "TV CONV" CODE S, 68
90 VERIFY "" CODE
  
```

## Commodore 64 'PRINT AT' simulation

One facility which the Commodore 64 lacks is the PRINT AT command. There are several ways of simulating this command on the Commodore 64, however.

Perhaps the simplest method is as follows:

```
10 REM SIMULATION OF
```

```

PRINT AT L,C,Z$
20 REM LINE L, COLUMN
   C: 1 <= L <= 25,
   1 <= C <= 40
30 POKE 214,1: POKE 211,
   C-1: PRINT CHR$(145): Z$
40 REM OR POKE
   214,1: PRINT CHR$(145):
   TAB(C-1): Z$
50 REM FOR PET
   CHANGE 214 TO 216
   AND 211 TO 198
   Note that cursor up,
   CHR$(145), is required (try
   removing it) and that TAB
   should only be used if the
  
```

previous PRINT did not terminate in a semicolon (again, try it).

It is worth reminding PET, VIC and 64 users of a bug in Commodore Basic. Typing a line number in the range 350720 to 353279 should result in a "?SYNTAX ERROR", but in practice various responses are possible, ranging from an effect similar to pressing RUN/STOP RESTORE on the 64 (or jump to the monitor in the PET), to an

irrevocable crash.

Finally, two tips relating to the use of cassettes on the VIC and Commodore 64.

An idea of the number of dropouts which occurred on reading a tape can be gleaned from PEEK(158): a value of 4 or less is usually not significant. The file name of the last cassette read or write operation can be inspected with the aid of FOR T=833 TO 849: PRINT CHR\$(PEEK(T)): NEXT

*Nick Higham*

## Epson HX 20 dating call

The Epson HX-20 presents an annoying MM/DD/YY format response to the DATES call. A partial solution is achieved by entering the following machine code routine (either by POKES or through the monitor), after executing MEMSET 8H0A49:

Hex Address	Value
0A40	96
0A41	47
0A42	D6
0A43	48
0A44	97
0A45	48
0A46	D7
0A47	47
0A48	39

A call of EXEC 8H0A40 will then result in all subsequent calls to DATES returning a DD/MM/YY response. Why only a partial solution? Wait until the witching hour.

*Nic Clift*

**RANKED IN THE US TOP 30!**  
 Each product marked ★ is ranked in the  
 top 30 list of the best IBM PC software rated  
 monthly by the authoritative US magazine "Softalk".



## NEW RELEASES from Sourceware's Software Supermarket

Sourceware is out to prove it has Australia's finest range of exclusive software for the IBM PC user. Here's just some of the top-performing unique software just released from Sourceware. Get the full details from your IBM PC dealer, or ring Sourceware for information or your nearest stockist.

### ★ AST RESEARCH INC

AST produce a range of IBM PC addon memory products which recently placed No. 1 in PC WORLD magazine user poll. These multifunction cards have memory from 64-512k as well as clock/calendar, Superdrive and Superspool software and extra serial, parallel and games output ports. AST also market full range of communication products such as IBM SNA, 3780, BSC and System 34, 36, 38 emulation cards as well as PC Net local area network systems.

### ★ LOTUS 1-2-3

Rated No. 1 on "Softalk's" monthly rating of the best IBM PC software. With 1-2-3, you can be using your IBM PC in a surprisingly short time. Even if you've never been near one before. 1-2-3 instructs you right on the computer's screen in a friendly, helpful way, so you learn as you go along. Everything is in English, not code, so there's no new language to learn. There's even a special HELP key you can press to put special instructions on the screen if you can't remember what to do next. But for all its comforting ease of use, 1-2-3 is one of the most powerful programs available for the personal computer. It combines spreadsheet, information management and graphics all in one.

### ★ PLANFIN & PROFIN

The easy to use financial analysis and budget forecasting system written in Australia to our local business specifications. These packages have also received high acceptance in the USA as business planning packages that are easy to understand and extremely valuable in their ability to prepare spreadsheet data for packages such as 1-2-3, Visicalc and Multiplan.

### GRAPHIC SOFTWARE SPECIALS

Sourceware carry a full range of business graphics packages for both dot matrix printers and colour plotters.

FASTGRAPHS	general graphics including "Slide Show"
GRAPHWRITER	advanced graphics
PRIME PLOT	CPM graphics for the SWEET-P and Apple
SWEET-PLOT-80	graphics package for OSBORNE, KAYPRO and NEC?

Here's more new releases from Sourceware:

**DEALER  
 ENQUIRIES  
 WELCOME**

### SOFTWARE

★PC ARCADE	Arcade games
★FRIENDLYWARE	Intro set for new PC users
★TUTORIAL SET	Professor DOS/Instructor Training set
PC DOCUMATES	Keyboard templates for all major packages
EASYWRITER II	Word processing including Easymailer and Easyspeller
★TIM III	Database manager
FAST FACTS	Personal filing and reporting package
PROKEY	Keyboard programming utility
SIDEWAYS	Vertical print utility
APL PLUS*PC	APL programming language for the IBM PC
★CROSSTALK	Communications and terminal emulation program

### HARDWARE

IRMA BOARD	IBM 3278, 3279 terminal emulation card
PCI 1051	IBM SYS 34, 36, 38 - PC interface
PCI 1076	IBM SNA/SDLC - PC interface
SWEET-P	12 Colour graphics plotter

 **SOURCEWARE**  
 4/73 Albert Avenue, Chatswood, NSW 2067. (02) 411 5711

The Source of Software 507.FPC

© All product names listed are registered trade marks of the original vendors

# daisywriter®

**No other daisywheel printer gives you this many features for such a low price!**

**\*INTERNAL 48K BUFFER MEMORY —**

Now you can forget waiting while your computer feeds your printer. Daisywriter lets you process and print simultaneously, it holds up to 30 pages of text and frees up the processor to do other tasks.

**UNIVERSAL INTERFACE —**

from Apple to Xerox and Commodore through IBM-PC to TRS-80. Daisywriter will connect to any processor with RS232, Centronics, IEEE or current loop interfaces.

**COMPLETE RANGE OF PROTOCOLS —** from Applesoft to Zardax and Multiplan to Visicalc. Daisywriter will run with virtually any software.

**Only \$1986\***



**HIGH SPEED PRINT THROUGHPUT —**

bi-directional printing with high speed logic seeking ability enables Daisywriter to ZIP over white space on the page at up to 200 cps.

**HIGH RELIABILITY —** runs on a linear motor — no belts, pulleys or wheels to wear and require adjustment.

**LOW RUNNING COST —** uses easily loaded daisywheel cassettes and standard IBM typewriter ribbon cartridge.

**GRAPHICS —** full graphics capability.

**INTERNAL SOFTWARE COMMANDS —** more than 75 software commands to give you true proportional spacing and speed up your word processing.

**CUTSHEET AND TRACTOR FEEDERS —** available as options.

\*Price does not include sales tax

**PSI**  
Incorporated in N.S.W.

**PAPERWORK SYSTEMS INC. (GROUP) PTY. LTD.**

HEAD OFFICE: 11th FLOOR, 124 WALLEN STREET, P.O. BOX 3511, NORTH SYDNEY N.S.W. 2060 AUSTRALIA TELEPHONE (02) 922 5322 TELEX AA23981  
3 BOWEN CRESCENT, MELBOURNE VICTORIA 3004 AUSTRALIA TELEPHONE (03) 267 7555





## Keeping fine time

Most Commodore 64 users will be well aware of the TIS function which allows access to the inbuilt clock for use in programs. However you are limited to hours, minutes and seconds. It is often the case that a timing system is required that will operate in tenths of a second. Well, it is possible to go one better than that and program in 100ths of a second.

The secret lies in the TI function which reads the interval clock in 'jiffies', or 1/60th second. This value is set to zero on power up and continually increments itself, except when the tape input/output routine is called. Try PRINT TI and RETURN followed almost immediately by another PRINT TI and RETURN. You will have two numbers giving the jiffy count at the moment of pressing RETURN.

To use in programs, refer to the following subroutine:  
 1000 PRINT "(CLS)"  
 1020 T1=TI:REM\*\*SET T1

```

AT START OF LOOP
1030 GET A$:REM**
INITIATE ACTION TO
BE TIMED
1040 T2=T1:REM**SET T2
TO FINISHING OR
UPDATED TIME
1050 T=INT ( ( T2-T1)/60)
*100+.5)/100:REM**
CALCULATE TIME
INTERVAL AND
ROUND TO 2 DECIMAL
PLACES
1060 PRINT"(HOME)"T:
PRINT"(CU (7CR)SECS"
1070 IF A$="" "GOTO 1030:
REM**RETURN FOR
NEXT ACTION
  
```

## Atari screen memory located

I have always wondered where the screen memory is located in my Atari, as many other routines are able to use direct PEEKs and POKES.

To find the screen location (whatever the memory) use:  
 SCREEN=PEEK(88)+PEEK(89)\*256  
 POKE SCREEN,ASC("A")-

32

If the character is less than 32, just add 64. To POKE anywhere on the screen use:  
 POKE SCREEN+X+(Y\*40), ASC ("A") -32

*Alan Ramsey*

## Eye-saving remedy for Basic boggles

Most of us have, at least once, been driven to distraction by the appearance of the much-dreaded "ILLEGAL QUANTITY" error-message, after many hours of typing in reams of DATA numbers. The trouble is that the computer only hints that the error occurs in a READ line, which means poring over the data lines in the somewhat forlorn hope that we spot the mistake.

I have found the following

routine a great eye-saver, and I can usually find the error(s) much more quickly. It simply consists of setting up a FOR NEXT loop.

1 On the line immediately preceding the READ statement, type FOR (X) = i (make sure here you use a number larger than the original "FOR NEXT").

2 On the line immediately following the original READ line, type: PRINT (X); (and then follow the original READ variables either singly, or, if there are very many, two or three at a time).

3 On the following line type: NEXT (X);END  
 Don't forget END

On running, this will list all the variables and their corresponding DATA numbers, making the job of weeding out the bugs much easier. The three lines that you may have had to erase in order to add the extra ones will probably take less time than you would have taken to find the bugs by yourself.

*J Holmes*

# SYSTEM 80 EXPANSION INTERFACES from \$399

At last, an all new expansion interface for SYSTEM 80 computers designed and manufactured in Australia. Features include:

Floppy disk controller: suitable for single or double-sided disk drives from 35-80 track. Economical upgrade to double-density to be released shortly

Memory Expansion: up to 32K STATIC RAM to ensure high noise immunity and reliability. Will also operate with computers having in-keyboard memory upgrades.

Centronics Printer Port: Double decoded to suit both SYSTEM 80 and TRS-80 software

RS232 Communications Port: for use with modem or direct wire connection to other computers.

MICRO-80's new expansion interfaces makes use of the latest technology to ensure economic and reliable operation.

Write for further information and a detailed price list to MICRO-80, 433 Morphett Street, Adelaide  
 P.O. Box 213, Goodwood, S.A. 5034 • Telephone: (08) 211 7244

# MICROMAIL

Australia's No. 1 Microcomputer Mail Order Club.

SPECIAL INTRODUCTORY OFFER: FREE MEMBERSHIP WORTH (see below for membership benefits) \$30 WITH PURCHASE OF \$100 OR MORE ON INITIAL ORDER.

**SPECIAL OFFER OF THE MONTH PART I**  
**FOR COMMODORE 64**  
 Normally \$400  
 Micromail \$145  
**Multiplan**  
**SAVE \$100's**

**SAVE \$100 SPECIAL OFFER OF THE MONTH PART II**  
 Spectravideo 318  
 Rec. Retail price \$399  
 Micromail \$299

## COMMODORE

Prices include sales tax.	RRP	Micromail
C64, datasette	\$572.00	\$469.00
Commodore 64	499.00	Call
1541 Disk Drive	499.00	399.00
Datasette	49.95	43.95
1526 printer	499.00	439.00
1701 Colour monitor	499.00	Call
Sx-64 Portable	1899.00	1699.00
Koala Pad	149.95	134.95
Light Pen	39.95	35.95
Parallel Interface	119.00	106.95
Intro to Basic	40.00	32.95
Easy Script	100.00	85.95
Bank Street writer	83.95	75.95
Home accountant	105.00	89.95
Avenger	29.95	25.95
Super Lander	29.95	25.95
Zork I II	25.95	21.95
Motor Mania	29.95	25.95
Choplifter	54.95	46.95
Snakman	29.95	25.95
Gridrunner	21.95	19.95
Grandmaster	29.95	25.95
Attack of the Mutant Camels	22.95	19.95
Programmer's Reference Guide	28.00	22.00
Advanced Calc Result	199.00	179.00
Pacman	69.95	62.95
Donkey Kong	69.95	62.95

and more!

## ATARI

Prices include sales tax.	RRP	Micromail
600XL	\$399.00	\$379.00
800XL	599.00	569.00
1050 Disk Drive	699.00	659.00
1010 Program Recorder	159.00	149.00
1020 Colour Printer	399.00	379.00
48k RAM board	199.95	185.95
Koala Pad	149.00	139.00
Compumate	129.00	99.95
Atari Writer	119.95	105.95
Donkey Kong	79.95	69.95
Paint	99.95	89.95
Visicalc	395.00	375.00
Data Management	39.95	35.95
Computer Card File	29.95	25.95
Quiz Master	39.95	34.95
Stereo 3D Graphics	39.95	34.95
Music I	59.95	53.95

and more!

## SPECTRAVIDEO

Prices include sales tax.	RRP	Micromail
SV-328 80K RAM	\$699.00	\$599.00
Data cassette drive	149.00	99.95
SV-328 Floppy Disk System	1599.00	Call
Super cross Force	49.95	42.95
Spectra Type	29.95	24.95
Music Mentor	49.95	42.95
Spectra Diary	29.95	24.95
Spectron	29.95	24.95
Intro Basic I	29.95	24.95
Fire Freddy	29.95	24.95
Nomis	29.95	24.95

and more!

## apple

Hardware (excluding sales tax)	RRP	Micromail
Vision 128k	\$499.00	\$429.00
Accelerator Board	825.00	749.00
Vision 80	295.00	239.00
RF Modulator	50.95	41.95
Micro Fazer	390.00	349.00
Digitek Printmaster	202.00	174.00
Software (includes sales tax)		
Bank Street writer	\$98.95	\$86.95
Wordstar	666.00	559.00
Zardax	324.00	288.00
Visicalc	428.00	378.00
PFS	175.00	149.00
PFS Graph	175.00	149.00
D Base II	825.00	689.00
Home Accountant	105.00	86.95
Versaform	570.00	459.00
Master Type	64.95	54.95
Typing Tutor	42.95	36.95
Frogger	48.95	39.95
Wizardry	81.95	69.95
Choplifter	48.95	39.95
Repton	53.95	44.95
Jawbreaker	42.95	35.95
David's Midnight Magic	44.95	36.95
Koala Pad	179.00	159.00
Defender	72.95	64.95
Pacman	72.95	64.95
Flight Simulator	56.95	46.95
Suspended	77.95	67.95
Shark Attack	42.95	35.95
Ultima II	81.95	69.95

and more!

Manufacturer's full warranty on all products.

## IBM

Software includes sales tax.	RRP	Micromail
LOTUS 1 2 3	\$950.00	\$799.00
<b>VISI ON PACK A</b>	<b>1395.00</b>	<b>1195.00</b>
VISI CALC	428.00	378.00
WORDSTAR	666.00	559.00
D BASE II	825.00	689.00
VISI FILE	428.00	359.00
PFS	175.00	149.00
Apple IBM Connection	315.00	259.00
Championship Blackjack	69.00	58.95
PC crayon	79.00	63.00
Flight Simulator	87.95	74.95
ZORK I, II, III	59.95	49.95
KOALA PAD	199.00	179.00
VISI ON MOUSE	445.00	385.00
HARDWARE (Excludes sales tax)		
QUADBOARD 64K (P S)	\$550.00	\$475.00
Davong 64K Ramcard	359.00	299.00
Davong 192k Ramboard	579.00	499.00
Davong 5MB Drive (EXT)	2880.00	2399.00
Persyst 64KB RAM	650.00	549.00

and more!

## MONITORS

Colour Monitor	RRP	Micromail
Teco Green Screen	\$249.00	\$199.00

## JOYSTICKS

	RRP	Micromail
Quickshot I	24.95	19.95
Quickshot II	29.95	25.95
Triga Command	24.95	21.95
Kraft	88.95	79.95

## PRINTERS

	RRP	Micromail
Pony Thermal Printer	199.00	call
Star Gemini 10x	720.00	495.00
Star Gemini 15x	955.00	795.00
Epson FX-80 copy	795.00	595.00
Brother HR15 Daisy Wheel	895.00	845.00
Juki 6100 Daisy Wheel	995.00	895.00

## Sinclair

ZX Spectrum	RRP	Micromail
16k	299.00	269.00
48k	399.00	349.00
Software	call	call
Microdrive	200.00	189.00
ZX-1 Interface	120.00	114.00
JOHN SANDS SEGA SC 3000	329.00	299.00
FLOPPY DISKS		
Lé Floppie "10" DISKETTES	49.95	37.95
2 Pack Lé Floppie	10.00	8.95

Order Toll Free 008-230-200 via Bankcard and Mastercard

24 Hour Service Sydney: 4495600

Or send cheque or money order to

Micromail P.O. Box 454, 4A Merrivale Rd., Pymble, NSW 2073

Despatch guaranteed in five working days. Shipping and handling charges: Hardware — Sydney max: \$5.00, anywhere in Australia max: \$10.00 Software — Sydney max: \$3.00, anywhere in Australia max: \$5.50. Prices subject to change without notice.

FOR ALL PRODUCTS NOT LISTED CALL US.

# MICROMAIL

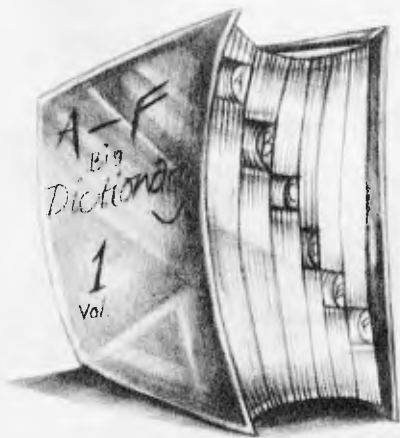
Visit our showroom at 4A Merrivale Rd., Pymble NSW. Training available.

Members receive: Discount vouchers for future purchases. Free cassette or diskette. Microgram bimonthly publication.



# Writing with Viza

*Trevor Jones is impressed with a new word processor package containing its own dictionary.*



The Commodore 64, much vaunted for both home and office uses, is most likely to straddle the two in its capacity as a word processor. Not surprisingly, then that among the rash of serious software written for it are several word processing packages.

Among these is the Vizawrite/Vizaspell word processing system being sold by The Microcomputer House for a combined price of \$169 (the programs can be purchased separately for \$129 and \$69 respectively).

## Features

Both parts are on disk: text files can be stored either on cassette or on disk and the package supports a comprehensive range of printers — from Commodore's own to Centronics models. It handles the 64's 40-character screen in two ways. You can alter the width of the document temporarily to fit the width of the screen or scroll the display sideways as text is entered.

Vizaspell supports a 30,000 word dictionary, to which you can add.

A facility allows page heading and footing texts of any length. Parts of the text can be marked as 'mail merge', so similar documents can be sent to any number of people. It is also possible to

merge all or part of a document into another, whether written using Vizawrite, or various other WP packages, such as Wordpro.

A number of utilities supplied with Vizaspell make it possible to copy disks etc. and Vizawrite lets you issue disk commands and display the disk directory.

## Presentation

The documentation is excellent: Two manuals, one for each program, each contains a section for the newcomer, while experienced users get a no-nonsense guide. There's a text file with 'help' information, which can be printed out for reference.

## In use

The beauty of Vizawrite is that it formats text as you type, using 'format' lines.

In these special lines, which appear in the text you specify print margins, tab positions and so on. There can be any number of them so you can vary features throughout the text. The screen display will show you how your printed output will appear. And, if you subsequently alter, for example, your left print margin, the whole document (up to the next format line) is instantly altered to reflect the change.

Special graphics show such things as tab positions, both within the format lines and in the text. These are entered using the 'CTRL' key, so that, for example, the command to centre text is entered as 'CTRL-c'. If you forget the code, you can move the cursor over the graphics character and the required letter (in this example 'c') is displayed.

Operations to alter text layout are implemented similarly, this time using the 'Commodore' key. The action of these commands is really smooth. To move a block of text from one position to

another, you first move the cursor to the start of the block and then press the 'Commodore' key followed by 'm'. The system then prompts you to indicate what is to be moved, to where. At the end of the operation the text is moved quickly and both portions of text are reorganised.

Many commands are carried out in this way. As well as the more usual ones, such as find and delete, there are others, such as displaying the disk directory, saving the document to disk and so on.

It is this method which is used to call up Vizaspell. This is called in from disk and to count the words in the document, which are checked against the system dictionary. You can then scan through your text and look at words not in the dictionary, which are highlighted. Corrections can be made and new words added to the dictionary. This is a very powerful feature, which is implemented extremely smoothly.

A wide range of options is available once the document is ready for printing. The text is displayed on the screen during printing. Parts, or all of it can be printed, and you can string documents together during printing.

## Verdict

This program was a pleasure to use. It ran smoothly, did the job professionally and gave no problems. With that, and the extra touches that add to its flexibility, I can give it a very high recommendation, particularly for ease of use.





# BRAINSTORM

*Brainstorm is a revolutionary new software product which turns creative thought into logical and practical propositions. Jerry Sanders, enthusiastic to discover how best to utilise and exploit his own ideas, takes a lesson in structured thinking.*



*'The most effective aid to creative thought since the pencil and paper.'* So says Caxton Software about its new product, *Brainstorm*.

One thing that boasts more for a product than any amount of advertising is whether the company who markets it uses it. Caxton's Director David Tebbutt — who first had the idea for Brainstorm — has been using it for three years, and since Caxton went into business two years ago Brainstorm has played a major role in the business of the company.

'We use it for everything: project planning, program design, document drafting — in fact, wherever there is a need to organise creative thoughts and turn them into practical propositions,' said Tebbutt, who is as proud of Caxton's software baby as he is of his own flesh and blood children. Brainstorm was co-written

by Tebbutt and Mike Liardet of Brainstorm Software.

Brainstorm is being launched as an 'ideas processor'. The name is designed to benefit from the goodwill earned by data processors and word processors in the past. The way Brainstorm 'processes' ideas is to organise them, which is why I prefer to think of it as an ideas *organiser*. Whatever you call it, as a new kind of software product, it presents Caxton with a marketing barrier which word processors and spreadsheets don't need to worry about. 'We'll have to use our advertising not just to sell Brainstorm but to educate potential customers about a new application,' said Tebbutt.

And reviewers, he might have added. Out of the window went Benchmarks and experience of similar products. My first job was to find out what Brainstorm was

supposed to do; my second to see if it did it.

## What does it do?

Remember the Gravox ad? The thing about Gravox was that it did everything 'all in one go'. In this case, the gravy is your thoughts and the gravyboat is Brainstorm. Pour your thoughts into Brainstorm, and Brainstorm links and structures them all in one go. Take a look at this piece of Brainstorm output:

### BRAINSTORM BENCHTEST

Introduction

paragraphs

1. Quote
2. Background
3. Launch

Body

— Sub-headings

What does it do?

Para 1. Gravox Ad.

Para 2. Brainstorm structured printout

Para 3. Tell them what they've seen

Para 4. Notice 'paragraphs' duplication

Para 5. Explain promotion and namesake

Para 6. Explain worksheets

How does it do it?

1. If I only knew!
2. What appears to happen.

How do you use it?

Other sub-heads to be determined  
Illustrations and diagrams.

Conclusions

paragraphs

1. Quote
2. Background
3. Launch
1. Usefulness?
2. Originality?
3. Competition?
4. Value for money?

The plan above was produced in two minutes, from inserting the Brainstorm disk into the Sirius to tearing the printout from the Epson. It is a first sketch of this Benchtest and shows you that this paragraph will tell you about what you've just seen. So now you've been told.

Notice that the word 'paragraphs' appears twice in the printout: once under 'Introduction' and again under 'Conclusions'. Notice also that the three lines under the first occurrence also appear



under the second, before 'Usefulness?'. In fact, they were only typed once. Brainstorm noticed when I wrote 'paragraphs' the second time that it already existed as an entry. Whenever an entry in a Brainstorm file has a namesake (as such duplications are called), the program notices the fact. Depending on whether one or all of them have subordinate entries it then does its organising: more on that later.

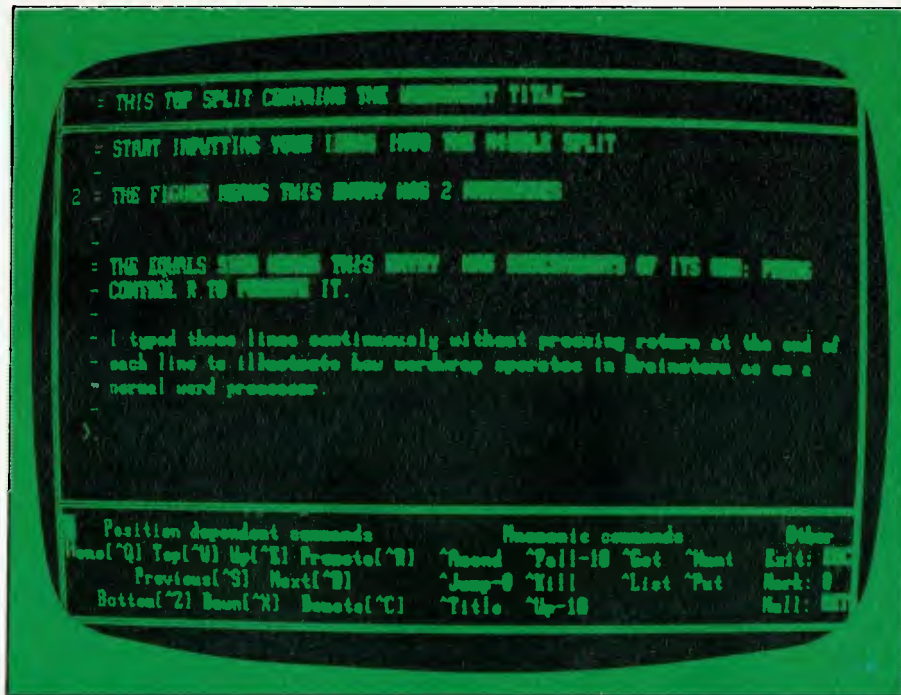
Notice also that under 'Conclusions', 'paragraphs' has four other lines, 'Usefulness' being the first. You'll see that these four lines were not reproduced under the namesake. The reason is that they are not descendants of 'paragraphs', but exist on the same level. Descent, or subordination, is shown on the printout by indentation. All input to Brainstorm on the same screenful of data is considered to be equal in rank. As befits an equitable environment, however, any entry in any screen can be promoted to header status and be the leader of its own screenful of entries.

A screenful of entries is in fact more than a mere screenful: it can be up to 988 lines of text (on my 128k Sirius), upon which the large middle split of the VDU acts as a 15-line window. The top split contains the name of the officer in charge — that is, the header to that group of subordinates. 'What does it do?' is such a header. The bottom split contains prompts and acts as a command screen. It also displays status information (see screenshot).

## How does it do it?

If I knew exactly how Brainstorm works I wouldn't be sitting here writing about it — so don't expect full details of the coding! What I can say is that it does its job extremely quickly, so quickly that the program doesn't intrude on your thoughts the way a word processor or a database might, by making you watch and wait while it carries out an instruction. Once loaded, Brainstorm resides in memory and requires no disk access except for SAVES and LOADS of the model on which you are working.

What appears to happen, however, is that every time you press the return key after writing a line of text, Brainstorm assigns pointers to indicate where it belongs in the model. Brainstorm also scans the entire model looking for namesakes of the line you just entered. If they exist, they all get flagged with a number indicating the total number of namesakes to date. The flagging and the pointer setting is totally transparent — that is, it happens swiftly without you being aware that something is going on. In fact, when you get more than 15 namesakes, you do see all the numbers incrementing down the left-hand side of the screen but this takes less than a second. The manual is slightly misleading about the number of name-



Commands are shown at the top of the screen and status information at the bottom.

sakes permitted, for it says: 'It is possible to have hundreds of occurrences of the same namesake all connected in this fashion.' This is not strictly true as although you may have hundreds, only 99 of them ever get flagged — more than 99 and they're all still flagged '99'.

## Namesakes

If none or only one of the namesakes has descendants, Brainstorm regards each one as an image of the others and, if descendants exist, gives them all the descendants of the one which had them.

If, however, you create a unique entry

with descendants and then change it so that it is then the same as another entry with a different set of descendants, Brainstorm checks with you that you want the two sets of descendants to be merged. If you type anything other than 'Y', the line is not entered and you must change it to avoid the merge.

Namesake matching can be a headache: you saw how the subheading 'paragraphs' in Conclusions above acquired all the descendants of the first occurrence. Upper and lower case distinctions do not apply when Brainstorm searches for namesakes. However, leading and embedded spaces are significant, so a good dodge to



**MICRO-EDUCATIONAL PTY LTD**  
**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**

### C. ITOH 1550 PRINTER

- ★ 120 C.P.S.
- ★ Friction Tractor
- ★ A 24 hr/day workhorse
- ★ Parallel & Serial
- ★ Graphics

**\$875 ex**

**\$985 inc**

+ \$12 Courier



RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624  
**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



distinguish between two entries of, say, 'paragraphs' is to type the second as 'paragraphs'. Trailing spaces are ignored. Another way of keeping same-meaning, non-matching entries apart is to choose a synonym for the new entry. You also need to be careful when you delete (or KILL) a header since all subordinate entries, if any, will also vanish. If what you want is to create namesakes easily, you can use an '\*' wildcard (like the joker in Gin Rummy). The line 'I want to reproduce this line lots of times elsewhere in the model' can be copied wherever you want by typing '/'\* and hitting return: the line beginning with the '/' is matched to the asterisked line.

## How do you use it?

Imagine you have just decided to do something — anything! You begin to think about how to go about it. Inevitably your thoughts encompass many aspects of the task, from your own input to the organisation of other resources. Similarly you find that some aspects of the job appear in your mind in detail while others are more

sketchy. In this initial phase of thinking about a new task, Brainstorm can be used as you might use a tape recorder or dictaphone. Instead of speaking your thoughts, you type them in as they occur to you. There is no need to set up records or define fields as you would do if you were using a database. You can save the file (or model) when you run out of ideas, and load it again when you want to add to the model. The advantages of Brainstorm over a tape recording are: a) there is no need for transcription; b) further input can be 'placed' at any point in the existing model; c) Brainstorm will make namesake links between matching input lines; and d) immediate structured print output can be obtained at the press of a button.

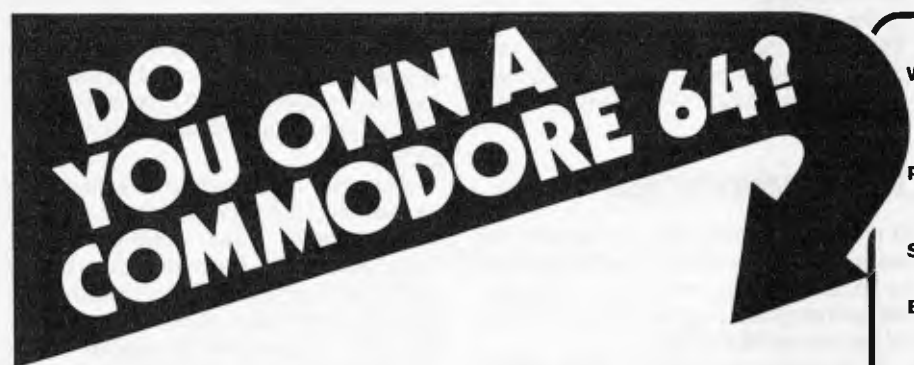
Having used the program as a flexible, intelligent notebook for fixing your ideas on the task, you may then use the model you have constructed as a basis on which to build a more detailed, formal document. In this sense Brainstorm is a kind of word processor. You select the part of the model you wish to expand and carry on writing.

Certain word processing features are *not* available: you can't set Brainstorm to double space automatically your entries on

the screen (although you can arrange for it to print that way). There is no block and copy facility as such. The same effect can be obtained by creating a namesake of the header to which the block is subordinate at the place in the model where the copy is required. Another way of achieving this effect is to use the 'mark', an 'at' sign placed in the margin (see below for details). Each time text is 'got' from a mark, the mark is reassigned to the next line of text. By 'getting' again, the next line is moved to the target area. There is no search and replace function, although there is a search option. Only if the target is a namesake, can you search and replace by changing it: this changes all namesakes instantly. To establish a point of comparison I ran the APC Word Processor Benchmarks which could be used — saving and loading times — and the results are shown in Fig 1.

## Good news, bad news

Two findings stood out while I was doing the Benchmarking. The good news is that



We have possibly the **LARGEST** range of software packages for the Commodore 64

— with *more programs to come!*

Quality programs at affordable prices. From business applications to adventure games, action space games, word processing and educational programs.



N.S.W. The Microcomputer  
S.A. House Pty Ltd  
VIC. 116 Abercrombie Street  
Chippendale 2008  
**(02) 698 7866**

Contact your local South Pacific Software dealer or state distributor

W.A. Vicwest  
P.O. Box 182  
Tuart Hill 6080

**(09) 444 3039**

TAS. Management Technology P/L  
8 Montgelier Retreat  
Battery Point 7000

**(002) 344 5222**

QLD. G.W. Sales  
5 Eams Street  
Slacks Creek

**(07) 370 2056**

### CHOOSE FROM THIS EXTENSIVE RANGE

#### Word Processing, Mailing and D-Base

Victext — Cartridge (Vic-20)	\$149.00
Busiwriter	\$89.00
Vizawrite	\$129.00

#### Programming Aids/Tutorial

Data Handler 64	\$89.00
Touch Typing Tutor (Tape)	\$29.00

#### Spreadsheet Analysis

Busicalc 1 64 (Vic-20)	\$89.00
------------------------	---------

#### Business Applications

Debtors	\$109.00
Creditors	\$109.00
General Ledger	\$109.00
Stock Control	\$109.00

#### Games and Recreation

Cosmic Capers	\$18.00
Cosmic Cruiser (Vic-20)	\$18.00
Goblin Towers	\$18.00
Guitar Tutor (Vic-20)	\$21.95
Guitar Tutor II (Vic-20)	\$21.95
Hunter Killer	\$21.95
Kaktus	\$18.00
Lord of Balrog	\$18.00
Mangrove	\$18.00
Medicine Man	\$18.00
Music 64	\$18.00
Stix	\$18.00
Tank Atak	\$18.00
Weather War II	\$18.00
Worms	\$18.00
Say Simon	\$18.00
Revenge	\$21.95
Ultra Sprite	\$29.95
Ultra Synth	\$29.95
Codemaster	\$21.95

plus many more



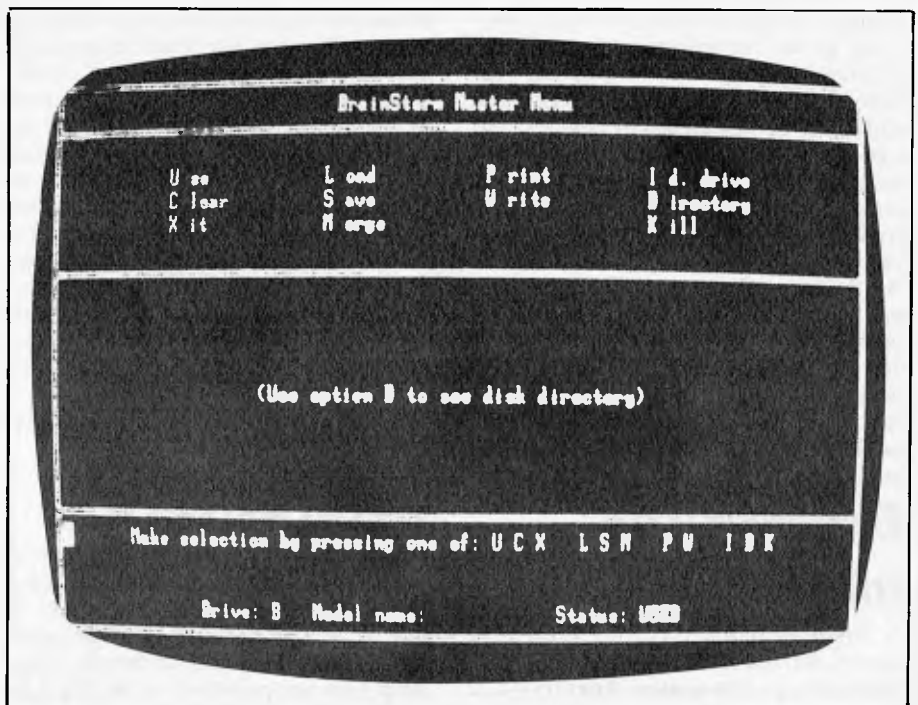
with Brainstorm you can jump to anywhere in the text without waiting for tiresome screen scrolling to get you there. This is because the entire model is held in memory and no disk accessing is required. The bad news is when you spot a mistake in the line above the one you are typing — a very common event — you can't just move the cursor to the line above and correct. Brainstorm regards each 72 character line as a discrete character string or symbol expression and the cursor may only be moved backwards or forwards within it during input. Word-wrap does operate if you are typing continuous text but to amend a line above or below the one you are typing you have to hit RETURN to come out of the line, reposition the line pointer to the line you want to correct, and then press ^A to get into it.

## Installation and tailoring

My test disk was supplied ready 'installed' for use on a Sirius with a Z80 card. About 25 machines running CP/M are catered for: should you not have one of them, an install program is supplied on the disk to enable you to get started. MS-DOS is the first 16-bit system for which Brainstorm will be available at launch: no decision has been taken at the time of writing about implementing Brainstorm under CP/M-86. A large section of the manual is devoted to explaining how to use the install programs. Even if you don't need them to get going, you may want to customise Brainstorm for your own use. You can change the graphics used for the menu borders and choose different control keys if you don't like the given ones. You can write your own prompt messages, change screen and buzzer control sequences and specify paper size and print area. You can also reset printer codes for double or triple line spacing, character sets and error checking sequences. Whatever new configuration you invent, you save it onto an alternative command file on a backup copy of Brainstorm which, as a registered user, you are permitted to make.

## Screen display

The Brainstorm displays are uncluttered and simple, and there are only two of them (excluding the 'welcome' display), both using the same format of a triple split screen. The main menu contains available commands (Fig 2) in the top split and status information in the bottom. The larger middle split is used to display directory information when required. The second screen display is the worksheet. Here the top split is a single line holding the worksheet header. The large middle split is the 15 line window on the model. The



Using Brainstorm for ideas capture, the cursor takes refuge in the bottom split.

lower split acts as a prompt display and command field.

## File creation and structuring

To set up a Brainstorm file (or 'model!') type U (for use) from the main menu. No RETURN is needed for any of the command keys. The cursor goes straight into the bottom of the worksheet screen. A line pointer '>' indicates which line you will use next time you enter text. This pointer can be jumped backwards and

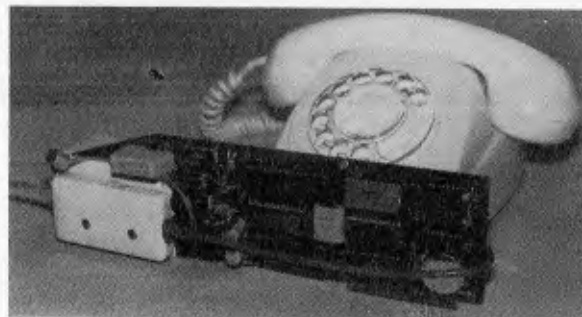
forwards over nearly 1000 lines in about a second! If you aren't word-wrapping (which you won't be if you're using Brainstorm for ideas capture), hit RETURN after each idea and the cursor takes refuge in the bottom split, ready to jump straight into the next line when you type the first letter of your next thought.

## The Mark

If you are wondering why you need both a cursor AND a line pointer (I did), the answer is that the line pointer acts as a marker when you are jumping around the



**MICRO-EDUCATIONAL PTY LTD**  
**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**



Automatic Ice direct-connect modem  
 (Apple version) **\$319 ex, \$369 inc**

+ \$5 Courier

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624

**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



model. You might want to mark a location (such as the Introduction header in my example) so that at any time during your flow of ideas you can jump straight back and add to it. You do this by typing an '@' sign. When you do jump, the '@' is automatically placed at the line you jumped from and the line pointer goes straight to where the '@' was. Next time you jump you go back to where you were. All this in a split second. However, only one '@' mark may be used; that is to say only one pair of lines can be linked in this way at any one time. This is no real problem because a wide range of other jump commands are included to get you swiftly from one part of the model to another.

## Brainstorm model

A Brainstorm file takes the form of a model, defined as the sum of all the entries made during a Use session. An entry is a 72 character line which may be the title of the model, a heading, sub-heading, sub-sub-heading (upon their backs to bite 'em), and / or a descendant. Each line is, of course, a

descendant of the heading under which it is entered. It may at any time be promoted to header status, as I mentioned earlier. There is no limit except computer memory to the number of entries or subordinated levels in a model. I got just under 1000 lines into my 128k Sirius, or else you could have 1000 levels each of one line! The normal kind of model will be somewhere in-between. During text input the bottom split displays an edit menu. In 'idle' mode (cursor in bottom split) the level of the current worksheet is displayed plus the line number of the current line, the number of lines in the worksheet and the amount of free memory. A control key menu can be displayed by typing '!'.  
**Control keys**

I said before that you can jump from top to bottom of a 1000 line model in a second. Top and bottom jumps are done with ^W and ^Z keys respectively — their north/south position on the keyboard. Other jump keys are provided — see Fig 3 for details. Assuming you don't change them, the other control sequences are mainly mnemonic or positional. H is used to enter search mode (H is for Hunt); J is for Jump,

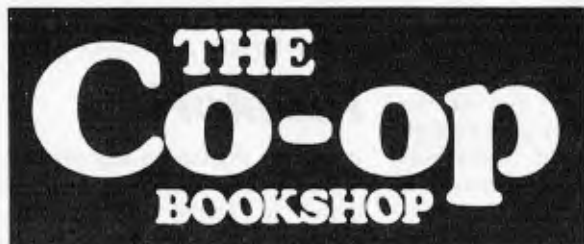
and so on. You can get text from an '@' mark or put text to one; both operations are useful when, having poured out your ideas, you start shaping them up.

WordStar users will find some of the control key sequences familiar; for example ^S and ^D which glide the cursor left and right without overtyping. Brainstorm's ^A and ^F, however, are equivalent to WordStar's ^G and DEL respectively. The manual is a bit naughty to refer to 'single keystroke commands' since they all require the ALT key to be depressed. It's very frustrating when you forget the ALT because Brainstorm types a letter which you then have to delete (cursor inside an entry) or else creates a new line which you then have to kill (cursor in 'idle' mode). You also have to remember that the value of the control key changes depending on whether the cursor is editing or idling; for example, ^A gets you into a line for amendment, but inside the line it means delete character under cursor.

## Hunt

Hunt operations may use the '\*' wild card, commonly at either end of the target string to delimit it. Once again response time is

**IT'S LOGICAL!**



## COMPUTER BOOKS AND SOFTWARE

- RANGE:** Full range from both publishing and computer industry sources; from micros to mainframe.
- QUALITY:** We have a new system for keeping all your urgent requirements in stock or easily obtainable. Staff are being especially trained to help you.
- AVAILABILITY:** All over NSW, at any branch of the UNI CO-OP — check your nearest store:
- PRICE:** You'll find our prices fair, and Uni Co-op members get a 5% discount.

**BAY STREET, BROADWAY**  
(nr. Grace Bros) 212 2211 (Open Saturday)  
**TECHNICAL BRANCH,**  
831 George Street, Sydney, 211 0561

**UNIVERSITY OF NSW,**  
Kensington, 663 4024

*Also:*

**INSTITUTE OF TECHNOLOGY,**  
Broadway, 212 3078

**UNIVERSITY OF SYDNEY**  
692 3705

**MACQUARIE UNIVERSITY,**  
Union Building, 888 6523

**WOLLONGONG UNIVERSITY**  
(042) 28 8672

**A.N.U. Canberra,**  
(062) 49 6244/C.C.A.E. (062) 51 2481

*Popular titles at:*

**NEW ENGLAND UNIVERSITY,**  
Armidale, (067) 72 2632

**RIVERINA C.A.E.,**  
Wagga, (069) 21 4363

**MITCHELL C.A.E.,**  
Bathurst, (063) 31 4331

**NEWCASTLE UNIVERSITY,**  
(049) 68 4450

**NEWCASTLE TECHNICAL COLLEGE,**  
(049) 61 6382

**LAW SCHOOL BOOKSHOP,**  
232 2250

**GRIFFITH UNIVERSITY,**  
Queensland, (072) 75 2475

**GIPPSLAND I.A.E.,**  
Churchill, (051) 22 1771

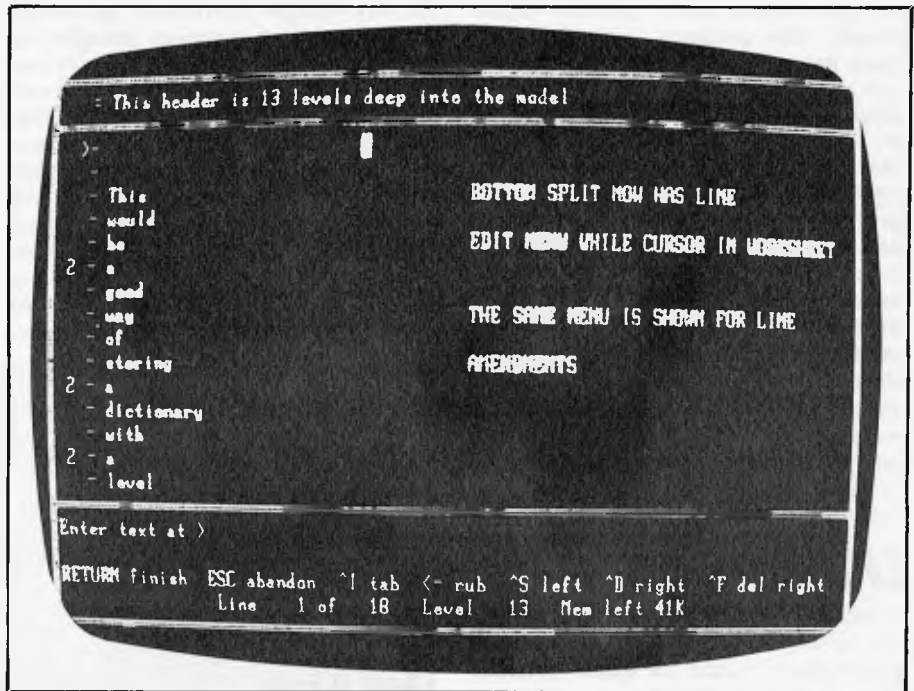
negligible and no appreciable degradation with model size occurs. Upper and lower case distinctions are ignored during a search. Unlike databases, Brainstorm has no 'high-level' search function using logical operators, but this is not really necessary given the speed of response: many potential targets can be evaluated in real time. Further, use of Brainstorm involves you in permanent interactive contact with the entire model, unlike a database-type model in which the records lurk out of sight among the circuitry. This means you have a far greater degree of familiarity with the model, and your knowledge keeps pace with it as it increases in size. You may also invoke a selection option when you request print output, using a marker to indicate the end of the print required or using the Hunt command to specify required headings, etc.

Any entry in a model can become a title or header if you position the line pointer opposite and press control R (Raise?). The moment any entry acquires subordinates, it is flagged in the margin with an '='. Non-header entry's rank is denoted by '-'. Control K is used to kill an entry (and all its descendants if it has them!).

## Multiple files

Brainstorm can hold several models simultaneously, memory permitting. The manual illustrates this well with a Diary and Address book example, where two files are maintained and used at the same time. In fact, Diary is simply a sub-heading on the same level as Address book, and both could be thought of as discrete sections of a larger model — at least, this is how Brainstorm will treat them. Files can be merged from disk into current models: when this is done, Brainstorm immediately cross-references any namesakes between the two files. This has an important implication for future Brainstorm-type programs: I can imagine this approach being very valuable for building up expert-system knowledge bases.

Having mentioned the MERGE option, this is an appropriate moment to consider the SAVE, WRITE and LOAD commands. These are the only ones that require disk access. SAVE automatically defaults to a .BRN-type file, in which your model is saved in Brainstorm format and can be loaded back in this format for further work. WRITE saves an ASCII version of your model which can be accessed by other programs such as word processors or by operating system commands like TYPE. Conversely, Brainstorm will load ASCII files produced by word processors. These load at a single level as blocks or paragraphs of text. They can then be structured manually using commands such as PUT, GET, and PROMOTE, before being saved or used as



The middle section of the screen displays directory information, when required.

Brainstorm models. Brainstorm will, however, forge any namesake-type links which may exist between entries. A section of the manual explains how to structure external files to correspond to Brainstorm internal format so they may be loaded as BRN files. I haven't yet worked out why anyone would want to do this, but it gives you a sneak glimpse of what Brainstorm gets up to behind that inscrutable screen.

I missed an option to run another program from within Brainstorm: it would be neat to be able to go into a word processor and then call up a Brainstorm-produced file for a final edit.

## Output

There's an old saying in the computer world that if you put garbage into a computer you'll get garbage out. Brainstorm significantly modifies this adage: it's now a case of 'garbage in, structured garbage out'. The manual boasts no less than 2.5 million output formats based on the sawtooth indentation theme, as well as both continuous flow and word processor-type paragraphs without indentation. The manual accepts, however, that most people's requirements will be met from no more than 15 variations on the theme, and



**MICRO-EDUCATIONAL PTY LTD**  
**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**

Graphic Dot Matrix Printers		Disk Drives
 \$355 ex \$399 inc <b>AMUST P-88</b> <small>* National 100 CPS Printer</small>	 \$325 ex \$375 inc <b>AMUST 80DT</b> <small>* 80 CPS</small>	 \$329 \$339 <b>HIPPO-3</b> <small>* With National Mechanism</small>
 \$495 ex \$550 inc <b>AMT-12RCB 12" Color CRT Display</b> <small>* For IBM®, Apple II®, III®, IIE®, and NEC Personal Computers</small>	 \$95 ex \$110 inc <b>APS-1 Switching Power Supply</b> <small>* Japanese 7 Amp Power Supply</small>	 \$299 \$339 <b>Atlas-8</b> <small>* With National Mechanism</small>

Apple, Apple II, Apple III, and Apple IIE are all registered trademarks of Apple Computer Inc.  
 IBM is a registered trademark of International Business Machines Corp.

**RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624**  
**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



the most popular one is made the default output. This produces successive four-space indentations and 'outdentations' as you go into and come out of lower model levels. The system of entering parameters to vary output is strangely complicated, bearing in mind the simplicity of use which typifies the rest of *Brainstorm*: I couldn't get the hang of it before writing this review and used the default output every time. Even with this poor show (I mean, using one out of 2.5 million possibilities says very little for my imagination), the output produced is extremely handy. The *Brainstorm* manual itself was composed using the program, while in the office I've used it to design the most exciting micro-users competition ever run in a micro magazine — details of which will be announced in a future issue.

## Userimage

*Brainstorm* is a program to help you think and to set you thinking. I found using it challenging because its quick reactions gave me a feeling that it knew exactly what it was doing, but I didn't really know what I was up to. With word processors and databases you spend a lot of your time telling the thing what to do. With *Brainstorm* it's more a question of knowing what you are going to do — or think — next. To my surprise I found that the cumulative effect of using the program was to improve

the way I thought: I am becoming more and more capable of organised thought with every *Brainstorm* session. This happened because from the word 'go' I found myself rehearsing a little snippet of mental aerobics at every press of the keys. It goes something like this: 'Does this thought belong here? If yes, slap it into *Brainstorm* now. If no, flick through the model and see if there's a home for it somewhere else. No home? OK, promote this thought to header status and give it an Empire to rule over.' To begin with I was angered at being

### BRN format

3000 words  
Load 12.8 secs  
Save 34.5 secs  
Full buffer (42k or 10,000 words)  
Saved 60 secs  
Load 34.1 secs  
Load degradation factor = 1  
Save degradation factor = 1.4

### DOC format

3000 words  
Load 21.4 secs  
Save 35 secs  
Full buffer (42k or 10,000 words)  
Saved 60 secs  
Load 60 secs  
Load degradation factor = 1  
Save degradation factor = 0.7

*Fig 1 Brainstorm Benchmarks for Load and Save*

made to feel inadequate, but it soon dawned on me what a change this feeling was from my usual 'stupid blankety-blank machine!' experience.

Now structured thinking is not a natural phenomenon. On the one hand, it could be

Use	(Use a <i>Brainstorm</i> model or create a new one)
Clear	(the current model)
X	(Exit to system)
Load	(a file or model from disk)
Save	(to disk in <i>Brainstorm</i> format)
Merge	(current model with file/model from disk)
Print	
Write	(current model in ASCII format to disk)
Identity	(change ID of logged drive)
Directory	
Kill	(delete file from logged drive)

*Fig 2 Main menu options — only the first letter needed*

said to exclude great creative leaps of the imagination but on the other, lack of structure has always been associated with second rate creativity. In the field of computer programming, the same principle is beginning to rule. There has to be a middle way between random, chaotic thought with its high creative content and

Amend entry	^A mend
Amend title	^T itle
Delete entry	^K ill
Cursor up	^E
Cursor down	^X
Cursor up 10 lines	^U p
Cursor down 10 lines	^F all
Cursor to top of list	^W
Cursor to end of list	^Z
Title screen	^Q
Promote an entry	^R
Demote an entry	^C
Previous namesake	^S
Next namesake	^D
The mark	@
Jump to mark	^J ump
Get from mark	^G et
Put to mark	^P ut
Search for an entry	^H unt
Print current list	^L ist
<b>Edit Controls</b>	
Cursor left	^S
Cursor right	^D
Delete left	^A
Delete right	^F
Tab	^I or TAB
Complete entry	<ret>
Abandon entry	<esc>

*Fig 3 Standard edit commands*

# MICROCOMP. SAFE, SOUND, AND STATE-OF-THE-ART

At Microcomp, we're proud of our successful four-year track record in microcomputer sales and service. But we're also proud to add innovation to that record of reliability.

If it's new, and if it's good, we'll get it. For instance.

**VIDEOTEK.** Turn your IBM PC into a colour Videotex terminal. High resolution colour graphics is an added bonus.

**POINT OF SALE.** Connect cash registers to IBM and SIRIUS PCs, to automate your Debtors and Stock.

**PC-TO-MAINFRAME.** We can help you incorporate microcomputers into your mainframe network.

**LOCAL AREA NETWORK.** Link your IBM PC's, for information and peripheral sharing, reduced total equipment cost.

Any questions? We'll be delighted to answer them.



CALL US ON 614 1433.

B. S. MICROCOMP PTY. LTD., 561 BOURKE STREET, MELBOURNE 3000. JLM/MCL

# BRAINSTORM

ordered, structured thought which is high on communication power. Brainstorm is a good middle way.

Leaving the psychology of creativity for you to argue about among yourselves, I found that when I messed things up Brainstorm is well equipped to sort you/me out again. 19 textual error messages, including a friendly 'Sorry', and a novel 'Unsure' (not what I expected from a program with Brain in its name) are available on screen, with backup information in the manual. For those unexpected hardware and operating system crashes Brainstorm has its own 'salvage crew' aboard, a program (!) called Rebrain. I'll explain the screech mark in a moment. According to the manual, if you use Rebrain immediately after a crash it offers a 'high probability of recovering' the model you were working on. I looked forward to trying this out and engineered a spectacular power surge which shut everything down for a nanosecond or two. Unfortunately, when I tried to 'Rebrain' my way back to life, nothing happened: the Rebrain program was missing from the disk. When I called Caxton to complain I was told how to write my own Rebrain program: you simply create a file called, say, Rebrain (anything else will do). When you then call the program, it loads zero bytes and branches to 100H, where the first instruction of Brainstorm resides. The model should still be there. I used 'Pip' to create the file by typing 'PIP REBRAIN.COM=CON:'. This makes the console the input device. I answered the prompt with a control Z to give an empty file. I then tried to save a model with the drive door open: crash! The door closed again, I hit 'C' to reset the offending drive and call the empty .COM file. This reset the pointers in the transient program area to the start of the last program to reside there; in this case Brainstorm itself. The model was intact, but I didn't get that 'Unsure' message promised by the manual. Most disappointing.

## Documentation

My manual was a pre-production version, but the retail version will come in a gold slip-case together with the disk. There were some 90 pages of manual, only 34 of which were used to teach me how to use all Brainstorm's facilities. I mastered them all in two half-hour sessions — all that is except for the print formatting codes which I'm still struggling with more as a point of honour than because I need 2.5 million options. So few instructions reflect Brainstorm's ease of use: I honestly didn't need any more help than what was offered. Of the other 56 pages, three or four contained

error message and command key references. I'm told that the user will get a fold-out reference chart: I didn't. Since all the reminders you need can be had from the screen it didn't seem a vital section anyway. One page describes how to 'Rebrain'; 26 are devoted to the installation procedures, with five pages appearing twice, once in the section called 'Getting Started' and once in 'Installation'. The remainder are shared between a five page appendix on how to create Brainstorm format files externally, some diagrams of screens and an ASCII/Hex 7 bit converter chart. Last, but most interesting of all, no less than 18 pages of ideas for using Brainstorm: an excellent inclusion to help get this new product off the ground. This section includes a listing of the Diary/Address book program for you to type in and run.

## Money matters

Having laid out a few thousand for your hardware and bought a word processor and/or a database for several hundred, you probably won't flinch at paying around \$600 for Brainstorm. I believe it could have been sold for less: Caxton would have loved to have sold it for more. In the end the price is Caxton's attempt to place its product into the market at an 'attractive' price.

There's certainly no question, at the moment, of having to fight off the opposition: Brainstorm is the first, and so far the only product of its kind. I'm quite sure it won't be the last. As the founder of what is going to be an applications dynasty, Brainstorm will have to do all the work of winning a market share for this kind of program. For that reason, Caxton is not resting on what it hopes will be laurels. The

next products based on the Brainstorm philosophy are already on the drawing board — or rather, in Brainstorm files!

## Conclusions

This is a new kind of tool which every micro user could find a place for. Its usefulness is not in doubt. My main disappointment is the price, but I suspect that's just because I couldn't afford to buy it myself. If you can afford it, Brainstorm will do three things for you: increase your ability to communicate with your staff and colleagues on paper; increase your ability to control and exploit your own ideas; and gradually train you to think in a more structured fashion if and when you need to. More control over the innovative instant namesaking process could be introduced — in particular a menu which would allow the user, in a particular Brainstorm session, to ask the program to accept a namesake without giving it all the descendants of the others.

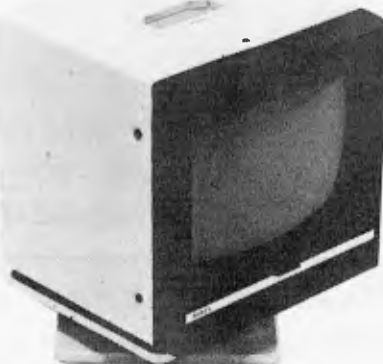
Bearing in mind that the program only occupies 14k of RAM and requires no disk access during use, Brainstorm is an ideal candidate for use with cassette I/O. This would bring thousands of home micro owners with memory expansions into contact with the kind of program usually reserved for business machines. So come on, Caxton, let's have a sub-\$100 cassette version later this year.

*Caxton's products are distributed in Australia by Imagineering.*

END



**MICRO-EDUCATIONAL PTY LTD**  
AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER



## AMBER MONITOR

High Resolution (80 x 24)

To suit all microcomputers

**\$199 ex \$229 inc**  
+ \$8 Courier

RING NOW FOR NEXT DAY DELIVERY (049) 43 6805 (049) 43 0624

**17 PARK ROAD, GARDEN SUBURB, NSW 2288**



## Sticky fingers solution

Aztec Electronics has come up with a product to fight the growing problem of "sticky fingers" in the micro business. It consists of one or two flexible steel cables attached to one or two square adhesive backed, aluminium plates. "Hold-it" is intended for use with computers, printers and disk drives but can also be used for typewriters, calculators and other business and personal electronic equipment. It's priced from \$29.95. Telephone: (03) 579 0011.

developed program which teaches touch typing has been launched on the US market. It is expected 50,000 units will be sold in the first year as a result of a \$100,000 advertising campaign due to start this month.

Noel McIntosh of the unfortunately named AID Systems said that "Typequick was designed to improve productivity in the office" on the basis that "most businesses find their accounting staff's productivity will decrease when the micro is installed until the clerks can type faster than they can write".

program for farmers. The program requires an input of a 12 month budget for the farming year (there are 25 codes available for income and 70 codes for expenditure items); cash flows in and out as they occur; and physical data as it becomes available. From this data, the available output includes a statement of cash flow of the business, a comparison of actual versus budgeted cash flow and a reconciliation statement.

Country Soft also sells a 'milk distributor's package', a 'bread distributor's package' and a general distributor's package.

Details on (09) 362 6416.

new distributor in Australia: Osborne Sales Centre (Aust). The contact phone number is (02) 290 3344. A new product has also been announced: it's a RAM disk of up to 384k capacity starting with a price of around \$600 . . .

Data Peripherals has announced the release of a new four user computer system — the TeleVideo TS804. Three operating systems are available: MP/MII, Oasis and CP/M Plus. It runs on a Z80A cpu with 320k of RAM. A price of \$6,995 (excluding sales tax) includes MP/MII and a 10Mb hard disk.

## Coals to Newcastle

Typequick, a Sydney-

## Farming cash flow

Country Soft in Western Australia has announced a cash flow and budgeting

## News in brief . . .

Osborne Computers has a

## AutoCAD for NEC APC

Entercom Computer Co. has

# FLIP-IT<sup>WORKS</sup>

If you use Single-Sided Floppy Disks **FLIP-IT** and use the other side

### What does it do?

**FLIP-IT** will enable you to write to and read from the other side of your single-sided diskettes . . . thereby allowing you to use both sides of your single-sided diskettes. **FLIP-IT** Kits will work on your hard or soft-sector, single, double, or any density required by your computer system.

For approximately the cost of a box of ten floppy disks you can **DOUBLE** your storage.

Price for 5¼" Kit — **\$57.00**

Price for 8" Kit — **\$67.00**

**LESS** introductory offer **DISCOUNT — \$5.00**

### How does it work?

**FLIPIT** Kits are pre-engineered to make it easy, accurate, fast and precise for you to convert your single-sided diskettes so you can use both sides.

### How can I be sure it will work?

Computer Hobbyists have been "flipping" their disks for ages. If it didn't work, they wouldn't bother.

Enclosed is a cheque for \$ . . . . . Please send 5¼"/8" Kit to  
 Name . . . . . Company . . . . .  
 Address . . . . .  
 . . . . .  
 Phone . . . . . P/Code . . . . .

**TAB E.D.P.**  
**SYSTEMS PTY LTD**  
 P.O. BOX 621  
 CLAYTON 3168  
 PHONE: (03) 579 0011



# PRINTOUT

released a two dimensional computer-aided drafting and design system for NEC's Advanced Personal Computer. It is a general purpose system suitable for a wide variety of applications, including areas as diverse as architectural drawings and chemical engineering. A sketch facility allowing free-hand drawings via a digitizer makes the system most suitable for graphic artists as well.

Other input devices include the Hitachi Tiger Tablet, Houston Instruments' pads, the Numonics Tablet and two varieties of mice. A large number of plotters from such manufacturers as Hewlett Packard, Houston Instruments and Alpha Merics are suitable output devices.

A large set of editing commands allows drawn objects to be moved, copied, modified, erased, rotated,

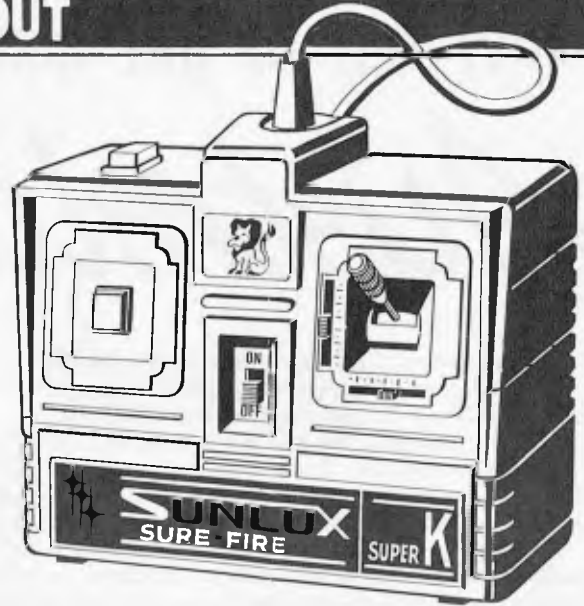
mirrored, and scaled vertically and horizontally. Repetitive patterns can be generated in either a rectangular or circular array.

A bi-directional zoom facility allows working on a drawing to any level of detail.

A disk directory of the hard or floppy disks can be viewed at any time and a file search facility is available. Utilities supplied with the package can convert drawings to or from an ASCII text file. This allows user programs such as word processors, data bases and high level languages to interface to AutoCAD.

Finally, help menus are provided and the user may request information on any command. All help menus can be edited or new ones constructed.

Further details are available from Entercom on (03) 429 5883. **END**



*Manufacturers of games peripherals appear to be gaining a greater appreciation of the lengths (and costs) to which people will go to increase their performance in that illustrious arena of the video game. Take, for example, the product pictured above from Lion Electronics in Western Australia. The "Sunlux Sure-Fire Super K" sports two fire buttons: one, a manual fire button for precise bombing runs and the other presumably for, say, a tail gunner with its four shots a second.*

*It also has an on/off switch. The Super K is suitable for Commodore, Atari and Apple machines. Details on (09) 274 4519.*

# HOLD-IT™

**HOLD-IT** is a new mechanical product that uses adhesive and aircraft cable technology in a unique combination that can be used to secure computers, printers, typewriters, video monitors, disk drives, calculators and a wide variety of business and personal electronic and electro-mechanical products without physically modifying the equipment or its supporting furniture, it is inexpensive, easy to install and very flexible. When properly installed "**HOLD-IT**" will deter most, if not all, "Target of Opportunity" type thefts of these products.

**HOLD-IT** consists of one or two flexible steel cables and one or two, three/four inch square, adhesive backed, aluminium plates.

Secure the end of the **HOLD-IT** cable to **any suitable structure, i.e. computer table leg or frame or pipes etc. as illustrated.**

**PRICE FROM \$29.95**



Please send further details to:

Name ..... Company .....

Address .....

.....

Phone ..... P/Code .....

**TAB E.D.P.  
SYSTEMS PTY LTD  
P.O. BOX 621  
CLAYTON 3168  
PHONE: (03) 579 0011**

# How not to get lost at the

# Australian Personal

Those of you who are itching to know who's attending the APC Show will be pleased to see the complete list, along with the floor plan, published below.

As you can see the variety is enormous. Nearly 80 exhibitors are present. And all the big selling computers will be in evidence: VIC-20 and Commodore 64, IBM's PC range, Atari 600 and 800, DEC's Rainbow, Apple's Macintosh . . .

Don't forget Wednesday, March 14 is a "business day" and you'll need to present a business card to gain admission.

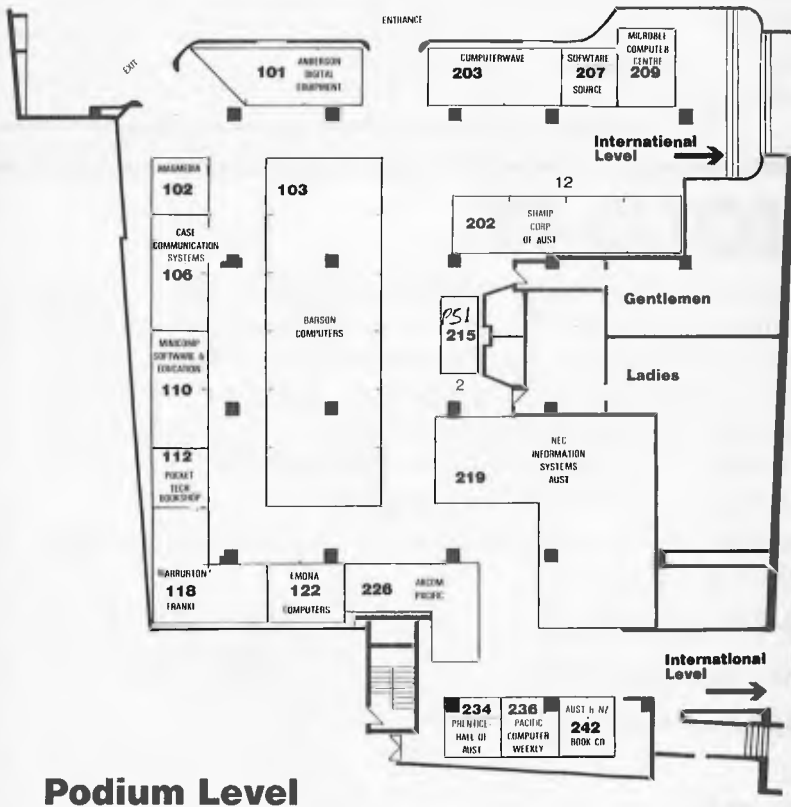
A new feature of this year's Show will be the staging of four audio-visual presentations on the hour, every hour, during the four days. A team of Coopers & Lybrand micro experts have been retained to stage the free presentations. Each has been designed to provide visitors with information on how to use the Show constructively and will provide a practical understanding of the commercial benefits that can be derived from the new microcomputer technology.

There will be four separate topics — each 3-5 minutes in length — during each session. These topics are "How To Use The Exhibition"; "Hard decisions" — decisions to consider when choosing hardware; "Soft Options" — outlining the various options for software; "Education" — aimed at the use of microcomputers in education. The education presentation will be run in conjunction with publishers McGraw-Hill, specialists in the education field.

A competition will be run in conjunction with the Coopers & Lybrand seminars which will offer visitors the opportunity to win a Rainbow 100 system, donated by Digital and configured with the appropriate operating system and application packages.

Admission to the Show on the three general public days is \$4 for adults (unless you spot the discount voucher in the Show advertisement in this issue) and \$2 for children.

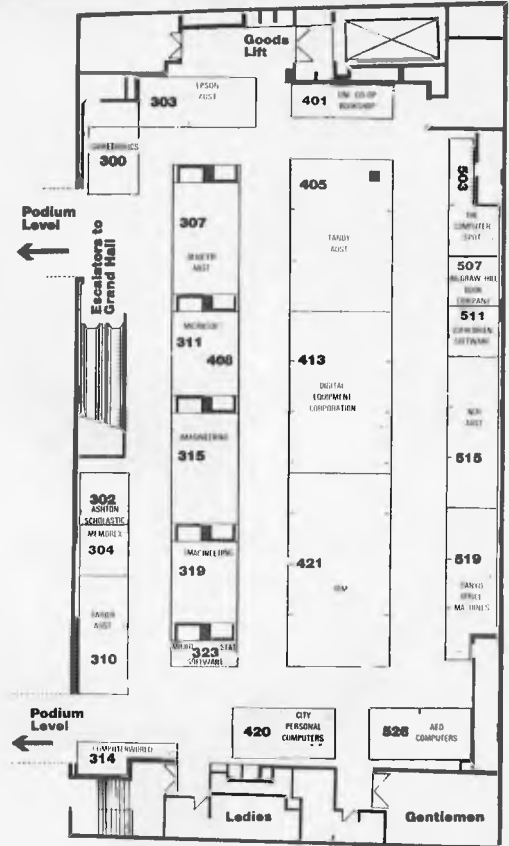
So we'll see you there. And we hope you're all looking forward to it as much as we are!



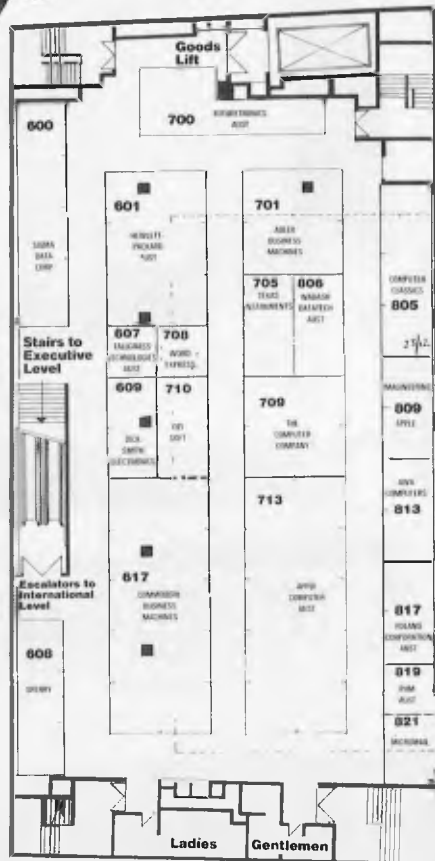
See you

# Computer Show...

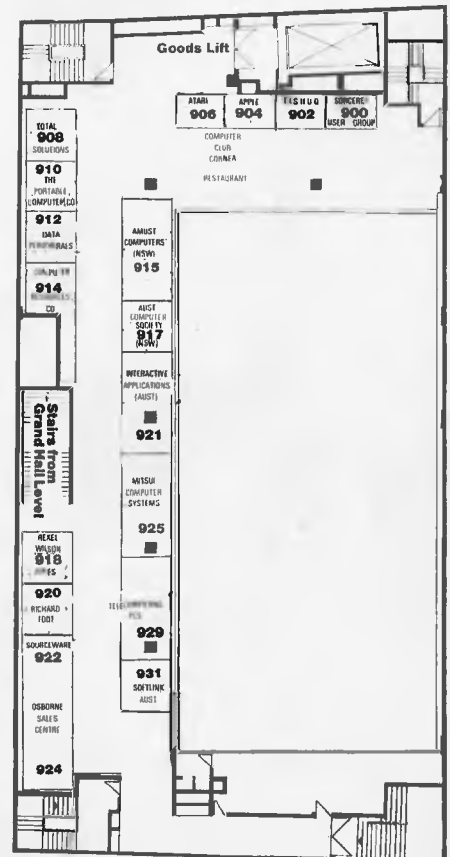
# ...you're there!



**International Level**



**Grand Hall Level**



**Executive Level**



**BENCHTEST**

# COMMODORE 720

Who says that computing is a sedentary profession? Not when you've got a Commodore 700 to review, it isn't! Having arranged to take delivery, at my flat, of the aforesaid machine I was somewhat disconcerted when the delivery man unloaded three small wardrobes at the front door. Anyway after much wheezing, heaving and puffing your chronically unfit reviewer finally secured the three items in his dining room.

Right – now for the unpacking! More wheezing, heaving and puffing and eventually a Commodore computer, with 8250 disk drive unit and 6400 daisywheel printer were perched on my dining room table. And with not a few boxes and polystyrene fillers strewn all around the floor. Well full marks to Commodore for packing, especially for the printer which was in a box within a box – I half expected it to be like those Russian dolls, with a diminutive thermal printer emerging at the very last!

Pausing, only to recover my breath and stack all those boxes out of the way, I decided to take stock of what lay before me: at the heart of the system is the Commodore 720 computer itself – this is the really new component of the three, and we have actually been waiting nearly a year for it to arrive. It consists of a detachable keyboard, main box containing the processor, 256k of RAM, Basic in ROM, and has a monitor secured on top of it. Other members of the 700 series have less RAM, or no monitor. Theoretically, at least, it is possible to use this unit without disks, and just with a cassette tape drive, but at a price around the \$2300 mark, this sort of configuration will not be causing competitors any sleepless nights.

The second unit contains two one megabyte disk drives. Externally it is very similar to the disk units that Commodore has been manufacturing for some time, but the capacity has recently been upped to a million characters per drive. The third component in my review installation was a Commodore 6400 daisywheel printer, actually a TEC F10-40 with a Commodore label, but of course just about any other type of printer could have been substituted for it.

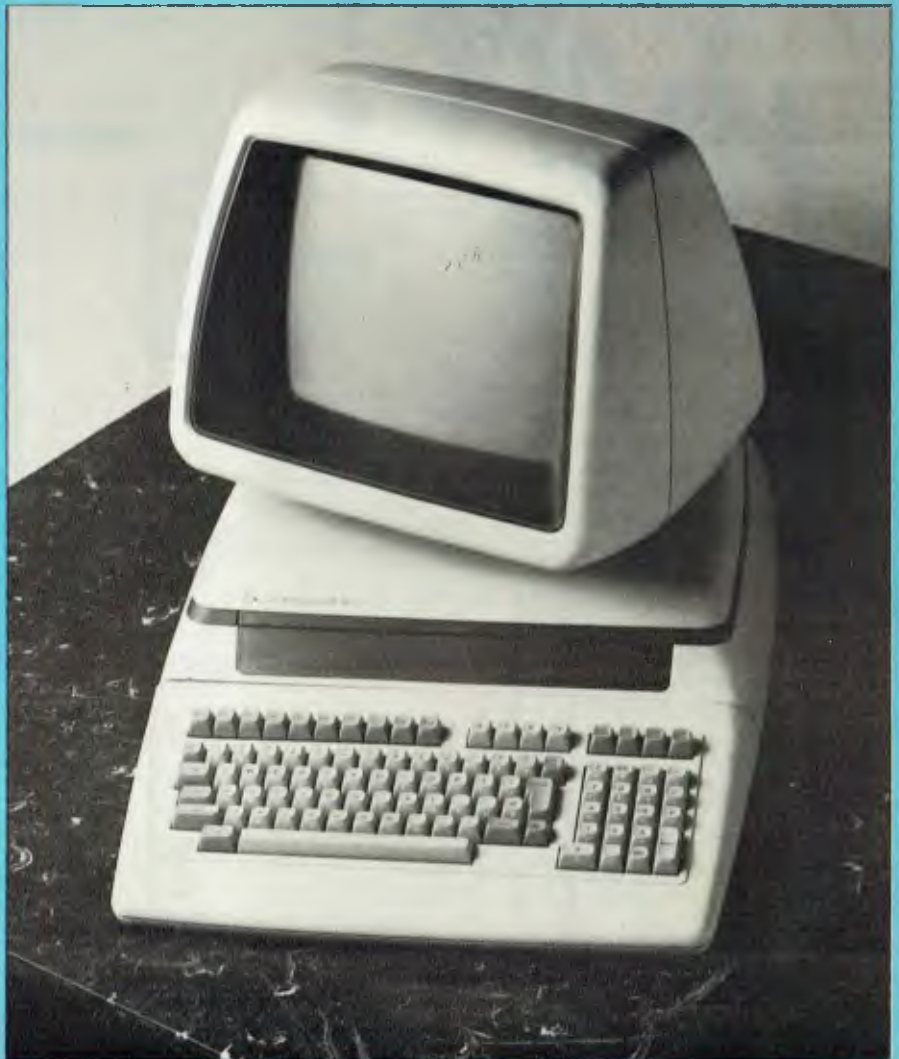
## Exploring the 700

*After a series of false starts and problems, the Commodore 700 range of business machines has finally arrived. Mike Liardt examines the 720 . . .*

Finally, the total cost of this unaccustomed load on my dining room table amounted to about \$7,000 including sales tax.

Readers will get some impression of the 700's appearance from the photographs. The 700 seems to be quite photogenic, and this is not a compliment: it does not look as graceful 'in the flesh' as it does in the photos. I think this is because it is actually a fair bit bigger than you would expect.

Hardware reviewers are currently fond of referring to 'desk footprint', the desk



*The Commodore 720: a Mostek 6509 processor, 256k RAM and Basic in ROM.*



space consumed by a machine. Well, the 700 has got big feet! It is roughly the size of an IBM PC, but unlike them, this does not include the disk drives, which are housed in a large separate box.

The keyboard is detachable and connected to the main box by a plug at the end of a coiled flex. You need very nimble fingers to insert this plug, as its socket is awkwardly placed, but the 700 is not a portable machine so you are unlikely to be doing this very often. The keys themselves are well laid out and have a good feel to them. I should imagine touch-typists would feel quite happy with them. There are 94 keys in total, including all the keys you would expect, and a few that you would not. There is a separate numeric keypad, row of function keys and arrow keys in addition to a fairly standard qwerty layout. The front of most of the keys is embossed with graphics symbols. These graphics characters, identical to the PET's, can be typed directly when in graphics mode; a single key toggles between upper/lower case mode and upper case/graphics mode. On the number keypad there is a key marked with two zeros, and pressing it

generates – you've guessed it – two zeros. Other unusual keys include one marked 'π', and another marked 'CE' for rapid 'clear entry' on the numeric keypad.

The monitor is firmly fixed to the main processor box, but can be swivelled and tilted to your preferred angle of view. The 12½ in screen is somewhat 'set back' in its case – rather like a lens surrounded by a lens-hood. This obviously helps shield it from reflections, but looks rather inelegant. The screen surface is anti-glare, and this seems to work quite well. I used it, with my back to a window, without any trouble.

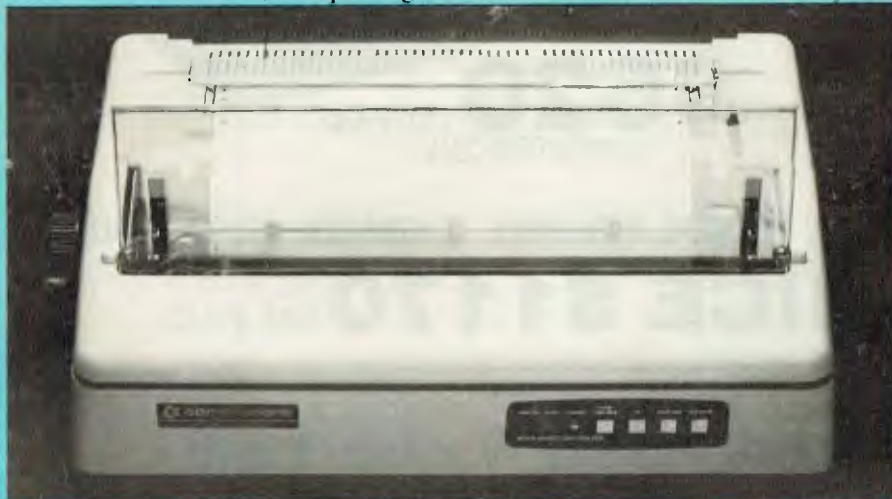
The display itself is a restful green phosphor, 80 characters wide by 25 rows high. This is one row more than most VDU displays, so the extra row can be usefully employed for system status messages, etc.

Moving round to the back are reset and on/off switches, a 240 volt mains socket and several interface 'ports' for connecting the 700 to other devices. In particular, its IEEE-488 interface can connect to a range of Commodore disk units: from a 165k single floppy drive right up to a 7.5 megabyte winchester disk. It can also connect to various matrix and daisywheel

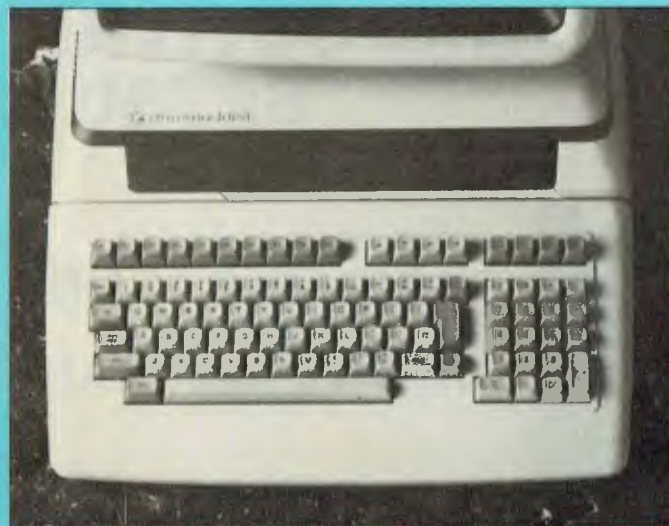
printers. Although there is only the one output socket, it is possible to connect to more than one device by 'piggy-backing' the plugs. There is also a cassette port which, along with the IEEE-488 port, is not a proper socket, but an edge connector from the main circuit board. You might expect this sort of thing on a cheap \$200 machine, but not on a \$2500 one. Finally there is an RS232 port and audio video outlets. It is a bit surprising to find a sound facility on a business machine – sound effects being usually confined to games software, but doubtless a hard-worked businessman would like to relax with some ear-splitting arcade game at the end of a hard day.

Undoing two bolts at the back allows the top of the main case to hinge forward, monitor and all. Actually, the bolts were missing on my review machine, but normally you will find them there. Unfortunately there is an earth-wire from the top of the case to the bottom, and this has to be unfastened before the case can be fully swung open.

At the bottom of the case lies a single circuit board, about the same size as a tabloid newspaper, but just printed with component identifiers and no sign of a page three anywhere. The larger chips are socketed, and right in the centre lies the Mostek 6509 processor. This processor is compatible with the well-known 6502 that has driven a whole generation of home computers, including the PET and Apple II. The main difference between the 6502 and the 6509 is that the 6509 has two extra instructions that can be used for accessing memory outside the normal 64k limit. Thus



*The 6400 daisywheel printer; actually a TEC printer with a Commodore badge.*



*Ninety-four keys — including some you wouldn't expect.*



*Slick styling, but no integral disk drives.*

# VECTORIO-64Z

## TWO-IN-ONE

### 6502 « Z-80A FOR CP/M

### APPLE COMPATIBLE

CENTRAL SPU, 6502 & Z80A  
 64K BYTE OF USER RAM  
 MEMORY  
 FULLY PROGRAMMABLE  
 KEYBOARD 54 PRE-  
 PROGRAMMED KEYS  
 NUMERIC KEY PAD  
 SPECIAL FUNCTION KEYS  
 UPPER AND LOWER CASE  
 FULL GRAPHICS 280X192  
 RESOLUTION  
 7 EXPANSION SLOTS  
 WILL RUN APPLE AND CP/M  
 SOFTWARE  
 #3 MONTHS GUARANTEE  
 FULL SERVICE AND SUPPORT



**\$620** TAX PAID  
 COMPUTER ONLY

★★SPECIAL★★ COMPUTER, MONITOR, DISK DRIVE, CONTROLLER AND ALL CABLES

**TOTAL PRICE \$1170** TAX PAID

TELEPHONE 03 568-6911

**MICRO PRO COMPUTERS**

43 ATHERTON RD  
 OAKLEIGH 3166  
 MELBOURNE AUST

PLEASE FIND ENCLOSED CHEQUE

FOR THE AMOUNT OF \$.....

FOR THE FOLLOWING.....

.....

.....

PLEASE SEND ME MORE INFORMATION

NAME.....

ADDRESS.....

SUBURB.....

STATE.....

**OSBORNE 1 \$2185**  
 and  
**OSBORNE EXECUTIVE**  
**\$2750**



AVAILABLE AGAIN  
 COMPLETE  
 WITH ALL SOFTWARE

SPECIAL PRICES FOR SCHOOLS



the 700 can be equipped with 356k of RAM, and with a theoretical expansion up to 896k (when Commodore get round to building the RAM boards).

## Getting started

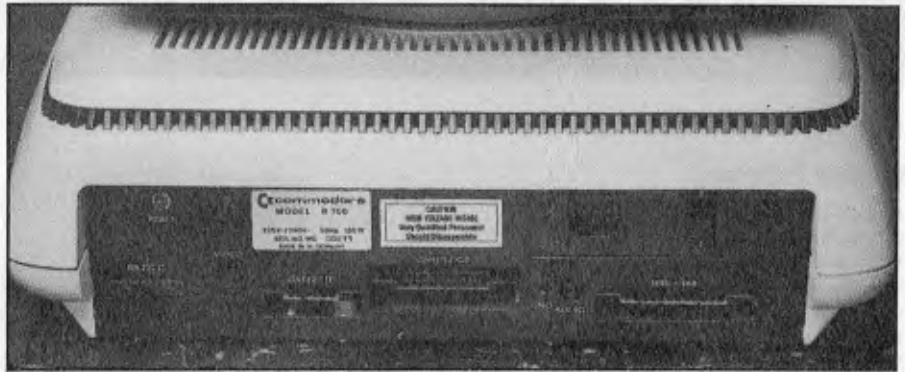
Ever since the PET was first introduced, back in 1979, Commodore has had an unenviable reputation for providing poor documentation, and the signs are that the 700 will not be an exception to this rule. Currently the 700 has to share its documentation with the 500 and 600 series, in a manual of just 113 pages covering all three systems. Naturally there is just not the room to impart enough information in this limited space. Evidently a new manual is on the way, but I was unable to find out any more about it, and with Commodore's reputation in this department it is a fairly forlorn hope that it will be a substantial improvement when it does arrive.

Anyway, once the system is unpacked, the three components need to be wired together using the very stout cables and connectors supplied. The back of all three have IEEE outlets – proper sockets on the printer and disk drives, but on the 700 itself there is just an edge connector from the main circuit board. One cable connects the 700 to the disks and the other connects the disks to the printer. This latter connection must be secured 'piggy-back' fashion to the plug already in place at the disk drives, since there is only the one IEEE outlet available there. This connection is securely bolted in place, so there is no danger of it coming loose or making poor contact.

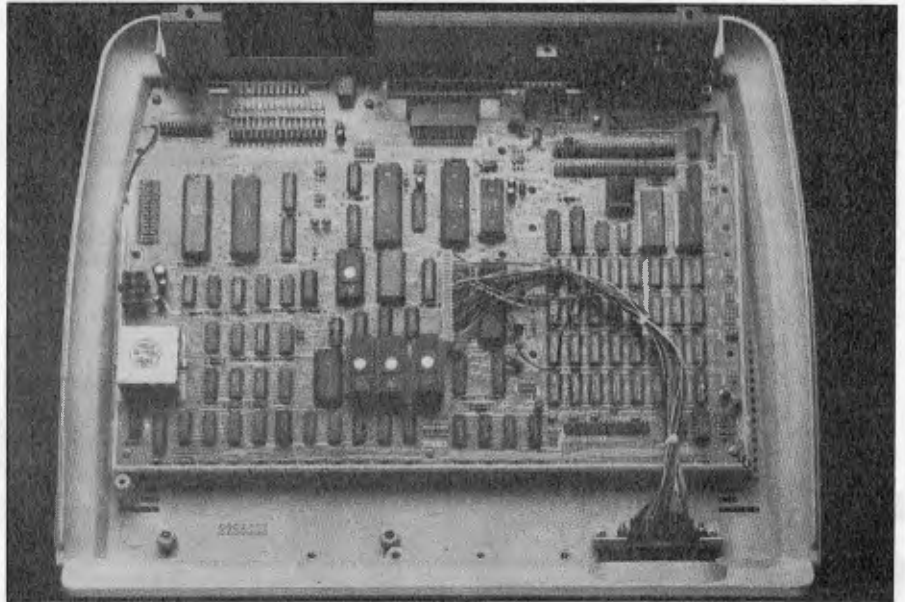
Each unit needs its own power supply, so after fitting three mains plugs comes the big moment – hide behind the couch, fingers in ears and switch on! Actually after switching on you are greeted with total silence – not even the sound of a disk drive whirring in order to boot up the operating system.

And at this point I hit my first problem: I had inserted Commodore's Demo disk in the drive (main drive is on the right, not the left like all other systems I have seen), but I was totally unable to access its disk directory to discover what files resided upon it. In addition to this I was a bit perturbed that the system had not booted up when I first switched it on. Perhaps there was something wrong with the disk drives? Needless to say the manual was not very helpful.

In fact, it transpires that the operating system does not need to be booted when the machine is first switched on, as it is already 'burned in' in ROM – an unusual feature for a machine in this price bracket, but neither advantageous nor disadvantageous. The other problem was caused by the manual failing to explain the correct syntax for the disk commands. In fact the CATALOG (printed in the manual in upper case) command is needed to see the



*The 720 could theoretically be used as a cassette-based machine.*



*The 6509 processor allows up to 896k RAM to be addressed.*

contents of a disk, but this should actually be typed in as "caT" – quite elementary when you know how!

## Programming language

Currently the 700 has only one programming language available: Basic. Other languages are being promised: Pascal, Forth, Prolog and Logo, but they are not available here and now.

The Basic is active as soon as the machine is switched on, and is available independently of the disk drives. In fact the Basic interpreter is embedded in 28k of ROM. This version of Basic includes commands to access the disk drives, if they are there, and contains a few extra commands, not available in most Basics:

★ **BANK** – This allows the Basic program to operate in more than 64k of RAM. With a full complement of RAM there are 16 'banks' available, each of 64k. This command only operates in conjunction with a few of the other Basic commands, so it is still quite a problem to write programs that need more than 64k of RAM.

★ **TIS** – It is possible to access the system clock through this variable, to an accuracy of one tenth of a second, thus introducing automatic timing to your programs.

★ **KEY** – This can be used to assign functions to function keys.

★ **PRINT USING** – This command greatly facilitates numeric formatting.

★ **BACKUP** – This is a disk command that can be used to copy disks.

Apart from the above, the Basic appears to be fairly typical. Although the 700 has fairly sophisticated sound generation facilities, a 6581 chip permitting three separate voices of nine octaves each, there are no Basic commands (documented) with which to access it, so any sound effects have to be implemented in machine code.

## Benchmarks

At this point, I decided to run the APC Basic Benchmarks. The Basic interpreter is permanently resident in ROM, so there is no need to load it from disk – it is there and available as soon as you switch on. Praying that there were no peculiarities in the 700 version of Basic (after all I was sure the

# THE ALTERNATIVE:

## Standard Features

- 6502 and Z80 microprocessors
- 64K RAM Expandable to 128K
- 2K System ROM, plus sockets for 10K additional user ROM
- RGB and Composite (NTSC or PAL) Video
- Selectable 80 or 40 Column Text display
- High Resolution Graphics: Six Colors, 280 x 192 or 280 x 160 with four lines of text
- Color Graphic Mode: 15 Colors 40 x 48 or 80 x 48; 40 x 40 or 80 x 40 with four lines of text
- 8 bit parallel output
- RS-232c Serial I/O
- Detached Keyboard: All standard keyboard functions, Upper/Lower case characters, Numeric Keypad, Cursor Control Block
- Six Apple II compatible slots for plug-in peripherals
- Game paddle I/O
- Built-in loudspeaker
- Mounting slots for up to three DN-25 I/O plugs



**SUPER  
SPECIAL  
VALUE**

**\$1550**

TAX PAID

Hardware and Software compatible with Apple II

# BASIS MED FLY

## PERIPHERALS

Disk Drive slim line 163k 5¼" with controller .....	\$380.00
Disk drive 8" 1.6 meg with controller .....	\$1120.00
Twin disk drive 3.2 meg with controller .....	\$1735.00
Hard disk 21 megabyte also available .....	\$3150.00

## PRINTERS

Brother HR15 daisy wheel printer .....	\$795.00
Brother EP44 printer terminal .....	\$399.00
Cp80 dp80 or xp80 dot matrix all one price .....	\$410.00

## SOFTWARE

APPLE SOFTWARE COMPATIBLE  
CPM 2.2 BUSINESS SOFTWARE

**SOFTWARE SPECIAL**  
**ACCOUNTS RECEIVABLE**  
**ACCOUNTS PAYABLE**  
**GENERAL LEDGER**  
**INVENTORY**

**\$500**

TAX PAID  
All Available  
For This Price

SPECIAL PRICES FOR SCHOOLS

**TELEPHONE 03 568-6911**

**MICRO PRO COMPUTERS**

43 ATHERTON RD  
OAKLEIGH 3166  
MELBOURNE AUST

PLEASE FIND ENCLOSED CHEQUE  
FOR THE AMOUNT OF \$.....  
FOR THE FOLLOWING.....

PLEASE SEND ME MORE INFORMATION  
NAME.....  
ADDRESS.....  
SUBURB.....  
STATE.....

manual would not bale me out if there were), I keyed in and timed all eight test programs.

In the event the 700 Basic caused no problems, behaving much like any other good version of Basic. The times were quite respectable too (see Benchmarks table). Referring to the summary of Benchmarks (elsewhere in this issue) which describes the tests and lists the results for 59 machines, the Commodore 700 would be 17th.

## Software

It is often said that it is software that really sells machines – for example, the VisiCalc spreadsheet system is generally acknowledged as a major reason for Apple's phenomenal success with the Apple II. Certainly I would advise anyone contemplating a computer purchase to look for the software first, then choose from the machines that will run it. So what incentives does Commodore provide for buying its machine?

On the accounting side, there is the standard Commodore packages including the usual debtors, creditors and general ledger. These are the same as those supplied on the old 8000 series machines although they have been revised and are now stamped as version 7. Apart from this Commodore also have Superscript II, SuperBore and Calresult as wordprocessor, database and spreadsheet packages respectively.

The main items missing from the above list are the magic words CP/M, MS-DOS and CP/M-86. Nor will you find the slightly less magic words UNIX or UCSD. For the benefit of the newcomer, let me explain that these are the names of industry standard operating systems, available on a vast range of microcomputers, and roughly in the order I have given each providing the key to a huge choice of software.

Commodore, like its rival pioneer of the personal computer, Apple, has steadfastly refused to adopt any of the standard operating systems, and arrogantly persisted with its own. The Apple III was launched

without access to CP/M, and was something of an anti-climax after the Apple II. And so, a couple of years later, the question is: Is Commodore simply going to repeat Apple's mistake?

To a certain extent it is hedging its belts. As I have already mentioned, the circuit design for the 700, based around a Mostek 6509 processor, includes provision for a second processor. This will be either a Zilog Z80 or Intel 8088, running concurrently. These processors are an essential prerequisite for running CP/M or MS-DOS and CP/M-86. However, Commodore has not exactly left a spare socket simply to drop the processor into. And these operating systems do actually need to be modified to work on the 700. So you cannot just go out and buy a Z80 chip and a CP/M disk – Commodore needs to put a lot more work in first! What all this does mean is that these operating systems *might* be available one day, and the Commodore can mention them now in its brochures.

*(Editor's note: Since this Benchtest was completed, Commodore has announced an 8088 board which will sell in Australia for \$558 and will allow the 700 to run CP/M-86 or MS-DOS. The operating systems are expected to sell for around \$300.)*

## A tale of two disk drives

The 8250 disk drives supplied with the review machine worked reliably enough and provided two megabytes of storage which is above average for 5¼in floppies. They are, however, housed in a sharply angular box. Doubtless this box blends in well alongside Commodore's PETs and 8000 range, which have similar angular features, but sticks out like sore thumb when placed next to the rounded 700. Fortunately, Commodore has redesigned the cases with its recently released slimline version of the 8250. It also stores one megabyte per drive but wasn't available in time for this review. Watch out for it on

Commodore's stand at the APC Show in March.

The 700 was originally planned to have internal disk drives, and indeed many of the illustrations of it show these drives in place. Certainly the main box of the 700 has enough space for a pair of disk drives – that is one of the reasons it is so large, but evidently Commodore has got cold feet on this idea. If this is the case then it is a great pity since it leads the 700 way off from the existing market trends towards transportability and elegance.

## Prices

<i>(Including sales tax)</i>	\$
610 – 128k RAM without monitor:	1116
710 – 128k RAM with monitor:	2046
720 – 256k RAM with monitor:	2325
8250 – 2x1 megabyte disk drives (slimline version):	2046
6400 – daisywheel printer:	2604
1361 – dot matrix printer:	1023

## Conclusions

For a machine that has now been launched, there are still a surprising number of essential features and facilities not yet available on the 700. At the time of writing this review we are still awaiting new manuals, CP/M and MS-DOS options and programming languages other than Basic.

I would advise anyone thinking of buying a 700 to wait and see if these problems are sorted out. Until such time as these extras are available the 700 does not have a great deal to offer. A particularly weak point is that it does not (yet) offer any of the standard operating systems. I know Apple's Lisa may very well succeed with a non-standard operating system, but this is because that machine has so much to offer. Commodore's operating system is very rudimentary in comparison.

My final word to would-be purchasers is: Wait! And if you can't wait then take a good look round at the opposition.

## Benchmarks

BM1	1.1
BM2	6.5
BM3	12.0
BM4	12.3
BM5	14.2
BM6	22.1
BM7	35.3
BM8	7.2

(or 72 secs for 1000 iterations)

Average 21.94

All timings in seconds. For an explanation of the Benchmark programs, see the Benchmark summary elsewhere in this issue.

## Technical specifications

Processor:	MOS6509 (602 compatible).
Memory:	256k (Model 720), 128k (710 & 610).
Screen:	12in green phosphor. 25 lines of 80 characters, each defined on 9 x 14 matrix. Full ASCII character set plus 64 graphics characters available.
Keyboard:	94 keys, qwerty layout, 10 function keys, numeric keypad and arrow keys.
Disk:	Range from single 5¼in (164.5k), through 2 x 1 megabyte 5¼in (8250 drives used in review), to 7.5 megabyte winchester. Connected via IEEE-488 interface.
Interface:	RS232C, IEEE-488, cassette, cartridge slot and audio and video outputs.
Language:	Basic.
Dimensions:	Keyboard – 450mm wide x 245mm deep. Main unit – 460mm wide x 350mm deep x 460mm high.



# A BEGINNER'S GUIDE TO PROGRAM CONVERSION PART 2: SIMULATING STATEMENTS

*In the October issue of APC Surya looked at the factors to consider when choosing between a program conversion and a complete rewrite. In the November issue he followed that up with the Basic Converter Chart and now he continues the series on the conversion of one Basic dialect to another with the assumption that a conversion is appropriate and analyses the procedure in detail.  
Next month Surya will continue with a look at graphics and sound conversion.*

The initial steps to be taken when converting a program from one dialect of Basic to another are much the same as when coding from scratch and just as much discipline is required. The starting point in either case is to have a clear understanding of what you're setting out to achieve. Make sure you can follow the logic of the program before you attempt to modify it. Spend a little time working out why the author has done things in that particular way. All this may seem unnecessary at first, but it's time well spent: the greater your understanding of the program, the easier the conversion will be.

Once you're satisfied that you have a clear overview of the program as a whole, you can look at each section in detail. Break the program down into its component subroutines. This is only possible with a reasonably structured program, but as mentioned in the October issue, programs with poor or non-existent structuring are best left alone.

When examining each routine, take a special look at the variables. Determine which are global and which are local. Global variables are those used throughout the program. Typical global variables include scores in games, some counters, printer-settings and so on. Local variables are those whose values are used only within a given subroutine: once the routine has been exited, the values are no longer required and the variables may be used for a different purpose within another routine. Typical local variables are counters in FOR-NEXT loops and flags used to check validity of data.

The reason you need to distinguish between the two is that local variables may be freely changed or discarded as appropriate, but global variables need to be treated with a great deal of care — the program as a whole is dependent upon them. If you're lucky, the programmer will have gone to the trouble of listing all global variables in remarks at the beginning of the program, and used fixed local variables so that, for example, w is

always a FOR-NEXT loop counter. Failing that, there are utility programs available that will locate variables for you.

## Coding

(Note: in the examples given below, I am using A\$ to represent any string variable and 100 onwards whenever line numbers are required. These choices are purely arbitrary and have no significance.)

During the process of converting a program from one machine to another, you will very often come across a keyword in the original program for which your machine has no equivalent. While experienced programmers will soon find a way round the problem, those a little newer to the game may find themselves stuck for a solution. What I have done below is to look at some of the common offending statements and methods of achieving the same effect using standard Microsoft. The keywords covered are not in any particular order.

**INKEY\$:** This statement is an almost statutory presence in just about every Basic program ever written. This statement tells the computer to scan the keyboard to test for a key depression and place the result into a specified variable. The standard format is A\$=INKEY\$; the most common variations are A\$=GET\$, GET\$=A\$ and GET A\$.

The statement takes one of two forms. On most machines, the processor will carry out a single sweep of the keyboard: if a key is pressed during this scan, the value of the key pressed will be placed into the variable A\$. If no key is pressed, A\$ will be null (empty). On some machines, however, the computer will carry out a continual series of sweeps until a key-press is detected. A few machines offer both forms.

A continuous scan using the former version of inkey\$ is straightforward: 100 A\$=INKEY\$:IF A\$="" THEN GOTO100. The BBC, however, goes a step further in offering a timed keyboard scan in the form A\$=INKEY\$(time), where time is given in 100ths of a second.

To simulate this using the standard INKEY\$ statement, we use a FOR-NEXT loop thus: 100 FOR A=0 TO (value):A\$=INKEY\$:NEXT. The value of the variable will need to be adjusted to suit. Since different machines have different processing speeds, you'll have to experiment with different values to establish some kind of relationship between the value of the FOR-NEXT counter and real time.

Of course, the example given above would return the final key pressed if there were two or more key depressions during the scan period, but this is easily overcome: 100 FLAG=0:A\$=""  
110 FOR A=0 TO (value)  
120 B\$=INKEY\$:IF NOT B\$="" AND FLAG=0 THEN A\$=B\$:FLAG=1  
130 NEXT

The value of the first key depression is now stored in A\$. If no key was pressed, then A\$ will be empty.

**INSTR:** This statement is used to search one string to find out whether it contains a second string. The format is INSTR(main string, sub-string) where the starting position of the sub-string is returned on a successful match and 0 is returned if the search fails. INSTR("APC","C") would return 2 while INSTR("APC","X") would return 0.

We might, for example, want to find out whether NAME\$ contains the sub-string 'Rev.'. Using INSTR, we would do this like so:

```
100 IF NOT(INSTR(NAME$,"Rev.")=0) THEN PRINT NAME$;" is a vicar."
```

To simulate this in standard Microsoft, we use MID\$. In the above example, we would do so thus:

```
100 FLAG=0:FOR A=1 TO (LEN(NAME$)-4)  
110 IF MID$(NAME$,A,4)="Rev." THEN FLAG=1  
120 NEXT  
130 IF FLAG=1 THEN PRINT NAME$;"is a priest."
```

Note that on an Atari, line 110 would read as follows:

```
110 IF NAME$(A,4)="Rev." THEN FLAG=1
```

and on a Sinclair machine, it would read:  
 110 IF NAME\$(A TO A+4)="Rev."  
 THEN FLAG=1

These differences are due to the non-standard forms of MID\$ supported by these machines. The original example should work on all other dialects of Basic.  
**PROCEDURES AND FUNCTIONS:**  
 User-definable functions are supported in varying degrees of sophistication by a number of machines, but you are most likely to come across the extended use of procedures and functions in BBC programs. Procedures and functions make programs infinitely neater and more readable, but they don't actually achieve anything which cannot be duplicated using ordinary sub-routines.

Some dialects of Basic will allow you to GOTO or GOSUB a variable which greatly aids readability — the Basic Converter Chart will tell you which machines do if you look under GOTO.

Sharp Basic SP-5025 has a number of weaknesses which are discussed in the article 'Sharp Logic' in the September issue.

**REPEAT-UNTIL and WHILE-WEND.**  
 These are two forms of the same control loop, one being the logical reverse of the other. WHILE-WEND checks that a given expression is true and then executes all statements up to the first WEND statement encountered. The computer then

returns to the original condition to check whether it is still true. If the condition is false, the statement following the WEND statement is executed.

For example:

```
100 REM — Silly example
110 X=10
120 WHILE X>0
130 PRINT "The current value of X
    =";X;"."
140 X=X-1:WEND
150 REM — X is now zero and the WHILE
    test fails
```

In a WHILE-WEND loop, the loop is repeated while the test expression is true. A REPEAT-UNTIL loop works the other way around. All statements between REPEAT and UNTIL are executed until the test expression is true. Thus the above example would be written:

```
100 REM — Same silly example
110 X=10
120 REPEAT
130 PRINT "The current value of X
    =";X;"."
140 X=X-1:UNTIL X=0
150 REM — X is now zero and the
    REPEAT test is satisfied
```

Converting from one structure to the other is thus straightforward. But the majority of present-day Basics offer neither of the above. To create the same effect,

we have to use a statement that causes purists to gasp in horror: the GOTO.

Thus:

```
100 REM — Here we go again
110 X=10
120 PRINT "The current value of X
    =";X;"."
130 IF X>0 THEN X=X-1:GOTO120
140 REM — X is now zero and the test fails
```

While somewhat less elegant, the net result is the same. We can see that rewriting a WHILE-WEND or REPEAT-UNTIL structure is simply a matter of manually inserting the test (using IF-THEN) and pointer (GOTO).

**STRING\$** is a statement which allows you to repeat a given sequence of characters. The format is STRING\$(number of times to print string,string). If you wanted to print a line of asterisks across an 80-column screen, for example, you would state: STRING\$(80,"\*"). If your machine doesn't support this statement, then we fall back once again on the ever ready FOR-NEXT loop. Thus: FOR A=1 TO 80:PRINT"\*";:NEXT, the string is simply duplicated, and the numeric argument placed in the FOR-NEXT loop.

**TAB.** This is supported by most machines, except that on the BBC micro the TAB function is performed by SPC while TAB prints in predetermined screen fields.

**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.

#### DISK FORMATS AVAILABLE

5" IBM-PC DOS 320K  
 5" 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.

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 **\$200.00**. META4 may be the only program you need to buy for your computer

#### Comparison Table Meta-4 + dBASE

True DATA BASE system	Yes	No
Simple SPREADSHEET	Yes	No
Simple WORD-PROCESSING	Yes	No
On-Line HELP	Yes	No
On-Line TUTORIAL	Yes	No
Needs PROGRAMMING	No	Yes
Max. Files Open together	12	2
Data Dictionary	Yes	No
Automatic Totalling	Yes	No
Auto. copy TO other file	Yes	No
Auto. copy FROM other file	Yes	No
Auto. maintain other file	Yes	No

You pay \$ 200.00 800.00

Registered trademark ASHTON-TATE

#### Prices (including tax)

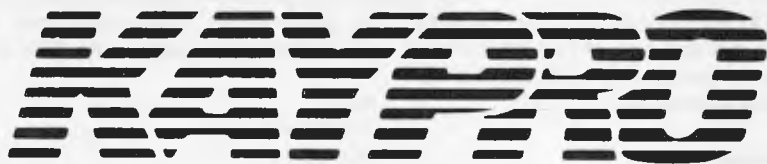
META4 SYSTEM .....\$200.00  
 MANUAL SEPARATELY .....\$20.00  
 deductible from later purchase of the system.

#### BACK A WINNER — GO FOR META4

Order from:  
**SYSTEM SOLUTIONS PTY LTD**  
 28-30 Palmerston Street,  
 BERWICK Vic 3806  
 AUSTRALIA  
 Tel: (03) 707 2851

Dealer enquiries invited  
 Watch META4 sell your systems.

★ Apple Users Society of Melbourne



## THE COMPLETE BUSINESS COMPUTER

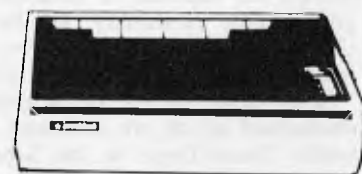
**WORLD'S  
No.1  
SELLING  
PORTABLE  
COMPUTER**

All KAYPRO computers come with standard software of CP/M, Wordstar, Perfect Writer, Perfect Filer, Perfect Speller, Perfect Calc. Microplan Uniform, The WORD Plus. M - Basic - C - Basic - S - Basic. Value at over \$3000. Computer - Printer - Software.



**KAYPRO 4 \$3695.00 inc. 80 col. C.P.S. Dot Matrix Printer and CARPE software.**

**KAPRO 10 \$6215.00 inc. 80 col. C.P.S. Dot Matrix Printer and CARPE software. (132 col. printer \$200 extra).**

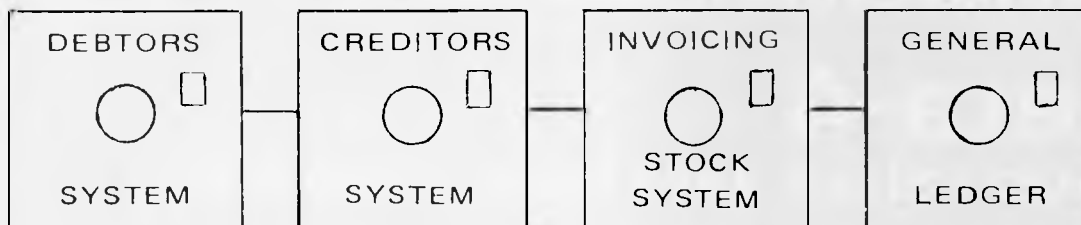


### LEASE COMPLETE PACKAGE FROM \$3.00 PER DAY

NO LEASE PAYMENTS FOR THE FIRST 3 MONTHS REQD.

#### FREE CARPE GENERAL ACCOUNTING SOFTWARE

Fully integrated and free with your KAYPRO



Suitable for most Australian small business application.

**NORMAL RETAIL VALUE OF THIS LEADING AUSTRALIAN SOFTWARE \$1600 PACKAGE**



CALL FOR DEMONSTRATION

 **president computers**

Sole Australian Dist. for KAYPRO computers.

100 George St.

Hornsby, 2077

Ph. (02) 476 2700

609 St Kilda Road.,  
Melbourne 3001  
Ph. (03) 529 1788

416 Logan Road  
Stones Corner  
Queensland 4120  
Ph. (07) 397 0888

Shop 2 Warramanga Ctr  
Warramanga  
Canberra  
Ph. (062) 88 2000

9a/1 Leura Ave  
Claremont 6010  
West Australia  
Ph. (09) 384 5511

Sole Australian Dist. for KAYPRO computers.

DEALER INQUIRIES WELCOME.



# MUSIC MICRO, PLEASE PART 2: DIGITAL SYNTHESIS

*In the second of this three part series Simon Tait begins to set up a digital synthesis system on the BBC Micro. You'll have enough here to keep you working until the final part next month which completes the project.*

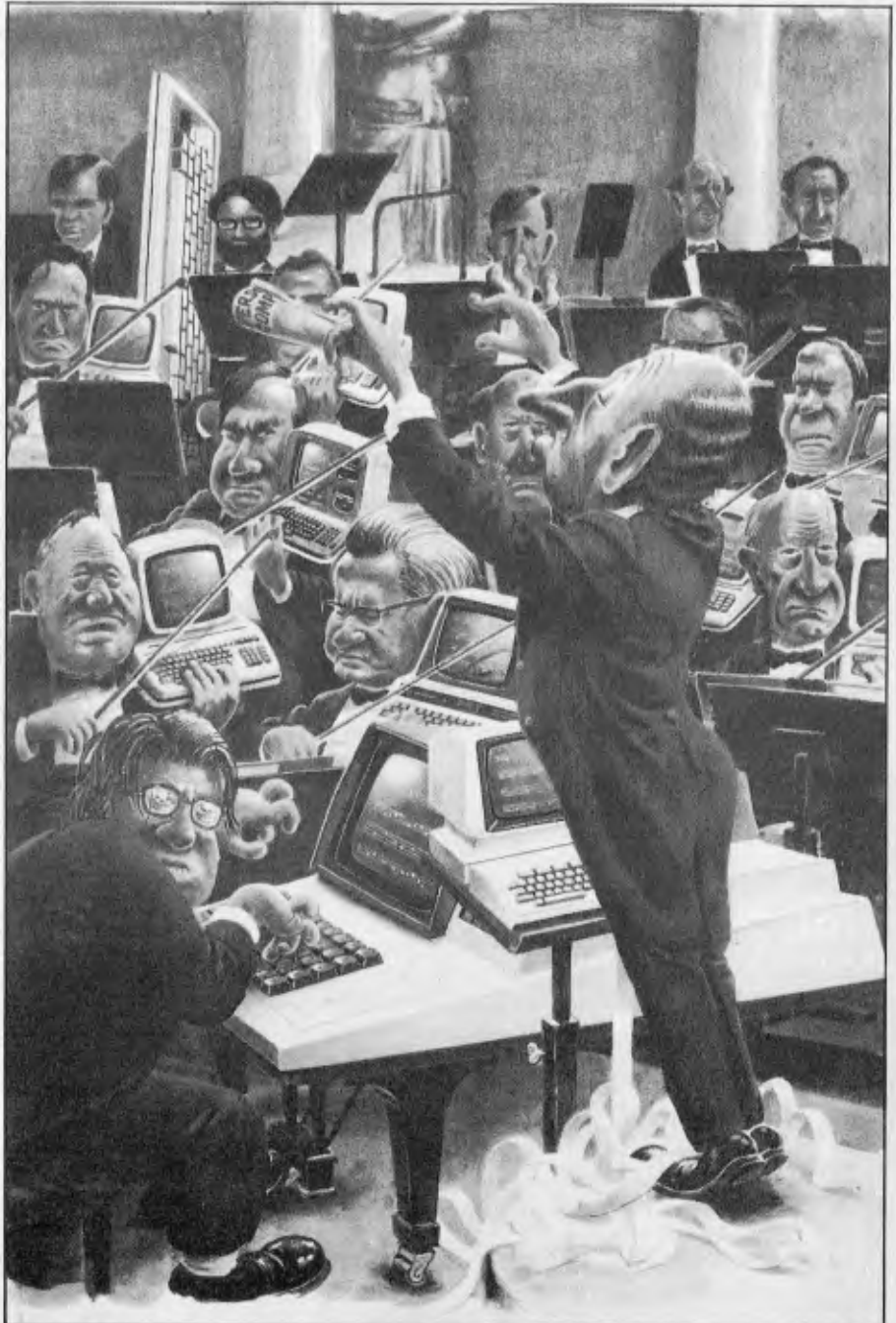
The system described in this article needs a BBC Model B Computer (with OS 1.2) and a digital to analogue (D to A) interface board. The D to A board consists of three chips (two DAC 08 type multiplying D to A converters and a 741 operational amplifier) and can be built by anyone with a little experience. Probably the most expensive part of the hardware is the ribbon cable and two speedblock connectors which plug into the computer. Power supplies needed are +9v and -9v which can be simply provided by PP3 type batteries. The output of the board (mono) is connected to the Phono input of a hi-fi amplifier. The circuit diagram is shown in Fig 1.

Software for the system consists of three programs which run one after the other, two of which are described this month. The third will be published next month. The first program, 'DIGISYN' (Listing 1) programs the function keys with some of the commands needed to operate the system and sets the PAGE to make room for the machine code. The other program 'SYN.ASM' (Listing 2) assembles the machine code to output the samples to the D to A board. When it has finished it puts the address of the start of the code into the variable M%. The final program 'SYN.BAS' provides the user interface doing the calculations needed to produce the sounds specified, and will appear in Part 3.

## How the system works

### Hardware:

The hardware has the function of converting numbers fed to the computer user and printer ports to an analogue signal. The two ports are both provided in the computer by a single 6522 Versatile Interface Adaptor chip. This device is very sophisticated, and provides extra functions apart from simple input/output. None of these special functions are used by the machine code which outputs samples via this chip. Once the ports are configured



# CIVILIZATION DISCOVERS XIDEX.



Like the discovery of fire, Xidex Precision Flexible Disks herald a new era for civilization.

They are the most advanced and durable disks technology has produced and far exceed all known Industry standards world-wide. Even the disk jacket is 33% thicker than the industry standard for greater protection from contaminants, and extended handling.

Xidex 5 1/4" and 8" disks carry a 10-year warranty. They are guaranteed 100% error-free and 100% precision made with a range to suit all Computer and Word Processing systems.

Phone Magmedia and discover Xidex yourself.



**magmedia**

Supplies and accessories for your computer

SYDNEY (02) 816 3222	MELBOURNE (03) 699 9688	BRISBANE (07) 229 1600
CANBERRA (062) 47 2322	PERTH (09) 328 3311	ADELAIDE (08) 223 6261
HOBART (002) 34 4522		

## MICROCOMPUTER SOFTWARE MADE SIMPLE!

Business software for microcomputers is Padmede's specialty.

For first time users and for those with no need of complex and confusing option oriented programs, Padmede systems are the answer.

Systems that are:—

- Easy to install
- Easy to operate
- Trouble free
- Fully supported.

and provide immediate results

At **\$390** per accounting module Padmede represents the best microcomputer software value in Australia today.

Available on all microcomputers that support CP/M and MS/DOS.

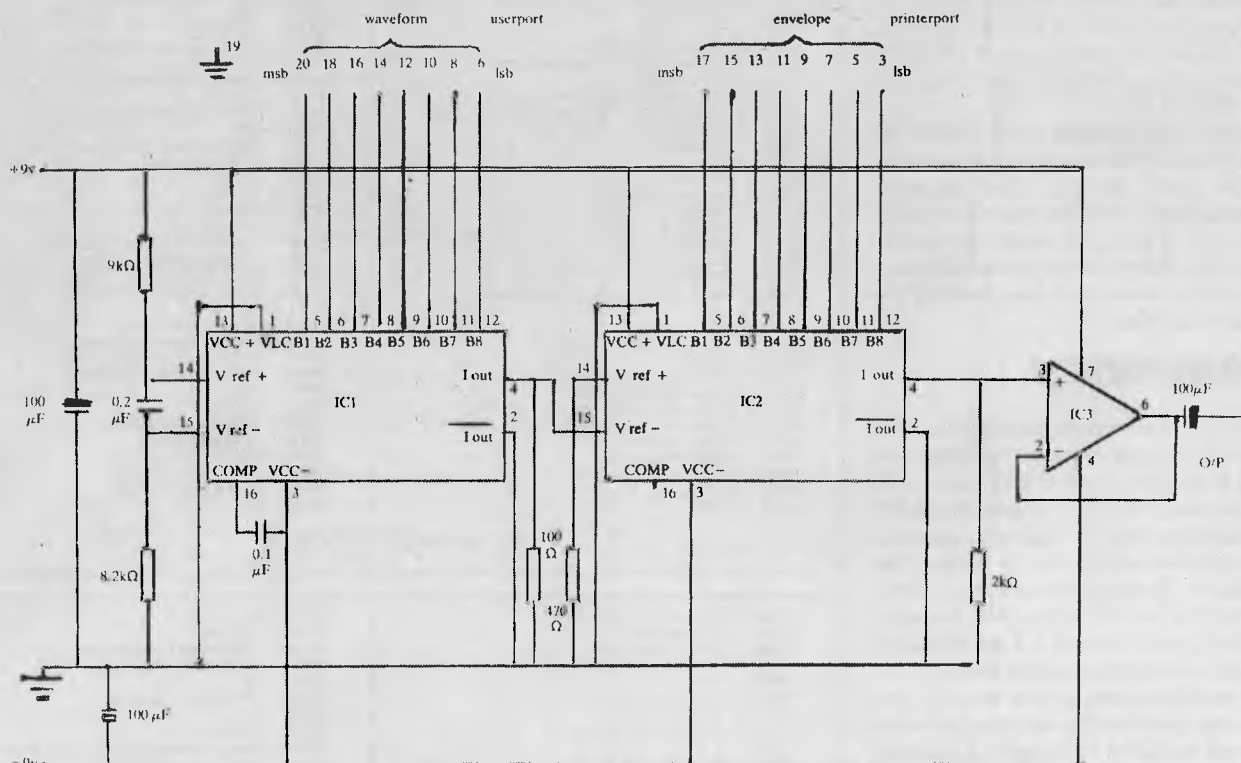
### Padmede Commercial Systems

26 Ridge Street, North Sydney, 2060.  
(02) 923-2899

TRAVERS SOFTWARE SERVICES  
262 High Street,  
Kew, VIC. 3101.  
(03) 862-2644

PROLOGIC PTY. LTD.  
38 Montpelier Retreat,  
Battery Point, TAS. 7000  
(002) 34-6499

CONSULTECH  
55 Colin Street,  
Perth, W.A. 6005  
(09) 322-1295



IC	Type
1	NE 5008 N
2	NE 5008 N standard DAC
3	7 4 1 08 type

Fig 1. Interface board circuit diagram

```

10 REM***** DIGISYN R.3 *****
20 REM (c) S.P.Tait 24th March 1983
300 code%=PAGE-512:MY=code%
100 #EY0 TABLE:IN
110 #EY1 HARMONIC:IN
120 #EY2 SEGMENT:IN
130 #EY3 NEXT:IN
140 #EY4 LAST:IN
150 #EY5 INSERT:IN
160 #EY6 DELETE:IN
170 #EY7 PITCH:IN
180 #EY8 DURATION:IN
190 #EY9 PLAY:IN
200 CLS
210 PRINT "      DIGISYN R.3"
220 PRINT " "
230 PRINT "Please wait for Program to load"
240 PRINT " "
250 PAGE=500+300
300 CHAIN"SYN.ASM"
320 END

```

Listing 1: DIGISYN

```

10 REM***** DIGISYN R.3 *****
20 REM (c) S.P.Tait 24th March 1983
500 code%=PAGE-512:MY=code%
1000 mem%=300
1010 soundoffset%=mem%
1020 tunePage%=1+mem%
1030 frequencyoffset%=2+mem%
1040 frequencyPage%=3+mem%
1050 envelopeoffset%=4+mem%
1055 envelopePage%=5+mem%
1060 controloffset%=6+mem%
1070 controlPage%=7+mem%
1080 pitchoffset%=8+mem%
1090 pitchfrac%=9+mem%
1100 duration%=10+mem%
1110 waveformoffset%=11+mem%
1120 waveformPage%=12+mem%
1130 waveformfrac%=13+mem%
1140 counter%=14+mem%
1150 pitchfracstore%=15+mem%
1160 pitchoffsetstore%=mem%+16
1200 vis%=&FE60
1210 Portenvelope%=vis%
1220 ddbx%=vis%+2

```

```

5420 STA:soundoffset%
5430 LDA:tunePage%
5440 CLC
5450 ADC:&439
5460 STA:tunePage%
5470 \main tune
5480 \repeatsound%
5490 \getinitial values
5500 LDY#0
5510 LDA:soundoffset%:Y
5520 CLC
5530 ADC:&439
5540 STA:frequencyPage%
5550 INY
5560 LDA:soundoffset%:Y
5570 CLC
5580 ADC:&439
5590 STA:envelopePage%
5600 INY
5610 LDA:soundoffset%:Y
5620 CLC
5630 ADC:&439
5640 STA:controlPage%
5650 INY

```

as simple outputs (lines 5220 to 5270 in 'SYN.ASM') the program can simply write numbers to the two ports as to any other memory locations in the computer.

Samples consisting of eight bit numbers or "bytes" remain latched (stored) at the ports until they are rewritten by the computer. These eight bits appear at the connectors for printer and user ports in the form of eight pins, each of which can assume a voltage of 0v or 5v. The two sets of eight signals from the two connectors, together with other signals which are not

used, pass down the ribbon cable to the interface board.

The two sets of signals arrive at their respective digital to analogue converters. These converters have the ability to multiply the quantity they are converting by a reference input. On the converter board a constant reference is used for the first converter and the output of this converter provides the reference for the second converter. In this way an analogue signal, which represents the value of the sample at the user port multiplied by the

number at the printer ports, is produced.

Since the analogue signals, with which the converters deal, are currents, and the final output needed is a voltage, a further component is needed in the circuit. A resistor is connected to the output of the second converter to produce a voltage signal. An operational amplifier buffers the voltage to provide the final output.

**Software:**

The subroutine to output samples to the D to A board is written in machine code. Samples must be output at the rate of 50000



per second and so Basic would be far too slow. There are just 20 microseconds for the software to produce the next sample; the 6502 microprocessor used in the BBC computer may typically execute 13 instructions in this time.

Although the sample rate is stated as 50kHz, not every parameter of the sound is changed every sample. The program outputs samples from the waveform table at the full 50kHz, or every 20 microseconds, but the frequency and envelope is changed after about six milliseconds or 256 waveform samples.

## Frequency

If the program were to output all 256 values in a waveform table one after the other, the period of the waveform would be 256 x 20 microseconds, giving a frequency of 195 Hz. To achieve lower or higher frequencies one possibility would be to change the sample rate. For a moderately high note, however, this would mean a time between samples of less than the 0.5 microsecond machine cycle of the microprocessor.

The method used in the system gets around the problem by skipping values in the waveform table for a higher frequency and by lingering on a value for more than one sample for a lower frequency. This happens quite naturally if the pointer used to point to the value in the waveform table has integer and fraction parts. The integer part points to the value in the waveform table and the fractional part is ignored except when the pointer is moved on. The amount to add to the pointer for a frequency F will be F/195.

This method does have an unfortunate side effect if the pointer falls between two values. The correct value will be neither one value nor the other but part way between the two. The software simply uses the integer part of the pointer and so always chooses the first of the two values. This means that the output will be slightly in error. The noise caused by this problem is sometimes noticeable when the waveforms have particularly strong harmonics.

In the program the pitch of the note is always stored as the pointer increment value mentioned. When the user specifies a pitch the value is converted and then stored. The pitch displayed is recalculated so this accurately represents the frequency that will be produced. The values in the frequency table are added to the increment value minus 128 to produce the final instantaneous increment.

## Machine code

Whatever tasks are going on while a note is sounding, the rate of sampling must not change. Every 40 machine cycles (20 microseconds) a sample must be output and the waveform pointer updated. This

```

1230 ddra%v1a%+3
1240 scr%v1a%+8B
1250 pcr%v1a%+8C
1260 portsound%v1a%+8F
1300 tables%#3000?tonePage%#0
1310 noofParams%#6
1320 lastsound%#256/noofParams%-1
5000 REM*****MAIN MACHINE CODE*****
5010 FORP%#0 TO 3 STEP 3
5020 P%code%
5200 C
5210 OPTopt%
5220 \set up VIA
5230 LDA#0
5240 STAPcr%
5250 LDA#8FF
5260 STAddr%
5270 STAddr%
5280 \mask interrupts; set binary
5290 SEI
5300 CLD
5310 \zero offsets etc.
5320 LDA#0
5330 STAfrequencyoffset%
5340 STAenvelopeoffset%
5350 STAcontroloffset%
5360 STAwaveformoffset%
5370 STAwaveformfrac%
5380 STAPortsound%
5390 STAPtenvelope%
5400 \set up a tune
5410 LDA#0
5660 LDA(soundoffset%).Y
5662 SEC
5664 SBC#80
5670 STAPitchfracstore%
5680 INY
5690 LDA(soundoffset%).Y
5710 SBC#0
5720 STAPitchoffsetstore%
5740 INY
5750 LDA(soundoffset%).Y
5760 STAduration%
5770 LDY#0
5780 LDY#0
5782 LDA#0
5784 STAcouter%
5790 LDA(frequencyoffset%).Y
5800 ADCpitchfracstore%
5810 STAPitchfrac%
5812 LDApitchoffsetstore%
5814 ADC#0
5816 STAPitchoffset%
5820 LDA(envelopeoffset%).Y
5830 STAPortenvelope%
5840 LDA(controloffset%).Y
5842 CLC
5844 ADC#439
5850 STAwaveformpage%
5860 \repeatnote%
5870 NOP
5880 J
5890 PROCmacrosample
5900 C

```

Listing 2: SYN.ASM

```

5910 OPTopt%
5920 DECcounter%
5930 BNErepeatnote%
5940 NOP
5950 J
5960 \repeatnote%
5970 J
5980 PROCmacrosample
5990 C
6000 OPTopt%
6010 DECcounter%
6020 NOP
6030 BNErepeatnote%
6040 NOP
6050 J
6060 PROCmacrosample
6070 C
6080 OPTopt%
6090 NOP
6100 NOP
6110 NOP
6120 \repeatbridge%
6130 NOP
6140 NOP
6150 J
6160 PROCmacrosample
6170 C
6180 OPTopt%
6190 LDAwaveformoffset%
6200 BPLrepeatbridge%
6210 NOP
6220 NOP
6230 NOP
6240 J
6250 PROCmacrosample
6260 C
6270 OPTopt%
6280 NOP
6290 NOP
6300 NOP
6310 \repeatbridge2%
6320 NOP
6330 NOP
6340 J
6350 PROCmacrosample
6360 C
6370 OPTopt%
6380 LDAwaveformoffset%
6390 BMIrepeatbridge2%
6395 INY
6400 LDA(controloffset%).Y
6410 CLC
6420 ADC#439
6430 STAwaveformpage%
6440 J
6450 PROCmacrosample
6460 C
6470 OPTopt%
6480 J
6490 PROCmacrosample
6500 C
6510 C
6520 OPTopt%
6530 LDA(envelopeoffset%).Y
6540 STAPtenvelope%
6550 J
6560 PROCmacrosample
6570 C
6580 OPTopt%
6590 LDA(frequencyoffset%).Y
6600 ADCpitchfracstore%
6610 STAPitchfrac%
6611 PHP
6612 J
6613 PROCmacrosample
6614 C
6615 OPTopt%
6616 PLP
6617 LDApitchoffsetstore%
6618 ADC#0
6619 STAPitchoffset%
6620 J
6630 PROCmacrosample
6640 C
6650 OPTopt%
6670 CPYduration%
6680 BEQcontinue%
6695 JMPrepeatnote%
6687 \continue%
6690 LDAsoundoffset%
6692 CLC
6694 ADC#noofParams%
6700 STAsoundoffset%
6710 CMP#lastsound%+1?noofParams%
6720 BEQdone%
6730 LDA(soundoffset%.X)
6740 CMP#0
6750 BEQdone%
6760 JMPrepeatnote%
6770 \done%
6775 CLI
6780 RTS
6790 J
6800 NEXTopt%
6805 CHAIN"SYN.BAS"
6810 END
10000 REM*****MACHINE CODE SUPPORT*****
10010 DEFPROCmacrosample
10020 C
10030 OPTopt%
10040 LDA(waveformoffset%.X)
10050 STAPortsound%
10060 LDAwaveformfrac%
10070 ADCpitchfrac%
10080 STAwaveformfrac%
10090 LDAwaveformoffset%
10100 ADCpitchoffset%
10110 STAwaveformoffset%
10120 J
10130 ENDPROC

```

would seem to be an ideal candidate for a subroutine except that calling a subroutine takes 10 of the 40 cycles available. The code to output and update must therefore be written 'in-line' wherever it crops up.

To simplify matters this group of instructions is defined as a 'macro'. This

means that a Basic procedure is written which will assemble this group of instructions whenever needed (lines 10000 to 10130 in SYN.ASM). After the sample is changed we have 13 cycles left before we must output the next sample.

# NEWCOMERS START HERE

*This is our unique quick-reference guide, reprinted every month to help our readers pick their way through the most important pieces of (necessary) jargon found in APC. While it's in no way totally comprehensive, we trust you'll find it a useful introduction. Happy microcomputing!*

Probably the first thing you noticed on picking up this magazine for the first time was the enormous amount of unintelligible-looking jargon. Well, in the words of *The Hitch-hikers' Guide to the Galaxy*, don't panic! Baffling as it may sound, the jargon does actually serve a useful purpose. It's a lot easier to say VDU, for example, than 'the screen on which the computer's output is displayed'. This guide is intended to help you find your way around some of the more common 'buzzwords' you're likely to come across in the pages of APC.

For those completely new to computing, let's start with the question: what is a microcomputer? We can think of a micro as a general-purpose device as opposed to a typewriter which can only be used for typing, a calculator to perform calculations, a filing-cabinet to file information and so on. A micro can do all those things and more.

If it is to be of any use, a general-purpose device needs some way of having a function assigned to it. We do this by giving the computer a set of logical instructions called a **program**. The general term for computer programs is **software**. Every other part of a microcomputer system is known as **hardware**. 'If you can touch it, it's hardware.'

Programs must be written in a form the micro can recognise and act on — this is achieved by writing the instructions in a code known as a **computer language**. There are literally hundreds of these different languages around, the most popular of these being **Basic**. Basic is an acronym of **Beginners' All-purpose Symbolic Instruction Code**. Although originally intended only as a simple introductory language, Basic is now a powerful and widely-used language in its own right.

Other languages you're likely to come across in APC include **Forth**, **Pascal**, **C** and **Comal**. These are known as **high-level languages** because they approach the sophistication of a human language. You'll also see references to the **low-level languages**, **assembly language** and **machine code**. We'll look at high and low-level languages in a moment.

The heart of a micro, the workhorse, is the **processor** or **Central Processing Unit (CPU)**. The processor usually consists of a single silicon chip. As with computer languages, there are a number of different types of processor around, the Z80, 6502 and 8088 being the three most common. The processor is nothing magical — it's just a bunch of electronic circuits. It's definitely not a 'brain'.

Being electronic, the processor's circuitry can be in one of two states: on or off. We represent these two states by **binary** (base two) notation, the two binary digits (known as '**bits**') being 0 and 1. It is possible to program computers in binary notation, otherwise known as **machine code** (or machine language) programming.

Machine code is called a low-level language because it operates at a level close to that 'understood' by the processor. (Languages like Basic are known as high-level languages because they are symbolic, operating at a level easily understood by people but not directly understood by the processor.)

Between high-level languages and machine code is a low-level language known as **assembly language** or, colloquially, **assembler**. This is a mnemonic code using symbols which the processor can quickly convert to machine code.

Since there is no binary equivalent of a comma or the letter 'a', for example, we need some sort of code to represent each character to be processed by the computer. In order to simplify communication between computers, a number of standard codes have been agreed on. The most widely used of these codes is the American Standard Code for Information Interchange, **ASCII**. This system assigns each character a decimal number which the processor can then convert to its binary equivalent.

There are two types of program to do this translation for us. The first of these is a **compiler** which translates our whole program permanently into machine code.

When we compile a program, the original high-level language version is called the **source code** while the compiled copy is called the **object code**. Compiled programs are fast to run but hard to edit. (If we want to change a compiled program, we either have to edit it in machine code (extremely difficult) or we have to go back to a copy of the source code.) For this reason there is a second translation program: an **interpreter**. An interpreter waits until we actually run (use) the program, then translates one line at a time into machine code — leaving the program in its original high-level language. This makes it slower to run than a compiled program, but easier to edit.

There are two strange-sounding Basic words you're likely to come across: **POKE** and **PEEK**. When you program in a high-level language, you are normally unable to choose which part of the machine's memory the processor will use to store things. This makes programming easier as you don't need to worry about memory locations, but slows down the program since the processor has to 'look up' addresses for you. Using the **POKE** command, however, you can 'POKE' a value directly into a desired memory address. 'POKE 10000,56', for example, puts the value 56 into memory location 10000. **PEEK** allows you to examine the content of a particular memory address. If you were to follow the above **POKE** with 'PEEK 10000', the computer would respond by displaying the value 56. (**POKEing** and **PEEKing** is normally done to increase program speed. It's a compromise between Basic and machine code.)

So far, we have a processor and a program. Since a computer needs somewhere to store programs and data, it needs some kind of memory. There are two types of memory known as **Read Only Memory (ROM)** and the badly-named **Random Access Memory (RAM)**. ROM is so-called because the processor can 'read' (get things out of) its contents, but is unable to 'write to' (put things in) it.

ROM is used to store **firmware**, which consists of software permanently available on the machine. An interpreter is a typical example of firmware (stick with it: it gets easier!).

RAM differs from ROM in two important ways. Firstly, you can write to it as well as read from it. This means that the processor can use it to store both the program it is running and data (information). The second important difference is that RAM needs a constant power-supply to retain its contents: as soon as you switch the computer off, you lose your program and data.

Memory is described in terms of the number of characters we can store in it. Each character is represented by an 8-bit binary number. 8 bits make one byte and 1024 bytes make one **kilobyte** or 1k. 32k, for example means that the computer can store about 32000 characters in its memory. If 1024 sounds like an odd number, remember that everything is based on the binary system, thus 1,2,4,8,16 ... 1024 being the nearest binary multiple to 1000.

There are numerous forms of **permanent** or **backup** storage, but by far the most common are the **floppy disk** and **cassette**.

Floppy disks or diskettes are circular pieces of thin plastic coated with a magnetic recording surface similar to that of tapes. The disk, which is enclosed in a protective card cover, is placed in a **disk drive**. Disk drives comprise a high-speed motor to rotate the disk and a read/write head to record and 'playback' programs and data.

The disk is divided into concentric rings called **tracks** (similar to the tracks on an LP) which are in turn divided into small blocks by spoke-like divisions called **sectors**.

There are two methods for dividing the disk into sectors. One method is called **hard-sectoring**, where holes punched in the disk mark the sectors, and the other is **soft-sectoring** where the sectors are marked magnetically. (The reason that disks from one machine

can't be read by a different make is that each manufacturer has its own way of dividing up the disk. Recently, however, manufacturers do seem to have begun to acknowledge that this situation can't go on forever, and they are working on making their disks compatible with each others.)

Since the computer needs some way of tracking the whereabouts of everything on the disk, we have a program called a **Disk Operating System**, more usually known simply as the **Operating System (DOS or OS)**. The operating system does all the 'house-keeping' of the disks, working out where to put things, letting the user know what is on the disk, copying from one disk to another and so on. As you might expect by now, there are lots of different operating systems available (each with its own advantages and disadvantages). The two most popular OSs are **CP/M (Control Program for Micros)** and **MS-DOS (MicroSoft Disk Operating System)**.

Floppy disks provide a reasonably fast and efficient form of secondary storage and are cost-effective for business machines. For home computers, however, the usual form of program and data storage is on ordinary cassette tape using a standard cassette recorder. This method of storage is slow and unreliable, but is very cheap and is adequate for games and the like.

Another type of disk you'll see referred to is the **hard disk**. This is an extremely efficient method of storing large amounts of programs and data. Hard disk capacity generally starts at around 10 Mbytes (10 million bytes) and rises to ... well, you name it. Besides offering a much greater capacity than floppies, hard disks are more reliable and considerably faster. They are, however, much more expensive than floppy drives.

Since computers need some way of communicating with the outside world, we need input and output devices. Input and output devices include all manner of things from hard disk units to light-pens, but the minimum requirement for most applications is a typewriter-style keyboard for input and a tv-like **Visual Display Unit** for output. The Visual Display Unit is variously referred to as a **VDU**, **Cathode Ray Tube (CRT)** and **monitor**.

The various component parts of a computer system (processor, keyboard, VDU, disk drives, etc) may all be built in to a single unit or they may be separate, connected by cables.

Take this paragraph slowly and it makes sense! When a computer communicates with an outside device, be it a printer or another computer, it does so in one of two forms — **parallel** or **serial**. **Parallel input/output (I/O)** requires a number of parallel wires. Each wire carries one bit, so with 8 wires we can transmit/receive information one byte at a time (8 bits = one byte, remember). **Serial I/O**, in contrast, uses a single wire to transmit a series of bits one at a time with extra bits to mark the beginning and end of each byte.

To enable different devices to communicate with each other in this way, standards have been agreed for different **interfaces**. An interface is simply a piece of circuitry used to connect two or more devices. The most common standard serial interface is the **RS232** (or **V24**) while the **Centronics** standard is popular for parallel interfaces.

When two computers want to communicate with each other over a distance, there are again two ways of doing it. Both methods use the public phone network. The simplest and cheapest method is to use a device known as an **acoustic coupler**. This simply plugs into your computer, and has a receptacle into which you place your telephone handset. However an acoustic coupler is slow and not exceptionally reliable.

A more sophisticated (and correspondingly more expensive) method is to use a **modem**. Unlike an acoustic coupler, a modem is wired into the telephone system and you should get permission for this from Telecom.

So, now you know!

## BANKS' STATEMENT



# SPREAD THE WORD

*Martin Banks speculates on the dangers of talking computers in education: will the parents opt out and let the children communicate in monotones?*

Whence upon a time, somewhere out there in the dim and distant future, a small child will come up to its parent-person (all sexist expressions and denominations having been expunged from the language) and say: 'Deah pah rent per san, ma eyeee havva ba nan aaaaH?'

To this, the parent-person will look askance at the small child and say 'eh?'

The time will have at last dawned when there is no longer any common ground for normal, verbal communications between what constitutes the old and *passé* (typified by said parent-persons the world over) and the new, dynamic and trendy. Small persons will be talking a strange kind of

monotonic, monosyllabic anguish (sorry, English) that us older mortals — trained as we were in verbal interaction with some-

---

**... there could be children who speak a fractured kind of English learned at the knee of a talking computer ...'**

---

one who spoke something approaching something understandable by every one else — will be unable to comprehend.

These small persons will have acquired this strange language not from school, where most of us picked up at least the more 'fundamental' aspects of our communicative capabilities, but from little plastic boxes of various sizes and colours. These boxes will by that time have become to these small persons surrogate parent-persons to whom they will look for all sorts of necessary and unnecessary help and advice.

The boxes, as if you didn't know, are all these 'talking' computers, machines which, through a variety of techniques, synthesise the human voice and speak words that can be understood.

Speech synthesis is, in my 'umble opinion, one of the best things to come out of the application of new technology. It is, however, also one of the worst. Now I know this may look like another classic case of Banksey facing in two directions at once, but I feel I can justify such Beeblebroxianism.


It is one of the greatest things (speech synthesis, I mean) because it can be used in a variety of extremely important ways that are of great benefit to personkind. For example, there are a large number of applications in boring things like industry where the capability of a computer control system to enunciate clearly and, perhaps more important, rapidly a problem, danger or similar area of concern to a human operative can prove to be no less than a life saver. There are applications where the use of speech as an instructional tool to humans can be beneficial. The list is endless.

One entry on this list will be education. Indeed, it has to be on the list for it has already become one of the most popular applications of speech technology. It is here that my Beeblebroxianism starts coming into play, for I really do have my doubts about some of this.

At face value, the use of speaking boxes for education has a great deal of merit. Because they are driven by computers, which are themselves morons, they can be instructed to take a child methodically

## DATATREE

### The ultimate in micro workstations



Designed for the home and office, DataTree will bring your sprawling microcomputer system back into a self-contained unit. With separate levels for the computer and drives, visual monitor and printer, and storage for disks, manuals and paper. A rear catch-tray keeps printouts off the floor, and castors and folding side flaps allow your system to be moved from room to room.

Also available is our lower priced PC Workstation specifically designed for the top selling desk-top systems.

Sturdy metal construction — no assembly required.

Contact the Data Decor dealer in your state, or



**DATA DECOR**

Waterloo Place, Richmond, Vic. 3121.

Telephone: (03) 429 9488

Melb.: (03) 419 8855, Stylecraft: (03) 67 6541.

NSW: (02) 221 1755. QLD: (07) 391 8033.

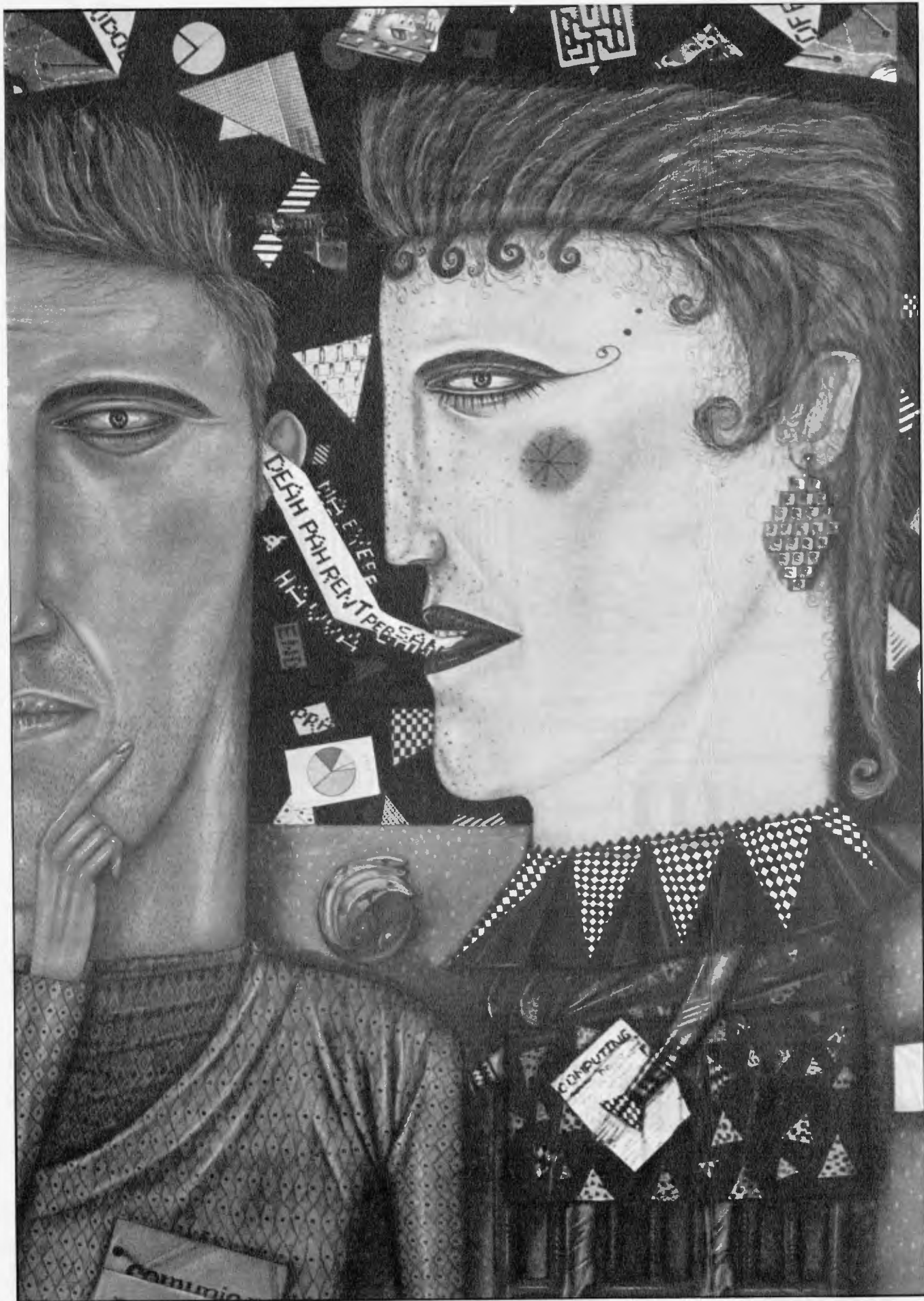
(07) 369 6899. W.A.: (09) 321 5540. A.C.T.:

(062) 48 5858. S.A.: (08) 332 5077. TAS.:

(002) 23 4841. N.T.: (089) 81 6455.

DD 727







microbee®

# DYNAMIC SOFTWARE

New for '84



VIPER



SWORD QUEST



BEE MONOPOLY



FROG HOP

### VIPER

A highly addictive game. You must eradicate the rabbits before they reach plague proportions but each time you catch a rabbit your tail grows.

Cassette \$14.95 . . . . . Diskette \$19.95

### BEE MONOPOLY

Now a full graphic version of the old family game of the same name. The entire board, players, Community Chest and Chance cards are displayed as required in this fast moving game. Full details of land ownership and finances. Superb graphics and sound effects. (Requires 32K).

Cassette \$14.95 . . . . . Diskette \$19.95

### SWORD QUEST

Just like the 'Dungeons and Dragons' series. Select your characters level of armour, weapons, strength and skill. Explore in search of treasure and the Great Sword, and battle with the dungeon's creatures.

Cassette \$14.95 . . . . . Diskette \$19.95

### FROG HOP

A most graphic variation of the popular arcade game. You must hop across a busy street (watch out for the trucks . . .) and across a crocodile infested stream before your frogs are safely home. Guaranteed to appeal to all ages.

Cassette \$14.95 . . . . . Diskette \$19.95

EDUCATIONAL  
UTILITY  
GAMES



**NOW AVAILABLE  
ON CASSETTE  
OR DISKETTE**

**MANY HAVE JOYSTICK  
CONTROL & COLOUR OPTIONS**

**ROBOT MAN '84**

Now one of the most popular games ever written for the **microbee** has been rewritten with new twists, a joystick and colour option.  
Cassette \$14.95 ..... Diskette \$19.95

**MICROSPACE INVADERS '84**

New update of one of the original **microbee** games. Now with full colour and joystick option. Sound and speed controls. Turn your **microbee** into a home arcade machine.  
Cassette \$14.95 ..... Diskette \$19.95

**SCRAMBLER**

A full colour version of the popular arcade game. You are the sole surviving defender of earth and you must destroy the aliens at all cost... very effective colour graphics (also suitable for non colour **microbees**).  
Cassette \$14.95 ..... Diskette \$19.95

**EYE OF MIN**

A graphic adventure game that will absorb you for hours. If you can solve this excellent mystery then you can proceed to the next saga 'Sabre of Sultan'. (Requires 32K).  
Cassette \$14.95 ..... Diskette \$19.95

**ELECTRONIC HOBBY MATE**

A real first. This clever program deals with resistors, capacitors, electronic terms and contains a wealth of 'live' information. A must for all experimenters. Your **microbee** will become a useful design aid.  
Cassette \$14.95 ..... Diskette \$19.95

**TUTORIAL: Touch Typing Tutor and Basic Tricks.**

The **microbee** is an ideal educational computer recommended by educational authorities across Australia. This package enables you to learn to touch type using the Pitman touch typing method. For those who want to master Microworld Basic there is a series of hints and suggested subroutines arranged in a most effective menu driven style.  
Cassette \$14.95 ..... Diskette \$19.95

**RING OF DOOM**

Your quest is to search for the Dark Lord of Saurean's Ring of Power. This action adventure game will operate in a 16k **microbee**  
Cassette \$14.95 ..... Diskette \$19.95

**SKETCH PAD**

Use the high resolution graphics in your **microbee** with this most effective drawing aid. Ideal as an introduction to Cad techniques and you can create complex shapes with a little practice. You can also 'trace' from images taped onto the screen to generate faithful reproductions. Have you ever wondered how programmers create the graphics for their software?  
Cassette \$14.95 ..... Diskette \$19.95

**CHOPPER PILOT**

Fly your helicopter through a small city and a series of mazes without crashing into the scenery. Has a training mode as well as the real thing for those who want to practice first. Now with joystick option.  
Cassette \$19.95 ..... Diskette \$19.95

**GENIUS AND INSANITY**

Yes, those insanity blocks are back! The game has several levels of difficulty but really serves as a vivid demonstration of the **microbee** colour graphic capability.  
Cassette \$14.95 ..... Diskette \$19.95

**CHESS/CHESS TUTOR**

For those who enjoy a serious graphics game it is hard to beat Chess. If your game needs improving try the tutorial first. You can select from 6 levels of play and these can be altered during the game. This program features very good graphics and, particularly at the higher play levels, becomes a most worthy opponent. (32k **microbee** recommended).  
Cassette \$14.95 ..... Diskette \$19.95

**TARGET/TREK**

These are two of the 'classics' of computer games and will still impress with the use of characters to emulate graphics (remember they only had teletypes on the 'old' days around 1976). The challenge of Trek will attract even the most ardent 'anti games freaks'.  
Cassette \$14.95 ..... Diskette \$19.95

**LEARNING CAN 'BEE' FUN**

Now the full series by John Grimley in one value package containing 6 cassette tapes (or 1 diskette). Utilizing well known games such as 'Donkey Kong', 'Frog Hop' and 'Rescue' you can enjoy the game and learn at the same time.  
Cassette Library Pack ..... \$49.95  
Diskette ..... \$39.95

**WORD ADVENTURE**

A powerful and gripping educational program. Follow the trails by solving problems involving homonyms, synonyms and antonyms. Various creatures will meet you along the trails and give you clues to the words you seek. If you make too many errors you will certainly have to face the spelling serpent who will test your fate. Once you master the first game you will learn a password which will enable you to load the next secret program. (Requires 32K).  
Cassette \$14.95 ..... Diskette \$19.95

**'BEE' CASINO**

Another value package with a collection of all the popular gambling/casino games written for the **microbee**. No need to take the wife to Las Vegas or West Point! This makes ideal party material for after the kids go to bed.  
Cassette Library Pack ..... \$39.95  
Diskette ..... \$39.95

**BEE SCIENTIST: Physics and Chemistry Laboratory.**

A collection of practical experiments and courses on physics and chemistry. You can study chemical equations, valency, Keplers laws, Coulombs Laws and Milliken's experiment. A valuable teaching aid now used in schools.  
Cassette Library Pack ..... \$49.95  
Diskette ..... \$39.95

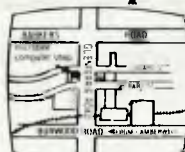
**FREE DELIVERY  
OF SOFTWARE  
for Direct Orders**

Ask your nearest **microbee** dealer for a catalogue of over 100 **microbee** programs now available on cassette, diskette and ROM covering applications in education, games and utility functions.

**microbee computer shops**



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



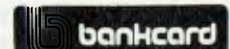
729 Glenferrie Rd,  
Hawthorn 3122.  
Phone (03) 818 2244



Cooleman Court,  
Weston A.C.T. 2611.  
Phone (062) 88 6384



141 Stirling Highway,  
Nedlands, Perth.  
Phone (09) 386 8250



welcome here  
DIRECT ORDERS  
PHONE (02) 487 2711

**APPLIED  
TECHNOLOGY  
RETAIL  
PTY LTD**



**microbee**

**Authorised Dealers:**

NSW: Jaycar, (inc. Electronic Agencies)  
117 York Street, Sydney.  
115 Parramatta Road, Concord.  
121 Forest Road, Hurstville.  
Cnr Carlingford and Pennant Hills  
Road, Carlingford.  
Compu-K, 7 Casino Street, Lismore.  
Comput/Ed, 8 Park Arcade,  
Park Avenue, Coffs Harbour.

ACT: Computech, Belconnen Churches  
Centre, Benjamin Way, Belconnen.  
VIC: Computerland South Melbourne,  
37 Albert Road, Melbourne.  
S.A.: Key Computers,  
1061 South Road, Edwardstown.  
77 Grenfell Street, Adelaide.  
W.A.: Altronics, 105 Stirling Street,  
Perth.

QLD: Software 80, 105 Milton Road,  
Milton.  
Electrographic Office Systems,  
25 Grafton Street, Cairns.  
Town and Country Computers,  
CTL Centre, Anne Street, Aitkenvale,  
Townsville.  
TAS: Central Data, 14A Goodwin  
Street, Launceston.



# Tandy Presents the New Standard in Small Business Computers



With 1 Disk Drive  
**4499<sup>00</sup>**  
26-4004

## The All-New TRS-80<sup>®</sup> Model 12

With  
2 Disk  
Drives

**5699<sup>00</sup>**  
26-4005

**A Multi-Purpose Computer.** Our new TRS-80 Model 12 is a remarkable business system that offers a unique combination of power, versatility and easy expandability. It's fully compatible with our popular Model II software, so it's ready right now to handle accounting, word processing and financial planning, for program development, even for communications with mainframe computers.

**Professional Features You Demand.** Features like one or two built-in 1.25-megabyte floppy disk drives. An 80K memory. A high-resolution 20.5cm green phosphor video screen that displays 24 lines of 80 characters. A detachable, low-profile 82-key

keyboard with numeric datapad and eight special-purpose keys to recall program-designated functions.

**Easy Expansion.** Expand at anytime to the power and capability you need to meet your business requirements. Easily expandable — add a printer, plotter, and more. Or team up our single-disk Model 12 with our 8-megabyte Hard Disk Drive (26-4150, \$5999) for a powerful — yet extremely affordable — system for large inventory control needs, accounting and data base management.

**Come In and See the New Model 12.** Get a personal demonstration of our TRS-80 Model 12 computer at our Tandy Computer Centres, as well as selected stores and participating dealers nationwide. Ask about our training and service plans, too.

**Tandy** **COMPUTER CENTRE**  
TANDY AUSTRALIA LIMITED INC. IN N.S.W. **The biggest name in little computers™**

### YOUR NEAREST TANDY COMPUTER CENTRE IS:

NSW: •BANKSTOWN Cnr Brandon Ave. & Chapel Rd ..... (02) 707 4611  
•CROWS NEST 1st Floor, 12-14 Falcon St ..... (02) 438 2900  
•RYDALMERE 267 Victoria Road ..... (02) 638 7055  
•SYDNEY CITY 81 York Street ..... (02) 29 3958  
•NEWCASTLE Shop 17, The Hunter Ctr, 12 Perkins St ..... (049) 26 3073  
ACT: •CANNBERRA Shop 1&2, Gnd Fl, Sth Tower, Caga Ctr, 38 Akuna St. (062) 47 0322  
QLD: •BRISBANE 301 Wickham St, Fortitude Valley ..... (07) 52 9000

VIC: •MELBOURNE CAMBERWELL 662 Burke Rd ..... (03) 82 8293  
•MELBOURNE CITY 284 Bourke St ..... (03) 683 3093  
•MOORABBIN 'Moorabbin Link',  
Cnr Nepean Hwy & Redholme St ..... (03) 553 3299  
SA: •ADELAIDE 240 Morphett St ..... (08) 51 9020  
WA: •PERTH 208 Beaufort St ..... (09) 326 4122  
•SUBIACO 169 Rokeby Rd ..... (09) 382 1900



through its learning paces in a way (subject to programming, of course) that can be fun, inspirational and rewarding. Dammit, the kids seem to like being taught by these things.

This is all well and good, up to a point. My problem is that I wonder just where that point ought to be. The reason I feel that there is a problem at all stems from the fact that if these boxes are so popular with the kids, and if they do, as they seem to do, a reasonable job in educating children in the fundamentals of arithmetic, grammar, sentence construction and the like, there will be a strong temptation for parent-persons to opt out. This will be either from choice (more time to spend doing the washing, mending the car, doing the pools, going down the pub, etc) or from rejection by the kids because the parent-persons were more boring than the machines, anyway.

Whatever the reason, such a trend is both sad and potentially harmful. It is noticeable, for example, how most parents will at some time refer to the way their children have changed since going to school. The 'pernicious' influence of teachers and other children markedly alters the horizons and perspectives of their 'one-and-only', and often that alteration is permanent.

Exactly the same effects can be achieved with more automated teaching environ-

ments, and the effect can be that much greater because the 'environment' can be brought home and set up in a bedroom or living room. These teaching machines carry with them an onerous responsibility on both the parents who buy them and (hopefully) oversee their utilisation, and on the manufacturers and programmers who constructed the machines in the first place.

The responsibility on the parents is that they do not succumb to the temptations that such teaching machines present. It would be very easy indeed to buy a specialised teaching system or concentrate of education software for a general purpose home computer, and assume that the best was being done by the children.

It would become an easy matter to restrict the overseeing of children to the level of ensuring that they were not wasting time playing Space Invaders, and taking no further interest beyond that point. It would be a very tempting prospect; many parents are already happy enough to opt out of a fair proportion of their responsibilities given half a chance. Human nature is, after all, human nature.

Now, it is difficult for most people to query the educational content of the material that children are thus given. At the simplest levels of education ( $2+2=4$ , etc) there often seem to be as many theories on how best to present the

material as there are educationalists working in the field. At the higher levels, many parents probably wouldn't know the answers any better than the kids, so could not value-judge the efficacy of the education.

This holds true for all forms of education, be it in school with human-type teachers or at home with a computer or education machine. With some of the education machines, however, there are areas that could and should be overseen by the parents, especially where the machines use pseudo-human techniques of interaction.

As such machines go at present, extremely clever though they are to the completed adult, they fall far short of what we should be wanting for our children. The voices that emanate from these boxes are, to date, serious emasculations of what passes for the English language.

Technology is going to be used increasingly to create ever-more powerful and comprehensive educational systems. This in turn is going to give more parent-persons the opportunity to opt out of the responsibility (to use an old-fashioned word) of participating in their off-spring's education. If such opting out ever proves at some future date to have been a great mistake its discovery, as happens with all the best mistakes, will be too late. **END**



## UNI CO-OP QUE BOOK SALE

### PUBLISHER'S BLUNDER!

Best seller books available at cost price.

A warehouse contract problem enables us to make a never to be repeated offer: Top quality Que Corp publisher's titles at cost price  
**ONLY WHILE STOCKS LAST**

Only available from UNI CO-OP bookshop branches\*

510 Apple II Word Processing .....	was \$39.95 now \$14.99	516 Sinclair ZX81 Users Guide Vol 1	
511 CPM Computer Software Catalogue...	was \$25.95 now \$15.99	(best seller) .....	was \$19.95 now \$12.99
512 CPM Word Processing .....	was \$33.50 now \$13.59	517 Sinclair ZX81 Users Guide Vol 2	
513 IBM's Personal Computer		(best seller) .....	was \$25.95 now \$15.99
(best seller) .....	was \$29.95 now \$19.99	518 Supercalc Super Models for Business	
514 IBM PC Expansion and Software		(best seller) .....	was \$29.95 now \$19.99
Guide .....	was \$33.95 now \$19.99	519 Visicalc Models for Business .....	was \$29.95 now \$19.99
515 Osborne Personal Computer Book		520 CPM Software Finder .....	was \$29.95 now \$19.99
(best seller) .....	was \$29.95 now \$15.99		

### \* INSPECT THESE AT YOUR CLOSEST BRANCH

- TECHNICAL BRANCH 831 GEORGE STREET, SYDNEY PHONE: 211 0561 ● 80 BAY STREET, BROADWAY, N.S.W. PHONE: 212 2211 ● NSW INSTITUTE OF TECHNOLOGY ● NSW UNIVERSITY ● SYDNEY UNIVERSITY ● ANU, CANBERRA
- WOLLONGONG UNI ● CANBERRA CAE. ● MACQUARIE UNI, RYDE ● ARMIDALE UNI (U.N.E.) ● NEWCASTLE TECH.
- NEWCASTLE UNI ● RIVERINA CAE. (Wagga Wagga) ● MITCHELL CAE. (Bathurst) ● GRIFFITH UNI (Old) ● GIPPSLAND CAE (Vic)

### AVAILABLE BY MAIL ORDER!

Please send me the following books by return mail

..... \$ .....

Less 5% discount if co-op member \$ .....

**Add postage:** \$2.00 N.S.W. \$2.50 elsewhere \$ .....

Cheque/Postal Order enclosed \$ .....

or Bankcard No ..... Expiry .....

Send to:

UNI Co-op Mail-Order P.O. Box 54 BROADWAY, NSW 2007

Place me on your free mailing list for 12 months

NAME .....

ADDRESS .....

STATE .....

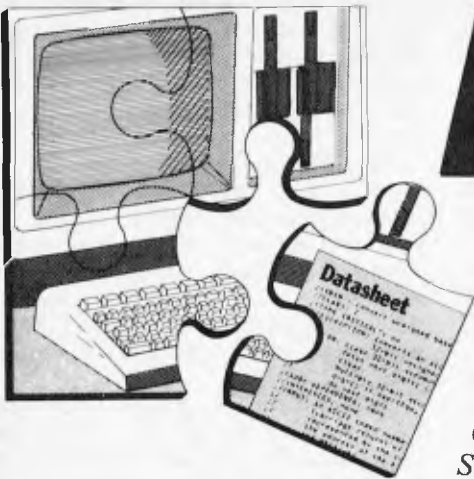
P/CODE .....

SIGNATURE .....

CO-OP MEMBERSHIP NO. ....

AVAILABLE MARCH .....

APC 2/84



# APC SUBSET

Alan Tootill and David Barrow present more useful assembler language subroutines. This is your chance to build a library of general-purpose routines, documented to the standard we have developed together in this series. You can contribute a Datasheet, improve or develop one already printed or translate the implementation of a good idea from one processor to another. APC will pay for those contributions that achieve Datasheet status. Contributions (for any of the popular processors) should be sent to SUB SET, 77 Glenhuntly Road, Elwood, Vic 3184.

## 6502 user stack

Inspired by the 6809 instruction set, Martin Ford has submitted four Datasheets to implement some of its most useful features on the 6502 processor. We give

here two of them, PSH16 and PLL16, which provide for a user stack at a 16-bit address anywhere in memory to hold any combination of eight registers, as determined by the bit setting of a byte embedded in the code, immediately following the jump to the subroutines to

push and pull the registers. The registers that can be saved on the stack are PC, P, A, X, Y and six contiguous zero page locations (taken as three two-byte registers, M5-M4, M3-M2 and M1-M0).

The program counter, if pushed onto the user stack, has been incremented to

point to the parameter byte (instead of the last byte of the jump instruction). The PC then being pulled from the user stack causes program execution from the stacked address + 1 on return from PLL16. This is a facility that needs to be used with some care.

### DATASHEET

```

// PSH16 = Push to 16-bit addressed user stack.
// CLASS: 1
// TIME CRITICAL? No.
// DESCRIPTION: Pushes registers and zero page onto a 16-bit
// user stack according to a parameter byte in
// the code following the JSR instruction:
// Bit set Register pushed
// 0 MO,M1
// 1 M2,M3
// 2 M4,M5
// 3 Y
// 4 X
// 5 ACC
// 6 P
// 7 PC
// ACTION: All the registers including the zero page are pushed
// onto the 6502 hardware stack. Get byte at return address
// Repeat:
// Shift parameter byte left.
// If carry set get byte off stack and put onto user
// stack. Point to next space on user stack. If it was
// a 2-byte register do the same for the next byte on
// the stack. If 2-byte register point to the next
// 8 times.
// Put updated address of user stack into pointer (ZP).
// Restore all registers and return to the incremented
// return address.
// SUBR DEPENDENCE: None.
// INTERFACES: RAM used for user stack.
// INPUT: 2 zero page bytes, ZP-ZP+1, point to the user stack + 1
// and a pseudo-opcode at the return address gives the
// registers to be pushed as described above.
// OUTPUT: ZP,ZP+1 point to the last byte saved on the stack.
// REGS USED: None.
// STACK USE: 10
// LENGTH: 107
// PROCESSOR: 6502

PSH16 PHP ;put all 08
PHA ;registers 48
TXA ;including 8A
PHA ;MO = M5 48
TYA ;onto 98
PHA ;6502 48
TSX ;stack. 8A
LDY #506 ;count in Y. A0 06
LDA MO-1,Y ;get zero page locations B9 Z2 00
PHA ;and save 48
DEY ;all six 88
BNE PUSH1 ;on the stack. 00 F9
INC $105,X ;return address = FE 05 01
LDA $105,X ;return address + 1, B0 05 01
STA MO ;which is 85 Z2
BNE PUSH2 ;placed in 00 03
INC $106,X ;MO,M1. FE 06 01
LDA $106,X ; 80 06 01
STA M1 ; 85 Z2
LDA #587 ;register size code A9 87
STA M2 ;byte to M2. 85 Z2
LDA (MO),Y ;get parameter byte B1 Z2

```

```

STA M3 ;in M3. 85 Z2
LDA #508 ;byte bit count A9 08
STA M4 ;to M4. 85 Z2
DEY ;Y = 255. (ZP),Y points to 88
DEC ZP+1 ;next space on user stack. C6 Z2
ROL M3 ;see if parameter 26 Z2
BCC PUSH4 ;byte bit set. 90 10
LDA $106,X ;if so, put first 80 06 01
STA (ZP),Y ;byte on user stack. 91 Z2
DEY ;point to next space. 88
BIT M2 ;is it a 2-byte register? 24 Z2
BPL PUSH4 ;if so, put next 10 06
LDA $105,X ;byte off 6502 B0 05 01
STA (ZP),Y ;stack to user 91 Z2
DEY ;stack. 88
PUSH4: DEX ; CA
ROL M2 ; 26 Z2
BCC PUSH5 ;for a 2-byte 90 01
DEX ;register X = X-2. CA
PUSH5: DEC M4 ;do eight C6 Z2
BNE PUSH3 ;times. 00 E2
SEC ;calculate new 38
TYA ;user stack pointer 98
ADC ZP ;according to number 65 Z2
STA ZP ;of bytes pushed 85 Z2
BCC PUSH6 ;and return it 90 02
INC ZP+1 ;to ZP,ZP+1. E6 Z2
PUSH6: LDY #0 ;replace all A0 00
PUSH7: STA MO,Y ;zero page to 99 Z2 00
INY ; ; C8
CPY #506 ; ; C0 06
BNE PUSH7 ; ; 00 F7
PLA ;replace registers. 68
TAY ; ; A8
PLA ; ; 68
TAX ; ; AA
PLA ; ; 68
PLP ; ; 28
RTS ;and return. 60

```

### DATASHEET

```

// PLL16 = Pull from 16-bit addressed user stack.
// CLASS: 1
// TIME CRITICAL? No.
// DESCRIPTION: Pulls registers and zero page off a user stack
// according to a parameter byte in the code
// following the JSR instruction:
// Bit set Register pulled
// 0 MO,M1
// 1 M2,M3
// 2 M4,M5
// 3 Y
// 4 X
// 5 ACC
// 6 P
// 7 PC

```





# G-PASCAL

## for Commodore 64

Fully supports the Commodore 64's graphic and sound effects capabilities in a self-contained, easy-to-use programming package. Available on disk or cassette for \$79.50. Disk version includes free demonstration program and arcade game, written in G-Pascal.

Other G-Pascal programs available on disk or cassette (source code supplied):

- Sound Editor  
– allows you to experiment with the SID chip! – \$25
- Sprite Editor  
– makes editing of sprite shapes easy! – \$25
- Adventure Game  
– see how to write an adventure in Pascal! – \$29.50

See your dealer today, or send a cheque, money order or Bankcard/Mastercard number to:

Gambit Games

P.O. Box 124, Ivanhoe, Victoria 3079  
Phone: (03) 497 1283.



## SOFTWARE RENTAL

NOW YOU CAN RENT THE MOST POPULAR GAMES — EDUCATIONAL — BUSINESS SOFTWARE FROM:



At only 20%-25% of the current retail price + Postage & Packing

- All software in original manufacturers packaging.
  - No minimum quantity.
  - Rentals are for 7 days (plus 3 days grace for return shipping).
- We will endeavour to obtain any software requested.

To immediately order, or for more information ring:

**S. D. COMPUTER RESEARCH**  
(02) 328-6293

```

LD DE,16DH ;by 365: 11 60 01
DYYRS: RRA ;shift out to Cy next place bit 1F
JR NC,NXTPLC ;of years and if set 30 01
ADD HL,DE ;add 365 * place. 19
NXTPLC: FX DE,HL ;shift 365 up one bit to EB
ADD HL,HL ;correct next place for 29
EX DE,HL ;next place of year. FB
OR A ;repeat for each place set bit. B7
JR NZ,DYYRS ; 20 16
LD B,H ;total elapsed days into 44
LD C,L ;BC for exit. 40
POP DE ;restore registers 01
POP HL ; E9
RET ;and return. C1
;table of month lengths
MONTAB: DEFB 1FH,00H ;Jan=31, Feb fixed by routines 1F 00
DEFB 1FH,1EH ;Mar=31, Apr=30 1F 1E
DEFB 1FH,1EH ;May=31, Jun=30 1F 1F
DEFB 1FH,1FH ;Jul=31, Aug=31 1F 1F
DEFB 1EH,1FH ;Sep=30, Oct=31 1F 1F
DEFB 1EH,1FH ;Nov=30, Dec=31 1E 1F
    
```

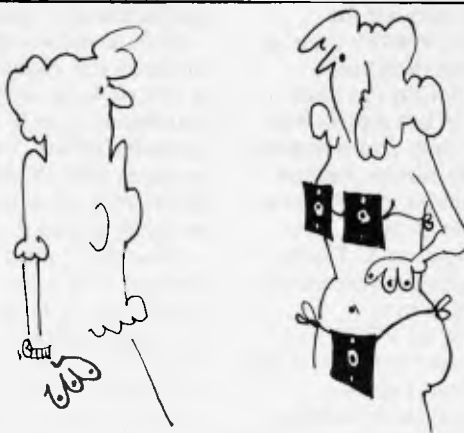
## DATASHEET

```

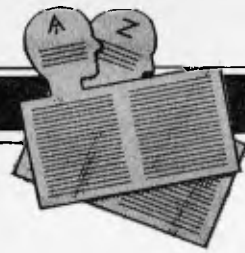
; CVDATE = Convert days since 01/01/01 to day/month/year
; CLASS: 2 (directly addresses table in RAM)
; TIME CRITICAL?: No
; DESCRIPTION: Converts a date expressed as the number of
; elapsed days since day 1 to a day/month/year
; format.
; ACTION: Repeatedly subtracts 365 until the subtraction
; won't go to determine years. Fixes February in
; month-length table to 28 or 29 if leap year.
; Subtracts month lengths in turn from table until
; subtraction won't go to determine months. Remainder
; gives days.
; SUBR DEPENDENCE: None
; INTERFACES: Month-length table (MONTAB) in RAM.
; INPUT: BC = no. of days since (and including) 1st
; January year 1.
; OUTPUT: A = day, B = month, C = year.
; REGS USED: AF BC
; STACK USE: 6
; LENGTH: 50 (+ 12 for month-length table)
; TIME STATES: Average approximately 310 + 35 * years
; PROCESSOR: Z80
    
```

```

CVDATE: PUSH HL ;save registers. E5
PUSH DE ; D5
LD H,B ;elapsed days into HL for 60
LD L,C ;arithmetic. Change count from 69
DEC HL ;'from 1' to 'from 0'. 2B
LD DE,16DH ;divisor of days-in-a-year. 11 60 01
LD BC,+0 ;clear month/year regs. 01 00 0C
LD A,8BH ;clear year Carry-setter. 3E 8B
DYYRS: INC C ;repeatedly subtract divisor, 0C
RRC A ;with carry every leap year, 01
SBC HL,DE ;counting years inc until ED 52
JR NC,DYYRS ;not a full year left. 30 FA
PUSH BC ;then save year count, get last C5
RLCA ;(leap year?) carry and get back 07
ADC HL,DE ;positive remainder. ED 5A
LD DE,MONTAB+1 ;index month-length table at Feb. 11 XX XX
RRC A ;get (leap year?) carry again 0F
LD A,B ;and make Feb. 28 or 29 7B
ADC A,1CH ;if a leap year. CE 1C
LD (DE),A ; 12
DEC DE ;then index table start. Clear 1B
XOR A ;month count (A) and Carry. AF
DIMNTH: INC A ;loop, subtracting tabled month 3C
EX DE,HL ;lengths and counting months EB
LD C,(HL) ;until not a full month left. 4E
INC HL ; 23
EX DE,HL ; EB 42
SBC HL,BC ; 30 17
JR NC,DIMNTH ;
ADD HL,BC ;get positive remainder (days) 09
POP BC ;in HL. Restore years in C. C1
LD B,A ;move months to B, and days from 47
LD A,L ;L to A, correcting for initial 70
INC A ;DEC HL which eliminated tests 3C
POP DE ;for zero result in subtractions. 01
POP HL ;restore registers E1
RET ;and return. C9
;table of month lengths (MONTAB) same as CVDATE.
    
```



*'It's the only way I can get him interested these days.'*



# 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 few months, these changes will be published and the next complete listing will appear in the May 1984 issue of APC.*

## NEW SOUTH WALES

### SORCERER USERS GROUP

At the October meeting, a successful on-line trial demonstration was given of the group's new Remote Bulletin Board System. Some hardware is still on order, and the demonstration used some borrowed equipment. However, opening day isn't far away.

Another development has been the merger of the group's program library with that of "Sorcerer Computers Users of Australia" in Melbourne. The joint library is now being run from Sydney, and members of both groups may place orders by writing to SUG, Box E162, St James 2000.

The monthly meeting is held on the third Friday, 8.00pm, at the Greenwich Community Hall, Greenwich Road, Greenwich N.S.W.

### MEGS

MEGS has moved from its original meetings at the WIA Hall at St Leonards following sale of the building. MEGS now meets in the hall at the rear of St Andrew's Presbyterian Church, 37 Anderson Street, Chatswood, on the third Monday of each month commencing at 7pm. All old members, and prospective members are encouraged to come along. Club membership fees have been held at the 1977 level of \$15 per year.

MEGS also has a new mailing address at P.O. Box 1309, Chatswood NSW 2067.

Further information may be obtained by phoning the Publicity Officer Jim Hooke on 419 2568 or the President

John Whitlock on 638 1142 between 7 and 9pm, or by coming along to any meeting, preferably the next!

### FORTH GROUP

The Sydney Forth Group meets monthly on the second Friday of each month at 7pm at Room L616 of the Morren Brown Building (near Library), University of NSW. Subscriptions are \$20pa (\$10 for students). For more details contact Peter Tregagle, 10 Binda Avenue, Yowie Bay 2228.

### OSBORNE DIFFICULTIES

The 'phone number published in the December issue for the Osborne Users Group should not be used. Ian MacCulloch has left that number.

### ILLAWARRA MICROBEE COMPUTER CLUB

The group meets on the 4th Monday of the month (from February to November) at the Wollongong Institute of Education, Norfields Avenue, Gwynneville at 7.30pm.

For further details contact Ronald Reed on (042) 71 2384 or write to the group C/- 49 Beatus Street, Unanderra 2526.

## QUEENSLAND

### TI BRISBANE USER GROUP

The group has asked that we publish amended details as follows:

TIBUG,  
P.O. Box 57,  
Aspley, 4034

The co-ordinator is Cheryl Bailey (263 4989) and meetings are held on the last Friday in every month except December at 'Com-

puters and Peripherals', 31 Kate Street, Kedron.

### PC1500/PC2 CLUB

The Brisbane PC1500/PC2 Club meets at 7.30pm every third Thursday of the month at Kelvin Grove BCAE Room E/315. All are welcome. 'Phone Chris on (07) 395 1952 A.H. for more details.

## VICTORIA

### MC-10 6803 USERS

A new computer user group has been formed by Frank Ræes for MC-10 6803 users. A special invitation is given to all past and present Dream 6800 users to join. If you wish to join and share ideas with others throughout Australia and NZ via medium of correspondence and a news letter then send SSAE for further details to Frank Ræes, 27 King Street, Boort, Victoria.

### MELBOURNE PC USER GROUP

All users of IBM and compatible personal computers interested in attending MELB-PC meetings should contact Christopher Leptos, C/- Pannell Kerr Forster, 500 Bourke Street, Melbourne, Victoria 3000. Telephone: B.H. (03) 605 2222.

Late in November '83 the group had its first meeting and elected an interim committee. At our next meeting (February 8th) we will adopt a constitution and formally establish the group.

### MELBOURNE PEACH USERS GROUP (MPUG)

A special interest group of MICOM for the Hitachi Peach. The group meets at

8pm on the first Friday of each month at the Templestowe Technical College, Cypress Avenue, Templestowe. For enquiries write to MPUG, P.O. Box 191, Rosanna 3084 or phone Branko on (03) 434 2541 (decent hours).

### HITACHI PEACH PUBLIC DOMAIN (HPPD) —

formerly known as Peach Software Exchange (PCX) has moved to Victoria. For details write to P.O. Box 191, Rosanna 3084 or phone Branko on (03) 434 2541 (decent hours).

## ACT

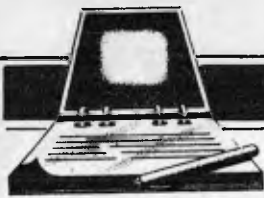
### CANBERRA MICROBEE USERS GROUP

The Group began towards the end of 1982 with a small number of enthusiasts (mainly those who had built Bees from kits) meeting on Saturday afternoons at the first MicroBee shop to open in Canberra. Membership as at December 1983 is about 200 including a large number from outside Canberra (as far away as Melbourne and Perth). A formal constitution was adopted on 16 August 1983.

The Group publishes a newsletter each month (#12 was published in December 1983). All contributions are welcome (from members or non-members). Advertising space is available at reasonable rates.

The Group meets on the third Tuesday of each month at 7.30pm at the Woden Valley High School. Visitors are welcome to attend. The Convenor is Bill Horsfall (6 Boyland Close, Spence, A.C.T. Telephone: (062) 58 3193).





## 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.*

Sydney	The Australian Personal Computer Show Contact: Australian Exhibition Services (03) 20 1208	March 14-17, 1984
Singapore	International Business Equipment & Computer Show	March 13-17, 1984
Hanover	Hanover Fair. Contact: (02) 29 3998	April 11-14, 1984
Sydney	Data '84 Contact: Graphic Directions (02) 212 4199	May 22-24, 1984
Perth	International Microcomputer Conference and Exhibition Contact: (09) 325 4427	May 22-24, 1984
Perth	Microcomputer Exhibition Contact: Jenna Ledgerwood (09) 325 0111	May 22-25, 1984

## NETWORK NEWS

*Steve Withers and Peter Tootill return with another look at the world of telephone networking.*

First of all, an apology to those who missed Network News last month. Family commitments around the Christmas period placed a severe strain on our schedules.

### A drastic move

The Bettisfield RCP/M system (U.K.) has now closed down, as the Sysop has decided to settle in the West Indies (perhaps it is something to do with their cricket team). Expect to see the number of Jamaica RCP/M in a few months time.

### File transfer between computers

There are several methods of transferring files between computers by telephone. The simplest is to send the file in ordinary ASCII code, with no error checking or correction procedures. Even machine code can be sent this way by translating the

individual bytes into ASCII representations of the two halves. For example, the byte 'FE' which requires 8 bits to send as it stands, can be transmitted by a system using 7-bit word length by sending a letter 'F' followed by a letter 'E'. This requires two bytes and makes transmission twice as long. It is, however, the only way machine code files can be transferred without special procedures.

The problem with sending data via the telephone is that a noise on the line can corrupt the data. This may not be a serious problem with say, a text file, as the human brain is very good at compensating for such errors from clues in the surrounding text. However, in a computer program a small error could be disastrous, and may not be easy to find, especially in machine code. One way to reduce the probability of such errors is to transmit the file in blocks, and to calculate the checksum of each block, with the receiving computer requesting re-transmission if the checksum doesn't agree with that sent by the transmitting

system. This is not a complete solution since two errors may compensate for each other to produce a correct checksum even though the data is wrong, but it is a great improvement on sending files with no validation at all. More advanced methods will use complex checks on the data, and can give virtually 100% error-free transmission.

One particular set of protocols for improving the reliability of transmission of data was developed by Ward Christensen for inclusion in his Modem and Xmodem series of intelligent terminal programs written for CP/M systems. These protocols, often referred to as CP/M or Xmodem protocols, have been applied to other systems, and have become a popular standard in North America. They are incorporated in many smart terminal packages (and by the MicroBee network ROM) and often supported by bulletin boards and Remote CP/M systems, making for much more reliable downloading of programs than would otherwise be possible. They use an eight bit

standard (with no parity) and can transmit machine code without the need to translate them into ASCII code first.

If you are thinking of writing smart terminal software, consider including Xmodem protocols in the package. (We hope to be able to give details on this in the near future.)

### Interest still rising

Bulletin board System Operators ('Sysops') are still experiencing a steady rise in the interest in their systems, and the amount of traffic they get. When Peter's system was running part time last year, it used to get a handful of calls a week. This spring when it went on to 24 hours a day operation, the number quickly rose to half a dozen or so a day. Now 30 or 40 calls a day is the order of things, and the number still seems to be rising steadily! Telecom must be delighted.

## Network jargon: X-On/X-Off protocol

When you call a bulletin board system and read a message, it's not really good enough for the system just to keep sending the message non-stop until it reaches the end, taking no account of whether you can keep up with it or not. You may want to read the top before it scrolls off the screen, or make a note of a phone number or something. What is required is a way of telling the system to 'hang on a minute', and indeed most systems provide such a facility. You simply press the 'P' key (or sometimes the 'S' key) at your end and output will pause until you send a carriage return. Something of the same sort is needed when two computers are exchanging data. For example transferring a file or a program from the bulletin board to your system (usually called 'downloading': if you send the file to the BBS, it's called 'uploading'). The receiving computer may need to pause, to save a part of the file to disk for example. One way of requesting such a pause is to send an 'X-off' character (control S, ASCII code 19 decimal, also called DC3). The system, if it supports this protocol will immediately pause until it gets an 'X-on' character (control Q ASCII code 17 decimal, also called DC1), when it will restart. With some systems 'X-on' is not specifically required, and any character will cause transmission to restart. Most bulletin board systems support X-on/X-off protocol for transfer of ASCII files, but it is not required if you are using the XMODEM, or CP/M protocols described in

December as they include their own 'handshaking' to prevent data being sent when the receiver is not ready.

## Australian systems

**Micro Design Lab RCPM** Tel: (02) 663 0151. System Operator: Stephen Jolly. Hours: 5pm—7am weekdays, 24 hours weekends.

**Mi Computer Club BBS** Tel: (02) 662 1686. Program downloading. Hours: 24 hours daily.

**Sydney Public Access RCPM** Tel: (02) 808 3536. System Operators: Barrie Hull and David Simpson. Hours: 24 hours daily.

**Software Tools RCPM** Tel: (07) 378 9530. Hours: 24 hours daily.

**MICOM CBBS** Tel: (03) 762 5088. System Operator: Peter Jetson. Hours: 24 hours daily.

**Gippsland RCPM** Tel: (051) 34 1563. System Operator: Bob Sherlock. Hours: 24 hours daily.

**Sorcerer Computer Users Association CBBS** Tel: (03) 836 4616. System Operator: Bruce Alexander. Program down-

loading for SCUA members. Hours: 24 hours daily.

**TARDIS RCPM** tel: (03) 67 7760. Hours: 6pm—8am weekdays, 24 hours weekends.

**Perth RMP/M** Tel: (09) 367 6068. Hours: 6pm—9pm WST.

This information is correct and current to the best of my knowledge, but I would be pleased to receive corrections and updates to: Steve Withers, *C/- Australian Personal Computer*, 77 Glenhantly Road, Elwood, Vic 3184.

### American/Canadian systems

TYPE	SYSTEM NAME	NUMBER	NOTES
Forum 80	HQ system	0011 1816 861 7040	
CBBS	HQ system	0011 1312 545 8086	
FBBS	HQ system	0011 1312 677 8514	
ABBS	Ottawa, Ontario	0011 1613 725 2243	
ABBS	HQ system	0011 1703 255 2192	
MABBS	Fort Walton Beach	0011 1904 862 1072	
Bull-80	Alabama	0011 1205 492 0373	
Conn-80	Colour Computer	0011 1212 441 3755	colour graphics for TRS-80 Colour

### European systems

ELFA	ABC-MONITOR Sweden	00114.68 7300706	Half duplex
ABC-Banken	Halmstadt, Sweden	00114.63 5110771	
ABC-MONITOR	ABC Club of Sweden	00114.68 801523	Passwords required
CBBS	Gothenburg, Sweden*	00114.63 1292160	75/1200 baud
		00114.63 1690754	300 baud

\* After receiving the tone and connecting your modem, either type: <C/R> or type: <COM C/R>. The system then asks for a password which is: 'cbbs' in small letters!! If you only get '>' when you dial up, the system needs resetting and you type <I> C/R.

### UK systems

CBBS	North East	0011 44 207 543555	
CBBS	London	0011 44 1 399 2136	
Forum-80	Hull	0011 44 482 859169	
Forum-80	London	0011 44 1 902 2546	
Forum-80	Milton	0011 44 908 613004	
Mailbox-80	Liverpool	0011 44 51 428 8924	
TBBS	London	0011 44 1 348 9400	ring-back system
TBBS	Blandford	0011 44 258 54494	
BBS	Southern	0011 44 243 5111077	ring-back system



# MICRO EXCHANGE

*All Micro Exchange ads must be submitted by readers on the appropriate form (or a photocopy). Maximum of 30 words. Print one word per box, very clearly. Contact name and telephone number/s must be included in the 30 words. All ads must be accompanied by a fee of \$5.00 for*

*Australian Personal Computer or \$7.50 for inclusion in both Australian Personal Computer and Australian Business Computer. Make cheques or Postal Orders payable to Micro Exchange. Ads cannot be repeated (unless sent on another form) and we cannot guarantee to print an ad in any specific issue. Please help the typesetter by printing very clearly. Send your form to: Micro Exchange, P.O. Box 62, Middle Brighton, Vic 3186.*

## NEW SOUTH WALES

8/16 BIT 5100 MEMORY BOARDS 16K, 64K, 256K. ALL RUN WITH AN ERG 68000 SYSTEM. BEST OFFERS. PHONE ADRIAN (02) 349 3684.

ALL VZ200 OWNERS - 8 PROGRAMME PACK SAVE HEAPS NOW ONLY \$20.00 POST FREE. SEND TO ALES SOFTWARE 39 READING AVE, KINGS LANGLEY NSW 2147

ANOTHER VIC 20 GIFT BONANZA. 4 PROGRAMME EDUCATION PACK PLUS DOCUMENTATION NORMAL PRICE \$40.00 GIFT PRICE \$19.95 INCLUDES LATEST CATALOGUE. SEND TO ALES SOFTWARE 39 READING AVE, KINGS LANGLEY NSW 2147.

APPLE USERS, LARGE RANGE SOFTWARE, HARDWARE AND ACCESSORIES AT BARGAIN PRICES. SEND LARGE S.A.E. FOR PRICES OR \$5.00 FOR 80 PAGES OF DETAILED INFO. NALCO, P.O. BOX 285 RYDALMERE 2116 (02) 638 2980

APPLE, FRANKLIN, MEDFLY AND NEDSHO SOFTWARE, HARDWARE AND ACCESSORIES AT REDUCED PRICES. SEND \$5 FOR OVER 80 PAGES OF DETAILED INFO AND REVIEWS. NALCO P.O. BOX 285 RYDALMERE 2116. (02) 638 2980

COMMODORE 64 SOFTWARE DATA 64 DATABASE PROGRAM FOR DISK (\$30) OR TAPE (\$25). SEND FOR FREE LIST OF PROGRAMS AVAILABLE. SIMA SOFTWARE 34 DE GRAAFF ST, HOLDER A.C.T. 2611

CROMENCO C10-SP TWO 8500 390K DISKS, STRUCTURED BASIC, WP, SPREADSHEET, OCOS CP/M DOS. RS232C CENTRONICS PORTS INCLUDES Z80 MACRO ASSEMBLER. ANTHONY CALLINAN 7/2 GROSVENOR STREET KENSINGTON 2033 PHONE (02) 633 2017 A.H.

HITACHI PEACH 32K. \$800.00; M.P.I. OS/DO DRIVE, CONTROLLER \$550.00; KAGA GREEN SCREEN, MONITOR \$200.00; STAR DP8480 PRINTER \$350.00; MANUALS, CABLES, SOME PROGRAMS INCLUDED. THE LOT \$1,800.00 ONO PHONE PETER (063) 36 1615 A.H.

HORSE RACING ANALYSIS. TO DATE EVERY DOLLAR INVESTED AT T.A.B. RETURNS \$2.40. CASSETTE AVAILABLE FOR SINCLAIR ZXB1 AND SPECTRUM WITH INSTRUCTIONS ONLY \$25.00. ORDER NOW PETER GARDINER, LIGHTNING RIDGE 2834.

IBM PC MONO DISPLAY AND PRINTER ADAPTOR CARD WITH IBM DISPLAY \$900 IBM PC PRINTER \$800 2 X 160K DRIVES \$300 EACH ALL ITEMS AS NEW PRINTER NEVER USED B.H. (02) 502 2982 A.H. (02) 768414

TRS-80 SOFTWARE TRADE/SELL: SEND ORIGINAL TRS-80 CASSETTE PROGRAM OR \$10.00 FOR COPY OF SPACE PIRACY A CONQUEST/TRADE GAME: SSAE MR E HUGHES 52 LOWRY STREET, CAROIFF NSW 2285.

WANTED: RADIO SHACK MODEL II WITH PICKLES AND TROUT CP/M OPERATING SYSTEM ALSO ANY ENGINEERING OR MATHEMATICAL PROGRAMS WRITTEN FOR COMMODORE 64 APPLE2E AND TRS MODEL II. PHONE JOHN (02) 439 7780 A.H.

## VICTORIA

64K RAM INSTALLED IN TRS-80 COLOUR COMPUTER FOR \$95.00 DROP OFF AND PICK UP THE NEXT DAY. PLEASE RING FIRST. DON MCKENZIE, 29 ELLESMERE CRES., TULLAMARINE 3043 (03) 338 6286.

APPLE-2 COMPATIBLE DISKS FROM \$299. ALSO 6502 + Z 80 DUAL PROCESSOR, NUMERIC KEYPAD, 188 FUNCTION KEYS, 10 USER'S DEFINE KEYS. FROM \$625. OR COMES WITH SEPERATE KEYBOARD. WRITE TO P.O. BOX 145 MULGRAVE VIC. 3170

COMMODORE 64 TO IEEE INTERFACE CARTIAGE. BRAND NEW. SELL FOR \$120.00 (NEW PRICE: \$175.00) PHONE FRITZ (03) 754 6765.

FIT 64K, 64K? YES 64K OF USABLE RAM IN SYS-80 AND TRS-80 MODEL ONE COMPUTERS FOR AROUND \$70.00. SEND

\$5.00 FOR INSTRUCTIONS TO DON MCKENZIE 29 ELLESMERE CRES, TULLAMARINE 3043.

FOR SALE: MICROANGELO MA520 S100 GRAPHICS BOARD WITH SCREENWARE PACII. SELL \$1,800 PHONE RICHARD SBRANA B.H. (03) 529 2722 A.H. (03) 689 5362.

FOR SALE: TANDON 5.25" DISC DRIVE MODEL TM-100 SS 80 TRK. INCLUDES BOX & POWER SUPPLY. SELL \$350.00 PHONE RICHARD SBRANA B.H. (03) 529 2722 A.H. (03) 689 5362.

FOR SALE: AOS 6809 SINGLE-BOARD CPU FOR S100. BARW PCB. INCLUDES LISTING FOR MONITOR SELL \$60.00. PHONE RICHARD SBRANA B.H. (03) 529 2722 A.H. (03) 689 5362

FOR SALE: BASE 2 PRINTER MODEL 800MST. SELL \$300.00 PHONE RICHARD SBRANA B.H. (03) 529 2722 A.H. (03) 689 5362.

HARDWARE HACKERS. SPEED UP YOUR TRS-80 MODEL ONE, OR SYS-80 TO THREE TIMES NORMAL SPEED. 5.3 MHZ. BENCHMARK TESTS COMPARE CLOSELY TO I.B.M. PERSONAL COMPUTER. BARE P.C. BOARD \$17.90 DON MCKENZIE (03) 338 6286

NEW PET GAMES: PLANET DEFENDER \$13.00, FASTSKI \$14.00, LUNAR LANDER \$12.00, TRAPBALL \$9.99, AIRSTRIKE \$12.00, PROARR \$13.00, DEATHMISSION \$13.00, TEN PIN BOWLING \$12.00, FREE CATALOGUE - ANTHONY DOUGLASS, 8 FAIRYOELL RD, 3160 TECOMA.

NEW VIC GAME: LUNAR MISSION \$14.99, COMMODORE 64: FASTSKI \$14.99. BOTH GAMES FEATURE HIGH RESOLUTION GRAPHICS, COLOUR AND SOUND. WRITE FOR FREE CATALOGUE TO ANTHONY DOUGLASS 8 FAIRYOELL RD, 3160 TECOMA.

PRINTER EPSON MX 80, EXCELLENT CONDITION, FITTED IEEE INTERFACE AND CABLE. READY FOR USE ON

*Goto to page 181*





# PROGRAMS

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 must, please, be fully debugged. Programs are paid for at the rate of \$20 per page of published listing, plus a \$50 bonus for the Program of the Month. Send contributions to: APC Programs, 77 Glenhuntly Road, Elwood, Vic 3184.

We'll do our best to acknowledge receipt of programs as quickly as possible, but following this acknowledgement it will usually be some time before a decision can be made, so please be patient! Generally speaking, programs which are rejected for any reason are returned fairly quickly, so 'no news . . .'



Games



Scientific/mathematic



Business



Toolkit/utilities



Educational/Computer Aided Learning



## TRS-80/System 80 Pascal Procedures

by John Gale

The Tandy 'Tiny Pascal' compiler often provides TRS-80 and System 80 owners with their first taste of a language other than Basic. While offering significant improvements on TRS-80 Basic in terms of both structure and execution time, 'Tiny Pascal' lacks some fairly fundamental features. John Gale set out to produce some useful Pascal procedures to augment the statements provided by Tandy.

PROCLP(CH) sends a single character (CH) to the printer. The primary use of this is to send control codes to the printer. Note that this procedure only works on the System 80 because of the TRS-80's insistence on using memory location 14312 to communicate with the printer. TRS-80 owners should substitute the following:  
PROC LP(CH);  
BEGIN WHILE MEM(14312)<> 0 DO;  
MEM(14312):=CH  
END;

PROCLIST lists Tiny Pascal source code to the printer.

PRO CLS is simply a mnemonic to clear the screen, used in place of the oft-typed WRITE(28,31).

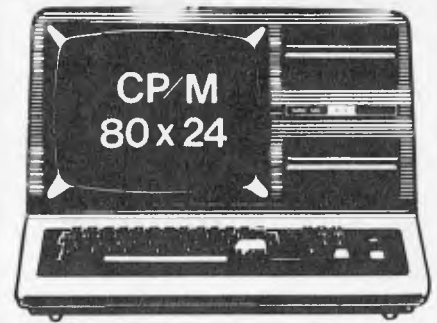
PROC DUMP (first line, last line) dumps a text screen to printer, PROC DUMP (0,15) dumping the whole screen.

PROC GRDUMP (first line, last line) does the same for a graphics screen, though this takes considerably longer of course.

Finally, PROC AT (line, column) provides a much-needed PRINT @ facility. This is a feature which most TRS-80/System 80 owners come to rely on to keep screen displays neat. It works in a non-standard form, but is just as easy to use.

The listing here contains a short demonstration program which uses all the procedures defined.

# TANDY



### ★ DISK CONTROLLER\*

A premium controller for the Model 3 Tandy Computer. Double density with precision LSI Data Separator for reliable performance. Mix 5 and 8 inch drives. Battery powered. Clock/Calendar and gold plated edge connectors included. Sold by itself or in complete kit with Switching Power Supply. Drive brackets, cables and hardware and fitting instructions.  
PRICE — \$530. Disk Drives at competitive prices. Also fits Model 4.

### ★ VIDEO — CP/M EXPANSION

Your Model 3 can have 80 column by 24 lines video display, and ability to run a 64K CP/M Operating System, and even an extra 64K bank of memory, YET STILL OPERATE IN ITS ORIGINAL FORM WHEN REQUIRED. The VID-80 fits inside the computer and is simply installed following our instructions.  
PRICE — \$365, CP/M \$199, extra 64K \$116

### ★ SPRINTER

Plug-in circuit with Z80B CPU to reliably "hot-up" the Model 1 or 3 by increasing the clock speed (but slowing down when required). Model 1 version optionally with Parallel Printer Port.  
PRICE — \$135. Model 1 with Printewr Port \$167

## STOP PRESS

### ★ MODEL 1 DISK CONTROLLER

Includes printer interface and plugs straight into keyboard! With Slim-line 40 track drive, LSI Data Separator, gold plated connectors. Double Sided and Double Density. Only \$700

### ★ MODEL 1 DOUBLERS

If you have drives, increase reliability and double storage with our Double Density Adaptors \$179.

### MODEL 4 MEMORY KITS

16K — 64K with instructions \$119  
64K — 128K with instructions \$160

ALL PRICES INCLUDE SALES TAX BUT ARE SUBJECT TO CHANGE. SEND YOUR NAME AND ADDRESS FOR COMPLETE PRICE LIST AND OUR NEW NEWSLETTER . . . FREE!

NOTE NEW PHONE NUMBER AND ADDRESS



## MICROCOMPUTERS

P.O. BOX 259,  
CAULFIELD EAST, VIC 3145  
Telephone: (03) 500 0628

# SYSTEM 80 AND TRS-80 OWNERS

## Z80 PROGRAMMING HAS EXTRA ROM FOR YOUR COMPUTER

Four preprogrammed Eproms are available with functions accessible by pressing Shift, Down arrow and appropriate key. Prices for each Utility are System 80 \$42.00 Fitted \$32.00 Kit. TRS-80 \$59.00 Installed only.

### 22 FUNCTION COMBINATION UTILITY

Eprom includes Lower case driver, Key debounce, Display, Edit, Zero and Move memory with full screen display in ASCII or Hex, Forward and Reverse full screen or one line scrolling and on screen edit in ASCII or Hex with edit address displayed between graphic bars, System and Basic Program load with auto select between the two, addresses or basic program are shown during load, System tape copier, Save memory to tape, Go to Hex or Decimal address, Screen Editor, Screen Print video, Hex and decimal conversions, Set & memory size, Edit & typed line not on a line number, Line renumberer, Restore program after a NEW, Protect and Cancel Protect on basic program, used with renumberer to merge programs. AND MORE!

### FAST LOAD AND SAVE TAPE UTILITY

Includes all the above functions, except Protect, Cancel Protect and Renumberer. Tape routines work at 3 times normal Baud. System Copier will load, save and verify at fast or normal Baud. Commands LOAD and SAVE are used for Basic. All Parameters available to CLOAD and CSAVE apply.

### BASIC EPROM UTILITY

Includes Lower case driver, Key debounce, APC80 Commands, Protect, Cancel Protect and Restore Basic Program, Line Renumberer, Basic Program load, Screen editor, Screen print, Set memory size, Select cursor value, Line move and line check, Shift lock, Key repeat, Single keyword entry which can be toggled on or off.

### MACHINE CODE EPROM UTILITY

Includes the functions of the first Utility less the basic Utilities, Display registers with half screen of memory or full screen of memory, Edit registers, Go to hex address with breakpoint, Relocate object code. Arrow keys move Edit bars to any location on the screen for easy edit.

### MOD BOARDS FOR EXTRA EPROMS

Boards plug in for easy installation and have logic for full disk compatibility. Comes with switch and instructions to fit Port logic for internal switching using the OUT command. All the above Utilities can be deinitialised for easy swap or a plug in replacement ROM 1 is available to enable direct swap between Utilities using SHIFT CONTROL U and Auto Initialise of Eprom and lower case. A 3 Eprom board is also available with keyboard decoding and bank select to run my new 4k Utility incorporating all the features of the above Utilities in 3k with a second 2k Eprom. Boards come ready assembled, 2 Eprom board \$17.00 3 Eprom board \$27.00. ROM One Replacement \$16.00.

### SYSTEM 80 LOWER CASE KIT

3 Dot descenders, easy to install Plug in board with 2 sockets for two character sets which can be Port switched or externally switched. Comes standard with one custom Character Generator and full installation and Port switching instructions ROM One Replacement can be fitted for Permanent Lower case driver. \$40.00 Kit. \$50.00 Fitted. Fancy Games set character generator \$14.00

### TRS-80 LOWER CASE KIT

3 dot descenders and easy Plug in board. American models only. SPECIAL! \$19.00 Kit. \$25.00 Fitted.

### 32 OR 48K ON BOARD MEMORY UPGRADE

48K Upgrade uses the new 64K IC's No Piggy backed chips! Less power drain. 32K \$45.00 48K \$95.00.

### OTHER MODIFICATIONS INCLUDE:

System 80 CHR\$(23) mod as per Tandy. Sound mod, Inverse video, Extra keys, Fitted only. Repairs, Eprom copying and mods of your own choice.

**Contact Geoff Lohrere at:  
57A STANLEY AVE,  
MT WAVERLEY 3149  
PHONE: (03) 543 1485**

Prices Subject to change without notice

# PROGRAMS

```
(*A package of Tiny Pascal utilities*)
VAR FIRST,KEY,L,X,Y:INTEGER;
(*-----*)
PROC LP(CH); (*sends a single chr from VG to printer*)
BEGIN WHILE INP(253)<>63 DO;
  OUTP(253,CH)
END;
(*-----*)
PROC LLIST; (*lists a Tiny Pascal source *)
VAR LOC: INTEGER;
BEGIN LOC:=MEMW(16768); LP(15);LP(27);LP(87);LP(1);
  REPEAT IF MEM(LOC)=9 THEN BEGIN LP(32);LP(32);LP(32) END
  ELSE IF MEM(LOC)<>10 THEN LP(MEM(LOC));
  LOC:=LOC+1
  UNTIL (LOC-1)=MEMW(16770)
END;
(*-----*)
PROC CLS; BEGIN WRITE(28,31) END; (*clears screen*)
(*-----*)
PROC LDUMP(K,N); (*used by DUMP and NOW*)
VAR B,C: INTEGER;
BEGIN FOR C:=K TO N DO
  BEGIN B:=MEM(C);
  IF B<32 THEN LP(B+64) ELSE IF B>127 THEN LP(32)
  ELSE LP(B)
  END;
  LP(13)
END;
(*-----*)
PROC DUMP(F,L); (*dumps VDU lines F to L to printer*)
VAR J: INTEGER;
BEGIN IF F<=L THEN
  FOR J:=(F AND 15) TO (L AND 15) DO
    LDUMP(15360+J*64,15423+J*64)
  END;
  (*-----*)
  FUNC PRINTER; (*remembers first VDU position to print*)
  BEGIN FIRST:=MEMW(16416); PRINTER:=0 END;
  (*-----*)
  FUNC NOW; (*writes to printer*)
  BEGIN LDUMP(FIRST,MEMW(16416)-1); NOW:=0 END;
  (*-----*)
  PROC GRLINE(J); (*used by GRDUMP*)
  VAR X,Y,B: INTEGER;
  BEGIN Y:=3*J;
  FOR X:=0 TO 127 DO
    IF POINT(X,Y) THEN LP(64) ELSE LP(32);
    Y:=Y+1; LP(13);
  FOR X:=0 TO 127 DO
    IF POINT(X,Y) THEN LP(64)
    ELSE IF (X AND 1) THEN LP(32)
    ELSE BEGIN
      B:=MEM(15360 + J SHL 6 + X SHR 1);
      IF B<32 THEN LP(B+64)
      ELSE IF B>127 THEN LP(32) ELSE LP(B)
      END;
      Y:=Y+1; LP(13);
    FOR X:=0 TO 127 DO
      IF POINT(X,Y) THEN LP(64) ELSE LP(32);
      LP(13);
    END;
  (*-----*)
  PROC GRDUMP(F,L); (*graphics dump of lines F to L to printer*)
  VAR J: INTEGER;
  BEGIN LP(27);LP(64);LP(15);LP(27);LP(51);LP(22);
  (*setting Epson control codes*)
  FOR J:=F TO L DO GRLINE(J);
  LP(27);LP(64);LP(27);LP(51);LP(36);
  (*restore normal Epson settings*)
  END;
  (*-----*)
  FUNC AT(L,C); (*positions cursor at line and column*)
  BEGIN MEM(MEMW(16416)):=32;
  MEMW(16416):=15360+((L*64+C) AND 1023);
  AT:=0 END;
  (*-----*)
  BEGIN (*demonstration program*)
  CLS;LP(27);LP(64);
  WRITE(PRINTER,'TINY PASCAL printer procedures',NOW);
  WRITE(PRINTER,'The following illustrates DUMP(4,12);',NOW);
  LP(13); LP(13); LP(13); CLS;
  FOR L:=0 TO 15 DO WRITE(AT(L,L),'THIS IS VDU LINE ',L);
  DUMP(4,12); CLS;
  LP(13); LP(13); LP(13);
  WRITE(PRINTER,'and this illustrates GRDUMP(0,15);',NOW);
  LP(13); LP(13); LP(13); CLS;
  FOR Y:=0 TO 47 DO
    FOR X:=0 TO 127 DO
      IF (X*X+Y*Y) MOD 85 > 53 THEN PLOT(X,Y,1);
      WRITE(AT(7,20),'... DEMONSTRATION...');
      WRITE(AT(8,20),'... OF GRDUMP(0,15)...');
      GRDUMP(0,15); LP(13); LP(13); LP(13); CLS;
      WRITE(AT(13,10),'LLIST? HIT Y OR N');
      REPEAT KEY:=INKEY UNTIL (KEY='Y') OR (KEY='N');
      IF KEY='Y' THEN LLIST;
    END.
  END.
```

# PROGRAMS



## PET Maths Maze

by Daniel Lawson

'Maths Maze' is an educational program for a 4000-series Commodore PET. It is aimed at the primary school level.

The program presents the user with a maze. The child moves through the maze using the keys U)p, D)own, L)eft and R)ight, but before a move can be made, the child must solve an arithmetic

problem. The program adjusts itself to the ability of the user by testing the score at the end of the Maze. Less than 40% correct results in an easier maze, greater than 60% a more difficult one. Instructions are contained within the program.

```

2 REM"MATHS MAZE 2"
3 POKE144,88
4 GOSUB9000
5 POKE59468,14
6 GOSUB8000
7 B=0:V=0
12 PRINT"*****ENTER DIRECTION (U) U)SH (D) D)"
13 PRINT"*****LEFT: L) RIGHT: R) UP: U) DOWN: D)"
15 M=33248
20 FORA=33248T033254
30 POKEA,160
40 NEXTA
50 FORS=33254T033054 STEP-40
60 POKES,160
70 NEXTS
80 FORA=33054 T033070
90 POKEA,160
100 NEXTA
110 FORS=33070T033190 STEP40
120 POKES,160
130 NEXTS
140 FORA=33062 T033182 STEP40
150 POKEA,160
160 NEXTA
170 FORS=33254 T033454STEP40
180 POKES,160
190 NEXTS
200 FORA=33454T033458
210 POKEA,160
220 NEXTA
230 FORS=33458T033388STEP-40
240 POKES,160
250 NEXTS
255 GOSUB5000
260 POKEM,77
270 GETQ$:IFQ$="" THEN270
280 IFQ$="L"THENM=M-1:M1=M+1
285 IFQ$="R" THENM=M+1:M1=M-1
286 IFQ$="D"THENM=M+40:M1=M-40
287 IFQ$="U"THENM=M-40:M1=M+40
289 IFM=33364 THEN500
290 IFPEEK(M)=32 THENM=M1
300 POKEM1,160
310 POKEM,77
320 X%=12*AND(1)+1
330 IFX%>4THENGOSUB1000
350 GOTO270
500 PER=(B-V)/B)*100:IFPER>=60THEN700
510 IFPER>=40THEN600
520 PRINT"*****G F L R U D L I"
530 PRINT"
540 PRINT"OR GETTING LESS THAN 40% RIGHT YOU "
550 PRINT"SHALL BE RETURNED TO THE START."
560 IFVAL(Y%)>1THENPRINT"IN A EASIER LEVEL."
:CO=VAL(Y%):CO=CO-1:Y$=STR$(CO)
570 FORO=1T05000:NEXTO
580 GOTO10
600 PRINT"*****G F L R U D L I"
603 PRINT"*****YOU HAD" B-V"OUT OF" B"CORRECT"
605 GOTO620
610 PRINT"*****SEE YOUR MATHS IS GOOD"
620 PRINT"DO NOT TRY TO PLAY AGAIN"
630 PRINT"*****G F L R U D L I"
640 GETI$:IFT$="" THEN640
645 IFT$="E"THEN660
650 PUN$
660 PRINT"*****G F L R U D L I"
670 PRINT"*****G F L R U D L I"
680 FORO=1T01000:NEXTO:PRINT"O" POKE59468,12:NEW
700 PRINT"*****G F L R U D L I"
710 PRINT"
720 PRINT"YOU HAD OVER 60% OF THE QUESTIONS RIGHT."

```

Alpha Media Sales



Western Australia's unbeatable combination for computer supplies. Floppies cleaning kits, ribbons, printer and VDU stands, chairs, print-out files & storage, etc.

YOUR **LOCAL** SUPPLIER

307 Mill Point Road,  
South Perth  
Telephone: (09) 367 6225

NOT \$10,000.00  
NOT EVEN \$5,000.00  
A BARGAIN AT \$1,000.00  
A STEAL AT \$500.00

**DATA BASE?**

WE'LL GIVE YOU  
ONE FOR A  
PIFLING  
**\$100.00**

CALL BARRIE ELLIS  
ON

**(03) 690 8095**

Your Friends will be Jealous,  
When you Buy from ELLIS



# Sendata 2000 Direct Connect Modem

Speed Selectable

Auto Answer/Disconnect



12 Months Warranty  
Telecom Approved

An unbeatable price/performance package of features including:

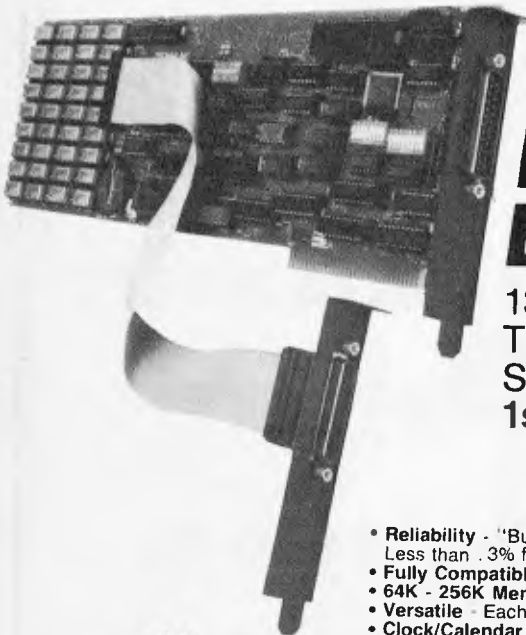
- 300bps Full Duplex.
- 1200bps Half Duplex Synchronous.
- 600 or 1200 Half Duplex V23 Standard.
- V24 (RS232) Interface.
- CCITT and Bell frequencies.
- Slimline Case (30mm high)
- Automatic (or manual) answer and disconnect.

OEM AND DEALER ENQUIRIES WELCOME.

**SENDATA**

MODEMS  
Designed and manufactured by  
**ELECTROMEDICAL ENGINEERING P/L**

69 SUTHERLAND ROAD, ARMADALE,  
VICTORIA 3143, AUSTRALIA  
TELEPHONE: (03) 509 5844.  
TELEX: AA34008



## RETAIL PRICE BREAK!

13 REASONS WHY THE **1<sup>st</sup> MATE™** SHOULD BE YOUR **1<sup>st</sup> CHOICE:**

- **Reliability** - "Burned In" for 3 full days prior to shipment — Less than .3% failure rate
- **Fully Compatible** with IBM PC's and other Tecmar products
- **64K - 256K Memory** - fully socketed for easy field upgrade
- **Versatile** - Each 64K fully addressable
- **Clock/Calendar** with easily replaceable battery back-up
- **Serial Port** for communications
- **Parallel Port** for printer
- **60% Faster** - SpeedDisk simulates ultra high-speed disk
- **RAMSpooler** - allows printing to become back-ground task — Easy to use - **Choice of 8 memory sizes**
- Accepts exclusive **PAL Option** to restrict certain information on "need to know basis"
- Full One Year Warranty
- 72 Hour repair turn-around **Guaranteed** - 24 hour average

The **1<sup>st</sup> MATE**

The Best . . . Take Advantage of the New, Low Prices for **1<sup>st</sup> MATE**, Tecmar's Most Popular Multifunction PC Expansion Board!

**\$560** 64K

Don't settle for 2nd best! Get yourself the **1<sup>st</sup> MATE™**, known for quality, quality, reliability and engineering excellence. So, take advantage of this fantastic price. Call Merton Scott (09) 328 6522 for information and to place your orders. We'll rush your shipment to you! Act Now!

**M S** **Merton Scott**  
**Business Machines** PRO. LTD.

248 Newcastle Street,  
Perth W.A. 6000  
Telephone (09) 328 6522  
Telex AA93413

# PROGRAMS

```

730 PRINT"AS A REWARD YOU CAN PROGRESS ONTO THE"
740 PRINT"NEXT LEVEL. THIS TIME GETTING A QUESTION"
750 PRINT"WRONG 1 2 3 4 5 6 7 8 9 10 11 12 ALSO YOU"
760 PRINT" MUST GO THROUGH EACH CHECK POINT.+"
770 PRINT"*****IT ONLY KEY TO BEGIN"
780 GETK$:IFK#="" THEN780
790 GOTO8200
1000 B=B+1
1001 IFVAL(Y$)=1 THENP%=5*WRND(1)+1:L%=5*WRND(1)+1:GOTO1010
1003 IFVAL(Y$)=2 THENP%=8*WRND(1)+1:L%=8*WRND(1)+1:GOTO1010
1005 IFVAL(Y$)=3 THENP%=12*WRND(1)+1:L%=12*WRND(1)+1:GOTO1010
1007 IFVAL(Y$)=4 THENP%=15*WRND(1)+1:L%=15*WRND(1)+1
1010 V=3*WRND(1)+1
1012 IFV=1 THEN1100
1015 IFV=2 THEN1300
1020 PRINT"*****P%"+ "L%""
1030 GOSUB8100
1037 PRINT"*****"
1040 IFW=P%+L% THEN RETURN
1050 PRINT"*****ANSWER= "P%+L%
1052 FORR=1 TO500:NEXTR
1054 PRINT"*****
1055 IFRIG=33295 THENPOKE1,102:POKERIG,205:M=RIG
1075 V=V+1
1080 RETURN
1100 PRINT"*****P% X "L%""
1110 GOSUB8100
1130 PRINT"*****"
1140 IFW=P%*L% THENRETURN
1150 PRINT"*****ANSWER= "P%*L%
1155 FORR=1 TO500:NEXTR
1160 PRINT"*****"
1170 IFRIG=33295 THENPOKE1,102:POKERIG,205:M=RIG
1187 V=V+1
1190 RETURN
1300 IFL>P% THEN1400
1308 PRINT"*****P%]- "L%""
1310 GOSUB8100
1315 PRINT"*****"
1325 IFW=P%-L% THENRETURN
1330 PRINT"*****ANSWER= "P%-L%
1340 FORR=1 TO500:NEXTR
1350 PRINT"*****
1370 IFRIG=33295 THENPOKE1,102:POKERIG,205:M=RIG
1385 V=V+1
1390 RETURN
1400 PRINT"*****L%]- "P%""
1410 GOSUB8100
1415 PRINT"*****"
1425 IFW=L%-P% THENRETURN
1430 PRINT"*****ANSWER= "L%-P%
1440 FORR=1 TO500:NEXTR
1450 PRINT"*****
1470 IFRIG=33295 THENPOKE1,102:POKERIG,205:M=RIG
1485 V=V+1
1490 RETURN
5000 FORA=33338 TO33358
5010 POKER,160
5020 NEXTR
5030 FORS=33348 TO33228 STEP-40
5040 POKES,160
5050 NEXTS
5060 FORA=33230 TO33215 STEP-1
5070 POKER,160
5080 NEXTR
5090 FORS=33358 TO33158 STEP-40
5100 POKES,160
5110 NEXTS
5120 FORA=33150 TO33159
5130 POKER,160
5140 NEXTR
5150 FORS=33160 TO33520 STEP40
5160 POKES,160
5170 NEXTS
5180 FORA=33520 TO33505 STEP-1
5190 POKER,160
5200 NEXTR
5210 FORS=33505 TO33345 STEP-40
5220 POKES,160
5230 NEXTS
5240 FORA=33360 TO33364
5250 POKER,160
5260 NEXTR
5270 RETURN
8000 PRINT"*****MATHS MAZE"
8005 PRINT"*****"
8010 PRINT" YOU ARE IN A MAZE, THE ONLY WAY TO "
8020 PRINT" ESCAPE IS TO ANSWER THE MATHS QUESTIONS."
8030 PRINT" AIM FOR A HIGH PERCENTAGE OF THE "
8040 PRINT" QUESTIONS RIGHT"
8050 PRINT"*****IT L%""
8060 PRINT"*****L%""

```

Leaders in the supply of computer peripherals.

**NEW COLOUR  
14" HI-RESOLUTION  
MONITORS**

24 MHz bandwidth, RGB output.  
Designed for Hi resolution graphic  
display, compatible with IBM  
& most computers. **\$650**  
**\$12 FREIGHT**  
Australia's Ultimate Value

**NEW AMBER  
12" MONITOR  
HI-RES II**

\$159 \$12 Freight  
**COMPLETE WITH  
ADJUSTABLE STAND**  
Compatible with any computer.

**LARGE DISKETTE  
STORAGE BOXES**  
(A must for all Disk users)




Stores 100 Diskettes,  
complete with lock.  
Available late February  
355 x 190 x 168mm.  
**\$140 \$2 P & P**

Plus complete range of Apple compatible products, computers & software.

**Video  
Technology**

TELEPHONE ORDERING   
Receive faster service.  
Phone your order NOW. (02)568-3423  
**P.O. BOX 217, Petersham 2049**  
LEVEL ONE, 604 PARRAMATTA RD.  
PETERSHAM, N.S.W.

All prices include sales tax.  
Monitor will work with any  
brand computer. 

Video Technology P.O. Box 217, Petersham 2049  
FOR FREE CATALOG — many bargains,  
send S.A.E. Fast del. No C.O.D. Personal cheques OK  
Please charge my Bankcard. Expiry date: .....

4 9 6 -  -  -  -

Name .....

Address .....

..... Postcode .....

Signature .....





# PROGRAMS

examples, supplying answers to the computer's questions as you go. The tree will carry out a search following each additional branch and request further details if the search fails.

The syntax requires attributes rather than properties of objects, since the questions asked are based on 'Can the

object...?' rather than 'Is the object...?', but this is easily changed if required. Once a tree is complete, it may be saved on disk for future use. Function key 0 prints the array holding the data so that you are able to see how the tree is structured.

```

10REM TREE STRUCTURE GAME
20 *****
30
40MPDE7
50PROCinit
60REPEAT
70PROCsearch_tree
80PROCend_of_tree
90PRDCanother_go
100UNTILFALSE
110 DEFPROCinit
120 *****
130
140DN ERROR GDT02760
150REM disable escape
160*FX220,0
170REM this shows how the tree is built up (after leaving prog use f0)
180*KEYOF.I=1TD10:P.TREE$(I,1);" ";TREE$(I,2);" ";TREE$(I,3):N:IM
190DIM TREES$(100,3)
200REM lower case
210*FX202,4B
220REM set VDU7 duration (FX213 sets pitch)
230*FX214,1
240REM assign colours eg r=RED
250r=129
260g=130
270y=131
280m=133
290b=134
300num=1
310newnum=1
320type$="TREE GAME"
330PROCheader
340PROCinstruct
350CLS
360PRINT
370PROCprint(b,"Shall I load the file you saved last time?")
380PROCyes_no
390CLS
400PROCCoff
410IF ans PROCload_datafile ELSE PROCfirst_data
420PROCCoff
430PROCdelay(60)
440PRINT"CHR$g;"Here we go....."
450PROCdelay(200)
460PROCcon
470PROCheader
480ENDPROC
490 DEFPROCfirst_data
500 *****
510
520PRINT
530PROCprint(0,"OK. I will ask you some questions to start a new tree.")
540PROCdelay(200)
550PRINT"CHR$g;"Here we go....."
560PROCdelay(200)
570CLS
580PROCcon
590PRINT
600PROCprint(b,"What tree do your objects belong to?")
610FRINT
620PRDCtext_col(y)
630INPUT"They are from the tree of "type$
640IF RIGHT$(type$,1)="s" type$=LEFT$(type$,LEN(type$)-1)
650PRINT
660PROCprint(b,"What shall I ask you first about the "+type$+"?")
670FRINT
680PROCprint(y,"Ask me if the "+type$+" can ")
690INPUT"TREE$(1,1)
700PRINT
710PROCprint(b,"If the "+type$+" could "+TREE$(1,num)+" what type of
might it be?")
720PRINT
730PRDCtext_col(y)
740INPUT"It might be "TREE$(1,2)
750PRINT
760PROCprint(b,"If the "+type$+" could not "+TREE$(1,num)+" what type of
"+type$+" might it be?")
770PRINT
780PRDCtext_col(y)
790INPUT"It might be "TREE$(1,3)
800next=2
810ENDPROC

```

# Loflorien Software

Cultivating New Concepts  
COMPUTER SOFTWARE  
SPECIALISTS



## EDUCATION

FRENCH & GERMAN TUTORS  
SPELLING & SPEED READING  
AUSTRALIAN GEOGRAPHY  
THE UNIVERSAL TUTOR  
SCHOOL RECORDS & REPORTS

## ADMIN. & FILING

ARCHIVE—BIBLIOGRAPY—FILING  
THE LIBRARY CATALOGUE  
THE LIBRARIAN'S ASSISTANT  
— Loan System —

## GAMES

THE CAVERNS OF MORDIA

G.P.O. BOX 1033, SYDNEY 2001  
Telephone: (02) 398 4023

## COULD YOU DEMONSTRATE A 16-bit MICRO???

Are you between 20 and 25 years, have some business knowledge and love playing/working with computers?

Then please write for an application form to: Ref: "Computer Demonstrator"

C/- G.P.O. Box 2422  
Sydney N.S.W. 2001

60187

## COMPUTER BOOKSHELF

Now you have bought your computer, you want to make the most of it.

We supply general and specialized books on computer hardware, software and languages.

Shop for your computer books at home, and write for our free list of recommended books for your computer.

Orders over \$20 post and package free, otherwise add \$1 per book.

**READING MATTERS**  
P.O. Box 127, Hornsby, NSW 2077



# MICRO VISIONS

VIC-20  64

NOW AVAILABLE

## COMMODORE HARDWARE AND SOFTWARE SPECIALIST



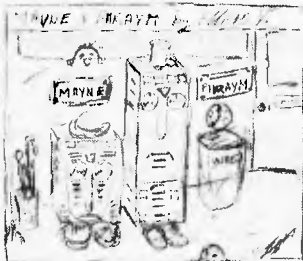
AN 8000 SERIES (CONSISTING OF CBM 8032, 8050 (DRIVE), 8023 PRINTER AND CABLES) ACCOUNTING SYSTEM WITH SOFTWARE FROM \$5320.

Numerical control editor for  
NC program tape and telex  
Call for details.

NOW SELLING



'BASIC' Computer programming courses starting February 1984.  
Ring now for more details.



MAYNE: Boy am I pooped!  
PHRAYM: Why - what did you run?  
MAYNE: I was stuck in a loop!

Contact:  
**MICHAEL LA ROBINA,**  
472 ANZAC PDE.,  
KINGSFORD, NSW 2032.  
(02) 662-4063.

# PROGRAMS

```

● 820 DEFPROCsearch_tree
● 830 *****
● 840
● 850CLS
● 860pos=-1
● 870REPEAT
● 880pos=pos+1
● 890num=newnum
● 900PROCText_col(b)
● 910PRINTTAB(0,pos)"Does the ";type$;" you are thinking of
  " TREE$(num,1);"?"
● 920PROCyes_no
● 930IF ans reply=2 ELSE reply=3
● 940newnum=ASC(TREE$(num,reply))-48
● 950PRINTTAB(0,pos);SPC38
● 960PRINTTAB(0,pos);CHR$m;TREE$(num,1);
● 970IF reply=2 PRINTTAB(25)CHR#g"yes";SPC12 ELSE PRINTTAB(30)CHR#r"no";SPC8
● 980UNTIL newnum>next
● 990ENDPROC
1000 DEFPROCend_of_tree
1010 *****
1020
1030PROCprint(0,CHR#11+"Are you thinking of "+TREE$(num,reply)+"?")
1040PROCyes_no
1050IF ans PRINTCHR#g"yes":PROCi_won ELSE PRINTCHR#r"no":PROCupdate_tree
1060newnum=1
1070ENDPROC
1080 DEFPROCupdate_tree
1090 *****
1100
1110TEMP$=TREE$(num,reply)
1120PRINT CHR$(r)SPC14"OK, you win."
1130FORI=5 TO 2 STEP-1
1140FORJ=150TO0 STEP-25
1150SOUND17,-(I+10),J+SIN(I^I),I
1160NEXT,
1170PRINT "What were you thinking of?"
1180PROCText_col(y)
1190INPUT "I was thinking of 'newtype$
1200PROCprint(b,"What question would differentiate between
  "+newtype$+" and "+ TREE$(num,reply)+"?" +CHR#10+CHR#13)
1210PROCText_col(y)
1220INPUT "Does it "act$
1230IF RIGHT$(act$,1)=""? act$=LEFT$(act$,LEN(act$)-1)
1240TREE$(next,1)=act$
1250PROCprint(b,"What is the correct answer for "+newtype$+"?")
1260IF POS>36 PRINT
1270TEMP$=TREE$(num,reply)
1280TREE$(num,reply)=STR$(next)
1290PROCyes_no
1300IF ans PRINTCHR#y"yes": reply=2' ELSE PRINTCHR#y"no":reply=3
1310TREE$(next,reply)=newtype$
1320IF reply=2 reply=3 ELSE reply=2
1330TREE$(next,reply)=TEMP$
1340next=next+1
1350newnum=1
1360PROCoff
1370PROCprint(0,"I know "+STR$(next-1)+" "+type$+"s now")
1380PRINT
1390PROCdelay(100)
1400PROCcon
1410ENDPROC
1420 DEFPROCyes_no
1430 *****
1440
1450*FX21,0
1460REPEAT
1470ans=GET OR t20
1480UNTIL ans=121 OR ans=110
1490IF ans=121 ans=TRUE ELSE ans=FALSE
1500IF ans THEN *FX213,250
1510IF NOT ans THEN *FX213,50
1520VDU7
1530ENDPROC
1540 DEFPROCi_won
1550 *****
1560
1570PRINT CHR#136CHR$(g)TAB(16)"I WON!"
1580FORI=5TO 2 STEP-1
1590FORJ=1TO6
1600SOUND17,-(I+10),150*SIN(I^I),I
1610NEXT,
1620PRINT
1630ENDPROC
1640 DEFPROCanother_go
1650 *****
1660
1670PRINT "Do you want another go?";
1680PROCyes_no
1690IF ans ENDPROC
1700REM reset
1710*FX202,32
1720*FX220,27
1730*FX213,100
1740*FX214,6
1750CLS
1760PROCprint(b,CHR#10+"Thanks for playing.")
1770PRINT "

```



# In the Hard Disk Jungle Tallgrass Clears a Path



In today's hard disk jungle, Tallgrass clears a path by offering high performance, integrated mass storage solutions for the IBM® PC and compatibles, the T.I. Professional and the Columbia computers.

## TALLGRASS INNOVATIVE FEATURES

**MASS STORAGE SYSTEMS** with formatted HardFile™ capacities of 6, 12, 20, 35 and 70 Mb, all with built-in tape backup.

**CONVENIENT INTEGRAL TAPE BACKUP SYSTEM** allows rapid tape "image" streaming, or incremental file-by-file backup and restore on ANSI standard inexpensive data cartridges, instead of the usual floppies, video cassettes, or low-capacity removable Winchester devices.

**NETWORK READY** and fully compatible with networks such as PCnet® and EtherShare.™

**HIGH RELIABILITY** with dual directory and read-after-write verify options. A dedicated landing zone, where the read/write heads reside when the disk is idle, provides data protection during powerdowns and transportation.

## NEW! TAPE BACKUP FOR IBM-XT

Tallgrass offers a streaming tape backup device to provide data security for the internal Winchester drive on your IBM-XT. If additional hard-disk storage is also required, the internal drive may be backed-up to a Tallgrass disk/tape subsystem.

**FOLLOW THE TALLGRASS PATH** to your local computer dealer and watch your personal computer transform into a powerful data processing system. Available from leading personal computer retailers throughout Australia.

*For further information call,  
Tallgrass Technologies Australia Pty Ltd,  
Suite 12, Five Dock Plaza,  
50 Great North Road,  
Five Dock N.S.W. 2046  
(02) 712 2010/712 2003*



**Tallgrass  
Technologies  
Australia**



## SOFTWARE AUTHORS AND 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" 48TPI or 96TPI

### Includes:

- ★ Z80A CPU at 4MHz
- ★ Printer, modem and terminal serial ports
- ★ 1 5" double sided 48TPI disk drive
- ★ 2 5" double sided 96TPI disk drives
- ★ 1 8" double sided 48TPI disk drive
- ★ 64K memory
- ★ Freedom 100 Terminal
- ★ CP/M 80
- ★ Diskette format conversion utilities

**Call for Pricing  
and Availability**

Also available,  
inexpensive CPM to CPM file  
transfer program (including COM  
files)

Commercial and  
Professional Microsystems  
9th Floor 505 St Kilda Rd  
Melbourne 3004  
Telephone: (03) 267 4755



## SERIAL TO PARALLEL PRINTER CONVERTER

Now you can use your parallel printer with  
any serial computer.

Complete with labels only  
**\$139.00 (incl. tax)**

### A & M Computer Solutions Pty Ltd

2 Prospect Hill Road,  
CAMBERWELL 3124  
Telephone (03) 813 3022

## MEDIA COPYING SERVICE

- ★ Copying of most formats.
- ★ Reasonable rates.
- ★ Quick turnaround.

Telephone:  
**(03) 772 0781** or  
**(03) 772 9177**

## PROGRAMS

```

1780PROCprint(0,"Do you want to save the information about "+type$+"s?")
1790PROCyes_no
1800IF NOT ans VDU26,12:PRINTCHR$b"Bye":END
1810file=UPENDOUT("$$.TREEDAT")
1820PRINT#file,type$,next
1830FOR I=1 TO next-1
1840PRINT#file,TREE$(1,1),TREE$(1,2),TREE$(1,3)
1850NEXT
1860CLOSE#0
1870VDU26,12
1880PRINTCHR$b"Bye"
1890END
1900 DEFPROCload_datafile
1910 *****
1920
1930file=OPENIN("$$.TREEDAT")
1940INPUT#file,type$,next
1950FOR I=1 TO next-1
1960INPUT#file,TREE$(1,1),TREE$(1,2),TREE$(1,3)
1970NEXT
1980CLOSE#0
1990PROCprint(0,CHR$10+"I have loaded the information from the file")
2000PROCdelay(100)
2010PRINT'
2020PROCprint(0,"I know "+STR$(next-1)+" "+type$+"s")
2030PROCdelay(100)
2040PROCcon
2050ENDPROC
2060 DEFPROCdelay(t)
2070 *****
2080wait=INKEY(t)
2090ENDPROC
2100 DEFPROCoFF
2110 *****
2120VDU23,1,0;0;0;0;
2130ENDPROC
2140 DEFPROCcon
2150 *****
2160VDU23,1,1;0;0;0;
2170ENDPROC
2180 DEFPROCinstruct
2190 *****
2200
2210PRINT
2220PROCprint(b,"Do you want instructions for the game?")
2230PROCyes_no
2240IF NOT ans ENDPROC
2250CLS
2260PROCoFF
2270PRINT
2280PROCprint(0,"You will be asked if you want to load a file containing
information about the tree or answer questions to start a new tree.")
2290PROCdelay(600)
2300PRINT'
2310PRINT"A type of tree might be"
2320PROCdelay(50)
2330PRINTTAB(5)CHR$y"animals'"
2340PROCdelay(250)
2350PRINT"The first question may be"
2360PROCdelay(50)
2370PRINTTAB(5)CHR$y"does it walk'."
2380PROCdelay(250)
2390PRINT'"I will ask questions in blue writing.'"
2400PROCdelay(50)
2410PROCprint(y,"Your replies will be in yellow.")
2420PROCdelay(700)
2430PRINT'CHR$q;"Here we go...."
2440PROCdelay(400)
2450PROCcon
2460ENDPROC
2470 DEFPROCtext_col(c)
2480 *****
2490REM poke colour outside text window
2500FOR I=&7C7B+VPOS*40 TO &7FC0STEP&28
2510?I=c
2520NEXT
2530ENDPROC
2540 DEFPROCheader
2550 *****
2560VDU26
2570CLS
2580FOR I=1 TO 2
2590PRINTCHR$(y)CHR$157CHR$132CHR$141SPC((34-LEN(type$))/2);type$
2600NEXT
2610REM text window to leave first col m blank
2620VDU28,1,24,39,3
2630ENDPROC
2640 DEFPROCprint(col,A$)
2650 *****
2660
2670IF col PROCtext_col(col)
2680IF LEN(A$)<39 PRINTA$;:ENDPROC
2690P=39
2700REPEAT
2710P=P-1
2720UNTIL MID$(A$,P,1)=""
2730PRINT LEFT$(A$,P)

```

# PROGRAMS

```

2740A$=RIGHT$(A$,LEN(A$)-P)
2750GOTO2680
2760REM ERROR ROUTINE
2770 *****
2780
2790IF ERR=129 PRINTCHR$13&CHR$r"
THE FILE IS NOT ON THE DISC":PROCdelay(600):RUN
2800PRINT"ODDS @ line ";ERL
2810REPORT
2820PRINT'
2830*FX202,32
2840*FX220,27
2850END
    
```



## Grid Bike

by David Pearson

Light cycles on the unexpanded VIC-20, impossible I hear you say — not so, because here they are. This game from David Pearson is a variation on the theme of light cycles called Grid Bike. You are presented with the multi-coloured grid on which some men are stranded.

Your mission is to collect all the men without chashing your bike into the sides of the playing arena or your own trail. On the easy stages this is not really a great

problem, but as you progress you will eventually want to try the harder version. Now you not only have to avoid your trail and the screen edges, you also have to dodge around some blocks that have been placed on the grid by the malicious maniacal machine (your computer under control of this program).

Accompanying the program are a set of notes that should help you to convert it to run on machines other than the VIC-20.

The program comes in two parts, the

first being a loader program. This loads up the user-defined characters into the memory and gives the playing instructions. The second, which is auto run from the first using the method of POKEing the load/run instructions into the keyboard buffer, contains the game itself. The main program can be run over and over as long as the defined characters are not overwritten, but from a cold start the loader program needs to be used.

### LOADER-PROGRAM NOTES

- 1000 Change the pointers to the string storage and the maximum memory allowed for Basic to leave room for the character definitions.
- 1010-1020 Define the characters from the data in lines 9010 to 9100.
- 5000 Print the codes to clear the screen and set text colour to white
- 5010 Set the screen colours, background and border to black.
- 5020-5175 Playing instructions and keypress prompt.
- 5180 Get any key from the keyboard, note that GET does not wait for a keypress and will return null if no key is pressed.
- 5190 Clear the screen.
- 5200 A few more instructions.
- 5300-5400 This POKEs Lo (carriage return) Ru (carriage return) into the keyboard buffer and sets the buffer pointer to 7 for 7 characters.
- 9000-9100 Data for the defined characters, note that the characters are one per line

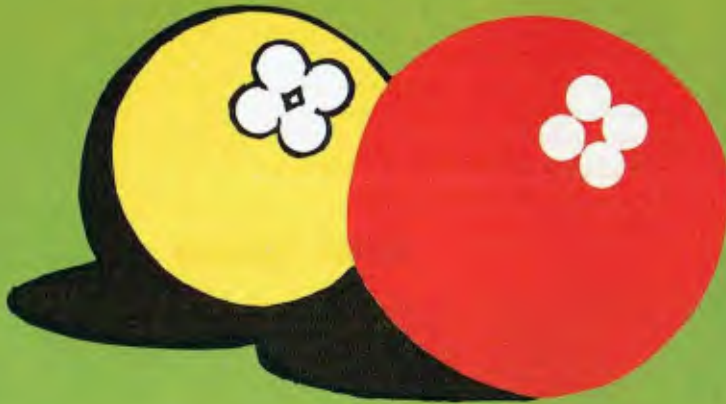
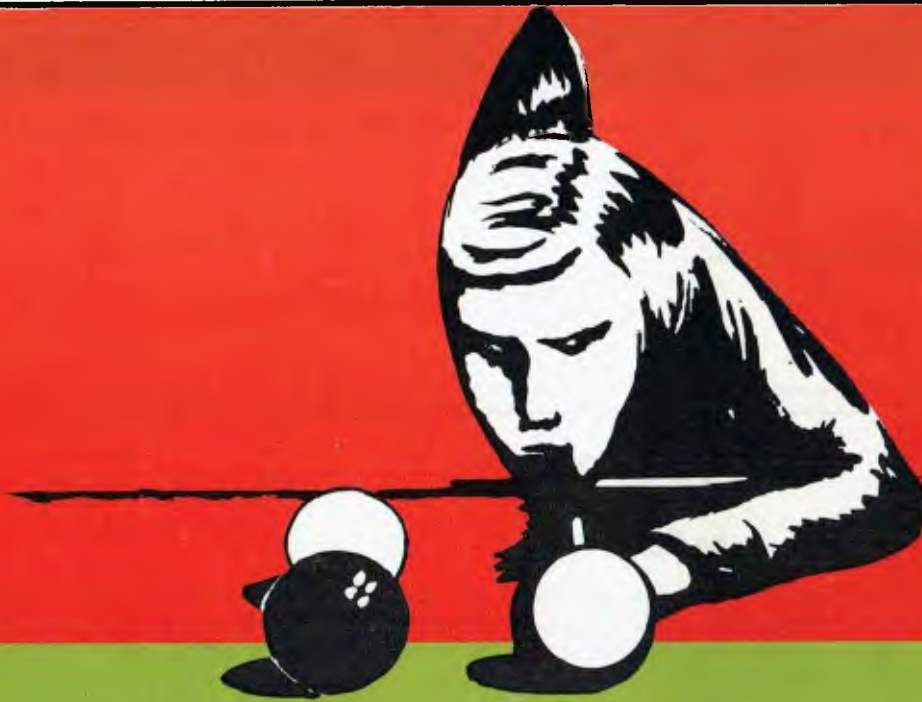
### LOADER PROGRAM

```

1000 POKE52,28:POKE56,28:CLR
1010 FORI=7168TO7256:POKEI,PEEK(I+25600):NEXT
1020 FORJ=7168TO7256:READQ:POKEJ,Q:NEXT
5000 PRINT"GRID BIKE"
5010 POKE36879,8
5020 PRINT"      █  GRID BIKE  "
5030 PRINT"MYOU ARE THE DRIVER  "
5040 PRINT"OF THE GRID BIKE."
5050 PRINT"YOU MUST DRIVE ROUND  "
5060 PRINT"THE GRID PICKING UP"
5070 PRINT"THE PEOPLE."
5080 PRINT"AS YOU DRIVE AROUND"
5090 PRINT"THE GRID YOU LEAVE A"
5100 PRINT"TRAIL."
5110 PRINT"IF YOU RUN INTO IT"
5120 PRINT"YOU WILL BE KILLED."
5130 PRINT"Z=LEFT"
5140 PRINT"X=RIGHT"
5150 PRINT"L=UP"
5160 PRINT"      =DOWN"
5170 PRINT"      █  PRESS ANY KEY"
5175 PRINT"      █  BY D. PEARSON"
5180 GETA$:IFA$=""THEN5180
5190 PRINT"GRID"
5200 PRINT"THIS PROGRAM LOADS THEGRAPHICS,SO LOAD IT EVERY
TIME"
5300 POKE198,7:POKE631,76:POKE632,207:POKE633,159:POKE634,13
5400 POKE635,82:POKE636,213:POKE637,13
9000 DATA0,231,255,255,255,255,231,0
9010 DATA126,126,126,60,60,126,126,126
9020 DATA255,129,129,129,129,129,129,255
9030 DATA24,24,24,24,24,24,24,24
9040 DATA0,0,0,255,255,0,0,0
9050 DATA0,0,0,31,31,24,24,24
9060 DATA0,0,0,248,248,24,24,24
9070 DATA24,24,24,248,248,0,0,0
9080 DATA24,24,24,31,31,0,0,0
9090 DATA255,255,255,255,255,255,255,255
9100 DATA28,28,8,62,8,20,34,65,0
READY.
    
```



**bubble bus**



# hustler

All enquiries for South  
Australia and Northern  
Territory:  
Universal Software  
P.O. Box 583, Cowandilla  
South Australia 5033  
(08) 219 4391

**For the Commodore 64, on cassette tape**

UNQUESTIONABLY one of the best games available on the COMMODORE 64.

Written in machine code and using sprite graphics to the full, HUSTLER takes game playing to new heights with its mixture of six games, for one or two players, and superb computer generated music.

*The HUSTLER includes the following games:*

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| 1. One Player — ANY BALL ANY POCKET | 4. Two Players — SCORE THE POCKETS  |
| 2. One Player — BALLS IN ORDER      | 5. Two Players — MINI POOL          |
| 3. One Player — BALL IN ITS POCKET  | 6. Two Players — LOWEST AND HIGHEST |

HUSTLER also keeps track of High Scores.

**only \$22.95 on cassette tape**

*Available from your local dealer.*

**DEALER ENQUIRIES WELCOME**

SOLE AUSTRALIAN DISTRIBUTOR — PROGRESSIVE SOFTWARE PUBLISHERS

P.O. Box 436, Pymble 2073 Telephone: (02) 446393



# PROGRAMS

## MAIN-PROGRAM NOTES

## MAIN PROGRAM

0	Set QWE to a random number using TI as a seed.	0 QWE=RND*(1-TI)
1	Clear all the variables from memory while leaving the program intact.	1 CLR
2	Prompt for easy or hard.	2 PRINT"DO YOU WANT EASY (E) OR HARD (H)?":INPUTTYU
3	Validate the answer.	3 IFTYU<1ORTYU>2THEN?
5	Clear the screen and set the sound volume to full; set the start of the character memory.	5 PRINT"!" POKE36878,15 POKE36869,255 10 A=8174:GRID=1:CH=1:DF=1:WT=3:NM=3:D=-22:SC=0:MAN=1 45 POKE36879,56 50 FORN=7680TO8195:POKEN,2:NEXT 60 FORN=3840TO38905:POKEN,6:NEXT 96 FORN=7680TO8164STEP22:POKEN,9:NEXT 97 FORN=3840TO38884STEP22:POKEN,0:NEXT 98 FORN=1TOMAN:RP=INT(RND(1)*506)+7680:IFPEEK(RP)<>2THENRP=RP+1 99 POKERP,10:NEXTN 100 IFTYU=1THEN103
10	Set up the variables used in the game.	101 FORN=1TO10:SP=INT(RND(1)*506)+7680:IFPEEK(SP)<>2THENSF=SP+1 102 POKESP,230:POKESP+30720,0:NEXT 103 POKER,CH:POKER+30720,2:POKER+(-D),WT 104 POKE36874,196:POKE36875,196:POKE36876,176 105 OD=D 106 IFNM=0THEN110 107 WT=NM 110 GETA\$
45	Border colour is yellow, background colour is white.	120 IFA\$="Z"THEND=-1:WT=4:CH=0 130 IFA\$="X"THEND=1:WT=4:CH=0 140 IFA\$="L"THEND=-22:WT=3:CH=1 150 IFA\$=","THEND=22:WT=3:CH=1
50	Fill the screen with user defined character 2.	160 A=A+D 162 IFPEEK(A)>2ANDPEEK(A)<10ORPEEK(A)=230THEN4000 163 IFPEEK(A)=10THENGOTO6100 165 GOTO3000
80	Fill the screen colour memory with blue, thus making all the characters POKE into the memory blue.	180 IFA<7680ORAD>8185THENGOTO4000 190 GOTO100
96	Fill the screen memory with user-defined character 9.	3000 IFOD=-22ANDD=-1THENNM=4:WT=6 3010 IFOD=22ANDD=-1THENNM=4:WT=7 3020 IFOD=-22ANDD=1THENNM=4:WT=5 3030 IFOD=22ANDD=1THENNM=4:WT=8 3040 IFOD=1ANDD=22THENNM=3:WT=6 3050 IFOD=1ANDD=-22THENNM=3:WT=7 3060 IFOD=-1ANDD=-22THENNM=3:WT=8 3070 IFOD=-1ANDD=22THENNM=3:WT=5 3080 GOTO100
98-99	Put men onto the screen in random positions, MAN is set to one in the first go.	4000 POKE36874,0:POKE36875,0:POKE36876,0 4001 FORKN=1TO10 4002 QN=128 4010 FORN=0TO7 4020 POKE(A+-D)+30720,N 4030 POKE36877,QN 4035 QN=QN+5 4040 NEXT 4050 NEXT 4055 POKE36877,0 4060 FORMJ=1TO250:NEXT 4070 POKE36869,240 4080 PRINT"!" 4090 POKE36879,0 4100 PRINT" 3 GRID BIKE "
100	Check the difficulty, if it is easy then don't put the random blocks onto the screen.	4110 PRINT"YOUR SCORE=":SC 4120 IFSCHSTHENHS=SC 4130 PRINT"HIGH SCORE=":HS 4140 PRINT"ANOTHER GAME(Y/N)?" 4150 GETA\$:IFA\$=""THEN4150 4151 RESTORE 4160 IFA\$="Y"THENGOTO4200 4170 IFA\$="N"THENEND 4180 GOTO4150
101-102	Put ten random blocks onto the screen and colour them.	4200 PRINT"DO YOU WANT (E) EASY OR (H) HARD 4210 INPUTTYU 4215 IFTYU<1ORTYU>2THEN4210 4220 PRINT"!" POKE36869,255:GOTO5 6100 DF=DF+1 6102 SC=SC+10 6105 IFFCMANTHEN165 6110 PRINT"!" POKE36874,0:POKE36875,0:POKE36876,0 6120 PRINT"GRID" :GRID="CLEARED" 6125 FORPT=1TO250:NEXT 6130 DF=0:MAN=MAN+1:GRID=GRID+1:SC=SC+100:A=8174: D=-22:WT=3:CH=1:NM=3:GOTO45
103	Put character CH (Bike character 1 or 0) into the screen memory specified by A. At the start of the game this is 8174 which is line 22, 10 characters across (bottom centre). This is then coloured red and a trail is left behind it by subtracting the movement amount D from A. The trail is in WT (chars 3 to 8 depending on the direction). Note that this line is the beginning in the main loop.	
104	Make the bike noise using a mixture of low medium and high range tones.	
105	Remember the old direction/position before changing it. Saved in OD.	
106	Check the trail.	
107	Get new trail if not zero.	
110	Get a key from the	

# PROGRAMS

	keyboard without waiting for it to be pressed.		left, puts and angled corner character onto the screen.	4080	Clear the screen and set the printing colour.
120	'Z' is left, thus D is set to -1, the trail and the bike are set to their horizontal values.	3010	Down to left.	4090	Set the foreground and background colours.
		3020	Up to right.	4100-4140	Print score and prompt for another game.
130	'X' is right.	3030	Down to right.	4150	Scan keyboard for answer.
140	'L' is up and D is set to -22 (this is the amount added to A for the new position). CH is set to the vertical character.	3040	Right to down.	4151	Reset the data pointers.
		3050	Right to up.	4160-4180	Validate and act on the reply.
		3060	Left to up.	4200-4220	Prompt for and get the difficulty, then clear the screen and restart the game.
150	'/' is down.	3070	Left to down.		
160	Update the screen position of the bike.	3080	Return to main routine.		
		4000	Turn off sounds.		
162	Check for a crash.	4001-4050	When/if you've crashed, this routine flicks the bike character through all the colours ten times by POKEing the colour memory with the colours specified by N. This line also triggers the noise generator for a crash sound.	6100	Increment the number of men picked up.
163	Check to see if a man has been picked up.			6102	Increment the score by ten.
165	Jump to corner routines at 3000.	4055	Turn the noise off.	6105	Check whether all of the men have been picked up.
180	Check to see if the bike has gone off the screen, if so then end game.	4060	Pause for a bit.	6110	Turn off all the sound.
190	Keep on going through the loop.	4070	Reset the character memory.	6125	Tell the player that the grid has been cleared.
3000	Set characters for up to			6130	Pause.
					Set up the variables for the next stage in the game.



## Heli-bomber

Robert Erskine

If you're fed up with games that have you whizzing around, you'll find it refreshing to return to Earth and struggle to cope with a fleet of helicopters whose pilots are committed to wiping out your fair city by foul means.

Thankfully you're in control of the

metropolitan laser tower, and it's up to you to shoot down the bombs before they hit the city. You'll get points for every bomb you hit, and while you can wipe out a chopper if you feel so inclined, you won't add to your tally by this kind of aggressive action.

You move your laser into sight with the Q, A, M and N keys. The game is over once one of the bombs finds a clear path to the ground or the laser tower itself is destroyed.

```

0 HS=0;POKE650,128;REM AUTO REPEAT 0
N ALL KEYS.
10 IFPEEK(53272)=21THENGOSUB9000
20 DIMSD%(24,21);SL$="XXXXXXXXXXXXXXXXXXXX"
" ;CL$=""
30 BD%=0;SC=0;HE=0;EN%=0;GOSUB20000
40 POKE53280,0;POKE53281,0
50 PRINT"XXXXXXXXXXXX DO YOU WANT INS
TRUCTIONS? (Y/N) "
60 WAIT198,15;GETA$;IFA$="Y"THENGOTO6
3
61 IFA$="N"THEN100
62 GOTO60
63 GOSUB10000
100 GOSUB1000;GOSUB1150;GOSUB2270
110 IFPEEK(198)>1THENPOKE198,1
111 DX=0;DY=0;GETA$;GOSUB21000
120 IFA$="Q"ORA$="●"THENDY=-1
130 IFA$="A"ORA$="▲"THENDY=1
140 IFA$="N"ORA$="/"THENDX=-1
150 IFA$="M"ORA$="\"THENDX=1
160 IFA$=" "ORA$=" "THENGOSUB1700
170 GOSUB21000;GOSUB1200;GOSUB1300
180 GOSUB21000;IFBD%=0ANDRND(1)>.85THE
NBD%=1;BX=HX;BY=HY+2
190 IFBD%=1THENGOSUB1400;IFEN%=1THEN1
000
200 PRINTLEFT$(SL$,18);SPC(19);PRINT" ";
998 GOSUB21000;GOSUB1600
999 GOTO110
1000 REM *** BUILD TOWN
1010 PRINT"J";FORN=0TO39
1020 H=INT(RND(1)*5)+20
1030 PRINTLEFT$(SL$,H);TAB(N);PRINTMID
$(CL$,RND(1)*7+1,1);
1040 FORX=HTO24
1050 PRINTCHR$(165)"|";NEXT;NEXT
1100 REM *** BUILD LASER TOWER
1110 PRINTLEFT$(SL$,18);TAB(19);" ";
1120 FORX=1TO6;PRINT"X";NEXT
1130 RETURN
1150 REM *** INITIALISE SIGHT POSITION
1160 SX=19;SY=10
1200 REM *** PRINT SIGHT
1202 PRINTLEFT$(SL$,SY+1);SPC(SX);" ";
1210 SY=SY+DY;SX=SX+DX
1211 IFSX>39THENSX=0
1212 IFSX<0THENSX=39
1213 IFSY<2THENSY=17
1214 IFSY>17THENSY=2
1230 PRINTLEFT$(SL$,SY+1);SPC(SX);" ";
RETURN
1300 REM *** MOVE HELICOPTER
1310 PRINTLEFT$(SL$,HY+1);SPC(HX-1);"
"
1320 HX=HX+INT(RND(1)*2)+1;IFHX>37THENH

```





# PROGRAMS

```

1,RND(1)*255:NEXT
20020 RETURN
21000 REM HELECOPTER SOUND
21001 POKE54276,0:POKE54277,0:POKE54272,
0
21002 POKE54276,129
21010 POKE54296,15:POKE54277,64
    
```

```

21020 POKE54273,10:POKE54272,255:POKE542
76,33:RETURN
22000 POKE54283,0
22001 POKE54296,V:POKE54284,15:POKE54280
,40:POKE54279,200:POKE54283,129
22002 RETURN
    
```



## Battlestar Fighter

by G & B Rushby

If, as an expert computer user, you have ever wanted to learn how to fly a star fighter, this simulator is what you have been looking for.

The game uses joystick port two to control the fighter, but can easily be converted to run from the keyboard (see

the accompanying notes). Notice that you are controlling your fighter and not the alien's. So, if the alien is above you, pull the stick back, if the alien is to your right then push the stick to the right to line yourself up so you can 'blast the alien out of the sky'.

The program makes good use of the 64's sprite facilities, to define the alien space craft that you're after. You have to hit the alien five times to kill it and it needs to be in the centre of your sights to hit it at all.

- 10-19 Copyright message
- 20 Set the screen and border colours then go to title page.
- 50 Set the sound register base at 54272.
- 60 Dimension the arrays used in the high score table.
- 100-105 Set sprite registers and define text as priority.
- 120-135 Declare all variables.
- 140-150 If G=0 then load the sprite data. If G=1 then no need to do it again.
- 160-171 Instructions option of first game. Subsequent games ignore this instructions option.
- 175 G=1, therefore preliminaries not needed again. Set the screen and border colours.
- 190 Gosub to screen print routine, then go to general initialisation and main routine loop.
- 200-202 Move left routine, includes part of the main sound routine at line 201.
- 203-204 Move the sprite left and test if the coordinates are allowed.
- 205-230 Deletes old radar image.
- 240-242 Move right routine. Includes part of the main sound routine at line 241.
- 243-244 Move the sprite right and test if the coordinates are allowed.
- 248-260 Delete the old radar image — POKE new radar image.

```

10 REM *****
12 REM
13 REM      BATTLESTAR FIGHTER
14 REM
15 REM WRITTEN BY BRIAN AND GARY RUSHBY
16 REM
17 REM      DECEMBER 1983
18 REM
19 REM *****
20 POKE53280,12:POKE53281,12:GOSUB2500
50 REM ** SOUND REGISTER *****
51 SD=54272
60 DIMSC$(5),SC(5),SH(5):FORJ=1TO5:SC$(J)="*****"
:SHC(J)=0:SH(J)=0:NEXTJ
100 REM** SET SPRITE REGISTERS *****
101 V=53248:POKEV+40,6:POKEV+44,6:POKEV+45,6:POKEV+46,2
:POKE53275,255
105 POKE2045,244:POKE2046,245:POKE2047,246
120 REM ** DECLARATION OF VARIABLES **
125 G=0:HI=0
130 SC=0:X=0:Y=0:I=0:SI=0:XP=0:XE=0:XR=0:XD=0:N=0:JY=0:M=0:Q=0
:S=0:TI$="000000"
135 YR=0:CL=0:F=500:A=0:SH=0
140 IF G=1 THEN GOTO 190
150 IFG=0 THEN GOSUB 5000
160 REM **INSTRUCTIONS OPTION*****
161 IFG=0 THENPRINT"*****"
:DO YOU REQUIRE INSTRUCTIONS(Y/N)?
167 GETA$:IFA$=""THEN 167/
169 IFA$<"Y" AND A$<"N" THEN 167
171 IFA$="Y"THEN GOSUB 3000
175 G=1:POKE53280,11:POKE53281,12
190 GOSUB 1000:GOTO 700
200 REM ** MOVE LEFT *****
201 POKESD+4,19
203 X=X-6:IFX<0 AND SI=2 THEN X=X+255:POKEV+16,0:POKEV+2,X:SI=0
204 IFX<0 AND SI=0 THEN M=0
205 IFXP<0 THEN XP=0
207 POKEXD+(YR-1)*40,160:POKEXD+54272+(YR-1)*40,5
211 XE=XP:XP=XP-6:IFXP<0 THEN XP=0
212 NR=1558+INT(XE*12/347)
218 POKEXR+YR*40,160:POKEXR+54272+YR*40,5
220 XD=1558+INT(XP*12/347)
225 POKEXD+YR*40,87:POKEXD+54272+YR*40,6
230 RETURN
240 REM ** MOVE RIGHT *****
241 POKESD+4,19
243 X=X+6:IFX>256 AND SI=0 THEN X=X-256:POKEV+16,2:POKEV+2,X:SI=2
244 IFX>90 AND SI=2 THEN X=90
248 POKEXD+(YR-1)*40,160:POKEXD+54272+(YR-1)*40,5
250 XE=XP:XP=XP+6:IF XP>347 THEN XP=347
252 XR=1558+INT(XE*12/347)
254 POKEXR+YR*40,160:POKEXR+54272+YR*40,5
255 XD=1558+INT(XP*12/347)
    
```



# PROGRAMS

```
825 IFCL/4=INT(CL/4) THEN N=INT(CL/4):YR=N
830 IF N<3 THEN N=3
835 IF YR<8 THEN GOTO 850
840 POKEV+21.1:POKEXD+280.160:POKEXD+54272+280.5
845 FORI=1TO2000:NEXT:A=0:GOTO 710
850 REM ** RANDOM MOVEMENT *****
851 M=INT(RND(1)*4)+1
855 ON M GOSUB 200,240,270,280
900 GOTO 770
1000 REM ** SCREEN PRINT *****
1005 PRINT"
1010 PRINT"
1020 PRINT"
1030 PRINT"
1040 PRINT"
1050 PRINT"
1060 PRINT"
1070 PRINT"
1080 PRINT"
1090 PRINT"
1100 PRINT"
1110 PRINT"
1120 PRINT"
1130 PRINT"
1140 PRINT"
1150 PRINT"
1160 PRINT"
1170 PRINT"
1180 PRINT"
1190 PRINT"
1200 PRINT"
1210 PRINT"
1220 PRINT"
1230 PRINT"
1240 PRINT"
1250 POKE2023,160:POKE56295,9
1260 POKE2040,240:POKEV+39.1:POKEV,175:POKEV+1.79:POKEV+21.1
1300 RETURN
1500 REM** END OF GAME *****
1505 POKEV+21.0:FORL=0 TO 24:POKESD+L.0:NEXT
1510 POKESD+14.5:POKESD+18.16:POKESD+3.1:POKESD+24,143:POKESD+6,240:POKESD+4,65
1515 FR=5389
1520 FORI=0TO70 : POKE53265,PEEK(53265)AND239
1525 FQ=FR+PEEK(SD+27)*3.5 : HF=INT(FQ/256):LF=FQ-HF*256
1530 POKESD,LF:POKESD+1,HF
1535 POKE53265,PEEK(53265)OR16
1540 NEXTI
1545 POKESD+24,0
2000 PRINT"
2002 PRINT"YOU SCORED ";SC "POINTS"
2003 PRINT"YOU DESTROYED ";SH "ALIEN SHIPS"
2025 IF HI<SC THEN HI=SC:PRINT" A NEW HI-SCORE
2030 PRINT"HI-SCORE=";HI
2100 FORX=0TO20:GETA$:NEXTX : Z=0:FORX=1TO5:IFSC>SC(X)THENZ=X:X=11
2105 NEXTX:IFZ=0THEN2140
2110 PRINT"ENTER YOUR NAME:"
2115 INPUT A$:IF LEN(A*)>10THENA$=LEFT$(A$,10)
2120 IF Z=5 THEN2130
2125 FORX=4TOZ STEP-1:SC(X+1)=SC(X):SC$(X+1)=SC$(X):SH(X+1)=SH(X):NEXTX
2130 SC(Z)=SC:SC$(Z)=A$:SH(Z)=SH
2140 PRINT"HIGH SCORE TABLE"
2150 PRINT"
2151 PRINT"TAB(5);"SCORE";TAB(13);"SH"
2152 PRINTTAB(5);" ";TAB(13);" "
2155 FORX=1TO5:PRINT"X";TAB(5);SC(X);TAB(12);SH(X);TAB(18);SC$(X)
2160 NEXTX:X=FRE(0)
2240 PRINT:PRINT"DO YOU WANT ANOTHER GO"
2250 GET A$:IF A$=""THEN 2250
2260 IF A$="Y" THEN PRINT"GO" GOTO 130
2270 IF A$="N" THEN PRINT"BYE" END
2280 IF A$<>"Y" AND A$<>"N" THEN 2250
2500 REM ** TITLE PAGE *****
2501 PRINT"*****"
2505 PRINT"*****"
2510 PRINT"
2515 PRINT"
2520 PRINT"
2525 PRINT"
2530 PRINT:PRINT
2535 PRINT"
2540 PRINT"
2545 PRINT"
2550 PRINT"
2555 PRINT:PRINT
2560 PRINT"
2561 PRINT
2565 PRINT"
2566 PRINT
2573 PRINT:PRINT
```





# PROGRAMS

## Bridge Builder

The aim of this game is to build a bridge across the top of the ravine. This is achieved by building a series of beams vertically and horizontally.

This cursor can be moved up or down — but not diagonally — using a joystick

plugged into port 1. The game is made more difficult by an inspector (the man in black) who checks to make sure the bridge is built correctly.

The beams must always start below the inspector, and after every beam has been

built the inspector moves to a different position. The horizontal beams must be supported at both ends, either by the ground or by other beams.

The aim is to build a bridge in as few days as possible.

```

0
100 GRAPHICS 0
105 POSITION 13,0:?" BRIDGE BUILDER"
110 POKE 752,1:OPEN #2,4,0,"K:"
115 ? :?
120 ? " YOU ARE NOW AN OFFICIAL ENGINEER!":?
125 ? " YOUR MISSION IS TO BUILD A BRIDGE"
130 ? "CONNECTING THE TWO BLOCKS AT THE TOP"
135 ? "OF THE SCREEN. YOU DO SO BY PLACING"
140 ? "BEAMS ALONG THE INSPECTOR'S FEET."
145 ? "SIMPLY MOVE THE POINTER TO THE PLACE"
150 ? "WHERE YOU WISH TO PLACE A BEAM, THEN"
155 ? "ENTER THE DIRECTION YOU WISH TO SET"
160 ? "THE BEAM. TRY TO CONSTRUCT THE BRIDGE"
165 ? "IN AS FEW DAYS AS POSSIBLE."
170 ? :? :? :?
175 IF STRIG(0)<X1 THEN 185
180 GOTO 175
185 GRAPHICS 5:SETCOLOR 2,0,0
190 POKE 752,1:SETCOLOR 1,11,10
195 SETCOLOR 0,15,2:SETCOLOR 4,0,4
200 COLOR 1
205 FOR X=0 TO 79:PL0T X,39:NEXT X
210 PLOT 0,0:DRAWTO 5,0
215 PLOT 0,0:DRAWTO 5,9
220 PLOT 79,0:DRAWTO 74,0
225 PLOT 79,9:DRAWTO 74,9
230 Y=10:D=71:X=4
235 PLOT 0,Y:DRAWTO X+3,Y
240 PLOT 79,Y:DRAWTO X-3,Y
245 Y=Y+1
250 IF INT(RND(0)*10)>3 THEN X=X+1:0=0-2
255 IF Y=39 THEN 265
260 GOTO 235
265 X=29:INT(RND(0)*17):Y=38
270 GOSUB 915
275 M=INT(RND(0)*31)+25:N=0
280 LOCATE M,N+1,XX
285 IF XX<0 THEN 295
290 N=N+1:GOTO 280
295 N=N-10:IF N<0 THEN N=0
300 ? :? :? :? :?
305 ? "USE JOYSTICK TO MOVE BEAM POINTER..."
310 ? " DAY M "18A+1" OF CONSTRUCTION"
315 IF M>76 THEN M=76
320 COLOR 2:PL0T M,N
325 FOR XX=1 TO 20:NEXT XX
330 C=STICK(0):IF C=15 THEN 325
335 IF C=7 THEN 340
340 IF C=11 THEN 380
345 IF C=13 THEN 400
350 IF C=14 THEN 410
355 GOTO 315
360 LOCATE M+1,N,XX
365 IF XX<0 THEN 435
370 COLOR XX:PL0T M,N
375 M=M+1:COLOR 1:GOTO 315
380 LOCATE M-1,N,XX
385 IF XX<0 THEN 435
390 COLOR XX:PL0T M,N
395 M=M-1:COLOR 1:GOTO 315
400 LOCATE M,N+1,XX
405 IF XX<0 THEN 435
410 COLOR XX:PL0T M,N
415 N=N+1:COLOR 1:GOTO 315
418 IF N<0 THEN LOCATE M,N-1,XX
419 IF XX<0 THEN 435
420 COLOR 0:PL0T M,N
425 N=N-1:IF N<1 THEN N=1
430 COLOR 2:GOTO 315
435 IF XX=3 THEN 330
437 IF N<Y THEN ? :? :?"STICK MUST START BELOW
INSPECTOR!":COLOR 0:PL0T M,N:CO
LOR 1
440 IF N<Y THEN FOR I=1 TO 200:SOUND 0,36,36,
36:NEXT I:SOUND 0,0,0,0:GOTO 380
445 ? :?
446 ? " PRESS BUTTON TO BUILD HERE!":?
:FOR DELAY=1 TO 100:NEXT DELAY:POKE 7
7,0
447 IF STRIG(0)=0 THEN 450
448 IF STICK(0)<X15 THEN 380
449 GOTO 447
450 ? :?
452 ? " USE JOYSTICK TO SET BEAM"
455 ? " IN EITHER DIRECTION"
460 REM
465 D=0:C=STICK(0)
470 IF C=15 THEN 465
475 IF C=14 THEN D=1
480 IF C=11 THEN D=2
485 IF C=7 THEN D=3
490 IF D<1 OR D>3 THEN 465
495 DA=DA+1:M1=M-N+1
500 00=0
505 FOR I=1 TO 10
510 00=00+1
515 SOUND 0,100,60,100
520 FOR XX=1 TO 10:NEXT XX
525 SOUND 0,0,0,0
530 IF M>76 OR N>6 OR X<2 THEN 585

```

```

535 COLOR 2:PL0T M,N
537 ON D GOTO 538,539,540,541
538 LOCATE M,N-1,XX:GOTO 545
539 LOCATE M-1,N,XX:GOTO 545
540 LOCATE M+1,N,XX:GOTO 545
541 LOCATE M+1,N,XX
545 IF XX=0 THEN 550
546 I=18:GOTO 555
550 I=I+INT(RND(0)*31)-1
555 ON D GOTO 560,565,570,575
560 N=N-I:GOTO 580
565 M=M-1:GOTO 580
570 M=M+1:GOTO 580
575 N=N+1
580 NEXT I
585 LOCATE M,N+1,XX
590 IF XX<0 AND XX<3 OR D=1 THEN 695
595 M=N-1:N=N1
600 ? :?
605 ? " BOTH ENDS OF BEAM MUST BE SUPPORTED!"
610 FOR I=1 TO 200:SOUND 0,36,36,36
615 NEXT I:SOUND 0,0,0,0
620 REM
625 FOR I=1 TO 00:COLOR 0
630 PLOT M,N
635 SOUND 0,100,60,100
640 FOR XX=1 TO 10:NEXT XX
645 SOUND 0,0,0,0
650 ON D GOTO 655,660,665,670
655 N=N-1:GOTO 675
660 M=M-1:GOTO 675
665 M=M+1:GOTO 675
670 N=N+1
675 IF N<2 THEN 685
680 NEXT I
685 REM
690 GOTO 275
695 SOUND 0,0,0,0
700 M=0:IF X<M THEN M=1
705 ? " INSPECTION...":? :?
710 FOR I=1 TO INT(RND(0)*40)+10
715 SOUND 0,60,0,10:SOUND 0,0,0,0
720 GOSUB 935
725 IF M=1 THEN 775
728 REM WALKING LEFT
730 LOCATE X,Y+1,X1
735 LOCATE X+2,Y+1,X2
740 LOCATE X-1,Y+1,X3
741 LOCATE X+1,Y+1,X4
745 IF X1+X2+X3+X4=0 THEN Y=Y+1:GOTO 815
750 LOCATE X-1,Y,XX
755 IF XX=0 THEN X=X-1:GOTO 815
760 LOCATE X,Y-1,XX
765 IF XX=0 THEN Y=Y-1:GOTO 815
770 GOTO 815
772 REM WALKING RIGHT
775 LOCATE X,Y+1,XX
778 LOCATE X+1,Y+1,X1
780 LOCATE X+2,Y+1,X2
785 LOCATE X+3,Y+1,X3
790 IF XX+X1+X2+X3=0 THEN Y=Y+1:GOTO 815
795 LOCATE X-3,Y,XX
800 IF X=0 THEN X=X+1:GOTO 815
805 LOCATE X,Y-1,XX
810 IF XX=0 THEN Y=Y-1:GOTO 815
815 GOSUB 915
820 IF Y<4 OR X<5 OR X>69 THEN 830
825 NEXT I
830 REM
835 FOR I=5 TO 75:FOR J=5 TO 10
840 LOCATE I,J,XX:IF XX<0 THEN 850
845 NEXT J:GOTO 275
850 NEXT I
855 FOR Z=1 TO 5
860 FOR Z1=200 TO 00 STEP -7
865 SOUND 0,Z1,10,7
870 SOUND 1,Z1+7,10,7
875 SOUND 2,Z1+14,10,7
880 NEXT Z1:NEXT Z
885 ? "YOU'RE DONE AND TOOK "18A1" DAYS!":?
890 FOR X=0 TO 2:SOUND X,0,0,0:NEXT X
895 ? "PRESS TRIGGER TO PLAY AGAIN"
900 POKE 77,0
905 IF STRIG(0)<X1 THEN RUN
910 GOTO 905
915 COLOR 3:PL0T X,Y:PL0T X+1,Y-1
920 PLOT X+2,Y:PL0T X+1,Y-3
925 PLOT X,Y-2:PL0T X+1,Y-2
930 PLOT X+2,Y-2:RETURN
935 COLOR 0:PL0T X,Y:PL0T X+1,Y-1
940 PLOT X+2,Y:PL0T X+1,Y-3
945 PLOT X,Y-2:PL0T X+1,Y-2
950 PLOT X+2,Y-2:RETURN

```

# MICRO EXCHANGE

Continued from page 160

COMMODORE 2000 TO 8000 SERIES. \$500.00 THE LOT. PHONE FRITZ (03) 754 6765.

REVIVE YOUR PET WITH THE FOLLOWING IMPORTED NEW GAMES: ASTEROID HUNT \$9.99, LUNAR LINK \$9.99, KILLER FISH \$11.00, ASTEROID CRUISER \$9.99, WRITE TO ANTHONY DOUGLASS, 8 FAIRYOELL RD, 2160 TECOMA.

SET OF EIGHT BY 4116 DYNAMIC RAM CHIPS SUITABLE FOR UPGRADING KOMTEK ONE FROM 16K TO 32K. \$12.90 INCLUDING POSTAGE. DON MCKENZIE 29 ELLESMERE CRES., TULLAMARINE 3043 (03) 338 6286.

SYS-80 AND TRS-80 MODEL ONE USERS. SEND ME A 60 CENT STAMP AND I WILL FORWARD YOU MY CATALOGUE ON AVAILABLE HARDWARE MODIFICATIONS. DON MCKENZIE 29 ELLESMERE CRES., TULLAMARINE 3043.

SYS-80 AND TRS-80 FAST TAPE UTILITY ROM. LOADS, SAVES & VERIFIES BASIC OR SYSTEM PROGRAMS AT 1500 OR NORMAL 500 BAUD. INCLUDES 22 OTHER POWERFUL FUNCTIONS. \$35.00 GEOFF LOHRERE (03) 543 1485.

SYS-80 AND TRS-80 USERS WITH HARDWARE LOWERCASE, HAVE INSTANT LOWERCASE DRIVER ON POWERUP AND OPTIONAL AUTOMATIC EPROM INITIALIZATION WITH MY PLUG IN ROM REPLACEMENT. NO WIRES. \$16.00. GEOFF LOHRERE (03) 543 1485.

SYS-80 3.5K TWO ROM SUPER UTILITY. 37 POWERFUL FUNCTIONS. SIX ADDITIONAL BASIC COMMANDS. NEEDS MY THREE EPROM PLUG IN BANK SELECT BOARD. ASSEMBLED P.C.B. \$27.00 EPROMS \$55.00 GEOFF LOHRERE (03) 543 1485.

SYS-80 AND TRS-80 32K OR 48K ON BOARD MEMORY UPGRADE. 48K UPGRADE USES 4164 64K IC'S. NO PIGGYBACKING! LESS POWER DRAIN.

32K \$45.00 FITTED. 48K \$95.00 FITTED GEOFF LOHRERE (03) 543 1485.

SYS-80 AND TRS-80 LOWERCASE. FULL DECENDERS. TWO CHARACTER SETS STANDARD. SECOND SET, COMPUTER STYLE CHARACTERS. PORT SWITCHABLE. EASY INSTALLED PLUG IN BOARD. SYS-80 \$45.00 TRS-80 \$35.00 GEOFF LOHRERE (03) 543 1485.

SYS-80 DISK COMPATIBLE TWO EPROM PLUG IN BOARD. PORT SWITCHABLE. FOUR POWERFUL 2K UTILITIES AVAILABLE WHICH RESIDE IN UNUSED AREA AT 3000H ASSEMBLED \$17.00. ROMS \$35.00 EACH GEOFF LOHRERE (03) 543 1485.

THE EDITORIAL STAFF OF THE ALTERNATIVE SOURCE U.S.A. PREFER AND USE MY LOWERCASE CHARACTER GENERATOR IN THEIR TRS-80 MODEL ONE. GENERATOR AND P.C. BOARD \$18.90 SUIT SYS-80 ALSO. DON MCKENZIE (03) 338 6286

### QUEENSLAND

EXTEND TRS-80/SYSTEM 80 FROM LEVEL II TO BEYOND DISK BASIC. RUNS 16K, 32K, 48K MODEL I, MODEL III AND COMPILES A CUSTOMISED MACHINE LANGUAGE PROGRAM OF YOUR CHOICE. \$49.95 PHONE WARWICK (07) 209 9821

MICROBEE WALL CHARTS, 850 X 600, ESSENTIAL FOR SERIOUS USERS, CONTAINS 64 X 16 CURS AND SCREEN POKE LOCATIONS, MEMORY MAP, ASCII TABLE, ALL GRAPHICS CHARACTERS. \$9.50 9INC.POSTAGE) TO J.KOCKA, 14 TANAHMERAH AVE., TANAHMERAH 4128

QUALITY APPLE COMPATIBLE CPU'S FROM \$650 EACH; USA SHUGART MECHANISM DISK DRIVES \$350 EACH (ALL TAX INCLUDED) ADD-ON CARDS, LITTLE INTELLIGENT COMPUTERS (LIC) AT BARGAIN PRICES WITH FULL WARRANTY PHONE (03) 572 2406 ANYTIME.

TRS-80 MODEL 1 48K DUAL DISKS PRINTER GREEN SCREEN SOFTWARE INCLUDES TRSOOS; NEWDOS/80; VISICALC; VISAGRAPH; LAZYWRITER WORDPROCESSOR; MAXI MANAGER DATA BASE ASSEMBLER EDITOR TEXTS MANUALS MUCH MORE \$3,150.00 KENMORE 378 6087.

TRS-80 GRAPHICS PRINTER DRIVER. LPRINT OR SCREENPRINT TANDY GRAPHICS ON ITOH 8510, STAR DP8480, EPSON MX/FX 80, LPVII, LPVIII, CASSETTE \$20.00. DISK \$25.00. MODELS I & III SPECIFY PRINTER G. HILDER 242 DENHAMS ST, ROCKHAMPTON 4700.

WANTED: DISTRIBUTORS & SOLE DISTRIBUTORS FOR PET, C64 & VIC GAMES. WRITE FOR FREE CATALOGUE TO ANTHONY DOUGLASS - 8 FAIRYOELL RD, TECOMA 3160

### WESTERN AUSTRALIA

PERSONAL COMPUTER REPAIRS AVAILABLE FOR SYSTEM 80 TANDY APPLE MICROBEE ETC. MEMORY UPGRADES CUSTOM INTERFACING TV/MONITOR CONVERSION. CONTACT JOHN WESTERN J & T COMPUTER SERVICES ON (09) 401 2733

WANTED: 8 INCH DISK DRIVES. EITHER 1 OR 2 WITH POWER SUPPLY. PREFER SS/SO BUT WILL CONSIDER BETTER DRIVES. PAUL SHIELDS 2139 SMQ DAMPIER W.A. 6713 PHONE (091) 83 1724 A.H. & (091) 83 1000 B.H.

### LATE VICTORIAN ENTRIES

CPM USERS GROUP DISCS UP TO NO 95 INC. BUSINESSMASTER II CATALOGUE \$8.00 8" SS/SO DISCS \$9.00 MICROBEE \$10.00 OTHERS AVAILABLE \$1.00 P&P PER ORDER R.B. ARCHER & ASSOC. P.O. BOX 696 RINGWOOD VIC. 3134

Please find enclosed my cheque/P.O. for \$5.00/\$7.50 for the following ad.


NAME..... ADDRESS.....

Postcode.....





## NEW GENERATION COMPUTER STORE PTY LTD PRESENTS . . .

### DATALINE BY IGTUR SOFTWARE

DATALINE is a new Australian designed and produced communications system which drives Modem Technology (1000 - 1200 Modem and Novation Call in the popular D.C.S.D. Phase 1 Environment) and gives the user a wide range of capabilities for communication with databases and other computers. The range of functions provided by DATALINE include:

**AUTO-DIAL:** Numbers can be fetched automatically from DATALINE's Phone Directory and dialed by the system. All your most commonly used numbers of the system are also available.

**FILE HANDLING:** Personal files can be sent and received onto a disk (write, direct, all processing and output) or onto a terminal (write, direct) or to a screen (write, direct) or to a printer (write, direct).

**PHONE DIRECTORY SYSTEM:** You can create an unlimited number of Phone Directories using extra disks if necessary (each directory can contain up to 127 entries in the following format:

**NAME:** New Generation Computer Store  
**ADDRESS:** 93 Longueville Road  
**SUBURB/CITY:** Lane Cove, NSW 2066  
**PHONE:** (02) 427 4781  
**CONTACT:** Mike George - Sales

Entries within a Phone Directory are automatically sorted into alphabetical order and can be changed or deleted. Each Phone Directory can be protected by a password.

**COMMAND FILE SYSTEM:** This allows you to create a file of DATALINE functions which will subsequently be executed simply by typing in the name of the Command File. Any number of such files can be created. Apart from making the system easier for you to use they also enable it to be operated in your absence (e.g. by an inexperienced user or automatically in conjunction with a clock).

**FEATURES:** Low Cost, High Performance  
Australian Developed Communications System  
**AUTO BOOT AVAILABLE**

### DATATREE DATA CASSETTE

DATATREE offers you a professional cassette tape DATA CASSETTE which is specifically designed with SQUARE WAVE OUTPUT to ensure 100% data transmission.

DATATREE also has built-in counter, SAVE indicator, PAUSE and AUTO STOP etc. All these make your data storage/retrieval an easy thing - fast and accurate!

DATATREE is compatible with ALL KINDS OF HOME COMPUTERS. It's the best choice today and it's at incredible low cost!

#### SPECIFICATIONS

- \* Square wave output 100% data transmission

DATA CASSETTE

Common cassette player

- \* Stable output voltage 2.5V (no need to adjust)
- \* Frequency response: 100Hz to 6.3K Hz  $\pm$  dB
- \* Input/Output impedance: 10K ohm
- \* Tape speed allowance: Wrms 0.35%
- \* Wow and flutter: Wrms 0.35%
- \* Power: 1.7V AC 60Hz, 220/240V AC 50Hz, or 9V DC 200mA
- \* Built-in counter, SAVE indicator, PAUSE and AUTO STOP function
- \* Size: 198 x 158 x 55mm 7.78" x 6.2" x 2.18"
- \* Weight: N.W. 700g
- \* Packing: 1pc/box with polyfoam 12pc/box/100pc/box

Specifications subject to change without notice.

**\$69.00**

DEALER ENQUIRIES  
WELCOME



## NEW GENERATION COMPUTER STORE

93 LONGUEVILLE ROAD, LANE COVE 2066.

TEL: (02) 427 4781, 427 4780



# BASF

Introducing a totally new level of excellence in magnetic media — the "qualimetric" standard. The "qualimetric" standard is maintained without compromise through every step of BASF design, production, inspection, and testing . . . reflecting an unwavering BASF commitment to media fidelity and durability.

For information security, tomorrow and beyond, look for the distinctive BASF package with the "qualimetric" seal.

#### Introductory offer:

Box of 10 Flexydisk 5.25, single side, in de Luxe library case for **\$38.50**

Free delivery anywhere  
in Australia

Comprehensive range in diskettes and computer tapes



**PERIMEDIA PTY LTD**  
357 Nicholson Street,  
Carlton North 3054  
Ph: (03) 347 7416

Fill out coupon and return with  
cheque to Perimedia Pty Ltd,  
357 Nicholson Street,  
Carlton North 3054

Company Name .....

Address .....

Phone .....

boxes of BASF Flexydisk 5.25 s/s

You find what you want at  
the last place you look  
See them all if you like —  
but **Last Word** can be  
your best last call — — —

Dual-Processor Computer (Z80A & 6502  
64k with 80 column upper & lower case and  
equipped with a host of functions . . . . **\$740.00**  
Hi-Res Green Screen Monitors . . . . **\$179.00**  
5 1/4" Shugart Drives (This month only) . . . **\$300.00**  
5 1/4" Controllers (to suit Apple™) . . . . **\$75.00**

(Sales tax incl. Shipping extra)

## Special mail offer — diskettes

QUALITY GUARANTEED DATALIFE VERBATIM  
Mailed anywhere in Australia. Sales Tax Included

5 1/4" Single-sided, Double-density — Box of 10 . . . . **\$35.00**  
5 1/4" Double-sided, Double-density — Box of 10 . . . . **\$46.00**  
8" Single-sided, Double-density — Box of 10 . . . . **\$50.00**  
8" Double-sided, Double-density — Box of 10c. **\$54.00**  
5 1/4" Drive Head-cleaning Kit . . . . **\$12.00**

38 WARATAH ST, OATLEY, 2223  
TELEPHONE: (02) 570-5197

## Last Word



## Tridata Pacific

SPECIALISTS IN NEW GENERATION COMPUTERS  
Incorporated in NSW

Texas Instruments PC  
Sharp  
Televideo  
Commodore 64  
Printers  
Softwares etc.



## SUPER SPECIALS (until stock runs out)

Texas Instruments P.C.  
2 DSDD incl: Monitor **\$3800.00\***  
GEMINI 10 120CPS Printer **\$375.00\***  
(\*Plus sales tax if applicable)

Check out our price on other products. We will try to better  
any legitimate deal.

SEND IN YOUR ORDERS NOW!!

B27/B24 Markets Plaza Building, Flemington Markets,  
N.S.W. 2129

P.O. Box 165, Flemington Markets, N.S.W 2129

# ADVERTISERS INDEX

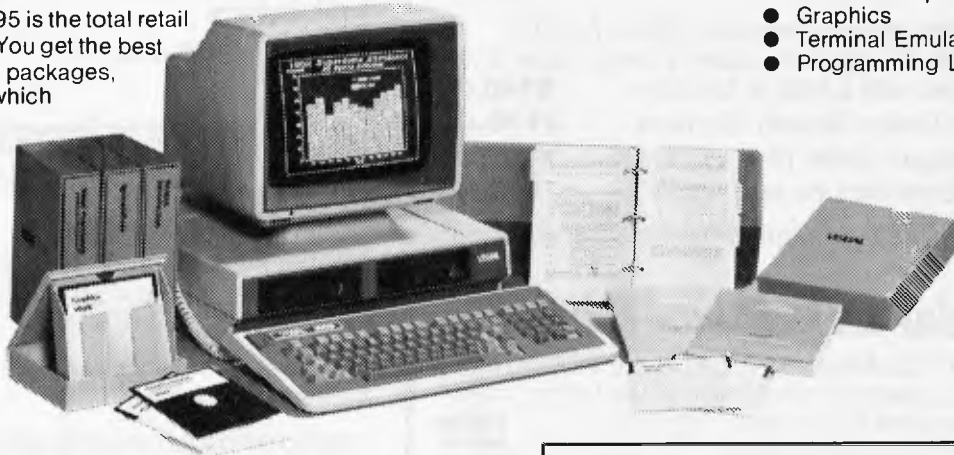
ACT..... OBC	Computer Galerie ..... 44	KJ Computer Services..... 171	Padmede ..... 144
Australian Exhibition Services..... 6.7.8	Computermax..... 14	Last Word..... 183	Perimedia..... 183
Alpha Media Sales..... 163	Computer Simulations..... 66	Lothlorien Software..... 167	Pitman Publishing..... 31
A&M Computer Solutions..... 12.85.170	The Computer Spot..... 76	Magmedia..... 167	Prentice-Hall..... 45
Amust..... 9.48.49.50	Computerware..... 166	Maxwell Office Equipment..... 75	President Computers..... 142
Applied Technology... 150.151	Country Soft..... 32	Media Copying Service..... 170	Progressive Software Publishers..... 13.172
Arbiter Electronics..... 182	Creative Electronics..... 61	Melbourne House..... 42.43	PSI Paperwork Systems..... 118
Archives Computers (Australia)..... IBC	CW Electronics..... 115	Memorex..... 11	Reading Matters..... 167
Archive Computer Services Sydney..... 2	Data Decor..... 148	Merton Scott..... 164	Robs Computer Centre..... 26.27
Arcom Pacific..... 70	Data Flow..... 29	Microbuff Computers..... 66.67.79.106	Rod Irving..... 100
ASP..... 161	Data Parts..... 98	Microdata Base Systems..... 58	J.W. Ross..... 155
Australia Computer Software..... 32	Data Peripherals..... 40	Micro Educational..... 86.87.103.105.107.109.123.125.127.129	S.D. Computer Research..... 156
Automation Statham..... 112	Datascap..... 31	Micro 80..... 119	Softpac Enterprises..... 166
Bayne & Trembath..... 25	Deforest Software..... 75	Micro International..... 39	Sourceware..... 117
BS Microcomp..... 128	Deker Business Machines..... 71	Micromail..... 120	South Pacific Software..... 124
BVP..... 108	Dick Smith..... 54.55	Micropro Computers..... 136.139	System Solutions..... 141
Calcutronic..... 25	Digital Source International..... 68	Microprogramming..... 83.99	Tallgrass Technologies..... 169
Case Communications..... 74	EDP Systems..... 130	Microvisions..... 168	Tandy Australia..... 152
Caulfield Business Systems..... 41	Electro Med..... 164	Multisoft..... 182	T.N.L. Computers..... 28
Centre Industries..... 72	Entercom..... 33	Nashua..... 30	Toshiba..... 73
Commercial & Professional Microsystems..... 15.190	Emerald Hill Computer Brokers..... 47	NEC..... 36.37	Trudata Pacific..... 182
Compak Computer Centre..... 18.19.22.23	Futuretronics..... 38	New Generation Computer Store..... 183	Uni Co-op..... 126.153
Computer Edge..... 89-96	Gambit Games..... 156	Nimari..... IFC.1	Video Technology..... 165
	Gametronics..... 65	Ozi Soft..... 10.16	Warburton Franki..... 104
	Hewlett Packard..... 111		Z80 Programming..... 162
	High Technology..... 17		Zygotech..... 35
	Home Computers..... 28		
	Kenelec..... 64.184		

## Introducing the VISUAL 1050 . . . The Complete Professional Solution at an Unbeatable Price

**Complete Solution.** The VISUAL 1050 is an advanced personal computer system designed especially for managers and professionals. It comes complete with top-rated software and high-performance hardware.

**Words, Numbers and Graphics.** Whether you work with words, numbers, or graphics, the VISUAL 1050 speaks your language. You get WordStar™, Multiplan™, and DR Graph™.

**Unbeatable Value.** \*\$2,995 is the total retail price for the VISUAL 1050. You get the best and most popular software packages, ready to run on hardware which offers the features and quality you should demand.



### HANDLE ALL YOUR BUSINESS NEEDS:

- Word Processing
- Mailing Lists
- Electronic Spreadsheet
- Graphics
- Terminal Emulator
- Programming Language

**KENELEC (AUST.) PTY. LTD.**  
(INCORPORATED IN VICTORIA)

**DEALER ENQUIRIES WELCOME**

\* Plus Sales Tax

48 Henderson Rd, Clayton, Vic. 3168. Telephone (03) 560 1011  
NSW (02) 439 5500 Q'LAND (07) 393 0909 SA (08) 42 6877 WA (09) 322 4542



# PRICE NEED NOT DECEIVE



## The System

The Archives PC provides powerful processing capabilities in a compact package designed to meet the most comprehensive needs of serious computer users.

This friendly computer includes tutorials to teach you how to utilise the full power of the famous Perfect Writer, Perfect Speller, Perfect Filer and Perfect Calc programs. All these are included at the Perfect Price of no additional cost.

The Archives PC's high capacity disk driver can enable you to type a single document for a week without filling a single diskette. Or if you are computizing records, this powerful little system can store literally tens of thousands of records.



Amazing power from such a small package.

## The Business Package

Based on the most common needs of business users over the past 18 months, we have packaged an unbeatable value business system. With 2 million characters storage, the business system could run your whole business without the need to continually change diskettes. The speed and efficiency will amaze you, with functions to impress any business manager.

The complete business system on lease costs only \$29 per week!

## Price Leadership

You compare the Archives PC features with other available systems. If we're not clearly the price leaders we'd like to know! Call us now.



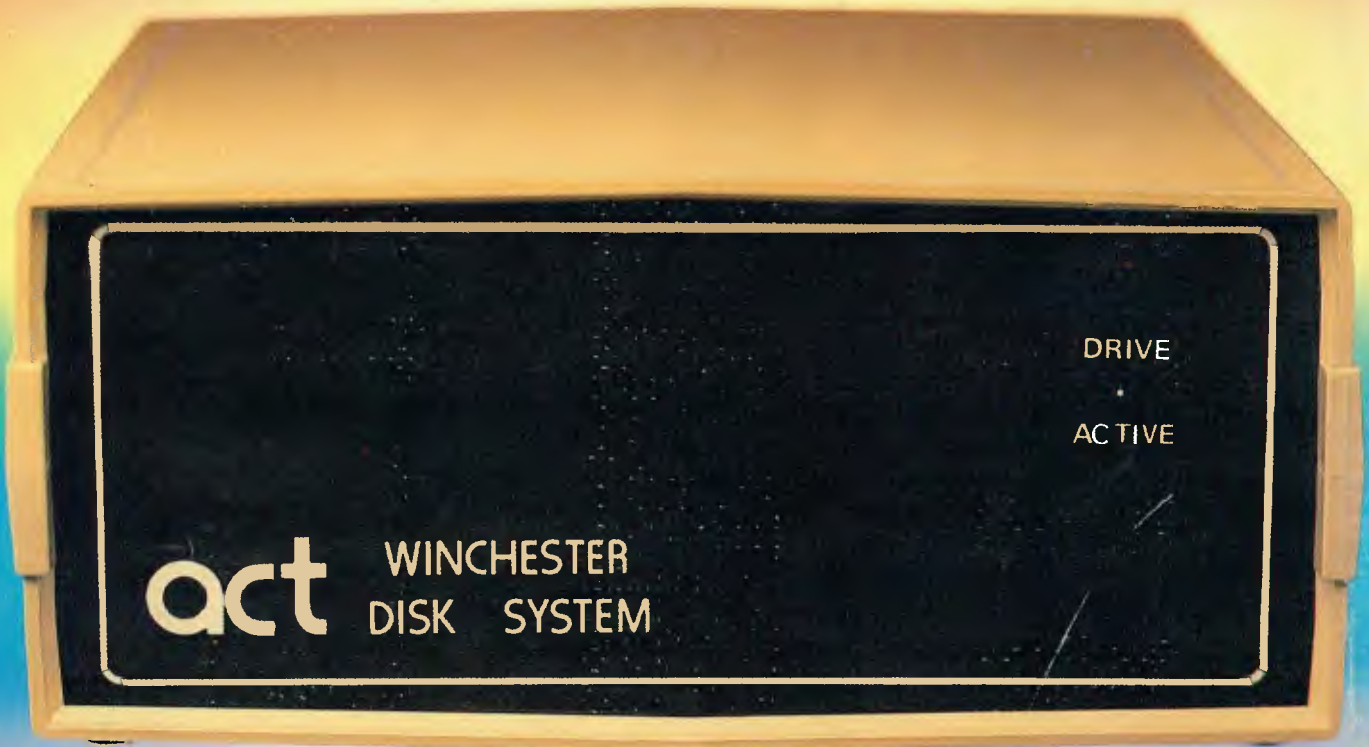
Archives P.C. the professional solution.

 **archives**  
computers australia pty ltd

- 163 Clarendon St, Sth. Melbourne, Vic. 3205. Tel: (03) 699 8377 Telex: ARCAUS AA39388
- 16th Floor, Lavender Street, Milsons Point, NSW, 2061. Tel: (02) 922 3188
- 419 Remuera Road, Remuera, Auckland 5, New Zealand. Tel: (9) 50 3548

- 
- Greensborough Computer, 81 Grimshaw Street, Greensborough, Vic. 3088. Phone: (03) 434 6166.
  - Rob's Computer Centre, 295 Thomas Street, Dandenong, Vic. 3175. Phone: (03) 791 2900.
  - Thorton Richards Camera Shop, 416 Sturt Street, Ballarat, Vic. 3350. Phone: (053) 311 633.
  - Corlo Computer Systems, 96 Hendy Street, Corio, Vic. 3214. Phone: (052) 754 163.
  - Data Parts, 11 Edwards Street, Shepparton, Vic. 3630. Phone: (058) 217 155.
-

# WE CAN GIVE YOU THE POWER!



## Make the Right Decision for Your Computer Storage:

### THE POWERFUL ACT

The ACT Hard Disk System upgrades your computer to a powerful high performance machine. Supported throughout Australia, the ACT HARD DISK is the answer to your storage problems. ACT, the affordable hard disk system.

### THE RELIABLE ACT

Far greater storage than floppy drives with reliable performance under all conditions, makes the ACT Hard Disk unbeatable value. Designed and manufactured in Australia.

*5-31 Megabytes of Hard Disk Storage.  
5 Plus 5 Fixed/Removable Hard Disk.  
5 Megabytes Removable Hard Disk Cartridge.*

### THE LOGICAL ACT

The obvious choice for your micro, the ACT HARD DISK is now available for:  
APPLE II • IBM PC • DEC RAINBOW  
• PEACH • KAYPRO • OSBORNE  
• MICRO • DECISION • MICROBEE  
• HEATH ZENITH • NORTHSTAR  
• SANYO • SUPERBRAIN • TANDY  
• TIME OFFICE • TOSHIBA • XEROX  
• S 100 • SIGMA OKI • NEW  
RELEASE: SIRIUS & NEC APC.

### THE SHAREABLE ACT — PC NET

PC Net is a hard disk sharing system — simple and cost effective. The disk is divided into logical drives, allowing independent users to share the disk. Available for most popular brands of microcomputer.

**W.A.**  
**MICRO E.D.P. HARDWARE,**  
9a/1 Leura Avenue,  
Claremont, WA 6010  
Phone: (09) 384 5511

**N.S.W.**  
**act**  
75 Willoughby Road,  
Crows Nest, NSW 2065  
Phone: (02) 439 6300  
Telex: AA 24816

**S.A.**  
**COMPUTER MART PTY LTD,**  
123 Gouger Street,  
Adelaide, SA 5000  
Phone: (08) 51 5363, 212 2888

DEALER ENQUIRIES WELCOME