

# Australian Personal Computer

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

\$2.95

GET RICH  
— SELL YOUR  
PROGRAMS

AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE



**IT'S ALL AT THE APC SHOW!**

**PX-8: Epson plays it cards/dBase III/Framework — full preview inside.**

# OSBORNE

WORLD CLASS COMPUTER



**TOTAL VALUE**  
**\$8336.25**  
**FOR**  
**\$3198**  
**UNTIL JULY 30 1984**

**TAX  
INCLUDED**

## AUTHORISED OSBORNE EXECUTIVE DEALERS INCLUDE:

### NEW SOUTH WALES

**AB Office Electronics** — BALGOWLAH  
(02) 949 7195  
**Complete Solutions** — SURRY HILLS  
(02) 331 6799  
**Delta Computer Systems** — PARRAMATTA  
(02) 633 4055  
**Foremost Office Equipment** — PARRAMATTA  
(02) 635 5477  
**Grace Bros Business Centre** — SYDNEY  
GEORGE STREET — (02) 238 9111  
**Orana Cash Registers** — DUBBO  
(069) 82 5833  
**S.C.C. Computing** — SYDNEY  
93 York Street — (02) 290 3344  
**Kopi-Kat** — KATOOMBA  
(047) 82-4074  
**Our Town Computers** — NEWCASTLE  
(049) 52 5105  
**Bathurst Computer Services** — BATHURST  
(063) 31-3964

**AUSTRALIAN CAPITAL TERRITORY**  
**Boulevard Business Services** — CANBERRA  
(062) 48 5411  
**R C Electronics** — HOLT  
(062) 54 7608

**NORTHERN TERRITORY**  
**Computer Sales & Leasing** — DARWIN  
(089) 84-4656  
**Davionics** — ALICE SPRINGS  
(089) 52 3517

### QUEENSLAND

**Competron** — MAYNE  
(07) 52 9700  
**Compsoft** — SPRING HILL  
(07) 229 0066  
**Myer Computer Centre** — INDOOROOPILLY  
(07) 378 5111  
**Scarborough Fair Computers** — SOUTHPORT  
(075) 32 5133  
**Servatronics** — ROCHDALE  
(07) 341 5340  
**Town and Country** — TOWNSVILLE  
(077) 75 4000  
**The Byte Shop** — NEWMARKET  
(07) 352 6621  
**The Byte Shop** — TARINGA  
(07) 371 0711

**WESTERN AUSTRALIA**  
**Amity Computers** — ALBANY  
(098) 41 6060  
**Computer Country** — PERTH  
(09) 328 4644  
**Ossie Computers** — CLAREMONT  
(09) 384 5787

**SOUTH AUSTRALIA**  
**Micro-80 Computing Centre** — ADELAIDE  
(08) 211 7244  
**Myer Computer Centre** — ADELAIDE  
(08) 217 0123

**The Copy Centre** — WHYALLA  
(086) 45 7755

### VICTORIA

**Almer Distributors** — OAKLEIGH  
(03) 569 0169 or 568-6911  
**Data Parts** — SHEPPARTON — (058) 21 7155  
— ALBURY — (060) 21 8080  
— BALLARAT — (053) 31 3399  
— BENDIGO — (054) 43 4866

**Direct Data** — ARMIDALE  
(03) 20 6949  
**Geelong Computer Centre** — GEELONG  
(052) 22 2844  
**IMA Computer Centre** — SURREY HILLS  
(03) 836 8835

**Nucleus Computers** — MOUNT WAVERLEY  
(03) 232 6370

**Tech-Rentals** — RINGWOOD  
(03) 879 2266 — NATIONAL RENTALS

**TASMANIA**  
**Coastal Computers** — BURNIE  
(041) 31 7959  
**Strawberry Enterprises** — BERRIEDALE  
(002) 72-2621

- All sales and related inquiries must go to the dealers
- All Engineering and machine faults must go to Hills Industries in your Capital City.

• **OSBORNE AUSTRALIA (02) 290 3344**

**Now in stock — the  10MB**  
**Hard Disk with a full suite of OSBORNE**  
**EXECUTIVE Disk Utilities & Disk Manager.**

**5¼ Winchester Drive — \$3695,**  
**comes ready to connect to the**  
**Executive and ready to run.**  
**Full 6 months' warranty.**

# EXECUTIVE

is Australia's Number 1  
now is the time to buy ...  
with four great offers

FREE Datatype  
HEADCLEANING KIT  
VALUE \$13.25



\$1200  
FREE

INCLUDED IN OUR ONE LOW PRICE

PURCHASE AN OSBORNE EXECUTIVE BEFORE JULY 30 AND RECEIVE THIS ACCOUNTING PACKAGE WORTH \$1200 FOR FREE.

The OSBORNE EXECUTIVE with complete software, MULTILEDGER, Dot Matrix Printer and 6 months Nationwide service and backing for \$3,250. And don't forget to claim your 18% Investment allowance on top. If that doesn't solve your year-end headaches nothing will!

Contact Osborne Australia for depreciation information

## THE AFFORDABLE PORTABLE

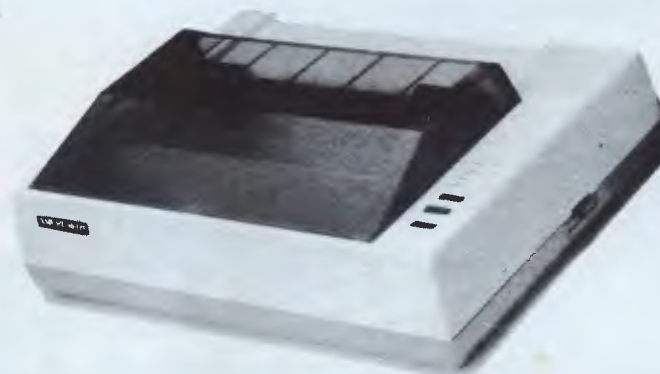
See your dealer for a demonstration before July 30

We Give You More

# Plus...

If you twist  
your dealers arm ...

A HIGH SPEED AMPEC CP-80  
DOT MATRIX PRINTER including Interface



FOR  
**\$50**  
VALUE \$425

TAX INCLUDED

TOTAL VALUE  
**\$8336.25**  
FOR  
**\$3198**

TAX INCLUDED  
UNTIL JULY 30 1984

• OSBORNE AUSTRALIA (02) 290 3344

**NEW**

**FULL 6 MONTHS WARRANTY**

BY **Hills** COMPUTER SERVICE IN YOUR CAPITAL CITY

**PARTS  
AND  
LABOUR**

Contact Osborne Australia for depreciation allowance

## REGULARS

### 6 NEWSPRINT

Guy Kewney reports from the mighty Comdex show in the USA; exciting communications board for the IBM; the latest on Macintosh software releases; and Microsoft's new concurrent, networking operating system.

### 80 BIBLIOFILE

Commodore 64 books feature in Steve Wither's assessment of the latest micro literature.

### 85 COMMUNICATIONS

It's a real battle ground this month — everybody has a grumble (plus the attackees' replies!)

### 101 SUBSCRIPTIONS

Shameless craving from our publisher for your cash.

### 105 SUBSET

Pot pourri of assembler subroutines to make more of your micro.

### 119 NUMBERS

Congruency, Modulo, Fermat and Wilson's Quotients . . . Mike Mudge explains all.

### 133 TJ'S WORKSHOP

Treasure trove of hints and tips.

### 143 NEWCOMERS START HERE

Understand computer jargon with our easy, expanded guide to personal computers.

### 153 BLUDNERS

Red faces time.

### 155 LAZING AROUND

Indulge in some mental gymnastics with this little tickler.

### 156 NETWORKS

A mansion of bulletin rooms, a guide to STD charges plus the latest network contacts plus a continuing tutorial on connecting your micro to a bulletin board.

### 159 DIRECT ACCESS

Includes Diary Data and Benchmark tests.

### 161 PROGRAMS

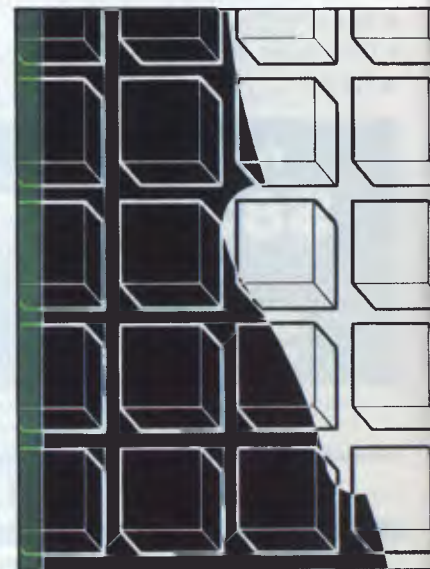
Listings for the Commodore 64, Atari, MicroBee, BBC, VZ-200 and VIC 20.

### 184 ADVERTISERS' INDEX

Alphabetical guide to the ads in APC.



A home computer that costs a little more — but offers plenty. See page 48.



A computer program that can become

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

## FEATURES AND SERIES

### 59 APPLE'S INSTANT ARTIST

A new graphics generation program for the Apple.

### 61 TEACH YOURSELF ASSEMBLER

APC's painless guide to assembly language programming examines counting in twos and sixteens.

### 66 OPERATING SYSTEMS

Our guide to operating systems continues with a detailed description of the commands and facilities available.

### 73 CREATING A PROGRAM

You may get rich quick with Mike Liardet's guide to designing and selling programs.

### 121 CP/M ACCESS

Take the tedium out of machine code programming by calling routines available in CP/M. Richard Moffat explains how.

### 127 THE STORY BEHIND MSX

Tom Sato goes to Japan to discover the origins of MSX.

### 129 PROGRAM CONVERSION

Find out how you can get listings for the BBC to run on your machine.

## BENCHTESTS & REVIEWS

### 28 FRAMEWORK

APC's world exclusive test of this revolutionary new integrated business package from the authors of dBase II. Word processor, database, spreadsheet, graphics generator and ideas processor — all in one package!

### 34 EPSON PX-8

Will this machine put Epson back at the top of the lap-held market? Dick Pountain finds out.

### 48 MEMOTECH

A home computer that has expansion possibilities into the small business field.

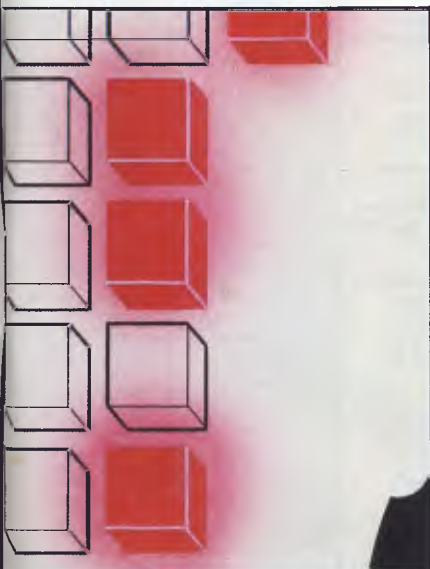
### 54 INK JET PRINTER

Ian Davies looks at Hewlett Packard's very quiet and moderately priced 'ink jet' printer that works with ordinary paper (and non-HP computers too).

### 110 EXPERT-EASE

Save money and gain yourself an expert with this life-saver for business. Surya experiments.

Cover photography: Robert Blackburn



smart as you (almost!). See page 110.



Australia's greatest personal computer show lands in Melbourne. See preview on page 6.

# LAE POWER CONTROL

REMOTE CONTROL SYSTEM FOR LIGHTING AND APPLIANCES



DEALER ENQUIRIES WELCOME

LAE POWER-CONTROL SYSTEM WILL TRANSFORM YOUR PRESENT MICRO-COMPUTER INTO A REAL "HOME-COMPUTER".

LAE POWER-CONTROL SYSTEM when combined with your Home Computer, can control up to 30 Appliances and 15 lights by remote control. You simply purchase the LAE INTERFACE MODULE with SOFTWARE, and the required number of LAE LIGHT and APPLIANCE MODULES.

Selected Lights and Appliances are plugged into the LAE LIGHT and APPLIANCE MODULES, and the MODULES plug into any standard 240V power point around your home. Appliances and lights can be controlled directly from the computer keyboard or the programmable software TIMER. The control signals are transmitted from LAE INTERFACE MODULE over existing 240V household wiring to LAE LIGHT and APPLIANCE MODULES of your choice.

Since LAE POWER-CONTROL SYSTEM plugs into standard 240V power points and uses existing home electrical wiring, there is no costly installation of any kind. LAE POWER-CONTROL SYSTEM is totally designed and manufactured in Australia for Australian conditions. Appliance and Light Modules are approved by the ELECTRICITY AUTHORITY.

LAE POWER-CONTROL SOFTWARE is now available for Atari range of Home Computers, and will shortly be available for the Commodore range.

**LAE POWER-CONTROL SYSTEM IS AVAILABLE AT THE SPECIAL DISCOUNT PRICE, DIRECTLY FROM THE MANUFACTURER UNTIL 31/8/84.**

**For detailed information write to LEMIC ADVANCED ELECTRONICS PTY LTD.**

Atari is a trade mark of Atari Inc., Commodore is a trade mark of Commodore Inc.

## LAE LEMIC ADVANCED ELECTRONICS PTY LTD.

(INCORPORATED IN VICTORIA)

135 Roseneath Street, North Geelong  
P.O. Box 187, Corio, Vic., 3214, Australia

Phone: (052) 78 4254

## WESTERN TECHNOLOGY

Shop 3 — 2 Clark Terrace, Seaton, South Australia 5023. Tel. (08) 45 8777

COMPUTERS		Tax Exempt	Tax Incl.	PRINTERS		Tax Exempt	Tax Incl.
C-VP	— Columbia VP Portable Computer. IBM-Compatible 128K. Twin Drives, Amber Monitor Parallel/Serial Ports, Perfect Software.			MP-800	Visa — 80 Column Printer	\$ 350.00	\$ 420.00
PC 301	— Copam 301 — 16 Bit Personal Computer 256K. Dual Drive 360k. 8088 Processor.	\$3400.00	\$3995.00	RX-80	Epson RX80 — 80 Column Printer Tractor Feed — 80cps.	\$ 447.50	\$ 537.00
		\$2690.00	\$3228.00	RX-80FT	Epson RX80 F/T 80 Column Printer Friction/Tractor Feed 80 cps.	\$ 537.50	\$ 648.25
				FX-80	Epson FX80 — 80 Column Printer Friction/Tractor Feed 160cps.	\$ 781.26	\$ 937.50
MONITORS				DISK DRIVES			
SANYO	Sanyo Green/Amber 12" Monitor	\$ 175.00	\$ 200.00	CH	Chinon Slimline Drive — 35 Track.	\$ 255.00	\$ 306.00
LINGO	Lingo Green/Amber 12" Monitor	\$ 175.00	\$ 200.00	ST-541	Teac Slimline Drive FD55 Mechanism — direct drive.	\$ 245.00	\$ 294.00
KD-AS	Kaga Denshi 12" Green/Amber Monitor	\$ 190.00	\$ 225.00				
KD-EX	Kaga Denshi 12" R.G.B. Monitor Type 1	\$ 390.00	\$ 468.00	PERIPHERALS			
KD-V2	Kaga Denshi 12" R.G.B. Monitor Type 2	\$ 490.00	\$ 588.00	DI-006	Disk Drive Controller Card	\$ 79.00	\$ 89.00
KD-V3	Kaga Denshi 12" R.G.B. Monitor Type 3	\$ 690.00	\$ 828.00	AZ-80	Z 80 Card	\$ 79.00	\$ 89.00
KD-IF	Kaga Denshi R.G.B. Interface	\$ 105.00	\$ 126.00	EW-202	Epromwriter with manual	\$ 99.00	\$ 110.00
VC	R.G.B. Video Cable to suit Lingo, Medfly etc.	\$ 25.00	\$ 30.00	AC-80	80 Column Video Card — Standard	\$ 93.30	\$ 112.00
PRINTER INTERFACES				RM-016	16 k. Ram Card	\$ 79.00	\$ 89.00
AI	Automatic Ice Printer Interface Parallel — Graphics	\$ 80.00	\$ 96.00	RM-128	128 k. Ram Card with software & manual	\$ 218.00	\$ 257.60
M132	Microbuffer Centronics Printer Interface with 32K. Bufferboard & cable.	\$ 162.50	\$ 195.00	JY-310	Joystick — Autocentre Telephone type cable	\$ 44.50	\$ 60.00
RS232	Serial Interface, Cable & Manual.	\$ 80.00	\$ 96.00	DX-050	Diskette Box Capacity 50 Disks	\$ 25.00	\$ 30.00
PI007	Centronics Parallel Interface & Cable.	\$ 60.00	\$ 72.00	DX-085	Diskette Box — Lockable — Capacity 85 Disks	\$ 34.60	\$ 41.50
PI009G	Grappier + Parallel Interface, Graphics.	\$ 75.00	\$ 90.00	DLD	Diskettes (Per Box 10) — Le Disc	\$ 42.00	\$ 50.00
PCB	Printer cable to suit Lingo, Medfly etc.	\$ 30.00	\$ 36.00	DX	Diskettes (Per Box 10) — Xidex	\$ 32.00	\$ 38.00
				S.A.M.	Software Automatic Mouth — S.A.M.	\$ 63.00	\$ 63.00
				WD-720	Wildcard	\$ 78.00	\$ 94.00
				RP	Replay	\$ 78.00	\$ 94.00
				GT-014	Graphics Table	\$ 79.00	\$ 95.00
				SB-360	Swivel Base for Monitors	\$ 20.00	\$ 25.00
				RF	R.F. Modulator	\$ 30.00	\$ 36.00
				FN-101	Computer Fan	\$ 50.00	\$ 60.00
				CC-130	Clock Card	\$ 105.00	\$ 125.00
				APS-001	Switching Power Supply — 5 Amp.	\$ 90.00	\$ 108.00

### SOFTWARE SPECIALS FOR JULY!

WORDSTAR FOR THE APPLE	\$ 150.00
VISIPILOT	\$ 140.00
VISIDEX	\$ 175.00
VISISCHEDULE	\$ 195.00
MAILMERGE FOR THE APPLE	\$ 130.00
VISIFILE	\$ 180.00
DESKTOP PLAN II	\$ 160.00
BUSINESS FORECASTING	\$ 120.00

ORIGINAL VERSIONS!

TERMS — PAYMENT WITH ORDER — FREIGHT INCLUDED OR CREDIT CARD

SALES TAX CERTIFICATES — MUST ACCOMPANY ORDERS WHEN SALES TAX NUMBER QUOTED.

WARRANTY — Ninety days from date of purchase.

DEALER ENQUIRIES WELCOME FOR ORDERS LARGER THAN SINGLE UNITS. CONTACTS — Mike Greer, Rod Smith.

# IF CHOOSING A COMPUTER IS DRIVING YOU CRAZY, CALM DOWN AT THE PERSONAL COMPUTER SHOW.

*The only complicated part about personal computers is trying to choose the right one.*

*It's enough to drive any sane person crazy.*

*That's why if you're in the market for a personal computer, you mustn't miss The 3rd Australian Personal Computer Show.*

*It's the only chance you'll have to calmly browse through the most comprehensive range of microcomputers,*

*peripheral equipment and software ever assembled at one convenient location.*

*Compare the leading brands, the prices, and get some honest, unbiased computer advice. There's even a free computer seminar.*

*So, if you'd like to calmly make the right computer decision, you'd be crazy to miss the Personal Computer Show.*

*Admission is \$4.00. Exhibition hours: Wednesday to Friday 10am-7pm, Saturday 10am-5pm.*

*Australian Exhibition Services Pty Ltd Suite 3.2  
Illoura Plaza 424 St Kilda Road Melbourne  
Tel (03) 2674500*



**The 3rd Australian  
Personal  
Computer Show**

**World Trade Centre  
Melbourne**

**18-21 July 1984**

# See you there

Once again the *Australian Personal Computer Show* is the venue for the launch of a huge number of computer products. It's evidence of the fact that, in this exciting, fast-moving industry of personal computers, there is a constant flow of innovative product releases making both the Sydney and Melbourne Shows the predominant launching pads in the Australian micro industry.

At the entrance to the Show (*don't forget to take along your complimentary invitation on the outside of this issue*) you will be given a comprehensive Show Catalogue. It'll contain the usual floor plans, introductions etc plus a stand-by-stand listing of exhibitors with a run down of what's on display. Below we've got a sneak preview of what'll be at the Show — it's by no means comprehensive: we don't want to steal all the thunder plus, in several cases, we've been sworn to secrecy. You'll just have to go along if you want to keep up-to-date with the latest in the industry.

On the business side, ICL have a brand new release: it's a multi-user (up to 16) microcomputer with a large disk capacity of 160 Mb. It's called the CLAN and has been featured in television advertisements. ICL will also be exhibiting the slightly smaller but still multi-user Personal Computer running multi-user Concurrent CP/M, with which any regular APC reader will be familiar.

Dick Smith Electronics marches in with its IBM PC work-alike — the Challenger, featured in the May issue of APC. It's considerably cheaper than the IBM yet runs most programs that work on Big Blue's baby. If you are on a budget, but want a fully blown business computer (including some applications software) have a talk to Dick Smith's people at the Show. The Challenger sells for less than \$3,000. Another work-alike from DS is the Cat (the company really made its name in computers with the System 80, a TRS-80 work-alike, so if anyone knows about the ins and outs of "work-alikes" in Australia, it's Dick Smith Electronics). The Cat was seen at the Sydney APC Show so it is not its first public airing, but if you want a nearly Apple-compatible, the Cat is a good buy.

Another IBM PC compatible that has received a lot of press is the Compaq. It has taken quite a while to reach our shores but has now done so, courtesy of Computerland. Of course, if you want the real thing, again the Show deserves a visit. IBM will be there in force displaying machines with reduced price tags of between 13 and 19% owing to a recent across the board cut in recommended retail prices of its PCs.

In the middle range, Apple has released its IIc, a portable extension of the Apple II family. It incorporates a single 5¼ inch disk drive and will soon have an optional 80 column, 24 line display. Barson Computers also expects to have a flat screen display for its Apricot business computer. Billed as a "transportable", this feature of the Apricot has always been hampered by the necessity of having to lug a monitor along with the machine.

LCD display technology is improving in leaps and bounds. Lap held computers are popping up everywhere — NEC, Tandy and Olivetti have already launched models. Epson's full 80 column screen PX-8 is this month's cover story (and will premier at the Show) and Hewlett Packard is about to release its HP 110, an 80 column by 16 line display model which, like all the other lap holds, can run on batteries.

After you've read about Hewlett Packard's ink jet printer elsewhere in this issue, you'll probably want to see it in action at the Show. It's extremely quiet, reliable and surprisingly inexpensive. And Hewlett Packard hasn't restricted its use to HP machines only — owners of gentile micros can purchase a version designed for use with a wide range of computers.

Sanyo has a very useful product on show for the small business. It's a multi-user, multi-tasking machine (which means that more than one person can access data stored in the computer at once) running Sanyo's 'SSS' (Australian written) business software package. Take a look at it, if you're about to computerise.

At the home/enthusiast end of the marketplace, you have the chance to see a plethora of new releases for just about every brand of microcomputer. There are new peripherals: new plotters, modems, joysticks, printers and speech synthesis units to name only a few. If it's happening in Australia, it's happening at the Show.

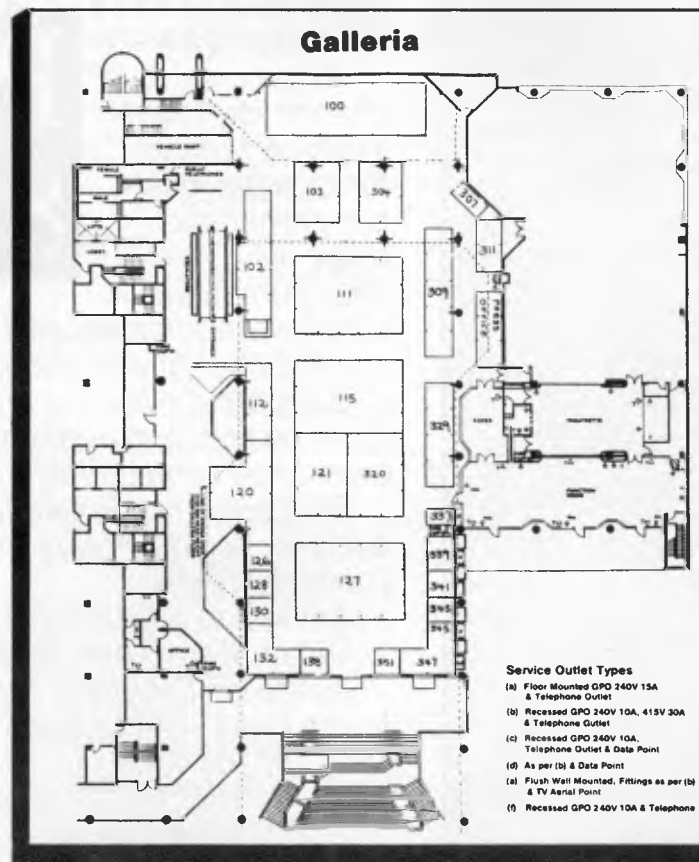
## Computermat

Newcomers to personal computing should be queuing at the door to experience a new concept at computer shows in Australia. Four of the country's top suppliers of computers have kindly arranged to provide twenty computers each as the basis of "hands-on" tutorial sessions. The introductory "classes" will be held during Show hours; details will be provided in the Show Catalogue at the entrance — so don't miss out!

## Don't be late

While we reckon APC is like the "Yellow Pages" to the personal computer industry, we have to admit the 3rd *Australian Personal Computer Show* is a worthy appendix. Virtually every major name in the industry — from IBM, DEC, Wang and Sperry at the top end to the king of the home computer marketplace, Commodore, at the low end — will be exhibiting.

It is Melbourne's first personal computer show — so be early (even then you probably won't dodge the crowds!)



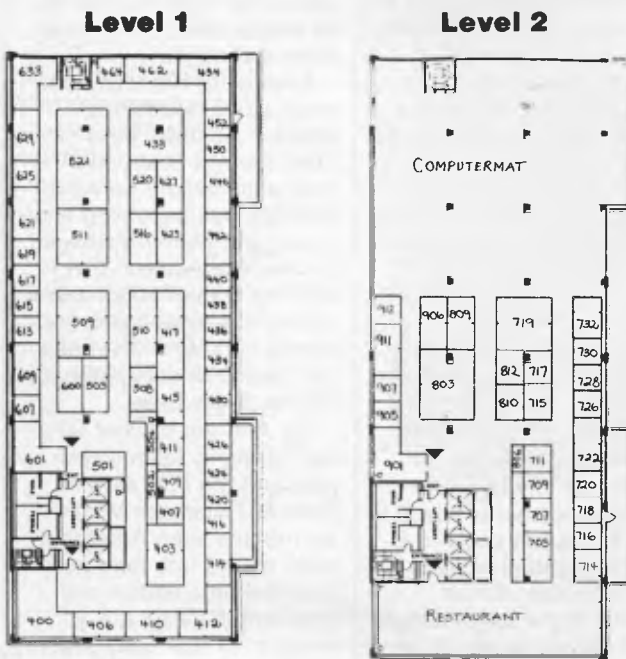


# PC 84

## The 3rd Australian Personal Computer Show World Trade Centre Melbourne 18-21 July 1984



Initially a first. Interface International will have this live panther (ie, not stuffed) at the show to tie in with its launch of the Panther computer. Don't bring your dog along.



**Floor Plan**

## Why go to the APC Show?

One of our readers retorts to the build up of the 3rd *Australian Personal Computer Show* with the above question. Well there are many reasons why you might go to the Show. Firstly, computer shows are an ideal opportunity to meet and talk to numerous people who share the same interest. This is important, as any hobby that involves hours of sitting at a keyboard can be a rather insular one. Shows are buyers' market-places where the competition between retailers is so intense that they often have a variety of special offers to entice you to their stand. You also get the chance to see and try a product before you buy. A wealth of help and advice is also readily available, be it how to solve an adventure problem or which printer to buy for your computer.

A trip to the Show may even be profitable: you may find a software house for your new game, a publisher for your new book.

I'm a feverish collector of show catalogues: not only are they an invaluable source of contacts and phone numbers, they are a still photograph of an ever-changing industry. The decision to attend the Show is entirely yours, however, just keep in mind, the 3rd *Australian Personal Show*, July 18-21, at the World Trade Centre, Melbourne.

*Maria Bokic*

## List of exhibitors

COMPANY NAME	STAND NO	COMPANY NAME	STAND NO
ABA Systems (Aust) Pty Ltd	420	Maclagan Wright & Associates Pty Ltd	728
AWA Computers	510	Magmedia	343
Ampec Electronics Pty Ltd	617	Melbourne House (Australia) Pty Ltd	126
Amust Computer Corporation (Aust) Pty Ltd	406	Memorex Pty Ltd	351
Anderson Digital Equipment Pty Ltd	511	Micro Stat Software	337
Apple Computer Australia Pty Ltd	111	MicroBee Computer Centre	403
Arcom Pacific	412	Microprocessor Applications	450
Ashtron Scholastic	633	Microprogramming	607
Australia & New Zealand Book Co Pty Ltd	345	Microsoft	132
Barson Computers Pty Ltd	127	Mitsui Computer Systems	600
Business Model Systems Pty Ltd	438	Moore Paragon Australia Limited	442
CASL Financial Services	424	Multisoft	907
Case Communication Systems Ltd	411	Myer Computer & Business Centre	309
Commodore Computers	100	NCR Australia Pty Ltd	417
Communication Control	452	NEC Information Systems Australia Pty Ltd	320
Computer Cellars	810	Nashua Australia Pty Ltd	711
The Computer Company	400	Novus Design	901
Computer Resources Company	504	Olivetti Australia Pty Ltd	803
Computerworld Pty Ltd	311	Osborne Computers (Aust)	503
Data General Australia Pty Ltd	433	Paperwork Systems Inc (Group) Pty Ltd	501
Data Peripherals (Vic) Pty Ltd	410	Pacific Computer Weekly	625
Database Management Services	613	Pitman Publishing	462
Datatel Pty Ltd	446	Pragmatix Pty Ltd	130
Dega Research	720	Pulsar Electronics Pty Ltd	516
Dick Smith Electronics Pty Ltd	430	Rexel Office Products	615
Digital Equipment Corp (Aust) Pty Ltd	121	Rose Music Pty Ltd	609
David Syme & Co Ltd	726	SCA Software Corporation of Australia Pty Ltd	440
Distributed Data Processing Pty Ltd	407	Sanyo Office Machines Pty Ltd	103
Dragon Technology Pty Ltd	508	Select Microsystems Pty Ltd	128
Eastern Micro Electronics Pty Ltd	905	Sourceware Pty Ltd	414
Emona Computers Pty Ltd	426	Sperry Computer Systems	521
Epson Australia Pty Ltd	509	Tallgrass Technologies Australia Pty Ltd	434
Goodman Cannington (Aust) Pty Ltd	911	Tandy Australia Ltd	329
Hewlett Packard Australia Limited	102	Technical Book & Magazine Co Pty Ltd	347
IBM Australia Limited	115	Telecomputing PCS	520
ICL (Australia) Pty Ltd	502	Texas Instruments Australia Limited	629
Interface International Pty Ltd	415	Think Computers	601
Interfaceware Pty Ltd	416	Tomas Systems	621
Jedko Games Co Pty Ltd	619	Toshiba Australia	304
John Sands Electronics	423	Video Com Australia	464
MC-P Applications	520	Wabash Datatech Australia Pty Ltd	427
McGraw Hill Book Co Aust Pty Ltd	307	Wang	112
		Warbuton Franki	120
		William Collins	409

## Micro switch

Microsoft appears to have changed its mind about how many programs we want to run at once. Secretly, quietly, and avoiding publicity, Microsoft has decided to release a new version of its operating system, MS-DOS. It does networking, and multi-tasking.

The newest version isn't available to customers yet, and isn't likely to be for some time. But the people who will supply it have been given samples to test, so that they can tell Microsoft what the problems are.

What is really interesting about the (very little) information that has filtered out from this well-shielded cage of activity is the fact that Microsoft was not talking about anything like as ambitious, last time it stood up in public to lecture. By Microsoft, I mean the chairman, Bill Gates.

Gates tells people these days that he isn't giving interviews because he wants to get back to programming. This has given rise in uninformed circles to the suggestion that he is really preparing his company for a launch onto the public stock market, a rumour which I have finally been brought to believe is premature. But in the days when he was buying the drinks at conferences and speaking his mind at parties, he used to argue that "concurrency is not what the user wants", and suggested that what was needed was the ability to switch from one program to another, fast, putting the first one on "hold" temporarily.

Word is that the test versions of multi-tasking DOS 2.0 are not quite so limited in their ambition. They include facilities for two programs to pass information

between each other, while they are both running on the same system.

And what is really fascinating is that the "system" can involve two or more computers, linked by a network.

This thinking conflicts with what a lot of traditional computer people are saying. They argue that Unix, an operating system which allows several people to use the same computer and work on the same data files, will more than meet requirements for multi-tasking, and that networking will never work.

Microsoft is the largest supplier of Unix type software, with its Xenix product. For Microsoft to produce a multi-tasking MS-DOS is going to be seen as less than an act of blind faith in Unix as the saviour of the future . . .

And, coupled with the recent quote by Altos boss David Jackson ("Unix applications are as rare as rocking-horse shit") it makes my own spirits a little lighter. I don't doubt that Unix does all the things its fans say it does. It's the things it doesn't do which will hold back the industry for ten years, and the industry must move forward, or die.

Guy Kewney

## NEC bundled software

The NEC APC now comes with Wordstar and Multiplan.

Mr Richard Berthet, responsible for marketing NEC's personal computer products said, "This bundle represents a value of around \$1100 retail for the purchaser of an APC . . . the

software has been exclusively customised for the NEC Advanced Personal Computer and so takes advantage of . . . the 44 programmable function keys and the large disk capacity. On our colour APC, Wordstar can be set up to use the eight available colours, giving word processing a whole new look".

## Comdex

A daily newspaper, weighing two pounds, personally delivered to 20,000 people before breakfast, covering not just one industry, but just one show in that one industry — it takes some believing. But there is one: it's the Comdex Show Daily, published by the organisers of America's biggest computer show.

To call Comdex "big" is to concentrate on its drawback, at the expense of its real value. Its real value is that this is the show where the big manufacturers are talking directly to their biggest customers, the distributors, who are also there, talking to their biggest customers, the dealers, and everybody is surrounded by the biggest corporate buyers, the top managers of the big companies which buy micros in bulk for their executives.

Nonetheless, before reporting on the products and announcements which I found at the last show, it is worth trying to give some idea of the size of it. It occurred to me that a simple way of doing this would be to interview its newspaper, via the editor, Vic Farmer.

Farmer used to be a senior editor on America's giant computer paper, Computerworld. One day, he was assigned to cover the growing National Computer Con-

ference for his paper, at a time when the computer industry was just turning into the sort of monster that we now take for granted.

"It was like running a big, daily newspaper," Farmer said. "There were all these conferences, all these parties, all these exhibition stands, all these people, and to cope, we had to set up a team. And filing reports back to the office was just exactly like running a live newspaper."

A few years later, Farmer had got into the routine of doing these big shows, and had a good idea of what sort of things went on, what sort of reporting costs (manpower, materials) would be involved in doing a report to be printed at the show. He started doing this, for Computerworld, and really was a bit surprised (a couple of years after that) that his face no longer fitted, and he was looking for a job.

Eventually, his search for employment led him to Sheldon Adelson, boss of The Interface Group, the enterprise behind Comdex. Comdex was becoming enormous, and Farmer managed to convince Adelson that it was big enough to take over the running of the show newsletters itself. Farmer got the job of doing The Official Show Daily.

For the four days of Comdex Spring in Atlanta each year, and the four days of Comdex Fall in Las Vegas, six months later, Adelson's team moves into high gear. Four full-time editors and three artists bring the skeleton of four daily papers down from Massachusetts, and publish the first edition to be ready for delegates the day before the conference starts.

It includes most of the information prepared for the conference organisers, by

# Memorex reliability, the inside story.

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

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

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

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

Special soft polyester liner constantly cleans disc during use.

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

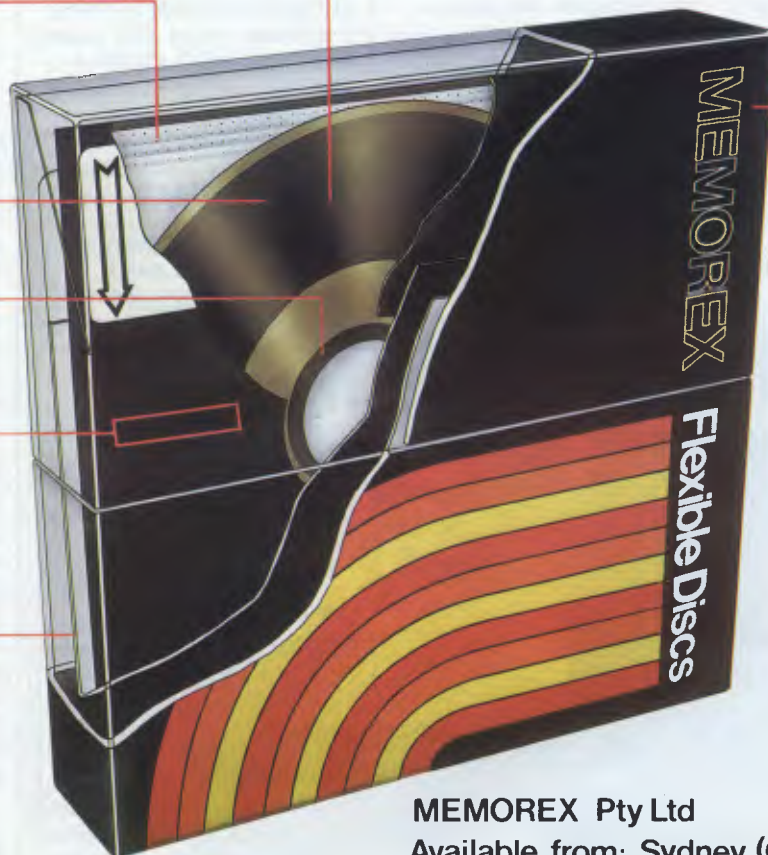
The Memorex name is your assurance of the ultimate in quality and reliability.

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

Precision applied plastic hub ring protects disc edge from damage.

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

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



**MEMOREX Pty Ltd**

Available from: Sydney (02) 908-2211

Melbourne (03) 267-2955

Or a Distributor near you

# MEMOREX

A Burroughs Company

# NEWSPRINT

exhibitors. Some of that comes in months before the show, and much of it is empty puff of the "once again. Best Computers will be demonstrating its extraordinary range of diskette hole-punch equipment" vein — but much of it is really new. Farmer's team is in an enviable position here: because they don't work on regular monthly or weekly magazines, they can be safely entrusted with commercial secrets, and can research stories in depth, well in advance of the launch date. (The rest of us have to try and make sense of it on the day of the launch because the manufacturers believe that we will rush off and tell the dailies all about it. So we do all our preparatory research by asking their competitors, who usually know all about it anyway, but that's another story for another day.)

Also pre-organised will be many background articles.

They range from hints and tips for keeping your feet in working condition while walking around the five to eight miles of exhibition carpet; health suggestions for avoiding strain and tension, eat-out hints for the strange town you're in, and other simple bodily requirements, right through to indepth analyses of new trends in the industry — five new portable micros, for instance, where each company contributing information about a new design thought it was unique, and was going to be the star of the show; or new deals being set up between manufacturers and distributors.

At the show, an add-on team of local freelancers — photographers and writers — joins in the hunt for news.

There are reports from the conference sessions, interviews with prominent industry figures attending the show, photographs of

new products and publicity stunts, and roundups of developments during the day.

At the end of each day, they sit down in front of a battery of computers — six Eagle PC machines (equivalent to IBMs) connected direct to the printworks.

"We do it with diskettes", said Farmer, "with one of the machines being connected to a modem, and everybody putting their copy onto diskettes for transmission. It's easier than a network."

At Las Vegas, the bigger of the two Comdex shows, the issues run to 200 pages, printing 50,000 copies a day.

Guy Kewney

success will have to wait for the half megabyte version, due out in December/January, when the big capacity memory chips are available on the market.

Many software producers at Comdex spoke of "limited memory" versions of their programs, for the IBM Junior, and the Macintosh — things that couldn't do quite so much, but were still usable versions of programs for the PC.

Lotus boss Mitch Kapor spoke of his company's efforts to put something on the Mac — a program something like 1-2-3 but with as many of the extra features of the new Lotus product (Symphony) as possible.

Kapor described the Mac as "somewhere between quite good and completely wonderful," and said that if only he had more memory to play with, the super-spreadsheet he is developing would be unrecognisable — and, when it is, it will be. He's given to "understatement" like that, I suppose one might say, but then most Americans are.

Another company, Living Videotext, author of Think Tank (a US rival to Brainstorm) released a version of that ideas processor, especially truncated for the Macintosh. "It isn't that 128k bytes isn't enough to do some nice things," explained David Winer, the boss: "It's just that with a machine like this, there are so many things you want to do, that it isn't enough."

That may be a little confusing, but the substance of it is simple enough. It is: for people who want to do the work that they would otherwise choose an IBM PC for — big spreadsheets, long reports, complex database structures on enormous files — for those people, the 128k byte Mac will not do. However, for those who want an ordinary eight-bit computer, the Mac is much nicer, and rather exciting.

Guy Kewney

## Mac news

Macintosh's success now seems certain to me: it seems also certain that its

## INFORMATION BUSINESS MANAGER



### FULLY INTEGRATED ACCOUNTING

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

FREE

**\$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**

## Comdex highlights

For me the smartest product of the show is one which can tell if you are using your phone.

It's a communications board for the IBM. It's called Master Link, and it is not just a modem but also the software to run it, and also the address list and phone number list you need to run it automatically.

What makes this \$1,000 board unique is the fact that it is totally invisible to the computer.

I watched the developers running Wordstar, and switch to running Master Link software by the simple technique of picking up the phone. Instantly, the Master Link board took over the system, freezing Wordstar exactly where it was, and put a menu up on the screen.

That menu included options to recall the screen display as it was, to call a phone number directly, to log on automatically to a remote system, or transfer a file to another computer from diskette, or download a diskette file.

All that, and you can go back to what you were doing simply by disconnecting the phone.

The same thing happens if the phone rings: the computer can answer it, or you can, but either way, whatever you were doing carries on.

Better yet: for a couple of hundred dollars extra, there is a little box called Nite Owl.

Nite Owl is an answering machine. You call the system up in the middle of the night, and of course it isn't switched on, and the software isn't loaded. Not to worry: Nite Owl turns the computer on, and takes commands from you from your remote portable micro. You can then dump files to

the home diskette, or download files, or even load and run programs on the home system, and get the results.

Best of all: if somebody else has Master Link, then you can transmit anything you like at about twice the normal speed, because they can use data compression and expansion. That means that there are tricks to recognise common "cliches" of data, and encode them, and decode them at the other end.

I blew my mind watching a demo of Flight Simulator. That is one program which it isn't normally safe to use in business hours, because it takes such a long time to stop! You have to turn the power off first, then turn it on, wait for the system to check out its memory, wait for it to load the operating system, wait for it to load the startup program, then answer its questions about date and time, and finally load whatever program it is you want to run.

With Master Link in the box, you can actually run the comms program in the middle of Flight Simulator. If you like you can even transmit the Flight Simulator screen to your friend's computer, and he can see what you are doing (you can do this with any program).

And at any stage, either of you can switch to voice, just by giving the right command. The computer waits patiently for its turn, and doesn't lose the line.

It sounds like a lot of money, but for somebody with an IBM XT, it isn't, especially when you realise that it automatically keeps track of all the phone numbers which it dials, and links them to automatic log-on procedures — all on its own memory on the card, and independent of whatever diskette you have in the drives.

The product is distributed in the US through ModTech (see All this and more).

Guy Kewney

## All this and more

Something in system integration from a startup company called ModTech: their main product is called Lois, and it reconciles your other programs.

The drawback of this product is simple: it needs an IBM with DOS 2.0. That said, it is the only attempt I know of to persuade all your conflicting business programs to talk to each other, and switch between one and the other.

Lois sits on the screen, looking like a menu. The options are various word processing, communications, spreadsheets, spelling checkers, stock market analysers, games, and so on, which you have bought over the years.

Lois can re-format files between all these programs,

and can load and run each one for you, without your having to close the first one down and reload the second.

The limitation is that it can't load programs which ModTech don't know about. Currently, the list is short — only a dozen or so. But they seemed very positive about their ability to increase this list by 100 or 200 by Christmas . . .

Oh, and it will also emulate intelligent terminals. And it works with any phone. And it will do pulse and touch-tone dialling, or let you do it yourself.

With Nite Owl, you can even tell it to turn the computer on at some time later in the evening, phone some remote system, keep trying if it can't get through, log on, transmit a file, look for a particular acknowledgement, and log off, switch off the system, and sleep well, your job is well done, son.

Guy Kewney



The three new configurations of the Apricot (pictured above) made their Australian debut last month. The first has double the disk capacity of the standard machine (pictured in the centre), bringing its on line storage to 630k per drive.

The other two models are hard disk units — both using 3½ inch drives but with differing capacities of 5Mb and 10Mb. The Apricot has been billed as a transportable machine so it is welcome news from Julian Barson of Barson Computers that the "3½ inch drives are truly reliable. Unlike preceding 5¼ inch winchester drives, they are designed so that the heads retract and lock on shut-down, allowing the machine to be moved around without any risk of damage to data".

The three new configurations set the price of the Apricot from \$4440 to \$8000 (including a good deal of bundled software).

# BBC Microcomputer

## The teaching computer for those who have done their homework



The BBC Microcomputer is the mainstay of the British educational system and will take their youth confidently into the 21st century.

The success of the BBC Computer Literacy Project is spreading rapidly across the world.


In Australia, a very large number of BBC school computer systems have already been installed in every state.

Why? Because 'The BBC' is not just an educational computer. It is one part of the British Government's project to produce the best microcomputer for education, plus the whole range of software and training aids needed to secure for youth the advantages of computer literacy in the coming computer age. Software abounds. The TV 'Computer Programme' has only begun. There is a wide variety of books and teacher aids. And the list grows constantly.

Australia is fortunate to be able to adopt the entire project without change — and to enjoy all the future developments. For the BBC Computer Literacy Project is ongoing. It will still be with us in the 21st century.

Of course, you are probably aware that Barson Computers were selected to distribute the BBC micro in Australia and New Zealand because they have the desired technical expertise, and are capable of giving BBC Microcomputer users a very high level of support indeed.

**You see, the BBC did their homework, too.**



**BARSON**  
computers

To: Barson Computers Pty Ltd  
335 Johnston Street, Abbotsford,  
Victoria 3067

Please send me information on the  
BBC Microcomputer and Software ticked  
below.

Name \_\_\_\_\_

Telephone \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

BBC Microcomputer  
 Educational Software  
 Games Software

1411/APC983

# THE WORLD'S MOST EXCITING SCHOOL LIBRARY

**W**hen the BBC was assigned the task of producing a computer system for education, serious criteria were also established for the development of software

which would form the basis of education today, and on into the 21st century.

As a result, more quality educational software has been developed for the BBC Micro that for any other educational computer. Not for the BBC the 'structured reinforcement' (drill and practise) variety of software. Here are examples of subjects, for students of all ages, covered by the world's most exciting educational and recreational software library.

## **Educational:**

### **Art**

Drawing. Painting.

### **Biology**

Animal. Monohybrid/Dihybrid/Chromosome. Statistics for Biologists. Human Energy. Biology Pack. Pond Ecology. Transpiration. Counter Current. Blood Sugar. Predator-Prey Hereds/Multifactorial Inheritance. Countercurrent Systems. Biomass Production. Flowering Experiment. Physiological Simulation.

### **Business and Business Studies**

VUType. VU-Calc. VU-File. Accounts 1 & 2. Business Games. Forecast. Payroll. Mailing. Cashbook. Memo-Calc. Ledger.

### **Computer Learning**

First Fleet Database. Factfile. Databas. Tree of Knowledge Graphs and Charts. Utilities 1. Lisp. Forth. The Classroom Micro and You. Curriculum and the Micro. Building Ideas. Keeping Learning. Home is where the chip is. Peeko Computer. The Computer Programmes 1 and 2. Acornsoft BCPL. Microtext. Bas. Procvar/Proc Flush/Proc Aid Computer procedures. Sort MIC. Sort Bas. Tas Logo. Search Bas.

### **Games and Educational Games**

Fun With Words. Doctor Who. Fun Games. Philosopher's Quest. Monsters. Sphinx. Superlife. Adventure. Games of Strategy. Pirates. Snapper. Planetoid. Katakombs. Rocket Raid. Meteors. Super Invaders. Arcadians. Arcade Action. Games of Logic. Sliding Block Puzzle. Missing Signs. Cube Master. Chess. Time. Sailing Ships/navigation. Campaign 1346. Disraeli 1875. Castle of Riddles. Starship command. Missile Base. Snooker. Draughts. Reversi.

Superlife. Battle. Cards. Hangman. Banner. Distances. Flags. Statpak. Countdown to Doom.

### **Graphics and Graphics Teaching**

Shape Maker. Graphs and Charts. Creative Graphics. Eureka. Bar Charts. Moving Modules. Technical Drawing. Picture. Creative Graphics on the BBC Microcomputer.

### **General Educational Subjects**

Educational I, Educational II. Results Analyst. Home Finance. Record Keeper. Desk Diary. Motorway. Farm Resources. Hill Railway. Rice Farming. Water on the Land. Prospecting. Light. Speed and Light. Urban Growth Stimulation. Urban Welfare. Census Analysis. Population Dynamics Transport/Manufacturing Location. Police. Diet. Map Skills 1 & 2. Balance Your Diet. Density and Circuit. Electrical Circuit.

Symbols to Moles. Lenses. Approximation, Estimation and Standard Form. Longitudinal Waves. Climate. Compass and Bearings. Yacht Race.

### **French**

Respondez. Comprenez.

### **Logical Thinking**

Vennman. Vennkid. Shape. Gate. Watchperson. Spanish Main. Cat and Mouse. Logic Games. Concentration.

### **Language Arts**

Early Learning. Word Hunt. Word Sequence. Sentence Sequence. Unscramble Spell. Pattern Recognition. Quiz. Anagram. Box/Wordshape. Dictionary Game. Vocabulary Practice. Hang the Man. Spelling Test Creation. List of Spelling Tests. Vocabulary Tester.

### **Mathematics**

Fractions. Tables. Number Balance. Number Sequence. Maths Topics 1. Ultracalc. Algebraic. Manipulation. Trains/Arithmetic. Snap/Fractions. Ergo/Arithmetic. Morless/Number Concept. Abacus. Moving Modules. Multiplication. Speed Drills: Addition, Subtraction, Multiplication and Division. Read Speed Drills. Clear Speed Drills. Dice Addition and Subtraction. Long Multiplication. Area and Perimeter. Factor and Base Games. Equations, Pythagoras and Directed Number Games. Pythagoras Rule. Processes. Skill Counter.

### **Music**

Music. Advanced Music.

### **Sciences**

Evolution and Natural Selection. Particle Scattering. Genetic Mapping. Enzymic Kinetics. Homogenous Equilibrium. Gas Chromatology. Organic Synthesis. Decomposition. Sulphuric Acid. Synthesis of Ammonia. Element. Formulae. Gas Laws. Rates of Reaction. Reaction Kinetics. Compound Identification. Diet Analysis. Organic Analysis. Plant Competition. Photoelectric Effect. Mass Spectrometer. Planetary Motion. Gravitational Fields. Capacitor Discharge. Gaseous Diffusion. Radioactive Decay. Electric Impedence. Acoustics. Collisions. Momentum. Alpha/Range/Fraun/Decay. Chemical Analysis. Chemical Structures. Chemical Simulations. Atomic Structure/Equilibrium. Projectiles. Satellite Orbits. Orbits and Alpha Scattering. Exponential Growth and Decay. Alphafoil. Nuclei. Gravity. Quantum Shuffle. Random Walk. Ampere. Millikan. Malthus. Watts in Your Home. Moving Molecules. Photosynthesis. Metabolic Pathways. Wave Motion. Transverse Waves. Interference and Diffraction of Waves.

### **Spatial Perception**

Shape Builders. Shape Shooter. What Shape. Axes of Symmetry. Crash. Perspective.

### **Word Processing**

VIEW. Wordwise. Wordpack.

**Note:** The above describes existing cassette or disk software by title or content, and is a partial list only. Additional teaching aids including books, audio and video cassettes, tutors and OHP's, are all part of the BBC Computer Literacy Project. Software by Australian and International publishers and developers: Acornsoft, Advisory Unit, Cambridge Educational Software, Edward Arnold, Golem Software, Heineman, Input, Longman, Micro Primer, Passionfruit Software, Tas & WA Education Departments.

**BBC / BARSON**  
MICROCOMPUTER / **computers**

Melbourne • Sydney • Auckland



**THE  
KING  
IS  
DEAD...  
LONG  
LIVE  
THE  
KING!!!**

The Medfly was unquestionably the King of the Apple workalikes. It did everything the Apple could do and then more. And it was cheaper.

**NOW THERE IS THE LINGO 128**

- ★ IT DOES ALL THE SAME THINGS AS THE MEDFLY AND THEN MORE
- ★ IT IS EVEN CHEAPER THAN THE MEDFLY
- ★ IT IS EVEN BETTER QUALITY

Check the specifications on the basic machine. Make up your own mind.

	Lingo 128	Medfly	Apple IIe		Lingo 128	Medfly	Apple IIe
Twin processor	Y	Y	Extra	Cursor control pad	Y	Y	Y
Resident basic	Y	Optional	Y	Function keys	Y	Y	N
Standard memory	128K	64K	64K	Front on/off switch	Y	N	N
Built in whisper quiet drives	Internal	External	External	Japanese made	Y	N	N
Software selectable 80/40 column	Y	Y	Optional	External joystick port	Y	N	N
Hardware selectable 80/40 column	Y	N	N	Voice synthesiser included	Y	Optional	N
Centronics port	Y	Y	Optional	<b>Price</b>	<b>\$1950</b>		
RS232/C port	Y	Y	Optional	cost of competitors Medfly with new keyboard, 128K memory, two external drives and Custom ROMs (\$140)		<b>\$2260</b>	
Composite B/W video	Y	Y	Y				<b>GO ASK</b>
Composite PAL/NTSC	Y	Y	Optional				it will scare the pants off you!
TV VHF output	Y	Y	Optional				
RGB colour output	Y	Y	Optional				
6 Apple compatible slots	Y	Y	Y				
Upper/lower case	Y	Y	Y				
Numeric pad	Y	Y	N				
Auto repeat keys	Y	Y	Y				

(pages 93 and 151 APC June 1984)

The Lingo comes with Pascal, CP/M and Applesoft as standard. Prices include tax. Monitor is extra. Come to COMPAK where you can choose from the best!

**SHOW ME A LOWER PRICE IN THIS MONTHS APC AND I WILL MEET IT OR BEAT IT!**

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



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

# COMPAK

Compak Computer Centre

## SPECIALS FROM COMPAK

### For your Apple . . . . .the Software Automatic Mouth

A brilliant voice synthesiser that can interpret intelligible speech from your written text. It even knows the difference between words like "through" and "rough". Phonemes too if you want to use them. Complete with manual and disk and hardware . . .



only **\$35**  
including tax

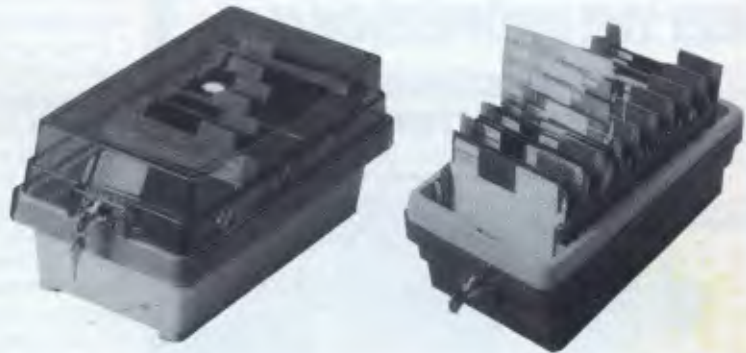
### Lockable disk boxes Concertina display 45 Disks

### Plain separators 85 Disks

The same boxes are sold for twice the price elsewhere!

Either Style

From Compak only **\$30**  
Postage to capital cities **\$5**



## THE NEW STANDARD THAT WILL SWEEP THE MARKET 120 CPS – SEND FOR SAMPLE OF PRINT OUT

### COMPAK COMPUTER CENTRE SELLS THE AMUST 80/DT 2 PRINTER AT THE BEST PRICE ON THE MARKET

**\$425** INCLUDING TAX

**\$375** EXCLUDING TAX

QUOTE ME AN ADVERT  
IN THIS MAGAZINE  
OFFERING THIS PRINTER  
AT A LOWER PRICE  
AND I WILL BEAT IT  
OR MEET IT!

Courier delivery \$8



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

## dBase III

A copy of dBase III arrived in our offices too late for a Benchtest to be conducted, so you'll have to settle for a brief mention of its main features in *Newsprint* this month.

dBase III is for the 16-bit (and larger) computers. It can cope with over two billion records per file, 128 fields per record and ten database files simultaneously.

The program is written in the C programming language from "the ground up" and is not, according to Ashton

Tate, its authors, just an enhanced version of dBase II. Although it does have the same features as dBase II.

A new feature of dBase III is the introduction of a "command assistance mode" called dBase Assistant which "guides the new user through dBase III providing him with a set of prompts to the most common areas of database use. When the cursor is moved to a dBase command word, a brief description appears explaining the category. Pressing the return key brings the category of database usage to the

screen, with a menu appearing for the possible options in the command word's category", according to the publicity.

dBase III is accompanied by a tutorial in the manual which is augmented by a set of on-disk examples.

Arcom Pacific distribute the product. Telephone (07) 52 9522.

Another product from Arcom Pacific which will get its first public airing at the 3rd APC Show is Concurrent PC-DOS. As we've mentioned before in APC it's from Digital Research International, the company that cleaned up the 8-bit micro market with CP/M but which has had a less than overwhelming success in the 16-bit market, largely due to IBM opting for an alternative product from Microsoft. In response DRI worked on producing a more advanced operating system for the IBM and came up with Concurrent CP/M which enabled users to run up to four programs simultaneously. But because so many software houses had already produced programs which ran on Microsoft's operating system, Concurrent CP/M also failed to entice users to leave their less sophisticated operating system for which there are plenty of applications programs and convert to DRI's nicer but less supported system.

So, Digital Research has produced a program which it reckons has all the advantages of concurrency (ability to run more than one program at once) and can run programs designed for use on both DRI's and Microsoft's operating systems. It's called Concurrent PC-DOS.

DRI reckons it runs "most of the popular PC-DOS applications" including Lotus 1-2-3, dBase II and Word-Star. It has windows to facilitate use of its concurrency feature; printer spooler (users can "queue"

documents to be printed while other tasks are printing); ability to drive two printers simultaneously; and a "two-user" feature which lets two people use the same system at the same time (primarily this is designed as a remote dial-up link, so that, for example, a secretary might be preparing a document using a word processing program while a supervisor picks up or leaves a message from a remote portable computer).

Concurrent PC-DOS will work with 256k of RAM and two floppy disk drives on an IBM (or compatible) but 512k and a hard disk are recommended.

## Capital show

The Microcomputer Special Interest Group (MICSIG) of the Australian Computer Society is organising "A Computer and Office Equipment Exhibition" in Canberra on the 16th and 17th of August at the Erindale Centre, Wanniasa. It's a three level show — the divisions being professional, home and office equipment.

Write to MICSIG, PO Box E237, Canberra 2600 for more details.

## Video based micro learning package

Bits & Bytes is the name of a New Zealand micro mag (bet you thought they hadn't even heard of PCs. By the way, did you know a Commodore 64 sells for A\$730 in Kiwiland? Cheap, eh!) and more recently a video-based micro learning package. It was created by TVOntario a self proclaimed world leader in educational telecommunications and specialist in the design of adult learning systems. B&B has been shown on public television

## MEET THE PROFESSIONALS

AT THE FRIENDLY

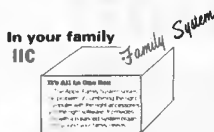
## NEW GENERATION COMPUTER STORE

**SPECIALIST IN INTERACTIVE VIDEO SYSTEM**  
UTILIZING IBM & APPLE MICROCOMPUTERS FOR CONTROL OF VIDEO RECORDERS FOR TRAINING IN INDUSTRY AND HOME

Call Sydney (02) 427 4780 (02) 427 4781

 **apple computer**  
Authorised Dealer

- Forecasting
- Stock evaluation
- Word processing
- Accounts payable
- Financial modelling
- Data base applications
- Sales analysis
- Free advice on the choice of your system
- Huge range of software to choose from
- Friendly atmosphere
- Attractive prices
- Financial management
- Other accounting functions
- Personal asset management
- Charts, graphs or plots
- Tax planning
- Statistical analysis
- Extended hours



For our opening offer this month only we offer one year free extended warranty plus your 90 day Apple Guarantee with every business Apple II system sold.

Check us out for YOUR SPECIAL PRICE

We also carry an extensive range of printers, monitors, disk drives and other peripherals to suit all microcomputers.

We offer specialised services to: Accountants • Doctors • Engineers • Scientists • Managers • Analysts • Solicitors • Financial Brokers • Teachers • Dentists



**NEW GENERATION COMPUTER STORE PTY. LIMITED**  
229 BURNS BAY ROAD, LANE COVE WEST, 2066. TELEPHONE (02) 427 4781 (02) 427 4780  
**COMPUTER SALES AND SERVICE**  
COMPUTERS FOR HOME, INDUSTRY, LABORATORY, OFFICE AND EDUCATION

stations throughout the US and received favourably, so it is probably worth a look.

Call Think Video on (02) 698 7666 for more information.

## Apple bulletin board

An Australian-designed electronic mail system is expected to provide 100 Apple dealers throughout Australia with a high speed communications facility within two months.

In addition to facilitating dealer communications for Apple, the system will provide dealers with in-store equipment to demonstrate Apple business communications capabilities, both with major mainframes and with international and local databases.

Utilising Apple IIe equipment in each store, the system will employ modems and cards designed and manufactured by the Sydney-based company, Netcomm, and will run two software packages, one of which will allow dealers to log into the Apple bulletin board at North Ryde, which will supply up-to-the-minute pricing and sales messages, new product specifications, software guides, and will also accept dealer queries.

Additionally, the system is planned to provide the capability for an inter-dealer electronic mail system and will allow similar international communications for Apple dealerships with such overseas systems as Prestel, Dow-Jones and the Source.

Testing is now underway on the Apple electronic bulletin board, and the system is expected to be operational in August.

## PC link

A micro to mainframe link for IBM PCs (and work-

alikes) has been announced by Distributed Data Processing. Tempus-Link will be on display at the 3rd APC Show in Melbourne, demonstrating its ability to not only provide simple file transfer but also define the PC's disks so they're accessible by the mainframe.

A single user system is available for \$2,500; further installations are at a reduced price. Details on (03) 62 4698.

## IBM drops price

In addition to announcing new configurations for its PC range in Australia, IBM has reduced prices by up to 19%.

The new configurations of the PC and PC XT come with 256k as standard, being priced at \$3381 (system unit, keyboard, 320k disk drive and disk drive adaptor) and \$7042 respectively (the same as the former but with a 10 Mb hard disk).

The new versions are scheduled to be available in September, and will be manufactured at Wangaratta.

## 4th generation Aussie exported

BBJ Computer Services reckons its "Today" package is "the world's first complete fourth generation product under UNIX" and will release it onto the US market later this year, previewing it at the NCC in July. It is an application development package which features a high level "user oriented" command language; decision tables; structured approach; flexible, easy to use report generation; help, test and training modes; self documenting

mode; application change audit trails; three-tier control environment; ability to use files/data base system of the host computer; low cost; foreign language compatibility; ultra-fast development and running of applications; and that it is menu driven and UNIX based.

## Another one

NCR has introduced a new personal computer which it says is a "16-bit industry standard compatible model". This means it runs a MS-DOS work-alike called NCR-DOS which supports programs like Lotus 1-2-3, dBase II, WordStar, Flight Simulator (mentioned in the press release not as a sales generating feature — execs don't fly jets at lunchtime — but to show how IBM PC compatible it is) and Frogger

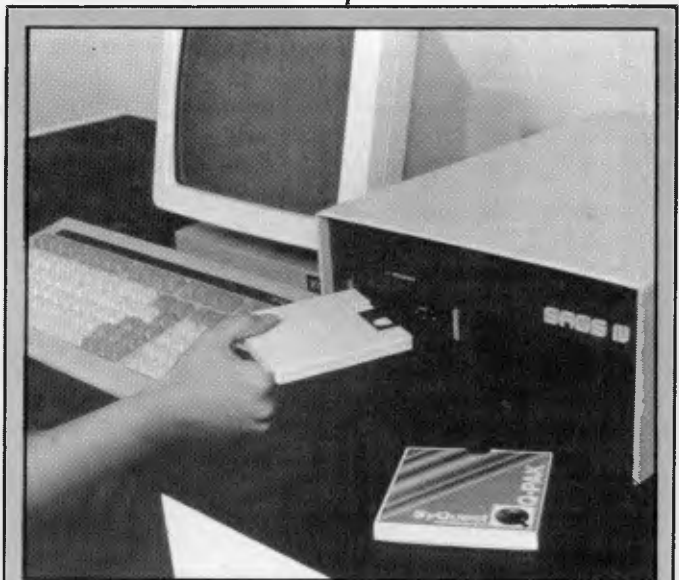
(don't know why this gets a mention).

The specs are too boringly familiar to mention here — they're virtually the same as every other IBM PC work-alike. Details on (02) 922 0161.

## Multi-Link

Cybox Computing has recently released a networking system for the Commodore 64 which is claimed to be substantially better than previous systems.

Multi-Link provides full communications among (up to) 48 Commodore 64s, making it ideal for schools. The satellite computers are set up in groups of six 64s daisy chained together and then connected to the master control unit. IEEE peripherals may be con-



Rakon Computers has released a Syquest removable hard disk option for the Sage microcomputer. The new drive provides 5.7Mb of formatted storage in a cartridge measuring about 11 x 12 cm. A typical Sage IV configuration utilising the removable hard disk would include a 12, 18 or 40Mb fixed winchester drive accompanied by a single half height floppy and the Syquest drive.

In addition to increasing the storage capacity of the Sage, the removable hard disk (at a cartridge cost of \$135) provides another method of backup for the main drive. The drive sells for \$2140.

Details on (02) 43 1351.

**LOWEST COST EVER ON A  
QUALITY DAISY WHEEL**

**SP 2000 – Workalike to  
Sanyo WD100**

**PARALLEL PRINTER**



**\$650 including  
tax**

Print speed	18 cps — Shannontext	
Friction feed	.....	Yes
Paper width	.....	13"
Hor. spacing	.....	10/12/15
increments	.....	1/120
bidirectional	.....	Yes
Ver. spacing	.....	6/3
increments	.....	1/48"
bidirectional	.....	Yes
Daisywheels	.....	Qume
Emulates Diablo 1610/630 Printer		
Tractor or sheet feed optional		extra's
High yield carbon ribbons (375,000 characters)		

# COMPAK

Compak Computer Centre

## PORTABLE POWER



### APRICOT — 256K MEMORY

Sirius compatible, portable 16 Bit — MS-DOS

You can even configure your screen to show 132 columns and 48 Lines — brilliant for your spreadsheet!

2 single sided 3½" microfloppies 315K each drive **\$4998 inc**

2 Double sided 3½" microfloppies  
720K each drive **\$5712 inc**

Includes MS BASIC,  
Superplan, Supercalc  
and lots more

### KAYPRO 4

Built like a tank

But runs as sweet as a racehorse!

The CP/M engine comes with:  
Compiler Basic, Basic 80, Wordstar, DBII  
Mailmerge, Word Plus, Report Star, Datastar,  
Calcstar and Superterm. Also comes with a  
library of support manuals that are more  
complete than for any machine on the market.

400K per Drive, 800K TDAL

**\$2,950 inc**



includes  
DB II!!



### EXECUTIVE 816

8 bit Menu driven CP/M computer

Comes with software

Brilliantly packaged for the professional and businessman.

Accounting/Wordprocessing/Communications/Spreadsheets/Databases  
and lots more.

The Crispest style for the businessman on the move.

1.5 megabytes from 2 5¼" drives **\$3,550 inc**

**REMEMBER — COMPAK GIVES TOP VALUE — WE WON'T BE BEATEN ON PRICE**

Phone for extra special prices on any of these portables and the C. ITOH 1550 Printer.

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

# ATARI 800XL



**ALSO AVAILABLE — PRINTER INTERFACES — SUIT ALL ATARI COMPUTERS**

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**

## “FRED” The Computer Desk every home computer needs



### FEATURES:

- Print Paper Slot
- Power Cable Holes (plugged)
- Power Cable Holders
- Power Board (max 10 amp)
- Disk Storage Drawer
- Strong Steel K Frame
- Hardwearing Laminex Surface

- Suits Many Computers
- Accessories Available

# \$299

F.D.B. Melbourne

AUSTRALIAN DESIGNED AND MANUFACTURED by CompuFurn.  
(DESIGN PENDING)

COMPUFURN a division of  
CAM INDUSTRIES PTY. LTD.

SEND CDUPDN TD: P.D. Box 909, FRANKSTON.  
VIC. 3199

\* TRADE INQUIRIES WELCOME.

I need more information about Fred.

Name .....  
Company .....  
Address .....  
Post Code .....  
Phone .....

OR CONTACT  
TREVOR or SANDRA  
ISTED on (03)  
783 8201

# TRUST IT TO TED'S

## WE'RE THE COMPUTER EXPERTS

The exciting SPECTRAVIDEO 318 computer at TED'S new lower price must be the best value home computer around. Check these features:

- Standard Qwerty standard style keyboard
- 32K of ROM (expandable to 144K)
- 32K of RAM (expandable to 96K)
- Built in Extended Microsoft Basic (MSX)
- Built in commands for ARCADE QUALITY graphics and sound
- Built in joystick for games and cursor control (Two other joystick ports too!)
- 3 Channels of sound over 8 octaves
- 16 colours, and LOTS MORE

## SPECTRAVIDEO



# \$199<sup>00</sup>

OFFERS CLOSE  
JULY 31, 1984

OR SOONER IF CURRENT STOCK SOLD OUT

OR SV 318 with data cassette recorder and FOUR BONUS PROGRAMS \$299.90

## CORONA PC — TRUE I.B.M. COMPATIBLE

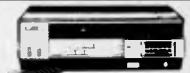


- Powerful, Low cost desk top and portable computers
- 16-Bit, fully compatible with IBM PC standard
- Crisper, cleaner display and higher resolution graphics (640 x 325 PIXELS)
- 128K Byte memory, room for 512K Bytes on main board
- Fast access 320K Byte Floppy Disc Drives built in
- Centronics interface port
- RS 232 interface port
- 4 expansion slots
- RAM - Disc software
- Includes MS-DOS, GW BASIC, PC TUTOR
- Optional Hard Disk
- Fully supported Direct by AWA
- System includes MULTIMATE Word Processing Program.

LARGE STOCK OF PERIPHERALS, JOYSTICKS, MONITORS, PRINTERS, MODEMS, SOFTWARE, BOOKS, MAGAZINES AND DISKETTES.

## GOING OVERSEAS?

Save between 25 and 60 percent on a great range of Ted's Duty Free products including VIDEO, CAMERAS, SPIRITS, CIGARETTES, PERFUME and much more. We'll also be here for service and know-how when you return.



## DUTY FREE

# Ted's COMPUTERS

**245 ELIZABETH ST. MELB. PH 676141**

**AND TED'S SELL VIDEO, PHOTOGRAPHICS & DUTY FREE**

Also at SIX other City Locations and Geelong, Footscray, Camberwell and Prahran

nected to the master unit as well as standard serial devices.

Programs can be downloaded at high speed from the master unit onto any of the satellite computers. At a recent demonstration at Commodore Computers, it was shown that even protected software could be used on this system without any problems (tut, tut, tut).

From the master computer it is possible to view and control what the students are doing. Messages may be sent from satellite to satellite using a few simple commands (ie, kids can hurl electronic insults at each other). Each satellite can also access any peripheral connected to the master computer.

Security is provided at various levels including password protection and ID prefixes for special files.

Cybox expect an entire system complete will all necessary hardware, installation, software and eight satellites to sell for around \$2500. Details on (08) 333 0711.

## Freestyle — Beyond word processing

Freestyle's 'Outline' feature helps you 'prewrite' or organise your thoughts and ideas. It allows you to create outlines so you can see the structure of a dozen pages on a single screen and manipulate your corresponding text by moving the outline headings.

'Draw' allows you to draw boxes, charts, arrows and symbols easily, thus eliminating the need for a separate graphics package.

As well as the two main features, Outline and Draw, Freestyle also comes with horizontal scrolling, Wang-like glossary, online help screens, on-screen bold and

underline, real-time justification, full cursor movement and on-screen international characters and maths and engineering symbols.

Freestyle is available for the IBM PC and compatibles under PC-DOS or MS-DOS 2.0 and 2.1. Freestyle requires 128k RAM (192k RAM recommended). Suggested retail price is \$650.

Further details on (03) 459 7877.

## 16-bit power

Computer Transition Systems has just announced the CO-16. It provides a 16-bit operating environment to users of CP/M 2.2 microcomputers. The main CO-16 circuit board contains either an 8086 or a 68000 processor and 256k of RAM. An extra 512k of RAM is also available as an option. The CO-16 comes with either the CP/M 68k (for the 68000 version) or MS-DOS 2.11 (for the 8086 version). In addition, RAM disk software is supplied so that the CO-16 memory can be used as a RAM disk when only 8 bit operation is needed.

Priced at \$1100, further details on (03) 818 7290.

## Power control

An LAE Power Control System when combined with your home computer can control lights and appliances throughout your home by remote control.

From your computer you can control a bedroom light, air conditioner, electric heater, TV set, sound equipment, microwave oven etc. The system can independently control up to 15 lights and 30 appliances.

There is also a timer function, where the whole house can be automatically controlled. Wake up to music on your stereo, coffee being made while you lie in bed (I've got a percolator

with a timer and a digital clock/radio — Ed) and the whole house air conditioned before you get up.

Further details on (052) 78 4284

## WPS-80 Word processing for the Digital Rainbow

LOGO announces the release of WPS-80, a CP/M-80 word processor for the Digital Rainbow, Decmate II and VT180 computers.

WPS-80 uses special keys and features unique to the DEC personal computers to reduce keystrokes and enhance performance. A set of colour coded key labels are included, with each key labelled in English with words like 'Word', 'Underline' and 'Bold'.

WPS-80 also includes a full screen editor, ten cut and paste areas, HELP command and an 'oops' key to retrieve deleted text, extra wide text (WPS-80 displays up to 132 characters across the screen without using a split screen), proportional spacing on the LQP-02 letter quality printer, ragged and justified margins intermixed within a document and footnoting.

WPS-80 is distributed in Australia by LOGO. Further details (02) 929 8508.

## Computer cruise

The Proud Mary is the venue for a five day cruise to learn about computers.

The programme is designed to enable participants to enjoy a relaxing top class cruise on the Murray River of South Australia and increase their

knowledge of computers.

Topics to be covered include: computer databases; word processors; and spreadsheets — their content and uses. All sessions will be based on practical work using Sanyo microcomputers. There are individual terminals for each student.

Limited to 26 participants, the cruise departs Sunday evening August 5, returning August 10. The all-inclusive cost is \$480.

For further information (08) 51 9472.

## An addendum to this month's Benchtest of Epson's latest

Before you rush off to buy the PX-8, I am informed by a colleague who uses one all the time that he has discovered an irritating little "feature" — the diary cleans itself out every time you have a problem with any other program.

I can't imagine that anybody who buys the PX-8, which has enormous memory and Wordstar, would do so only to get the diary, but here is what happens, just in case:

Wordstar on the PX-8 is very nice, and includes a command (unknown in other Wordstars) to "transmit a file" — very nice, too.

However it only seems to work if you transmit it to another Epson (a QX-10, probably) and if you don't, it won't stop without somebody pressing RESET.

At that point, all your diary dates are completely erased.

Anybody found a way round this? Let our Workshop know, will you?

Guy Kewney

# Rob's Computer

## CARDS

### RC MULTICARD

\$240 including Tax.

Expand your Hitachi's capabilities with this new Australian designed and manufactured board. Robs Computer center gives you for the first time on Hitachi

- **Two Joystick Ports.**  
compatible with Atari or Commodore joysticks.
- **Two Sound Generators**  
giving you 6 sound channels
- **Voice Synthesis Chip**  
lets your program speak to you.
- **Real Time Battery backed up Clock.**  
Keeps track of time and date even when power is off.
- **16 Input/Output Channels.**  
These are buffered T.T.L. level inputs and outputs that let you connect up to the real world and control your house lights, alarms and relays, etc.

Price includes demonstration software, documentation, and programs necessary to implement all these features in a basic or machine code program.

### SUPERCHAMP JOYSTICK

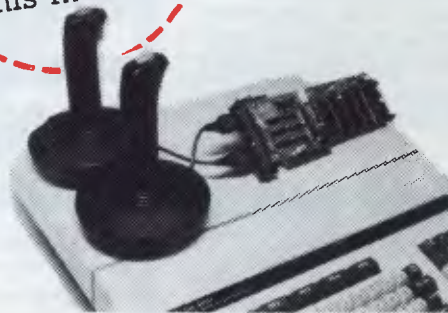
as shown \$29.50  
Including Tax.

### COMMODORE JOYSTICK

\$12 Including Tax.

Pack and Post **Cards and Joysticks**  
\$5 anywhere in Australia.

Free  
Donkey Kong  
and SPRITES  
SOFTWARE with  
every order  
this month.



## DISK DRIVES

### NEW 5" DISK DRIVES FOR HITACHI PEACH

DUAL DS/DD DRIVES 320K per drive.  
\$1295 including Tax



These are Hitachi Disk Drive packages in an Australian case with RC 1802 controller.

SINGLE DS/DD DRIVE 320K formatted.

\$695 including Tax  
All prices include RC 1802 controller, and free demo, games disk.

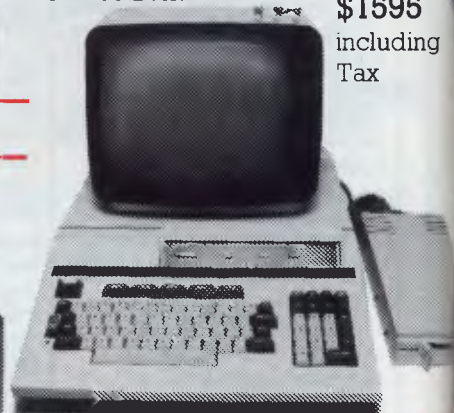
## COMPUTERS

### HITACHI STARTER PACK

You get the following equipment and software at a price that represents better value than any other Home Computer.

- Hitachi MB6890 Computer
- Hi Res Green Screen
- Single 5" DS/DD Disk Drive
- 16K RAM Card
- Hi Star Disk
- Computer Tutor Disk
- Games Disk

\$1595  
including  
Tax



## PRINTERS

**BROTHER  
HR 15  
Daisy wheel  
printer.**



## SOFTWARE

### 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)

\$49.50 including Tax

### MICROLEDGER

For Hitachi Peach DS/DD  
Microledger is a small accounting system for general business comprising of 10 different accounts which are subdivided into 120 sub accounts, together with reporting facilities. Includes bank reconciliation and many other features.

\$95 including tax.  
\$3 pack and post.

### MICRODATA

For Hitachi Peach DS/DD  
Powerful new data base program Hitachi Peach (5" DS/DD and 8" formats). Create your own data base and store up to 2,000 records. When doing reports, selected records can be sent to a Hiwriter file for merging into standard letters. Powerful package at an affordable price.

\$95 including tax.  
\$3 pack and post.



# Center Specials

**FREE  
D BASE  
2**

## HITACHI HOME & SMALL BUSINESS SYSTEM

There is no other system that can come anywhere close to what you see here for this price.

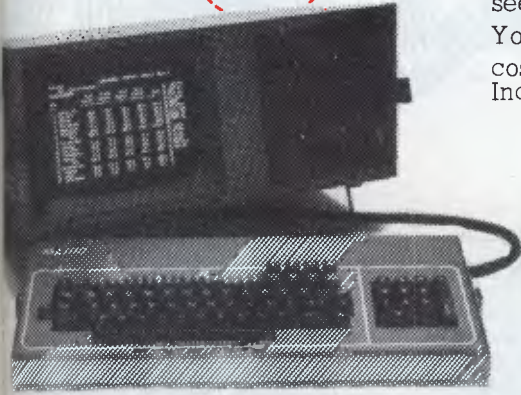
You get the lot for the incredibly low cost of **\$2,995** Including Tax

### YOU GET:

- Hitachi MB6890 Computer
- Hitachi Hi Res Colour Monitor
- 16K RAM Card
- Dual DS/DD Disk Drives and RC1802 Controller
- Microledger and Microdata Software. (See below for description.)
- Hi Writer Word Processor Disk
- Procalc Spread Sheet Disk
- 15 Colour Games Including Flight Simulator
- Computer Tutor Disk
  - Basic Tutor Disk
  - Typing Tutor Disk
  - Hi Star Disk

**SAVE  
\$2405!**

Off recommended retail price



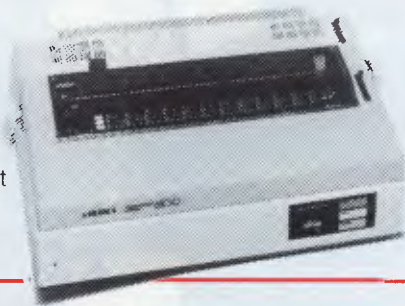
### NEW KAYPRO 4 COMPUTER

**\$2,995** including tax.

Complete with Slim Line Drives, and non glare screen with graphics. Software now includes Wordstar, super term, perfect series, M Basic, and much more.

**\$725**  
Parallel Version  
**\$395**  
Sheetfeeder to suit  
**\$295**  
Keyboard option  
**\$165** Tractor feed to suit  
**\$20** Printer cable  
All prices include Tax

### JUKI 6100 DAISY WHEEL PRINTER.



Control codes are identical to Diablo Printer.

**\$950**

Including Tax and cable.

### COMPUMATE CP80 PRINTER



**\$395**

Including Tax.

Compatible with Epson FT type III.

### GAME PACKS FOR HITACHI PEACH

Brand new Hi-resolution games especially designed for the Hitachi Peach. Please specify format required and if you have a Multicard or not.

**\$25** per pack. \$2 pack & post.

#### Games Pack 1

Super snake  
Star Trek II  
Combat  
Connect 4

#### Games Pack 2

Centipod  
Ganymede  
Battleships  
Thief

Also available from:



**COMPUTER CENTER**

295 Thomas Street, Dandenong 3175

Phone (03) 7912900

OFFICE UPDATE — PERTH Ph. (09) 325 3499  
METROPOLE — ADELAIDE Ph. (08) 223 5538

IK/40

# STAR

**SYDNEY** (02) 452 5231  
**MELBOURNE** (03) 529 7644  
**BRISBANE** (07) 221 4727

Please ask for:  
Michele Cahill  
Kevin Murphy  
Bruce Isbister

## STX 80

### The Silent

Prints 60 characters per second with muffled serenity. Standard ASCII, selectable international characters. Block graphics and bit-image-graphics. The STX 80. At a price to start with. Soft on the ear. Easy on the purse.

## Gemini 10X

### The Bestseller

Number 1 in the range, the Gemini 10X has swiftly soared to stardom. 120 characters fast per second. Economical. Reliable. And now compatible with IBM: Gemini 10Xi. Any more details? Let us know. We support you.

## Gemini 15X

### The Economical At Pro-Range

For professional output at a reasonable price the Gemini 15X is hard to beat. The print-head provides you with more than 100 million characters. Gemini 15X. The optimal price/output relation.

## Delta 10

### The Powerful

Serial and parallel interface. 8k-byte buffer. Macro-instruction. 2 x 96 download characters. Bi-directional printing with logical seeking. Where others speak of extras we mean standard. The Delta 10.



# PARADE

Distributed by Case Communication Systems Ltd. 1-3 Rodborough Road Frenchs Forest NSW 2086

## **Delta 15**

### **The Powerful At Pro-Range**

For full power, wide carriage output the Delta 15 is your printer. Up to 233 columns width and 160 characters per second. Just great. Effortless efficiency at a standard price.

## **New: Radix 10 The Pro**

200 cps, automatic single sheet feed, 16k-byte buffer, near-letter-quality. For the professional use. Radix-10. Setting new output standards. From Star.

## **New: Radix 15 The Pro At Pro-Range**

It's super duper. With super-wide action. Provided with everything a pro asks for. Radix 15. Right on course.

## **New: PowerType The Typist For your computer**

Sets new dimensions in your correspondence. With over 100 type fonts. 18 clear characters per second. Serial and parallel interface. Proportional printing. PowerType. Prints as typed. At a surprising low price.



**PRINTERS FOR  
PERSONAL COMPUTERS**

# At these low prices you can't afford not to buy

FREE FREIGHT IN AUSTRALIA



## ★ AMUST DT80 PRINTER

80 characters second  
Bidirectional printing  
Crisp clear print style  
from square pins  
Superscript/subscript  
Graphics capability  
Italics  
Sprocket feed for fanfold paper  
Pressure feed for sheet paper

**\$259** (EXC)

YES THAT'S RIGHT!  
OR JUST

**\$309** (inc)

\* ASK ABOUT OUR  
NEW 120CPS  
STAR GEMINI —  
NOW IN STOCK

## SUPERB QUALITY DISKS

LOWESET PRICE EVER!

**\$25.00** ex tax  
(box of 10)

**\$29.95** inc. tax  
(box of 10)

Full Warranty and Famous Brand

## Color monitors that give you more performance and reliability

### ADI-INTRA COLOUR MONITOR



**\$399 inc**  
**\$339 exc**  
COLOUR MONITOR

Suits Commodore, Apple, etc.  
(Manufacturers rec. retail price \$620)  
RGB + Composite video

Features  
Unique  
Green Screen  
Switch

OR A

### HI-RES GREEN SCREEN

Features  
• 20 MHZ Resolution  
• STURDY STEEL CABINET  
• ANTI GLARE  
• CABLES & MANUAL  
INC.



**\$159**  
(EXC)  
**\$179**  
(INC)

**SAVE \$30**

## OUR PLEDGE TO YOU ...

We absolutely guarantee to supply all our mail order customers the very best quality.

All mail order products are clearly and unconditionally covered by the Data Parts 6 months parts and labour warranty!\* (That means something — ask our customers).

\* Ask about our exclusive Data Parts warranty. Its as good as having a Data Parts store next door!

Data Parts are one of the biggest and oldest mail order houses in Australia. We don't just claim to be the best ... check our superb quality products ... but still we are never undersold!

And remember all products are delivered free to your door.

YES — FREE FREIGHT  
anywhere in Australia  
RING ME PERSONALLY IF YOU  
WANT — YOU WON'T BE  
DISAPPOINTED

Regards *Boyd Dainton*  
Boyd DAINTON

NATIONAL • INTRA • BBC • MITISBISHI • XEROX • SILVER REED • DIGITAL • MPI • DEC • TEC

NEC • BMC • AMUST • COMMODORE • TEC • AMUST • COMMODORE • BMC • AMUST • COMMODORE

EPSON • OSBORNE • C-ITOH • STAR • ADI • TELEVIDEO • TEAC • VERBATIM • DIGITAL

# You won't buy better — both in price & quality

FREE FREIGHT IN AUSTRALIA

★ BEST PRICE EVER ★ ★ ★ COMMODORE ★

**\$199<sup>00</sup>**  
(EXC)

ON QUALITY IMPORTED  
APPLE COMPATIBLE  
DISK DRIVES  
(\$238 INC TAX)  
55 UNITS AT THIS PRICE  
**SCHOOLS.**

**PHONE FOR YOUR  
SPECIAL PRICES**



**ATLAS.8 SLIMLINE**  
\$234 EXC. \$264 INC.



**THE FAMOUS  
COMMODORE  
EXECUTIVE**

**\$998<sup>00</sup>**  
(EXC)

- BUILT IN DISK DRIVE
  - COLOUR MONITOR
  - 64K MEMORY
  - \$1240 (INC TAX)
- ASK ABOUT THE SOFTWARE DEAL!

• SENDATA

• DIGICARD

• INTRA

• TRIN

	Price (inc tax)
*COMMODORE	
1541 DISK DRIVE.....	\$380.00
1526 PRINTER.....	425.00
1526 LOOKALIKE PRINTER with Interface .....	368.00
1701 MONITOR.....	425.00
64 COMPUTER .....	CALL
COMMODORE 2031 DISK DRIVE .....	399.00
1520 PRINTER/PLOTTER .....	116.00
64' REFERENCE GUIDE .....	CALL
DATASET .....	48.00
KOALA PAD .....	129.00
EASY SCRIPT .....	84.00
SIMONS BASIC .....	73.00
C30 BLANK TAPES (10) .....	9.95

*PRINTERS	(inc tax)
DT80 .....	309.00
EPSON RX80 .....	Save \$120 439.00
EPSON FX80 .....	CALL
EPSON RX100 .....	Save \$120 799.00
EPSON FX100 .....	Save \$220 CALL
DIABLO/XEROX 630 .....	1998.00
SMITH DAISY WHEEL .....	595.00
PRAXIS '40 .....	695.00
C. ITOH COLOR PRINTERS .....	CALL
SILVER REED DAISY WHEEL .....	695.00

*RIBBONS	(inc tax)
AMUST/XYZ80 .....	12.90
EPSON 80 .....	12.80
EPSON 100 .....	16.80

*MONITORS	(inc tax)
NEC 15 MHZ Green.....	139.00
BMC 18 MHZ Green .....	174.00
INTRA 20 MHZ Green with Swivel, Super Hi Res.....	189.00
INTRA ADI Color (Composite & RGB) .....	399.00
AMBER MONITOR HIRES with Swivel Base, Super HI-RES .....	199.00



**SUPER SPECIAL \$99.00 inc. tax**

*APPLE COMPATIBLE	(inc tax)
Z80 CARD.....	54.50
SNAPSHOT CARD .....	119.00
80 COL 'DIGI SWITCHING' .....	89.00
16K CARD.....	60.00
DISK CONTROLLER.....	54.00
PARALLEL PRINTER CARD & CABLE.....	89.00
COOLING FANS.....	49.00
POWER SUPPLIES .....	69.00
JOYSTICKS TOP QUALITY .....	39.00



**12 ONLY B/W MONITORS**

Converted TV Sets  
all fully reconditioned

**\$69.00 inc.**

*OSBORNE	(inc tax)
● MODEL 01, D/D drives 80/100 col. card and all the software.....	1895.00
● EXECUTIVE Model unit comple- te with all the extras .....	2850.00
● Best deal in Australia on all Osborne products	

**SAVE  
\$\$\$  
\$28.50**



*HOBIEST ADD ONS	(exc tax)
MPI B51 Disk Drives.....	189.00
MPI B502 Slim Line DS/DD .....	289.00
Mitsubishi 4853 .....	329.00
Mitsubishi 4854 .....	349.00
National D/S D/D NEW LOWER PRICE.....	269.00

CABLES (Printer)	(inc tax)
Serial — serial.....	\$19.95
Centronic — Centronic.....	29.95
MicroBee Cable .....	34.95
Centronics plugs solder .. (each)	4.90

*MEMORY COMPONENTS	(exc tax)
6116 RAM .....	5.68
4116 RAM .....	1.59
4864 RAM (any quantity) .....	6.59
2732 EPROM (any quantity) .....	4.50
2764 EPROM.....	6.99
2716/2516.....	3.80

*DISKETTES	(inc tax)
OUR BRAND Box of 10.....	29.95
Datalife (the best).....	525.01
Box of 10 S/S D/D .....	34.95
DEC Formatted diskettes (10) .....	55.00

*TERMINALS	(exc tax)
KDS. I ICL Lookalike .....	790.00
ESPIRIT II.....	795.00
TATUNG VT100 or VT152.....	695.00
● MODEMS Sendata 300 .....	199.00

**FOR ITEMS NOT MENTIONED  
PLEASE PHONE**

• ARCOM

• C.I.TOH

• ZEUS

• ACT

• OZISOFT

• BBC

TRADE ENQUIRIES WELCOME

CASH/CHEQUE OR BANKCARD WELCOME HERE

# DATA PARTS

**MAIL ORDER CENTRE  
11 EDWARDS STREET,  
SHEPPARTON VIC 3630  
Telephone: 21 7155 (058)**

- SHEPPARTON (As Above) Telephone (058) 21 7155
- ALBURY 658 Dean Street Telephone: (060) 21 8088
- BENDIGO 27 Bath Lane Telephone: (054) 43 4866

- BALLARAT 307 Mair Street Telephone: (053) 31 3399
- MILDURA C and G Computers Telephone: (050) 23 6272
- Opening soon in WAGGA WAGGA.

PREVIEW

See it  
first at the  
3rd APC  
Show

# Framework

*Ashton-Tate's new product has all the right buzzwords — 'integration', 'desktop', and 'windowing'. Steve Withers looks beyond the advertisements in this exclusive APC preview.*

## What is Framework?

Framework is far more sophisticated than I expected. On the surface it is a package that combines word processing, spreadsheets, graphing, database management and outlining (or "ideas processing"). While it does all these things, providing the kind of integration

deserves a graphics board, and because it keeps all the active data in memory many users will find that some additional RAM wouldn't go amiss.

## User interface

Framework has a pleasantly consistent user interface. Novice users are aided by pull-down menus that are activated by pressing the Insert key with selection carried out with the cursor keys. This

### *Frames add structure to windows — a frame may contain other frames*

we have come to expect, its real power is hidden. At first, I thought the use of the word "frame" had been adopted to distinguish the product from others, but in fact there is more to it than that.

Like windows, frames seem to open up on the screen, and their size and position can be changed at will. The difference is that while you simply look through a window, a frame has more substance. Frames add structure to windows — a frame may contain other frames — as well as having an existence of its own through Framework's programming language.

At this stage I should point out that this article is based on a single day spent with Arcom Pacific working on a Beta test copy of Framework plus a study of a draft of the documentation. This means that what I saw isn't the product you will be able to buy at the end of July, although any differences should be minor. Accordingly, I intend to present a broad-brush picture of the program. Every user of off-the-shelf software knows that the fine details can make or break a program, so we plan to present a full review of Framework after its release.

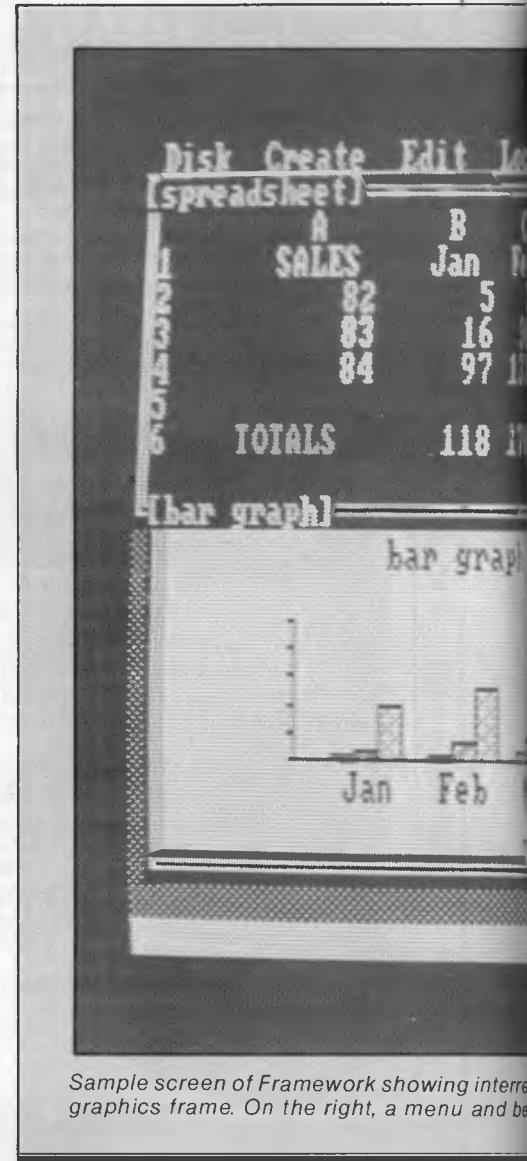
To run Framework you need an IBM PC with a couple of disk drives and 256k of memory, but this should be regarded as a bare minimum. Framework really

type of operation is much easier with a mouse. (I'm sure a mouse driver could be added to Framework), but it's better than permanently cluttering the screen. I liked the way the menus reappear in the state you left them.

Framework's consistency can be illustrated by comparing the commands needed to change the size of a frame and to adjust the width of a spreadsheet. In both cases you press the F4 ("size") key followed by left or right arrows to stretch or shrink the object. The only difference is that you have to start by selecting the object to be adjusted. Another example is that when you press 'delete' the selected item is deleted, whether it is a whole frame, a paragraph, or a single number.

When you fire up Framework the only thing showing on the desktop is the box representing the disk drives. You select a drive, open it, and a window opens to reveal the directory. When you choose files they pile up at the bottom of the screen — the effect is rather like a filing tray. Opening the file puts the frame onto the screen.

As there can be more than one open frame, there has got to be some way of moving from frame to frame. I mentioned earlier that frames can be nested, pressing the grey '+' key moves down a level,



Sample screen of Framework showing interrelated graphics frame. On the right, a menu and bar

while the grey '-' key takes you back towards the desktop level. Switching between frames at the same level is achieved with the cursor keys (just like moving between cells in a spreadsheet).

Although this consistency means that users won't need to constantly switch from one set of commands to another, there are a large number of commands to learn. Of course, you only need to learn the commands that are essential for your way of working, but some keyboard labels would be useful. I've seen keyboards fitted with transparent rubber covers that are flexible enough to be unobtrusive in use while effectively relabelling the keys.

In many cases it's more convenient to enlarge a window so it fills the screen (while word processing, for example), so Framework has a "zoom" key which does just that. Pressing it a second time returns to the normal desktop display.

either inserting or overtyping. There are other, more powerful commands for moving the cursor longer distances, searching and the like. Margins may be adjusted at will and justified or ragged right formats used. When a graphics board is used, text can be shown in its normal manner, or italicised, underlined, or bolded. This also applies to text in spreadsheets, graph labels and outlines.

The page layout is not controlled from within the frame. Instead of having print commands scattered around the text they are all tucked away 'behind' the frame (much as the formula defining a spreadsheet cell hides behind the value it generates), care must be taken as these

Framework has the most comprehensive set of heads and footer commands I have seen. You may specify left, right and centre headers and footers for odd and even numbered pages, and the text of the headers and footers can be spread over more than one line.

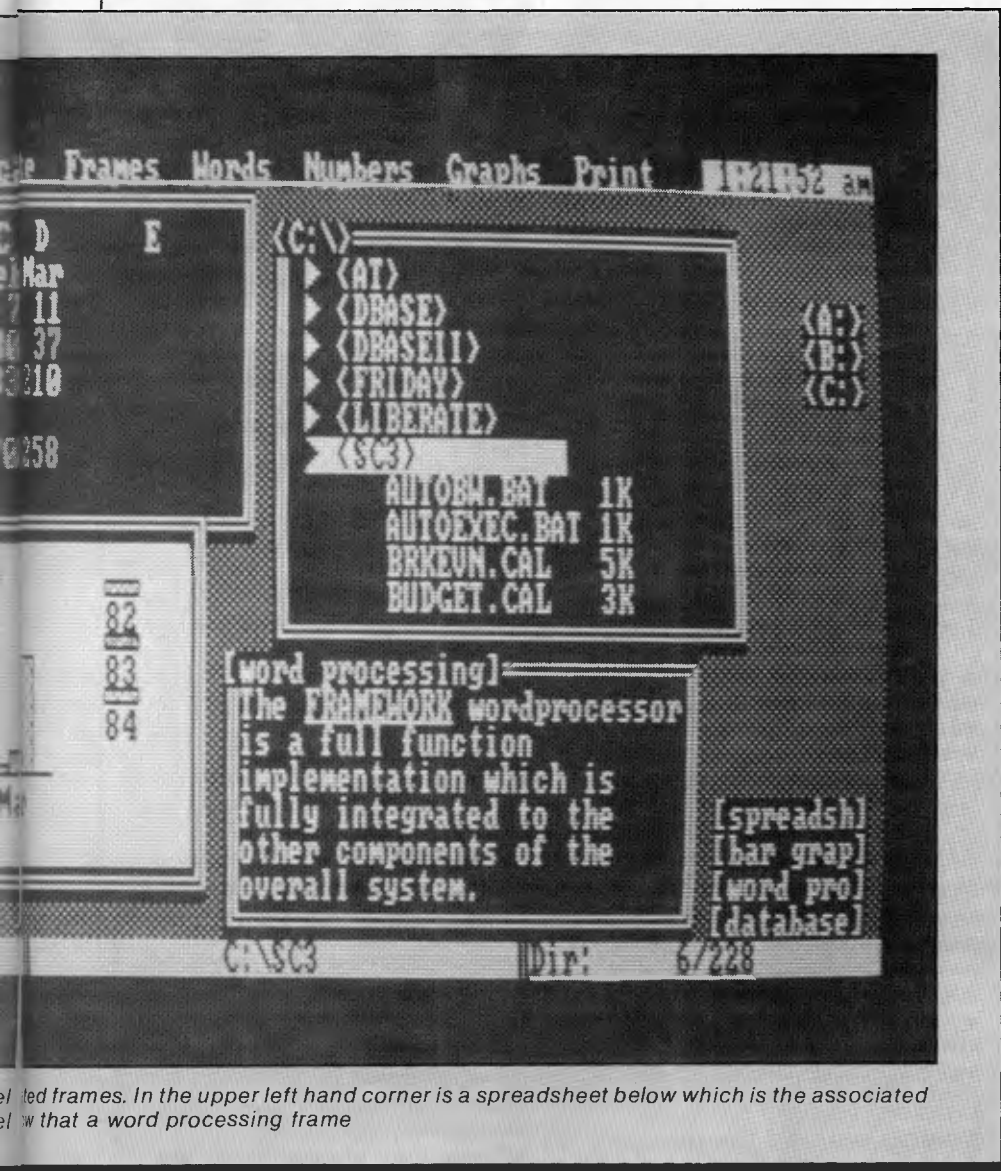
The word processing side of Framework seems intended for 'executive' word processing; it would be fine for letters, memos and short reports, but it lacks the features that become useful on larger jobs — there's no provision for footnotes, indexing, or multiple character sets. I assume that the database manager can be used with the word processor to handle mailing lists, but the exact method isn't obvious.

## Spreadsheets

The most surprising thing about the spreadsheet is its default size, just 14 x 14. While you can specify a larger size, there's probably no need. Look at it this way: 14 columns give enough room for a label for each row, 12 monthly figures and a total for the year. Similarly, one row will be occupied by the column labels and another will hold column totals, leaving room for 12 items. We are back to the question of presentation — many people have realised that a condensed report provides key information quickly, hence the growing use of business graphics. Framework encourages a multi-level approach to spreadsheet analysis, call it modular spreadsheeting if you like.

The top level report might show the net profit generated by a company's divisions. This might receive information from spreadsheets at the division level that aggregate figures relating to products, and so on down the line. Framework makes the construction of interrelated spreadsheets as easy as working on one big sheet. Users of current spreadsheet programs will be familiar with the idea of building a formula by 'pointing'.

For those who aren't, it's most easily explained with an example. Suppose you wanted cell value B3 to take the value of 0.75 times A1. You position the cursor in B3 and type in "0.75\*", then move the cursor to A1 and press return, and the program completes the formula for you. This is a considerable time-saver when the formula becomes more complicated, and it's less open to errors — because the cells referred to are highlighted, you are less likely to use the wrong cell. Where Framework scores is that it allows you to point to cells in other spreadsheets. It doesn't stop there, because for extra security you may tell Framework to recalculate a referenced cell before collecting its value. You can also have your spreadsheet interrogate a database frame.



ed frames. In the upper left hand corner is a spreadsheet below which is the associated  
el w that a word processing frame

## Word processing

The simplest thing you can do with a frame is type some text into it. Text frames are edited in a predictable way, moving around with the cursor keys and

commands seem to have a minimum impact on the frame's contents. For example if a line length is specified which is less than the length of the lines within the frame the excess characters will simply be truncated.

Another advance is Framework's ability to reference cells in the user's language. If column B is headed "January" (ie, cell B1 contains the string "January") and row 10 is labelled "Profit", then instead of talking about cell B10, you may refer to "January.Profit". While other products (like Multiplan) allow linked spreadsheets and named areas, Framework seems to be a significant improvement.

When you are typing in data, most spreadsheets allow you to enter the value you've typed and move to the next cell with a single keystroke (typically by using the cursor keys). Framework only permits this if you are working left-to-right along a row, but I have found that I usually enter figures in columns. This is a small omission, but one that I would find annoying.

If you have an 8087 processor in your system, you'll be pleased to hear that Framework will take advantage of it during spreadsheet calculations.

## Graphics

The graphics facilities are in line with Framework's orientation — business style bar and pie charts, plus line graphs and scattergrams. While these have broad application, there is no provision for things like log scaling as needed in many scientific and technical applications. It's no big deal to transform the data while it is still in the spreadsheet or database, but that doesn't result in appropriately marked axes.

Framework makes most basic tasks easy, and graphing is no exception. To draw a graph you simply select the data set to be used from a spreadsheet or database, enter the graph command (either directly or through the menu bar), and then specify the type of graph wanted. There are a few options available, but generally I found it was a case of "set and forget".

One feature makes it particularly easy to set up Framework applications for relatively unskilled users. Once a graph has been created, you can include the name of its frame in the database or spreadsheet that supplies the data, and then the graph will be updated whenever the data changes.

While Framework provides for switching between two printers and a plotter, I have no information about the particular models it can drive. Plotter support is an excellent idea — I've seen programs that produce well-formed graphs which are marred by reproduction on a dot-matrix printer. On the other hand, not everyone needs presentation quality, so a graphics printer provides an economical alternative.

The only time that Framework uses colour is when you zoom in on a graphics

## XIDEX PRECISION FLEXIBLE DISKS QUALITY RETAILERS

### N.S.W.

**DICK SMITH STORES:** ALBURY, AUBURN, BANKSTOWN SQUARE, BLAKEHURST, BONDI JUNCTION, BROOKVALE, CHULLORA, GORE HILL, GOSFORD, HORNSBY, LIVERPOOL, NEWCASTLE, NORTH RYDE, PARRAMATTA, PENRITH, RAILWAY SQUARE 2000, BRIDGE ST. SYDNEY, YORK ST. SYDNEY, TAMWORTH, WOLLONGONG.

### AUZ ELECTRONICS CO.

248 Merrylands Rd, Merrylands.

**COMPUTER GALLERIE**, 66 Walker St, North Sydney.

**COMPUTER LIGHTHOUSE**, 320 High St, Penrith.

### COMPUTER VILLAGE

119 Horton St, Port Macquarie.

### COMPUTERLAND BURWOOD

31 Burwood Rd, Burwood.

**COMPUTERTIME**, 345 Victoria Ave, Chatswood.

**GRACE BROS.**, 77 Morsden St, Parramatta.

**NSW INSTITUTE OF TECHNOLOGY, UNION SHOP**, Tower Bldg, One, Broadway.

### JAYCAR PTY. LTD.,

117 York St, Sydney.

Corlingford & Pennant Hills Rds., Corlingford.

115-117 Parramatta Rd, Concord.

121 Forest Rd, Hurstville.

### PRESTIGE OFFICE EQUIPMENT

3 Burwood Rd, Burwood.

### SOUTHERN CROSS RESOURCES

461 Pacific Hwy, Artarmon.

### UNIVERSITY OF NSW UNION SHOP

Lower Compus, Anzac Pde, Kensington.

**ZAP ELECTRONICS**, 60 George St, Parramatta.

Northgate Shopping Centre, Hornsby.

**COFFS COPY CENTRE**, 17 Park Ave, Coffs Harbour.

**COLEMANS BUSINESS**, 142 Darling St, Dubba.

**DATA CONCEPTS**, 24 Moonee St, Coffs Harbour.

**KOPI-KAT**, Gang Gang St, Katoomba.

**OFFICE DATA SYSTEMS**, 100 Victoria St, Taree.

### FAR SOUTH COAST COMPUTER CO.,

106 Auckland St, Bega.

**MAGMEDIA**, 2B Buffalo Rd, Gladesville.

**COMPU — K PTY. LTD.**, 7 Casino St, Sth. Lismore.

**LOGIC SHOP**, 330 Pacific Hwy, Crows Nest.

### BERESPO COMPUTERS

1/201 New South Head Rd, Edgecliffe.

### A.C.T.

**DICK SMITH STORES:** 98 Glodstone St, Fyshwick.

**SWAINS PTY. LTD.**, 65 Gladstone St, Fyshwick.

Gorema Place, Civic, Woden Shopping Centre.

Belconnen Hall, 123 Monaro St, Queanbeyan.

### BOULEVARD BUSINESS SERVICES

68 Wollongong St, Fyshwick.

### STEVE'S COMMUNICATIONS

57 Wollongong St, Fyshwick.

### COMPUTECH

Belconnen Church's Centre, Belconnen.

**MAGMEDIA**, 31 London Circuit, Conberro City.

### VICTORIA

#### MYER HOME AND BUSINESS COMPUTER CENTRES.

**DICK SMITH STORES:** BALLARAT, BRIGHTON (EAST), COBURG, FRANKSTON, GEELONG, MELBOURNE, RICHMOND, SPRINGVALE.

**MAGMEDIA**, 100 Park St, South Melbourne.

#### SELECTED TOY WORLD STORES.

**METROPOLITAN BUSINESS MACHINES**,

328 Sydney Rd, Coburg.

**COMPAK**, 350 South Rd, Moorabbin.

**COMPUTER 2000**, 29 Ross Smith Ave, Frankston.

**COMPUTER BIZ**, 30 Armstrong St, North Ballarat.

**ENTERCOM COMPUTER CO.**,

136 Bridge Rd, Richmond.

### HIGH TECHNOLOGY COMPUTER SYSTEMS,

87 Swan St, Richmond. 290 Bay St, Brighton.

### HI TECH OFFICE SYSTEMS,

4 Commercial Rd, Morwell.

Desailly and Cunningham Sts, Sale.

### HI FLIGHT COMPUTING SERVICES,

110 Mt. Pleasant Rd, Belmont.

**HARMON BROS.**, 359 Moorabool St, Geelong.

602 Sturt St, Ballarat.

### HOME COMPUTER SERVICES,

"Junction Park", Kyalite.

### devere COMPUTER ACCESSORIES,

294 Kingsway, South Melbourne.

### ASTRO EDUCATIONAL SERVICES PTY. LTD.,

1/3 Ruby St, East Burwood.

### DATA PARTS,

11 Edward St, Shepparton. 27 Bath Lane, Bendigo.

658 Dean St, Albury. 305 Mair St, Ballarat.

### QUEENSLAND

#### MYER HOME AND BUSINESS COMPUTER CENTRES.

**DICK SMITH STORES:** BRISBANE, BURANDA,

CHERMISLE, SOUTHPORT, TOOWOOMBA,

TOWNSVILLE.

### MAGMEDIA,

Adelaide and Mocrossan Sts, Brisbane.

**UPSHOT ELECTRONICS**, 135 Abbott St, Cairns.

**COMPUTERWORLD**, Hermit Pk, Townsville.

**SOFTWARE 80**, 105 Milton Rd, Milton.

**AAB EQUIPMENT**, 310 Mulgrave St, Cairns.

**COMPSOFT**, 537 Boundary St, Spring Hill.

### C.P.U. COMPUTER CENTRE,

279 Junction Rd, Clayfield.

**SHANNON ROBERTSON**, 4 Corrol St, Nambour.

### SOUTH AUSTRALIA

#### MYERS HOME AND BUSINESS COMPUTER CENTRES

**DICK SMITH STORES:**

ADELAIDE, DARLINGTON, ENFIELD.

**MAGMEDIA**, 305 Morphett St, Adelaide.

### MIKE SANDEMAN COMPUTERS,

9 Todd Moll, Alice Springs.

**WESTERN TECHNOLOGY**, 2 Clark Terrace, Seaton.

**D.C. ELECTRONICS**, 182 Gilles St, Adelaide.

**LEEDALL OFFICE PRODUCTS**,

91a Goodwood Rd., Goodwood.

### WESTERN AUSTRALIA

**DICK SMITH STORES:** CANNINGTON, William St,

Perth. Centreway Arcade, Perth.

**MAGMEDIA**, 252 Stirling St, Perth.

### BACKGAMMON SHOP,

City Centre — Perth.

Carousel Shopping Centre — Albany Hwy,

Cannington.

Mirrabooka Shopping Centre — Yirrigan Drive,

Mirrobooka.

Belmont Forum — Belmont Ave, Belmont.

Gorden City Shopping Centre — Risely St,

Booragoon.

### ALLIED OFFICE PRODUCTS,

Unit 4, Sandridge Crt, 13 Sandridge Rd, Bunbury.

### JAYS BUSINESS EQUIPMENT,

105 Hay St, Subiaco.

**GERALDS ELECTRICS**, 179 Murray St, Perth.

366 Albany Hwy, Victoria Park.

**MICRO BASE**, 422 Newcastle St, West Perth.

### SOFTWARE CENTRE,

Shop 8, Cremorne Arcade, 576 Hay St, Perth.

**AUSTRALIAN COMPUTER ENTERPRISES**,

1341 Albany Hwy, Kennington.

### BOANS LTD.

**COMPUTER AND ELECTRICAL DEPTS., PERTH**,

Carousel Garden Centre, Grove Plaza, Innaloo,

Karrinyup, Morley, Albany, Bunbury, Geraldton.



# XIDEX PRECISION FLEXIBLE DISKS.

**BUY THE  
100%  
DISK**



**GET  
ONE  
FREE!**

\*Boxes or singles

We believe that Xidex precision disks are the best in the world and to prove it to you, we are offering you **DOUBLE THE PRODUCT** at half the normal price from our participating retailers! \*This is a strictly limited offer and has a maximum quantity allowance of 2 boxes or 20 single disk purchases per application. So you had better be fast.

### Why you will love Xidex!

- Xidex has superior electronic performance consistently better than all its competitors.
- 50% tighter hub hole diameter to avoid head to disk interchange problems.
- Longer wear via extensive polishing also helps avoid costly head wear.
- Thicker more protective jacket increases disk life and prevention of contamination and temperature damage.
- Quality controlled by 18 exacting tests that really make Xidex 'Precision' disks.
- We want you to have the best and come back to Xidex again and again so we offer you a 10 YEAR WARRANTY on every disk you purchase.

**BEAT THAT!**

### XIDEX PRECISION FLEXIBLE DISKS

**Xidex 5012 — 10030 5 1/4"** Single Sided, Double Density, Soft Sected, 10 Pack, 40 Track Per Inch, (Single pack available)

**Xidex 5022 — 10030 5 1/4"** Double Sided, Double Density, Soft Sected, 10 Pack, 40 Track Per Inch, (Single pack available)

**Xidex 5012 — 2000 5 1/4"** Single Sided, Double Density, Soft Sected, 10 Pack, 80 Track Per Inch.

**Xidex 5022 — 2000 5 1/4"** Double Sided, Double Density, Soft Sected, 10 Pack, 80 Track Per Inch.

**Xidex 8012 — 1000 8"** Single Sided, Double Density, Soft Sected, 10 Pack, 40 Track Per Inch.

**Xidex 8022 — 1000 8"** Double Sided, Double Density, Soft Sected, 10 Pack, 40 Track Per Inch.

### Unique plastic library file each box of 10 disks!!

\*Add 20% Sales Tax

PLUS \$1.00 POSTAGE IF APPLICABLE

OFFER ONLY VALID TILL OCTOBER 31ST, 1984 and is only available to customers who fill in the coupon below and present it with order or by mail. Facsimilies of coupon not acceptable.

## ORDER FAST!

### XIDEX ORDER FORM: PLEASE SUPPLY

NUMBER OF DISKS PURCHASED

5012 — 10030 — 5 1/4" : \_\_\_\_\_  
 SS — DD 10PCK — 40TP1 (SP AVAIL.)

5022 — 10030 — 5 1/4" : \_\_\_\_\_  
 DS — DD 10PCK — 40TP1 (SP AVAIL.)

5012 — 2000 — 5 1/4" : \_\_\_\_\_  
 SS — DD 10PCK — 80TP1

5022 — 2000 — 5 1/4" : \_\_\_\_\_  
 DS — DD 10PCK — 80TP1

8012 — 1000 — 8" : \_\_\_\_\_  
 SS — DD 10PCK — 40TP1

8022 — 1000 — 8" : \_\_\_\_\_  
 DS — DD 10PCK — 40TP1

APPLICATION FORM MUST BE COMPLETED IN FULL TO QUALIFY.  
**HAVE YOU ADDED SALES TAX AND POSTAGE?**

NAME \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

POSTCODE \_\_\_\_\_

TYPE OF SYSTEM \_\_\_\_\_ USUAL BRAND OR TYPE \_\_\_\_\_

CASH  CHEQUE  COMPANY ACCOUNT  BANKCARD

PHONE NUMBER \_\_\_\_\_ SIGNATURE \_\_\_\_\_

BANKCARD NO. \_\_\_\_\_ EXPIRY DATE \_\_\_\_\_

803/AAE/Little

# Framework

frame, probably because of the different resolution of the IBM's graphics. This gives a rather coarse look to the graph, and I think I would prefer a full screen monochrome view.

concentrate on particular sections (eg, global searches are confined to the position under scrutiny) without having to explicitly reconnect it with the others. As a bonus it is also able to add page numbers to the outline, turning it into a table of contents.

For my money, outlining is the key feature of Framework. It would make so many writing jobs easier that I would consider buying it even though I have little need for graphing and database management.

represents a specific case of this process.

FRED is modelled on the 'language' used to build spreadsheets: every element generates a value. That's the idea, but there seem to be some exceptions like @SETSELECTION("name") which causes the frame called "name" to become the active frame.

I think FRED would be most easily learned from a worked example. It is sufficiently different from conventional programming languages to cause conceptual problems, while interlinked frames with hidden formulas would be difficult to represent on paper. A well-designed tutorial would make a lot of difference, and I hope there will be one in the final version of the manuals.

Framework's programmability means we are likely to see it used for a wide range of applications. FRED even includes a mechanism for generating menus that match Framework's own, so there is no excuse for failing to maintain the consistent user interface.

FRED has so many functions (over 140 according to the manual) that I won't try to list them, but there are finan-

*Framework encourages a multi-level approach to spreadsheet analysis, call it modular spreadsheeting if you like*

## Database

As Framework keeps all its active data in RAM, small databases are the order of the day. If this bothers you, bear in mind that provision is made for reading dBase II, dBase III, and Friday! files into a frame. As such files are likely to be too big to fit, you can specify selection criteria to retrieve just those records you're interested in.

Framework allows the usual data management operations like searching, sorting, merging, and selection. The effect of selecting records is to make the other 'disappear' — this is because the filter expression is applied to the frame containing the database, and so it controls the appearance of the frames contents.

There are two ways of displaying a database. The default is a tabular view, showing the records in columns, while the alternative is a "forms view" which displays one record at a time. As the name suggests, by juggling with the position of the fields within the frame it is possible to design forms for data entry and display.

## Ideas processing

While nested frames make it easy to structure a document, the outline facility is very convenient. When you create an outline frame, it contains a number of other frames representing the major sections of the document. Each of these contains further frames giving the sub-sections, and these will contain text, graphics, etc. You can start by giving each frame an appropriate title, and then go inside to flesh it out.

The beauty of this system is that you can add extra sections as necessary and rearrange material at will. While this is possible with a conventional word processor, Framework allows you to con-

## DOS Access

The ability to run one program from within another is nothing new — Wordstar's had it for years. Where Framework scores is that it sets up a separate DOS session, capturing its console output in a frame for later use. There

are two main benefits — all the DOS functions are available to the user, and the results of other programs can be easily brought into Framework. You can run any program you like providing you've got enough memory — everything sits in RAM simultaneously, so a 256k system could prove restrictive if you make extensive use of this feature.

By the way, Framework understands DOS 2's directory structure, so you can keep associated files in a sub-directory if you wish.

## Programming with FRED

FRED ("FRamesEDitor") is Framework's programming language. Because of the relatively complex nature of this part of the package, my comments are based on the documentation rather than first-hand experience.

It seems that every Framework feature can be invoked by FRED. FRED functions live "behind" frames and deposit their result inside or behind the frame. As functions can access the contents of other frames, this provides a means of linking frames with each other — the earlier discussion of linked spreadsheets

*For my money, outlining is the key feature of Framework*

cial, statistical, and mathematical functions as well as others to manipulate times and dates. The writers obviously recognise the value of the international market as they have made provision for different currency symbols and number formats — Framework is as happy with "1,500,000 Skr" as it is with "\$1,500.00". On the other hand they expect everyone to express dates as month, day, year.

## Conclusions

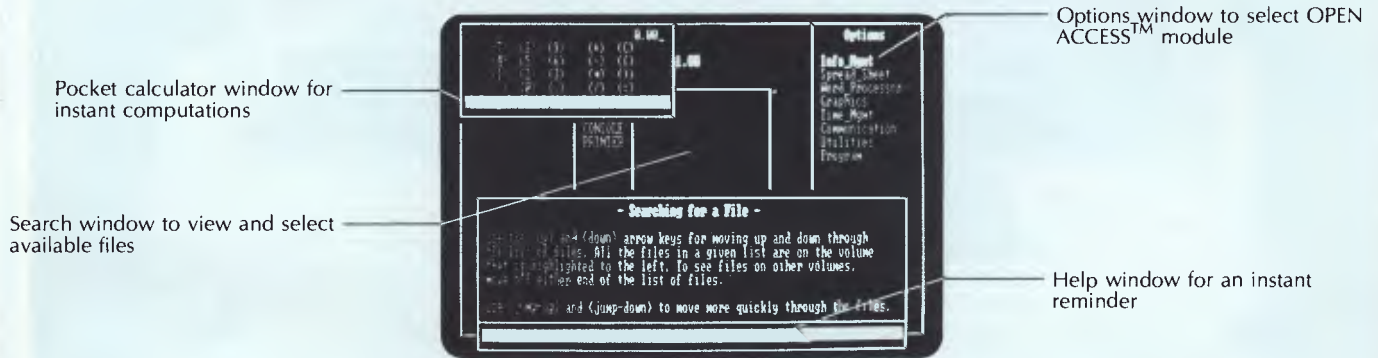
It's dangerous to draw conclusions from such a brief exposure to a new product, especially one that's still in Beta test. Framework's main competitor is bound to be Symphony, and I think that ease of adoption will play an important part. Users of Lotus 1-2-3 will, we're told, be able to move up to Symphony with a minimum of fuss, while people with extensive dBase II files would be more interested in Framework.

Given the momentum behind Ashton-Tate, I think Framework should take off, and we will probably see a number of applications that will sit on top of it.

Framework is an interesting product, so if you get a chance to try it out I suggest you take it.

# O·P·E·N ACCESS

MAKES YOUR COMPUTER AN EXECUTIVE WORK STATION



**OPEN ACCESS is the result of 60 man years of effort to create a truly super-program that can perform virtually every managerial or business task you're ever likely to encounter.**

With OPEN ACCESS you can crunch numbers, create 3-D colour graphics, write reports, transmit data around the world, scan multiple files simultaneously, and electronically arrange all your appointments. You can teach OPEN ACCESS to automatically execute a complex task just by doing it once yourself. After that it can be re-executed as often as you wish at the touch of a button.

OPEN ACCESS uses window technology, including extensive help windows which are available almost anywhere.

## Information Manager

The OPEN ACCESS Information Manager is a Relational Database Management System featuring advanced functionality and simple to use, interactive, English-like commands. This module allows you to easily tailor database files, screen layout files, and report layout files to fit the needs of your application. Once information is entered into the files it may be quickly retrieved using the English-like statements of IBM's SQL query language. Once retrieved, records may be displayed, updated, removed, appended to other files, included in reports or form letters, and/or moved to another OPEN ACCESS module.

## Spreadsheet

The OPEN ACCESS Spreadsheet is the first of a new generation of spreadsheet modules. This Spreadsheet not only includes the normal "what-if" processing capabilities found in all

other spreadsheet programs, but it also includes "how can" processing. This is accomplished through the Spreadsheet's Goal Seeking feature. The OPEN ACCESS Spreadsheet module includes additional features not found in other "advanced spreadsheet" programs as well as all of the standard features.

## Graphics

With the OPEN ACCESS Graphics module, you may take raw numeric data and create beautiful color graphs. The numeric data may come from another OPEN ACCESS module or it may be entered interactively in the Graphics module. You may create two-dimensional bar graphs, pie charts, and line graphs. In addition, you may: build three-dimensional bar graphs; overlay bar and/or line graphs on top of each other; or separate bar, line, and pie graphs each into their own window.

## Word Processing

Word Processing in OPEN ACCESS provides you with a complete text editing and text formatting system. Text may be easily typed in and then edited as necessary. Once your document is in the proper form, you may print it out with a wide variety of text formatting options. You can easily incorporate information from the Spreadsheet, Information Manager, or graphics module into Word Processing documents.

## Communications

OPEN ACCESS Communications allows you to communicate with the outside data processing world. The Communications module may operate in any one of three modes;

micro to micro to allow for file transfers, etc; micro to subscription network; and micro to mini or mainframe as a dumb terminal emulator.

## Time Management

The OPEN ACCESS Time Manager provides you with an assistant to help you or your secretary to efficiently organize your engagements. The Time Manager enables you to enter individual appointment records and then list them on a day-at-a-glance screen. A search command lets you retrieve an appointment by who it is, or the subject, when you have forgotten the time and date of the appointment.

## Hardware

OPEN ACCESS is available on a wide range of computers including: IBM PC/XT or 100% COMPATIBLE, CORONA, RAINBOW, HP150, HYPERION, NCR, TI PROFESSIONAL, TOSHIBA T3000, COMPAQ, COLUMBIA, TANDY 2000.

The minimum systems requirements are 192K RAM MEMORY, MSDOS/PCDOS 2.0 or later, DUAL 320K DISK DRIVES.

CONTACT YOUR NEAREST DEALER  
OR

# Multisoft

1121 Hay St, West Perth. 6005.  
Western Australia.  
Telephone: (09) 322 6637

OPEN ACCESS is a trademark of  
SOFTWARE PRODUCTS INTERNATIONAL



# Epson PX-8

*A truly capable lap-held computer must incorporate all the specifications of a standard desktop machine. The Epson PX-8 runs on the CP/M 2.2 operating system and has unlimited access to a huge CP/M software base. Does it fit the bill? Dick Pountain reports.*

What sits on your lap, has three processors, uses ROM, RAM and cassette as disk drives, and runs CP/M 2.22? The only answer as far as I know is Epson's new PX-8 Portable Computer.

Epson started the 'lap-held' market with its HX-20, and the signs are that this sector is going to become the hottest

area of competition over the next year. The market is driven largely by workaholic business practices in the US, where we are led to believe that young execs like to keep up with their spreadsheets even in the toilets of transcontinental airliners. Whatever the reason, suddenly everyone is making

lap-held computers, and some of them (like the Sharp 5000 I reviewed last month) are sporting most of the features of desktop machines, including 16-bit processors. Only display technology now holds off the fully capable (which should include an 80 x 24 screen) portable computer that has been the dream of portable

'nuts' for several years; the rumours are that the last hurdle will be passed later this year by a new, fully IBM PC-compatible Tandy.

Meanwhile, Epson has brought out a replacement for the HX-20, whose small 20 x 4 display places it in a previous generation compared with the Tandy and NEC lap-helds.

The PX-8 was originally called the 'Maple', an attractive name which has been sadly dropped in favour of the inevitable hi-tech number (software writers could have gone to town with programs called 'Walnut' and 'Syrup'). It has an 80 x 8 display, and also has the powerful advantages of a built-in micro-cassette drive and a grown-up operating system, CP/M 2.2. Rather than chasing after the still-confused 16-bit market, Epson has wisely decided to go for the established winners, and is offering a selection of proven CP/M software (including WordStar) bundled with the machine.

## Hardware

I can still remember the impression the HX-20 made on me when I first saw it — I wanted one. The PX-8 has a similar effect but even more pronounced. There is an air of quality about the mouldings, keyboards and various neat design touches of both machines that no-one else seems to be able to match.

The PX-8 is almost exactly the same external size as an HX-20 (A4 magazine size), the immediately obvious differences being a removable cover over the keyboard and a fold-away display, so that when packed for travelling it forms a fully-covered box. Joy of joys! — it also has a sliding carrying handle which fits flush and unnoticeable around the front edge of the keyboard. When this is extended, the machine feels very much like a small portable radio. The case is moulded in cream high-impact plastic to a very high standard; numerous legends labelling the various controls and ports are moulded in sharp relief. Two little fold-out feet at the rear of the case allow it to sit on a desk slightly tilted forward for better typing — good thinking, Epson.

The keyboard cover slips off by pulling it forwards, after which a catch can be released to allow the display to fold up out of its recess behind the keyboard. In doing so, it reveals the microcassette deck and a small audio speaker. The dis-



The Epson PX-8 case: 'an air of quality'.

play can be set to various angles up to 180° (flat) in 15° increments, using a ratchet mechanism that is built into the concealed hinges. The display is the now-familiar eight-line LCD but, like the Sharp, has a full 80 characters per line. The contrast is rather better than that on the Sharp, but it still requires strong frontal illumination for comfortable reading. Until some form of flat self-luminous display becomes cheap enough, I'm afraid this is as good as we'll get. The character set is chunky and readable though it lacks descenders. Contrast is controlled by a slider which is sensibly placed below the display.

The keyboard is very good indeed, with flattish keys with 'sculptured' tops and a superb positive action. The SHIFT and RETURN keys are properly placed

and double sized. Four cursor keys are picked out in orange and live above the RETURN key. TAB, CAPS LOCK and two CTRL keys are provided, the second CTRL key placed at the end of the space bar for touch typists. Like the HX-20, the PX-8 has two extra shift keys to access the graphics character set and to turn part of the QWERTY pad into a numeric keypad (CAPS and NUM locks have red LED warning lights to show they're engaged). Above the main key block is a row of smaller keys which include STOP, ESC, PAUSE, HELP, and five programmable function keys. The HELP key is not supported at the CP/M command level, only in suitably written applications (including Portable WordStar).

The only thing I didn't like about the keyboard was the type-ahead buffer but this is a personal phobia — some people consider it indispensable. I'm the sort of impatient guy who pounds away at the RETURN key when something takes too long to happen. My reward is half a minute of frantic scrolling as the slow LCD tries to display twenty machine-gun CRs.

The PX-8 contains alternative character sets for nine different countries which can be switched either by an internal DIP switch or under software control. There is also provision for 32 user-defined characters, using ASCII codes 224 to 255 accessible from the keyboard via the GRAPH key.

The PX-8 is powered by a rechargeable NiCad cell pack which lives under a trapdoor in the bottom of the case. It's



The 'sculptured' keyboard has a superb positive action


# DAVONG DELIVERS WHAT EVERY APPLE, IBM, OR OSBORNE USER WANTS.



*More*



Available from all fine  
Micro Computer Dealers.

APPROVED  MICROWARE

**IMAGINEERING**

3/579 Harris Street, Ultimo  
Sydney NSW 2007 (02) 212 1411

**MORE disk storage**  
Expand the disk storage of your Apple II\*, Apple III\*, IBM Personal Computer\*, Osborne 1 Computer™ — up to 60 megabytes of fast, reliable Winchester data storage.

**MORE value**  
Davong 5, 10 and 15 megabyte systems are priced at only \$2880, \$3799 and \$4348 (ex tax). Adding additional Davong slave drives costs even less. Everything you need is included. And because the Davong system is universal, your disk investment is preserved, even if you change to a different personal computer.

**MORE software**  
The Davong system includes all the software you need to start right away. And Davong's new Multi-OS™ supports all Apple and IBM PC operating systems.

The Davong Multi-OS operating system gives your computer full multitasking network capability. Complete software support includes back-up and restore programmes.

**MORE backup options**  
Davong offers 18Mb cartridge tape backup at an extremely attractive price.

**MORE support**  
Additional 9 months warranty available.

**MORE of what you bought your personal computer for**  
Better performance, higher reliability, the best value — hard disk storage from Davong.

The Davong Universal Hard Disk also supports most IBM PC- and Apple-compatible computers.

Apple II and Apple III are registered trademarks of Apple Computer Corporation. IBM PC is a registered trademark of IBM Corporation. Osborne 1 is a trademark of Osborne Computer Corporation. Multi-OS is a trademark of Davong Systems, Inc.

- |                     |                  |               |
|---------------------|------------------|---------------|
| VIC A.C.I.          | Barbara Bartlett | (03) 544 8433 |
| B.S. Micro          | Bill Saunders    | (03) 814 1433 |
| C'land Box Hill     | Peter Adams      | (03) 890 0468 |
| C'land Camberwell   | Richard DeVere   | (03) 813 1300 |
| C'land Melbourne    | Richard Mizgala  | (03) 662 2133 |
| Hisoft              | Alan Kras        | (03) 534 0383 |
| Metro Bus. Machines | Ian Hargreaves   | (03) 383 2222 |
| Myer Bus. Centre    | Harry Henderson  | (03) 66 111   |
| Parity Computers    | Trevor Dent      | (03) 267 6844 |
| Random Access       | Mark Thompson    | (03) 62 1339  |
| Tech Rentals,       | Peter Gould      | (03) 51 1303  |

- |                     |                   |               |
|---------------------|-------------------|---------------|
| WA A.C.I.           | Brian Goodwin     | (09) 321 2859 |
| Merton Scott        | John Krokosz      | (09) 328 6522 |
| Myer Bus. Centre    | Chris Ornstein    | (09) 321 0151 |
| Stott & Hoare       | Peter Livingstone | (09) 328 1299 |
| QLD A.C.I.          | Fred Hill         | (07) 321 2859 |
| C'land Brisbane     | Paul Rees         | (07) 221 9777 |
| Myer Bus. Centre    | Brian Maddern     | (07) 378 5111 |
| Computer City       | Horry Hunt        | (07) 388 6571 |
| ACT C'land Canberra | Ed Gentry         | (062) 81 1379 |

- |                             |                 |               |
|-----------------------------|-----------------|---------------|
| NSW A.C.I.                  | David Ridley    | (02) 662 7011 |
| City Personal Comp., City   | Greg Wiley      | (02) 233 8992 |
| City Pers. Comp. Crows Nest | Greg Stringer   | (02) 922 3600 |
| C'land Central Coast        | Mary Hendricks  | (043) 24 1811 |
| C'land Chatswood            | Steve Byrne     | (02) 411 7611 |
| C'land N. Sydney            | Rob Byrne       | (02) 929 4499 |
| C'land Parramatta           | John Green      | (02) 683 3199 |
| C'land Ryde                 | Mike Wells      | (02) 808 2666 |
| Independent Micro           | Graeme Harrison | (02) 698 7666 |
| Logic Shop (Crows Nest)     | Andrew Holland  | (02) 439 1072 |
| Parity Computers            | Neville Marsh   | (02) 929 0900 |

- |                       |                  |               |
|-----------------------|------------------|---------------|
| The Computer Shop     | Lynn McDonough   | (02) 517 2999 |
| Zofary Enterprises    | Richard Purchase | (02) 745 1888 |
| Computernat           | Arthur Jones     | (02) 982 3288 |
| SA A.C.I.             | David Gillard    | (08) 268 1933 |
| Computer Programs etc | Paul Campbell    | (08) 212 7535 |
| Myer Bus. Centre      | John Grogan      | (08) 217 0123 |
| Oriental Micro        | Mike Greer       | (08) 49 9649  |
| Personal Comp. Centre | Mike Duff        | (08) 223 2608 |
| Random Access         | Trevor Starke    | (08) 223 2505 |

# BENCHTEST

good for up to 15 hours of use (without power-hungry external devices) and takes eight hours to charge fully from the supplied AC adaptor. This, unlike the HX-20's, is smart enough not to overcharge however long it's left on, and the machine can be used with it connected. After a 'Low Battery' alert, the battery can be charged up to operating level in about 15 seconds, allowing you to put the house in order before setting it to charge fully.

Another trapdoor under the case contains two ROM sockets and the master reset switch. The 32k ROMs are treated by Epson's special CP/M as disk drives and are the principal medium for distributing software. Before you start to panic — no, you don't have to insert bare ROM chips, legs and all. The chips are mounted on a simple plastic carrier with their legs wrapped around which plug into a low insertion force socket, gripping it by finger grips at each end. It's no more hassle than inserting the bulky edge-connector cartridges favoured by other manufacturers and is much more compact. ROMs can be changed at any time, with only a warm start required afterwards.

At the back of the case are six I/O sockets. One is the power socket for the AC adaptor followed by the high speed serial port (for printers and disk drives), the RS232C port, and three jack sockets for Bar Code Reader, Analogue Input, and External Loudspeaker. There is no support for external cassette recorders. The main Power On/Off switch and speaker volume control are at the right-hand side of the case, and the Reset is one of those holes you poke a Biro into at the left (there are three different levels of Reset). Between the sockets is a removable panel which conceals the 50-pin system expansion bus.

Dismantling the PX-8 is gratifyingly easy: remove seven screws and the case bottom lifts off to reveal a single board computer of exquisite simplicity and uncluttered execution. There are only 36 ICs on the whole board and of those, three are ROMs, eight are 64k RAMs and three are processors. The main processor is a Z84 by Toshiba (presumably a CMOS Z80) and it's this which is the host for CP/M. Epson doesn't say, but the timings suggest it runs at 2MHz. Under its control are a Slave Processor 6301 (as used in the HX-20) which looks after all the I/O devices, with its own 6k of RAM to use as video memory. The third processor is a 7508 which controls the keyboard and the 6-bit resolution A/D convertor.

The RAM is battery-supported, and the clock-calendar chip has its own separate back-up battery which can also support the main memory for a short time in case of a low main battery. Power is automatically shut off to conserve the batteries after a period of disuse which can be set in software. A variety of automatic power on modes are also provided.

The Z80-style processor addresses the full 64k of internal RAM and also a 32k ROM called the IPL (Initial Program Loader), from which CP/M is booted into RAM. Up to 24k of the internal RAM can be configured as a RAM disk so that the machine can be used as a self-contained unit without any other mass storage. For many purposes 24k of RAM disk will not be enough, so Epson has provided two models of optional 'Intelligent RAM Disk' extension, one of 60k and the other of 120k. These are thin wedge-shaped boxes which bolt onto the underside of the case and increase its thickness but not its 'footprint'. They connect by a printed flexible ribbon cable to the system expansion bus and have their own battery back-up (Epson does not guarantee that they can be used to transfer data from one PX-8 to another).

When an external RAM disk is in use an internal one can't be assigned, so the full 64k is available to CP/M as TPA.

The microcassette deck is based on a standard Olympus mechanism and features a software tape counter as on the HX-20. Unlike the HX-20 however, the tape is configured as a CP/M device (drive H:) and its operation is normally completely transparent to the user, though a manual control mode does exist. As the tapes are set up as (sequen-

tial) CP/M media with a directory, there are complications when removing a tape from the drive (the directory is not automatically updated after writing so removing the tape could corrupt it). Tapes must only be changed with the MOUNT and REMOVE commands which guarantee that the directory is up-to-date. The tape system is not very fast (in fact, it seems slower than that on the HX-20) but it works OK as a second line of security for the RAM disk contents when you are writing lots of text on a tropical beach (some hope). Copying a 1000-word WordStar file to tape takes approximately three minutes, but PIP is appreciably faster. The cassette deck plays Olympus PearlCorder format audio tapes through the built-in speaker or through headphones, so the machine can be used for audio typing. That's smart thinking for you.

## Operating system

It's a fact of life that you can get used to anything given time. I can remember numerous occasions when I and other writers slugged off CP/M in these pages as a dreadfully unfriendly operating system, unfit for personal computer users.

Time and the computer industry marches on, and I find myself more and more in favour of the spartan simplicity of CP/M compared with some of the grisly edifices that have been erected since! The software base for this operating system is now huge and most of it is genuinely portable, give or take a few evenings cursing and spitting escape sequences.

By comparison, the 16-bit scene has

## Technical specifications

CPU's	Main Z80-compatible CMOS Slave 6301 Sub 7508
Memory for Z80	64k RAM 32k ROM containing CP/M Variable RAM and ROM disk size
Memory for 6301	128 bytes on-chip RAM 4k on-chip ROM 6k video RAM
Display	80 x 8 character LCD
Keyboard	ASCII type with US, UK, Fr. Ger, Swed, Dan, Nor language character sets
Interfaces	RS232C, serial (38,400 baud), bar code reader, analogue/digital
Power supply	Rechargeable NiCad pack, AC adaptor
Dimensions/weight	297mm x 216mm x 48mm/2.3kg

# Meeting the challenge of change



Four award winning models to choose from.

microbee really is "meeting the challenge of change" with two ROM and two DISK based models, each guaranteed expandable to any level. From arcade games through to word processing and business management, you can choose the level of development to suit your needs.

Tomorrow looks equally bright for microbee owners . . . with new technology and advances . . . with reports and literature on new software and peripherals . . . and with training courses for each level of development.

HI RES Economy Green Screen Monitor



## 16K Educator \$449

Now with WORDBEE!

The microbee Educator is specifically designed for the education market and has been chosen by NSW, Western Australia, Queensland and the Australian Schools Commission as a computer for use in schools.

microbee Educator boasts high quality graphics and sound effects capability, exceptional performance at a realistic price plus powerful software designed for Australian curriculum needs.

## 32K Personal Communicator \$499

microbee's top selling portable computer now features:

Telcom 1 firmware WORDBEE, Microworld BASIC, machine code MONITOR, ADM-3A terminal emulation, self-test in 28K of ROM with 32K of CMOS battery backed user memory, high resolution PCG GRAPHICS, SERIAL AND PARALLEL I/O ports, programmable cassette interface and direct monochrome video output.

A vast library of educational, entertainment and utility software is now widely available.

Microworld BASIC supports full high resolution graphics, colour if required, music, I/O data can be directed at will and best of all, MW BASIC is a breeze to program yourself.

The low cost

BEEMODEM can be added enabling your microbee (via your phone line) to communicate with other computers worldwide!

## Software and your microbee

Whichever microbee model you choose there is a vast and growing array of software to use with it . . . some built-in and included in the price of your computer. Games and family entertainment, education programmes, communication, information systems, personal and business finance, word processing and much, much more.

Ask at your microbee Computer Centre for the current range of software included with each model or ask for the catalogue of "Software Available".

## Options and Peripherals

Advanced "State of the Art" peripherals and options are available to interface with your microbee such as:

- microbee HI RES Economy Green Screen Monitor . . . \$149.50
- Adjustable Monitor Stand . . . \$19.95
- BEEMODEM . . . . . \$149.50
- microbee MB80 Dot Matrix Printer
  - Parallel . . . . . \$399.00
  - Serial . . . . . \$449.00(Includes cables)
- microbee High Resolution Anti Glare Ergonomically Designed Amber Screen Monitor . . . \$249.00



# Now with Dynamic RAM to meet today's user demands

## 64K Advanced Personal Computer

(with Single 400K Disk Drive  
and all manuals) **\$1,595**

The microbee 64K Advanced Personal Computer with a Single 400K Disk Drive is the ultimate configuration for the serious enthusiast.

It is supplied 'bundled' with world class software such as CP/M, MICROSOFT BASIC, MULTIPLAN, WORDSTAR and a powerful library of support programs. Comprehensive user manuals are also supplied. No wonder this model microbee is regarded as the most powerful and best price/performance computer in its class.

## microbee 128K

(with Dual 400K Disk Drives  
and all manuals) **\$1,995**

Designed for the serious home and small business user, the package consists of the microbee with 128K of dynamic RAM controlled by the proven Z80A processor plus a dual 400K disk drive, with the increased power more sophisticated programs can be executed including a whole host of bundled software for word processing, terminal emulation and communication with other computers worldwide, spreadsheet analysis and networking.



**microbee 128K  
Computer with  
Dual Disk Drive**

### microbee computer centres

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

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

141 Stirling Highway,  
Nedlands, W.A.  
Phone (09) 386 8250

Coolman Court,  
Weston A.C.T. 2611.  
Phone (062) 88 6384

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

455 Logan Road,  
Stones Corner, Qld 4120  
Phone (07) 394 3688

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

Authorised Dealers in:—  
*NSW:* Carlingford,  
Coffs Harbour, Concord,  
Hurstville, Lismore,  
Sydney.

*QUEENSLAND:*  
Townsville, Cairns,  
Milton.

*VICTORIA:*  
Melbourne.

*SOUTH AUSTRALIA:*  
Adelaide, Edwardstown,  
Port Lincoln.

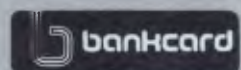
*WESTERN  
AUSTRALIA:*  
Mount Tom Price.

*TASMANIA:*  
Launceston

*ACT:*  
Belconnen, Weston.



**microbee**



welcome here

**DIRECT ORDERS  
PHONE (02) 487 2711  
TELEX AA72767**

**APPLIED  
TECHNOLOGY  
RETAIL PTY LTD**



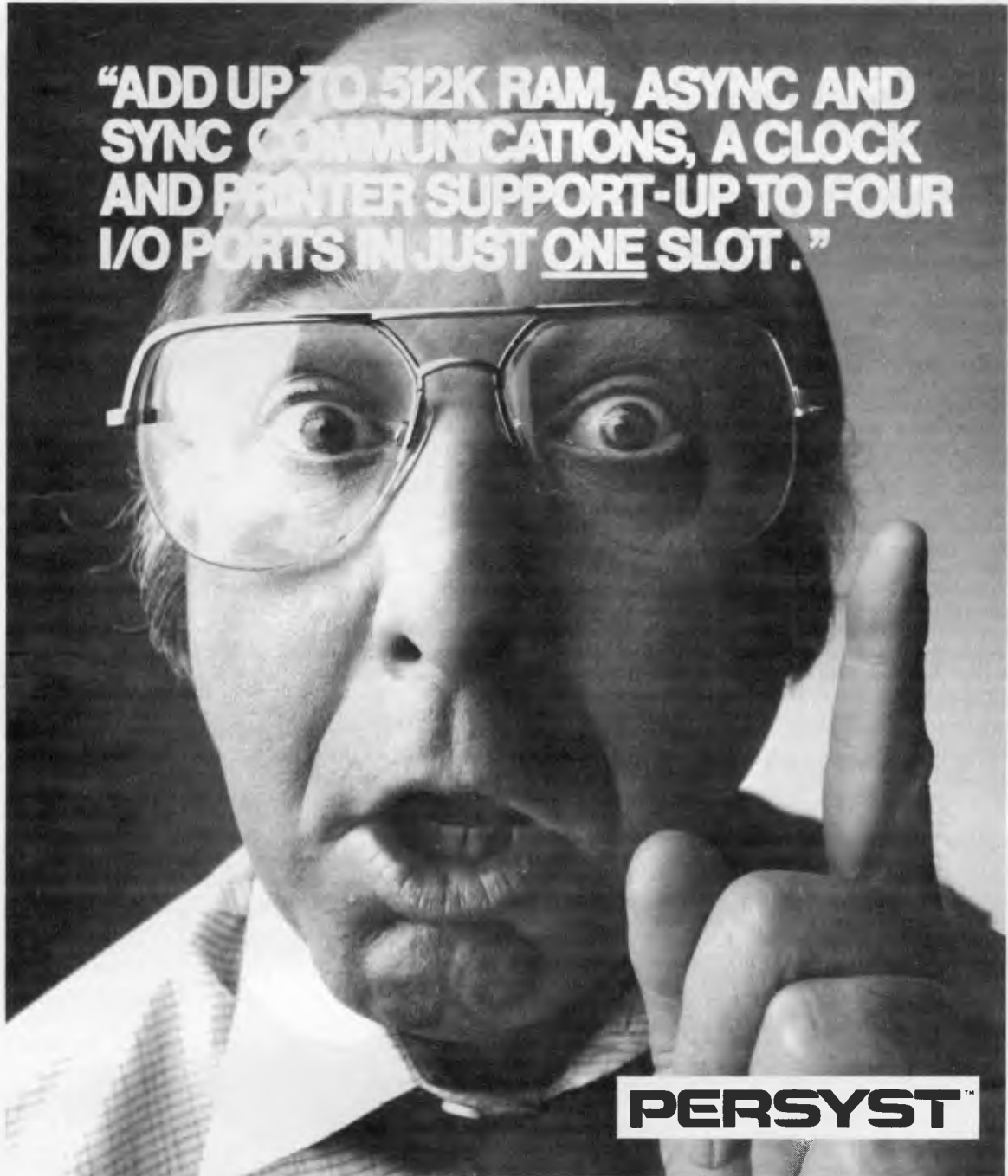
**IMAGINEERING™**

"The Art of Software"

*presents*

## **THE TIME SPECTRUM™**

**"ADD UP TO 512K RAM, ASYNC AND SYNC COMMUNICATIONS, A CLOCK AND PRINTER SUPPORT-UP TO FOUR I/O PORTS IN JUST ONE SLOT."**



**PERSYST™**

**Available for the IBM PC & XT at all fine microcomputer outlets**  
IMAGINEERING, 579 HARRIS STREET, ULTIMO, N.S.W. 2007. TELEPHONE: (02) 212 1411

# BENCHTEST

turned out to be a step backwards, with IBM ROM-BIOS compatibility (or more usually incompatibility) replacing portability. PIP and STAT now seem like old friends.

One thing that's certain is that when Gary Kildall created his little monster, he had no notion of ROM drives, RAM drives and microcassettes. Epson (or its contractors) have had a lot of work to do to get CP/M to accept these alien devices, and they've done it very well. PX-8 CP/M actually behaves more like proper CP/M than a good few desktop 'versions' I could name. In addition to the standard CP/M formula of BDOS (Basic disk operating system) and BIOS (Basic I/O system), Epson has added a complete cassette operating system (consisting of the corresponding MTOS and MIOS), plus a stack of BIOS extensions to handle the plethora of clever hardware features such as automatic power on, alarm clock/scheduler, high-res graphics, bar code reader and A/D convertor. There is even a BIOS entry point to talk to the slave processor which can be brought under the control of Z80 programs.

A very powerful innovation is the User BIOS. This is an area of RAM (the size is allocated during system configuration) which can hold new routines and then effectively become part of the CP/M BIOS. The User BIOS has its own table of entry points and a function to reload them; it provides a clean way of adding new device drivers to the ROM-based operating system.

The display driver supports four different display modes. The first, Mode 0, is the normal 80 x 8 display, though it's actually a window onto a virtual screen. To be exact, it's a window onto one of two virtual screens, the sum of whose lines must be 48; at power up they are both set to 80 x 24. It's possible to switch from one screen to the other and to scroll up and down using CTRL and the cursor keys. This applies even at the CP/M command level, so you can scroll back up a long directory listing. Mode 1 splits the screen in two vertically, with a line down the middle. The 39-column wide text wraps around to the top of the right-hand half giving, effectively, 16 lines; the two halves scroll together. Mode 2 again splits the screen, but the two halves are two separate virtual screens and can be scrolled independently. The split can be moved by the user so that one part is, for example, 20 columns and the other 59 (the sum must be 79). In all these modes the character size remains the same. Mode 3 is graphics

mode in which the screen becomes a 480 x 64 dot bit map (in this case there is no virtual screen — what you see is what you get).

Much has been done to the user end of CP/M. When you boot up the PX-8, a menu of files is presented instead of the normal bare A>. Programs can be run from this menu merely by moving the cursor to the right name and pressing

Other clever things you can do with the system configuration program include setting a password to prevent unauthorised use of the machine, getting the machine to switch itself on at a preset time, setting up an alarm clock message which will be displayed at a given time (interrupting any applications which are running — ESC lets them continue) and altering the RAM disk size.

---

*'Rather than chasing after the still-confused 16-bit market, Epson has wisely decided to go for the established winners, and is offering a selection of proven CP/M software (including WordStar) bundled with the machine.'*

---

RETURN. Given the small display (one third of a normal CP/M screen) and the presence of at least four drives (RAM disk, two ROM disks and cassette, maybe two floppies), it's clear that you can't get everything on this menu. A system configuration program is built in which can be accessed at any time (even inside an application program) by pressing CTRL HELP. One option is to choose which drives are shown on the Menu and the types of files to show (it comes set up to show .COM files only but you can have up to four different extensions).

Pressing ESC gets you out of the Menu and into the A> prompt, where the CP/M built-in and transient utilities work as usual. You can't PIP into a ROM (they behave exactly like write-protected disks) though you can PIP out. The supplied utility ROM contains PIP, STAT, SUBMIT, XSUB, TERM, FILINK and CONFIG (another configuration program used to set RAM disk size, function keys and RS232 parameters).

One thing missing is a way to find out how much RAM is free (STAT could have been extended to do this). It doesn't usually matter in CP/M, but when you have a variable user BIOS and RAM disk, it does. The only hard fact I have is that 24k is free to Basic with no RAM disk or UBIOS, which suggests that the CP/M is larger than normal.

Initially, the RAM disk is A:, the ROMs are B: and C: and the cassette is H: with optional floppies at D: and E:, but this order can be changed from the system configuration screen if you want to have a floppy area as A: (only the cassette is fixed as H:)

The ALARM/WAKE function uses the battery-backed clock/calendar in the PX, which also displays the time and date (including day of the week) continuously when you're in the file menu. WAKE sets the PX-8 to switch itself on at a specified time and date, and can also take a string which is executed as if it had been typed at the CP/M command line. You can therefore get the PX-8 to switch itself on next Christmas and run a program (perhaps Yonder Star™). By cleverly allowing wild cards in the specification of the WAKE time, the machine can perform this robot operation at regular intervals too. For instance, \*\*/12 \*\*:15 would cause it to WAKE on the 12th of every month, every 15 minutes throughout the day. AUTO START takes a string similar to that in WAKE but executes it automatically when you switch the machine on manually. In both cases the file menu must be switched off, otherwise the program lying under the cursor will be run instead with your string as a parameter! I know because I now have a WordStar file called DIR.

The RAM disk has to be formatted just like a real disk (though it only takes a second) and if it's corrupted you get a BDOS ERROR: BAD SECTOR just like the good old days.

Resetting the PX-8 is a rather baroque affair of the number of independent little minds in there. Many hung programs will be tamed by the STOP key on the keyboard; if not, CTRL STOP should warm start CP/M. If that fails, the Reset switch on the side of the case performs a warm boot and resets most of the system parameters to their default values (it

usually doesn't destroy programs or data). The ultimate deterrent is to press SHIFT NUM/GRAPH and Reset at the same time (borrow a friend's octopus), which blows away everything including the RAM disk and requires you to re-enter the date and time. This should only be necessary if the battery has been removed, or something equally drastic.

One final point about the operating environment is of very special importance. You can switch off the power to the PX-8 in the middle of an application program and have it restart at exactly the same point when you switch it on. To do this, you must hold down CTRL as you switch off, otherwise it will boot up into the file menu next time you switch on. This feature has a beneficial effect on WordStar, not the quickest program in the world to start up from scratch. Now you can forget it — just switch off and start again where you left off. This feature is automatically applied when the machine switches itself off to save batteries.

## Software

The PX-8 comes with a set of 'bundled' applications: a word processor (Portable WordStar), spreadsheet (Portable Calc), diary/scheduler (Portable Scheduler) and Basic. In addition, two communications programs are included among the ROM utilities: TERM is a simple asynch terminal emulation; FILINK is a file transfer program which uses a rather complex protocol of Epson's own devising.

### Portable WordStar

This alone will sell the PX to many people. If you've been using WordStar as your main editor for some time (and around a million people have) then it's very difficult to cope with a different editor on your portable. How does it compare with the desktop version? Apart from the smaller screen there is little difference. Being in ROM it boots up a lot faster than any floppy disk version, and saving to RAM disk is almost instant. On the other hand, the slow updating of the LCD display makes scrolling through a document rather agonising. It's not possible to have H: (the cassette drive) as the logged drive in WordStar as it's far too slow for virtual memory access.

Because the screen is so small (the Help menus fill the whole screen), the automatic Help facility of WordStar has been suppressed and the menus are raised manually by hitting the HELP key. The SpellStar-related commands are missing from the main menu, but in their place are new commands — T for Transmit and C for Receive — to transfer

files to another computer via the RS232 port.

The biggest handicap is memory space. With a 24k RAM disk (the maximum allowed internally) I could only produce a document of around five single-spaced pages; any more and a 'Drive Full' error occurs when you try to return to the first line. The file is only 13k in size but WordStar has to reserve the same again for its back-up file, hence the error; given the non-volatile memory I think I could live without .BAK files. For any serious writing, the external RAM disk (or the portable disk drive) will be essential.

### Portable Calc

I wasn't supplied with a Calc ROM but played with it briefly on another machine. It's written in Micropro and seems like a perfectly useful spreadsheet with all the facilities of a desktop version. Surprisingly, the small screen does not make it at all difficult to use, probably because we are already used to scrolling a window onto a larger spreadsheet.

### Portable Scheduler

The scheduling program allows you to choose a screen which represents a diary page (the date is displayed at the top). The page is split into morning and afternoon, each divided into half-hour intervals. On each line you may type a short reminder of what you are to do at that time. Any of these reminders can be automated using the ALARM/WAKE function, and each one so selected is marked on the page by a musical note beside it. At the appointed hour, the Scheduler will interrupt what you're doing, beep, and print the reminder. This interrupting can happen even though the Scheduler (which is just a data entry program) is not loaded, because it has stored the appointment times into the User BIOS and passes them in sequence to ALARM.

### TERM and FILINK

TERM provides terminal emulation using the built-in RS232C port at a range of baud rates up to 19,200, which can be set in software. Unfortunately, it's necessary to leave TERM and go into the configuration program to alter the communication parameters. TERM allows transmission and reception of files as well as direct keyboard interaction, but without any protocol. It worked well when connected to my CP/M system, and transferred files successfully in both directions at up to 2400 baud.

For reliable transfer at higher rates the more specialised FILINK should be used.

Unfortunately, the protocol it uses is not XON/XOFF or ACK/NACK so you'll either have to write a special program or communicate only with Epson machines. It transfers the file name in ASCII followed by 128-byte blocks with their XOR as a check byte, and uses no less than 13 different characters as handshake signals — that is, to establish connection it sends R (ready), receives S (set), then sends G (go).

## Basic

The Basic supplied with the PX-8 is an extended version of Microsoft's Basic-80, but is not extended to the level of GW-Basic, the version used on the IBM PC and rapidly becoming the new standard. In particular, Epson's Basic does not have the sound and graphics 'sub languages' of GW-Basic, having just a SOUND command with pitch and duration, and only point and line plot commands for graphics instead.

More surprisingly, given the rich hardware environment, it doesn't have the new software interrupt structures such as ON COMM . . . GOSUB and ON TIMER . . . GOSUB, though it does have full support for the RS232 port and the alarm timer. The latter can be programmed through the ALARM command which uses the same clever wild card formats as are available in CP/M. The W option gives WAKE instead of ALARM, which means that a Basic program can be set up to run itself at programmed intervals — useful for data-logging or control activities. AUTO START and the automatic power off feature can also be used from Basic. However, the Bar Code Reader and Analogue interfaces are not directly supported and will need a machine code routine to be linked in to read them.

As on the HX-20, the program area is partitioned into five, so that up to five different Basic programs can coexist in memory. Each can be given a name, and a menu of the contents is shown on entering Basic. Swapping to a new program is done by the LOGIN command.

## Benchmarks

BM1	3.0
BM2	8.0
BM3	19.5
BM4	19.0
BM5	22.5
BM6	40.0
BM7	62.5
BM8	89.0

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

# BENCHTEST

Decimal, hex and octal constants can be used and double-precision (16-digit) constants are allowed. Integer-, single- and double-precision variables can be optionally declared with DEFINT, DEFSNG and DEFDBL, and type conversion is automatic.

Sequential and random files are permitted for both disks and micro-cassettes, though random files on the latter can either be read or written but not both (they must be closed and reopened). File I/O is performed in the same way for all external devices, files being referred to by a descriptor which includes the device name they're intended for. Up to 15 files may be open simultaneously, and memory use can be optimised by specifying the number you will be using as an option when loading Basic. For example, BASIC/F:3 will only create buffers for three files.

The Benchmark timings show that the PX-8 sacrifices little in speed to its CMOS processor. They are exactly the timings you would expect for the older desktop CP/M machine with a 2MHz processor.

PX-8 Basic has a full trapping of CP/M BDOS errors, and about time too. If you try to save to a write-protected disk, or to one with a bad sector, you'll get a Basic error message and the chance to retry, rather than being dropped into CP/M and losing all your data. All things considered, this is a thoroughly professional Basic, with a bias more toward business programs than amusement.

The system disk which came with the floppy drives contained a PROM-burning program, which I assume will be made available to third party software vendors to allow them to put their software into ROM capsules. The fact that no fancy cartridge is used should enable costs to be kept down (if the chip shortage allows them to get any ROMs at all!).

## Expansion & potential use

Like the Sharp 5000, the PX-8 is a fully-fledged general purpose business computer and can be used to 'take the office with you' to places where mains power is not available. The 15-hour battery life is adequate for the longest journeys and for any sort of day trip in the field. If no printer or other external devices are employed then this could extend to several days of average use.

Potential users include those people currently using portable computers, from business executives through sales-

men to scientists and engineers. The latter should find the combination of the sophisticated timing facilities, with the ability to run other languages like Fortran, Forth and C, particularly attractive.

For users who require large data volumes, such as a writer or sales rep logging his contacts and orders, then

one of the external RAM disks would be a good purchase. Epson has released a portable, battery-powered 3½ inch disk drive to accompany the PX-8. It wasn't available for the review, although another APC staff member had a brief opportunity to use one and assures me it performs well.

Another alternative is to send the data

# IBM PC USERS

## Now you can process your Mainframe data directly on your PC.

In fact you can now treat some of your company's mainframe resources as an extension of your PC.

Tempus-Link gives you 4 additional PC disk drives which are actually located at the mainframe. You access these drives in exactly the same way you access your existing PC drives. Any PC program, including your favourite spreadsheet or database system, can read and write data to and from these mainframe disks. You can use PC/DOS COPY to move data between the mainframe disks and your present PC disks.

A mainframe task can move data between mainframe files and PC/DOS files located on

your Tempus-Link mainframe disk drives. If you are a TSO user you can use full screen SPF panels to select the files you wish to transfer.

Over 30 of Australia's largest companies have Tempus-Link PC users processing mainframe data on their PC's. They have found Tempus-Link to be the most cost effective way to get PC-users in touch with their mainframe data.

Tempus-Link will operate on all mainframes running MVS, DOS/VSE or VM/CMS. Ask your data processing department or Information Centre to make you a Tempus-Link user or contact us directly for some more information.

See us on  
Stand 407

**PC** The 3rd Australian  
Personal Computer Show  
World Trade Centre  
Melbourne  
18-21 July 1984



## TEMPUS-LINK

## DDP

DISTRIBUTED DATA PROCESSING PTY. LTD.

Level 29, 459 Collins Street, Melbourne 3000  
Tel: (03) 62 4698



An exciting range of games for your

**Commodore 64**

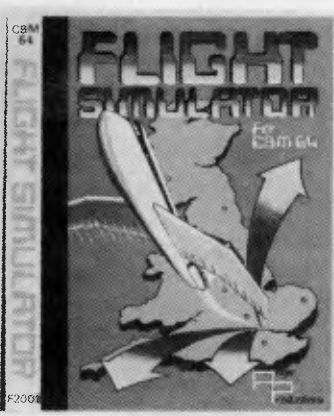
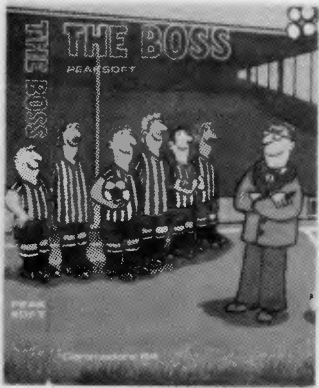
**THE FABULOUS WANDA AND THE SECRET OF LIFE, THE UNIVERSE AND EVERYTHING!**  
Saucy Super Space Adventure Game. Will Wanda reveal her special secrets to you? **R.R.P. Cass. \$26.75**

**THE BOSS**  
Manage your own soccer team for major honours. 13 screens to be in full control at all times. Features include free game save tape, 4 divisions, F.A. Cup, transfers, European Cup, league tables, buy, sell, substitute players, minute by minute goal facts and more. **R.R.P. Cass. \$26.00**

**FLIGHT SIMULATOR**  
Control your own plane to take-off, reach a destination and use your skills to land without crashing. Three screens with cockpit compass controls and flight indicators. **R.R.P. Cass. \$28.00**  
**R.R.P. Disk \$37.50**

**COLOSSUS CHESS 2.0**  
The World Champion Chess Game has beaten Grandmaster 12 to 4 and White Knight the 1983 Home Computer European Champion 11 to 5. **R.R.P. Cass. \$29.95**  
**R.R.P. Disk \$39.95**

**AAGH! CONDOR**  
George dreams of a damsel in distress. A strange vulture-like bird is flying down to carry the damsel off. George becomes the hero but has many hazards to overcome. **R.R.P. Cass. \$17.25**



	<b>R.R.P. CASS.</b>		<b>R.R.P. CASS.</b>	<b>R.R.P. DISK</b>
Purple Turtles	\$28.50	Assembler	\$26.25	\$32.75
Aquaplane	\$28.50	Golf	\$26.25	\$32.75
Ring of Power	\$33.50	Olympic Skier	\$19.75	\$31.75
Quintic Warrior	\$28.50	Red Alert	\$19.75	\$31.75
Ultisynth	\$49.95	Jackpot 64	\$19.75	\$31.75
Boogaboo	\$28.50	Wheeler Dealer	\$19.75	\$31.75
Sting 64	\$28.50	Westminster	\$19.75	\$31.75
Snake Pit	\$18.75	3-D Tank	\$26.00	
Xanagrams	\$18.75	Millie-Bug	\$26.00	
Falcon Patrol	\$29.95	Eggbert	\$17.25	

**AND MANY MORE!**  
**AVAILABLE FROM YOUR LOCAL DEALER**  
**OR FROM OUR MAIL ORDER DEPT.**  
**PLEASE SEND REMITTANCE OR BANKCARD NO.**  
**PLUS \$1.50 FOR POSTAGE & HANDLING.**

**MAILSOFT**  
**COMPUTER SOFTWARE**

P.O. Box 225, Wahroonga 2076 N.S.W.  
Phone (02) 449 2804

**SEND S.A.E. FOR CURRENT PRICE LIST**

**DEALERS ENQUIRIES WELCOME**

# BENCHTEST

back home by telephone link, rather than store it on the spot. I tried the battery-operated acoustic coupler (CX-21) which can be used with the PX running its TERM program. This is a 300-baud, full/half duplex, answer/originate device, compact and well constructed. One of the rubber cups is on a swivel to accommodate different shapes of telephone handset.

Epson has launched a PX-8 compatible battery portable printer. The P-40 is a 40-column thermal printer which was not available in time for this test.

The floppy disk drives (TF-20) that I used for this review are not specially designed for the PX-8 but will work with the HX-20 and the QX-10 desktop too. The twin slimline drives hold 280k per drive, and the unit is 'intelligent' in that it has a processor and boots the operating system into its own RAM (it's possible to boot the drives without a computer connected at all). This allows QX-10 disks to boot the PX-8 and *vice versa*. The drives (connected by serial link) are comparatively slow in transfer rate, and make the most extraordinary clicking noise which had me constantly worried that they were trying to read a bad sector, which they weren't.

## Documentation

The User Manual and the Basic Manual are chunky spiral-bound soft cover books (no nasty ring bindings to drop pages all over the floor) of over 300 pages each, and they are very good indeed. Both start off ominously by saying that they are not intended as tutorials (some tutorial books on CP/M and Basic are recommended) which is often an excuse for skimpy, hastily-produced stuff written by the programmers. Not so in this case. It's an excuse for clear, concise, no-nonsense, non-patronising information, on a par with that supplied by Apple and Hewlett-Packard. Just about everything you need to know is there and it's fully indexed (20 pages of index in each). The workings of all the utility programs are explained, including TERM and FILINK. The RS232 port is fully documented, including the signals and pin-outs of every alternative cable. The user manual has all those tricky little things like the console escape sequences, lack of which can often hinder you in installing new applications, and even fully documents the special BIOS routines to control the clock. For the professional software writer there is a separate Operating System Manual.



*The CX-21 acoustic coupler can be used with the PX-8's TERM program*



*A ratchet mechanism allows the display to be set to various angles*

## Conclusion

The PX-8 is without doubt the most capable lap-held computer to be introduced so far. Apart from the fact that it has virtually all the capabilities of a desktop CP/M machine, it also has immediate access to the huge CP/M software base which its 16-bit competitors will find difficult and costly to match. None of the existing lap-helds have attracted an adequate third party software base, largely because of the restrictive hardware limitations and a certain lack of faith in this market sector on the part of the software houses. The PX-8 should change that at a stroke.

Its price, at around twice that of the NEC and Tandy machines, puts it firmly in the professional user market, but it's still at the bottom of the price range for

CP/M machines. It's extremely well made and its design makes it a pleasure to use. The variable angle display is a big improvement for word processing when compared to the flat, fixed displays of its cheaper competitors. And for many users, the inclusion of WordStar will alone be enough to tip the balance.

## Prices (excluding sales tax)

PX-8.....	\$1,300
Acoustic Coupler.....	\$209
TF-10 Disk Drives.....	NA
TF-20 Disk Drives.....	\$1391
60k RAM Disk.....	\$404
120k RAM Disk.....	\$570
P-40 Thermal Printer.....	NA

# Maximising techno



**MTX512:64k RAM \$859.00**  
**MTX500:32k RAM \$769.00**

COME AND  
SEE US  
AT THE  
(STAND 416)

DISTRIBUTED BY **interfaceware** 1/303 Pacific Highway Lindfield, 2070 NSW. Ph: (02) 46 4374



ology



## The All-Purpose System

The MTX Series is a new departure in micro-computer technology. Whether your needs as a user are for personal programming, games playing, scientific or process control, educational or business use the MTX Series is already capable or very easily adaptable to almost every application.

2 x The speed of IBM  
3 x Capacity of Apple Disk Drives

## FOR 1/2 THE PRICE

PLUS:

### 4 INTERACTIVE LANGUAGES IN ROM.

(MTX BASIC/GRAPHICS. MTX NODDY.  
ASSEMBLER/DISASSEMBLER. FRONT  
PANEL DISPLAY)

PLUS:

### \$1000 of Free Software.

(NEW WORD. SUPERCALC. 80 COLUMN  
COLOUR)

Available through your computer outlet.

<b>SYDNEY</b>	Computer Spot	(02) 235 2971
	Compushack	(02) 467 1933
<b>MELBOURNE</b>	Ultrapase	(03) 857 4233
	Computerbytes	(03) 500 0861
<b>ADELAIDE</b>	Abraxas	(08) 223 5133
	Talking Computers	(08) 297 1919
	Mr Computer	(08) 258 3122
<b>BRISBANE</b>	CW Electronics	(07) 397 0888
<b>CANBERRA</b>	Steves Com- munications	(062) 80 6877

**6 Month Warranty  
Nationwide Service**

The 3rd Australian  
Personal  
Computer Show  
World Trade Centre  
Melbourne  
18-21 July 1984

**MEMOTECH**  
**MTX**  
**SERIES**





# Memotech

*The British firm Memotech has launched a moderately priced colour micro that can be expanded into a small business CP/M machine. We give our verdict.*

Memotech made its name in the fickle world of computers over two years ago with cheap reliable add-ons for the Sinclair micros. Not content with a role on the sidelines, in the middle of last year a Memotech micro was launched to an enthusiastic response. A year later (courtesy of Sydney firm, Interfaceware), this micro has reached our shores.

The Memotech micro comes in two forms. The MTX-500 and the MTX-512. The 500 is the cheaper at \$769 (all prices quoted in this article are recommended retail only and inclusive of sales tax) and comes with 32k. The only difference in the MTX-512 is that it comes with 64k of RAM. This will cost you an extra \$90. If you want to upgrade an MTX-500 to an MTX-512 the RAM extension will, of course, cost that bit more (\$151) than having it built-in from scratch.

Memotech has produced a whole heap of software cartridges and add-ons to turn your humble MTX-500 or 512 into a fully fledged business system (or thereabouts). These were not available for the review so we'll concern ourselves only with those items that actually arrived in the cardboard carton.

Firstly there is of course the micro itself. This is large by home micro standards, nearly 20in across. This room is not wasted, though; most of it is taken up by the 79 keys which make up the Memotech's keyboard.

The keyboard is the real typewriter kind. This is essential if hopes for the machine are to be realised. Even if you are only ever to use your micro for games and your own programming, a decent keyboard is a great bonus. The MTX doesn't fail here. Typing on this keyboard is no strain on the finger or the brain. The feel of the keys is a little on the rattly side but this does not detract from them too much.

As well as the usual qwerty selection of letter keys there is also a numeric key

pad and a pad of eight function keys. Full marks for that. The function keys are situated as a block at the right hand end of the keyboard and not strewn along the top row of keys like some micros. Although this is a style more in line with business machines (that's probably why Memotech chose it) it does preclude any method of temporarily labelling these keys. A perspex strip over a row of user definable keys, to take a paper strip of labels, is a trick already used by several other manufacturers and well worth copying.

On each side of the space bar there is an unlabelled key. These apparently do nothing, but if pressed at the same time they act as a reset key. Reset keys are always a good idea but because of the finality of their action it is an even better idea if they are a bit harder to accidentally hit than these.

## Graphics potential

Hidden inside the impregnable fortress of your MTX case is a chip from Texas Instruments known to those in the trade as a 9918. The number, of course, need not worry you, but what should concern you is that this chip is the same as that used in several other micros. This chip controls just about every aspect of the MTX's display, the text format, the graphics, and the sprites. It is certainly a versatile little piece of plastic, more complex than the microprocessor itself, that is in charge of the whole machine.

Several other machines use exactly the same chip. This means that the graphics potential of the MTX should not be greater or lesser than these other machines. The Sord M5 (\$395) uses this chip as does the Spectravideo SV318 (\$399). In fact this graphics controller chip is the one specified in the recent MSX standard.

Not only, then, do other machines on

the market have potentially exactly the same graphics facilities as the Memotech, but an awful lot of cheap Japanese micros to this standard will appear in the very near future.

What, then, is the potential of this marvellous chip used in the MTX? Firstly text. The MTX can put 960 characters at once up on your TV screen in a 40 x 24 format. This is as good as most home computers and about all that a normal TV can display without resorting to fuzziness. Memotech has produced an 80 column card which is essentially for real business work. It is incorporated into the disk drive unit. (There is, however, no plan for a separate 80 column add-on for home users who don't want to go to the expense of disk drives).

The text can be any of sixteen colours. These cover the usual range from bright primary colours to pastel shades. All of the colours appear a little washed out on the Memotech machine. This was not the fault of the TV used nor the display chip itself — colours on the Sord M5 for example are very strong. It seems that Memotech may have a bit of cleaning up to do on some part of the video circuitry here.

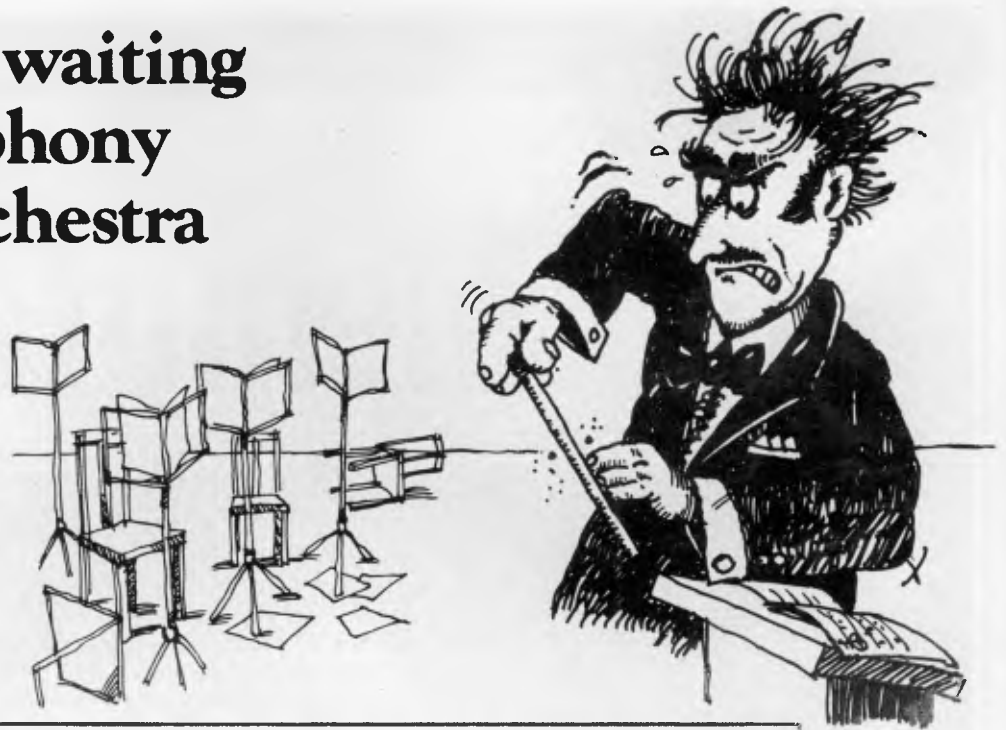
The background to the text can also be in any of the sixteen colours. It is a pity that the display chip used does not allow parts of the screen to be different background colours. The BBC micro, for example, will allow any single character to take a different background colour from its neighbour.

All of the letters, numbers, and other characters available on the MTX can be redefined to create new or accented letters and symbols. In addition to these 95 characters there are also 25 others that are set aside for your own character shapes.

The greatest attraction to buyers for the MTX in the UK has been its graphics. The potential for graphics from the controller chip in the MTX is excellent. The

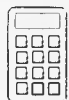
Are you still waiting  
for the Symphony  
when the orchestra  
hasn't even  
assembled?

Don't wait.  
We have our  
act together.



# Corporate **MIBA**™

**The software solution for the decision makers**



Spreadsheet modelling



Business graphs



Custom forms design



Mainframe data retrieval and electronic mail  
including 3278 Communications with IRMA board



Database searching



Executive word processing

**...all in one integrated, easy-to-use program.**



**Sydney:** 4th Floor, 204 Clarence St., Sydney NSW 2000.

Phone: (02) 267 1711. Telex: MNC AA25026.

**Melbourne:** Suite 203, 620 St Kilda Rd., South

Melbourne Vic 3004. Phone: (03) 51 1406. Telex: AA39219.

**Brisbane:** (07) 343 9122. **Perth:** (09) 322 1677.

Intelligence provides full service, including: ★ system consultation ★ training ★ hotline service

display from this chip (so the chip's manual goes) can be best thought of as a series of transparent sheets placed inside your TV, one on top of the other. If there isn't anything at some position on one sheet then the next sheet behind will show through. On the back sheet there is a backdrop. This can be any plain colour. This sheet will also effect the border around the active part of your TV screen. In front of the backdrop there is the main graphics sheet. This can be used in a number of ways in various modes.

First there is the text mode. It is this mode that gives you the 40 column by 24 row text format. The text mode uses up very little of the screen memory (only 3k) because it is comparatively simple, but this doesn't help you much as no

Basic. This is not a full implementation of Logo, but a useful addition nonetheless.

## Sprites

The sprites take up the remaining 32 sheets that make up your display. Each sheet can hold one sprite. By carefully arranging which sprite is on which sheet you can make your space invader, say, move in front of the flying saucers. All the difficult parts of moving the sprites around are taken care of for you. Once the sprite's shape has been defined with one command and given a number to determine which sheet it is to appear on, with another, it can be placed anywhere

---

*By carefully arranging which sprite is on which sheet you can make your space invader, say, move in front of the flying saucers.*

---

more is released for your program's use. The text mode display can only be in two colours. One for the characters and one for the background.

There are three graphics modes available on the MTX's graphics chip. One, the so-called multicolour mode is not too useful. This mode comprises a screen of 64 x 48 small squares. Each of these squares can be any of the sixteen colours available. However as there is no possibility of text in this mode and the graphics are, to say the least, chunky, this mode is not available from Basic.

There are two other graphics modes. These are a lot more useful. Both will allow text, graphics and sprites on the screen, and both will allow you to use all sixteen colours on the screen at once. The differences between the two modes are that mode II allows more user definable characters (768) than graphics I, giving you enough to have a different character in all of the 32 x 24 positions if you really wanted. Graphics II also allows you to define a separate foreground and background colour for each line of a sprite (they are made up of eight lines) instead of just a single pair of colours for the whole sprite as graphics I dictates. It is mode II that is used as the graphics mode by MTX Basic. Both mode I and the multicolour mode could be selected using machine code, but as mode II gives you everything that the others do and more, Memotech has wisely restricted the choice from Basic to simplify matters for the user. Drawing pictures on the screen is also simplified with the inclusion of several Logo type commands in

on or off the visible screen, or moved in a straight line, with yet another single Basic command.

All this makes writing fairly complex games very simple. The problems start when you realise what commands Memotech expects you to learn for these actions. Instead of simple, easy-to-remember Basic keywords such as PUT SPRITE as there is in MSX standard Basic, Memotech have used a selection of horrible mnemonics like MVSPR and CTLSPR. True, Memotech has left the system as versatile as possible, but it would have been preferable to have made it really easy to use.

## Basic

The MTX Basic has a few pluses and minuses. A versatile automatic line numbering command is included but there is no line renumbering. There are no definable functions and the Basic program editing is also a little strange.

Usually Basic editors come in one of two forms. Some form of on-screen editor is best. These allow you to move a cursor around the program lines that you have already written on the screen, changing characters as you go. The more old fashioned line editors require you to tell the micro that you want to edit a particular program line, whereupon it will present you with a copy of that line to run through making your additions and deletions. The line editor is a lot less convenient to use but simpler to implement. Memotech has chosen a sort of hybrid

editing system for the MTX Basic.

As you type a program it will appear in the top two thirds of the screen. To edit a line, you have to tell the computer that you want to do so and that line appears at the bottom of the screen in a separate editing window. So far so much like a line editor. Now however you can move back and forth over that single line using cursor keys incorporated into the numeric pad to change the single line. Much in the same way as a decent screen. The net result is an editor that is fairly easy to use, certainly better than a normal line editor, but why couldn't Memotech have gone the full hog to a real screen editor?

The use of windows on the screen like this is another feature of the MTX. The screen can be divided up into sections by a program so that, say, data can be entered into one area while another part of the screen displays the results. Although the control of these windows from Basic is very versatile, the commands used are confusing. The section in the manual which deals with this is also incomprehensible, to say the least. The program, error message and editing windows are just examples of the seven windows that the screen can be divided into at any one time. The manual warns of the dangerous consequences of tinkering with these particular windows, so you are left with only four to play with.

MTX Basic includes a versatile sound facility too. The almost standard three voices plus a noise channel are provided with the sound output directed to your TV speaker. The Basic commands to control this are better thought out than those to control the graphics. Single notes can be played or tunes easily constructed. Some control of the envelope, or shape, of the sound is also possible. For this last facility, Memotech has not resorted to its tactics of horrible mnemonic commands, either. The relevant numbers are just tacked on to the end of the sound statement if needed, or not if they are not required. Couldn't be simpler.

Basic is not the only language that is included with an MTX. The 24k of ROM also contains an assembler and strange new language called Noddy. Noddy is a text handling program. It is not a word processor but a text formatting and shuffling program. It is difficult to see why it was included at all. Had the trouble been taken to make this language some real use to users of the MTX then nothing but praise could be bestowed on Memotech. As it is, however, Noddy is likely to spend most of the time totally ignored.

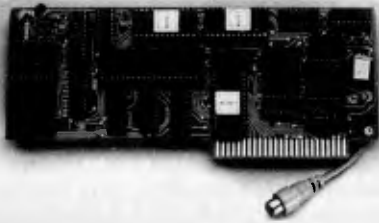
Noddy's only redeeming feature is the sense of humour that it reveals in its authors. The command to be used in Basic to call up a Noddy program is 'PLOD'. Erstwhile followers of Enid Blyton will recognise the name of

# MICRO ~ BUFF

TELEX AA 139718

TELEPHONE 277 7754 (ASK FOR RAY POPE)

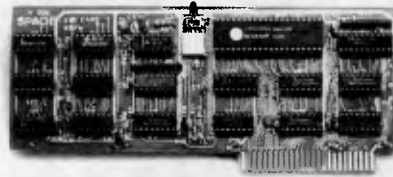
499 HIGH STREET ROAD,  
MT WAVERLEY 3150  
MELBOURNE, VICTORIA,  
AUSTRALIA



### 80 COLUMN I/F

80 x 24 Lines  
Lo Res Graphics  
Compatible with  
Word Processors in  
BASIC, CP/M or  
PASCAL

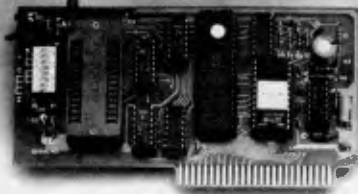
**\$85.00** Tax Paid



### CP/M CARD

Turn Your Apple  
into the most  
Powerful  
Business  
Computer

**\$55.00** Tax Paid



### EPROM WRITER

2716, 2732, 2764  
Does them all  
**AUTO** Blankcheck  
**AUTO** Verify  
Read, Write, Copy,  
Includes software

**\$83.00** Tax Paid



### S. A. M.

ADD SPEECH  
TO YOUR  
COMPUTER  
SOFTWARE  
INCLUDED

**\$39.00** Tax Paid



### 128K RAM CARD

Super-Fast Disk  
Immulation or  
Just Total  
Expansion of  
Memory Software  
Included

**\$225.00** Tax Paid



### 16K RAM CARD

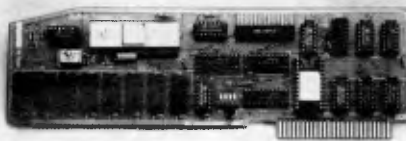
Make Your  
Old APPLE  
into a 64K  
Computer  
32K also available

**\$89.00** Tax Paid

## GET SLOTTED

SUIT ALL APPLE  
TYPE COMPUTERS

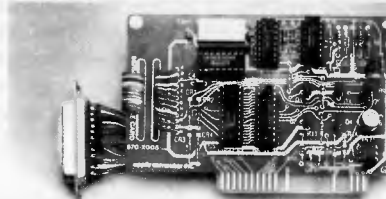
### THE AFFORDABLE PLACE TO SHOP



### BUFFERED PRINTER INTERFACE

Centronics (Parallel)  
Compatible 16K —  
64K Buffer Text or  
Graphics same as  
Grappler Cards

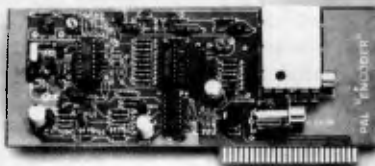
**\$160.00** Tax Paid



### SERIAL RS232

For PRINTERS  
or MODEMS  
Fully  
Programmable

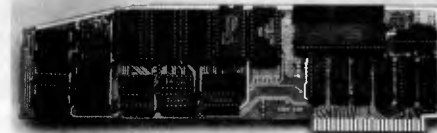
**\$75.00** Tax Paid



### PAL INTERFACE

Connect to your TV  
For the Colour of  
Your Enjoyment

**\$95.00** Tax Paid



### 8088 INTERFACE

MSDOS (IBM)  
or  
CPM 86  
Speeds up  
the APPLE  
Includes software

**\$269.00** Tax Paid

## DISK DRIVES

800K SINGLE **\$700.00**

1.600K DOUBLE **\$980.00**

**5 1/4" DISK DRIVES BY TOSHIBA  
INTERFACE CARD BY MICRO BUFF  
COMPLETE WITH SOFTWARE**

Toytown's long arm of the law.

In addition to Noddy, the MTX machines also offer a built-in assembler. Assembly language is the intelligent man's machine code. It offers all the advantages of machine code, such as speed and efficiency of memory usage, without half of the hassle. Assembly language is about half way between machine code and Basic on the understandability scale. The assembler that resides in the MTX's ROM, takes your assembly language program and translates it to genuine machine code before it is run.

The joy of using assembly language on the MTX, however, is that programs written in this language can be incorporated into Basic programs in a similar way to their inclusion on the BBC micro. However, there is a major difference between the assembler language built-in to MTX and BBC Basics. In BBC Basic the assembler language program is listed, just like Basic, as part of the Basic program. This means that it can be edited and shifted around just as though it was a Basic program. Not so on the MTX.

The assembly programs on the MTX are written in a different mode from normal Basic program writing. This separate mode is a bit like the separate mode needed to edit a Basic program. Programs can be written and edited for inclusion in a Basic program only in the assembler mode. The commands used to list and edit the assembly language program in the assembler mode also leave much to be desired. It seems that Memotech, in its striving to simulate the concepts of business machines, has taken a leaf out of WordStar's book. All the editing commands are horrible single letter mnemonics.

There are several other items included with the micro itself, in the Memotech box. For a start, there is, of course, a power supply. It is styled to go nicely with the main machine, and (unusually) includes such items as an on/off illuminated switch and decent lengths of lead. There are also five cassettes neatly tucked into the expanded polystyrene of the packaging.

Two of these are games provided by 'Continental Software'. These are 'Toado' — a variant on the Frogger theme — and 'Draughts', which speaks for itself. The other three cassettes include a demonstration tape to goggle at, when you first use your micro, a blank tape to take your own programs, and a cassette recorder head-cleaning tape; a very thoughtful touch. A cassette lead is also provided.

Continental has released a range of games software including adventure, chess, bridge and arcade-style programs.

## Documentation

In a word: poor. The 250 page manual is not typeset (ie, just typed) and it lacks an index. Nearly all the explanation is confusing and the contents page is barely complete. On the positive side, it is comprehensive although at times difficult to follow.

## Expansion

The Memotech can be expanded to a total of 512k RAM in steps of 128k units costing \$405 each. On the business side, a package called the FDX system

can be added to the 512. It includes two 5¼ inch floppy disk drives (Qume disks, each of 500k capacity); the 80 column colour card mentioned earlier; CP/M; a word processor called New Word which comes as a ROM cartridge; and the SuperCalc spreadsheet. The FDX package sells for \$2130.

If you're a speed freak, an extra \$359 will get you a "silicon disk" system which is simply 256k of RAM configured to look like a floppy disk drive to the operating system. Of course, accessing the RAM is a lot faster than accessing data on a floppy disk drive.

Promised software packages include an accounting system and educational software. Unfortunately, none of the above were available for review at the time of going to press.

## Conclusion

The manual distracts from what is mainly a good machine. The Memotech MTX is not revolutionary in any way, but it is, however, a tried and trusted design and sturdy in construction.

If you're looking for a business machine for serious work then it is bound to be a better bet to buy a machine purpose designed for that task. If you're wanting a machine only for playing games and the simplest of programming then there are cheaper home micros on the market with similar capabilities.

However, if you fall between the business and the home micro market you will find either of the MTX a good buy, giving you a decent home machine and a good base for future expansion.



**EXECUTIVE 816 owners  
UPGRADE YOUR SYSTEM....**

**..... TO 10 MEGABYTES  
totally within your briefcase!**

The EXECUTIVE 816 BRIEFCASE COMPUTER has sold over 400 systems and so we expect that there are many of you out there who would like to upgrade to a very powerful 10 megabytes of fast hard disk, operating within your briefcase.

**10MB UPGRADE - \$2191**  
(inc tax)

Upgrades your 1.6mbyte dual floppy system to 10MB HARD DISK and one 800K FLOPPY.

Your unit is returned to us for refitting, and returned to you fully upgraded within 7 days. 6 MONTHS WARRANTY.

**COMPAK MICROCOMPUTER  
PRODUCTS P/L  
44 THE ESPLANADE, BRIGHTON BEACH, 3186  
TEL. (03) 592 8744**



# 'ThinkJet' Ink Jet

Ink Jet printers offer the next quantum leap in printer technology available to the home/small business market. Of course, laser printers are still undoubtedly the best, but the \$200,000.00 starting price puts it slightly out of the PC class. Ian Davies takes a look at the 2225A ink jet printer by Hewlett Packard, and also mentions the 2225C, which is built for the non-HP world.

The Hewlett Packard HP2225A "Think-Jet" printer uses Ink Jet Technology which means several things. Firstly, that the printer is very quiet — 50 Db to be exact, which is quieter than many hard disk drives and most cooling fans.

## Ink Jet?

Traditional impact printers employ chunks of metal which fly about with great velocity, hurling themselves at the paper through an inked ribbon, (which also moves), thereby leaving an imprint on the paper to mark their passing. Ink jet printers simply spray ink onto the paper where ever it is supposed to go. There are four movements in a traditional printer — the horizontal movement of the print head, the movement of the paper, the movement of the ribbon and the insane slamming of the print head against the paper. Ink jet printers remove the need for two of these movements — the ribbon is done away with, and most importantly, the print head is dispensed with. It is the physical slamming of the print head against the paper which creates most of the noise and imposes the greatest limitations on the speed of traditional printers.

Of course, the trick with ink jet printers is to make ink go where you want it to, and preferably nowhere else. The ink is propelled at the paper using electrically charged droplets. The ink flows from a reservoir into a tiny holding chamber where the drop is then charged and may be accelerated towards the paper by a

number of cathodes which correspond to the print pins in a normal dot matrix printer. The difficulty with ink jet printers is generally that the ink is in a much more fluid state than inked ribbons, therefore refilling them can be an extremely messy process. HP have solved this problem in their HP2225 by integrating the ink reservoir and the ink head into one disposable unit, good for about 500 pages. Initially this might appear very wasteful, but really it is no different from disposable ribbon cartridges, and a darn sight easier to use.

## The 2225A

As well as being much quieter than the average printer (you can sit next to it and not realise that it is actually printing), the 2225 is faster, cheaper, much more reliable and smaller. What more could one ask for?

Its print speed is a respectable 150 characters per second with bi-directional logic-seeking movement. The speed of vertical paper movement is 2 inches per second, (or 5.08 cms/sec). It provides four different print pitches and can perform underlining and bolding in a single pass — operations which normally devastate the efficiency of most printers.

Paper feed is achieved via both tractor and friction feed. Although the 2225 only accepts two sizes of paper (quarto and A4), narrower paper may be employed using the friction feed. The print line itself is 80 characters wide in





normal mode, and can be set to 40 or 142 in expanded and compressed modes respectively. Vertical line spacing may be one of two settings — 6 LPI or 8 LPI.

The print head (or should I call it an "ink head" or perhaps a "jet head") produces characters in an 11 x 12 character cell, which certainly outperforms most other dot matrix printers. With this dot resolution, it is surprising that HP did not install the necessary intelligence for the 2225 to provide different fonts or perform correspondence quality printing.

Graphics are achieved by individually controlling the print elements. This can be done in two modes: a normal mode of 96 x 96 dots per inch providing a total width of 640 dots, and a high density mode of 192 x 96 dots per inch, yielding a total of 1280 dots across the page. The graphics mode is set to the printer in the normal way, with each bit in a byte corresponding to the individual print elements. Conventional impact printers may damage themselves when used in graphics mode, specifically when all the bits are used continuously without

interruption, as they tend to overheat their electromagnetic mechanisms. Needless to say, the same cannot happen to an ink jet such as the 2225.

The 2225 supports 128 printable characters, and includes escape sequences to control bolding, underlining, pitch, line spacing, page length, text length, wrap around, bi-directionality, and a debugging mode which prints the control sequences instead of doing them. These commands are sufficient for most users of the printer, but do lack some of the facilities found on other "dot matrix" printers, such as font selection, letter quality mode, font definition and double height characters. A 1000 byte input buffer is included which greatly speeds most screen dumps.

Changing the print head is child's play. A simple lever releases the cartridge allowing it to be removed using two fingers. The new cartridge can then be slipped in and the level secured. No problems at all. The cartridge stores the ink in a small bladder which collapses as the ink is used up, so it is possible to visually inspect the amount of ink remaining. The only maintenance required on a regular basis is cleaning the contacts between the cartridge and the rest of the printer, as a dirty contact can cause one of the print lines to be deactivated, thereby causing a white line through all your output. This can be performed using a tissue and yields immediate results.

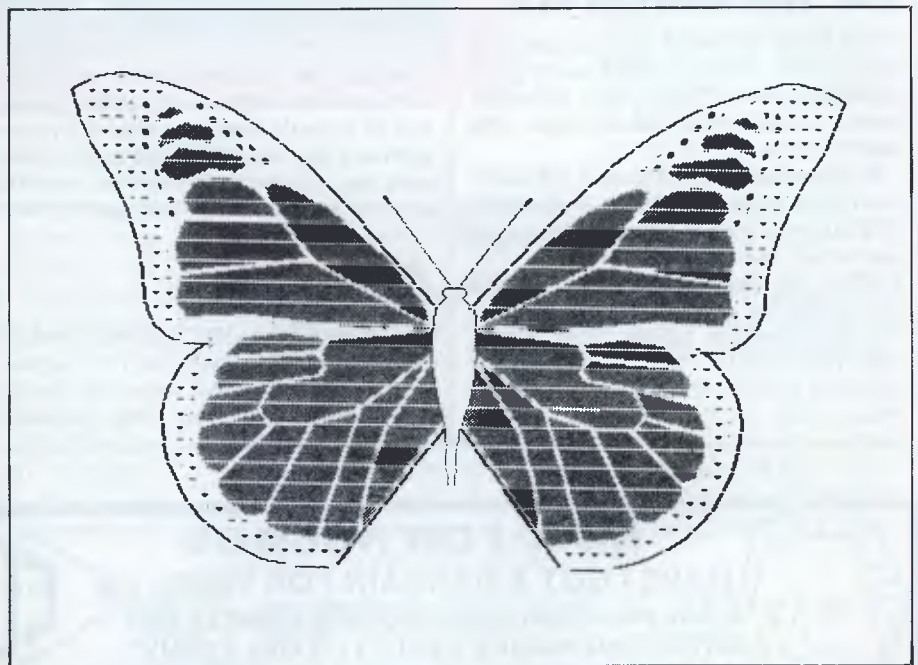
The printer itself looks more like one of those 'el-cheapo' printers available for those 'el-cheapo' home games computers. Its physical dimensions are only 206mm x 292mm x 89mm and it

weighs in at 3.3 kg. Quite simply, the 2225 can afford to look puny since it does not contain all the whirring bits of the average impact dot matrix printer. Don't judge a printer by its physical stature — the 2225 is just as good as any of its more chunky impact counterparts — it just uses smarter technology.

## But

The 2225 ink jet printer seemed to be the best of everything to me. It appeared to have all the desirable features of a dot matrix impact printer as well as the one desirable feature of thermal printers (quiet operation) without the need for that silly thermal paper. However, HP do recommend that you use the approved "ThinkJet" paper in the printer, which apparently is more absorbent than normal paper. So I tried using several varieties of "Non-ThinkJet" paper, ranging from high quality computer stationery to a sheet off an old writing pad. The result in all cases was that the print darkness was greatly reduced. Indeed, the output looked like a normal impact printer whose ribbon had reached the end of its life. The best result was achieved by using the old writing paper.

The "ThinkJet" paper is not anything like thermal paper — it is just normal paper which happens to work very well with the 2225. This presents no great problem unless you are planning to use the 2225 on preprinted stationery or on letterheads. The best course of action might be to wander into HP with a few



Graphics demo on the 225A



## FRAMEWORK

Framework® is the first of a new generation of products that goes beyond today's integrated spreadsheets. It is an order of magnitude better than the original integrated products and windows.

The heart of Framework is a unique "frames" technology. Frames are actually self-contained, inter-related displays that can be nested, resized and relocated anywhere on the screen. Frames bring new flexibility to the way information is created and managed with a PC. With this truly three-dimensional design, the user can create infinite logical hierarchies of information, leading to as deep a level of complexity as needed for the task at hand. There is no limit to the number of frames that are active in the system. Framework's user interface is one of the most elegant designs yet conceived.

### Word Processing

Framework's word processor is dynamite! It gives users the choice of frame or fullscreen viewing of documents, multiple margins within a single file, automatic justification and repagination, header/footers, page numbers and more. The streamlined menu system helps new users get started in a hurry and "shorthand" commands help veterans work even faster.

### Outlining

The innovative and very powerful outline processor can be used as a standalone organizer or as a companion to the word processor. Using this outline mode, single ideas can be quickly captured and then expanded into fuller concepts and solutions. Any outline-frame or subheading within an outline can be instantly expanded to include text, spreadsheets, graphs or databases. Finally, with Framework, your PC is truly a thinking machine.

### Database

Framework's database system can be learned quickly and put through its paces effortlessly because most commands are common throughout the entire program. Framework itself will handle most of your analytical information management needs, and if very large data handling is required, Framework is fully compatible with dBASE II®.

## Spreadsheet

Spreadsheets are simple to create, use traditional row/column or English-language cell addresses, can be linked to automatically update other files based on cell data and have an exclusive international numerics feature that will change entries to accurately reflect changes in currency denominations including the placement of commas and decimal points.

## Graphics

The graphics portion of Framework has been designed to produce exceptional charts and graphs on standard monochrome monitors. Six of the most frequently used business graphs are built-in and can be automatically drawn and updated from data in spreadsheets and database files.

## DOS Access

The new DOS access capability allows any user to actually run other PC DOS software inside Framework. This allows users to gather data from other programs without quitting Framework. It will be of great help to people who frequently shuttle between programs and to businesses who perform frequent interchange of programs or data with larger systems.

## Custom Applications

Framework comes complete with its own programming language. Users can begin writing their own custom packages or use software developers right away. In addition, dealers will continue to receive the excellent support that

has helped make Ashton-Tate the front-runner in the software industry with dBASE II and FRIDAY!

## Hardware

Framework will run on the IBM PC, PC XT and all compatibles. It requires just 256K RAM and dual 360Kb floppy disk drives with monochrome display.

## Availability

Framework will be available in Australia from the end of July. Contact your dealer end-June for more details or write to the Master Distributor, ARCOM Pacific, Freepost 2 (no stamp required), P.O. Box 13, Clayfield, Qld. 4011.

# ASHTON-TATE



**arcompacific**  
software distributors & wholesalers

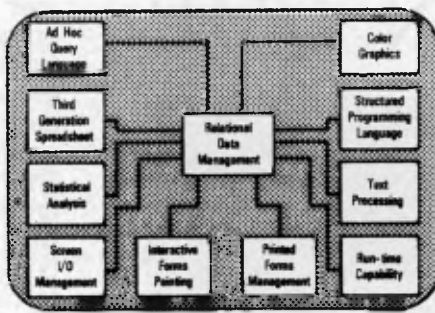
**master distributors**

# Knowledge Manager: The software that keeps on growing . . .



KnowledgeMan is a trademark of Micro Data Base Systems, Inc.; SQL/DS of IBM.

## For people who just can't get enough of a good thing



We help a lot of different people solve a lot of different problems: from the simplest to the most complex . . . from mailing lists to integrated accounting, from preparing tax returns to order entry. Whether you need help saving money or making it, the Knowledge Manager can help you manage your information better than any other micro software package.

### Quality Software for Quality Results

You can start just as simply as you want and grow just as fast as you like. The Knowledge Manager's powerful commands are always ready when you are. You get quick results, improved productivity, accurate information, custom tailored to meet your needs. The Knowledge Manager lets you use your information, when you want it and in the way you want it.

### Reliable and Comprehensive

The Knowledge Manager is built to last. You can start with the Beginner's Guide, or run right through the instruction manual to advanced data management commands.

Dealer inquiries invited.

For Further Information contact:

**DATABASE  
MANAGEMENT  
SERVICES**

**Box 62, Brighton, Vic 3186  
Telephone: (03) 523 5947**

Features*	Advantages*	Benefits*
Unlimited number of tables open at a given time Up to 255 fields per record	No need to open and close tables repeatedly Greater descriptive capacity	Speedier answers to your queries Lowers frustration of having to deal with multiple tables for a single topic
Passwords, read/write access, data encryption Query multiple tables with a single command Query syntax like IBM's SQL/DS	Access to data is individualized Retrieves data without unnecessary intermediate steps English-like commands	Unauthorized use of data prevented Users get information more efficiently Users not required to learn a new language
Dynamic sorting and grouping of query output Spreadsheet cells may be defined in terms of • formulas • data table values • programs	Control of output format Cell can automatically retrieve information from tables and can perform intricate mathematical operations on that information	Data can be customized to users needs No need to rekey information or perform calculations separately
Forms creation for screen and printer using 8 colors, blinking, bell, prompts, reverse video, etc.	Greater versatility in screen and printed output	Screens and forms are easy to understand and use
Statistics (e.g., min, max, average, sum, standard deviation, variance, etc.) automatically generated	Provides more complete analytical description of data	Improved decision-making capabilities
High resolution color graphics: pie charts, bar charts, area curves, scatter diagrams, etc.	Numerical data from spreadsheets and tables can be pictorialized	Patterns and trends easier to spot

\*Partial List

## Whether your needs are simple . . . intricate . . . or somewhere in between

Chances are you won't find a job  
the Knowledge Manager can't do.

FORMERLY TRADING AS MICRO DATA BASE SYSTEMS



# Apple's Instant Artist

*Helena Siedlecka discovers a talent for design using  
Penguin's new graphics package for the Apple.*

For Apple users who've found that tasks always seem to need more graphics facilities than one has on tap, the Complete Graphics System from Penguin Software is now available in Australia.

A set of versatile graphics utilities designed for programmers and non-programmers alike, it contains almost everything needed to draw pictures, graphs, plans, maps and perspectives.

## Presentation

The disk and manual come in a slim foam-packed cardboard box with a wrap-around cover the size of a thick paperback. The front cover shows a smart airbrush illustration and the back cover's tempting screen shot of the palette describes what you can do.

The otherwise dull parts of the documentation have been made light-hearted and amusing. For example, cartoons on the disk sleeve remind you NOT to store your disk at the bottom of the budgie's cage, in the toaster, in the back pocket of your jeans, and so on.

## Features

This new version of the Complete Graphics System II combines various programs, all compatible with their brothers and sisters in the Penguin series. Using this system you can design a house in 3D and look at it from any angle, paint it in 100 colours with 96 brushes, add text, turn it upside down, and more.

However, the title, Complete Graphics System, might be an overstatement, since it lacks a printout facility, and animation. This is because these are complex functions, best handled by other, more specialised programs.

Any graphics created with the system can be printed using the Paper Graphics program, or made into presentations using the presentation system, Transitions. Animations can be added with The Graphics Magician.

It's compatible for use with a paddle, joystick, trackball and touch tablets such as the Koala Pad. It also supports the new

Apple Mouse, as well as the Apple Graphics Tablet. But if you don't have any of these you can still use the keyboard.

## In use

Since the disk is copyable, it is best to work with a copy and keep the original in a safe place. Placing a copy of the master in the disk drive and turning on gets you to the Main Menu.

Depending on the type of input device you have you type a number from 1 to 4. From here you can choose the drawing facility you need. But it's a good idea to first check the disk-access defaults; the program- and data-disks can be redefined. The usual way is to type 1 or 2 but this would be a mistake here, causing problems later, such as a DOS Syntax Error. The correct procedure is to type D1 and D2 if you have two disk drives, or D1 if you have one drive. A more intelligent parsing routine would be an idea. Of course, you can add this, since it's an unprotected program.

To test the capabilities of this package, I elected to design a computer graphics work station, with shelves for books, monitors, a printer and so on, starting with a 3D wire model.

As my preferred input device is a Bit Pad, I typed in 2 and selected the 3D Panel Creator from the Main Menu by typing P. This option enables you to construct your design in 2D as flat panels which are saved in a 3D format. To see them on the screen assembled as a 3D image, they are loaded into the 3D Viewing Program. Editing can be done using the 3D Point Editor program.

With the 3D Panel Creator, you can recreate an object of specific size by setting the scale on the screen. The scale can be altered by changing the distance between the two dots on the screen.

You can only use the keyboard to draw in this option. That seems limiting if you have grown accustomed to touch tablets or similar devices. However, you could also add alternative input devices, such as a light pen, which may be the only advanced pointer-device which isn't supported.

Drawing every flat surface of the work station, filling in all the details and reassembling it in 3D to scale would be quite complicated and time-consuming, in spite of the simplicity and efficiency of the program. So instead I decided to experiment with the colour palette.

To get out of the 3D Panel Creator I pressed M which brought me back to the Main Menu. Keying in the number for the Bit Pad allows access to the drawing screen and colour palette. Input device controls consist of single key press commands even a gorilla would find simple.

Pressing the spacebar flips between the colour palette and the drawing screen. If you want any drawing functions displayed alongside the palette, you point at it using your input device, which controls little arrows on the screen.

Penguin has made the most of the six primary Apple colours by texturing small areas with a variety of coarse to fine patterns, creating lighter and darker tones. In my dabblings I found these textures particularly effective for landscaping, and I imagine they would be ideal for use in graphs, maps, architectural symbols or any graphic work that does not have too much detail, or requires hatching.

I used a variety of small and large brushes from the 96 brush screen and as in normal painting it is best to start from the back and work forward, using broad strokes to lay down the base colours, later picking out the details with a small brush. Results can be achieved quickly and easily.

## Conclusion

The Complete Graphics System's comparatively-sophisticated set of facilities would take months to fully explore. It would be useful to a commercial artist for anything not too detailed, and is well ahead of comparable packages in this price range (\$99.95). Add the related Penguin programs, and you'll be well away, and at reasonable cost.

Penguin Software is distributed in Australia by Imagineering.

In the realm of computer learning and imagination, there is nothing like a touch of genius.

*from Chalkboard*  
**PowerPad** and

**Leonardo's Library** *the software that makes the magic*

**The touch of genius**

PowerPad is the revolutionary new 30 cm x 30 cm touch-sensitive surface that lets you bypass your home computer keyboard. Just touch PowerPad and watch your ideas appear on the screen in living colour.

PowerPad is a drawing pad, a multi-coloured canvas, a piano keyboard, a jigsaw puzzle, a gameboard. It stimulates and reinforces creativity for users of any age. PowerPad turns your computer into an entertaining, learning experience.

Available for Commodore, Apple and Atari home computers.

Leonardo's Library, Chalkboard's revolutionary approach to software is structured to provide an entertaining, innovative entrance into the worlds of visual arts, music, mathematics, science, language arts, and social studies. Five strands within each subject area explore the ideas of similarities, patterns, interaction, change and evolution.

Each package includes software in either cartridge or disk format, as well as a tough plastic overlay that is imprinted with each product's unique function buttons and a manual describing a number of learning activities.

COMMODORE/ATARI  
VERSION  
**\$169.95** RRP

APPLE VERSION  
**\$189.95** RRP

Ask to see a demonstration of PowerPad at your nearest computer retailer:



PO Box 579  
Gosford, NSW 2250  
Phone: (043) 28 3555



# TEACH YOURSELF ASSEMBLER

*Paul Overaa continues his series on assembly language programming with a general discussion of arithmetic operations.*

*This is part five of APC's Teach Yourself Assembler series. It's unique in using Basic as its point of reference, and avoiding the 'drop you in it' approach often used on this subject. Three processors, the Z80, 6502 and 8080 are covered in detail, but enough information is provided to enable users of other processors to follow the course. Copies of earlier articles in the series, which started in March 1984, may be obtained from our Back Issues dept.*

The 8-bit processors, such as the Z80, 8080 and 6502, have instructions to perform only elementary addition and subtraction. To provide anything more sophisticated requires us to program the more complex procedures in terms of these simple operations. This month we look at some general ideas, then next month we'll relate this to assembly language routines.

We 'take for granted' the facilities offered by high level languages for adding, subtracting, multiplying and dividing, and an appreciation of how languages, such as Basic, actually perform the 'arithmetic' is useful for gaining insight into the problems involved when providing such facilities. Our first job is to look, in a general sense, at the way we represent numbers inside a computer.

## Integers

With the eight bits of a single byte we can represent numbers from 00000000 Binary to 11111111 Binary — that is, from 0 to 255 decimal. To represent

larger numbers we must use 'more bits'. By using two bytes for the representation we can deal with integer numbers up to the value 65536 (1111 1111 1111 1111 Binary). The magnitude of a number that can be represented in this way is therefore limited by the number of bytes we choose to assign to its representation. This form of representation is called 'unsigned binary'. To allow for the occurrence of negative numbers it is necessary to make provisions within the representation of the number to indicate whether it is positive or negative. This can be done by using one bit as a 'sign' bit. By convention, we use the most significant bit, the left-hand bit. It is set to zero to represent a positive number and to 1 to indicate a negative number. An 8-bit 'signed binary' number will therefore have only seven bits for the numerical value. For example, Decimal 5, which is 101 Binary, can be represented as follows:

```
+5 Signed binary form = 0 0000101
-5 Signed binary form = 1 0000101
                        ^
                        |
```

*(Leading bit used to represent the sign of the number — separated for clarity only.)*

By using a suitable number of bytes, and using one bit as a sign bit, we can represent both positive and negative numbers of any magnitude. Are our problems of representation over? If we just wanted to represent the numbers, then yes. The problem is that we want to manipulate them (add, subtract, and so on). We'll first add two positive numbers, 4 and 5, as an example:

```
+4 is 00000100
+5 is 00000101
```

Result 00001001 represents 9 (which is correct).

Now we try adding the two numbers -4 and +5:

```
-4 is 10000100
+5 is 00000101
```

Result 10001001 represents -9 (which is incorrect).

The correct result is +1, so clearly a problem exists with the representation, or the way we are using it. The solution lies in using 'two's complement' representation. In this form, positive numbers are represented in the usual signed binary form. The difference lies in the representation of the negative numbers. We take the 'unsigned binary' form and complement it: turn all the 1s into 0s and 0s into 1s (often called the 'ones' complement' form). Having done this, we add 1 to the result to obtain the final 'two's complement' representation. It can be shown that by using this representation, the results of arithmetic operations, including the sign, come out correctly.

Here are some examples to outline the general idea. Let's try the addition of -4 to +5 again. +5, being a positive number, is represented in usual signed binary form but we must convert -4 to its two's complement in the manner described above. We represent the number in binary form, complement it, and add 1 to the complement. When the correct representation has been obtained, retry the example and check the result. The details are shown in Fig 1.

One of the 'rules' of two's complement arithmetic is that the setting of the carry flag can safely be ignored.

If the magnitude of a result is too large to be expressed within the bits allotted for the representation of the numerical part of the number, it's possible for the sign bit to be changed accidentally. This is called 'overflow' and the effect is an incorrect result.

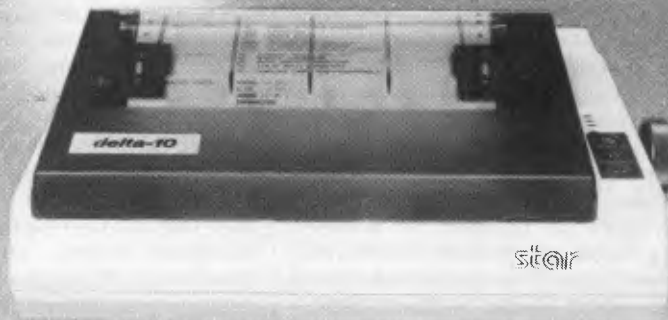
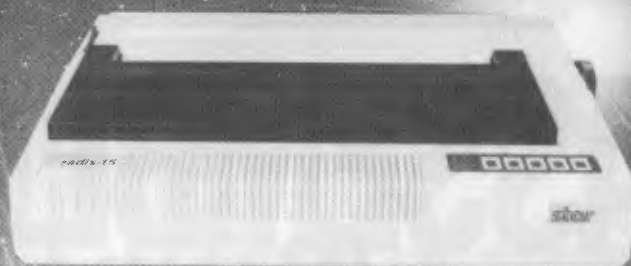
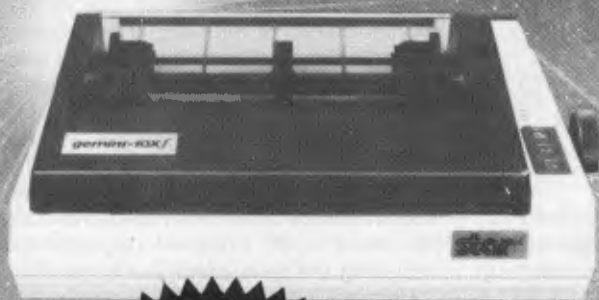
The most obvious cause of such an error is an 'internal carry' from bit 6 to bit 7, as the following example will show:

```
0 0111111 two's comp form of +63
0 1000001 two's comp form of +65
1 0000000
↑
```

*(The 'sign' bit has been changed due to a carry from bit 6 to bit 7).*

Overflow can also occur when we add two negative numbers. In general, it occurs when the result cannot be expressed in the seven bits available. It is obviously useful to be able to detect such a condition and most processors, including the Z80 and 6502, have an 'overflow' flag

# A CONSTELLATION OF CHOICES



**NOW WITH  
IBM  
COMPATIBILITY**

## For the job of your choice

Need faster throughput for those long spreadsheets or near letter quality for a report or proposal? What about firing off some program listings — or even homework? For all jobs, for all people — get STAR Power.

**GEMINI**-Best-selling 120 cps model for both home and business applications. Tractor feed, friction feed, roll paper, and full graphics all standard. Economical. Reliable. Compatible.

**DELTA**-Rugged assistance for when the job demands more. 160 characters per second fast, Delta solves small and large business needs. More buffer (8K), more interface (both serial and parallel) — less dollar.

**RADIX**-The Powerhouse. Feature-packed Radix prints at the speed of light (200 cps) but slows down to excellent near letter quality resolution for when looks count. Tear-off edge and semi-automatic sheet feed included with standard model.

All models available in two sizes — 10 and 15 inch.

\*Recommended Retail Price

GEMINI 10X	\$449	GEMINI 15X	\$795
DELTA 10	\$795	DELTA 15	\$1195
RADIX 10	\$1280	RADIX 15	\$1550

\*Please add sales tax where applicable.

**SYDNEY** (02) 452 5231  
**MELBOURNE** (03) 529 7644  
**BRISBANE** (07) 221 4727

Please ask for:  
Michele Cahill  
Kevin Murphy  
Bruce Isbister

Distributed by:  
**Case Communication Systems Ltd.**  
1-3 Rodborough Road Frenchs Forest NSW 2086



**PRINTERS FOR  
PERSONAL COMPUTERS**



for this purpose (the 8080 does not possess an overflow flag).

## Multiple-byte integers

The magnitude of the largest integer we

### Conversion to the two's complement form

00000100 is binary 4  
 11111011 One's complement form of -4  
 11111100 Two's complement form of -4

### Addition of the two's complement forms

11111100 -4 (two's complement form)  
 00000101 +5 (two's complement form)  
 (1) 00000001 result +1 (which is correct)

1  
 Carry flag is set in this example

Fig 1 Addition using two's complement arithmetic

```

4 REM
5 REM
6 REM
10 INPUT Please enter integer value; X%
20 MSB$=HEX$(PEEK(VARPTR(X%)+1))
30 IF LEN(MSB$)=1 THEN MSB$=0+MSB$
40 LSB$=HEX$(PEEK(VARPTR(X%)))
50 IF LEN(LSB$)=1 THEN LSB$=0+LSB$
60 PRINT MSB$+LSB$
70 END
80 REM
    
```

Input an integer value  
 Most significant byte  
 Least significant byte  
 Shows how X% is stored

Fig 2 Print hex representation of integer X%

	< MSB >	< LSB >	
66 =	0000	0100	0010 Binary
Complement	1111	1011	1101
Add 1			1
Two's complement form	1111	1011	1110
Equivalent Hex form	F	B	E

Fig 3 Explanatory details for -66

1 bit Sign	n bits Exponent	1 bit Sign	m bits Mantissa
------------	-----------------	------------	-----------------

Fig 4 Schematic form



# SANYO (FROM \$1495 INC TAX)

## PERSONAL/HOME COMPUTER. IBM COMPATIBLE



**\$2850 Software Package SPECIAL PRICE \$495**

### FEATURES

- 8088 Processor (16 Bit) (Same as IBM/PC)
- MSDOS — (Optional CPM86)
- 128K RAM/Colour
- Single 160K Drives (Dual Optional) (320K Optional)
- Green Screen Monitor (Optional)

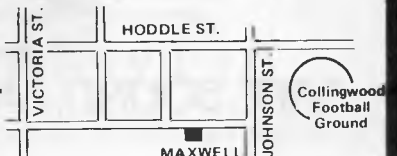
Software Package Includes: Wordstar, Mailmerge, Spellstar, Datastar, Reportstar, Supersort

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**



# LANGUAGES

can represent is governed by the number of bytes used. We can show this by looking at how Microsoft's Basic stores the 'integer variables'. When you write the Basic statement `LET X% = 10`, the per cent sign indicates that an integer variable, `x%`, is being assigned the value 10. Can we write a program to look at the internal representation of such a number? Yes, easily.

The function `VARPTR(X%)` is used to obtain the address of the variable `X%`. This byte, and the contents of the following byte, are examined using the `PEEK()` function (after prior translation to hexadecimal form by use of the `HEX$( )` function). For hex numbers less than 16, the `HEX$( )` function returns only one character (for example, `F` rather than `0F`), so we add the '0' to such numbers from within the program. The program in Fig 2 asks for an integer value and prints the hex form of the internal representation.

(Note: The function `VARPTR()`, an abbreviation of 'variable pointer', is normally used to pass addresses of variables from a Basic program to an assembly language routine).

If this program is run with the number

15, 000F will be obtained, which corresponds to the binary number 0000 0000 0000 1111. With `-66`, you will get `FFBE` — Fig 3 shows the reason why.

## Floating point representation

The representation of wide ranges of decimal numbers has its own special problems. The usual way of coping with wide variations in magnitude is to use scientific notation. For example, 26063.15 can be represented as  $2.606315 \times 10^4$ , or  $-0.000003415$  can be written  $-3.415 \times 10^{-6}$ . This gives a clue to providing a similar computer representation. We need to reserve bits for the mantissa, and further bits for the exponent. We also need to indicate the signs of each part of the number. In scientific notation, we 'normalise' the number by moving the decimal point to a position where the mantissa takes a value between 1 and 9.999. It transpires that for floating point representation, it's better to move the 'binary point' to the far

left of the number:

111.1101 is represented as  $.1111101 \times 2^3$

.0000111 is represented as  $.111 \times 2^{-4}$

The general floating point format is based on a schematic form, `m` and `n` varying according to the number of bits chosen. Fig 4 illustrates the essential idea.

## Binary coded decimal

For some applications, it is necessary to have complete numerical accuracy. An often quoted example is the use of computers in accountancy. For these applications, an alternative representation called 'binary coded decimal', or 'BCD', is sometimes used.

The principle is to code each digit separately, using as many bits as necessary. Each digit requires four bits with some combinations being unused:

BCD	Number
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010 - 1111	Unused codes

Two digits are packed into each byte, thus the amount of space a number will require is dependent on how many characters are present.

The advantage of representing numbers in this way is that complete accuracy is obtained. The disadvantages are firstly, that more memory is required to store the numbers and secondly, that arithmetic operations are slower.

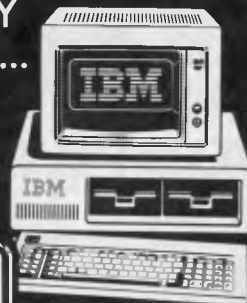
*Next month: Having briefly described some of the more common ways of representing numbers within a computer, we turn our attention to simple routines that use some of the forms we have discussed. In the meantime, try this experiment: take a number and multiply it by 2, 4 and 8. Express the number and all the products in their binary form. What do you notice about the bit patterns?*

END

SOME OF AUSTRALIA'S BIGGEST COMPANIES  
WOULDN'T BUY  
ONE OF THESE...



...WITHOUT  
ONE  
OF THESE



In microcomputers, as in any machine, a system is only as good as its backup. Which is our strong suit, at MicroComp, with custom-designed programs, full service and replacement machines, and a fully-equipped Computer Training Centre.

This, combined with a successful four-year track record in microcomputers, and a reputation for innovation, is why IBM and Sirius chose us to sell their products, and why you should request a copy of our Corporate Account Support Policy.

It makes very encouraging reading.



SAFE, SOUND, AND STATE-OF-THE-ART

B. S. MICROCOMP PTY. LTD., 561 BOURKE STREET, MELBOURNE 3000. CALL US ON 614 1433. JLM/MC21

# 8 PEN MULTI COLOR PLOTTER

at an affordable price

**NOW AVAILABLE  
HP-GL  
COMMAND SET  
AVAILABLE EX STOCK**



## National

## A-3 Type Digital Plotter VP 6802A

### 1. MULTICOLOR HIGH SPEED PLOTTING

**EIGHT COLOR GRAPHICS AT 450mm/sec  
(18 inch/sec)**

The high plotting speed of 450mm/sec (18 inch/sec), the variety of pens (fiber, ball point, plastic tip) and colors allow great versatility in the creation of graphs.

### 2. SIMPLE PROGRAMMING

**A VARIETY OF INTELLIGENT FUNCTIONS**

The high level of intelligence built into this Digital Plotter greatly simplifies the programming required to generate the complicated engineering drawings or business charts.

### 3. RELIABLE PAPER SECURITY

**ELECTROSTATIC PAPER HOLDING**

The highly reliable, electrostatic paper-holding method guarantees secure paper holding, which is applied by simple switch operation.

### 4. QUIET MOVEMENT AND SAFETY

**DESIGN CONSIDERATION ON MECHANICAL  
CONSTRUCTION AND SOFTWARE PLUS  
PROTECTIVE COVER**

The detachable plastic cover assures durability and safety while suppressing the movement noise substantially.

### 5. CONTINUOUS PLOTTING

**AUTOMATIC CHART ADVANCE "OPTION"**

By combining the automatic chart advance option, this plotter can function in a totally unattended mode. This makes it possible to build up fully automatic drawing system which does not need any human care.

### 6. COMPUTER INTERFACES

**THREE TYPES**

Eight bit parallel, RS-232-C and GP-IB interfaces are able with VP-6802A. The above interfaces allow the plotter to be used as a computer graphics device as well as an instrumentation graphics device.



## SCIENTIFIC DEVICES AUSTRALIA PTY LTD

2 JACKS ROAD, SOUTH OAKLEIGH,  
VICTORIA, 3167 PHONE: 579 3622

31 HALSEY ROAD, ELIZABETH EAST, S.A. 5112 PHONE: 255 6575  
559A WILLOUGHBY ROAD, WILLOUGHBY, N.S.W. 2068 PHONE: 95 2064



# Operating Systems

*Eric Bagshaw continues the third part of our operating system overview which focuses on the practical merits of various systems.*

In this last part of the APC operating system trilogy, we will concentrate on the practical use of the more common systems, covering accurate listings, the facilities available, and any idiosyncrasies.

As these are provided primarily for the end user, we will not cover the system utilities such as debugging tools, assemblers or complex text editors; neither will

we go into great detail on the language — like facilities provided by certain operating systems.

In some computers, the language (usually Basic) and the operating system are intermingled, and the divisions between the two blurred; the PET and the Apple being well known examples of this aspect. The reason for this is that the language is an integral part of the machine, usually in ROM, and not loaded from disk.

In the next issue we will be printing conversion tables which summarise and provide a quick reference of the popular features that are commonly required. The following text will cover each operating system in turn and detail the features

provided concentrating on those not covered in the tables and those that need greater amplification. A list of abbreviations are provided to enable compact text and tables to be produced.

## Apple

The DOS 3.3 operating system of the Apple is a simple system having a small number of commands. The machine has a unique 'slot', 'drive' and 'volume' disk accessing technique. The unit itself has a simple bus — the disk controller card can be in any of these seven sockets or 'slots', and each card can support two

Device:	Function:
LOGICAL:-	
CON:	console.
LST:	List information — printer.
PUN:	Send information — paper tape punch.
RDR:	Receive information — paper tape reader.
PHYSICAL:-	
BAT:	Batch, console in from RDR. console out LST.
CRT:	Console (Cathode Ray Tube).
LPT:	Printer.
PTP:	Paper tape punch.
PTR:	Paper tape reader.
TTY:	Slow console.
UC1:	User defined console.
UL1:	User list device.
UP1:	User punch number 1.
UP2:	User punch number 2.
UR1:	User reader number 1.
UR2:	User reader number 2.
<b>Valid Assignments:</b>	
CON:	= BAT. OR CRT. OR TTY. OR UC1:
LST:	= CRT. OR LPT. OR TTY. OR UL1:
PUN:	= PTP. OR TTY. OR UP1. OR UP2:
RDR:	= PTR. OR TTY. OR UR1. OR UR2:
DIR	— Displays all files on lagged drive.
DIR d:	— Displays all files on drive d.
DIR afn/ufn	— Displays selected files.
ERA afn/ufn	— File erase command.
PIP d: = d: afn/ufn [options]	

Fig 1 CP/M 2.2 command functions and assignments

B	—block Read.	STAT	—displays disk drive unused space.
Dn	—delete characters after column n.	STAT DEV:	—displays actual devices assigned.
E	—echa to screen.	STAT VAL:	—displays command summary/ possible devices.
F	—remove form feeds.	STAT log: = phy:	—assigns logical to physical devices.
Gn	—get data (files) from user number n.	STAT d: = R/O	—sets drive d to read only.
H	—check source proper hex.	STAT d:afn/ufn	—displays files sizes and status.
I	—ignore hex at location 00 and turn on 'H'.	STAT d:afn/ufn \$R/O	—sets file(s) specified to read only.
L	—convert upper to lower case.	STAT d:afn/ufn \$R/	
N	—line number destination data.	W	—sets file(s) specified to read/ write.
O	—treat file as object data.	STAT d:afn/ufn	
Pn	—page throw after n lines.	\$SYS	—sets file(s) specified to system.
Q\$ Z	—quit copy after finding string s.	STAT d:afn/ufn \$DIR	—sets file(s) specified back to dir.
R	—read and copy sys files.	STAT DSK:	—displays disk characteristics.
S\$ Z	—start copy after finding string s.	STAT USR:	—displays active user areas.
Tn	—expand tabs to column n.	SUBMIT ufn.sub	—submit allows the batching of CP/M commands.
U	—convert lower to upper case.	TYPE ufn	—displays the contents of file to the screen.
V	—verify file copy.	USER n	—change to user number n (0—15).
W	—write over read only files.		
Z	—zero high order bit.		
REN new ufn = old ufn	File rename utility.		
SAVE n ufn	Save n pages (256 bytes) to a disk file.		

Fig 2 PIP options

COPYSYS - copies CP/M system to a new disk - menu driven.  
 DATE - set and display date (see conversion)  
 DEVICE - the device command replaces the STAT facility for assigning logical and physical devices and adds port customization facilities.

Logical Devices:	Device Type:	Usual Physical Assignment:
CONIN:	CONSOLE INPUT	KEYBOARD
CONOUT:	CONSOLE OUTPUT	SCREEN
AUXIN:	AUXILIARY INPUT	NULL
AUXOUT:	AUXILIARY OUTPUT	NULL
LST:	LIST OUTPUT	PRINTER

DEVICE - display/change current logical and physical assignments.  
 DEVICE NAMES - displays physical devices and their characteristics.  
 DEVICE VALUES - displays current logical assignments.  
 DEVICE phy - displays the attributes of the named physical device.  
 DEVICE log - displays the assignment of the named logical device.  
 DEVICE log: =  
 phy{[options]} - assigns devices.  
 DEVICE log: = null - detaches device.  
 DEVICE phy  
 [options] - sets attributes.  
 DEVICE {[PAGE,  
 COLUMNS = n,  
 LINES = n]} - display and set console layout.

Device options are XON (sets XON/XOFF protocol), NOXON (turns off the protocol) and baud rate from 50-19200.  
 DIRSYS - The same effect as DIR but also displays files with the SYS attribute set.  
 DIR and DIRSYS have in CP/M 3.0 some extra options if used with the below syntax.  
 DIR {d;} afn/ufn [options]

**DIR options:**  
 ATT - displays user attributes F1-F4.  
 DATE - displays date and time stamping if set.  
 DIR - displays file with dir option.  
 DRIVE = ALL - acts on all logged drives.  
 DRIVE = (A,B,C,...P) - acts on specified range of drives.  
 DRIVE = d - acts on drive d.  
 EXCLUDE - Displays files not matching the afn/ufn.  
 FF - paper form feed.  
 FULL - displays all available directory information sorted order, file name, size, attributes, password mode, time stamps and the drive label.  
 LENGTH = n - displays n lines before a table heading.  
 MESSAGE - displays drives and user numbers active during a search.  
 NOPAGE - continuous scroll of listing.  
 NOSORT - unsorted display.  
 RO - displays only files set to Read only.  
 RW - displays only files set to Read/write.  
 SIZE - displays file names and sizes.  
 SYS - displays only files set to sys.  
 USER = ALL - searches all user numbers.  
 USER = n - searches user number n.  
 USER = (0,1,...,15) - searches all user number specified.

The ERA command is extended to incorporate a confirm option.  
 GET - redirects CP/M to take its console input from a file (see PUT).  
 HELP - on line help utility for the CP/M operating system and its commands with facilities to create your own help files.  
 INITDIR - initialize directory for date time stamping.  
 PIP - as CP/M 2.2, but includes the 'A' or archive option, and 'C' or confirm for selective file copy, and if the file is protected must include the password (such as PIP a: = b: afn/ufn. pass (options)).  
 PUT - opposite to get, allowing console or printer output to a disk file.  
 RENAME - this is extended to a menu driven option if just RENAME is entered.  
 SET - this option controls most of the attribute setting in CP/M 3.0. It has the following syntax.

SET [options]  
 SET d: [options]  
 SET afn/ufn [options]

**Set Options:**  
 DIR - DIR attribute.  
 SYS - SYS attribute.  
 RO - read only.  
 RW - read/write.  
 ARCHIVE = OFF - archive mode off.  
 ARCHIVE = ON - archive mode on (see PIP option 'A').  
 F1 = ON/OFF - on or off user defined attribute 1.  
 F2 = ON/OFF - on or off user defined attribute 2.  
 F3 = ON/OFF - on or off user defined attribute 3.  
 F4 = ON/OFF - on or off user defined attribute 4.  
 SET (NAME = ufn) - disk label.  
 SET (PASSWORD = pass) - password protect a disk label.  
 SET (PROTECT = on/off) - enable/disable protection.  
 SET afn/ufn (PASSWORD = pass) - password protection to a file(s), the disk must be password protected and enabled before this can be used.  
 SET afn/ufn (PROTECT = mode) - protection mode for passwords, these can be read, write, delete or none.

Two of the following time and date stamping modes can be assigned.  
 SET (CREATE = ON)  
 SET (ACCESS = ON)  
 SET (UPDATE = ON)  
 SETDEF - This controls the disk search order and the console display of system messages.  
 SHOW - Show replaces many of the functions of STAT and adds a few of its own.  
 SHOW d: - displays logged drive, read/write access and space left.  
 SHOW [LABEL] - displays label and all attributes.  
 SHOW [USERS] - displays active users and their files.  
 SHOW [DIR] - displays free directory entries.  
 SHOW [DRIVE] - displays drive characteristics.

Fig 3 CP/M 3.0 commands

drives. At initialisation (formatting), a label and 'volume' number can be applied. If the numbering is used it will have to be specified when sending some types of commands to the disk. The directory lists files according to their types; a summary is illustrated:

Type:	Description:	Creation method:
I	Integer Basic program file.	SAVE
A	Applesoft Basic program file.	SAVE
T	Text file.	OPEN and SAVE
B	Binary memory-image file.	BSAVE

All the machines' main commands (INIT, CATALOG, RENAME and DELETE are covered in the conversion table. LOCK (and UNLOCK) is a simple delete protection, and is not a full password protection system. The two commands PR#n (directs output to a slot), and IN#n (directs input from a slot) offer simple device routing.

CP/M 2.2/  
 CP/M 3.0/CP/M-86

The single user/single tasking systems from Digital Research have many underlying similarities. 'DIR' has the same basic effect across the whole

range; however in some varieties a command may have some extra facilities, CP/M 3.0 for example, expands this to the powerful DIR [FULL] option. A command may be replaced or enhanced - for example, the STAT command of CP/M 2.2 is superseded and expanded upon by the combination of SET and SHOW in CP/M 3.0. CP/M 2.2 is configured to have four logical devices, which perform conceptual functions - the user can address them without worrying about the inner workings (see Fig 1).

In addition there are 12 physical devices some of which will have been patched in with all the necessary and

# HI-TECH C

An Australian developed Z80 C Compiler  
that runs rings around the opposition.

## Features:

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

## System Requirements:

Z80 CPU  
56Kb RAM  
200Kb Disk space  
CP/M 2.2  
or any UNIX system

## Disk formats:

8" SSSD  
\* Kaypro  
\* Osborne  
DEC Rainbow  
Others: enquire  
(\* \$5 surcharge on these formats)

## Pricing: (all prices include tax)

Compiler — limited support	\$125
12 Months full support	125
Manual only (refundable)	25
Post & Handling	5

**Availability: NOW**  
(Watch for 8086 version soon)

**HI-TECH SOFTWARE**  
P.O. Box 118, Eastwood, 2122. Ph. (02) 854-552

CHKDSK — simple display of disk and memory status.  
 COMP {d:} {afn/ufn} {d:} {afn/ufn} — compare files.  
 COPY {options} {d:} {afn/ufn} {options} {d:} {afn/ufn} {options} —  
 DATE — display and enter date.  
 DEL {d:} {afn/ufn} — file delete command.  
 DIR {d:} {afn/ufn} {options} — simple directory listing. Option '/P'  
 pages the list and '/W' lists file names only across the screen.  
 PAUSE — temporary halt in the process of a batch  
 command.  
 REM — remark in a batch command.  
 REN {d:} {old afn/ufn} {new afn/ufn} — rename utility  
 TIME — display and enter time.  
 TYPE {d:} {ufn} — displays the contents of a file to the screen.

Fig 4 MS/PC-DOS 1/2 commands

CHDIR {d:} — displays current directory path (CHDIR = CD).  
 CHDIR {d:} — change current directory.  
 ECHO ON/OFF — enable or disable screen display during batch  
 operations.  
 FOR — simple loop structure for replaceable parameters  
 in the batch mode.  
 GOTO — batch goto label.  
 IF — batch if (or not) conditional  
 MKDIR {d:} path — creates a sub directory (MKDIR = MD).  
 PATH {d:} path — directory search.  
 PRINT — print queue.  
 RMDIR {d:} path — removes a sub directory, must be empty  
 (RMDIR = RD).  
 SHIFT — double up the number of replaceable  
 parameters in the batch mode.  
 TREE {d:} {/F} — lists out the tree directory, if '/F' is specified it  
 also lists the file in each directory.  
 VERIFY ON/OFF — disk write verify, toggle on or off.

Fig 5 Batch commands

E(DIT — multi option text editor.  
 R(UN — executes the current work file  
 (compiling and linking if required).  
 F(ILE — filter — see later.  
 C(OMP — pascal compiler.  
 L(INK — links in P-code subroutines.  
 X(ECUTE — load and executes a Pascal code file.  
 A(SSSEM — assembles 6502 assembler.  
 D(EBUG — not yet implemented.  
 U(SER  
 RESTART — retry last option.  
 I(NITIALIZE — warm boot.  
 H(ALT — cold boot.

Fig 6 P-System options

complex driver routines for whatever communications are required, whether they be printer, terminal or other ports. Therefore, the user can assign a pair of devices, one logical and one physical, and communicate with the minimum of problems.

PIP, the Peripheral Interchange Program (which is in most installations), is only ever used in its simplest form, as a file copying tool; however, as its name implies, it can be used in many more powerful ways: it can send a file to a device, receive data from a device and convert it to a file, and, lastly, transfer from device to device. (A list of PIP options is given in Fig 2).

## CP/M 3.0 (Plus)

CP/M 3.0 (or CP/M Plus as it is also called) is the latest version of the 8-bit CP/M series following CP/M 2.2. It incorporates many improvements which bring it close to CP/M-86 and CCP/M, and some that set it apart. The basic DIR, ERA, PIP, REN, SUBMIT, TYPE and USER are the same; however, a number, such as DIR, are extended. In addition, some new commands are introduced, these are DIRSYS, COPYSYS, DATE, DEVICE, GET, HELP, INITDIR, PUT, SET, SETDEF and SHOW. We will cover each new command in turn after providing details of the extra options provided on the 'old' commands (given in Fig 3).

## CP/M-86

This has many similarities to the other CP/Ms; the equivalents are DIRS to DIRSYS, COPYDISK to COPYSYS, and TOD to DATE. The following facilities have already been covered elsewhere. DIR, ERA, PIP, REN, SUBMIT, TYPE and USER.

## CCP/M

Concurrent CP/M has many similarities

to MP/M and CP/M Plus. A number of extra commands in addition to the DIR, DATE, ERA, HELP, INITDIR, PIP, REN, SUBMIT, TYPE and USER have been added. These are:

ABORT — stops the execution of a program  
 on the virtual console.  
 ERAQ — erase with confirm.  
 SDIR — like DIRS, includes system files in  
 directory.  
 SYSTAT — detailed system status display.  
 VCMODE — displays and sets background/  
 foreground mode of the virtual  
 consoles.

## MP/M II

The main difference between the CP/M and MP/M, is that MP/M (Multi-Processing Monitor control program) is the former's multi-user brother. The first thing most users will notice is that the prompt is different. In a normal CP/M system the display for a user logged onto drive A would be:— A>; however, in the case of MP/M in addition to this, the area in which the user is logged is added; therefore a user on drive A in user area 5 would have the prompt:— 5A>. In addition to the facilities described, DIR, ERA, ERAQ, PIP, REN, SDIR, SET, SHOW, STAT, SUBMIT, TYPE and USER MP/M has some extra programs and commands, these are presented later.

## MS/PC-DOS 1/ MS/PC-DOS 2

MS-DOS and PC-DOS are very similar, the only major differences being the machine specific commands, such as port attribute setting therefore these will be omitted from the discussion. To save space we will henceforth refer to both systems as MS-DOS. MS-DOS 1 is very similar to the basic versions of CP/M (2.2 and 86), but has fewer features.

## MS/PC-DOS 2

In addition to the commands (in Fig 4) MS-DOS 2 incorporates many Unix-like features and an extended batch facility. The directory now incorporates a Unix type tree structure, and therefore if a file is to be accessed which is not in the current (or working) directory then to find it a 'path name' must be provided. This path name must precede any file name in command, if required. The path name consists of the sub directory name separated by a backslash '\'. If the line starts with the backslash then the path begins at the root (top most) directory.  
 DIR1 \ DIR2 \ DIR3 \ FILE-  
 NAME.EXT—PATHNAME \ DIR1 \

B(AD-BLOCKS) - test disk black integrity.  
 C(HANGE) - renames file or disk.  
 D(ATE) - display and enter date.  
 E(XTENDED-DIRECTORY-LIST) - detailed directory listing.  
 G(ET) - gets a work file.  
 K(RUNCH) - packs disk (removes unused space).  
 L(IST-DIRECTORY) - simple directory listing.  
 M(AKE) - produces dummy disk file.  
 N(EW) - clear work file.  
 P(REFIX) - change default work val.  
 Q(UIT) - exit from filer to main menu.  
 R(EMOVE) - delete disk file.  
 S(AVE) - saves work file.  
 T(RANSFER) - copy (or list to screen/printer).  
 V(OLUME) - lists volume assignments.  
 W(HAT) - name and state of work file.  
 X(AMINE) - fixes or marks bad blacks.  
 Z(ERO) - erase and rename a disk directory.

Vol No:	Volume Name:	Input/output Device:
#1:	CONSOLE:	screen keyboard with echo.
#2:	SYSTEM:	keyboard without echo not used.
#3:		
#4:	DISK NAME:	baor disk (slot 6, drive 1).
#5:	DISK NAME:	2nd disk drive (slot 6, drive 1).
#6:	PRINTER:	printer (slot 1).
#7:	REMIN:	remote input (slot 2).
#8:	REMOUT:	remote output (slot 2).
#9:	DISK NAME:	5th disk drive (slot 4, drive 1).
#10:	DISK NAME:	6th disk drive (slot 4, drive 2).
#11:	DISK NAME:	3rd disk drive (slot 5, drive 1).
#12:	DISK NAME:	4th disk drive (slot 5, drive 2).

Fig 7 P-System commands

AUTO command - auto load after boot up.  
 BUILD ufn - building of a batch command file.  
 CLOCK {(OFF)} - toggle real time clock screen display.  
 DO ufn - execute the file create by build.  
 DUAL {(OFF)} - dump to printer of screen contents.  
 ERROR n - displays description of an error number.  
 FORMS (WIDTH = n, LINES = n) - forms set up.  
 FREE:d {(PRT)} - disk free space map.  
 LIB - command list.  
 LIST ufn {(PRT, SLOW, ASCII)} - list a file to screen (or printer).  
 MASTER (DRIVE = d) - assign master drive.  
 PROT :d(PW, LOCK) - use or change master password. pw = allows to change master password, lock assigns master to all unprotected users.

PURGE :d{(type)}SYS/INV/  
 ALL - mass deletion.  
 ROUTE (orig = s, dest = s) - input/output routing, substitute for sets of the two letters as below.

DO = display  
 PR = Printer  
 KB = Keyboard  
 RI = RS232 input  
 RO = RS232 output  
 SETCOM (OFF, WORD = n, BAUD = n, PARITY = n, MODE) - port setting.  
 OFF - turns RS232 off.  
 WORD - number of bits 5-8.  
 BAUD - 50-9600.  
 STOP - stop bits 1 or 2.  
 PARITY - 1 = odd 2 = even 3 = none.  
 MODE - wait or nowait.  
 WP (DRIVE = d) - write protect drive d.  
 WP - write protect off.

Fig 8 TRS-DOS additional commands

**\$AT** time {(day)}  
 {file} - run command at specified time.  
**\$CAL** {(month)}  
 year - prints a calendar for a single month (month 1-12) or a full year (year 1-9999).  
**\$CAT** ufn - display file to screen.  
**\$CD** - Return to the login directory.  
**\$CD** dir - change working directory to dir.  
**\$CHMOD** - {who} op-code permission ufn.

**Who:**

u - login owner (user).  
 g - group.  
 o - all others.  
 a - all of above (default).

**Op-Codes:**

+ - add permission.  
 - - remove permission.  
 = - assign absolute permission.

**Permissions:**

r - read.  
 w - write.  
 x - execute.  
 U - user permission from present mode.  
 g - group permission from present mode.  
 o - other permission from present mode.

**\$COMM** ufn ufn - compare the similarities and differences between two sorted files.

**\$CRYPT** key - encode/decode using a encryption key.

**\$FIND** - sophisticated file searching utility.

**\$GREP** - search file for a specified string.

**\$KILL** n - kill process number n.

**\$LPR** - option ufn Queue file for printing.

**\$LS** - directory list.

**\$MAIL** loginname - send or receive mail.

**\$MAN** - online manual.

**\$MKDIR** - create directory.

**\$PR** - print a file.

**\$PS** - status of active processes.

**\$PWD** - path name of working directory.

**\$SORT** - sorting utility with many options.

**\$SPELL** - spell check (even an English option!).

**\$STTY** - full terminal port and options configure.

**\$TTY** - path name to users terminal.

**\$UNIQ** - removes multiple occurrences in a sorted file.

**\$WC** - counter with character, word and line options.

**\$WRITE** user - writes on another terminal.

Fig 9 Unix operating commands

DIR2 \ DIR3 \ FILENAME.EXT - PATH NAME STARTING AT THE ROOT

The Batch command has been greatly extended with the addition of IF, GOTO replaceable parameters. A batch job is a file of DOS commands with the exten-

sion .BAT which is executed by typing the file name minus the extension. The extra commands will be described in the next section along with the other new MS-DOS 2 commands.

## P system

This section on the UCSD P operating system will concentrate on the version installed for the Apple II, as this is the



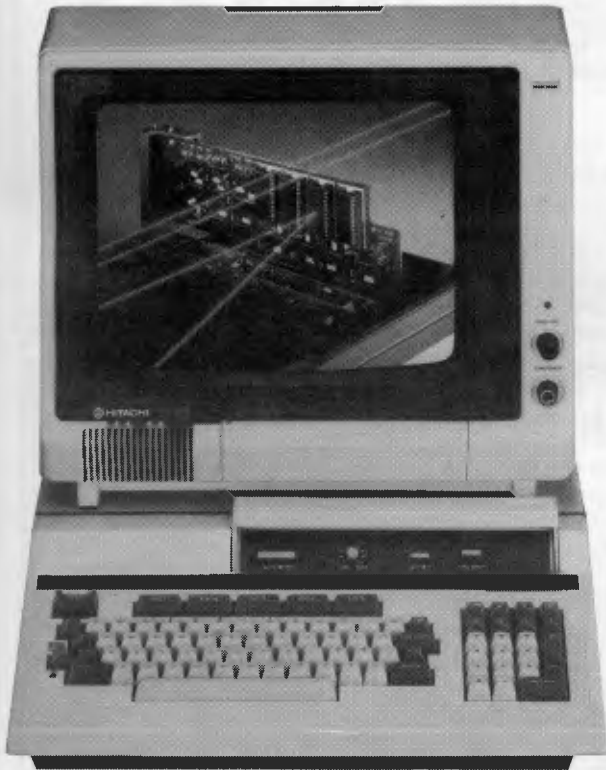


# HITACHI Personal Computer,

# The better Business Solution

**Nissei Sangyo Co Ltd, One of the world's largest system,  
marketing and sales organisations!**

It's not so important that you know our name.  
Although, Internationally, we are well-known marketing and sales specialists of electronic products — and a turnover of more than A\$1,400 million speaks for itself. However, it is much more important for us that you are impressed by our products.



### Greater Performance Personal Computer HITACHI MB-6890K PERSONAL COMPUTER

**Specification:** MC-6809, memory (24KB ROM, 32KB RAM standard), Interface (Monochrome & Colour R.G.B. Monitor Interface, Light Pen Interface, Parallel & RS232C Interface), Expansion Slots (Five Slots), Popular Software, including CP/M Card\* available (Optional).

For your local dealer, please contact:

### Professional, High Performance Business Computer HITACHI MBE-16000 SERIES PERSONAL COMPUTER

**Specification:** Intel 8088, 8087 Option, memory (320KB RAM expandable upto 512KB), Interface (Monochrome & R.G.B. Colour Monitor Interface, Parallel & RS232C Interface, Light Pen Interface), Expansion Slots (Four Slots), Built in Two 320KB Mini Floppy Drives, Popular Software on MS-DOS is available.



 **Nissei Sangyo Co.,Ltd.**

(INC. IN JAPAN)

200 PACIFIC HIGHWAY, CROWS NEST  
N.S.W. 2065 AUSTRALIA

TELEPHONE (02) 923 1522 (4 lines)  
TELEX AA70941 FACSIMILE (02) 922 2498





# SOFTWARE Operating Systems

CATALOG, COPY, HEADER, RENAME and SCRATCH will be covered in the conversion table next month.

## Unix

Unix is a complex and sophisticated operating system with many commands, some of which most people will never use. The majority of the commands have been summarised in the tables; however, there are quite a few extra options that do not fit in to the categories of the chart and some that do have extra options that need expanding upon. Unix has a tree directory structure and the ability to PIPE — send the output of one process to the input of another. The simple commands that will be covered in the table in next month's issue of APC are \$CAT, \$DATE, \$CP, \$MV and WHO. The rest are given in Fig 9.

machine most people are likely to come across. The system is menu driven, and therefore in the conversion chart the option required is given rather than the full command. On loading the system, the user is presented with a series of options. These are selected by pressing the first letter of the required option. If the Apple in use has a 40 column screen, then to view the last three a '?' has to be hit. The options are summarised in Fig 6.

The FILE option covers all the commands to be tackled in this series. The options available are outlined in Fig 7.

## TRS-DOS

The Tandy operating system TRS-DOS has for a simple system many useful commands. It is especially unusual in having a help facility. In addition the system uses a '/' and not a ':' to mark the start of the file and the disk designator is ':d' and not 'd:'. The system has a range of password protection facilities, which can protect whole disks and individual files. On formatting a disk, a master password can be assigned, if an individual file can be accessed by the full

command (if protected) by the command shown.

filename/ext.password:d  
The password is set by the ATTRIB command:  
ATTRIB ufn (vis,ACC=pass,UPD=pass,PROT=level)

Prot  
Levels: Degree of access:  
FULL full access no protection.  
KILL kill, rename, read, execute and write — total access.  
NAME rename, read, execute and write.  
WRITE read, execute and write.  
READ read, and execute.  
EXEC execute only.

The BACKUP, COPY, DATE, DIR, ERROR, FORMAT, HELP, KILL, LIST, RENAME and TIME will be covered in the conversions tables next month. In addition there are the commands given in Fig 8.

## PET

The Commodore PET, like the Apple, is a simple machine with few operating system commands; it also has its own peculiarities: not 'slots' in this case, but the IEEE 44B communications bus. All the systems commands, BACKUP,

## Disks for Model 1/System 80

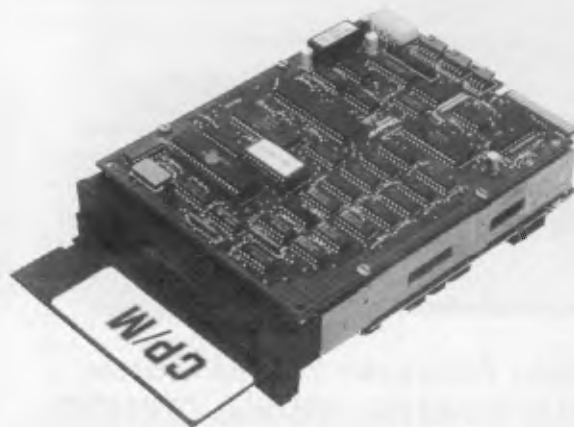


- Direct disk controller
- Parallel printer port
- Gold plated connectors
- Includes Mitsubishi double sided slim drive
- Tandy version includes double density
- No expansion interface
- Compact enclosure
- LSI Data Separator

Model 1 ..... \$699  
System 80 ..... \$639

(both including Sales Tax)

## Quantity One... \$399\*



- 4Mhz Z80A CPU, 64K RAM
- Mini floppy controller
- On-board -12V converter
- Screws directly onto a mini floppy drive
- Cases, drives and complete systems available
- Two RS 232 serial ports
- Parallel printer port
- Only 146 mm x 197 mm

All this . . .  
and CP/M 2.2 too!

\*ex Sales Tax,  
generous OEM discounts  
available



P.O. BOX 259,  
CAULFIELD EAST, VIC 3145  
Telephone: (03) 500 0628

MICROCOMPUTERS

# WRITING SOFTWARE



# Creating a program

*Ever gazed wistfully at the name on a successful software package and wished it could happen to you? Dream no more. Mike Liardet begins a two-part lesson in producing your own mass-market software. This month: strategy.*

The microcomputer revolution has put computer power within everybody's reach, spawning a new class of computer user unknown in the industry only a few years ago. Today's computer users are 'software consumers' with no training or deep knowledge of computers, but a huge appetite for easy-to-use games, educational and business software.

Programmers today face a unique opportunity. The time is ripe for fresh faces who understand the new medium and can feed the public what it wants. They won't need huge budgets and teams of programmers to obtain their success — just one or two individuals with the right idea can make it.

If you aspire to these giddy heights, then read on. I'll be describing some of the issues involved in producing a mass-market product, and some of the tricks of the trade to give your concoction an 'edge' over the opposition. This article is aimed at the home-worker with scarce resources and precious few people to call upon. Big budget projects are not catered for.

Of course, there is no simple formula for success — you can rest assured I'd keep it to myself if I knew it! — but it is possible at least to point yourself in the right direction.

Thousands of programmers spend thousands of hours and millions of dollars developing software for consumption by just one or a handful of

users. This bespoke software is presently the backbone of the software industry and has nothing to do with writing mass-market software. If you're one of these aforementioned programmers you'll have to throw out a lot of old habits and preconceptions if you plan to write something for the masses. And if you've never programmed professionally, although you haven't learned any software skills at someone else's expense, at least you won't have picked up any bad habits.

In comparison to bespoke software, mass-market software must appeal to, and be eminently usable by, as many people as possible. With bespoke software, the occasional malfunction or misunderstanding can be dealt with on a one-to-one basis. With a mass-market product, every problem is literally multiplied (by the number of users). To have any reasonable chance of success, a mass-market product mustn't have these problems, and must be as close to perfection as is possible in a limited time-scale.

Another major difference is that, initially, there are no users to define the requirement. Thus, when writing the software, you must invent a notional user and write the program for him. If you've only ever written software under the direction of others you might find this difficult, but when you get used to it, it's very refreshing!

## Beginnings

The starting point for any product is an idea. Many people present a dearth of ideas as an excuse for not doing anything. I believe that getting an idea can be difficult for everyone, and that sometimes even Paul McCartney sits with a blank sheet, chewing his pencil.

Acknowledge that you're looking for an idea. As soon as a notion hits you, however silly it may seem, write it down. Some ideas might seem so derisory that you would cringe with embarrassment if anyone saw them. Still, write them down — you might need them later.

To stimulate ideas it can be useful to go to exhibitions, read magazines, talk to others, and generally soak up the current state of the micro world. Many ideas can be stimulated by thoughts of improving existing software, and so on. The main categories of software are: educational, games, business and personal, so you might choose to hang your ideas on these pegs. But don't let that stop you inventing a new category — that really would be a winner. If you have a collaborator, then a brainstorming session can be invaluable.

Eventually, you must call a halt to this ideas generation. How long you allow yourself is entirely up to you, but after a while you should be anxious to get started on something. Leave the decision-making too long and the era of garret



**GALAXY** 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 attack is then joined by the mother ship who will form a convoy to attack or capture you with its laser traction beam. This action-packed game has two player option, plus 100 screens including a challenge stage in which the enemy fighters do not attack you.



**STAR TROOPER** is a fast, action packed, machine language game for your Commodore 64. It's a game that will test the best arcade strategists. Amazing graphics and superb sound add to a game that only the bravest will survive!



**THE HOBBIT.** Visit J.R.R. Tolkien's Middle Earth in the most amazing adventure yet devised. "A game by which future games will be judged."  
 — Personal Computing Today. "Superior to any other adventure game."  
 — Your Computer. The Hobbit is now available for the BBC, Oric, Commodore 64 and Spectrum.

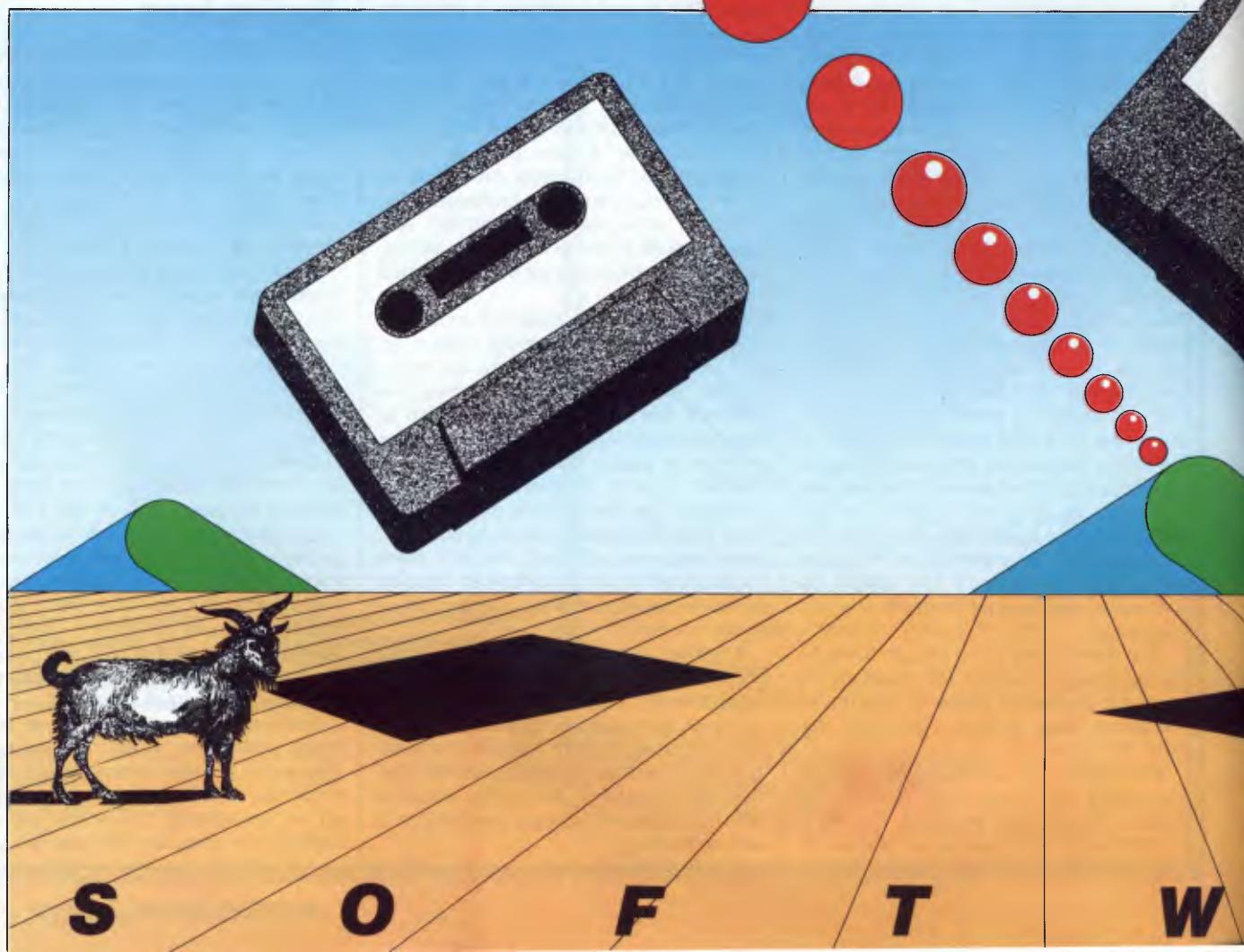


**H.U.R.G.** A revolutionary piece of software for your 48K Spectrum which allows you to develop high quality Machine Language arcade games with absolutely no programming experience. "It is difficult to find fault with such a complete games generation program."  
 — Crash.



**COMMOORE 64 HORACE GOES SKIING** is the sequel to the very successful Hungry Horace. In this adventure our hero attempts winter sports. Skiing is complete with slalom flags, trees and moguls so watch out Horace! "One of the most addictive packages yet encountered."  
 — ZX Computing. Horace Goes Skiing now available for Dragon.

# MELBOURNE

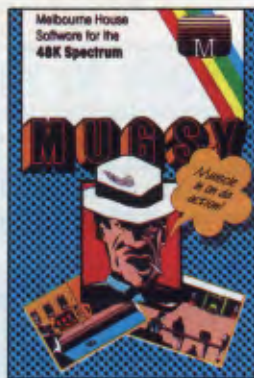


SEE US  
AT THE  
APC SHOW  
STAND  
NO. 126

The 3rd Australian  
Personal  
Computer Show  
World Trade Centre  
Melbourne  
18-21 July 1984



**CLASSIC ADVENTURE.** This is the program that started it all. Now you can discover the excitement of Classic Adventure on your Spectrum 48K, Commodore 64, BBC or Electron. If you are masterful enough you too could become a Master Adventurer. "The classic brainteaser."  
— Micro Adventurer. "It's excellent but be warned: it's also very addictive."  
— Home Computing Weekly.



**MUGSY** gives a totally new direction for thrill seekers — comic animation in text, stunning graphics and a full arcade game! Mugsy is your one and only chance to become the greatest gang leader with definite ill repute. "Da game Mugsy have, an dis is no lie, da bes graphics eber seen on da Spectrum da tru admospear ob da East side." — Popular Computing Weekly.

**PAVLODA**

**ULTRA FAST LOADER**

A program using PAVLODA is as convenient as a disk but at the much more affordable price of a cassette! The PAVLODA program itself occupies almost no useable memory. The speed is increased approximately six times, so the average program will load in less than three minutes.

Orders to:  
**Melbourne House**  
70 Park Street,  
South Melbourne, 3205.  
Telephone (03) 690 5336

**DEALER ENQUIRIES WELCOME**

Please send me your FREE catalogue  
I have a \_\_\_\_\_ Microcomputer.  
Please send me:

**COMMODORE 64**

- \*  Star Trooper ..... \$22.50
- \*  Horace Goes Skiing ..... \$20.00
- \*  Galaxy ..... \$20.00
- \*  Classic Adventure ..... \$22.50
- \*  The Hobbit ..... \$39.95
- A.C.O.S. + ..... \$29.95
- \*  Cybotron ..... \$20.00
- \*  Zodiac ..... \$20.00
- \*  Starbase Defence ..... \$20.00
- \*  Indian Attack ..... \$20.00
- \*  Cosmic Commando ..... \$20.00

**BBC/ELECTRON**

- The Hobbit ..... \$39.95

**SPECTRUM**

- Mugsy ..... \$22.50
- H.U.R.G. .... \$39.95
- The Hobbit ..... \$39.95
- Classic Adventure ..... \$22.50
- Penetrator ..... \$22.50
- Hungry Horace ..... \$20.00
- Horace Goes Skiing ..... \$20.00
- Horace & The Spiders ..... \$20.00
- Abersoft Forth ..... \$39.95

All versions of 'The Hobbit' are identical with regard to the adventure program. Due to memory limitations, BBC cassette version does not include graphics.

\* These programs incorporate PAVLODA

..... \$ .....  
Please add \$2.00 for post & pack ..... \$ 2.00  
TOTAL ..... \$ .....

I enclose my  cheque  
 money order for ..... \$ .....

Please debit my Bankcard No. ....  
..... Expiry Date .....

Signature .....  
Name .....  
Address .....

..... Postcode .....

APC7



MELBOURNE HOUSE



A R E

software may be gone, and you'll have to go seeking massive venture capital to get anywhere at all.

Now comes the time to make a decision.

There are many decisions to make — what to do, which machine, in which programming language, and how long to spend on it. Build up a checklist of questions to pose for each idea. How well will it sell? Who will buy it? What will they use it for? Is it feasible to implement with the resources available (time, money, machine, the current state of technology). Is it specific to Australia, or an international product? Obviously, your own level of interest should figure highly in your list of criteria.

Whatever you choose, you will have to live with it for some time, through moments of great doubt and hard work. If it doesn't really interest you as a project, you won't see it through. Try to think into the future when making the decision. It's highly unlikely that whatever you do will see the light of day for 12 months or more, and where will micros be then?

Finally, avoid choosing a project that has already been well covered by the industry. Even if you can write a better word processor than anyone else, no one will want to know about it. Your strength as an individual is to seize fresh opportunities quickly. In comparison, the industry giants are like lumbering armies. It's not easy for them to change direction, but if your product happens to be in their way they won't even notice as they trample all over you. Make doubly sure that you are somewhere else, where you can really make your presence felt.

## Choices

It's possible that this decision is already made — you have a computer and it's all you can afford. However, you can always try to develop the software in a machine-independent fashion so that the choice of machine(s) can be delayed. The price you pay is that you cannot usually take advantage of the special features of your own machine.

The micro world currently offers six different types of computer: home computers, lap-held portables, transportables, desktop personal computers, local area networks and multi-user machines. You might hope that your software will be relevant to several types of machine. If you are working under one of the industry standard operating systems, like CP/M and MS-DOS, with only minimal effort it should be possible to design software that will operate on a great many machines in the latter four categories.

At the moment, all except the first two

categories can be assumed to have disk drives. Their presence or absence will have a major impact on the design of the software. Some types of software are not practicable without them (database, for example).

You should identify the minimum capacity machine that will support your software, and estimate the minimal RAM, disk capacity, minimal screen size, printer paper dimensions, and so on. You should also itemise any optional extras, such as light pens and graphics hardware, that might be needed. Now ask yourself — would anyone want all this lot if it weren't for the program? If they must buy extra options just to run your product, it effectively puts the price up. Plan the product around a minimal machine, where the extra goodies can be bought later if the purchaser wants to use all the wonderful facilities you have in mind.

Bear in mind that you don't have to develop the software on the target machine. While recovering from an illness, a friend of mine developed a space war game on a cassette machine in hexadecimal machine code. If I were to try that, it would cause an illness! I much prefer to work with disks, text editors and assembly language, then hit the target machine at the end of the project, either by downloading the software or using a ROMwriter with a mutually compatible ROM chip. If you decide to develop on another machine, make sure you don't do the equivalent of developing a 35-foot yacht in the spare room: establish early on that you will be able to extract the fruit of your labours when you have finished.

If you are stuck for cash you might consider hiring a machine, but after a few months the bill can mount up to the cost of an original purchase. However, a short-term hire is a valuable option for checking out your software in special configurations. For example, performance testing your floppy-developed software with a hard disk.

There are four different types of programming language available: interpretive, compiled, intermediate and assembler (some languages are embraced by more than one category).

*Interpretive:* the code you type is the same as the executable image. An 'interpreter' continually translates code throughout the execution of your program. The best known such language is Basic but there are many others, like some versions of Lisp, Logo and Prolog.

Although it's easy to work with interpretive languages, I'd rule them out for product development. They are admirable for quickly checking ideas, learning programming, and, in the case of Basic,

come free with many micros. But there are three problems: the purchaser may need to buy the interpreter to use your product; they run very slowly (because of the interpretive overhead); and they provide little or no security for your code. With an interpretive language, it would be easy for anyone to list all your hard work, change a few bits here and there and come out with a rival product that you would be hard-put to prove was a rip-off.

*Compiled:* the code you type is translated, by a compiler, into an executable image that can be understood immediately by the computer's processor. Compiled languages include C, Fortran, PL/M and Pascal. A lot of sanctimonious twaddle is written about Pascal in particular, but don't let this browbeat you into using it. With this proviso, I rate compiled languages as the preferred environment for most product development.

A good compiler will generate fast, secure, compact code, but because you are using a high level language you can maximise the portability of the software. Moving your software from an 8-bit to a 16-bit machine need involve no more than purchasing the new version of the compiler and transporting your source code onto the new machine, with little or no changes.

A word of warning about compiled Basic: All Basic compilers I have ever seen generate large program files, and provide disappointing improvements in execution speed. Some of the interactive techniques I'll be introducing later won't work in compiled Basic as it's too slow.

*Intermediate:* compromise between compilers and interpreters. A pseudo-compiler translates your original source code into a pseudo-machine language which must then be interpreted; of which UCSD Pascal and CBasic are the best-known languages. Language suppliers can implement intermediate languages across a wide range of machines more easily than any other type of language. This is often billed as an advantage, but like everything else concerned with intermediate languages, it's really a pseudo-advantage which accrues to the implementor and not the user. Intermediate languages offer the worst of both worlds.

*Assembler:* you develop your program directly with your processor's instruction set, albeit symbolically, and not in hexadecimal code. Assembly programming produces the fastest and most compact codes, but is the most difficult to work with.

Most micros use one of the following processors (or a compatible one): 8080, 6502, 8086, M68000. Unfortunately,

Stand 607  
3rd Australian Show  
Personal Computer Show  
July 18-21 Melbourne

# GET MORE OUT OF YOUR 8 BIT COMPUTER EXPAND TO THE WORLD OF CP/M 86 & MSDOS

JOIN THE IBM-PC REVOLUTION THE CHEAPER WAY THROUGH EVOLUTION  
(COMING SOON — EXPANSION TO 32 BIT M68000 FOR MOST COMPUTERS)

**CP/M 86 & MS-DOS**  
for the TRS-80 I, III,  
& IV<sub>L</sub> LNW

**CP/M 2.2 FOR THE  
ATARI COMPUTERS**

**CP/M 86 & MS-DOS**  
for the following  
computers: Atari using  
ATR8000, Bigboard,  
Kaypro, Osborne, Tele-  
video 802, Xerox 820,  
820-II and Zorba

**CP/M 86 & MSDOS**  
for **APPLE 2E** and  
virtually any Z80  
based computer

CP/M or MSDOS  
RS232 Serial I/O  
Centronics Parallel Port  
Complete with Power Supply  
and Enclosure  
128K RAM **\$1350**

64K RAM with CPM 2.2  
& MYDOS WAS \$995.00  
**SPECIAL \$885.00**

128K RAM with CP/M 86  
& MS-DOS WAS \$1250  
**SPECIAL \$1100.00**  
256K RAM WAS \$1350  
**SPECIAL \$1250.00**

128K RAM **\$1250.00**

### DISK DRIVES SPECIAL

#### TEAC DRIVES

77 Tracks .....	<b>\$390.00</b>
40 Tracks .....	<b>\$290.00</b>
80 Tracks .....	<b>\$350.00</b>
Case & P/S 1 Drive .....	<b>\$69.00</b>
2 Drives .....	<b>\$99.00</b>
Disk Cable .....	<b>\$42.00</b>

### MONITORS SPECIAL

Yanjen Amber or Green Screen  
including swivel base (Hi-Res) ... **\$199.00**

#### DISKETTES SPECIAL TOP BRAND

40 Tracks DSDD 48TPI (10) .....	<b>\$39.50</b>
80 Tracks DSDD 96/100TPI (10) .....	<b>\$49.90</b>

### PRINTERS SPECIAL

ASTECH 100 CPS .....	<b>\$499.00</b>
STAR (10) 120 CPS .....	
STAR (15) 120 CPS .....	<b>\$950.00</b>
EPSON FX80 .....	
MAX-80 5MHZ CP/M3 .....	<b>\$1695.00</b>
IBM-PC Compatible (Complete) .....	<b>\$3200.00</b>

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 873 2069 ASK FOR LOUIS BELCOURT**

ALL PRICES INCLUDE SALES TAX

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. IBM-PC is a trademark of IBM. Kaypro is a trademark of Kaypro/Non Linear Systems. Xerox 820 and 820-11 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.

## HOME, PERSONAL, SCHOOL and BUSINESS COMPUTERS

 **commodore**

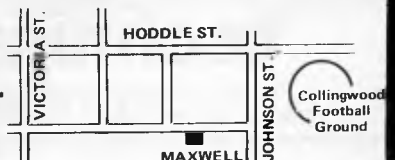
 **sirius**



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**



each of these processors has its own unique instruction set, and so once committed to a particular processor it's very difficult to translate your program for another.

There are translation programs available for converting code between processors, but they're not as easy to use as two different versions of a high level language compiler, for instance.

You might consider developing your program as a hybrid, using different languages for different bits. I did this to great effect with a product I've developed where the installation software was developed in compiled Basic and the rest in Assembler. As the installation software is only ever used once, and is not time or space critical, it was possible to develop sophisticated installation features quickly and easily using Basic. This enabled me to devote more time to the key part of the software, and optimise its time and space requirements by using Assembler.

Having just passed the ideas phase, it may seem rather early to start thinking about selling the software, but as it's the whole point of the exercise, it's best to keep it in mind from the earliest moment. I hold the view that only rarely do marketing and software design skills reside in the same head; unless you are one of these rarities you should acquire a partner to complement your skills.

There are now a number of software publishers in Australia, and although it's easier said than done, there's a lot to be said for a publication arrangement. Software publishers are analogous to book publishers, and in exchange for you signing away all or most of your rights to the software, they will do all the marketing and production, paying you a royalty for each unit sold. The deals offered can vary greatly, some publishers offering a percentage of the transfer price, and others on the retail price. If you are in the fortunate position of having several offers, it's impossible to predict which will be best as the big question is how

many units each publisher might sell.

Without prior thought, it's easy to anticipate ludicrous royalty percentages which would put the publisher out of business. Consider a \$100 product: if sold direct to a dealer, the publisher will only receive \$70, perhaps even less, if it's part of a multiple order. Of that \$70, perhaps \$10 was spent manufacturing the product, \$20 advertising it and \$10 allocated for support. This leaves \$30 to spare, which the publisher might generously agree to split down the middle with you, or not. So don't be surprised if you're offered a single-digit percentage. You won't be alone — most royalties in other industries are around this mark.

Of course, publication is not the only method of selling your magnum opus — advertising is another alternative. You might care to check out advertising rates at this early stage, too.

## Campaign

Programmers are notoriously bad at estimating time-scales for projects, but it's essential to try. Even an inaccurate plan of campaign will get the project finished quicker than none at all, and next time round your planning will be better.

I consider it dangerous to attempt a first project that you anticipate will take more than 12 months. The micro market is moving rapidly, and unless you are very far-sighted you're likely to be left languishing with a software dinosaur.

It's easy to overlook the 'hidden extras' when drawing up time-scales. In the absence of any better ideas, use the following rule of thumb to plan your project right through from inception to product launch:

- 5%: total time to study the operating system and programming language.
- 5%: feasibility studies.
- 30%: implementation of program proper.

10%: implementation of peripheral supporting software (for instance, installation).

15%: writing documentation.

5%: alpha-testing; internal checking and debugging.

5%: beta-testing; independent checking and assessment.

5%: implementation of corrections and enhancements following testing.

5%: final beta-testing.

15%: publication; printing and advertising.

Note, in particular, that there is probably some core part of the program proper, perhaps a quarter of it, which encapsulates the original idea. The other three quarters comprise essential 'extras', such as file handling. Thus, only 7-8 per cent of the overall project is actually taken up with writing, hence the saying that genius is 95 per cent perspiration and 5 per cent inspiration!

Unless you are living with Mum or rich enough to support yourself on what might be a highly speculative venture, you will have to do the work alongside a regular job. Check the small print on your employment contract — you might have signed away all rights to the software already. Ideally, your job should be compatible with software work, which means NOT being a programmer already — you can't face another computer in the evening.

If you are working in collaboration, then aim for a good demarcation between you. The first 50 per cent of the percentage breakdowns can very easily be assigned to one, with the other handling the documentation onwards.

Finally, I pass on a tip which increased my productivity by 50 per cent. Decide where in the house you most like to sit, and put your computer there! In my case, that happens to be somewhere near the TV which produced not a few grumbles from the rest of the household, but stick to your guns, and good luck!

*Next Month: Making mass-market software part II: tactics.*



The 3rd Australian  
Personal  
Computer Show  
World Trade Centre  
Melbourne  
18-21 July 1984

# we'll be at the show!

We'll be displaying — and selling — a wide range of computer books and magazines, including those published by Addison-Wesley, Holt Saunders, Jacaranda Wiley and Prentice-Hall.

Come and see us in the Galleria at **Stand 347** (next to ANZ Book Company) or visit our

**computer information centre** in our Swanston Street bookshop **soon!** Can't make it to Melbourne? Write or phone to be placed on our Microcomputer Books mailing list for regular information on new titles.

WE'RE FIRST IN INFORMATION

## technical book & magazine co

289 SWANSTON ST, MELBOURNE 3000. (03) 663 3951





# TAILOR MADE PRINTERS FROM RIFA.

With the ever-increasing multitude of printers available today, it's reassuring to know you can rely on RIFA for NEC's highly advanced Pinwriters and Spinwriters.

What's more, with NEC's amazing new click-in modules, your new printer will be compatible with virtually any computer system in existence today, and tomorrow.

NEC printers from RIFA offer you standard features many others don't even have as options – like extra high reliability, enormous range of type fonts, interchangeable thimbles, variety of paper feeds, selectable printing modes and much more.

And naturally, with a recognised quality name like NEC, you also get a Nationwide Service Network back-up that's second to none.

If you're about to buy a new printer, talk to RIFA now about NEC – you'll get more printer for your money.

## RIFA NEC



**RIFA**  
COMPUTER PRODUCTS

RIFA PTY. LTD.  member of the Ericsson group

VIC: 1st floor 55 A'beckett Street, Melbourne, Vic. 3000. Ph: 348 1811

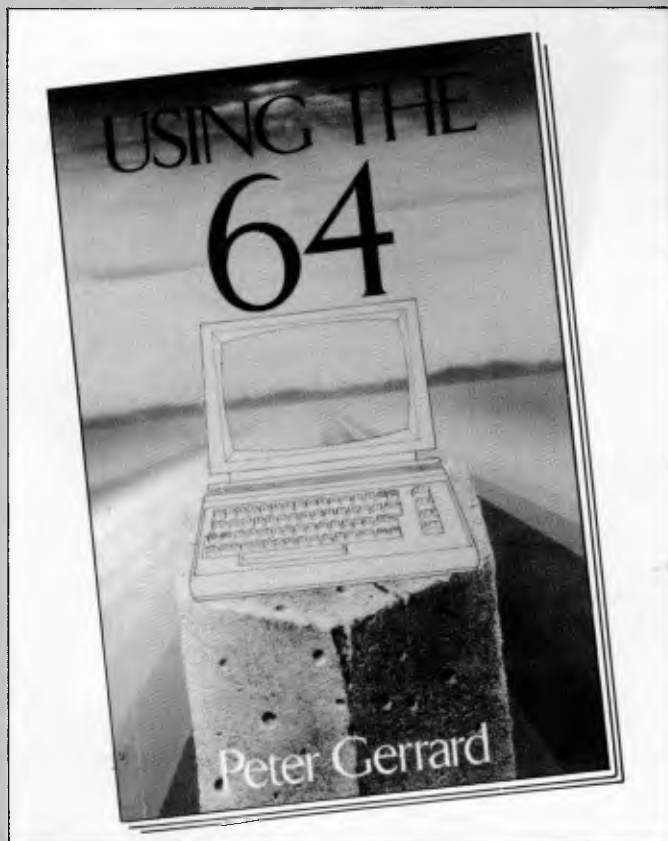
N.S.W. Cross House, 2 Cross Street, Hurstville, NSW, 2220. Ph: 570 8122

Q'LAND: 5/59 Barry Parade, Fortitude Valley, 4006. Ph: 823 3700

MC/R/030

# BIBLIOFILE

Steve Withers' selection from the bookshelf this month features a smorgasbord of literature on the Commodore 64.



## Using the Commodore 64

What I particularly liked about this book is the way it really does describe the 64. Some of the books I have received make me think that some publishers are happy to produce multiple editions that describe a woolly dialect with just enough machine-specific details to justify the changing titles, but Peter Gerrard has come up with a book full of nuts and bolts information about this very popular home computer.

The first chapters contain the mandatory tour through Basic, written with more zip than most authors seem to manage. There are several interesting routines and programs, including one that allows you to scroll backwards or forwards through a program.

Things liven up considerably in Chapter Three, with the introduction of machine code programming. This chapter struck me as one of the least intimidating descriptions of assembly language programming I have come across. The examples used are commonplace (loading characters into the video memory and simple arithmetic), but Gerrard writes with a matter-of-fact style that should encourage most readers to try their hand.

The chapters on graphics and sound cover most, if not all the features of the 64. This isn't a "cookbook" (although there are several program fragments that could prove useful), the object seems to be to give the reader a clear

understanding of the principles and techniques involved. It's as if the author is saying "here are all the things your computer can do, now go away and use your imagination to come up with an interesting or useful application."

A major section describes in considerable detail the principle chips inside the 64 — the 6566 video controller, 6581 sound generator, 6521 interface chip, and of course the 6510 cpu. These chapters include the kind of information found in manufacturers' data sheets (pin-outs, electrical characteristics, register definitions, etc), as well as a description of the chip in terms that can be understood by those of us without a background in electronics. The coverage of the 6521 is the weakest, but this is understandable as it will be of little interest to most users compared with the sound and video chips. Its most useful feature — the time of day clock — is described in detail.

In common with many books of this type, 'Using the 64' has a number of appendices containing "useful information". Along with the usual lists of Basic keywords and error messages, code charts and conversion tables, there is a very detailed memory map that includes hundreds of entry points to ROM routines. Something I don't recall seeing before is a list of timings for Basic elements (eg, 27 milliseconds to evaluate a cosine, 0.9ms to perform a RETURN, etc). It's arguable how useful this is, but I found it intriguing. I won't bother with the other appendices, except to mention that there is a listing of the 'Extramon' machine code monitor. The author admits that much of this information is available elsewhere, but I agree with him when he suggests that saving the reader from "diving about from book to book in an effort to find [a] particular bit of information" is worthwhile.

I spotted one or two minor errors, for example a delay loop on page 90 is actually an infinite loop. Despite this I can best sum up the book by saying that I would be happy to buy it with my own money. It's not a book for beginners (although they would find some of the complete programs interesting), but it is a great reference source for anyone seeking to write programs that fully utilise the power of the 64.

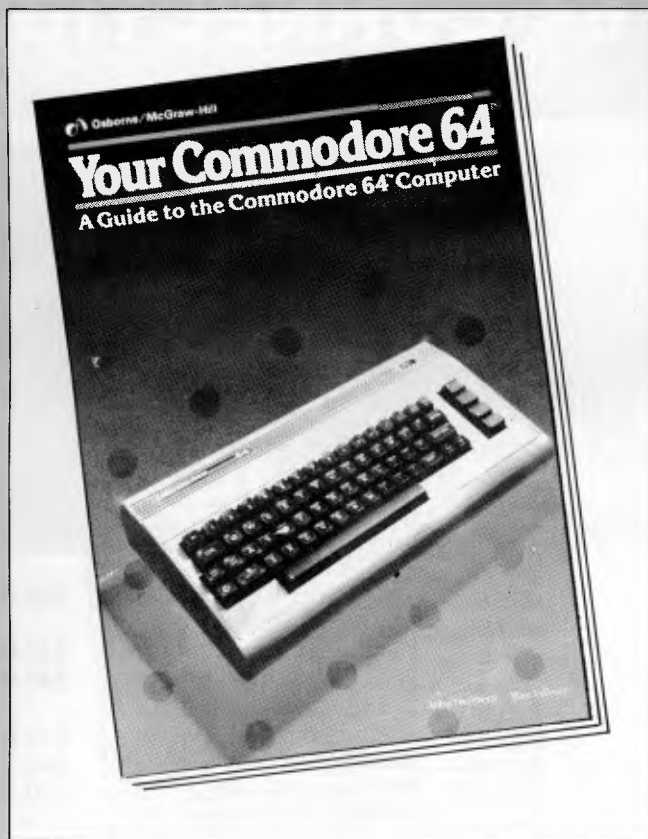
### Using the Commodore 64

Author: Peter Gerrard  
Publisher: Duckworth, London  
Price: \$29.95

## Your Commodore 64

'Your Commodore 64' is one of the most comprehensive books describing this computer. As well as extensive coverage of the 64 itself, there is information about the 1541 disk drive, 1525 printer, and the Commodore cassette drive. While some of the material is along the lines of "how to connect a printer", most of it is aimed at the Basic programmer.

In common with so many other books, the chapter that purports to be an introduction to programming is actually an introduction to Basic. I'm sorry if that statement is becoming a cliché, but there are a lot of people that need to be shown how to turn an idea into a program before worrying about the



syntax of any particular language.

Anyway, once you've got the hang of programming there's plenty of material in later chapters. There are routines to handle game controllers and others that illustrate the animation of character-based displays. As you might expect, there is a major section on graphics programming including the use of customised character sets, bit-mapped graphics, and sprites. If you explore these features you will probably appreciate the routines that save and load chunks of memory to and from tape or disk — it's claimed to be much faster than using a combination of DATA and POKE statements to create character sets, sprites, and bit-maps.

A problem often experienced with colour graphics is 'fringing' or one colour bleeding into another. The authors explain that this occurs because a TV set can draw dots faster than it can change from one colour to another. This effect can be minimised by a careful choice of horizontally adjacent colours, so Heilborn and Talbott prepared a table showing the compatibility of various colours. Their efforts were in vain, as the table is nowhere to be seen. I noticed a couple of other editorial slip-ups, including a misaligned table and a circular reference in the index ("Clock, real-time. See also Jiffy Clock" and "Jiffy. See Clock").

While 'Your Commodore 64' isn't the best introduction to programming I've seen, it does contain a wealth of information for the Basic programmer, including an extensive collection of reference material in the appendices.

## Your Commodore 64

Authors: John Heilborn and Ron Talbott  
 Publisher: Osborne/McGraw-Hill  
 Price: \$25.45

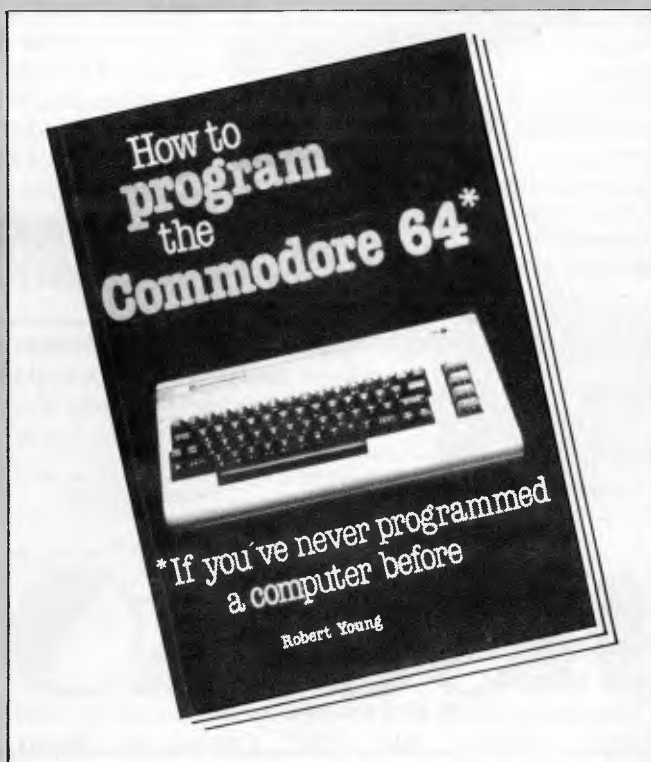
## How to program the Commodore 64

I wonder how many books have been published with titles like "How to program the Zit PC"? Quite a few, I suppose, but how many are really good? My guess is that there would be a much smaller number. This particular book is OK, but not outstanding. It is, however, an honest book — it doesn't claim to teach the reader everything about programming, or to describe the advanced features of the 64. This limited scope is at once the book's strength and weakness.

The advantage is that there is no extraneous material. A specific dialect of Basic is presented, so there are none of the problems that face novices using more general text. For example, many books that set out to teach a non-specific version include the matrix arithmetic statements that are rarely found on micros. When working from a book designed for use with your computer you can be quite confident that the examples will work (although mistakes sometimes slip through, I didn't notice any in this particular book).

On the other hand the narrow scope of the book limits its useful life. By working through the chapters you would gain a reasonable knowledge of Commodore Basic along with some good programming habits — my main criticism is the lack of comments in the sample programs — but you won't know very much about the machine itself. Another drawback is that Young's book isn't suitable as a reference book for two reasons — there's no index, and the material isn't there anyway. To be fair, it's only meant as a tutorial, but is that all you want?

Perhaps the best thing about the book is that it doesn't concentrate on numeric calculations at the expense of other aspects of computing that are of interest to many users. As it's relatively inexpensive, maybe the complete beginner





# BIBLIOFILE

would be well served by this book as a prelude to something more detailed ("Using the 64" perhaps?).

## How to program the Commodore 64

Author: Robert Young  
 Publisher: Interface  
 Price: \$14.95



## More on the Sixtyfour

As this book is a collection of assembly language routines for the 64 it isn't very reviewable, but I thought it deserves a mention. If you are interested in assembly language programming, there's something here for you — disk and tape I/O, adding commands to Basic (with some useful examples), turning the user port into a Centronics interface that Basic can use. There's also a flexible terminal program. In my opinion, this book is definitely worth a look.

### More on the Sixtyfour

Author: HC Wagner  
 Publisher: Hofacker, Holzkirchen, West Germany  
 Price: \$19.95

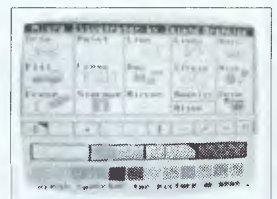
END

# THE WORD IS OUT...

The Tech Sketch Light Pen with Micro Illustrator Software is the most advanced & versatile of its type now available for Commodore C64.



Turn your VDU into a video canvas with 16 different features on the main menu. Two additional secondary Menus. Ten different brushes. 256 available colours and 12 different patterns. Storage of up to 48 pictures on disk and magnification for fine detail.



No other light pen comes close! Make your C64 a creative medium and Dealers act fast as available stocks are moving out quickly.



*Pictured: Micro Illustrator Menu & Actual picture drawn with Light Pen*

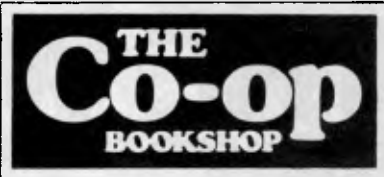
Australian Distributors:

# Ozi Soft™

Suite 33/8-24 Kippax Street, Surry Hills NSW 2010, Australia.

THE MAT OS 2082 APC

SEE US NOW!!  
FOR  
COMPUTER  
BOOKS



● **RANGE**

Biggest in Australia. Always in stock — from Robotics to Sinclairs.

● **QUALITY**

Good service, trained staff, best titles we can find on every subject.

● **PRICE**

5% Discount to members.

● **AVAILABILITY**

Check us out now at your nearest branch.

1. Sydney Technical Branch, 831 George St., Railway Square, Sydney. Ph: 211-0561.
2. Bay St., Broadway (Nr. Grace Bros.) Open Saturday mornings. Ph: 212-2211.
3. University of NSW on campus. Ph: 663-4024.
4. Institute of Technology, Broadway. Ph: 212-3078.

**ALSO AT:** Macquarie University, Ph: 888-6523. Sydney University, Ph: 692-3705; And at ANU Canberra, Armidale, Wagga, Wollongong, Newcastle, Bathurst, etc. **VISIT US NOW!**

SPECIAL  
INTRODUCTORY  
OFFER

**12 PROGRAMS for \$10 MULTITAPE 64**

THAT'S  
RIGHT — JUST  
\$10.00 BUYS THESE  
TWELVE GREAT PROGRAMS.  
FOR YOUR COMMODORE 64 ON  
ONE VALUE PACKED CASSETTE.

- |              |           |            |            |
|--------------|-----------|------------|------------|
| * Pinball    | * Jotto   | * 64 Clock | * Boxes    |
| * Pontoon    | * Keybeep | * Breakout | * Checkers |
| * Key-Repeat | * Maze    | * Pokies   | * Graphit  |

Clip the coupon now — or if paying by Bankcard you can order through our 24 hour telephone ordering service. [02] 526 1267  
G.S. WEBBER & ASSOCIATES — Freepost 4, P.O. Box 238, Gympie. 2227. [19/260 Kingsway, Caringbah, N.S.W. — For security reasons please forward all mail to our P.O. address.]

Please rush my CBM Multitape 64. I enclose full payment of \$10.

Cheque  P/Order  Bankcard  No.

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

Name .....

Address .....

..... P/Code .....

# TWO-FINGERED TYPERS

NOW THERE IS AN EASY WAY TO BREAK THE KEYBOARD BOTTLENECK

## TYPEQUICK

**FASTER SPEED, FEWER ERRORS AND IMPROVED PRODUCTIVITY IN 10 HOURS  
USING YOUR MICRO & TYPEQUICK**

TYPEQUICK is THE successful keyboard training course, now also used by many colleges and large companies. Thousands have been sold.

Just 12 lessons is all it takes. Your computer patiently instructs you, continually. TYPEQUICK monitors your keystrokes for speed and accuracy and eliminates your weakness by changing the text to suit your needs.

TYPEQUICK is for executives, professionals, managers and their staff, and students.

Learning is quick and easy with TYPEQUICK. It's fun too because you type mostly words and sentences — not just boring drills. The computer encourages and reports.

You will soon type faster than you can write!  
It will force up your speed.

Tell us which micro you have  
(DEC, Hitachi, IBM, ICL, Kaypro, NEC,  
Osborne, Sanyo, Sirius, Wang, etc. etc.)

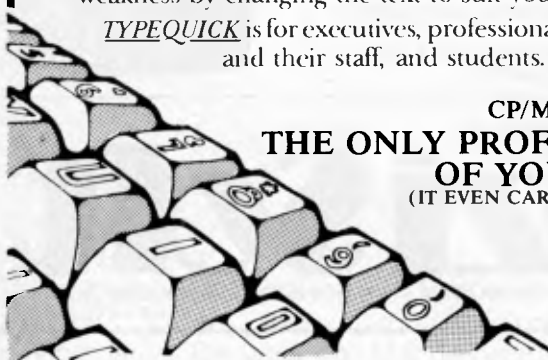
TYPEQUICK is great value at only \$77.  
Get your fingers moving now!

CP/M, CP/M86, MS DOS, PC DOS.

**THE ONLY PROFESSIONAL COURSE WORTHY  
OF YOUR TIME & EFFORT**  
(IT EVEN CARRIES A MONEY BACK GUARANTEE)

**AID** SYSTEMS (PTY) LTD.  
14 Cecil St. Gordon 2072  
(02) 498 7428

YOUR NAME.....  
ADDRESS.....  
COMPUTER TYPE.....  
OPERATING SYSTEM.....  
DISK FORMAT.....  
INCLUDE \$77 WITH ORDER  
HOW TO AID SYSTEMS  
14 CECIL ST.  
GORDON 2072  
**SEND NOW**



MS DOS Microsoft Trademark. CP/M Digital Research Trademark



# COMMUNICATIONS

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

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

## Mail order reply

*The managing director of Micromail has written to APC in response to last month's letter from R Byrne headed "mail order hazard" on the basis that "although the name 'Micromail' was not stated in the article it clearly makes apparent who the company is by using wordage that identified Micromail."*

For the past eight months, Micromail, the Sydney based Microcomputer Mail Order Club has satisfied the microprocessing needs of over 2000 new club members. In fact, the demand has been so strong that Micromail has moved to a newly built location at 1/303 Pacific Highway in Lindfield, NSW. The new location allows club members and nonclub members alike to visit, browse, get advice, and purchase products of their choice.

But there is more to Micromail than meets the eye. The staff consists of former Commodore, Apple, ComputerLand, and Tandy managers and executives. And club members get to use this expertise at any time. This experienced team of professionals is leading the retail microcomputer industry by providing the greatest services to its members — some of these include: a 24 hour toll free order line, extremely competitive pricing, training, service and maintenance, courier delivery, direct overseas ordering — US, UK, the latest products, the latest information, and the best staff to satisfy customer needs. Micromail also allows

its customers to purchase goods over the telephone and charge these purchases to a credit card. This service helps speed delivery time.

Micromail is having its Grand Opening on July 28th and invites all to come along and meet the staff of the most progressive micro-computer retailer in Australia.

Letters like the following are an inspiration to the staff of Micromail to continue providing this unique service — "... thank you for your letter of 28 March... I wish to take this opportunity to thank your company for the excellent service you have so far afforded me... looking forward to many years of association with your company." — RJ Fletcher. "... I wish to thank you for your excellent help, prompt service, and beaut prices... The new US made Cardco + G interface really makes my Gemini 10x hum... I'm really looking forward to getting that new Video Pak 80 column card too... Keep that Yankee stuff coming in! Thanks again." — KL Robertson.

*Justin C Beck  
Managing Director  
Micromail*

## Post-hypnotic suggestion

The letter from W Harrison (APC May, page 69) on hypnosis has greatly intrigued me. Although the letter was of a humorous nature it had a ring of truth about it. Was there, perhaps, a PHS (post-hypnotic suggestion) contained within the letter to which I have responded?

I too have watched several

hypnotists' shows and was so amazed by them that I have since delved into various techniques for inducing trances. The approach of CAH (computer aided hypnosis) adopted by Mr Harrison is most interesting as it's known that television is an ideal medium for hypnosis (*Hypnosis: Fact & Fiction* by FL Marcuse, Publ Pelican), since the focus of attention is often completely captured and the normal censor mechanism can then be sidestepped. Indeed, if this were not so, commercial television would soon collapse as its revenue from advertising (based on 'suggestion', which has close links with hypnosis) would dwindle quickly.

Obviously, as Mr Harrison has already discovered, two people are required when modifying CAH programs: the operator in front of the console and an observer behind it watching for the glassy stare to appear in the eyes of the operator, often heralded by the eyelids dropping fractionally.

If Mr Harrison & Co really do have a computer tape available which they believe will induce a simple trance state, I would be very interested to see it.

*Dr R Evans*

*(So would we! — Ed)*

## Helpful suggestions

With reference to Mr Harrison's hypnotic problems (Communications, APC May).

Being a fully qualified psychoanalyst, I make the following suggestions to

improve his team's situation:  
1 Throw the micro in the bin.

2 Go on a long holiday to help clear the mind.

*D Maclean*

## End user copyright interests

In the discussion of software copyright and protection, too much attention is given to the interests of suppliers and manufacturers, and too little to the interests of end users.

I note with some amazement that some suppliers of compilers claim an interest in the sale of software produced using those compilers. The logical conclusion to this argument would be a situation in which the designers of (for instance) the Z80 would expect to receive royalties on every profit made with the assistance of a Z80. This is plainly ridiculous.

On a slightly different tack, I am as concerned as most about the difficulty buyers of multiple machines have in complying with the 'single-use' limitation imposed by software licenses. However, I do not see the remedy lying in attempts to rigidly enforce single user licensing in these situations, but rather in the issue of suitably worded licenses for multiple use of the software, accompanied by a suitably higher charge. The present situation makes criminals of us all.

May I bring to your attention an astonishing clause in the standard DEC software warranty which, while dis-

Atari  
is the official  
Home Computer  
of the 1984  
Olympic  
Games.

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

N.S.W.  
Education  
Dept. preferred  
computer

- 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
- 12 month Warranty.

## 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 (07) 277 9311 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 9933



# COMMUNICATIONS

claiming all responsibility for 'loss of data and profits' (the sort of effect which reliance on faulty software might very well have), indemnifies the user massively against 'direct damage to property caused by defects in the software'. How on earth can faulty software *directly* damage property? I don't wish to imply any shortcomings in DEC products, but is it surprising if people find it hard to take such inequitable contracts seriously?

M Taylor

(Maybe DEC's worried about its stuff being used for missile guidance! — Ed)

## Keyboard impressions

I'd like to correct two 'wrong impressions' in Conall Boyle's 'History of the Keyboard' (APC June).

The French government and the French telecom company PTT have been stepping up the installation of free online directories (Minitels) and it's the subscribers who scorn them!

Your writer shows a startling ignorance of keyboard instrument procedures when he remarks: 'On the piano, notes are usually struck together in the form of chords.' Most piano music is separate notes with mandatory fast action:

'Michael H Adler (*The Writing Machine*, Allen & Unwin, 1973) argues persuasively for a new standard keyboard that puts the 10 most common letters — ETAOINRSHD — on a single row, curved in such a way that each of the 10 fingers (thumbs included) rests comfortably on one of the keys . . . Adler delegates the space bar, the shift key and carriage return to the feet . . . This somewhat piano-like arrangement should result in much faster typing. As Adler points out: "After all . . . a pianist can

comfortably handle over 1500 to 2000 keystrokes a minute (the equivalent of 300 to 400 words per minute) on a much less compact keyboard than the one described, and without trying to break world speed records either.'"

This is from Phil Lemmon's *Short History of the Keyboard* (Byte November 1982, page 386). Incidentally, someone came up with a keyboard concept involving both relabelling of the keys (as in the Dvorak layout) and remodelling of the typewriter (as in the Norden or Adler concepts), and all that in the late 1970s! It was called, I think, the Maltron, and had a slightly curved squarish keyboard with ancillary functions (shift, C/R, space bar, and so on) on large contoured keys to the right and left of the main letter cluster. Unfortunately, it appeared a bit too early, before micros and daisy wheels, at a time when flat-top keyboards (Olivetti) were fashionable. Apparently, it sank without trace.

B Sigaud

(The keyboard's days seem to be numbered, don't they? — Ed)

## The spirit of discovery

Thank you for Surya's preview of Atari research on QLogo (APC April). From those pages I sense an attitude toward computing that is intellectual, practical, and realistic as well as open and completely undefeated by short-term markets. That is refreshing!

I have used [TLC] Logo in University of California Extension courses since June 1983. I believe it has somewhat anticipated others and combines Logo and Smalltalk ideas to offer users a sophisticated, interactive environment. Versions of

[TLC] Logo, as it has been implemented on a succession of micros, bring it even closer to achievement of a notation giving freedom to work with any type of object in a general way. Lists, vectors, and strings are all possible. Turtle is not a special case, and I can hatch as many turtles, or as few, as I wish, and send each my message. Each may swirl and dance in either unique or orchestrated ways. A descriptive approach keeps attention drawn to the application in particular situations — the actual functions and relations are kept in mind and not lost in the bureaucracy of prescriptions and procedures. Thinking is close to notation, and Logo work becomes alive and even beautiful!

It's important to remember that the idea of Logo is to present environments in educational settings appropriate for mathematics and science, not only in the area of concepts, but also of notation. It is very much that we educators want to bring the spirit of Soho, James Watts and discovery into its rightful place in the mathematics, science and computing curriculum alongside directed and prescriptive methods.

TLC Logo is a product of The Lisp Company, PO Box 487, Redwood Estates, CA 95044, USA. Attn: John R Allen

G Mason

## Don't leap 2000

In Communications in the May issue D Nowlan refers to the year 2000 as being a leap year. This is not correct. As you know we have leap years in order to enable the clocks to catch up with the sun, but a whole day every 4 years is just too much, so every 400 years the leap year is left out. The last time

this happened was in 1600 and so the year 2000 will not have a February 29.

W White

## Challenger Benchtest challenged

We greatly appreciate your interest and subsequent "Benchtest" on the "Challenger" reviewed on pages 46-54 of the May 1984 edition of *Australian Personal Computer*.

Some of your constructive criticisms were valid and almost certainly applied to the unit under test which, as you implied, was an early release. However we would like to make the following comments on sections of the evaluation:

1. Page 49/50 Keyboard. The keyboard described has every symptom of the pre-release keyboards. Sticking keys have been cured by completely retooling the key-matrix moulds. Key bounce has also been cured by replacing the original nickel-tin contacts with gold. We believe the lack of tactile feedback was caused by the original tight mouldings. Please feel free to fully test the enclosed latest version of the keyboard.
2. Page 51. The missing DOS programs could not be provided with the Challenger as they are IBM copyright programs. A Challenger version of the MODE program has now been developed and will be supplied with all future machines.
3. Page 51. Technical information at this stage has largely been omitted from user manuals and will be included in two other manuals, a Programmer Manual and a Technical Manual both of which are now being developed in the UK.
4. Page 51. Switch Settings.



# PROFESSIONALS ARE DELIGHTED WITH THE PERFORMANCE OF THE MORROW MICRODECISION

(THE BUDGET CONSCIOUS ARE PLEASED TOO)

MD2 TWO DISC DRIVES SSDD 400K, HIGH RESOLUTION  
TERMINAL, 80 CPS, 80 CHARACTER LETTER QUALITY  
PRINTER, 136 COMPRESSIBLE **\$2949** + ST

**AS**

**AUTOMATION STATHAM  
PTY. LTD.**

47 BIRCH STREET, BANKSTOWN, NSW 2200, AUSTRALIA.  
TELEPHONE: (02) 709 4144. TELEX: AA 73316.

# COMMUNICATIONS

All switch settings for the System Unit are detailed in Appendix G of the System Unit manual.

5. Page 54.

The Challenger *must* be set for either RGB video or composite PAL video. Failure to do this results in incorrect colours and loss of intensified characters. This setting is detailed in Appendix G of the manual.

6. Vertical Synch.

Screen 1 and Screen 2 are always in 60Hz mode. Screen 0 (Text screen) can be set for 50Hz or 60Hz. If set for 50Hz and connected to a monitor that is adjusted to 50Hz then vertical synch. may be lost when screen 1 or 2 is entered, although most monitors can be adjusted to lock in both modes. Dip switches are now set so that video is always 60Hz. The IBM PC is always 60Hz unless reprogrammed by Australian Software.

We would like you to take the opportunity of re-evaluating the Challenger in light of the above factors and assure you of our co-operation at all times.

*Michael Wilson*  
General Manager  
Dick Smith Electronics

*Ian Davies, who conducted the Benchtest, will reply in the next issue — Ed.*

## Microchess

Congratulations on your excellent article in Microchess concerning the Scisys Superstar chess computer. The article truly reflected the chess computer market in 1983 where stronger chess computers were released at much lower prices than in previous years.

Of particular interest was the results of the tournament games between Scisys Superstar and Novags' Constellation and the reference to the "End game" strength of the Superstar. In chess, the openings can be learned

from books, the middle game is a matter of not making mistakes but it is the quality of the "End game" which separates club players from grandmasters as the moves in the "End game" are virtually infinite. To create a strong chess end game is the greatest challenge to programmers of chess computers.

Scisys introduced the first strong "End game" chess computer with the MK V which won the micro chess world championship in September 1981. The Superstar is the latest continuation of the programming techniques used in the MK V.

The version in your article was Superstar version 21. The current version on the Australian market is Superstar version 25 which is about 10% stronger. In your article you mentioned Gary Kasparov was assisting Scisys in the development of a 36k upgrade module. It is worthy to note that this module will be released in Australia in September, the same month that Kasparov is challenging Karpov for the human world chess championship in Moscow. Kasparov is rated higher than the world champion and is expected to win the championship. It is therefore quite a coup for Scisys to obtain his services, and players interested in the continuing increase in strength of computer chess programs will be in for a treat when the Kasparov 36k Superstar chess computer is released.

I thought this information would be of interest to your chess playing readers and look forward to more unbiased reports on chess computers in Microchess.

*Kerry Harrison*  
Computerplay

## Quicker labels

Reference is made to two

recently published programs in APC designed to print labels for cassettes.

I fail to see why it should be necessary to go to such lengthy programs when it can be cut quite short.

Attached hereto please find a program that will do the same job with a lot less effort. It was done on a System 80 computer and printed on a CE 60 Brother printer/typewriter.

I trust it will be of some interest to you. As it is based on the last month program I can take no claim for the originality of the program.

*K Nutt*

## We were wrong

The excellent Benchtest review of the HP150 published in the May issue of *Australian Personal Computer* was unfortunately marred by an erroneous reference to pricing at the end of the article.

Hewlett-Packard Australia Limited, has carefully priced the HP150 to be competitive, particularly with the IBM PC.

A similarly configured IBM PC would, I believe be more expensive than the HP150

```
80 CLEAR 200
110 A$=STRING$(47,"=")
120 B$=STRING$(20,"-")
130 D$=STRING$(47,"-")
140 LPRINT CHR$(27);(50)
160 FOR Z=1 TO 2
170 LPRINT D$;" "
180 FOR I=1 TO 15
190 LPRINT USING "***";I;
200 LPRINT B$;";";C$;" ";
210 LPRINT USING "***";I;
220 LPRINT B$;";";C$
250 NEXT I
255 LPRINT A$;" "
260 FOR I=1 TO 15
270 LPRINT USING "***";I;
280 LPRINT B$;";";C$;" ";
290 LPRINT USING "***";I;
300 LPRINT B$;";";C$
310 NEXT I
320 LPRINT:LPRINT
330 LPRINT A$;" "
340 FOR X=16 TO 21
350 LPRINT USING "***";X;
360 LPRINT B$;";";C$;" ";
370 LPRINT USING "***";X;
380 LPRINT B$;";";C$
390 NEXT X
400 LPRINT D$;" "
410 LPRINT:LPRINT:LPRINT
420 NEXT Z
430 END
```

Cassette label printing program



**AUSTRALIA'S LARGEST DIRECT MARKETING COMP SUPPLIER**

## UNIVERSAL PARALLEL PRINTER INTERFACE

**PRINTRON INTERFACE**

**\$99**



Now you can use your Vic-20 & C-64 with any standard Parallel input printer. And you don't have to give up the use of your user port (MODEM), or use special printer commands, or load any special software driver programmes to do it. Just plug in our PRINTRON and print away! You can access all of the advanced functions of today's printers.

- \* Outputs standard ASCII
- \* Plugs in your computer's serial I/O port
- \* Understands all Vic Print commands
- \* CBM to ASCII Conversion
- \* All functions software selectable, (Tab, Upper/Lower Case, Auto Line Feed, all from the keyboard)
- \* No special programming is needed
- \* Includes all cables for a standard Centronics Parallel hook-up
- \* Full Graphics capability
- \* Doesn't tie up your cartridge or games ports
- \* Includes a 48 p. manual with programming examples.



## Koala Pad for Apple \$180

*The Modem  
you've been  
waiting for . . .*

# HERE NOW!



### AUTOMATIC ICE CO. DIRECT CONNECT MODEM FOR APPLE II AND IIE.

1. 300 baud full duplex or 1200/75 & 75/1200 baud with optional automatic line turnaround.
  2. Auto answer — auto dial.
  3. Fits completely in Apple slot — does not require serial card. Conforms to 'Apple Firmware' standard — compatible with Pascal and CP/M.
  4. Asynchronous or synchronous operation. Supports Bisynch, HDLC, SDLC and X25 at the link level. Flag generation, CRC error code generation and checking are all done by hardware. All registers and operating parameters are fully software programmable.
  5. Onboard loudspeaking conference telephone. Software controlled — also audibly indicates call progress.
  6. Senses true dial tone, ring tone and busy tone. Generates error messages.
  7. Pulse or DTMF (tone) dialling. When used with DTMF telephone exchanges, connection to the called party can be established in less than one second.
  8. Has onboard colour Videotext (Prestel) system in firmware. Eventually will also support NAPLPS.
  9. Can emulate Hayes Micromodem, Hayes Smartmodem, Apple serial card, Prestel terminal as well as its own modes, some of which include automatic error correction based on the Christansen Protocol. A fully transparent mode is available.
  10. Default operating parameters are stored in battery backed RAM & can be changed at any time under software control.
  11. 2Kx8 CMOS RAM powered by an eight year lithium battery stores default parameters, phone numbers and log on strings, allowing single keystroke call establishment.
  12. Provision for EPROM up to 16Kx8.
  13. Onboard battery backed clock can time & initiate calls. Also accessible for other uses including PRODOS. Emulates Thunderclock.
  14. Optional standard telephone connection on the modem allows easy installation into existing phone plug. When the modem is not engaged the telephone acts in the normal manner.
  15. Firmware will eventually contain most communication facilities, making additional communication packages unnecessary. Virtual disk transfer and direct read/write to disk is envisaged.
  16. Has socket for installation of DES data cypher chip for security identification and EFT applications. Permission is required from the American State Dept. for purchase of cypher chip.
  17. Optional search and setting to incoming baud rate and word format.
  18. Can act as an automatic telephone dialler with multiple redial and 'dial alternate number' features.
- Note: The hardware is final and is capable of all of the above but the complete firmware may not be available initially. We will exchange the EPROMS when the final firmware is available.

**MAIN OFFICE:**

**40 LAMAN ST  
NEWCASTLE**

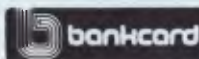
**POSTAL ADDRESS: PO 154  
CHARLESTOWN 2290  
9 to 5 (049) 26 4214**

**STD FREE  
ORDER HOTLINE**

**(008) 02 5229**

**WAREHOUSE AND AFTER 5 PM**

**17 PARK RD  
GARDEN SUBURB  
PHONE ENQUIRIES:  
(049) 43 6805**



**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**

## PRICE ISN'T EVERYTHING

Yes, it's true we have the **LOWEST PRICES** in Australia on **QUALITY** computer peripherals. It's also true that we have **OVERNIGHT DELIVERY** anywhere in Australia and offer **10 DAY MONEY-BACK** and **6 MONTH FULL SERVICE GUARANTEES**.

But did you also know that:

- ★ We are the largest direct-marketing computer supplier in Australia. Scouts honour.
- ★ We have excellent hardware servicing facilities.
- ★ We only sell **TOP-QUALITY** products.
- ★ You can order by **PHONE** using **BANKCARD** with complete security. Guaranteed.
- ★ You get to speak to people who **KNOW** about **COMPUTERS**. (George or Bernard).
- ★ We treat you like a **FRIEND-OF-THE-FAMILY**.

So next time you can't find a parking spot or the computer store salesman doesn't know what you're talking about (much less what he's talking about) give me a call. You'll find that low prices are only part of the service.

### GUARANTEE

- 1 WE SERVICE WHAT WE SELL. WE WILL ONLY SELL QUALITY PRODUCTS FOR WHICH WE HAVE SPARES & DIAGRAMS. WE WILL NOT SELL CHEAP RUBBISH.
- 2 ALL HARDWARE CARRIES A 6 MONTH FULL SERVICE WARRANTY
- 3 ALL HARDWARE CARRIES A 10-DAY MONEY-BACK GUARANTEE IF GOODS ARE UNSATISFACTORY

*Hello again,*

Well it had to happen. We've grown so fast we have had to open a city office for 9 to 5 sales, service and despatch. For all enquiries our new number is (049) 26 4214. Credit card orders can now be made STD free on (008) 02 5229.

Industry News: — Round two to Apple. Apple won their Computer Edge appeal on May 29. This effectively returns copyright protection to software. Bye-bye Mr Langer. And Unggar Soemardjo!

Component shortages are soaring the exponential growth in the computer industry. Delivery times of 30 weeks and up are being quoted on certain chips so expect to see total shortages by Christmas of drives, printers, monitors, everything. Moral: Buy it now. Remember, you heard it here first.

New Products. Well it's arrived! Dennis' modem. And it's fantastic so aren't you glad you waited 2 years? Limited quantities now available. Go on. Spoil yourself!

Coming soon: AMUST 120 Super printer. 100 c.p.s. \$349 ex. \$399 inc. 8" Disk boxes — hold 50 — \$50.

Now working: AMUST 10Mb hard disk for Apple. \$1995 ex. Great value. Runs everything.

Top sellers: DT80 printer. Hundreds in stock. Thousands sold. Top value at \$268 ex. \$315 inc. DISKS. Selling 5000 per week and no wonder at the price. Top quality Control Data Storage Master, MicroEd logo disks \$32 per library box.

Well that's the news. Next time you're in Newcastle why not drop into our Laman St office for a cup of coffee.

*George*

### PRICE LISTS (RING FOR BULK ORDER DISCOUNTS)

PRODUCT	Tax	OnTax	Ex	PRODUCT	Tax	OnTax	Ex
<b>DISKETTES</b>				<b>APPLE PERIPHERALS</b>			
Diskettes, Micro-Educational, SS, DD.				Disk drive controller card	\$ 90	\$ 80	
Reinforced hub, plastic library box				Automatic Ice parallel I/F and cable	\$110	\$ 99	
10-99	\$3.20	\$2.80		Automatic Ice Direct Connect	\$399	\$349	
100-499	\$2.90	\$2.49		Apple Modem			
500+	\$2.80	\$2.35		Down-Under Clock	\$ 99	\$ 99	
<b>BULK DISKS (No Boxes)</b>				Z80 card	\$ 90	\$ 80	
10-99	\$3.00	\$2.60		Vision-80 80 col card for Apple II or	\$199	\$179	
100-499	\$2.70	\$2.29		ite (spec)			
500+	\$2.60	\$2.15		Vision-80 128K Ramcard	\$395	\$345	
Disk boxes, Lockable, hold 100	\$ 35	\$ 35		16K ramcard	\$ 90	\$ 80	
<b>PRINTERS</b>				Music Machine includes speakers	\$145	\$120	
Dot-Matrix printer, Micro-	\$315	\$265		S.A.M. Speech Synthesiser	\$ 65	\$ 65	
Educational DT80				Wildcard, Snapshot or Replay, ea:	\$ 90	\$ 80	
Serial option for DT80	\$ 95	\$ 95		Power Supply (7A)	\$110	\$ 99	
DT80 printhead	\$ 65	\$ 55		Dataliner 300 electric copyholder	\$ 99	\$ 99	
DT80 ribbon	\$ 12	\$ 10		Clip-on fan, includes surge	\$ 65	\$ 65	
C.I.T.O.H 1550 dot-matrix printer	\$985	\$875		suppression			
CABLES: IBM, OSBORNE, TRS80,	\$ 35	\$ 35		Joystick	\$ 45	\$ 45	
TI 99, BBC, etc				Koala Pad graphics entry tablet inc	\$180	\$160	
MicroBee cable	\$ 50	\$ 45		software			
Silver Reed 500 Daisywheel	\$825	\$695		Game Port Extender (2 socket)	\$ 35	\$ 35	
AMUST Super 120	\$399	\$349		Game Port Extender (2 socket	+\$ 50	\$ 50	
<b>DRIVES (Apple compatible)</b>				Vision80/Zardax mod)			
TEAC Slimline drive	\$339	\$299		RF Modulator	\$ 40	\$ 34	
Atlas Slimline Drive	\$265	\$235		Apple Mouse Keyboard function	\$ 79	\$ 79	
Chinon slimline	\$275	\$275		extender for II+			
<b>MONITORS</b>				DT 80 Ribbons	\$ 12	\$ 10	
BMC Green Screen (Japanese)	\$195	\$170		Monitor stands, swivel & tilt	\$ 25	\$ 20	
Yang Jen 12" monitor, amber	\$195	\$170					
BMC Amber	\$195	\$170					
EA 9" Amber	\$195	\$170					

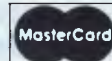
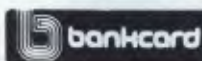


**MAIN OFFICE:**  
40 LAMAN ST  
NEWCASTLE  
POSTAL ADDRESS: PO 154  
CHARLESTOWN 2290  
9 to 5 (049) 26 4214

STD FREE  
ORDER HOTLINE

**(008) 02 5229**

**WAREHOUSE AND AFTER 5 PM**  
17 PARK RD  
GARDEN SUBURB  
PHONE ENQUIRIES:  
(049) 43 6805





## AUSTRALIA'S LARGEST DIRECT MARKETING COMP SUPPLIER



~~\$745~~ ex  
~~\$880~~ inc

SERIAL OR  
PARALLEL 17 c.p.s.

**\$695** ex  
**\$825** inc



**\$349** ex  
**\$399** inc

100 c.p.s. **EPSON COMPATIBLE**

Choose the Fast One:



**PROM 8200  
Programmer  
Version D**

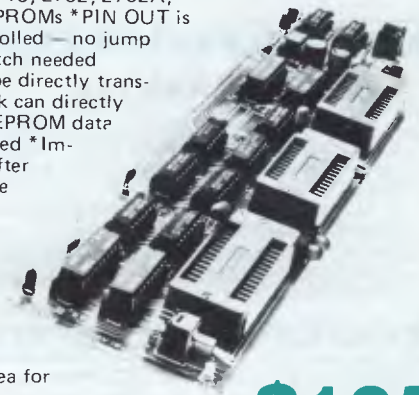
**\$1295** ex  
**\$1450** inc

This BIPOLAR PROM/EPROM programmer features incredibly fast copying speed. Its intelligent algorithm needs only 20 seconds to finish a 2716 copy, and boasts a powerful telephone memory handling capability of 16K to 256K EPROM, and 32-bit to 32K BIPOLAR PROM.

For more on this powerful, low-cost multi-function programmer and the rest of our products, contact us today!

## The YKH-128 EPROM Programming System for Apple II Interfacing

\* For Apple II and compatible personal computers \* Programs 2716, 2732, 2732A, 2764, and 27128 EPROMs \* PIN OUT is fully software controlled — no jump wire socket and switch needed \* EPROM data can be directly transferred to disk or disk can directly program EPROM \* EPROM data is immediately printed \* Immediate auto-stop after finding errors in byte \* Program process, time, and address can be displayed on monitor \* When in EDIT mode, address counts up, counts down, or moves over EDIT area for high speed checking.



YKH-128

**\$195**

**NEW!**

## DOWN-UNDER CLOCK

**for Apple \$99!!**

Fully PRODOS and THUNDERCLOCK compatible. Battery backed. Grab one NOW!

## BOSS-1

Keyboard for Apple II+

**\$180** ex  
**\$199** inc



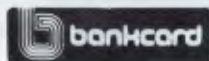
MAIN OFFICE:

40 LAMAN ST  
NEWCASTLE

POSTAL ADDRESS: PO 154  
CHARLESTOWN 2290  
9 to 5 (049) 26 4214

STD FREE  
ORDER HOTLINE

**(008) 02 5229**



WAREHOUSE AND AFTER 5 PM

17 PARK RD  
GARDEN SUBURB  
PHONE ENQUIRIES:  
(049) 43 6805

**VISION - 80 COLUMN**

**\$179** (ex tax)      **\$199** (inc tax)



80 Column Text Card for Apple II or IIe (please specify) + \$5 COURIER

**C. ITOH 1550 PRINTER**



**\$875** ex  
**\$985** inc  
+ \$12 Courier

- ★ 120 C.P.S.
- ★ Friction Tractor
- ★ A 24 hr/day workhorse
- ★ Parallel & Serial
- ★ Graphics

Clip on fan for your Apple



**\$65**

includes single suppression

**DATALINER**



A3 **\$129**  
A4 **\$99**

NORMAL RETAIL  
**\$249!!**

*Electric Copyholder*



Automatic Ice direct-connect modem (Apple version)

**\$349** ex, **\$399** inc + \$5 Courier

**NOW AVAILABLE**

Swivel Base for Video Display Monitors & TVs. Lets you turn your monitor or TV to any position you like!



**\$25** inc. tax

**\$20** ex. tax

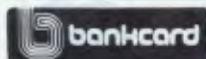
Swivels a full 360° — features 12.5° up/down tilt adjustment

MAIN OFFICE:  
40 LAMAN ST  
NEWCASTLE  
POSTAL ADDRESS: PO 154  
CHARLESTOWN 2290  
9 to 5 (049) 26 4214

STD FREE ORDER HOTLINE

**(008) 02 5229**

WAREHOUSE AND AFTER 5 PM  
17 PARK RD  
GARDEN SUBURB  
PHONE ENQUIRIES:  
(049) 43 6805



**AUSTRALIA'S LARGEST DIRECT-MARKETING COMPUTER SUPPLIER**

## BEST PRICES BEST SERVICE

*That's me! George.*

We can do it because we're the biggest. Look at our track record: • 6 years in operation • 9000 customers • Multi-million-dollar sales • Overnight delivery anywhere in Australia • Full service and money back warranty • Phone orders • Friendly service. And **WE WON'T BE BEATEN ON PRICE!** Why would you buy elsewhere? Even our competitors buy from us! It's true! Look at our top-selling products.



### BEST SELLERS

<p><b>PLASTIC BOX OF 10</b> <b>NEW:</b> Control Data Storage Master Disks With 5 Year Warranty!</p>  <p>5¼" S.S.D.D. <b>\$29 ex</b> <b>\$32 inc</b></p> <p>8" S.S.D.D. <b>\$38 ex</b> <b>\$42 inc.</b></p> <p>+ \$2 POST</p>	<p><b>MICRO-EDUCATIONAL DT80 PRINTER</b> <b>\$268 ex.</b> <b>\$315 inc.</b></p>  <p><i>Reduced AGAIN!!</i></p> <ul style="list-style-type: none"> <li>★ Australia's Top-selling Printer. 10,000+ sold!</li> <li>★ Epson MX80 Compatible</li> <li>★ GRAB ONE NOW!</li> <li>★ Friction/Tractor</li> <li>★ 80 C.P.S.</li> <li>★ 6 Months Full Warranty</li> </ul>	 <p>DX-85 for 5¼" Disks <b>\$35</b></p> <p>Dx-88 for 8" Disks <b>\$50</b> (Holds 50)</p> <p><b>LOCKABLE DISK BOX</b> HOLDS 100 DISKS</p> <p>+ \$2 POST</p>	
 <p><b>BMC 18 MHZ MONITOR</b></p> <p>GREEN SCREEN MONITOR <b>\$170 ex.</b> <b>\$195 inc.</b></p>	<p><b>SUPER 5 DRIVE</b></p> <p><b>\$235 ex.</b> <b>\$265 inc.</b></p>  <p>APPLE-COMPATIBLE SLIMLINE</p> <p><i>Super quiet Super reliable</i></p>	<p>AMBER <b>\$199</b></p>  <p><b>YJE MONITORS</b> NEW SWIVEL BASED MONITORS. HIGH RESOLUTION GREEN &amp; AMBER 20 MHZ BANDWIDTH</p>	 <p><b>\$45</b> <b>APPLE JOYSTICK</b></p>

**PHONE ORDERS:** Ring our toll free number:(008)02 5229 for Bankcard and MasterCard orders only. Overnight delivery by Kwikasair anywhere in Australia add \$5 or \$9 (printers & monitors).

**MAIL ORDERS:** Send cheque/postal order/or Bank/MasterCard number to PO Box 154 Charlestown 2290.

**ENQUIRIES:** and orders: (049) 43 6805 and (049) 43 0624.

**RING NOW:** George, Bernard, John and Sue are waiting to take your call 9 am to 8 pm Mon to Fri. 9 to 2 Sat.

<p><b>MAIN OFFICE:</b> 40 LAMAN ST NEWCASTLE POSTAL ADDRESS: PO 154 CHARLESTOWN 2290 9 to 5 (049) 26 4214</p>	<p>STD FREE ORDER HOTLINE</p> <p><b>(008) 02 5229</b></p>  	<p><b>WAREHOUSE AND AFTER 5 PM</b> 17 PARK RD GARDEN SUBURB PHONE ENQUIRIES: (049) 43 6805</p>
---	---	--





AUSTRALIA'S LARGEST DIRECT MARKETING COMP SUPPLIER

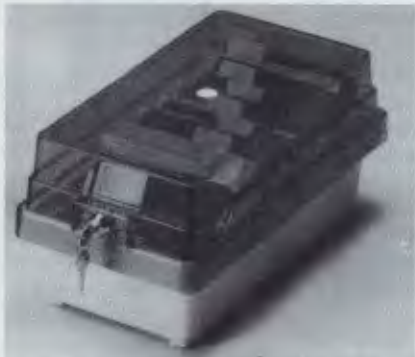
## This magnificent collector's item

# YOURS FREE

with every purchase of:



### LOCKABLE DISK BOX



## \$35

### DISKS



## \$32 (INC TAX)

Delivery  
1 Box \$2  
More than 1 Box \$5  
(Courier Del.)

### Or any order for that matter over \$30!

Well, it's enough to make you roll over and go back to sleep. They've taken away our dollar note. Must be the only country in the world with a \$2 unit of currency!

Anyway, despair not. Good old George has come to the rescue again. Being the boy scout that I am I have managed to rescue a pile of mint, unused, uncirculated one dollar notes stashed away against the day they'll be worth more than the paper they're printed on. Maybe much more.

I'm hanging on to most of them for posterity, but I've decided to give a few away to friends of the family as fond keepsakes of a gentler past. If you would like me to send you one (Nicely packed in its own plastic wallet) just drop me a line on the enclosed order form.

Oh yes, to qualify as friend-of-the-family just buy a lockable disk box a \$35, +2 post or a box of our new Storage Master disks (Same price of \$32 plus post and now with 5 year warranty) or any order over \$30 using the enclosed order form and we'll call the dollar "change" to keep the taxman happy. I'll only be giving away 500 (one per box) so if you would like to rescue your little piece of Australiana (Available only to mail order customers) better be quick. If you miss out because you're too slow I'll send you a mint uncirculated dollar coin as consolation. Scout's honour.

### ORDER FORM

Dear George,

Quick, send me my dollar(s) before they're all gone. Would you please send me

- DX85 lockable disk box(es) at \$35.
- box(es) of Micro-Educational Storage Master disks by Control Data at the bargain price of \$32 per box.
- (other goods over \$30)

Enclosed please find cheque/Bankcard No. .... for \$ ..... which includes \$2 per box postage (Maximum charge \$5). Please enclose one dollar per box in change.

Regards:

P.S. Please send to me as follows:

Name: .....

Address: .....

POSTCODE: .....

# YES YOU CAN PHONE THE VIC CENTRE MAIL ORDER DEPARTMENT ON (008) 777 130 STD FREE

The **VIC CENTRE** mail order department is open now 24 hours a day 365 days a year, here you can phone **FREE** on **(008) 777 130** at any time whatsoever from any where in Australia.

## **YOUR PHONE CALL REFUNDED**

Try it NOW. Phone **(008) 777 130** to put your name on the mailing list and you will be credited your 20¢ for the local call charge against any future order that you place.

## **YOUR FREE "MENU"**

You will also receive **FREE**, if you have not already done so, a copy of the **VIC CENTRE "MENU"** (cost \$3.50). This is a 152 page book cataloging the majority of C64 and VIC-20 hardware, software and publications available in Australia to-day together with pages of hints and tips on the C64 and VIC. There is even an amateur radio section.

## **FREE USER NEWSLETTER**

Also once on the mailing list you will receive your regular **FREE** user newsletter which will hold technical tips, useful hint, specials and other benefits.

## **FREE STD PHONE CALL**

We have now installed for you the latest Telecom (008) phone service on which you can phone the **VIC CENTRE** order department from anywhere in Australia for the price of a local call. We will deduct from your order the 20¢ local call charge, making your call to us truly **FREE**.

## **FREE 24 HOUR SERVICE**

As well as the **(008) 777 130** number we have installed for you the very latest computerised telephone answering and ordering machine available from U.S.A. This will allow you to order 24 hours a day 365 days a year. During business hours we talk to you personally.

## **YOU CAN SAVE**

You can now save money; save time with the convenience and pleasure of shopping from your home, you can choose at your leisure the items that you would like delivered to your door. We have available for you almost any item of software or hardware available for Commodore in Australia to-day and if not in stock we will advise you, by phone or post, when it is expected in or suggest an alternative.



## **SPECIALS**

We will have specials from time to time for you that will be announced in your **FREE** users newsletter or you can phone our enquiry number (07) 397 0888 for further details.

## **STOCK**

You will find that we endeavour to keep in stock most items from Australia's and the world's most reputable companies including those listed below.

## **LARGE RANGE**

Our ever increasing range includes both software and hardware from:-

*Commodore, Imagineering, Ozi soft, Kiwisoft, Progressive Software Company, Abacus, Romik, Totl, South Pacific Software, Quicksilva, Micro Applications, High Technology, Ashton Scholastics, ANZ Book Co., Computer Classics, Computer Market, Dataform, Kim Books, Pittwater Computers, Melbourne House, Lamasoft, Umi, Hes, Creative, Auto Simulations, Pixel, Phototronics, Wizware, Microgenis, Currah, The Vic Centre, Computer Craft, Contronics, Vic Education* and others.

We also stock a large range of amateur radio equipment including *ICOM, YAESU, DIAWA* and *ATN* etc.

## **OUR GUARANTEE TO YOU**

Beside the manufacturers warranty you will have our personal guarantee to replace or repair any faulty item (in original condition and packaging) returned to us within 90 days of the date of your **VIC CENTRE** invoice date.

## **CREDIT CARDS**

We accept your Bankcard, Master card, Visa card and American Express for all phone and mail orders.

**SAVE** money, **SAVE** time and phone **FREE** right **NOW** from the comfort of your home.

What could be easier for you than placing an order with the **VIC CENTRE**. Phone the order department now on **(008) 777 130**.

For enquiries and local Brisbane orders phone (07) 397 0888 for prompt service.

Mail orders are also welcome at the **VIC CENTRE**. Write to:

**THE VIC CENTRE**  
416 LOGAN ROAD,  
STONES CORNER,  
QLD. 4120  
TELEX. 40811

**POSTAL ADDRESS**  
PO BOX 18,  
STONES CORNER  
QLD 4120.

## **DISTRIBUTORS, SOFTWARE HOUSES, BOOK PUBLISHERS & MANUFACTURERS.**

If you wish your products to sell whether they be Commodore, IBM, APPLE etc. Contact Brian Beamish of the **VIC CENTRE** as we are looking to increase our range extensively.

**STD** orders only **(008) 777 130**.

**Local and enquiries (07) 397 0888.**

# COMMUNICATIONS

configuration to which you refer.

As a result, your readers could get the impression the HP is more expensive when it is not.

*Russell Lea  
Marketing Communications  
Manager  
Hewlett-Packard Australia*

*You are correct. The sales tax inclusive price of an IBM PC with the 5 inch floppies, 256k of RAM and a green screen monitor is \$6446 (as opposed to the HP150's price of \$5739).*

*I would like to state that the error was not that of the Benchtester, but of a sub editor (who has been suitably scolded). — Ed.*

## Compatibility questions

I am most concerned with the implication drawn in your recent Benchtest report regarding IBM-PC compatibility of products on display at the *Australian Personal Computer Show* in Sydney.

I heartily applaud your stance regarding the many suppliers claiming compatibility. However, I am most concerned that the TeleVideo Tele-PC by implication has been ranked with the less than compatibles.

There were five Tele-PCs on display at the show, on our stand and our dealers — ADE, Arcom Pacific, Osborne Sales and The University Co-Op Bookshop. There was no excuse to miss it. All stands were offering standard Lotus 1-2-3 for \$299 as an introductory offer and we were demonstrating colour output from Lotus 1-2-3 on a Tele-PC to both a three pen plotter and an 8 colour ink jet printer. Not all machines on display had the 192k memory compliment to run Lotus 1-2-3.

In surveys and tests by

US PC World, Computerworld, Pacific Computer Weekly and others, the Tele-PC has always scored the highest level of compatibility.

I trust that your reviewer would be prepared to ensure that this oversight is corrected in the minds of your readers.

*Brian Killin  
Managing Director  
Data Peripherals*

## Spectravideo vs BBC

OK, how much do I get to sue Spectravideo for, or do I have to take my place in the queue? Upon opening the November issue of *APC* I saw an ad on page 177 comparing the Spectravideo computer to the BBC model B. Under the assumption that companies don't place full-colour page ads in national magazines to embarrass themselves I read the ad and found Spectravideo comparing the two computers the only way they favourably could, by lying through their teeth. A few points:

1. The BBC has 32k ROM expandable to around 16 x 16k ROMs (256k) each of which may be used separately. Not 16k expandable to 64k as claimed in the ad.
2. The BBC can be expanded to 96k memory, not 32.
3. It can have, to my knowledge, at least 32 user definable functions, not 10.
4. It has a separate cartridge slot.
5. It can have sprites with the purchase of a graphics ROM.
6. The BBC has 4! F-O-U-R channels of 7 S-E-V-E-N octaves, not 1 channel of 3 octaves.
7. Spectravideo claim the BBC has 100k disk capacity. I suppose the dual 400k drives in my living room officially ceased to exist as of November? And the 1Mb

hard drives available in England too? Low-profile drives ARE available.

8. Can anybody tell me what "Special word processing" is under keyboard features?

These are all mistakes from only one of the seven computers compared. Are they all as error-ridden? Would someone from Spectravideo mind replying to this letter explaining just where they got their facts from?

*B Hyslop*

*We would like to reply to Mr Ben Hyslop's allegation.*

1. BBC is only expandable to 64 ROM 4 x 16 (see paragraph 4 of BBC's own brochure).
2. Please refer to "Memory" paragraph 2 in the BBC instruction book.
3. Please refer to "Key Board" re user definable function keys.

4. The BBC M/- does not have a separate games cartridge slot, it has only cassette interface. RS 423 (RS 232C) ETC. slots. See diagram on page one. If you want to interface cartridges you must buy a separate "Cartridge ROM pack interface".

5. The BBC has definitely no sprite built into the computer. This was confirmed by BBC on June 14.

6. The BBC has only 3 music channels (NOT FOUR) see "tone generation".

As you can see either Mr Ben Hyslop does not know his computer or Barsons and BBC are short selling their own computer.

P.S. The Spectravideo does have special word processing keys "CLS/HM, copy, ins, paste, del, cut, select and print.

*M Myer  
Spectravideo*

## A word on the care and maintenance of your micro computer...

### Rexel

*"See us at  
PC 84  
Melbourne"*

A regular maintenance program helps prevent data loss, errors and expensive service calls. And more — you can actually extend the life and improve the performance of your micro computer with Rexel Wilson Jones computer care products:

- Wilson Jones Head Cleaning Kits for 5¼" mini disk and 8" flexible disk drives.
- Wilson Jones Micro Maintenance Kit for computers, word processors, terminals and peripherals.
- Wilson Jones V.D.U. Cleaning Kit for terminal screens and keyboards.
- Wilson Jones Anti-Static Kit — for surrounding areas.
- Wilson Jones Type Element Cleaning Kits for printwheel and golf balls.
- Wilson Jones Anti-Static Desk Mats prevent charge sparking through micro-circuitry.

From office and computer supply specialists and wherever quality office equipment is sold.



Getting the whole world organised

New South Wales (02) 736 1888. Victoria (03) 329 8966. Queensland (07) 52 7866.

SAAREX49/84

**LOGITEC**

**2**

**FT-500 Dot Matrix Printer**

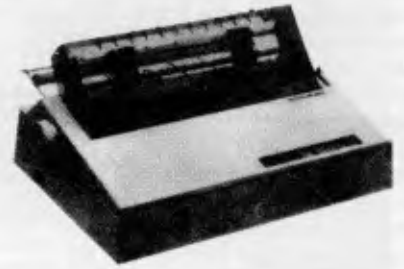
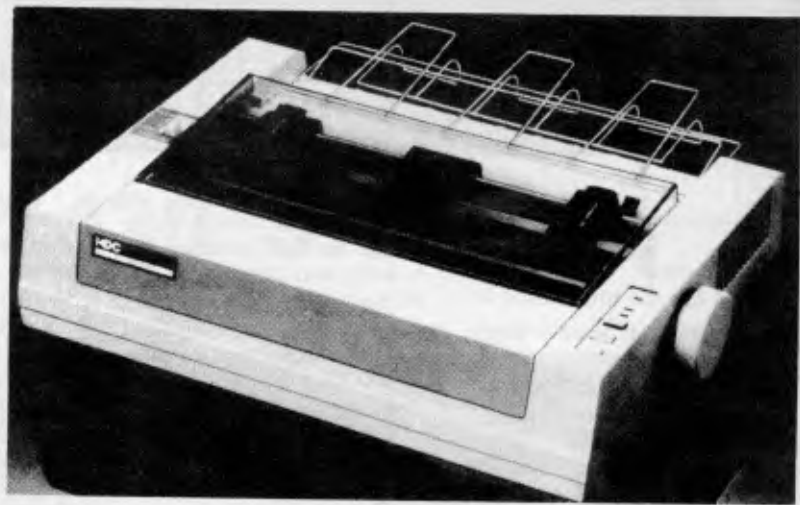
Low-cost and reliable  
with graphic capability  
Elite, Pica typefaces  
Enhanced with selectable  
62 characters memory capacity  
120 CPS & MUCH MORE  
FOR

VERY

LITTLE

**(\$408 Inc Tax)**

IBM COMPATIBLE IN GRAPHICS MODE



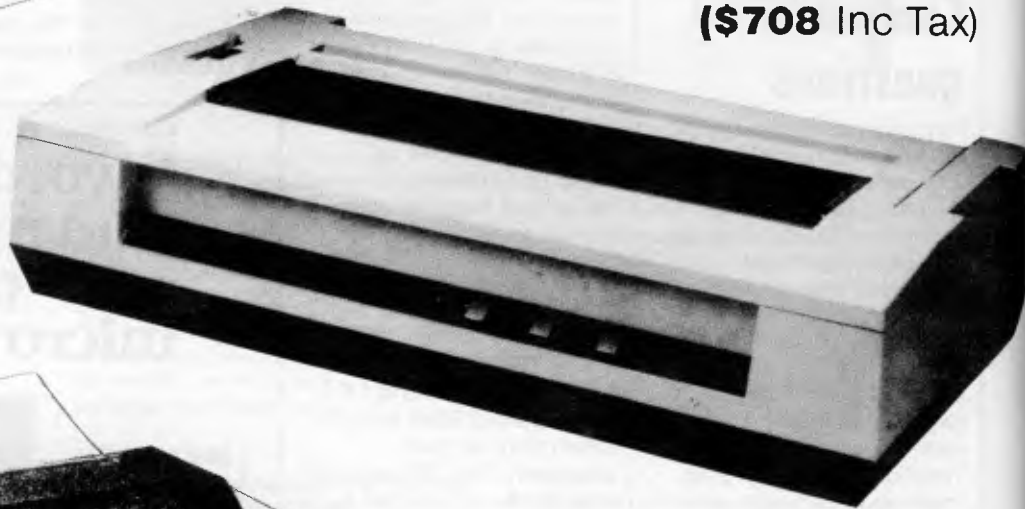
**BROTHER HR15**  
DAISY WHEEL PRINTER  
**(\$708 Inc Tax)**

**WP550**  
**(RS232 & PARALLEL)**  
DAISY WHEEL PRINTER

HIGH QUALITY  
AT A LOW PRICE

**(\$708 Inc Tax)**

INCLUDES FRICTION  
& TRACTOR FEED



**C ITOH 1550**  
15" WITH THE LOT  
Tractor & Friction Feed  
**(\$900 Inc)**



**CP80**  
**(EPSON WORKALIKE)**

80 cps; 80 Columns;  
Tractor Feed; Friction Feed

**(\$299 Inc Tax)**

**MICRO ~ BUFF**

**TELEX AA 139718**

**TELEPHONE 277 7754 (ASK FOR RAY POPE)**

**499 HIGH STREET ROAD,  
MT WAVERLEY 3150  
MELBOURNE, VICTORIA,  
AUSTRALIA**

# COMMUNICATIONS

## Commodore backlog

Having had two recent experiences of long delays in (warranty) repairs, along with several unsuccessful attempts to find out information, I am hoping you will publish my complaint about the excessive time that Commodore is taking these days.

My first experience was back in October last year, when I wrote to Commodore about a new ROM chip for my 1526 printer. The reply stated that a replacement "will be supplied as soon as possible", and mentioned a delay of about 4 weeks. That was six months ago, and I have only now received the replacement ROM after my dealer went in personally.

Complaint number two concerns my 1541 disk drive, which misbehaved at the youthful age of ten weeks. It was returned by my dealer on February 24 for repairs. A letter from me and a visit from my dealer on Friday April 6 have still not discovered any trace of it.

I keep hearing rumours of a massive backlog of repairs. I know of one other hapless user who had his machine in the repair shop from just after Christmas until late February.

Just what is going on at the Commodore repair shop? Why is a generally fine computer being spoiled by such frightfully inadequate service?

*P Stanhope  
Secr. Wollongong Users  
Group, NSW.*

*Your frustrated correspondent, raises concern (which previously we have shared) about the servicing of Commodore computers.*

*The overwhelming response of Australians to the Commodore 64 and the VIC 20, both of which have become the most popular*

*computers in Australia, resulted in unfortunate delays in our servicing. But the difficulties we faced in trying to keep up with the success of our Commodores have become a matter of history rather than of current fact.*

*In fact there are some 275,000 Commodore computers in homes throughout Australia, and sales are still setting new records each quarter.*

*The early strain that was placed on our service department has now been relieved with the appointment of additional service staff in Sydney, the establishment of service centres in Melbourne, Perth and Brisbane, and shortly a service centre in Adelaide to provide even faster service.*

*Certainly the days of a six week delay are gone. Most serviced hardware is turned around in a matter of only a few days.*

*We're sorry for the inconvenience experienced by P Stanhope or any other Commodore users who faced long delays in service.*

*However, they can look forward to a more enjoyable future with their computers because of the extensive range of software available and the assurance of rapid service from our offices now established in all major Australian capital cities.*

*Tony Serra  
National Sales Manager  
Commodore Business  
Machines*



## MICROBEE SYSTEM 80, TRS-80

Write or call for a free catalogue on the following products:

**Blast your Microbee into hyperspace with the Enhancer 1 superexpander from Vitronics!!!**

**ONLY \$189**

**The Enhancer 1 has these incredible features:**

- two ATARI ®/COMMODORE ®/COLECO ® type joystick inputs
- two TRS COLOR COMPUTER ® type (proportional) joystick inputs
- 4 voice music/sound effects synthesizer
- real time clock
- unlimited vocabulary speech synthesizer (option)
- allows connection of touch pads, paddles, trackballs, and mice!
- built-in speaker with volume control
- comprehensive user manual
- an 8 channel, 8 bit analog to digital converter
- an 8 bit digital to analog converter
- a voice input channel
- a 40 pin experimenter socket
- includes tank target game, sound effects demonstration and powerful drawing program
- compatible to all Microbees
- 90 day warranty and servicing is also available
- includes subscription to Vitronics newsletter

Available direct from us or ask at your local Microbee Dealer. Dealer enquiries welcome. Software writers wanted.

**For the System 80/TRS-80,  
Z80 PROGRAMMING has the following:**

- Four powerful 2K Eprom utilities for the unused 2K block in the System 80/TRS 80 memory map. For Disk and Non Disk users. All include lowercase driver and key debounce.
- Two and Three Eprom plug in P.C. Boards. Three Eprom board is designed to run my 3.5K Super or 7K Super Utility. Plus using keyboard decoding and bank select. Over 50 powerful functions eg: Disassembler, Copier, Relocate Object Code, Memory display and edit, Renumberer, etc. Uses no RAM. For Disk and Non Disk users.
- Lowercase with full three dot descenders. Involves four wires and plug in board for easy installation. Takes one or two character sets.
- Hi-resolution graphics. P.C.G. type. Four switching modes. Only **\$95.00**.
- 32K, 48K and 60K memory upgrades. No piggybacking. Less power drain.
- ROM One replacement. Lowercase driver from power up. Auto initialisation of Eproms, etc.
- Dual Fast Tape ROM board. First ROM has usual 500 Baud and second 1500 Baud tape routines. At the flick of a switch everything in ROM or which calls ROM, works at 500 or 1500 Baud. Has I.C. timed switching to prevent lockup. No soldering or track cutting. Plugs in.
- Repairs. Extra keys. Sound. System 80CHR\$(23) as per Tandy. Inverse video, etc.

CONTACT GEOFF LOHRERE AT

**STONE-AGE  
COMPUTING**

57A STANLEY AVE, MT. WAVERLEY  
PH. (03) 543 1485





# THE WORDWORKS

85 Petrie Plaza, Canberra City, ACT 2601. Phone: (062) 47 7739



## HISTORIC BARGAIN!

16-Bit Computer/Word Processor

## THE UNBELIEVABLE SANYO MBC 550

- 8088 cpu (same as IBM PC)
  - Disk drive & 128K RAM standard
  - MS DOS, BASIC standard; CP/M 86 option
  - Onboard graphics & RGB colour output
  - Wordstar/Calcstar package \$195
  - Spellstar/Mailmerge/Inforstar database \$295
- from **\$1495** (incl tax)

'the Sanyo MBC 550 is the clear-cut winner in the least expensive MS DOS computer contest' — *Microcomputing* (US)  
**HURRY WHILE WE HAVE STOCK — DEMAND CONSTANTLY OUTSTRIPS SUPPLY!**

## AT LAST!

Featherweight liquid crystal display portable with

- **WORDSTAR** on-board option
- Inexpensive **REMOVABLE STORAGE**

## The Exquisite EPSON PX-8

from only **\$1480** (including tax)

- 8 line x 80 column liquid crystal display
- built-in micro-cassette drive
- built-in rechargeable batteries for 10-20 hours work away from mains
- 64K CMOS RAM; memory stays alive for weeks
- Z80 cpu; CP/M; Microsoft Basic standard
- communicates with other computers directly or via modem
- beautiful keyboard feel
- **WORDSTAR** on ROM chip \$320 extra
- **WORDSTAR/CALCSTAR/SCHEDULER** on ROM — \$510 all up
- battery-powered 360K 3½" disk drive option
- mains-powered dual 5¼" drives option
- 60K or 120K add-on CMOS RAM option
- battery-powered featherweight printer option



PLEASE SUPPLY Pamphlet with information   
 \* Enclose cheque/money order   
 Computer System   
 Name ..... P/Code .....  
 Address .....  
 Phone .....

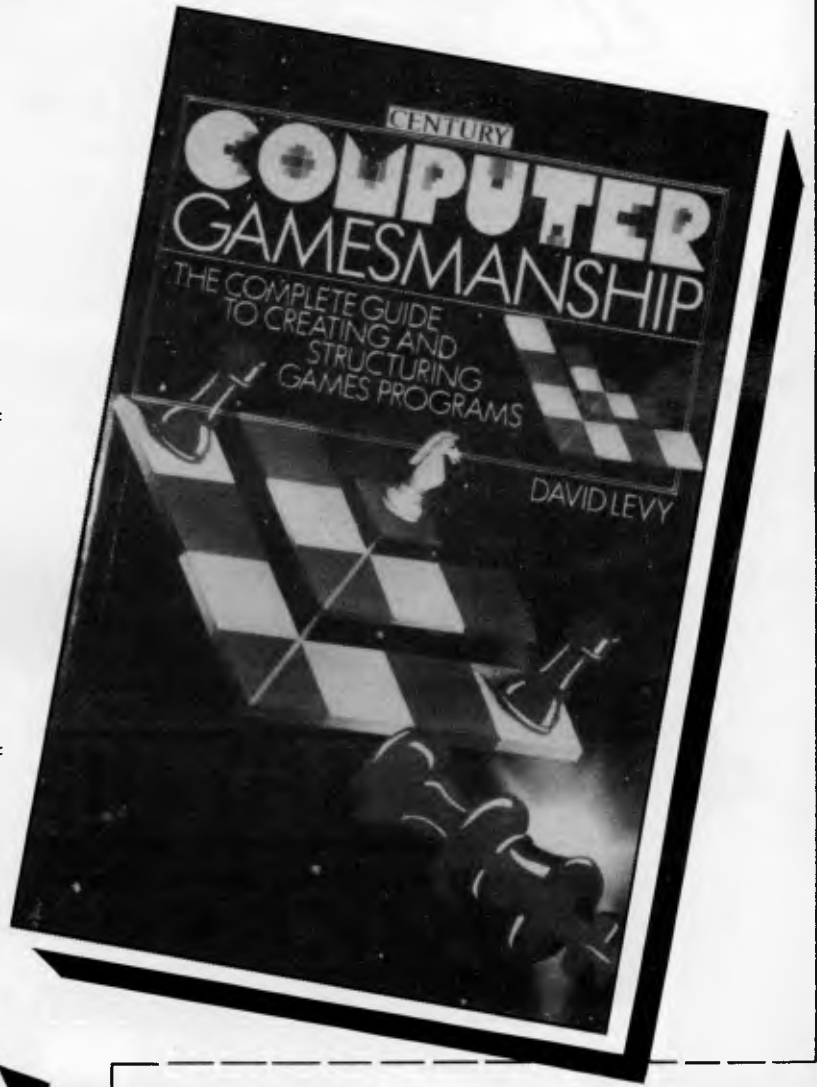
# DON'T WASTE YOUR MONEY BUYING GAMES SOFTWARE — WRITE YOUR OWN

If you subscribe to *Australian Personal Computer* this month you will receive not only 12 issues of the biggest and best micro magazine in Australia just as soon as it comes off the presses, but you will also get a FREE copy of David Levy's book, *Computer Gamesmanship*, worth \$19.95.

*Computer Gamesmanship* was written by chess champion and programming expert David Levy and it will show you how to create your own structured games and baffle yourself with challenges more demanding than anything the software companies have thought up.

To get a year's subscription to APC and your FREE copy of *Computer Gamesmanship*, all you have to do is fill in the subscription order form below and send it off to us. Lucky existing subscribers who want to take advantage of this offer can do so by extending their subscriptions for another year.

**DON'T WAIT. GET YOUR COPY NOW  
— BEFORE THEY RUN OUT.**



## SUBSCRIPTION ORDER FORM

Please send your remittance to *Australian Personal Computer*, 77 Glenhuntly Road, Elwood, Victoria 3184.

I would like to subscribe to APC and receive a free copy of *Computer Gamesmanship*.

- This is a new subscription     This is a renewal  
 1 year (12 issues) \$35     2 years (24 issues) \$65  
 3 years (36 issues) \$92

I enclose my cheque, made payable to *Australian Personal Computer* for \$ \_\_\_\_\_

Please debit my Bankcard

Account No. \_\_\_\_\_

Signed \_\_\_\_\_ Expiry Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_



DISTRIBUTED BY Porchester Computers (Australia)



## AUTHORISED EXECUTIVE DEALERS:

### **VICTORIA**

**Splitters Photo — MELBOURNE**

313 Little Collins Street (03) 63 4035

**Admar Computers — BENDIGO**

1st Floor, Killians Walk (054) 43 1169

**Calcutronics — HAWTHORN**

797 Glenferrie Road (03) 818 6631

**Compak Computer Centre — MOORABBIN**

350 South Road (03) 555 9844

**B & P Electronics — ASCOT VALE**

232 Union Road (03) 370 2936

**Komtron — WARNAMBOOL**

91 Liebig Street (055) 62 4489

**Porchester Computers (Aust.) — FITZROY**

169-171 Victoria Parade (03) 417 6999

**JME Computer Systems — COLLINGWOOD**

382 Smith Street (03) 419 8919

**Coultish Computers — CROYDON**

58 Kincumber Drive (03) 725 6397

**Joint Computer Marketing — CANTERBURY**

23 Shierlaw Avenue (03) 830 1594

**Jontee Enterprises — BARWON DOWNS**

(052) 36 6290

**KJC Computers — DANDENONG**

Suite 36/37 Vandy Court (03) 792 1237 — (03) 877 2377

**Parallel Distribution — MOUNT WAVERLEY**

Suite 10, 9 Alexander St (03) 277 8644

**Thornton Richards Cameras — BALLARAT**

416 Sturt Street (053) 31 1633

**Australian Executive Briefcase — MELBOURNE**

Fawkner Towers, 431 St Kilda Road (03) 267 5925

**Ultraphase Computers — GREYTHORN**

296 Doncaster Road (03) 857 4233

### **NEW SOUTH WALES**

**Stenberg & Associates — NSW DEALER AGENT**

(048) 61 1534 — (02) 260 1249

**Computerease — NORTHBRIDGE**

Kordell Building, 160 Sailors Bay Road (02) 95 5050

**B & B Computer Solutions — INGLEBURN**

Cnr Nardoo & Norfolk St (02) 618 1343

**Blue Mountains Business Equipment — KATOOMBA**

54 Megalong Street (047) 82 2333

**Boa Computers — ORANGE**

Suite 222, Anson Street (063) 62 9911

**Professional Computer Solutions — NTH P'MATTA**

6c Villiers Street (02) 630 6933

**Computer Innovations — NTH SYDNEY**

11/263 Alfred Street (02) 922 1608

**Oakline Electronics — WOLLONGONG**

PO Box 77, Oak Flats (042) 56 3592

**Collard Computer Consultants — NEWCASTLE**

32 Fourth Street, Adamstown (049) 52 2339

**Command Glen — FORESTVILLE**

811 Willoughby Road (02) 452 4867

**PHM Australia — MANLY**

Suite 8, 8th Floor, Manly National Building (02) 977 6104

**Donncorp — ENMORE**

25 Marian Street (02) 517 1907

**Ecoray Computers — NEWCASTLE**

Lot 17, Chifley Street, East Maitland (049) 33 5444

**Greytella — CLOVELLY**

315 Clovelly Road (02) 665 9569

**King Street Computers — FIVE DOCK**

Suite 7, 118 Great North Road (02) 713 2366

### **QUEENSLAND**

**Electronic Resources — CAIRNS**

9 Brutus Place, Edmonton (070) 55 4130

**PHM Equipment — GREENSLOPES**

737 Logan Road (07) 394 2388

### **WESTERN AUSTRALIA**

**Microbase Computers — WEST PERTH**

422 Newcastle Street (09) 328 9544

### **SOUTH AUSTRALIA**

**Computer Programs — ADELAIDE**

Machines and service

3rd Floor, Grain House 126 South Terrace (08) 212 7535

### **AUSTRALIAN CAPITAL TERRITORY**

**The Wordworks — CANBERRA**

85 Petrie Plaza (062) 47 7739



# THE PORCHESTER EXECUTIVE 816

## Now there's a Business System that's portable.



816-1 1.6 MByte twin floppy system  
816-10 10 MByte hard disk system



In the office a serious but flexible Business System. Anywhere you need information, a compact, powerful fully portable computer. Team the 816 with a 12" monitor (optional) to complete a business system with enough power to keep control of a business turning over millions of dollars. Yet still remaining portable enough to take anywhere...

**SOFTWARE:** As part of the standard system comes a comprehensive range of software (programs) including:

Accounting, Stock Control, Project Costing, Word Processing, Database, Supercalc financial spreadsheet and more, over 10 individual programs. Specialised software also available for use in such industries as Real Estate, Retail Shops, Insurance Broking, Medical Practices, Accountanting, Legal Practices, etc.

**POWER:** Twin inbuilt disk drives give you 1.6 Mbytes of floppy disk storage. More than twice the capacity of most desk top computers. Also available is a 10 Mbyte HARD DISK model.



**COST:**

6 months Warranty, all standard software, and personalised training. A complete business system which you can lease for only \$24 per week.

Phone Sue at Porchester on (03) 417 6999 for your nearest dealer.



**PORCHESTER**  
Computers (Aust.)

169 Victoria Parade, Fitzroy, Vic. 3065

**FULL 6 MONTHS WARRANTY**  
**PACE** COMPUTER SERVICE IN CAPITAL CITIES

Enquire NOW with your local dealer for a demonstration of the EXECUTIVE 1.6 MByte or 10 MByte systems.

**PORCHESTER**

Tel. (03) 417 6999  
Telex: AA135042

**EXECUTIVE 816**

**THE TRULY BUSINESS PORTABLE COMPUTER**

PLEASE SEND ME MORE INFORMATION



Name .....

Address .....

Telephone .....

**PORCHESTER COMPUTERS (Aust.) Pty Ltd**

169 Victoria Parade Fitzroy Vic 3065

# INCREASE YOUR MEMORY

Memory boards from Britain easily upgradeable — Top quality with gold edge connectors and full no-quibble 12 months warranty

## IBM SUPERAM

Provides from 64K to 512K of additional memory. Fully compatible with all PC/XT models

64K — \$448 128K — \$568 192K — \$688 256K — \$809  
320K — \$929 384K — \$1049 440K — \$1169 512K — \$1289

## IBM MULTI

Includes memory (64K — 1MB), Parallel port, Serial port, Clock/calendar and Optional 2nd Serial port

64K — \$743 128K — \$863 256K — \$1103 384K — \$1452

## SIRIUS SUPERAM

Provides a 128K - 512K memory upgrade

128K — \$676 256K — \$930 384K — \$1184 512K — \$1438

## APRICOT SUPERAM

Extra memory available NOW for your Apricot.

128K — \$675 256K — \$1014

Also available — IBM TRIO, SIRIUS CLOCK/RAM.

★ 12 months warranty ★ FREE Print Spooling Software ★ FREE Memory Cache Software

BRISBANE'S LEADING SUPPLIER OF:

**BBC** apricot  **sirius**

DEALER ENQUIRIES WELCOME

**compsote**

SUPER VALUE

## GREEN & AMBER MONITORS



AGC Monitor

- ★ FREE - 360° swivel base
- ★ Super high resolution
- ★ Crisp 80 chr. display
- ★ Non-reflective dark screen
- ★ Resolution: 1000 lines
- ★ 22 M.Hz band width
- ★ F.C.C. Class B. approved
- ★ Attractive styling

**OVERSTOCKED:  
WE MUST CLEAR!!**

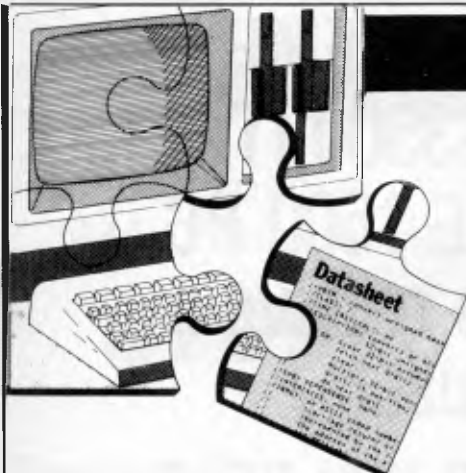
Green Screen	<b>\$169.00</b>	SAVE \$90.00
Amber Screen	<b>\$179.00</b>	SAVE \$100.00

These are the best value monitors in Australia today

Rush your order to:

Address: 537 Boundary St.  
Spring Hill  
Brisbane. 4000  
Phone: (07) 229 0066

# 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.*

## Relocatable code

Rois Harder thinks that machine code documentation should indicate whether or not the code is relocatable and that, if it isn't, the addresses that would need changing, on moving the code, be clearly marked.

SubSet documentation standards (last printed in full in June '83) state whether a routine is Class 1 or Class 2. Class 1 routines are re-entrant (usable by part of the program interrupting another part of the program that was using it), operate correctly wherever they are

located in memory, do not alter their own instructions and return unaltered all registers and flags except those declared as being used to pass information to and from the routine. Other routines are Class 2.

All Class 1 routines are, therefore, relocatable but so are most of our Class 2 routines. No actual addresses are given in SubSet routines because it's simply not practicable to allocate memory for them to suit many readers. The only SubSet routines not relocatable are those containing jumps to absolute addresses, which are shown as YYYY in the machine code.

## 2040-bit conversion

LNGIBD is part of a 'family' of large number routines with a consistent interfacing protocol written by Andrew Stephenson. The 'LNGxxx' family includes 'clear', 'copy', 'add', 'subtract', 'multiply', 'ASCII decimal to binary' and 'binary to ASCII decimal' — LNGIBD.

The action of LNGIBD is interesting. Instead of left-shifting the binary value to get the next bit — as most conversion routines do — it sets up a bit mask. The mask is rotated right every iteration to cover the next bit for processing. When it wraps around to cover bit 7, the next byte down is

indexed. The entire binary value is processed bit by bit, without being disturbed — a far quicker method than a 255-byte shift.

The conversion is done in two stages. The first stage produces an intermediate result which is *unpacked* BCD — one decimal digit per byte — stored 'lo-digit-lo-address'. This is the normal order of storing binary values in the 8080/Z80 processor family. In the second stage, the order of the digits is reversed and, at the same time, the ASCII nibble for decimal digits is added. The end result is a normally ordered ASCII string.

LNGIBD is written to convert to ASCII decimal but will convert to any base 2 to 10 by changing the variable

'BASE'. It can be altered to convert to any base 2 to 36 (using letters up to Z for these new digits) by substituting CALL BASASC for each of the occurrences of OR 30H at eight and five lines from the end. BASASC is an 8-byte subroutine tacked onto the end.

Andrew's interfacing protocol does not include returning the addresses in the registers used for input. HL and DE both point to the middle of the ASCII string on exit so you will need to save the addresses used before calling LNGIBD.

```
BASASC: ADD A,30H ;add ASCII decimal high C6 30
        CP 3AH ;nibble and test if 0 to 9, FE 3A
        RET C ;exiting if ok, else D8
        ADD A,7 ;step up to ASCII letters C6 07
        RET ;and exit C9
```

## DATASHEET

```
!- LNGIBD - Long Integer Binary to Decimal conversion.
! / CLASS: 2 (registers not saved, direct addressing used).
! / TIME CRITICAL: No.
! / DESCRIPTION: Converts a binary integer, stored in-byte-
! / lo-address to ASCII decimal string stored
! / hi-digit-lo-address in different storage area.
! / ACTION: IF value = 0 THEN write '0' and end.
! / ELSE index most significant bit of MSbyte
! / FOR each bit of binary value
! / Set Carry if bit set
! / FOR each digit of intermediate result
! / Double digit adding in Carry
! / IF digit < 10 THEN clear Carry
! / ELSE subtract 10 and set Carry
! / NEXT digit
! / IF overflow from partial result THEN form
! / new high order digit = 1
! / NEXT bit
! / Reverse digit sequence, add ASCII hi-nibbles.
! / SUB-DEPENDENCE: None.
! / INTERFACES: Binary value in RAM or ROM.
! / Output area in RAM. 2-byte storage in RAM.
! / INPUT: BVAL = address of 1st byte of binary value.
! / DVAL = address of 1st byte of output area
! / (output area = 2.42 * binary byte length + 1)
! / HL = BVAL, DE = DVAL, A = binary byte length (1 to 255)
! / OUTPUT: ASCII decimal string at DVAL with null terminator (0)
! / REGS USED: AF BC DE HL
! / STACK USE: 2
! / LENGTH: code: 114 temporary storage: 2
! / PROCESSOR: 8080/8085/Z80
!
BASE EQU 10 ;conversion base (decimal)
```

Announcing the arrival of the new **EME PC 1600 IBM** fully compatible. At \$3500 (Tax incl.). With every purchase of the **EME 1600 PC** at this incredible price you also receive a free swivel base monitor (as illust.)



**Where can you get a better deal than this??**

### Features

- 8088 processor
- 256k RAM fitted as standard
- 1 parallel & 2 serial ports
- 5 IBM PC compatible expansion slots
- 83 key IBM layout keyboard
- 13Mbyte hard disk option (XT model), disk controller, video controller, clock & calendar.

EME is a newly developed but fast growing company, offering to Australia's computer buying public the latest in microcomputers, software and associated peripherals.

The EME model III dual processor CP/M and/or Apple compatible has been praised as the first of our range.

Now we introduce to you THE IBM compatible. This outstanding computer boasts the above features. Impressive features indeed, but we don't stop there. With every purchase of the IBM PC or XT (ask about our competitive hard disk price) we also include the following software:

- PC & MS-Dos 1.10/2.00
- lotus 1-2-3
- CP/M-86
- Wordstar

As an introductory offer for this, the month of the 3rd Australian computer show, and in conjunction with APC magazine; with every purchase of the EME PC or XT we will give you a superb swivel base high resolution green screen monitor free.

**For \$3500 you simply could not find a better IBM compatible package.**

**Come in and see our range at 92-94 Bank St. Sth Melbourne or on level 2 at PC 84.**

# EASTERN MICRO

**92-94 BANK STREET, (Cnr**

**SOUTH MELBOURNE, VICTORIA 3205 Teleph**



# EME MODEL III

Reduced specially for the  
1984 Computer Show

**\$799** Tax incl.

## Features

- ★ 6502 and Z80 Dual Processors
- ★ 64K RAM
- ★ Upper and lower case
- ★ Extendable keyboard
- ★ Built-in cooling fan
- ★ Single or twin Teac slimline disk drives can be installed
- ★ The 10 function keys each have 48 characters of built-in memory
- ★ 188 function keys



## MONITOR

\$199 (Tax incl.)



## TEAC SLIM LINE DISK DRIVES

\$299 (incl. Tax) Ideally suited for Model III.

# ELECTRONICS



### EASTERN MICRO ELECTRONICS

92-94 Bank St., Sth Melbourne, 3205

Please find enclosed cheque for the amount of \$ .....  
For the following. ....

.....  
.....  
.....

Please send me more information

Name .....  
Address .....  
Suburb .....  
State .....

(at the corner of Bank Street and Kingsway)

Phone: (03) 699 3088 Telex: AA 38432 ATT EME

```

VPTR: DEFP 0 ;temporary storage space. 00 00
LEGBD: LD C,A ;byte length as 16-bit value 4F
LD B,0 ;in BC for adding to pointer. 06 C0
DEC HL ;BVAL - 1 for indexing and 2B
LD (VPTR),HL ;save for use in main loop. 22 YY YY
LD A,OPFH ;mark temporary end of 3E FF
LD (DE),A ;decimal output area. 12

;find most significant byte. Else deal with zero value.
ADD HL,BC ;index binary highest byte. 09
NEXTB: LD A,(HL) ;loop: get byte and test for 7E
OR A ;zero, exit loop when 87
JP NZ,NSKFPD ;NSByte found, with C as 02 YY YY
DEC HL ;no. of significant bytes 2B
DEC C ;and HL pointer to hi-byte, 0D
JP NZ,NEXTB ;for all bytes zero so 02 YY YY
EI DE,HL ;index DVAL and put 8B
LD (HL),'0' ;default ASCII 0 36 30
INC HL ;followed by 23
LD (HL),0 ;null terminator 36 00
RET ;then exit. 09

;find most significant bit, initialise bit-select mask.
NSKFPD: LD B,A ;NSByte to B for comparison. 47
LD A,80H ;start bitmask. 3E 80
NEXTB: CP B ;loop: shift bit down 86
JP C,NSKFPD ;until in same place 0A YY YY
JP Z,NSKFPD ;as highest set bit in 0A YY YY
RCA ;NSByte, covering most 0F
JP NEXTB ;significant bit. 03 YY YY

;main loop. Get next bit into intermediate decimal result.
NSKFPD: LD B,A ;B - bitmask, C - byte index 47
PUSH BC ;save both on stack. 05
LD HL,(VPTR) ;get BVAL - 1 and add 2A YY YY
LD B,0 ;current byte index to 06 00
ADD HL,BC ;address current byte. 09
AND (HL) ;get current bit, masking out 46
ADD A,OPFH ;others, propagate to Carry. 06 FF

;partial result * 2 + current bit. Adjust each byte using
;Couleur's criterion to use BOD digit per byte.
LD L,B ;move DVAL to HL. 6B
LD H,D ; 62
NEXTB: LD A,(HL) ;loop: get intermediate 7E
INC A ;result byte, test for end 3C
JP Z,OPVDOB ;mark (OPFH), exit if found 0A YY YY
DEC A ;else correct back and double 3D
ABC A,A ;it, adding in current bit. 8F
CP BASE ;skip if digit is valid 7E 0A
JP C,BOCOUL ;else make it valid and have 0A YY YY
SUB BASE ;a carry over to next digit. 06 0A
BOCOUL: CCF ;correct state of Carry. 3F
LD (HL),A ;store digit and repeat until 77
INC HL ;end of current partial 23
JP NEXTB ;result reached. 03 YY YY
OPVDOB: JP NC,NEXTB ;skip if no result overflow 02 YY YY
LD (HL),1 ;else new high digit can 36 01
INC HL ;only be 1. Point to next 23
LD (HL),OPFH ;byte and put new end mark. 36 FF

;rotate bitmask to cover next bit, next byte if necessary.
NEXTB: POP BC ;restore mask and byte index 01
LD A,B ;move mask to A and shift set 78
RCA ;bit down. If not in bit 7 0F
JP NC,NSKFPD ;then loop for next bit 02 YY YY
DEC C ;else index next byte and 0D
JP NZ,NSKFPD ;loop if not finished. 02 YY YY

;reverse digit order and add ASCII digit hi-nibbles.
LD (HL),0 ;terminator replaces end mark. 36 00
NEXTB: DEC HL ;decrement high pointer and 2B
LD A,L ;test if hi-pointer and 7D
SUB R ;lo-pointer have passed each 93
LD A,H ;other yet, setting Carry if 7C
SBC A,D ;they have, exit conversion 9A
RET C ;complete if they have. 0B
LD A,(DE) ;else pick up lower digit 1A
OR 30H ;convert it to ASCII and 76 30
LD B,A ;save in B while 47
LD A,(HL) ;getting higher digit 7E
OR 30H ;converted to ASCII. 76 30

```

```

LD (HL),B ;replace ASCII digits in 70
LD (DE),A ;reverse order. 12
INC DE ;move lower pointer up 1 13
JP NEXTB ;and repeat until all done. 03 YY YY

```

## 6809 random numbers

A perennially recurring subject is that of pseudo-random numbers.

The conclusion drawn in SubSet was that a 16-bit generator based on the algorithm, or series  $R_{i+1} = (1509R_i + 41) \text{ mod } 2^{16}$  and a 32-bit generator

based on  $R_{i+1} = (69069R_i + 41) \text{ mod } 2^{32}$  would produce sequences that ought to satisfy all but the absolute perfectionist.

Z80 implementations of these generators, by Kevin Smith and John Kerr, were published in SubSet, March 1983. RAND16 and RAND32 are versions written for the 6809 by Dr Paul Beale.

### DATASHEET

```

;= RAND16 - 16-bit pseudo-random number generator.
; / CLASS: 1.
; / TIME CRITICAL: No.
; / DESCRIPTION: Generates a 16-bit number from the series
; / R = (1509 * R + 41) mod 2**16
; / ACTION: 1509 = 5 * 256 + 229
; / R-temp := (41 + 229 * R) mod 2**16
; / R := (R-temp + 5 * 256 * R) mod 2**16
; / SUBR DEPENDENCE: None.
; / INTERFACES: Stack RAM.
; / INPUT: Seed or previous random number in user stack
; / U:U+1 = RAND.
; / OUTPUT: New RAND in U:U+1.
; / REGs USED: U.
; / STACK USE: Hardware stack (S): 3. User stack (U): 2.
; / LENGTH: 37.
; / TIME STATES: 116.
; / PROCESSOR: 6809.

```

```

RAND16: PSHS A,B,CC ;save registers and flags. 34 07
LDA 1,U ;get RAND low order byte, 46 41

LDB #85 ;multiply it by 229 06 E5
MUL ;and 3D
ADDD #829 ;add 41 and store in user 03 00 29
STD ,--U ;stack as accumulator. ED C3
LDA 2,U ;multiply RAND high order 46 42
LDB #85 ;byte by 229, add product 06 E5
MUL ;to high byte 3D
ADDB ,U ;of accumulator. EB C4
STB ,U ;'R-temp' now complete. E7 C4
LDA 3,U ;get RAND low order byte, 46 43
LDB #5 ;multiply it by 5, add it 06 05
MUL ;not to 'R-temp' lo-byte but 3D
ADDB ,U ;to 'R-temp' hi-byte for EB C4
STB ,U ;'5 * 256' by single byte shift. E7 C4
LDD ,U++ ;replace old RAND by new EC C1
STD ,U ;RAND, correcting user stack. ED C4
PULS A,B,CC ;restore registers from 35 07
RTS ;system stack and return. 39

```

### DATASHEET

```

;= RAND32 - 32-bit pseudo-random number generator.
; / CLASS: 1.

```

```

;/ TIME CRITICAL: No.
;/ DESCRIPTION: Generates a 32-bit number from the series
;/          R = (69069 * R + 41) mod 2**32
;/ ACTION: 69069 = 65536 + 13 * 256 + 205
;/          R-temp := (41 + 205 * R + 13 * 256 * R) mod 2**32
;/          R := (R-temp + 65536 * R) mod 2**32
;/ SUBr DEPENDENCE: None.
;/ INTERPACKS: Stack RAM.
;/ INPUT: Seed or previous random number in user stack
;/          U:U+1:U+2:U+3 = RAND.
;/ OUTPUT: New RAND in U:U+1:U+2:U+3.
;/ REGs USED: U.
;/ STACK USE: Hardware stack (S): 7. User stack (U): 5.
;/ LENGTH: 59.
;/ TIME STATES: 322.
;/ PROCESSOR: 6809.

```

```

RAND32: PSHS A,B,I,Y,CC ;save registers and flags.      34 37
CLR -3,U ;clear part of accumulator at 6F 5D
CLR -4,U ;U-5 to U-1 and initially 6F 5C
LEAX -2,U ;index it by I at low 2-bytes. 30 5E
LDA 5,I ;get RAND lowest byte, A6 05
LDB #3CD ;multiply it by 205 C6 CD
MUL ;and 3D
ADDD #29 ;add 41 and store in low C3 00 29
STD ,X ;2-bytes of accumulator. ED 84
LDY #3 ;count 3 remaining bytes. 10 8E0003
LOOP: LEAX -1,X ;address next byte. 30 1F
LDA 5,I ;multiply RAND current byte A6 05
LDB #3CD ;by 205 and add to C6 CD
MUL ;correct position in 3D
ADDD ,X ;accumulator. E3 84
STD ,X ; ED 84
LDA 6,I ;multiply next lower byte by A6 06
LDB #30D ;13 and add to accumulator C6 0D
MUL ;at one byte higher up for 3D
ADDD ,X ;'* 256' by single byte shift. E3 84
STD ,X ; ED 84
LEAY -1,Y ;on exit from loop 31 3F
BNE LOOP ;'R-temp' is complete. 26 E8
LDD 2,U ;'* 65536' done by double EC 42
ADDD -4,U ;byte shift, add to 'R-temp' E3 5C
STD ,U ;replace old RAND ED C4
LDD -2,U ;by new RAND from EC 5E
STD 2,U ;accumulator. ED 42
PULS A,B,I,Y,CC ;restore registers from 35 37
RTS ;system stack and return. 39

```



'At last! A keyboard for the two-fingered typist!'

# TANDY ELECTRONICS DEALER

## BIG DISCOUNTS ON ALL TANDY COMPUTERS AND ACCESSORIES

Free delivery throughout Australia.  
90 day Warranty  
Bankcard & cheque orders accepted.

## Bayne & Trembath

3 Boneo Rd., Rosebud, Vic 3940  
Ph: (059) 86-8288, A/H (059) 85-4947  
(TANDY DEALER 9320)

## 14 FREE PROGRAMS

with each G-Pascal Compiler purchased on disk for  
the Commodore 64. \*

DEMO - G-Pascal demonstration program.  
SUB HUNT - example arcade game (joysticks, paddles or keyboard).  
MODEM64 - data communication program.  
ADVENTURE - Pascal adventure game.  
SPRITE EDITOR - create sprite shapes easily!  
SOUND EDITOR - experiment with the synthesizer chip.  
RUNTIME - create stand-alone programs written in Pascal.  
CENTRONICS PRINT - print G-Pascal programs via parallel port.  
BITMAPPED TEXT - mix text and hi-res graphics!  
NUMBER GAME - a simple Pascal game.  
PRIME NUMBERS - calculate prime numbers quickly.  
PAINT SINGLE - 'fill in' landscapes quickly in single colour hi-res.  
PAINT MULTI - 'fill in' landscapes in multi colour hi-res graphics.  
WORD WRAP - wraps words around at the end of the line.

All of the above programs are supplied free with each purchase of G-Pascal on disk. G-Pascal is available from your local Commodore dealer, Commodore Information Centre Pty. Ltd., or Gambit Games. Recommended retail: \$79.50

\* excludes existing older dealer stocks

If you have already purchased G-Pascal these extra programs may be ordered by sending \$20 direct to Gambit Games.

Gambit Games

P.O. Box 124, Ivanhoe, Vic. 3079  
Phone: (03) 497 1283.



# EXPERT SYSTEMS



# Expert-Ease

*Expert Systems have been successfully used in diagnostic medicine. They also have much to offer businesses but installation time and costs are often prohibitive factors. Expert-Ease is designed to enable even the most inexperienced user to create his own 'intelligent' model. Surya reports.*

Artificial intelligence (AI) has long been considered solely the domain of computer scientists, but with the introduction of expert systems, AI could at last make its mark on non-specialist users. Expert-Ease is an expert systems generator which enables people with little or no programming experience to create and interrogate expert models.

The term 'artificial intelligence' conjures up a variety of images, from programs which play chess to the HAL of Arthur C Clarke's *2001*. To date the most practical application of research into AI has been the development of computerised 'models' of intelligent thought: expert systems.

## Theory and practice

Expert systems are based on the principle that an expert is simply a person who has access to specialised knowledge, and can apply this knowledge using a set of logical rules. Given both the knowledge and the rules, a computer is capable of modelling the thought processes of the expert. To see how this might work in practice, let's take the example of a motor mechanic.

A mechanic, faced with a faulty car,

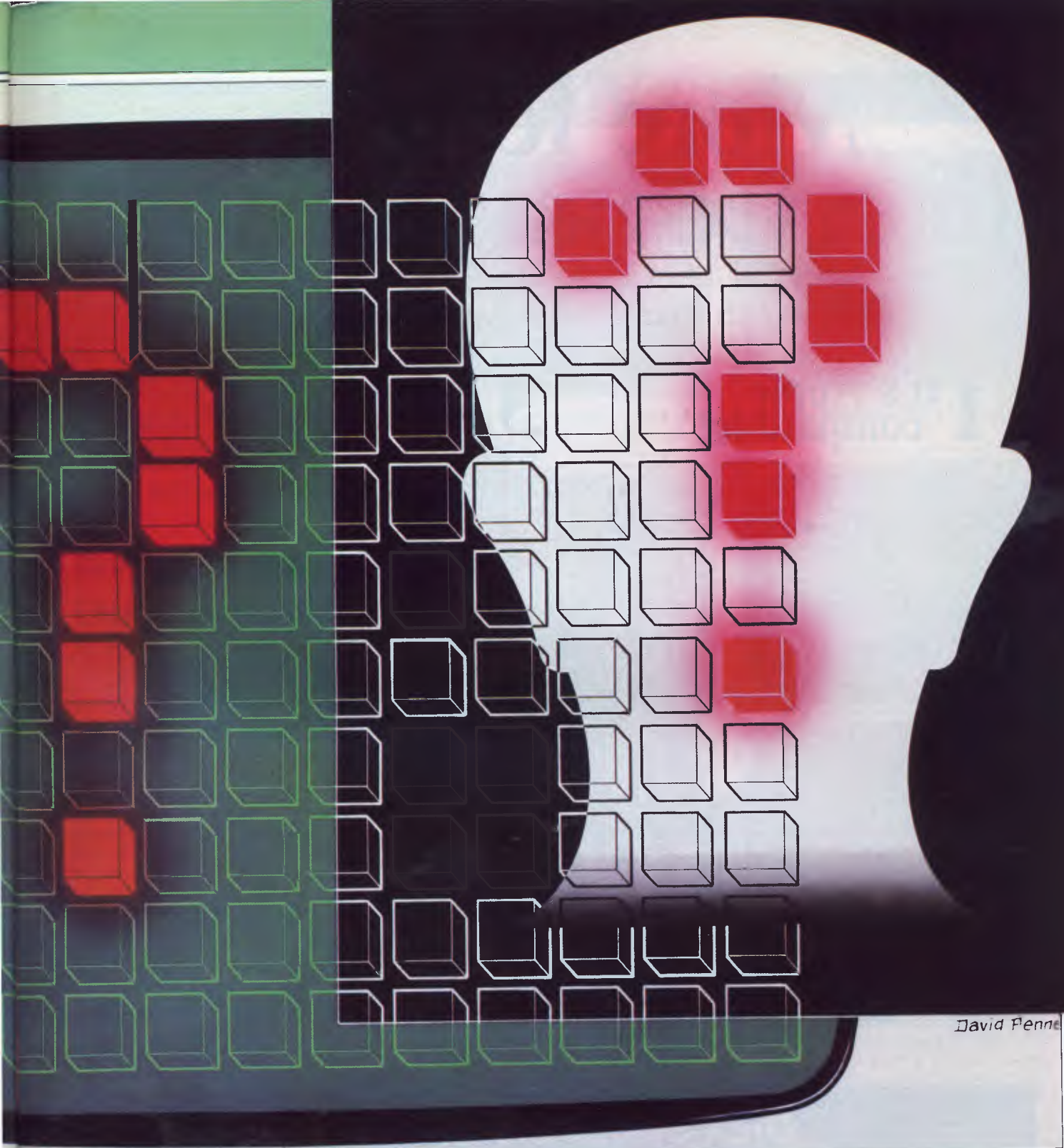
looks first of all at the observable symptoms. These might range from no response when engaging the ignition, to a slight tapping sound at high speeds. Based on these symptoms, the mechanic will immediately be able to narrow down the range of possible problems. If there is no response when the ignition key is turned, then the problem obviously lies in the electrical system. The mechanic would then carry out various tests (checking electrical connections, battery level, and so on), until the problem is identified.

To someone who knows nothing about motor mechanics, the process of identifying and correcting a fault might seem the result of inspired guesswork. In reality, of course, the mechanic simply observes, tests and makes deductions by using a set of specialised knowledge (with perhaps a touch of inspired guesswork!). Someone with little or no knowledge of mechanics is quite capable of carrying out the tests and observations; they just need the expert mechanic to tell them which tests to make — and to draw conclusions from the results. The basis of an expert system is to take this reasoning one stage further: the mechanic becomes superfluous and only the mechanical expertise is required.



On its simplest level, an expert system simply presents the user with a set of questions and uses the answers to indicate likely solutions. This in itself is nothing new; there have been books available for years based on this principle — not least for DIY emergency car repairs! You work through a checklist and — depending on the results of the tests to be executed — are referred to a page or section which reveals the likely problems and how to correct them. A com-





David Penne

puterised version of this process is easy to write, even in Basic. But a true expert system does more than simply store a set of information and rules for manipulating them; it should act 'intelligently', both when accepting the information and rules, and when interrogated by the end user. It is the degree of 'intelligence' an expert system can demonstrate that determines its usefulness.

The beauty of an expert system is that

someone's expertise can be made available as required without the need for the expert to be present. This is invaluable when a specialist's time may cost several hundred dollars per day. But true expert systems take time to write, and are costly, requiring the services of a skilled programmer. This is what prompted Export Software International to produce Expert-Ease.

Expert-Ease allows a user to create and interrogate expert systems or

'models' easily and without programming skills. At present it runs on the IBM PC and the Sirius in 128k minimum RAM.

Based around a 'spreadsheet', it provides an easy — if a little tedious — method of creating an expert system.

APC created a simple model to identify the language in which a piece of text is written by presenting the user with a series of questions, primarily concerning the type of accents in evidence. I'll begin

# More features than Commodore 64!

And more powerful than an Apple IIe, for a fraction of the cost. Dick Smith Electronics presents The CAT.

## 1 It's Apple compatible!

That means that you can use a huge range of programs (approximately 15,000) designed to run on the Apple IIe – without paying the Apple IIe's price! Programs for fun, for learning and for business. And because you aren't 'locked in' to any one supplier, you can save a fortune: buy your programs from us, or buy them somewhere else if they're cheaper! (You could even buy them from Apple . . .)

## 2 It's more powerful!

With its very large internal ROM (Read Only Memory) – twice the size of the Apple – and larger, easier-to-use keyboard (81 keys compared to the Apple IIe's 63 keys!), high resolution graphics, 8 colours, 6502A second generation processor, it has the features you need – without paying one cent extra for 'standard' features others charge you a fortune for!

## 3 It's so easy to use!

Just plug it into a video monitor (or any B & W or colour TV set with a \$34.90 modulator) – and you're ready to go computing. You don't need to buy anything else! But when you want to expand, The CAT is ready for serious computing with a range of top quality add-ons and peripherals all at "value for money" Dick Smith Electronics prices.

## 4 And it's only \$699

The bottom line is always the price! And The CAT wins paws down. Feature for feature it more than stacks up against the Apple IIe, the Microbee, plus any other computer you care to name. And we don't load up the 'options' either – a fully expanded Apple IIe costs over \$2,300 while The CAT, similarly optioned, sells for less than \$1,500. Affording the best computer has become a whole lot easier . . . with The CAT, from Dick Smith Electronics.

Basic CAT computer X-7500	\$699.00
Disk Drive X-7505	\$349.00
Disk Controller X-7510	\$149.00
Emulator Cartridge X-7530	\$99.00
Dual Joysticks X-7520	\$34.50
RF Modulator X-7550	\$34.90
RS-232C Serial Adaptor X-7515	\$129.00
Printer Cable (Centronics) X-7540	\$39.00
File Utilities Disk with DOS & Man. X-7512	\$39.00
High resolution RGB Monitor X-1193	\$599.00
RGB Cable X-7560	\$39.00



**Dick Smith Electronics**

**COMPUTER CITY**

In 46 Dick Smith Electronics stores throughout Australasia



Hey kids, get your free CAT stickers from your nearest Dick Smith Electronics Store. A788m



Get your FREE **cat** Information Pack (including comparison brochures)

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone \_\_\_\_\_ P/Code \_\_\_\_\_

Would you use a CAT computer for:  
 Business     Education     Fun     (Other)

Post to: Marketing dept., Dick Smith Electronics, PO Box 321, North Ryde NSW 2113, or call into your nearest Dick Smith Electronics Centre for a demonstration.

# EXPERT SYSTEMS

by describing the way in which our model would look to the user, then go on to examine the process of creating it.



Fig 1 Filer screen showing disk directory

## Running an Expert-Ease model

To run Expert-Ease, the main disk is placed in the left-hand drive. This disk contains MS-DOS system tracks, the program itself and three demonstration files. The disk takes one minute and 20 seconds to boot and load Expert-Ease, during which time the software licence number, copyright notice and disclaimer are displayed. The last recorded date is then displayed, and you can either press <CR> to leave it as is, or enter a new date. This is to allow date stamping of files.

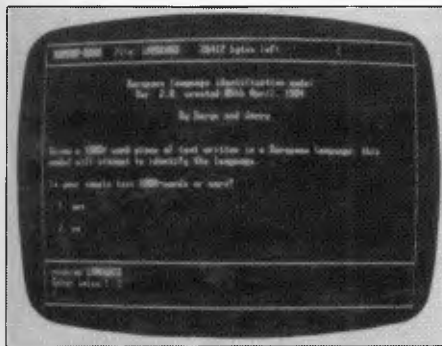
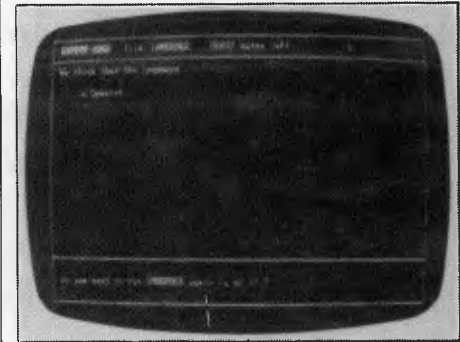
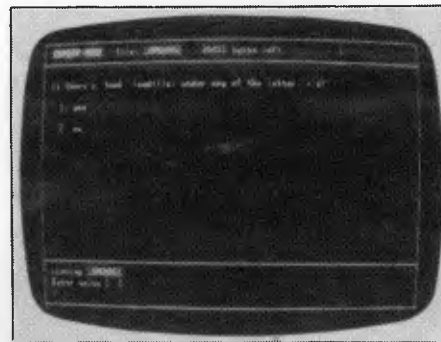
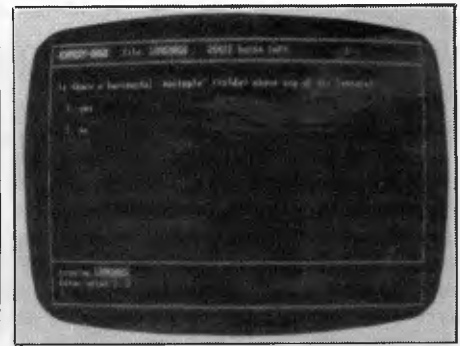
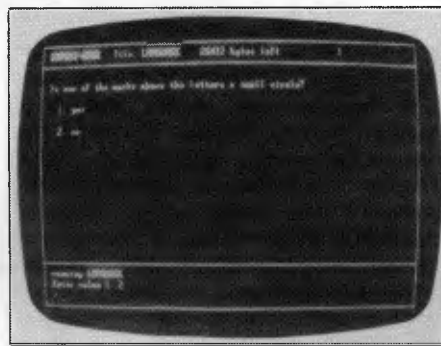


Fig 2 First screen of language-identification model

Expert-Ease is based around five screens: filer, query, attribute, example and rule; all of which are divided into three areas. The top status line always displays the name of the currently loaded model and the amount of free RAM. The main area of the screen consists of seventeen lines of work-space, and the bottom three lines show the title of the screen, a menu of valid single-key commands and a prompt line. After



Fig 3 The series of questions shown in the screenshots above and below illustrate the way in which a language is identified using Expert-Ease



entering the date, you are taken into the filer screen.

The filer screen displays the models present on the currently logged disk, the currently loaded model, the amount of free RAM and the file menu (see Fig 1). Each model is displayed by its title (standard MS-DOS, one to eight characters

without an extension), the date the file was created or last updated and an optional 1-47 character description. The first file is highlighted. To move the highlight up or down a file, the cursor control keys are used. Once you have highlighted the model you want to work on, '1' loads the model. When the model has been loaded, <q>very interrogates the model. After unnecessarily asking 'Do you want to run <filename> (y or n)?', Expert-Ease clears the screen and displays the first question in the model.

In the case of our language identification model, the first question is: 'Is the sample text 1000-words or more?' (see Fig 2). If the answer is no, nothing else matters since the sample text is not large enough to allow accurate identification. The model therefore jumps to the 'no-can-do' screen. If the answer is 'yes', the model proceeds to the next question:

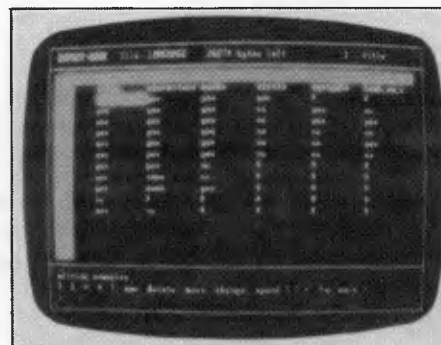


Fig 4 Attribute screen is created first

EXPERI-EASE Attribute Listing, Problem: LANGUAGE Date: 4-apr-84

title : European language identification model

Ver. 2.0, created 05th April, 1984

By Surya and Jerry

Given a 1000+ word piece of text written in a European language, this model will attempt to identify the language.

Is your sample text 1000-words or more?

yes :

no :

characters : Are the letters 'English' (ignoring accents for the moment)?

yes :

no :

some :

marks : Are there any marks (accents) above or below any of the letters?

yes :

no :

circle : Is one of the marks above the letters a small circle?

yes :

no :

squiggle : Is there a horizontal 'squiggle' (tilde) above any of the letters?

yes :

no :

hook\_on\_c : Is there a 'hook' (cedilla) under any of the letter 'c's?

yes :

no :

capitals : Does there seem to be a large number of capital letters in mid-sentence?

yes :

no :

slope\_down :

yes :

no :

conclusion : We think that the language ...

scandinavi : ... is Scandinavian (Norwegian or Swedish)

spanish : ... is Spanish

portuguese : ... is Portuguese

german : ... is German

french : ... is French

italian : ... is Italian

english : ... is English, you illiterate wally

greek : ... is Greek to me, guv

russian : ... is Russian

no\_can\_do : ... cannot be accurately identified from the sample text available.

If you'd like to try anyway, press 'y' to run again and answer 'yes' to the first question. Please note, however, that the conclusion reached by this system may not be accurate with a small sample of text.

not europe : ... is not a European language

Printout 1

Vice President of New Technology, Ashton-Tate — Wayne Ratliff said:  
"Although we have kept all the features of DBASE II that have made it so popular, we rewrote DBASE III in 'C' language from the ground up to have greater capabilities, storage, speed, power and ease of use, and to take advantage of the power and technology of 16 bit and larger computers."

# dBASE<sup>TM</sup> III goes II

# BETTER

## Features of DBASE III

1. Over 2,000,000,000 records per data base
2. 128 fields per record
3. Variable length text field up to 4K bytes per entry
4. 4,000 bytes per record
5. 10 data base files in use simultaneously
6. Fast internal sort and improved indexing
7. 16 digits of numerical accuracy
8. Enhanced reports capability
9. On line help system
10. Full screen formatting

## System Requirements

1. IBM PC XT and all PC compatible computers
2. Minimum 256K bytes RAM, two 5¼" floppy disc drives
3. Monochrome or colour display, any printer with at least 80 columns
4. PCDOS 2.0 operating system

ASHTON · TATE ■<sup>TM</sup>

distributed by **arcompacific**

Contact your local dealer for more information or write to  
Arcom Pacific, Freepost 2, P.O. Box 13, Clayfield Q 4011

# EXPERT SYSTEMS

EXPERT-EASE Rule Listing, Problem: LANGUAGE Date: 4-apr-84

```

title
  yes : characters
      yes : marks
          yes : circle
              yes : scandinavi
                  no : squiggle
                      yes : hook_on_c
                          yes : portuguese
                              no : spanish
                                  no : hook_on_c
                                      yes : french
                                          no : capitals
                                              yes : german
                                                  no : italian

      no : english
  no : null
some : marks
      yes : russian
          no : greek
no : no_can_do
    
```

Printout 2

'Are the letters "English" (ignoring accents for the moment)?'. The options are yes, no and some. Again, if the answer is 'no', we need go no further since the language is obviously not European. Fig 3 illustrates the way in which a language is identified.

To create an Expert-Ease model, the user must first of all create the 'attribute' screen. This defines the different questions to be presented to the user, the text that will be displayed on the screen and

the options available. In our language model, the attributable screen looks like Fig 4.

Expert-Ease allows this to be dumped to a printer, with or without the text (see Printout 1).

Creating the attribute screen is straightforward using the spreadsheet-style format. The attributable screen merely defines the different sections of the model. Once this has been done, 'e' selects the <e>xample screen.

If we were writing an expert system in a high level language, the most obvious approach would be to work out a flow-chart for the system. While anybody who is able to program will be quite at home with flow-charts (even if they never use them!), non-programmers might find them a little daunting. For this reason, Expert-Ease doesn't ask the user to work out the logic of the model, but only to show it by example. Hence the example screen.

On the Printout of the example screen for the language model, you can see how the logic is built up. Under each heading, we have entered yes, no or asterisk (the 'don't care' symbol). Under title (the title screen containing the '1000-word+' question), we need look no further if the user does not have a large enough sample. So this 'route' comprises 'no' in this column, and asterisks under the rest leading to a 'no-can-do' message. To identify a Scandinavian language, the model needs to check as far as the 'circle' question ('Is one of the marks above the letters a small circle?') On Printout 3 you can see how each language is similarly identified.

So far, Expert-Ease has not done anything particularly clever. The clever bit comes next. Using the data you have entered in the example screen, Expert-Ease will attempt to 'induce' the logic behind the data. Induction is called by pressing '!' from the example screen.

The induction routine is known as the Analogue Concept Learning System. It was developed as a stand-alone routine and correlates the example data to produce a 'rule' (flow-chart):

If the example data is inconsistent (two or more paths leading to the same

EXPERT-EASE Example Listing, Problem: LANGUAGE Date: 4-apr-84

	title	characters	marks	circle	squiggle	hook_on_c	capitals	slope_down	conclusion
	logical	logical	logical	logical	logical	logical	logical	logical	logical
1	yes	yes	yes	yes	*	*	*	*	scandinavi
2	yes	yes	yes	no	yes	no	no	no	spanish
3	yes	yes	yes	no	yes	yes	no	no	portuguese
4	yes	yes	yes	no	no	no	yes	no	german
5	yes	yes	yes	no	no	yes	no	no	french
6	yes	yes	yes	no	no	no	no	yes	italian
7	yes	yes	no	*	*	*	*	*	english
8	yes	some	no	*	*	*	*	*	greek
9	yes	some	yes	*	*	*	*	*	russian
10	no	*	*	*	*	*	*	*	no_can_do
11	yes	no	*	*	*	*	*	*	not_europe

Printout 3

NOW there is a REASON to buy a computer. Introducing . . .

# Meta-4

## the Australian data base adventure

### A WINNER

WINNER of 1st PRIZE in the Business Division of the 1983 AUSOM\* Challenge programming competition sponsored by VERBATIM (Australia)

Pty. Ltd.

\*Apple Users Society of Melbourne

META4 is a revolutionary new data base system which gives YOU full control of your computer with NO PROGRAMMING. No other data base system even comes near it. Now you can have an integrated Data Base system for your business for only \$395.00. META4 may be the only program you need to buy for your computer.

### 1. MONEY-BACK GUARANTEE

If you are not satisfied with META4, return it within 14 days for a cheerful refund. If you buy from a dealer, check he is prepared to do this before you buy.

### 2. TELEPHONE CONSULTING

If there is something you want clarified after you have purchased META4, ring us up. Maximum time for any one call 15 minutes.

#### BASIC FACILITIES

META4 is a comprehensive Data Base Management system, including:

- FULL DATA BASE
- SIMPLE SPREAD-SHEET
- SIMPLE WORD-PROCESSING
- MAILING LISTS
- STANDARD LETTERS
- LABELS

#### THINK OF AN APPLICATION

META4 is suitable for a very wide variety of business, professional, academic and personal applications, such as

- |              |                |
|--------------|----------------|
| BUSINESS     | QUOTES         |
| CUSTOMERS    | SALES          |
| ORDERS       | ACCDUNTS       |
| INVOICES     | NAMES          |
| CREDITORS    | ADDRESSES      |
| LETTERS      | LABELS         |
| FINANCIAL    | PRODUCTS       |
| SUPPLIERS    | PERSONNEL      |
| CATALOGUES   | DRG STRUCTURE  |
| DEPTS        |                |
| PROFESSIONAL |                |
| MEDICAL      | DENTAL         |
| LEGAL        | PHARMACEUTICAL |
| INSURANCE    | FARMING        |
| ACADEMIC     |                |
| LIBRARY      | STUDENTS       |
| TIMETABLES   | SCORES         |
| BDOKS        | BORROWERS      |
| PAPERS       | AUTHORS        |
| REFERENCES   | LECTURES       |
| FORMULAE     |                |
| INDUSTRY     |                |
| VEHICLES     | REPAIRS        |
| MAINTENANCE  | PRODUCTION     |
| REAL ESTATE  |                |
| PROPERTIES   | ENQUIRIES      |
| ADVERTISING  | CLIENTS        |
| RENT         | COMMISSIONS    |
| PROJECT      |                |
| TASK LISTS   | SCHEDULES      |
| DIARY        | MEETINGS       |
| MANUALS      | DDOCUMENT'N    |
| TIMESHEETS   | ESTIMATING     |
| BUDGETS      |                |

Information from any or all of the above applications can be AUTOMATICALLY LINKED & CROSS-REFERENCED, since META4 is a true Data Base system.

#### BASIC CONCEPTS

META4 uses familiar concepts to aid you in it's use.

**ROOMS** — META4 has many rooms in it. Each room is used to store information about a different type of thing.

**QUESTIONS & ANSWERS** — when you go into a RDDM META4 asks you QUESTIONS about the type of thing (e.g. CUSTOMER INVOICE, PRODUCT etc) held in the ROOM and stores away your ANSWERS.

**RECORDS** — META4 stores the ANSWERS to a set of QUESTIONS in a room as a RECORD. There can be many RECORDS in a room.

**DOORWAYS** — You can move from ROOM to ROOM through DOORWAYS. META4 automatically relates information in one ROOM to information in the rest.

**BUILDINGS** — A building is a collection of related ROOMS and DOORWAYS. A BUILDING corresponds to the traditional concept of a Data Base.

#### META4 IS PORTABLE

Any application you develop under META4 will run without change on any computer that META4 runs on.

#### EASE OF USE

- SIMPLE AND CONSISTENT
- HELP — 3 levels for the current
  - BUILDING you are in
  - ROOM you are in
  - QUESTION being asked
- 3 TUTORIALS
  - USING META4
  - DESIGNING WITH META4
  - META4 EXAMPLES

Designed from the ground up to be totally consistent and as easy to install, learn and use as possible.

#### META 4 IS EXTENDABLE

All the features of the system are fully extendable to your own applications. You can add your own BUILDINGS, ROOMS, DOORWAYS, and QUESTIONS. You can define your own maps, HELP text and tutorials.

#### SELLING YOUR META4 APPLICATIONS

If you wish to sell your application you will have the widest possible market. We will evaluate your application and may assist in marketing it.

#### DETAILED FACILITIES

- Menu drives
- True DATA BASE — RELATIONAL NETWORK
- Variety of Answer-types e.g. CALCULATED, DATE, YES/NO, NUMERIC, TEXT, LIST
- FULL PROMPTING
- Automatic VALIDATION
- Powerful Selection & Reporting
- All facilities fully EXTENDABLE to user's own applications
- No programming
- Full DATA DICTIONARY defined as a META4 application
- Automatic TOTALLING of lists
- Automatic COPYING of ANSWERS from one room to another
- Automatic MAINTENANCE of records in other rooms (Secondary Index facility)
- Copying of information to and from other products such as WORDSTAR
- B-Tree ISAM Source Code

#### DISK FORMATS AVAILABLE

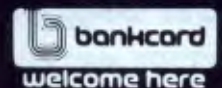
- 5 1/4" IBM-PC DOS 320K
  - 5 1/4" APPLE-II CP/M 126K
  - 8" CP/M SS/SD 256K
- Other formats by request

#### MINIMUM HARDWARE REQ.

- CP/M — Minimum 56K System
- IBM PC-DOS, MS-DOS — Minimum of 128K RAM
- APPLE-II — 64K RAM, 80-Column Card, CP/M card, 2 diskette drives

#### Prices (inc. Sales Tax)

- Manual alone ..... \$30.00
- META4 (CP/M) ..... \$395.00
- META4 (IBM-PC) ..... \$395.00
- META4 (MS-DOS) ..... \$395.00
- Non-Standard Disk Conversion ..... \$50.00
- Post & Packaging ..... \$10.00



BACK A WINNER! GO FOR META4. ORDER DIRECT FROM: **SYSTEM SOLUTIONS PTY. LTD., 28-30 PALMERSTON ST, BERWICK VIC (03) 707 2851** OR FROM ANY OF THE FOLLOWING DEALERS:

- VIC: ALPHA R & D (AUSTRALIA) 789 4658. COMSOFT MICROCOMPUTER SERVICES (03) 428 5269. COMPUTERS 2000 (03) 781 4244. EMERALD HILL COMPUTER BROKERS (03) 690 8095. METROPOLITAN BUSINESS MACHINES (03) 383 2222. PRESIDENT COMPUTERS (03) 529 1788. ROBCOM (AUSTRALASIA) (03) 429 6233
- NSW: J.T. MICROCOMPUTERS (02) 848 0452. THE COMPUTER WORKS (065) 53 5485
- QLD: MERMAID COMPUTERS (075) 35 5511
- WA: COMPUTER AGE (09) 384 1111 SA: COMPUTER MARKETING HQ (08) 260 2444. GENERAL BUSINESS MACHINES (08) 42 0031

conclusion) or ambiguous (insufficient data), a rule is formed and a message displayed to the effect that, for instance, 'examples 4 6 9 contradict the rule'. Once a rule has been formed, with or without contradictions, it can be displayed or printed as in Printout 2. Using this printout, it is a simple matter to see where the contradictions and/or omissions lie and to edit, or add to, the example data. When a rule is induced without contradictions, the model is ready to be interrogated.

The accuracy of a model obviously depends on the accuracy of the example data, but equally important is that the text presented to the user is comprehensible and unambiguous. This can be effectively tested only by 'field-testing' the model on inexpert users and modifying it in the light of their comments. If this is done, the models produced are extremely easy to use even by someone who has never used a computer.

## Documentation

The documentation received with the review copy was inadequate — considering the package costs about \$2300. Supplier Export Software International (ESI) claims the documentation has

since been improved and will be supplied to all purchasers as soon as it has been printed.

The existing documentation takes the form of a tutorial. It is clear and easy to follow: with plenty of screendumps to show exactly what the screen should look like at each stage. Without an index, though, it is absolutely useless as a reference manual; I found it quicker to learn by trial-and-error than to look things up in the manual.

### Sirius version

This review was carried out on a pre-release version running on the Sirius. Unlike the IBM version, the Sirius implementation did not have proper screen-addressing. Because of this, there were no scrolling facilities: the entire screen was re-written whenever it was necessary to move the current 'window'. This made the package very slow.

The Sirius is notorious for having powerful screen-handling facilities that nobody understands! ESI says it is working on proper screen-handling for the release Sirius implementation.

## Conclusions

Expert-Ease is not cheap. At \$2350, it

costs more than half as much as the machines it runs on. But expert information is expensive. Specialists in many fields may charge \$500, \$1,000 or even more per day for their services. And, in many cases, an expert system could replace the expert to a significant extent — perhaps needing the expert only for a few days instead of a fortnight.

There are, of course, areas where an expert system cannot be used: for example, when subjective decisions are required, or when the decisions are too important to be entrusted to a computer! But in many areas where an expert system is appropriate, Expert-Ease represents a convenient and cost-effective means by which to generate them.

*Expert-Ease will not be available in Australia for about another month (from the time of publication of this issue), so if you're interested in purchasing the product immediately you can ring ESI directly in Scotland on 0011 44 31 556 3266. The price of Expert-Ease in Britain is £1,480 which translates to \$2,350 at the present rates of exchange. We have been assured that we will be advised of the Australian distributor within a month and therefore hope to publish details in the next issue.*



# HOW! MUCH PERFORMANCE DO YOU REALLY NEED? B.V.P. 6400

COMPATIBLE WITH AN ENORMOUS AMOUNT OF SOFTWARE AND ACCESSORIES.

64k — 128k OF RAM. 16k OF ROM

**PROVEN POWER !!!  
AT A PRICE THAT KEEPS  
YOUR BALANCE**

# B.V.P.

"THE MICRO COMPUTER SOLUTION"



456 St. Kilda Road,  
Melbourne 3004. Telephone: (03) 267 5450



## NUMBERS COUNT

# Quotients

This month Mike Mudge examines the quotients of Fermat and Wilson.

### Notation

We write  $A \equiv B \pmod{C}$ , read as A is congruent to B modulo C, if A and B leave the same remainder when divided by C. For example,  $16 \equiv 21 \pmod{5}$ ,  $64 \equiv 0 \pmod{16}$ .

### The Fermat Quotient

A famous theorem in classical number theory, Fermat's Little Theorem states that if p is prime and does not divide a, then  $a^{p-1} \equiv 1 \pmod{p}$ . The number  $F_p = \frac{a^{p-1} - 1}{p}$  is Fermat's Quotient.

Computations by Fröberg for  $a=2$  and p less than 5000 have revealed only two solutions,  $p=1093$  and  $p=3511$ , to the equation  $F_p \equiv 0 \pmod{p}$ . It is still an open question whether any more solutions exist for  $a=2$  with p greater than 5000, and the nature of any solutions for  $2 < a \leq 31$ ; this range being relevant to the proof of Fermat's Last Theorem.

### The Wilson Quotient

A well-known theorem by Wilson states that if p is prime, then  $(p-1)! \equiv -1 \pmod{p}$ . The number  $W_p = \frac{(p-1)! + 1}{p}$  is known as Wilson's Quotient.

Computations by Fröberg for  $3 \leq p \leq 50000$  have revealed only three solutions,  $p=5$ ,  $p=13$  and  $p=563$ , to the equation  $W_p \equiv 0 \pmod{p}$ . It is theoretically probable that there are more solutions to this equation.

Large tables of  $W_p \pmod{p}$  would be useful in empirical number theory. At the present time, only two small tables are known: p less than 300, and p less than or equal to 211, due to NGWH Berger (1920) and ET Lehmer (1937).

Readers are invited to reproduce the results given above, and to extend them in any natural way. Submissions should include program listings, hardware

description, run time and output, and will be judged for accuracy, originality and efficiency (not necessarily in that order). A prize will be awarded to the 'best' entry received by 1 August 1984. Please address to Mr MR Mudge, C/- APC, 77

Glenhuntly Road, Elwood, Victoria 3184.

Please note that submissions can only be returned if a suitable stamped addressed envelope is provided.

# \$500

## '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
- \* PAYROLL
- \* INSURANCE BROKER SYSTEM
- \* OTHER CPM SOFTWARE

## A&M Computer Solutions

2 PROSPECT HILL ROAD, CAMBERWELL 3124  
Telephone: (03) 813 3022



# THE FAMOUS FIVE AT IMA



All New: 128K  
Transportable  
A NEW ENTRY POINT INTO  
COMPUTERS

Built in drive  
2 serial ports  
Mouse power  
80/40 columns/LCD  
Ultra hi-res color graphics  
Full size keyboard



Mouse & Profile  
Powered  
Apple IIe

THE PROFESSIONAL.  
EXPANDABLE MICRO  
WITH HARD DISK

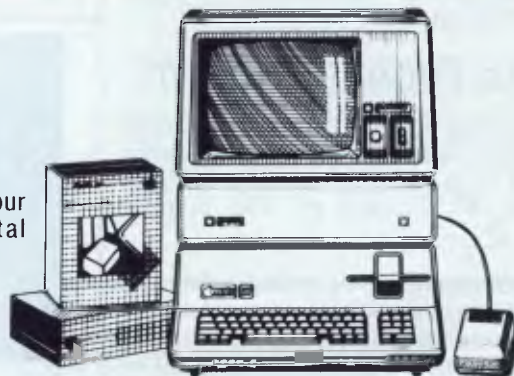


## IMA Computer Co P/L

292 Canterbury Rd.,  
Surrey Hills, Vic. Tel: 836 8835



Powerful Business Micro with our  
integrated software; a total  
solution at low cost.



Sheer brilliance  
in ease of use  
and 32 bit software  
integration —

THE REVOLUTIONARY TOOL FOR KNOWLEDGE  
WORKERS AT AN AFFORDABLE PRICE

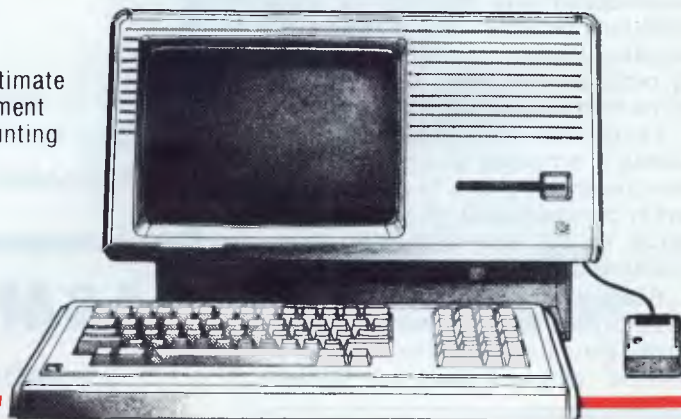


### WE OFFER YOU

- World-wide software sources
- Software development
- Unique legal, restaurant & dietary planning, health & fitness software
- Lisa Accounting
- Communication specialists
- Business/Accounting on IIc, IIe, III+, Lisa
- Training courses
- Field service
- Customer Hotline



32 bit brilliance — the ultimate  
micro for office management  
and our integrated accounting  
package is unrivalled



## IMA COMPUTER CO P/L 836 8835

"Macintosh" is a trademark licensed to Apple Computer, Inc.  
Apple is a registered trademark of Apple Computer, Inc.

# CP/M access

*Programs written for one CP/M machine should run without modification on another, or at least that's the theory. Richard Moffat explains how to call CP/M functions from within your own machine code programs.*

There are several reasons why it can be a good thing to persevere with writing programs using CP/M, and not the routines hidden deep within the ROM in your machine. The first major advantage of accessing files on disk is easier — for example, how many times have you erased a file only to discover that you have deleted the wrong one? I'm sure nearly everyone has done this at some stage, and if you don't have a back-up of the file it can be very annoying. However, if you know a little about how CP/M stores files in the directory, you don't need to spend a lot of money on a utility to recover 'lost' files, as you can write one yourself in under 20 minutes.

Once you have mastered file access there is a whole suite of programs waiting to be written, only bounded in complexity by your imagination and available time.

Another significant advantage of using as many CP/M functions as possible instead of CALLs to ROM routines is that your program will become much more portable. As an example, one of my early machine code programs used no CP/M functions at all, even though its purpose was to copy files from one disk to another. To run this program on another micro using CP/M would require several days conversion because of the non-standard way in which the disk access had been written. More recently, I wrote a much more powerful utility to perform a similar function which I'm confident could run on any CP/M machine within a couple of hours. Therefore, if you want to write any software that you hope to market, write it using CP/M functions wherever possible.

## Problems

My first attempts at using CP/M functions from within my own machine code programs were fraught with problems. The only information I had to

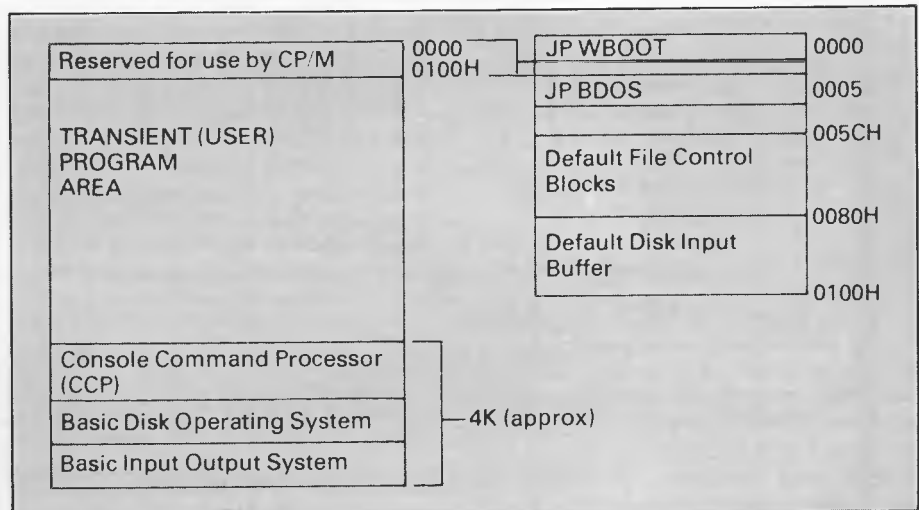


Fig 1 Typical CP/M memory map

work from was provided in Digital Research's *CP/M Interfacing Guide*, which is far from ideal as an introduction. Nearly all my first programs failed and I must have cursed the creator of CP/M more times than I care to mention. Part of the problem was due to my tendency to use the instruction manual only as a last resort, but I've certainly learnt from my mistakes.

## CP/M memory map

Let's take a look at a typical CP/M system memory map (Fig 1).

The Console Command Processor (CCP) decodes and takes appropriate

action on the text typed in after the prompt. The CCP checks that what has been typed in corresponds to any of the built-in commands (DIR, TYPE, ERA, REN, SAVE, and so on). If not, it looks at the disk directory to see if what has been typed corresponds to a file on the disk which has a .COM extension: if it finds such a file it proceeds to load the file into memory starting at address 0100 hex. When all the file has been loaded the CCP executes CALL 0100H to run the program. As well as processing the command, the CCP scans the rest of the input text and places it in the Default Disk Input Buffer at locations 0080 hex onwards. Location 0080H contains the length of the entered text. In addition, if

```

W.BUFF  ORG 0100H      ; set the assembly address
        EQU 09       ; code number for write strings
        LD C,W.BUFF  ; set up function code in C
        LD DE,TEXT   ; set up address of string in DE
        CALL 0005    ; call the BDOS
        JP 0000      ; perform a warm boot
TEXT:   DEFM 'HELLO $' ; note the dollar terminator
    
```

Fig 2 Z80 code

the CCP finds that you have typed a possible filename or filenames after the command then it places a correctly formed file control block at location 005CH for the first filename and at location 006CH for the second — it's then up to your program to make use of these if required.

The Basic Input Output System or BIOS is the only machine-specific part of the CP/M operating system. It contains the necessary code for writing to and reading from disks, printing characters on the VDU, and so on.

The Basic Disk Operating System or BDOS is the real workhorse of the system. It's the interesting part as it's possible to call the BDOS in order for it to perform various tasks such as reading a file into memory, creating a new file and printing text to the screen.

To call the BDOS we use the vector at 0005, as locations 0005, 0006 and 0007 contain the code for JP BDOS. This vector also provides a way of finding out the highest available memory location that our program can make use of (assuming that the program ends with a JP 0000 to reload the CCP by a warm boot). The instruction LD HL,(0006) puts this highest available address into the HL register pair.

Before calling the BDOS with CALL 0005, the C register must be loaded with a code number. This number tells the BDOS which function is to be carried out, so if the C register is not correctly set up you may find that CP/M has just erased one of your programs, or performed some other unexpected operation. It may be necessary to pass a parameter to the BDOS in addition to the code number: if a single byte parameter is required then it is placed in the E register, if an address is required it is placed in the DE register pair. Some BDOS functions return a result and this is placed in the Accumulator.

Consider the Z80 code in Fig 2 to print a message.

CP/M knows it has reached the end of a string to be printed when it reaches the dollar sign.

If this simple program is assembled and run (with any slight adjustments needed for your assembler) you will notice a delay between the message 'HELLO' appearing on the screen and the return of the prompt. This is caused by the JP 0000 instruction which causes the operating system to be reloaded from the disk. To avoid this delay we can use the fact that the CCP executed the program with a CALL 0100H. Provided we leave the stack in exactly the same state as when the program was run it's possible to return to the CP/M prompt with a simple RET instruction. The modified program is shown in Fig 3.

It is important to set up your own local stack when writing CP/M programs

```

W.BUFF  ORG 0100H
        EQU 09
        LD (OLDSP),SP      ; save the stack pointer
        LD SP,STACK        ; set up our own local stack
        LD C,W.BUFF
        LD DE,TEXT
        CALL 0005
        LD SP,(OLDSP)      ; reset the stack pointer
        RET                 ; back to CP/M
TEXT:   DEFM 'HELLO $'
        DEFS 16            ; room for the stack which grows
                                ; down
STACK:  DEFW 0000
OLDSP:  DEFW 0000
    
```

Fig 3 Modified program

because the default stack grows down from location 0100: that is, it grows into the default disk input buffer — this is vital if your program uses this area for disk I/O.

File control blocks play an important role in CP/M. A file control block (FCB) is an area of memory containing a program's filename, filetype and other information relating to the current record being processed, where the file is on the disk. The disk directory contains the FCB for each file present on the disk, each

Another important point worth noting is that when the BDOS returns to your program, the chances are that it has altered the registers that were holding precious information prior to the CALL 0005 instruction. Therefore, instead of calling the BDOS direct, call a routine in your own program, called 'CPM' for example. This routine should save all the registers (except AF, since a result may be returned), CALL BDOS and then recover all the registers again. It may also be worthwhile to include an ORA instruc-

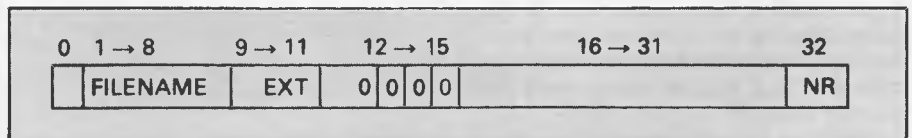


Fig 4 Frequently used FCB bytes

being 32 bytes long. The exact meaning of each byte in the FCB can be found in the CP/M documentation but the ones that are frequently used are shown in Fig 4.

Byte zero gives the status of the file. A zero indicates an active file whereas E5H indicates an unused FCB or a null entry. Under CP/M 2.2 this byte can also contain the user number of an active file. When a file is erased this byte is set to E5H so that the operating system forgets the file ever existed — the rest of the FCB remains as it was before the file was erased and this provides a way of recovering accidentally-erased files. It's only possible to recover such files if no other files have been added to the directory (thus overwriting the old FCB), and the file was not erased by using ERA', which writes an E5H byte to every byte in the directory. If you have a good disk editor on your system this can be used to search the directory tracks (usually about track 2) and then change the first byte of the correct FCB to a zero. Alternatively, it's not too difficult to write a program to find the file and then change the FCB to that of an active file in much the same way.

tion at the end of the routine to set the flags, since a zero result in the Accumulator often means that the BDOS has carried out the desired function without error.

For example:

```

CPM:  PUSH BC
      PUSH HL
      PUSH DE
      CALL 0005
      POP DE
      POP HL
      POP BC
      OR A
      RET
    
```

It's not usually necessary to save the IX and IY registers too since the BDOS is written in 8080 code which has neither of these registers. However, some machines including the Osborne 1 use these registers in the BIOS so it's really a case of trial and error to see if you need to save them on your system.

It is often necessary to copy the matched filename and filetype and copy it into memory where it can be made use of: to do this decode the byte address. When a match is found, the sector of the directory containing the matched FCB is read into the disk input buffer. Since

# MEGA-BOARD™

*new!*

**Ideal for**

- **COMPUTERISTS**
- **OEM MANUFACTURERS**
- **DEVELOPMENT LABS**
- **UNIVERSITIES**
- **INDUSTRIAL APPLICATIONS**

**THE ULTIMATE OEM/PC  
COMPATIBLE SINGLE  
BOARD COMPUTER**

**FULL IBM – PC\*  
COMPATIBILITY!**

**DEALERS AND OEM MANUFACTURERS  
QUANTITY DISCOUNTS AVAILABLE**

**Standard Key-  
board Interface**  
(Full PC compatible)

**Hardware Reset**  
(Overcomes reset flaw  
in PC)

**Eight Compatible  
I/O Interface  
Connectors**  
(Full PC compatible)  
(compatible with all  
IBM-PC\* plug-in cards)

**Power Connector**  
(Full IBM\* pinout  
compatible)

**Special J1  
Interface**  
(Allows horizontal mount-  
ing of compatible expan-  
sion cards for easy bus  
expansion and custom  
configuring) (Board has  
62 pin gold plated compat-  
ible connector)

**8088 Processor**  
(Same as PC)

**8087 Numeric  
Processor**  
(Same as PC)

**Peripheral  
Support Circuits**  
(Same as PC)

**Extended ROM  
Capability**  
(Runs all compatible PC  
ROMS) (Jumper program-  
mable to accommodate all  
popular 8K, 16K, 32K and  
64K ROM chips and NEW  
EE ROMS! VPP power pin  
available for EP ROM  
burning!) (External  
VPP voltage required)

**Configuration  
Switches**  
(Same as PC)

**Speaker/Audio  
Port**  
(Same as PC)

**Board Size**  
10.5 inch X 13.5 inch

**Wire Wrap Area**  
To facilitate special custom  
applications!

**Full Mega-Byte Ram Capacity!  
On board!**  
(With parity)  
 256K Bytes using 64K chips  
 1 Mega Bytes using 256K chips

**ONLY!**  
**\$165**  
**Evaluation  
Board Kit**

**MEGA-BOARD™ Evaluation Board Kit!**  
(Blank board with full assembly  
instructions and parts list.)

Includes highest quality PC board  
with gold plating, silk screen,  
solder mask

- MEGA-BOARD™** with full assembly instructions . . . . \$165
- USERS MANUAL** with theory of operation,  
schematics, block diagram, application notes . . . . \$36
- MEGA-BIOS™** fully compatible MS-DOS/PC-DOS BIOS . . . . \$45

**ORDER NOW!!!**  
SATISFACTION GUARANTEED!  
10-day money back guarantee if not completely satisfied.

## PHILITRONIC

180 FLINDERS ST, MELB TEL: 654 1327  
17A BRIGHTON RD. ST KILDA TEL: 534 0285, 534 0286

Please send me .....

Name ..... Address .....

Postcode .....  cheque  Bankcard No. ....

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

```

GETDIR:  LD HL,DIRTBL      ; start of my table
        LD (DIRPNT),HL   ; set up a pointer
        LD C,17          ; find first match
GET001:  LD DE,FCB        ; address of FCB in DE
        CALL CPM         ; enter BDOS (saving registers)
        INC A
        RET Z            ; if code was FF it will now be 0
        DEC A           ; back to original byte address.
        AND A,3         ; get in range 0...3
        RRCA            ; multiply by 32 by shifting
        RRCA            ; right through carry 3 times.
        RRCA
        ADD A,81H       ; we don't need byte 0 so add 81 hex
        LD L,A          ; get address into HL.
        LD H,0
        LD DE,(DIRPNT)  ; current pointer position.
        LD BC,11        ; number of bytes to copy.

```

Fig 5 Code used for program requiring a table in memory

each FCB is 32 bytes long and a single sector contains 128 bytes, there will be four file control blocks in this buffer, only one of which is required. The first step in decoding the byte address is to mask off all but the lower two bits so that either 0, 1, 2 or 3 remains. I then multiply this result by 32 to reach the correct address within the buffer. Once this address has been reached it's a simple matter to copy the filename and filetype into memory wherever needed.

As an example, I wrote a program requiring a table in memory containing all the directory entries. The code I used to obtain this table is shown in Fig 5.

The next eight bytes of the FCB contain the primary filename padded with blanks if necessary. The filetype or extension follows in bytes 9 to 11, again padded with blanks if required. Bytes 12 to 15 are normally assumed zero. Bytes 16 to 31 are filled in by the operating system regarding where the file is actually stored on the disk. Byte 32 is the record number currently being processed — it is important that when a file is accessed for the first time, this byte is set to zero.

## Disk directory searching

CP/M provides two functions which enable the disk directory to be searched. The first, BDOS function number 17, searches the directory for the first occurrence of the file whose FCB is located at the address in the DE register pair. The next, BDOS function number 18, finds the next occurrence of said FCB.

As each file on the disk has a unique name and extension you may wonder why it's necessary to have this second function at all. The reason is that it's

possible to include wild cards in the FCB which will match any byte at all. These wild cards are byte 3FH — that is, a question mark. If you set up a FCB which has as the primary filename ????????, it is possible to find all the files on the disk with the given extension by using function 17 followed by repeated use of function 18. It is important that after using function 17 there are no other DBOS functions used before you use function 18. Both these functions return a result called the byte address. The byte address is a code referring to the position of the FCB within the directory.

The routine in Fig 6 should prove useful — it took several days of frustration to decode the byte address correctly, and since then I have used the routine in about 70 per cent of all my machine code programs.

The BDOS also provides functions for creating a new file, renaming a file, erasing a file, reading from a file, writing to a file, opening a file and closing a file. All these functions are described fully in the CP/M documentation but a few points are worth making here.

Firstly, you must open a file before reading or writing to it. This is not strictly correct as in some cases it isn't necessary, but it doesn't do any harm

and it's a good habit to get into. Secondly, and more importantly, at the end of writing to a file you must close the file so that the disk map for that file is correctly updated.

A good analogy is a ring file with papers inside it. Before using it, whether for reading or for inserting new information, you must open the file first. Then, after you have used the file, you must close it before putting it back on the shelf.

## Conclusion

Before using any of these features pass the address of the FCB on which the operation is to be performed to the BDOS. All you will need to set is the primary filename and the extension; the operating system takes care of the rest of the FCB. The exceptions to this are reading or writing to a file. In these cases you also need to set the NR byte of the FCB. This is worth remembering as there are many cases when this is what's wrong with a program — you have forgotten to set the record number. Note that you need only set this byte initially — after reading or writing a record the operating system automatically increments the NR field.

In case you are wondering how CP/M copes with files longer than 256 records (since the NR byte can have any one of 256 values), there is a byte in the FCB called the extent byte. One extent equals 256 records and in this way the system copes with very large files.

Finally, a hint about software protection. You will have noticed that when you type something in after the prompt which appears in lower case, the CCP automatically folds this back into upper case — making it impossible to use files with lower case letters or graphics codes. This is purely a function of the CCP, not of the BDOS.

END

```

LDIR                    ; copy the filename & filetype
LD (DIRPNT),DE         ; update pointer
XOR A                  ; quicker than LD A,0
LD (DE),A              ; ensure end of table zero
LD C,18                ; set up search for next match
JR GET001              ; go back and do it
FCB:                    ; find active entries only
    DEFB 00
    DEFM '?????????'
    DEFB 0,0,0,0
    DEFS 16
DIRPNT: DEFW DIRTBL
DIRTBL: DEFS 64 * 11

```

Fig 6 Routine for machine code programs



# NEW GENERATION MICRO SERVICES

The personal computer back-up system you're been looking for. Unfortunately, most people find out the hard way that there's one question even a personal computer can't answer.

## WHERE CAN YOU TAKE IT FOR SERVICE?

We have a suggestion. Come to our new service centre. right now we're equipped to handle:

Apple II, II+, IIe, III, Osborne, Commodore, Tandy, I.B.M. and all Apple compatibles. In addition Epson, Itoh and many other printers.

But in the future, we'll be servicing even more brands of personal computers and related items.

We're even providing a back-up system to our back-up system with a "Hot-line" to all the leading computer distributor service centres. So in the unlikely event that your Bugaboo baffles us there's extra help close at hand:

We also keep our parts well stocked. Which means your problem can be fixed a lot faster than you'd imagine.

But one of the best things about bringing your equipment to us is that you get quality personal service at a very affordable price. Pick-up and delivery available.

## SERVICE CONTRACTS

We are also introducing a new type of service contract. The new contract is valued at 10% p.a. and 8% p.a. of total hardware cost for on-site and in-store respectively. In addition the contract will have a No-claim bonus system of up to 40% per annum.

The above contract includes a quarterly preventative maintenance on the system covered, FREE of charge. This ensures your system is operating to the manufacturers specifications.

## WE OFFER

- ★ 24 hour turnaround on Apple II, II+, Apple disk drives and peripherals.
- ★ All original equipment repaired will carry a one month warranty.
- ★ Open on Thursday nights and Saturday mornings.

**As an opening special for March and April — FREE Apple II, Osborne and I.B.M. disk drive alignments with every machine repaired or tested.**

**SCARLAN PTY LTD** (Inc in N.S.W.)

**T/A NEW GENERATION MICRO SERVICES**

**REAR 229 BURNS BAY ROAD, LANE COVE WEST 2066. Telephone (02) 427 0314**

# COMPAS PASCAL

COMPAS Pascal for only \$175.00\*

## THE IDEAL DEVELOPMENT AND EDUCATIONAL TOOL

The 16 Bit Versions now with interface routines for GSX graphics package

You probably won't believe COMPAS until you've seen it!

australian  
**Micro**  
computer magazine

Software Report Card

Compas  
Pascal

Setup

Ease of Use

Performance

Documentation

Serviceability

Poor	Fair	Good	Excellent
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

See review in September issue

You probably won't believe COMPAS until you've seen it. Standard Pascal in a single 32K-byte program, including an advanced on-screen editor. Compiling 6000 lines per minute directly into native machine code (not slow p-code), which runs faster than anything yet seen. Well, it's true, and it's there.

COMPAS Pascal closely follows the definition of Standard Pascal, as set forth by Jensen & Wirth in the "Pascal User Manual and Report". Furthermore, several extensions are offered by COMPAS, to make it the most complete implementation of Pascal ever seen on a microcomputer.

Now available in both 8 and 16-bit versions for:

**CP/M\*, Apple\* with Softcard  
PC-DOS\*, MS-DOS\*, CP/M-86\***

\* registered trademarks

### SOME OF THE COMPAS FEATURES:

- Wordstar\* like editor
- Dynamic strings
- Random access data files
- Structured constants
- Free ordering of sections within declaration part
- Alphanumeric labels
- Control characters in string constants
- Type conversion functions
- Program chaining with common variables
- Program overlaying
- Include files
- Full support of operating system facilities
- Logical operations on integers
- Bit/byte manipulation
- Direct access to CPU memory and data ports
- Absolute address variables
- In-line machine code and external subroutines

Up till now, most purchases of COMPAS pascal have been Colleges, Universities, Software Houses etc., who have expressed very high satisfaction with this excellent product. We believe that many computer owners/users who may have seen COMPAS in action somewhere would like to use it on their own computer. We have, therefore decided to offer for a limited period only, COMPAS pascal at only \$175.00\* (including tax).

If you haven't heard of COMPAS before, ask around or phone us for more information, but hurry — this offer won't last.

\* plus \$15.00 copy/handling fee. Single user licences only — SORRY no multi user licences at this price.

**K.J. COMPUTER SERVICES, PO Box 66, Mentone Vic 3194. (03) 772 0781, (03) 772 9177**

# 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
- ★ 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.**

**STOCKTAKING SALE  
NOW ON. RUSH IN FOR  
FOR BARGAIN PRICES ON  
SOFTWARE AND  
HARDWARE  
SAVE UP TO 50%**

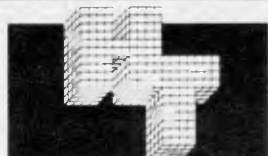
## COURSES

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

**HIGH TECHNOLOGY COMPUTER SYSTEMS PTY. LTD.**

290 Bay Street, Brighton. 3186 Phone: 596 7130  
87 Swan Street, Richmond. 3121 Ph.: 429 1966

**APPROVED EDUCATION SUPPLIER**





# The story behind MSX

*Tom Sato uncovers the success story behind ASCII's development of MSX — a badly needed computer standard.*

In the centre of the MSX operation is one revolutionary company called ASCII. ASCII has set standards which a large number of manufacturers now follow. The Japanese computer industry badly needed an industrial standard. There were a huge number of micros with limited software and this deterred many would-be computer buyers.

## Origins

ASCII started off as a small publishing company back in 1977, the year when the PET 2001, APPLE II and TRS-80 came onto the market. That July ASCII started publishing its computer magazine of the same name — in terms of history, and circulation, it's the Japanese equivalent of *APC*.

The following year, having realised that US software was far superior to Japan's, vice president Nishi flew to the US and signed a deal with Microsoft to set up a company called ASCII Microsoft. ASCII footed the bill to set up the new company, so ASCII Microsoft is a 100 per cent Japanese company with ASCII holding all its shares.

At that time the Japanese electronics giants, NEC and Sharp, were developing their own micro after seeing Apples and PETs being sold like hot cakes. ASCII's first deal was to supply NEC with a modified version of Microsoft Basic for the NEC PC8001. This was the turning point for ASCII and ASCII Microsoft. The success of the PC8001 brought in more business and as the number of personal computer manufacturers increased, so did ASCII's business. At the time of writing, ASCII Microsoft's Basic dominated 80 per cent of Japanese personal computers including Hitachi, Fujitsu, NEC, National Panasonic.

ASCII Microsoft's task is to adapt the language to individual machines and 'Japanise' it so most computers with Microsoft Basic can handle Japanese characters.

Earlier this year I went to ASCII in Tokyo and met Hiroshi Watanabe, one of the vice managers of ASCII.

He told me: 'The MSX machine is designed to be easy to adapt. We gave the prototype MSX computer to all interested so all they had to do was modify it, which wasn't difficult. By November last year 11 manufacturers announced their products to our amazement.'

MSX machines use old technology. But the way the Japanese have adapted the ageing Z80 and TMS 9918 chips and executed the whole operation is an eye opener.

The philosophy behind MSX is standard hardware which any manufacturer can build with identical software. The chips used in MSX are produced by many second source manufacturers. The Z80 is made by NEC, Sharp and a number of others. The same goes for the graphics chip and the sound generator, so there should be no chip shortage problems. The sheer number of MSX makers means that no one semiconductor manufacturer can cope with the demand. Also the Z80 and TMS 9918A are tried and tested and no one has to learn new technology.

In terms of cost the Z80 and TMS are now very cheap compared with some exotic VLSIs.

ASCII sold prototype MSX machines to software houses well before the launch of MSX computers, so by the second month after the launch of the machines there were about 100 software titles independently produced. Arcade video game producers

were also encouraged to move into the home computer software market. Namco, which created Pacman, is now converting most of the coin-operated arcade games to the original specification for MSX computers.

MSX is made as expandable as possible; it can handle up to 16 I/O ports so you can plug in anything from a disk interface to expansion RAM. This expandability meant that the MSX makers were quick to include various firmware and peripherals for their machines. The choice of graphics chip (TMS 9918A) means that user memory is not eaten up by using high resolution graphics; it has its own 16k video RAM. Also this chip can handle sprites as well as 16 colours in high resolution.

On the negotiation side, ASCII has been able to reap the harvest of past efforts in selling Microsoft Basic. But what is ASCII's plan for the future of the MSX system?

'Well', said Watanabe, 'the blueprint of a second generation MSX is already drawn up. I think MSX will be around for a long time. The reason why Apple was so popular for such a long time was because of the huge amount of software and peripherals. MSX has a similar quality and MSX will expand around the same basic system for quite a while.'

'The MSX-DOS for floppy disk drives is now in working order at our laboratory and manufacturers will be releasing disk drives in May. The disks are not standardised but MSX-DOS is the same for all disks. It is possible to have 3.5in and 5in floppy disks at the same time and transfer data between them. The popularity of floppy disks among home computer users has recently increased dramatically.'

'As for software, we have converted Microsoft's Multiplan to MSX. Also various languages which run under MS-DOS including Fortran, Cobol, Logo and Pascal will be converted to MSX.'

Watanabe continued, 'We have about 100 games software titles now, increasing rapidly. Before the launch of MSX we sold prototypes to various software houses to enable them to get started early. Quite frequently a software house would send in a prototype of its MSX software and ask us to test it. We have all the MSX computers in our laboratory to do this. We also support smaller software houses which have limited finance. ROMs have to be made in a large quantity to be cost-effective, so we do that for them.'

'What of future MSX hardware?' I asked.

'A number of VLSI manufacturers are now working on customised chips for MSX,' said Watanabe. Thirty or so chips will be reduced to about five but with total hard/software compatibility. The MSX chips will cost less thus enabling reduction in the overall price of MSX computers. This opens a wide horizon for MSX as there is a possibility of MSX ICs being used outside computers: for example, they can be used for controlling videos and TVs.'

## Conclusions

What ASCII has created is the Japan Computer Industry Inc, with almost all the electronics giants participating. It has considerable strength combined with an ability to market consumer electronics. The company has an impeccable record for quality control. It is almost inevitable that MSX will be exported, as with hi-fi and videos.

# Do Lingo

- ★ 6502 & Z80 CO-PROCESSOR
- ★ 128K RAM MEMORY
- ★ SELECTABLE 40/80 TEXT DISPLAY
- ★ CENTRONIC PRINTER OUTPUT
- ★ RS-232C SERIAL I/O
- ★ RGB COLOUR & PAL VIDEO OUTPUT
- ★ 6 EXPANSION SLOTS
- ★ UPPER & LOWER CASE
- ★ NUMERIC PAD & FUNCTION KEYS
- ★ AUTO/FAST AUTO REPEAT KEYS
- ★ 4 DIRECTIONS CURSOR CONTROL
- ★ GENUINE JAPANESE POWER SUPPLY



## PC-128 THE SOLUTION COMPUTER

- Solutions to your expansion problems
- Solutions to your reliabilities problems
- Solutions to your application requirement problems

## OFFER OF THE MONTH

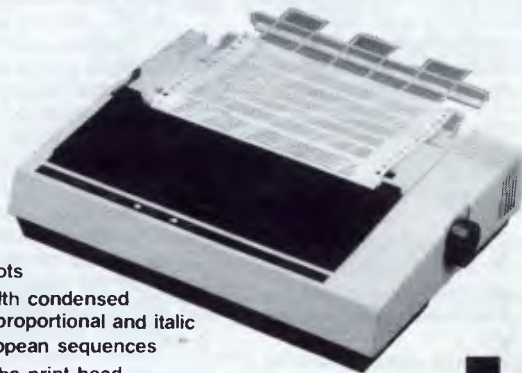
- PC-128 System with high resolution Monitor
- BMC 100cps Dot Matrix Printer BX-100
- Comprehensive accounting package developed in Australia

- Including:
1. Accounts Payable
  2. Accounts Receivable
  3. Stock Control
  4. Invoicing
  5. General Ledger

## BMC 100cps DOT MATRIX PRINTER BX-100

### FEATURES

- Clearly formed dot matrix characters by 9 x 11 dots
- Pica, elite, double-width (pica & elite), double-width condensed characters can be mixed in same line with both proportional and italic
- 96 character USASCII plus seven selectable European sequences
- Printed paper can be cut only 1-inch separates the print head
- Adjustable tractor by standard inclusion
- Print on fanfold, single sheet and roll paper
- Maximum 11" of paper back feeding with minimum control pitch of 1/72"
- High through-put with bi-directional logic seeking (66 L/M)
- Equipped with both parallel interface (CENTRONICS) and simple serial interface (RS-232C)
- Operator replaceable print head (detachable/attachable without tool)
- Longer ribbon life by snap-in cassette (2.5 million characters)



**ONLY  
\$3200**  
(Inc. tax)

# Logitec

## LINGO TURBO DRIVE LT555



### FEATURES

- ★ Fully compatible with Apple II & IIe
- ★ Low Profile High Performance
- ★ Fast Head Seeking
- ★ Stable Circuit Using SITL . IC
- ★ 40 Tracks Available
- ★ No noise operation
- ★ High precision head positioning

COMAX CMD-22  
1 MBYTE 160 TRACKS  
5 1/4" DISK DRIVE

- ★ Fully Compatible with Apple Soft\*
- ★ Double sided 80 Tracks/Side
- ★ Storage Capacity: 640 KBytes (Formatted)
- ★ Track to Track Access Time: Less than 3 mSec.
- ★ Encoding Method: MFM
- ★ Number of Heads: 2
- ★ Complete with Disk Controller Card
- ★ New feature — switch select 40/80 Tracks



FT-7000

## NEAR LETTER QUALITY PRINTER

- \* 140cps
- \* 9 x 9 Text Mode
- \* 23 x 16 near letter mode



FT-6000

**DIGITAL SOURCE INT'L PTY. LTD**  
(AUSTRALIAN IMPORTER)

**DEALER ENQUIRIES  
WELCOME**

169 Phillip Street, Waterloo N.S.W. 2017. Telephone: (02) 690 1268. 690 1540. Telex: AA 75406

# PROGRAM CONVERSION

# BBC

*This month Surya turns his attention to the BBC in his continuing series on graphics and sound on each of the machines included in the APC Basic Converter Chart (see November issue).*

*Find out how to convert BBC listings to work on your micro.*

The complexity of the BBC's graphics often make its listings all but incomprehensible to owners of other machines. But there are a lot of well-written BBC listings around which the aforementioned owners would no doubt like to get up and running on their own machines. For this reason, I think it worthwhile to go into the subject in a fair amount of detail.

The BBC comes in one of two models: the 'A' and 'B'. The only difference between the two as far as graphics is concerned is that the model B offers eight screen resolutions, or 'modes', while the A offers only four.

The BBC has very powerful graphics-handling capabilities. This is useful if you own one, but makes life difficult for anyone trying to convert BBC graphics routines. Let's start with the business of modes. The model B can support eight different screen resolutions, while the model A supports modes 4, 5, 6 and 7 only. A brief summary of the modes follows:

- 0 — 80x32 text, 640x256 graphics, 2 colours
- 1 — 40x32 text, 320x256 graphics, 4 colours
- 2 — 20x32 text, 160x256 graphics, 16 colours
- 3 — 80x25 text, 2 colours, text only
- 4 — 40x32 text, 320x256 graphics, 2 colours
- 5 — 20x32 text, 160x256 graphics, 4 colours
- 6 — 40x25 text, 2 colours, text only
- 7 — 40x25 text, teletext mode (see later)

Mode x, where x is in the range 0 to 7, clears the screen and places you into the appropriate mode. This can be done as either a command or statement.

Once in a given mode, the graphics statements are as follows:

- CLG —clears the graphics screen
- CLS —clears the text screen
- MOVE x,y —move the graphics cursor to point x,y

DRAW x,y —draw a line from the current cursor position to point x,y in the current foreground colour

COLOUR x —set the colour to be used for all subsequent printing of text, where x is an integer in range 0 to 15 to set foreground colour, 128 to 143 to set background colour. Note that the colour values are dependent upon the current mode: colour 2, for example, is yellow in a four-colour mode but green in mode 2 (the 16-colour mode). For an explanation of the colour codes, see later.

GCOL w,x —sets the colour to be used for all subsequent graphics operations, where x is the colour and w is the logical operation defined as:

- 0 — use the specified colour
- 1 — OR the specified colour with any colour already present
- 2 — AND the specified colour with any colour already present
- 3 — XOR (eXclusive OR) the specified colour with that already present
- 4 — invert (that is, change to the logical opposite) the colour already present

Note that x is as for COLOUR.

PLOT —more powerful version of draw: see later for further details

To set the text or graphics colour, numbered codes are used. These codes, as has been mentioned, are dependent upon the current mode. These codes can be reset (see VDU later — virtually everything you say about BBC graphics needs to be qualified in some way), but default values are:

- Two-colour modes (0,3,4 and 6):
- Black —0 foreground, 128 background

White —1 foreground, 129 background

Four-colour modes (1 and 5):

Black —0 foreground, 128 background

Red —1 foreground, 129 background

Yellow —2 foreground, 130 background

White —3 foreground, 131 background

Sixteen-colour mode (2):

Black —0 foreground, 128 background

Red —1 foreground, 129 background

Green —2 foreground, 130 background

Yellow —3 foreground, 131 background

Blue —4 foreground, 132 background

Magenta —5 foreground, 133 background

Cyan —6 foreground, 134 background

White —7 foreground, 135 background

Flashing colours:

Black/White —8 foreground, 136 background

Red/cyan —9 foreground, 137 background

Green/magenta —10 foreground, 138 background

Yellow/blue —11 foreground, 139 background

Blue/yellow —12 foreground, 140 background

Magenta/green —13 foreground, 141 background

Cyan/red —14 foreground, 142 background

White/black —15 foreground, 143 background

The last four colours incidentally, are not a typesetting error but merely one of the BBC's little idiosyncrasies.

To recap, first of all a mode is selected. This determines the resolution and the

# PROGRAM CONVERSION

number of colours available. Then the screen may be cleared (using CLG and CLS), and the text colour (COLOUR x) and graphics colour (GCOLORx) set. The graphics statements available are MOVE, DRAW and PLOT.

## PLOT:

Whichever mode has been selected, the screen is addressed as a virtual screen 1280 x 1024 pixels. The origin (0,0) is at the bottom left-hand corner of the screen though this — like most things on the BBC — can be repositioned if desired. As described earlier, DRAW x,y draws a line in the current foreground colour to the specified coordinates. MOVE x,y moves to the specified coordinates without drawing (OK — for the purists — it draws a line in the current background colour (s)). PLOT is a more sophisticated form of DRAW and uses three parameters which we'll call k, x and y since the manual does.

Parameters x and y are straightforward, these being the coordinates used. The parameter k determines the manner in which the line is plotted as follows:

- 0 — move (ie, draw in background colour (s)) relative to present position
- 1 — draw (in foreground colour) relative to present position
- 2 — as 1, above, but in logical inverse colour
- 3 — as 1, above, but in background colour. This differs from 0 in that the background colour will overwrite any foreground colour present
- 4 — move to position (x,y)
- 5 — draw line to position (x,y) in current foreground colour
- 6 — as 5, but in logical inverse colour
- 7 — as 6, but in current background colour

Note that 0-3 plot x points in the x-axis and y points in the y-axis; that is, the plot is relative. 4-7 move to the screen coordinate (x,y); that is, the plot is absolute.

Higher values of k may be used to achieve other effects. The ones which are currently implemented are:

- 8-15 — as 0-7 but with the last point in the line omitted
- 16-23 — as 0-7 but using a dotted line
- 24-31 — as 0-7 but using a dotted line and with the last point in the line omitted
- 64-71 — as 0-7 but plotting only the last point of the line
- 80-87 — as 0-7 but use the last two

points visited to plot and fill a solid triangle

You can see from the above that PLOT 4 is the same as MOVE and PLOT 5 is the same as DRAW.

There are also 33 'VDU codes', a number of which are related to graphics. These appear in listings as VDUx, where the most commonly used values of x are:

- 5 — join text and graphics cursors to enable text and graphics to be printed at the present graphics cursor position. This is disabled using VDU 4
- 19 — a very common VDU code used to redefine logical colours. For example, colour 1 is normally white in two-colour modes, but the programmer may wish to change it to a different colour. Thus VDU 19 allows access to colours not normally available in a given mode. The statement takes the form VDU 19, logical colour code, new colour code, 0,0,0 OR VDU 19, logical colour code, new colour code;0;. Thus in mode 0, VDU 19,1,3;0; would redefine white to appear as yellow. VDU 20 resets all colour codes to their default values.
- 23 — define a user-defined character. It uses the same binary-based system as most other machines, the form being VDU 23, ASCII code of the character to be defined, followed by the eight codes separated by commas.
- 24 — define a graphics window, that is an area of the screen outside of which no graphics may appear. The form taken is VDU 24,lower x coordinate;lower y coordinate;upper x coordinate;upper y coordinate;. Thus VDU 24,100;200;300;400; would define a graphics window with coordinate (100,200) as the bottom left-hand corner and (300,400) as the top right-hand corner. This is reset by VDU 26.
- 28 — define a text window. This works as for VDU 24, only commas are used instead of semi-colons and no trailing punctuation mark is required. The text screen is 39x31 characters by default. VDU 26 resets default.

And that covers the graphics handling. Now for sound.

## Sound

The BBC has two sound statements, SOUND and ENVELOPE. The SOUND statement is relatively straightforward, ENVELOPE is so specific to the BBC that it would be of little use to spend the not inconsiderable amount of time necessary to explain it. Even if you could work out roughly what sort of sound was being created, you would have no way of effectively simulating it on another machine. What ENVELOPE does is to define the shape of the sound generated by the SOUND statement, so you may not be able to recreate the sound faithfully.

The format is SOUND channel, volume, pitch, duration where:

\* Channel is in the range 0-3, channel 0 producing 'white noise' and used to create special effects.

\* Volume is in the range 0 to -15 with 0 silent (useful) and -15 the loudest.

\* Pitch ranges from 0 to 255, covering some five-and-a-bit octaves.

\* Duration is in the range -1 to 254. -1 means 'continue until stopped' (either by pressing escape or by sending another note to the same channel), positive values are in twentieths of a second.

Sending two or more notes to the same channel at the same time produces a chord. Where channel 0 is used, the type of white noise produced depends upon pitch, the BBC manual summarising the effects as follows:

- 0 — high-frequency periodic noise
- 1 — medium-frequency periodic noise
- 2 — low-frequency periodic noise
- 3 — periodic noise, frequency determined by pitch setting of channel 1
- 4 — high-frequency white noise
- 5 — medium-frequency white noise
- 6 — low-frequency white noise
- 7 — white noise, frequency determined by pitch setting of channel 1

And that's the BBC micro! You do need to remember that without the equivalent of the ENVELOPE statement, you will not be able to achieve the kind of complex sound effects used in some BBC programs. Sound effects are generally the frills rather than the meat of a program, and while good sound effects can very much improve a program, they can usually be simplified without losing the effectiveness of a program.

END



## 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

### MONITORS

NEW SWIVEL BASED MONITORS  
 HIGH RESOLUTION GREEN & AMBER  
 20MHz BANDWIDTH  
 GREEN **\$179** AMBER **\$199**



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.

**\$249**

OUR FAMOUS RITRON MONITORS  
 IN AMBER AND GREEN  
 18MHz BANDWIDTH  
 AMBER **\$199** GREEN **\$189**



- 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.

### PRINTERS

JUKI PRINTER WITH 8K BUFFER  
 DAISY WHEEL 18CPS

**\$999**



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.)



**\$359**

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

M2896-83  
 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. **\$630**  
 Box & Power Supply to suit. **\$125.00**

M4851  
 Slimline 5 1/4" disk drive. Double sides, double density. 0.5 Mbyte unformatted. 3ms track to track track/side. 9922 bits/inch. Steel band drive system. **\$329**  
 Box & power supply (with drive) **\$369**

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. **\$399**  
 Box & Power supply to suit (with drive) **\$439**

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. **\$359**  
 Box & Power supply (with drive) **\$399**

### 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

### 160 cps Printer Introductory Offer \$725

Brilliant new printer that gives you great graphics ability, high quality (letter quality mode) and fantastic speed. Leaves those 80 cps printers for dead.

### 2.4 Mbyte CP/M system for \$2700



Yes that's right 2.4 Mbyte and the Ferguson Bigboard II get you a 4MHz Z80 system with two RS232 ports plus a centronics and STD bus expansion. If you want we can add Eprom programming facilities. Comes complete with CP/M80. Check it out at our computer division C-Tech at A'Beckett Street.

### VERBATIM DISKS

Code	Description	Price
C12501	MD525-01 Single sided, Double density	30.00
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	50.00
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.

### APPLE

Compatible Disk Drives  
 Slimline, Japanese mechanism

Only **\$285**  
 including controller card  
**\$265** excluding card.

Printer Card and Cable **\$60**

Apple is a registered trademark of Apple Computer Inc.

**10 Mbyte Hard Disk for Big Board II**  
 — **\$2600.**

**MEGATRON**  
COMPUTER SALES & SERVICING



Dual Processor  
64K RAM  
Z80a on Board  
Programmed Keyboard  
Numeric Key Pad — upper  
and lower case —  
expansion slots —

**\$650** Inc. Tax

Computer only

- Service & Warranty work done on premises
- QUALIFIED Company Engineers
- Education in use of equipment

- Large range [redacted] available, Drives & Monitors.
- [redacted] from \$345 incl tax
- 5¼" Verbatim [redacted] SS DD Box 10 \$36 (While stocks last)
- [redacted] (Computer Desks) \$89 incl tax

IBM Compatible Computer 128K, Dual Drives, Monitor and Education,  
runs most IBM software.

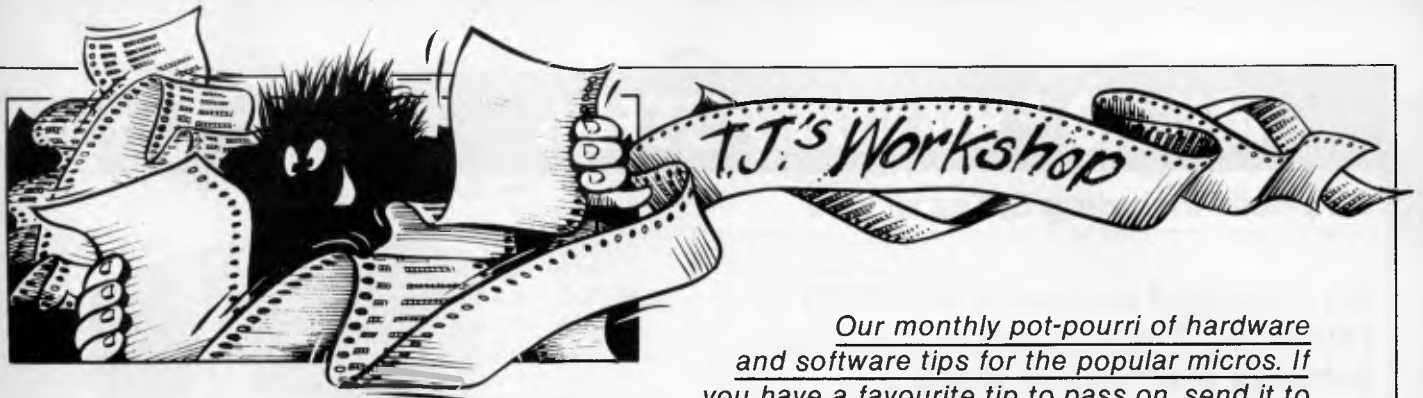
**FINANCE**

arranged for approved purchasers on no deposit.

**Megatron Computer Industries Pty Ltd**

192 Mt Dandenong Rd, Ringwood East, Victoria

**(03) 870 4017**



*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, Victoria 3184. Please keep your contributions as concise as possible. We will pay \$10-\$30 for any tips we publish. APC can accept no responsibility for any damage caused by using these tips, and readers should be advised that any hardware modifications may render the maker's guarantee invalid.*

## 64 screen dump

Here is a short listing for a routine which produces an exact printed copy of the Commodore 64 screen.

It will reproduce all characters and block graphics in upper or lower case and normal or reverse video.

It's a fairly easy task to convert for the VIC 20.

Alterations in lines 60040 (checking for upper/lower case), 60100 (screen memory locations), and 60105 (screen width) are necessary.

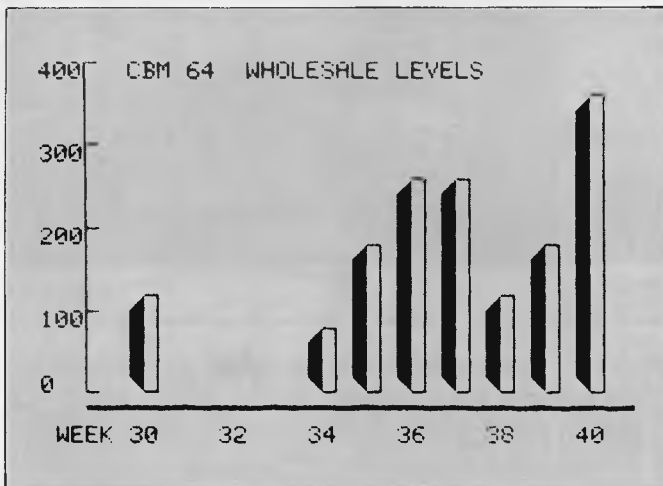
The program runs by examining the screen one line at a time, and building up a string of CHR\$ values to be printed. It is very useful as a subroutine in a main program.

D Twinberrow

```

60000 REM*****SCREEN DUMP*****
60001 REM*****
60002 REM*****BY D.K. TWINBERROW*****
60010 AT$="" AS$=""
60020 F=0 DIMAS$(80)
60030 OPEN#4:PRINT#4
60040 CK=PEEK($3272):IFCK=21THENCASE=145
60050 IFCK=23THENCASE=17
60100 FORX=1024TO2023STEP40
60105 FORS=0TO39
60110 CH=PEEK(X+S)
60120 IFCH=0 AND CHC=31 THEN AS$(S)=AS$(S)+CHR$(CH+64)
60130 IFCH=32 AND CHC=63 THEN AS$(S)=AS$(S)+CHR$(CH)
60140 IFCH=64 AND CHC=95 THEN AS$(S)=AS$(S)+CHR$(CH+32)
60150 IFCH=96 AND CHC=127 THEN AS$(S)=AS$(S)+CHR$(CH+64)
60160 IFCH=128 THEN CH=CH-128 AS$(S)=AS$(S)+CHR$(18):F=1 GOTO60120
60170 IFF=1 THEN AS$(S)=AS$(S)+CHR$(146):F=0
60190 AT$=AT$+AS$(S):AS$(S)=""
60200 NEXTS
60210 PRINT#4,CHR$(15)CHR$(CASE)AT$CHR$(8)
60220 AT$="" NEXTX
60230 CLOSE#4:RETURN
FEATV.

```



## Tandy tips

The following Tandy routines may be useful.

1) Places a comma after every third digit from the right in a number. Number input in X, output as A\$.

Uses A,B,C, internally.  
500 A\$=MID\$(STR\$(X),2):

```

A=LEN(A$):C=A
510 AA=1:BC=A:
IF A=0 THEN RETURN
ELSE IF B/3 INT(B/3)
THEN A$=LEFT$(A$,A)+
""+MID$(A$,A+1):
GOTO510 ELSE 510

```

2) Given a line of text, this routine stops the words being split by the edge of the screen. Text input in A\$.

Line length in LL. Uses A2 internally. For ? read print.

```

600 IF LEN(A$)<LL
THEN?A$:RETURN ELSE
A2=LL

```

```

610 IF MID$(A$,A2,1)=""
THEN 620 ELSE

```

```

A2=A2-1:IF A2=0 THEN?
A$:RETURN ELSE 610
620 ?LEFT$(A$,A2-1):

```

```

A$=MID$(A$,A2+1):
GOTO600

```

3) This routine justifies a row of numbers into 0.00 form which is ideal for use in money printing routines. INPUT P where P is the sum of money in cents. Output in S. Uses A,B internally.

```

100 S$=MID$(STR$(P),2):
B=VAL(S$):IF B<1
THENSS$="0" + S$
110 A=LEN(S$):B=A
120 IF MID$(S$,B,1)=""
THEN 130 ELSE B=B-1:IF
B=0 THEN B=A+1:
GOTO 130 ELSE 120
130 S$=S$+RIGHT$(
"".00",2-(A-B)):
RETURN

```

These routines have been running on my Tandy Color Computer since they were developed (I don't have Extended Basic or PRINT USING). They should be easy to convert to computers that don't have ELSE or multi-statement lines.

Peter Griffiths

## Tandy merge

There do not seem to be many programs or hints for the TRS-80 Color Computer around at the moment, so here is a handy little program to rectify the situation. It allows the user to merge two Basic programs together. My computer has Extended Colour Basic Version 1.0 — I'm not sure whether the program will work with other versions of Basic.

```

10 'MERGE FOR THE TRS-
80 COLOR COMPUTER

```

```

20 CLEAR 200,16364
30 FOR I=16365 TO
16381
40 READ A:POKEI,A:NEXT I
50 DATA 158,25,175,140,
12,158,27,48,30,32
60 DATA 3,174,140,3,
159,25,57

```

To merge program B onto the end of program A:

1. CSAVE program B onto tape.
2. CLOAD or type in the MERGE program and RUN it.
3. CLOAD program A.
4. Make a note of the last line number in program A.

# MICRO PRO COMPUTERS

TELEPHONE 568 6911  
43 ATHERTON RD  
OAKLEIGH 3166

All prices including S/Tax of 20%

No copyright problems. Our DOS is (Wombat) Copyrighted and will run software that runs in Apple Computers.

## MONITORS

12" Green Monitor	\$170
12" Green Screen Tilt Swivel	\$252
12" Amber Screen Tilt Swivel	\$265
12" Green with Filter Screen	\$295
Kaga Vision 2 Colour RGB	\$595
General 14" RGB TV	\$620

## PERIPHERIES

Serial Interface RS232	\$ 84
Parallel Interface	\$ 76
Grappler Interface	\$ 89
Eprom Programmer	\$135
Z80 CP/M Interface	\$ 88
80 Column Card (Videx)	\$ 95
16K RAM Card	\$ 92
128K RAM Card	\$219
PAL Colour Card UHF	\$ 87
RGB Colour Card	\$ 97
Printer Cables	\$ 35
Joy Sticks	\$ 45
Speech Cards	\$ 68
Graphics Table	\$130
Disk Storage Boxes (60)	\$ 33
Verbatim Diskettes	\$ 38



## VECTORIO 64ZS \$785

Vectorio 64ZS is a dual processor computer with a separate keyboard with built in fan and room for two disk drives in the case. Separate numeric key pad, 88 function keys, 6 slots for peripherie cards, upper and lower case characters. Can run Logo, Zardex, Wordstar, Dbase etc.

## COMPUTERS

Med-Fly "Basis" 64K	\$1275
Med-Fly "Basis" 128K	\$1395
Vectorio 64Z	\$ 620
Vectorio 64ZS	\$ 785
PC 301 (16 bit)	\$3400

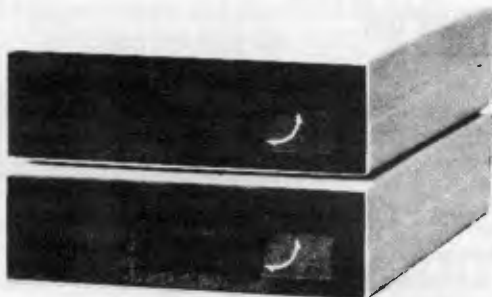
Special for this month  
Disk Drives

Choose from **\$285**

Teak Slim

or

Shugart



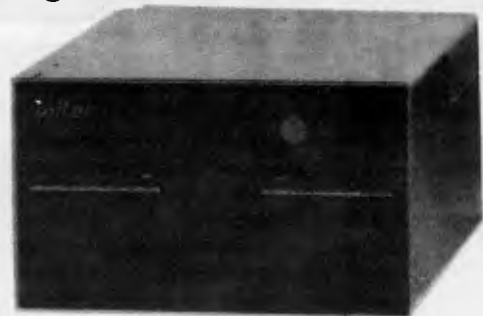
8" Drive with Software	\$ 913
8" Twin Drive with Software	\$1564
5" Drive Controller	\$ 75
8" Drive Controller	\$ 300

10MB Hard Disk with Cont	\$3400
20MB with 5MB Removable	\$8350

## ELECTRONIC TYPEWRITERS

Daisy wheel with Centronic Interface. Use as a printer.

inc tax \$849 — Complete



TELEPHONE (03) 568 6911  
MICRO PRO COMPUTERS

43 ATHERTON RD,  
OAKLEIGH 3166  
MELBOURNE AUST

PLEASE SEND ME MORE  
INFORMATION

NAME .....

ADDRESS .....

SUBURB .....

STATE ..... Postcode .....





T.J.'s Workshop

```

5. EXEC 16365.                ORG $3FED
6. CLOAD program B.          FIRST LDX $19
7. Use RENUM to make the     STX QUIT,PCR
   line numbers in program   LDX $1B
   B higher than the last   LEAX -2,X
   number in A.              BRA +3
8. EXEC 16376                SECOND LDX QUIT,PCR
   The merge is now com-    STX $19
   plete and the program    RTS
   in memory can be CSAVED  QUIT   RMB 2
   as one program (which it now is).

```

Here is the assembly language listing of the machine code:

D Winnett

```

10 REM** TOPLINE 064 - SHORT VERS. +
1000 ML=828
1010 READ A:IF A=256 THEN STOP
1020 POKE ML,A:ML=ML+1:GOTO 1010
1030 DATA 160,0,162,40,169,0,153,0
1070 DATA 216,200,202,208,247,160,0,185
1080 DATA 100,3,240,7,153,0,4,200
1090 DATA 76,75,3,76,49,234,7,153
1100 DATA 0,4,200,76,89,3,150,2
1110 DATA 148,136,137,147,160,137,147,160
1120 DATA 148,136,133,160,148,143,144,160
1130 DATA 140,137,142,133,160,143,134,160
1140 DATA 148,136,133,160,147,131,146,133
1150 DATA 133,142,174,174,174,160,160,160,0
1170 DATA 120,169,60,141,20,3,169,3
1180 DATA 141,21,3,88,96
1190 DATA 120,169,49,141,20,3,169,234
1200 DATA 141,21,3,88,96,256

```

## Topline for Commodore 64

This program is designed to print a non-vanishing line of print at the top of the screen which can be altered from within the program by POKE commands.

The address in the hardware IRQ interrupt

vector at \$0314-\$0315 is changed to that of the ML subroutine at \$033C (828). This routine fills the topline colour memory and then the characters of the line are loaded from their locations to the screen locations.

The 40 characters are in data statements in lines 1100-1150 and in the example program the topline reads (in reverse print):



To change to characters in program mode, POKE867+CP,SC where CP = character position in the line and, SC = the screen code.  
 To turn on the topline ..... SYS909 and,  
 To turn off..... SYS922

N Cornish

```

10 REM*****
11 REM** TOPLINE FOR COMMODORE 64 **
12 REM **
13 REM** AN ML PROGRAM BY:- **
14 REM** NEIL CORNISH **
15 REM** **
16 REM** LOTS OF HELP FROM:- **
17 REM** MIKE RYCHTER **
18 REM** **
19 REM** 83.06.84 **
20 REM*****

1000 ML=828 REM LOCATED IN CASSETTE BUFFER.
1010 READ A:IF A=256 THEN END REM TRANSFERRED TO SCREEN LOC'NS.
1020 POKE ML,A:ML=ML+1:GOTO 1010 REM IN 5/R CHANGE END TO RETURN.
1030 DATA 160,0 REM
1040 DATA 162,40: REM 40 CHRS IN MESSAGE.
1050 DATA 169,0: REM COLOUR, @=BLACK.
1070 DATA 216,200,202,208,247,160,0,185: REM COLOUR MEMORY FILLED & CHRS
1080 DATA 100,3,240,7,153,0,4,200: REM TRANSFERRED TO SCREEN LOC'NS.
1090 DATA 76,75,3,76,49,234,7,153: REM ENDS WITH JMP TO NORMAL
1100 DATA 0,4,200,76,89,3,150,2: REM INTERRUPT ROUTINE AT $E931.
1110 DATA 148,136,137,147,160,137,147,160: REM LINES 1110 - 1150 CONTAIN THE
1120 DATA 148,136,133,160,148,143,144,160: REM 40 CHARACTERS FOR THE LINE
1130 DATA 140,137,142,133,160,143,134,160: REM PADDED WITH SPACES
1140 DATA 148,136,133,160,147,131,146,133: REM FOLLOWED BY 0 (BARK)
1150 DATA 133,142,174,174,174,160,160,160,0: REM
1160 DATA 0: REM MUST FOLLOW CHRS.
1170 DATA 120,169,60,141,20,3,169,3: REM THIS IS START (SYS909) AT
1180 DATA 141,21,3,88,96: REM $830C. IT SETS $033C (828)
1190 DATA 120,169,49,141,20,3,169,234: REM IN CTRV (IAG VECTOR) SO THAT
1200 DATA 141,21,3,88,96,256: REM THIS 5/R PERFORMED EACH 1/60
1210 : REM SECOND.
1220 : REM TO CHANGE A CHR IN THE LINE,
1230 : REM POKE867+CP,SC
1240 : REM WHERE CP= CHR POS'N IN LINE
1250 : REM AND SC= SCREEN CODE.
1260 : REM SWITCH OFF WITH SYS922

READY.

```

## BBC garbage collection

A peculiarity of the BBC Basic interpreter is that it does not perform any 'garbage collection', or, support the FRE(X\$) function found in many Basics. This means that programs which perform extensive manipulation of strings can gradually consume the free variable space, resulting ultimately in an ominous 'No room' catastrophic error message.

This proved to be the problem with a mailing list program where alphabetical order sorts are carried out on various fields of the data. The data is organised using a separate string array for each field (title, surname, house number, road, town) with an array element per record, and the problem arises because elements in each array are exchanged in the course of the sort.

The solution is to avoid moving the string array elements when sorting the arrays. This is done by exchanging the pointers to the string array elements instead. A simple way is needed to find the location of the string pointers in memory, and use is made of a CALL statement which builds a parameter block at 0600H before executing a machine code subroutine. The example shows the

relevant portions of the program:  
 Lines 60-69 assemble a machine code subroutine (PBMOV) which transfers the parameter block placed at 0600H by the CALL statement to a safe location, because 0600H is also used by other parts of Basic. 0C00H was chosen as it is reserved for customised character fonts and is rarely used.

Line 64 sets the number of bytes of the parameter block to be transferred. This should be at least 3\* (number of arrays)+2.

Lines 1400-1470 comprise a Basic subroutine which the sort program calls (using GOSUB) in order to exchange two elements in all arrays. The two elements are specified by T and rec.

Line 1400 calls the machine code subroutine and specifies the string arrays we wish to locate.

Lines 1420, 1460 set up a FOR-NEXT loop which will handle one array on each pass.

Line 1430 reads the pointer information in the parameter block and finds the location (N) of the 4-byte pointer block for array element (0).

Line 1440 calculates the locations (Y and Z) of the pointer blocks for the two array elements to be exchanged.

Line 1450 then exchanges these pointer



blocks.

The technique used is general and may be useful in other applications with little

or no modification.

*Martin Cope*

```

LIST
50 REM
51 REM PBMOV - PARAMETER BLOCK MOVE ROUTINE
52 REM
60 DIM AX 20
61 FOR C=0 TO 2 STEP 2
62 PX=AZ
63 LOFT C
64 .PBMOV LDY 20
65 .LOOP DEY:BEQ EXIT
66 LDA &600,Y:STA &C00,Y
67 JMP LOOP
68 .EXIT RTS
69 JNEXT
70 REM
71 REM
1300 REM
1310 REM ARRAY ELEMENT INTERCHANGE SUBROUTINE
1320 REM
1400 CALL PBMOV,sur$(0),title$(0),ho$(0),road$(0),town$(0)
1410 M=&C00
1420 FOR X=1 TO 13 STEP 3
1430 N=(M?X)+256*(M?(X+1))
1440 Y=N+4*Z:Z=N+4*Z
1450 W=Y:Y=Z:Z=W
1460 NEXT
1470 RETURN
1500 REM
1510 REM
  
```

## IF statements and bubble sorts

After reading about replacing IF statements with boolean operations, I thought it might be possible to apply this to a bubble sort to speed it up. Unfortunately this method of exchange was slower on my computer

(NEC 8201a) than the ordinary IF exchange as normally used in sorts of this kind.

This may not apply to other versions of Basic. When converting the program, note that the operation of the algorithm depends on a true condition producing a -1 and false a 0.

*K Garroch*

```

10 DIM A(28)
20 FOR T%=0 TO 25
30 A(T%)=25-T%
40 PRINT A(T%); " ";
50 NEXT
60 PRINT TIME$

70 FL%=0
80 FOR T%=0 TO 25
90 S=A(T%)
100 T=A(T%+1)

110 A(T%-(S<T))=T
120 A(T%-(S>T))=S
130 FL%=FL%-(S>T)
140 NEXT
150 IF FL%<>0 THEN 70
160 PRINT TIME$
170 FOR T%=1 TO 26
180 PRINT A(T%); " ";
190 NEXT
  
```

## Spectrum operating system quirk

I have found an interesting quirk in the Spectrum operating system. It occurs whenever the 'scroll?' command is encountered when printing to the screen. Typing CAPS LOCK (SHIFT and 2) produces the last

command interpreted (for example, when listing a program, LIST is produced). Try typing in the following as a direct command:  
FOR A=1 TO 1000:PRINT "FRED":NEXT A

When the scroll? prompt appears type caps lock — the whole of this line will reappear. Also, after pressing another key, all the keywords are listed.

*C Evans*

## Save machine code on the VIC and 64

An easy way to SAVE machine code programs on the VIC 20 or Commodore 64 without the use of a long machine code program is to type in a couple of direct commands.

For a program starting at address S and ending at address E the following commands should be typed:

First: PRINT(S/256-INT(S/256))\*256, INT(S/256)

This produces two num-

bers we will call LS and HS respectively.

Next: PRINT (E/256-INT(E/256))\*256, INT(E/256)

Two more numbers we will call LE and HE will appear.

Finally: just enter the line  
POKE 43,LS:POKE44,HS:POKE45,LE:POKE46,HE:SAVE" program name",I,I inserting the values for LS,HS,LE and HE.

The program can then be verified with the verify command and the VIC or 64 returned to normal by SYS64824 for the VIC or SYS64738 for the 64.

*M Davies*

## VIC's operation speeded up

Location 37879 can be used to speed up the operation of the VIC.

This is useful for adding difficulty to games and zest to graphics. It does not,

however, appear to work with the super expander graphics. Speed is achieved here by using Multicolour mode.

The higher the value POKEd into 37879, the faster the operation.  
eg POKE 37879,255 — fast  
POKE 37879,1 — slow

*D Williams*

## VIC goes into reverse

An interesting effect that can improve an explosion, or the demise of a player, in a game is the reversing of the screen contents a few times.

The following routine can be used to do this on the VIC 20.

The program is stored in a part of the memory that is not affected by any operation performed by the VIC and hence no memory is lost when the routine is used. It can be accessed from Basic

## CATCHA SNATCHA



...the name of the game

Barney Bootlace, is demoted from ace detective of the aristocracy to the level of mere store detective at one of the craziest run-down stores in town.

It's a hectic life for the hardened crime fighter when he has to look after lost children, taking them to the lost children's office in the top left hand corner of the shop. He must also rush the lost umbrellas and handbags to the lost property office ready for the careless owners to fetch. The lost property office is in the top right hand corner of the shop. At least some variety enters into the action when the occasional bungling shop-lifter attempts to remove a box off the counter and get away with it. Barney has to grab the box and return it to the manager's office to prove it was shop-lifting, but watch those shop-lifters run as you try to grab that box. They hide the box under their coats and you have to keep your eye on them in case they get mixed up with the other shoppers. There is one time our hero has reason to panic — when the occasional customer drops a parcel bomb in the rows between the counters.

**VIC 20**

## BEWITCHED

You have allowed the evil magician Mordread to cast you down into the haunted maze of dungeons beneath his dark and forbidding castle.



...the name of the game

He has transformed you into a magical key to roam for eternity through the haunted labyrinths below ground, whilst he enslaves all those who live above.

There are four sets of different coloured doors, all of which must be opened before you can gain freedom, and all the time you are at the mercy of hordes of ghosts and ghouls intent on hampering your progress. At the entrance to the maze there are four coloured keys, the colours corresponding to those of the doors. You must pass through one of these keys to become the same colour, and only then can you open the corresponding doors.

You must escape from this dank, evil place so that you can repel the forces of darkness and bring light and liberty to the land once again.

**VIC 20**

**FAST LOADING**

## ARCADIA

The spaceship Arcadia has been specially equipped with dual Plasma Disrupter guns and an Ion Thrust Drive in order to combat the deadly menace of the many alien races of the Atarian Empire. Your mission as commander of the Arcadia is quite simple — to destroy as many of the enemy as possible. Intelligence reports indicate that the Atarian fleets will attack in formation and are often quite suicidal in their methods.



...the name of the game

If you manage to destroy the entire fleet within this time another fleet will attack you. ARCADIA works on the basic unexpanded VIC-20, requiring no memory expansion or peripherals except the standard Commodore cassette recorder.

**VIC 20**

**Commodore 64**

## WACKY WAITERS



...the name of the game

You enter this rather ramshackle place to find that the vacancy is for a waiter. Pure desperation for work makes you apply for the job, and the mean-looking boss decides you'll do but warns he'll keep an eye on you.

It doesn't take long for the first guest to scream for service, so off you run to find out what they require. Into the first lift you leap as it passes, taking you up into the building. You have been called to the third floor so on that floor you leap out. You have to wait for the next lift to pass and leap in. You timed it wrong and your tip is dropping, but you'll soon learn. The lift finally passes. In you dive. Now you have the knack, you race into the lift and so on to the next.

You are only paid by tips and the quicker you learn this waiter lark the better for you.

**VIC 20**

Available from

**CORGI & BANTAM  ELECTRONIC PUBLISHING**

Sole Australian agents

26 Harley Crescent, Condell Park N.S.W. 2200

Phone (02) 709 2022

For trade enquiries call our toll-free number

008 222 444

# THE BEST COMPUTER CHESS GAME . . .

## COLOSSUS CHESS 2-0

**FAST LOADING**



**C**olossus is the best computer chess program available on any home computer. It is written using the very latest techniques by a computer chess programmer of seven years' experience. It has been tested against a wide range of other chess programs and proved stronger than any of the opposition. It has the widest range of true features available, including some never before implemented on any home computer chess program. Colossus also has a perfect understanding of all the rules of chess, including underpromotions, the fifty-move rule and all draws by repetition.

**STATISTICS:**

Author: Mr M.P. Bryant  
 Publisher: CDS Microsystems  
 Language: 6502 assembly  
 Code size: 26K  
 Data size: 5K  
 Positions examined per second: 520 (average)  
 Estimated rating: 1750 + ELC

**OPENINGS BOOK:**

Colossus has an openings book of about 3000 positions, which it uses to play the first few moves of the game quickly and accurately. Lines vary from 2 ply to 17 ply deep. When there is a choice of book moves at any position, Colossus will choose between them at random, with a slight bias towards the moves which Colossus itself considers best.

**RESULTS**

Colossus 2.0 has been tested against numerous other chess programs and has beaten them all. In the tests, sixteen games were played, on various levels, with an equal number of whites and blacks for each program. One point was awarded for a win, half a point for a draw, no points for a loss. The results of these tests were as follows:

**Colossus 2.0 beat the following programs by:**

White-Knight Mk11	BBC Publications	BBC	11.5
Superchess 3.0	CP — Software	Spectrum	12.4
Grandmaster	Audiogenic	CBM 64	12.4
Cyrus IS Chess	Sinclair	Spectrum	13.3
Spectrum Chess II	Artic	Spectrum	14.2
Chess	Acornsoft	BBC	16.0
Chess	Bug-Byte	BBC	16.0
Chess	Computer Concepts	BBC	16.0
Chess	Program Power	BBC	16.0
Chess	Atari	Atari	16.0
Chess	Oric	Oric	16.0
Chess	Psion	Spectrum	16.0
Master Chess	Mikro-Gen	Spectrum	16.0
Sargon 2.0	Hayden	Apple II	16.0
ZX Chess	Artic	ZX 81	16.0

NOTE: White-Knight was the 1983 Home Computer European Champion!!!  
 Commodore 64 Tapes \$29.95 Diskettes \$39.95

Available from

**CORGI & BANTAM  ELECTRONIC PUBLISHING**

Sole Australian agents 26 Harley Crescent, Condell Park  
 N.S.W. 2200 Phone (02) 709 2022

For trade enquiries call our toll-free number 008 222 444

**THE BIG ENTERTAINER**

Well they spent years trying to perfect a snooker table to play on at sea, but with this you can take it on an aeroplane or in the comfort of your own home. O.K., it's not a full-scale table in front of you but then you're not paying two grand or one. I mean, all in all this has to be the best game around — even the girlfriend can play. The rest of the family have also been known to have a go. So unless you're of a generous, free-spirited nature, guard this game with care. You never quite know who you will find playing it next.

COMMODORE 64  
— TAPE \$22.95

**FAST LOADING**



**FEATURES:**

- All machine code
- Full-colour holes graphics
- 1-2 player option
- Sound
- Ball-delete function
- Positional cue ball feature
- Accurate cue function position
- Variable shot strength
- Accurate table layout
- Enquire colour feature
- Puts spin on ball in any direction
- Foul snooker option
- Ball select feature
- Play help feature on colour
- Joystick option

Available from

**CORGI & BANTAM **  
**ELECTRONIC PUBLISHING**

Sole Australian agents  
26 Harley Crescent, Condell Park  
N.S.W. 2200 Phone (02) 709 2022  
For trade enquiries call our toll-free  
number 008 222 444

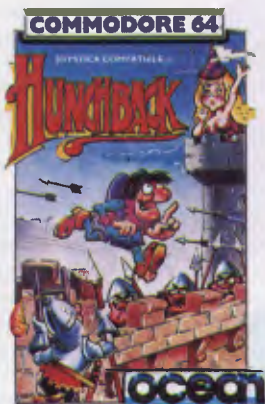




## PIPELINE

You are the **FOREMAN**. Your job is to keep the pipeline open. Take workmen to fix plugs. Watch out for the evil Ladderman. His mission is to plug the pipeline and stop you saving thousands of gallons.

- JOYSTICK COMPATIBLE
- COMMODORE 64



## HUNCHBACK

**QUASIMODO** must rescue the imprisoned **Esmerelda** from the castle stronghold. Jump along the Ramparts, swing over the Fiery pit, dodge the Arrows and Fireballs and remember to keep ahead of the chasing Knight. 15 Screens of fun and excitement and each one more difficult than the last.

- COMMODORE 64

## JAMMIN'

Guide **Rankin Rodney** through the top twenty mazes to number one, collecting the instruments and bringing them home. Avoid bum notes and distortion, and rescue the instruments from discords. Use joystick and jump button together to step onto the moving circles.

- JOYSTICK COMPATIBLE
- COMMODORE 64



## CHINESE JUGGLER

Spin the plates in this 3-D simulation of the classic game. Requires skill, speed and judgment.

You can also do real juggling tricks like tossing up the plates and catching them, this comes in useful because they change colour and the different colours rate different scores.

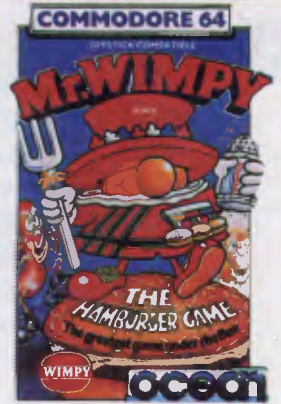
- COMMODORE 64



## COSMIC CONVOY

Planets in the system **Coman** are dying. Millions of people need supplies urgently. A relief convoy is assembled in orbit around **Com-Alpha**. Your task is to guard that convoy to the next planet-fall. You command a squadron of **H-Vips**, each with a fully sorted **Gon-4** stab laser. You know that the convoy must cross the **Trans-Com** freight lanes where the meanest space pirates could pounce. Survive long enough to escort the supplies to **Com-Beta** and become an **Admiral** — but the next planet in the system still needs supplies.

- COMMODORE 64



## MR WIMPY

**Mr Wimpy's** task is to make his delicious Burgers and you must guide him around the screen to achieve this. First assemble the ingredients, avoiding the moving manholes and **Waldo** the burger-thief. Now make the **Wimpy Burgers**, avoiding the kitchen rebels. If you are trapped by the rebels you can pepper them into oblivion but only three times, unless you pick up the bonus gems, the ice cream or the cup of coffee, which gives you more chances to shoot.

- COMMODORE 64

## FAST LOADING

- TAPES \$19.95
- DISKETTES \$29.95

Available from

**CORGI & BANTAM  ELECTRONIC PUBLISHING**

Sole Australian agents

26 Harley Crescent, Condell Park N.S.W. 2200  
Phone (02) 709 2022  
For trade enquiries call our toll-free number  
008 222 444

## T.J.'s Workshop

using SYS 730 and from a machine code program via JSR \$02DA.

```
1 FOR A=730 TO
  738:READ B:POKE
  A,B:NEXT A
2 DATA 173, 15, 144, 73,
  8,141,15, 144, 96
```

```
LDA $900F
EOR #08
STA $900F
RTS
```

M Davies

## Commodore 64 moving message

In the Apple II europlus' Hello program it has, down the bottom of the screen a moving message. This program will make a message of your choice move across the screen.

As this is a typeset copy of the program there are a few points you should note before typing this program.

'S' means CLR/HOME  
'R' means CTRL — RVS ON  
'Q' means CRSR DOWN

```
10 A$=" THIS IS THE
  MESSAGE ":REM PUT
  YOUR MESSAGE HERE
20 FOR A = 1 TO 75 :
  NEXT : REM CONTROLS
  SPEED OF MESSAGE
30 PRINT"SRQQQQQQQQQ
  QQQQQQQQQQQQ";
40 LEFT$(A$,39);
50 A$=MID$(A$,2)+LEFT$
  9a$,1):GOTO 20
```

J Williams

## TANDY MODEL 4 \$2795

### A Logical Solution - TRS 80 Model 4

- ★ A Complete Small Business and Personal Computer
- ★ Fully tested with RS232 Interface included
- ★ Two Disk drives built-in and fast "Memdisk" feature
- ★ 80 x 24 character display "key click" features and sound
- ★ 4MHz CPU, 64K RAM expandable to 128K
- ★ Parallel printer interface and software print spooler
- ★ TRSDOS 6.0 included, CP/M compatible (available now)
- ★ Model III mode allows full use of existing software

#### JWR Systems offers the following for the Model 4

- ★ Montezuma Micro CPM 2.2 with Contesi's "inside CPM" ..... **\$220.00**
- ★ Microsystems DDSPLUS 1VA ..... **\$179.00**
- ★ Information Business Manager ..... **\$500.00**
- ★ Mscript wordprocessing — Models 1, 3 and 4 ..... **\$95.00**
- ★ 6.0 PLUS TRSDOS enhancement ..... **\$59.00**
- ★ Model 4 Lazywriter wordprocessor ..... **\$175.00**

Please write or call for details of package deals

**J. W. ROSS (Systems) Pty. Ltd.**

P.O. Box 200, Forest Hill Centre, Vic 3131

Telephone: (03) 689 2992

Telephone: (03) 233 7212

# DO YOU REALLY NEED THAT \$3000 P.C.?

We're the first to admit that you can't expect a computer system under \$500 to do everything a \$3000 P.C. can do. But do you know what a COMMODORE C64 will do for you besides saving money?

It's an incredibly powerful tool for office or home and don't let anyone convince you otherwise.

At the Computer Spot we will show you software that will handle almost anything you'd like it to do. Fresh programs daily and great stuff too!

If you're new to computers, we'll help. That's what's so special about dealing with us...

The <sup>friendly</sup> Computer Spot...  
Commodore has more.

Call us  
now for  
low prices!



## the Computer Spot

MLC CENTRE: Martin Place, Sydney, Phone: (02) 235 2971.

EASTGATE CENTRE: Bondi Junction, Phone: (02) 387 5208.

THE MAT CS2085

# U UNITRON 2200 PERSONAL COMPUTER

★ IDEAL FOR  
EDUCATIONAL  
BUSINESS OR  
HOBBY USERS

DISK DRIVES  
**\$270**  
SHUGART or TEAC



This syst Price  
**\$1495**  
includes 80 col card  
• 2 Drives Monitor  
Computer  
• Also available  
Single Disk Drive

- \* with 52 preselected functions
- \* 10 user definable keys
- \* auto repeat
- Optional: IBM keyboard extra \$40

Computer Only **\$715** Featuring:

- Dual micro processors 6502 and Z80A
- Dual disc drive controllers
- 5 expansion slots
- 64K Ram
- 80/40 column soft switch
- Software Capabilities
- CP/M\* software

**SUPER SPECIALS**

Highly  
Competitive  
Prices on  
e.g. Printer Interface **\$60**  
**DISC DRIVES**

- Shugart **\$270**
- Teac Slimline **\$270**
- **doublesided SLIM \$335**

**MONITORS** — Unitron Green  
or Amber **\$199**

**CARDS**

128K ROM, 8088 IBM, Z80 and 80 column, Language  
& PAL, Serial A parallel I/O, A/D & Eprom burner

**Super Special Prices** (for buys of 10 or more)

## KULVI COMPUTERS

P.O. Box 387, Everton Park, Q. 4053  
P.O. Box 280, Greensborough, Vic 3088

Adelaide: (08) 337-9820 Excalibur Computer Centre:  
Melbourne: (03) 439-3751 (08) 421-887  
Brisbane: (07) 351-1037 Computer Medics: (02) 546 5175  
Canberra: (062) 588-211

PLEASE SUPPLY Pamphlet with information   
Computer System

\* Enclose cheque/money order plus \$12 delivery

Name: .....  
Address: .....  
Phone: ..... P/Code: .....

\* CPM is a trademark of Digital Research

# COMMODORE 64 BACKADISK

BACKADISK will allow you to make an exact copy of your original diskette on either a single 1541 disk drive or two 1541 drives.

BACKADISK ignores errors on disks when backing up and allows you to re-create the protection errors later. Yes you can WRITE ERRORS to any disk.

The most popular protection method for disk programs is to have errors on them, and during running, the program checks to see if the errors are still there. If they are missing the program crashes. Most generally available copying programs will not copy errors — you need BACKADISK.

Using BACKADISK you can make backups of your valuable programs and prevent the worry of losing or damaging your only copy.

BACKADISK will make a complete backup in only three passes using a single 1541 drive. This program when run on a 64 will also copy VIC 20 disks. For more details send S.A.E.

To obtain your copy send **\$35** to:

**BANANA SOFT**

P.O. BOX 701  
WOODRIDGE Q 4114  
PHONE (07) 200 5926

# APPLICATIONS SOFTWARE FOR CP/M SYSTEMS

### Fleet — Machinery Maintenance

Full maintenance and operating costs control together with production of maintenance schedules.

### Finance Company

Full finance company accounting — for investors, borrowers — general accounts — ideal for small finance company.

### Builders, Jobcosting and Estimating

Builds up costings from individual materials into modules which can be recalled in any combination to give overall cost and full bill of materials. Includes full accounting.

### Accounts Receivable

All standard features plus — invoicing with auto price generation, alphanumeric debtor codes eliminating look-up tables, 3 different invoice data entry routines in one package accepts part payment of invoice. All transaction routines display debtor financial details and lots more features.

### Accounts Payable

All standard features plus alphanumeric creditor codes, hold invoices in dispute, part-pay invoices, two methods of selecting invoices for payment on a priority basis.

Write for more details:

**BARRY JUDD AND CO. ELECTRONIC SYSTEMS**

PO Box 366, 11 Wood Street, Mackay, Q. 4740



# 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. In the words of *The Hitch-hiker's 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 in contrast to a typewriter, which can only be used for typing; a calculator, for performing calculations; a filing cabinet, for filing information, to name just a few of its functions. A micro can do all these things and more.

If it's to be of any use, a general-purpose device needs some way of knowing what to do. 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

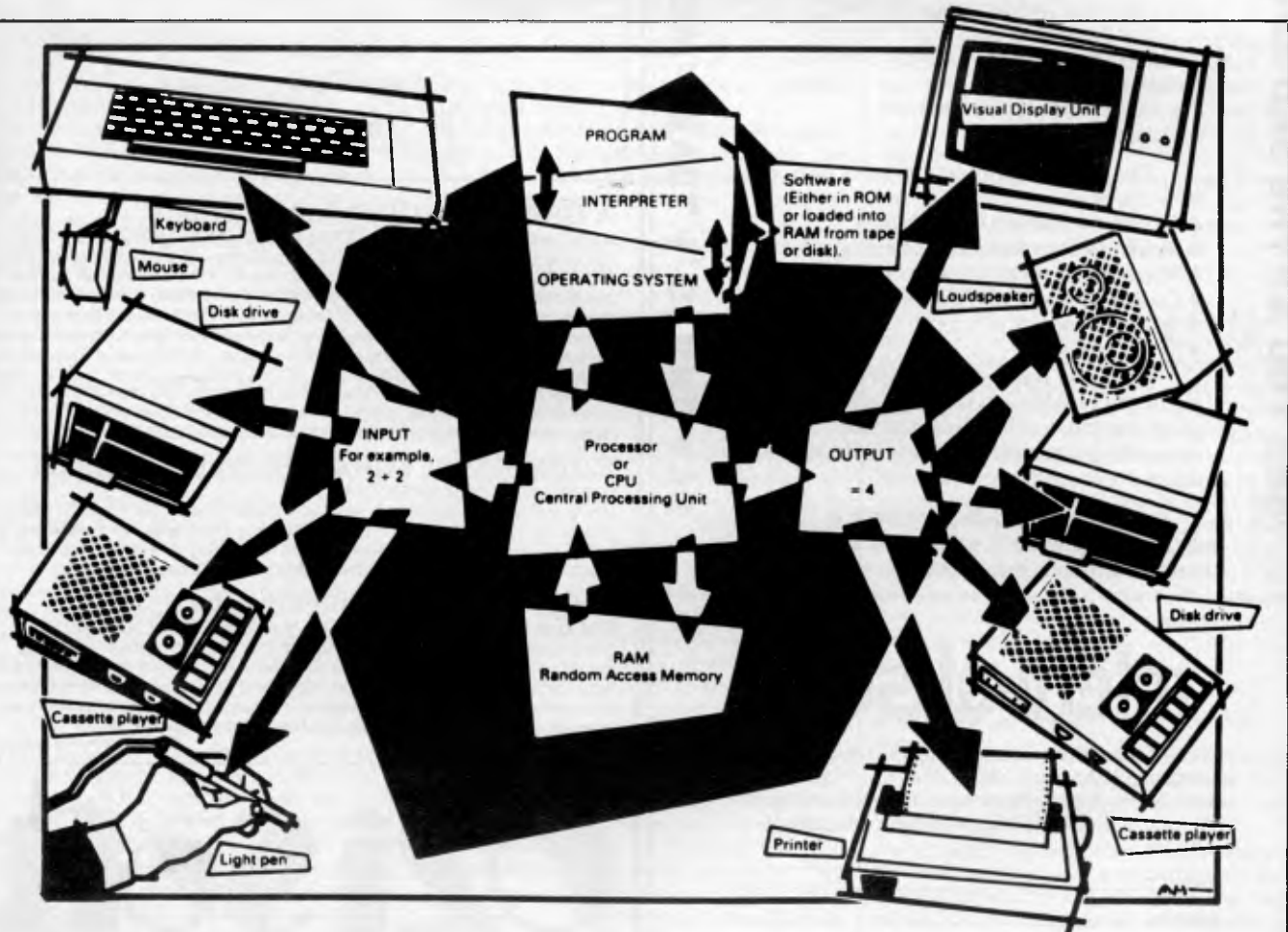
system is known as *hardware*: 'If you can touch it, it's hardware.'

## Programming

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 different languages around, the most popular of these being *Basic*. Basic is an acronym of *Beginners' All-purpose Symbolic Instruction Code*. Although originally intended 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 are *Forth*, *Pascal*, *Logo*, *C* and *Comal* to name but a few. These are known as *high level* languages because they approach the sophistication of a human language. You'll also see references in APC to the *low level* languages, *assembly language* and *machine code*. We'll look at these 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 available, *Z80*, *6502*, *6800* and *8088* being just a handful (literally) of the types in common use. The processor is nothing magical — it's just a bunch of electronic circuits. It's definitely not a 'brain'.



A schematic view of a microcomputer system

SEE YOU AT THE 3RD APC SHOW: LEVEL 1, STAND 436

# Four teachers for Sinclair ZX Spectrum and BBC Microcomputer users available now in Melbourne

Arnold Wheaton, Sulis, Artic and Widgit

These four established educational software publishers have seen the light and have selected Micro-Allsoft to manufacture and distribute their excellent ranges of teaching software throughout Australia.

Programs available now, for classroom or home use, are designed for all student ages. Many come with varying degrees of difficulty.

There are even pre-school 'starters' for two-year-olds, and packages for adults.

For those who want to get the most from their Sinclair ZX Spectrums, there are Pascal, Forth and Assembler now available, plus Disassemblers, Toolkits and 64 column display.

Our educational programs cover a lot of subjects, like . . .

- Alphabet • Spelling • Vocabulary
- Reading • Punctuation • Grammar
- Shakespeare • History • French • Time
- Counting • Angles • Logical Thinking
- Spatial Reasoning • Science Horizons
- Magnets • Diet

There are books available on elementary RAMs and ROMs, Basic programming, machine language and networking capability with the use of micro drives.

Micro-Allsoft is the new name in educational software. It will pay you to phone us or mail the coupon below for more information.

SEE YOU AT THE 3RD APC SHOW: LEVEL 1, STAND 436

# micro-allsoft

23/210 Toorak Road, South Yarra, Vic 3141  
Telephone 10am-5pm: 240 0156  
Hello, Micro-Allsoft. Please send me details on Sinclair ZX Spectrum and BBC Microcomputer educational software.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_postcode \_\_\_\_\_'phone \_\_\_\_\_



apple  
VIC 20

# BIG LITTLE BITS



### 1. GRAPPLER CD Printer Interface

**FOR COMMODORE C64 A NEW ERA IN COMMODORE PRINTING POWER.** The Grappler CD may be the most intelligent printer interface available for ANY MICROCOMPUTER, and is available only to users of the Commodore 64. Over 20 commands, accessible either from the keyboard or software, provide unbelievable versatility in printer operation. Using Grappler CD's 1525 Emulation Mode, your printer will be compatible with virtually all Commodore Software. Special character translations permit easy reading of program listings. There's even a Transparent Mode to pass data to the printer exactly as the Commodore sends it. It also offers the revolutionary dimension of Screen Dumping. A wide selection of commands provides full control over text and hi-res graphic screens. No other Commodore printer interface offers all this. NOTHING ELSE EVEN COMES CLOSE:-

### 2. UNIVERSAL PARALLEL Printer Interface

**FOR VIC-20 & COMMODORE C64.** Use your Vic-20 & C64 with any standard Parallel input printer. You don't have to give up the use of your user port (MODEM), or use special printer commands, or load any special software driver programs to do it. Plug in PRINTRON and print away!, with access to all of the advanced functions of today's printers.

### 3. GRAPPLER+ Printer Interface

**FOR APPLE THE MOST INTELLIGENT APPLE INTERFACE AVAILABLE!** The original Grappler was the first graphics interface to give you hi-res screen dumps from your keyboard. The new Grappler+ with Duel Hi-Res Graphics adds flexibility with side-by-side printout of page 1 and page 2 graphics. 4K of exclusive firmware makes the Grappler+ the most intelligent, fully-featured Apple Printer Interface made. And, the Grappler+ is Apple III compatible.\*

\*Requires additional software driver

Australian Distributors:

# Ozi Soft™

Suite 33/8-24 Kippax Street, Surry Hills NSW 2010. Australia.

THE MAT OS 2081 APC

As it's 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's 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.

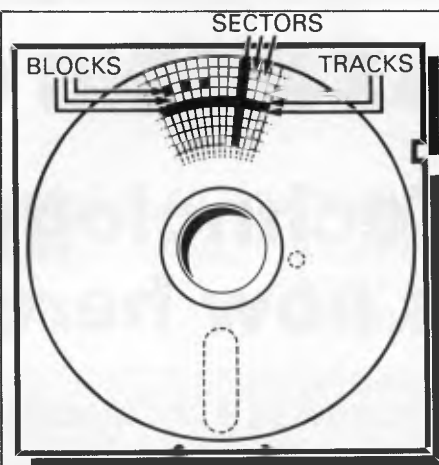
Since everything has to be converted into binary form before the processor can make sense of it, we need some sort of code to represent each character to be processed by the computer. In order to simplify communication between computers, a number of standard codes have been agreed on. The most widely 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.

A program written in a high level language must be converted into binary before the processor can carry out its instructions. We could of course do this manually, but since this is exactly the sort of tedious job computers were designed to do for us, it makes much more sense to write a program to do it.

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 unusual 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 in which part of the machine's memory the processor will 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



Cross-section of a floppy disk

displaying the value 56. *POKE*ing and *PEEK*ing is normally done to increase program speed, but may also allow us to do things which could not be done through Basic.

## Memory

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: *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*, the name given to 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.

There is a type of RAM, known as *CMOS RAM*, which requires only a tiny amount of power to retain its contents. This is found in portable computers like the Tandy 100. It is usually powered by small ni-cad batteries so that programs and data are retained even when the main power is switched off. At present, CMOS RAM is extremely expensive and is not likely to be used in desktop machines for a little while yet. (CMOS stands for Complementary Metal Oxide Semiconductor).

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.

While we're on the subject of bits, you'll

often see computers and their processors described in terms of their *bit power*: 8-bit, 16-bit, 32: 16-bit and so on. This is a means of describing how large a binary number the processor can handle in one chunk. A binary number, incidentally, is known — confusingly — as a *word*. An 8-bit processor, for example, can handle 8-bit words, that is, up to 11111111 (255 in decimal). Anything larger than this has to be broken down into manageable chunks before it can be processed.

A 16-bit machine can handle bigger chunks of data at a time. This means it can handle ('address') larger amounts of memory at one time. This is why most 8-bit machines have a maximum of 64k RAM while 16-bit micros usually have 128k upwards.

As 16-bit processors can handle larger words than an 8-bit machine, they ought to be twice as fast. In practice, however, there is a little more to it than that. While it may take a 16-bit machine half as long to work out that  $2+2=4$ , the actual processing is only part of the story.

The result of the calculation has to be placed into the appropriate memory location, passed to the screen or whatever is required. The transfers to and from the processor are often made in 8-bit form; this is why you'll hear people arguing that certain processors are not 'true' 16-bit. If the problem has to be handed to the processor in 8-bit form, turned into 16-bit, calculated and then the result turned back into 8-bit for transfer elsewhere, there may be little or no saving in time over an 8-bit system.

The other factor affecting speed is that the actual processing may form only a small part of the overall operation. A word processor, for example, spends most of its time passing files to and from disk and waiting for the user to type the next character. The processing itself consumes very little time. And if you look at the Benchmarks summary (*APC*, February 1984, pp 59-60), you'll see some 8-bit machines beating their 16-bit rivals — even in processor-bound operations like the *APC Benchmarks*.

Returning to the subject of RAM for a moment, a word of warning: Don't rush out with your new-found understanding to buy the machine offering you the most RAM for your money. Quite aside from the fact that the amount of RAM is by no means the only consideration when buying a micro (no matter how much manufacturers may stress it), different machines use differing amounts of RAM for things like graphics. Always check how much RAM is actually available to the user for program storage. Machines which proudly proclaim '64k' may well leave you with less than half of this in which to store Basic programs and data.

## Back-up storage

There are numerous forms of *permanent* or *back up storage*, but by far the most common are *floppy disk*, *floppy tape* 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

# \*WOMBAT BASIC 65SC02

## Technology is now here!

Introduce your \*Wombat, Apple or compatible to new \*Wombat Basic and 65SC02 Technology.

\*Wombat Basic runs all Applesoft programs and has many extra special features. The 65SC02 not only runs faster but it also has 27 extra opcodes. For more information or demonstration please call Computer Edge.

We can upgrade your computer to the latest in technology for only \$150.00.

\*Wombat Basic and Applesoft programs written in Australia and copyright by Computer Edge both in Australia and the USA.

## SNAPSHOT

NOW FOR  
APPLE IIE

especially airfreighted in

**\$185.00**

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:**

**JUST**  
**\$155.00** (with tax)  
**\$145.00** (excluding tax)

Computer Edge Pty. Ltd.

229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

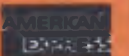
Hours: 9.00am — 5.30pm Mon.-Thurs. 9.00am — 9.00pm Fri. 9.00am — 12.00 noon Sat.

For toll-free calls — orders only, ring **008 33 1131**

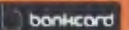
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.



DINERS CLUB



MasterCard



bankcard

# ★ ★ WOMBAT ★ ★

Computer Edge is pleased to announce our new WOMBAT BASIC

The standard case WOMBAT range includes: WOMBAT 1  
WOMBAT 2  
WOMBAT 3

WOMBAT 1, 2, & 3	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.	\$625.00	\$ 645.00
	2. WOMBAT 2	(W2) Same as Wombat 1 but with 64K RAM.	\$690.00	\$ 775.00
	3. WOMBAT 3	(W3) 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 Applesft programs.	\$765.00	\$ 840.00

We carry a large range of accessory cards for the WOMBAT which include:

80 column cards	\$95.00	Printer cards with graphics	\$95.00
Z80 cards	\$90.00	Famous SAM speech synthesizer	\$45.00

**NEW!!** ENHANCED ORIGINAL FIRMWARE THAT INCLUDES WOMBAT BASIC AND AUTOBOOT PROGRAMS WRITTEN IN AUSTRALIA AND FULLY COMPATIBLE WITH APPLESOFT PROGRAMS. COPYRIGHTED BY COMPUTER EDGE PTY LTD BOTH IN AUSTRALIA AND UA. CMOS 65 SC02 IS FASTER AND HAS 27 EXTRA OPCODES.

Standard case WOMBAT shown

### 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

**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.



# NEWCOMERS START HERE

read/write head to record and 'play back' 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 have apparently begun to acknowledge that this situation can't go on forever, and they are working on making their disks compatible.

Since the computer needs some way of organising the disk, we have a program called a *Disk Operating System (DOS)*, usually known simply as the *Operating System (OS)*. The operating system does all the 'housekeeping' 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 three most popular OSs are *CP/M* (Control Program for Micros), *MS-DOS* (MicroSoft Disk Operating System) and *PC-DOS* (Personal Computer Disk Operating System). MS-DOS and PC-DOS, incidentally, are all but identical.

Disks can support what are known as *random access files*. That is, you can randomly choose a point in a file and the drive head will move directly to that point. You can then edit the file, and only the blocks affected will be rewritten. The rest of the file remains unchanged.

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 adequate for games, for example.

Cassettes can support only *serial access files*. That is, whenever a file is to be edited, the whole file must be written back to the tape. This makes certain applications — word processing being a prime example — extremely tedious.

*Floppy tape drives* are a compromise between speed and cost. They use a small continuous loop tape which, like a disk, is divided into blocks. Floppy tape drives rely on serial access files, but by rotating the tape at high speed and using the block markers, they can simulate random access files.

Another type of disk you'll see referred to is the *hard disk*. This is an extremely efficient method of storing large amounts of data. Hard disk capacity generally starts at around 10Mbytes (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.

## Input/output

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, and so on, may all be built into a single unit or they may be separate, connected by cables.

Take this paragraph slowly and it will make 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 eight 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 (that's why it's called *serial*), 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*)

slow, however, and prone to interference.

The alternative 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.

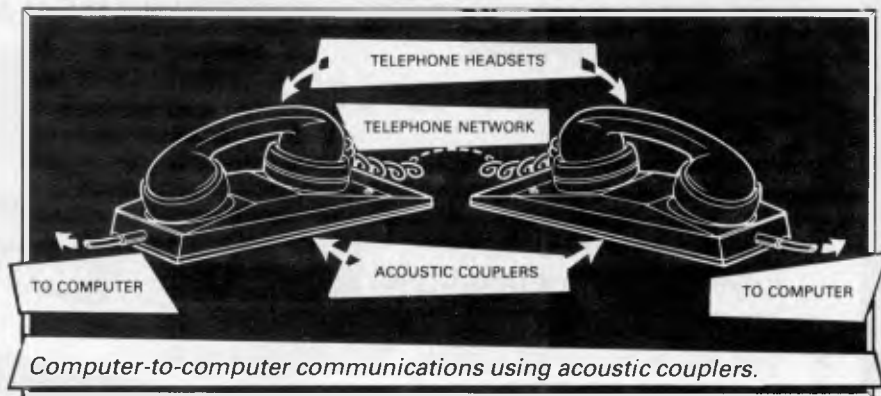
A term you'll hear used in connection with acoustic couplers and modems is *baud rate*. The *baud rate* is a measure of the speed at which a device can transmit and receive data. You can safely think of the *baud rate* as being bits-per-second, though the accurate definition is a little more complex. Therefore, a 300-baud modem can transmit/receive data at the rate of 300 bits (about 50 characters) per second.

A 1200/75 modem means that it receives at 1200 baud but transmits at 75. Most modems are 1200/75 and acoustic couplers 300/300. By way of comparison, saving programs to cassette is normally done at between 300 and 1500 baud.

Finally, communications between computers is either *full* or *half duplex*. Full duplex is when the machine receiving the data echoes it back to the machine transmitting it and says 'This is what I think you said — is that right?'. If it's wrong, the section will be transmitted again. Half duplex is where no checking is made. If you're ever unsure of which to use, start with full duplex. If everything you type appears on your display twice, then you should switch to half duplex.

## Database

A database allows you to store, process and report on structured information. Most of the cheaper packages are based on a traditional card index where each card about an individual, order or item of stock is stored in a



while the Centronics standard is popular for parallel interfaces.

## Networks

When two computers want to communicate with each other over a distance, there are again two ways of doing it (nothing is ever clear-cut in the world of micros — you'll get used to it). Both methods use the public phone network. The first is known as an *acoustic coupler*. This simply plugs into your computer, and has a receptacle into which you place your telephone handset. The acoustic coupler is convenient in that you can unplug it from one computer and plug it into another one in a matter of seconds. They are generally

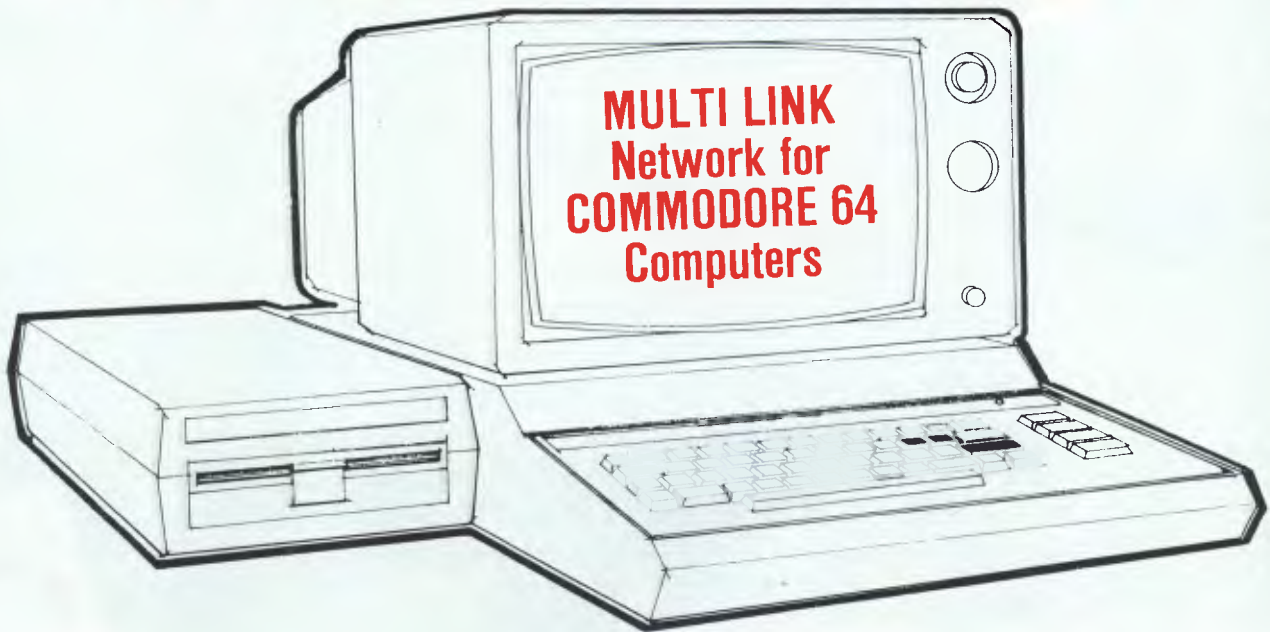
single record and a group of like records is stored in a file (corresponding to the index card box). Sophisticated packages can relate several files together, so that you can process groups of dissimilar but related records.

## Spreadsheet

Spreadsheet software is useful to anyone who regularly uses a calculator. The VDU acts like a 'window' on a large sheet of numbers — neatly laid out in rows and columns, occasionally interspersed with text headings. The user is able to shift the window to the point of interest and so enter text. The rest of the calculation is displayed immediately with automatic recalculations throughout.

# MULTI LINK

## A Proper NETWORK for the COMMODORE 64 Computer



- Network together up to 48 computers.
- Download software.
- Communicate between satellites.
- Central control terminal for the teacher.

Also available from CYBEX:  
1541 Express, doubles the Baud  
rate of your 1541 Disk Drive  
(Hooray!!!)  
Logo Screen dump program for  
1526 Printer.

### Teaching features:

- Save time loading software. Preparation time cut to a minimum. No more long waits while loading up programs like LOGO, Bank St Writer and Easy Script.
- Check students work on the master terminal.
- Use the screens as a blackboard with the "ECHO" command.
- Have different students working on different programs at the same time.
- Control the classes work with commands such as: Echo, Halt, Continue, Screen, Message, Allow, Disallow.
- Teach concepts such as communication between computers.

**CYBEX COMPUTING** 121 Tynte St, North Adelaide SA 5006  
(08) 267 5855 A/H (08) 271 2944



# apricot

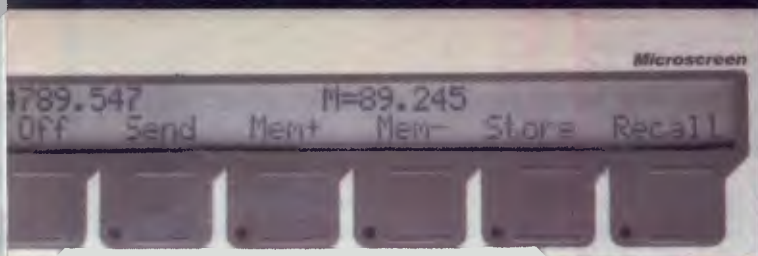
## The 4th generation personal computer

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

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

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

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



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







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

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



**BARSON**  
**computers**

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

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

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

# Australia's No. 1 Microcomputer Mail Order Club.

**FREE MEMBERSHIP WORTH  
\$30 WITH PURCHASE OF \$100 OR MORE ON INITIAL ORDER.**

**RUB SHOULDERS WITH ROYALTY AT OUR GRAND  
OPENING ON JULY 28 — SATURDAY**

**303 Pacific Highway Lindfield, NSW — BE THERE**



## commodore

Prices include sales tax	RRP	Micromail
Commodore 64	\$499.00	\$395.00
1541 Disk Drive	\$499.00	\$395.00
Other Disk Drives	Call	Call
Datasette	49.95	43.95
802 Printer	499.00	439.00
1701 Colour monitor	499.00	449.00
SX-64 Portable	1499.00	1375.00
Koala Pad	149.95	139.95
Stack Light Pen	79.95	75.95
Data 20 Parallel interface/graphics	119	106.95
Advanced Calc Result	200.00	179.00
BC Basic	—	80.00
Simons Basic	80.00	74.95
Multiplan	149.00	129.00
Intro to Basic 1, 2	40.00	32.95
Easy Script	100.00	85.95
The Manager	100.00	85.95
Home Accountant	105.00	89.95
Jumpman	54.95	46.95
Wanda	29.95	25.95
Zork 1, II, III	25.95	21.95
Homeword	105.00	89.95
Typing Tutor	19.95	17.95
Bank Street Writer	83.95	75.95
The Hobbit	39.95	35.95
Choplifter	54.95	46.95
Data Manager	29.95	25.95
Programmer's Reference Guide	28.00	22.00
Colossus Chess	35.95	29.95
Hover Bovver	29.95	18.00
Attack of the Mutant Camels	22.95	18.00
Revenge of the Mutant Camels	22.95	27.95
Computer Tutor	79.95	69.95
Assembler	60.00	49.00
Video Pak 80	299.00	279.95
Light Rifle	99.95	95.95
IEEE	129.00	124.95
4 slot cart. exp.	89.95	85.95
Arrow (cass. speed up)	89.95	85.95
Compiler	69.95	65.95
Games for Stack Light Pen	24.95	21.95
Quick Brown Fox	—	99.95
Witness	59.95	55.95
Electronic Arts software	Call	Call
USA Cardco par/int w/graphics	—	139

## ATARI

Prices include sales tax	RRP	Micromail
600XL	399.00	Call
800XL	599.00	Call
1050 Disk Drive	699.00	629.00
1010 Program Recorder	159.00	149.00
Koala Pad	149.00	139.00
Pacman	79.95	72.95
Atari Writer	119.95	105.95
Donkey Kong	79.95	69.95
Parallel Printer interface	—	139.00
Frogger	49.95	43.95
More software	Call	Call

## IBM

Software includes sales tax	RRP	Micromail
LOTUS 1 2 3	950.00	599.00
Sybiz software	Call	Call
Padmede Accounting Modules	390.00	325.00
Spellbinder	795.00	645.00
Symphony	995.00	895.00
Supercalc 3	445.00	369.00
D Base II	825.00	Call
Visicorp Specials	Call	Call
Multimate	595.00	495.00
Open Access	940	850
Wordstar Professional	795.00	695.00
Zork 1, II, III	59.95	49.95
More software	Call	Call
Hardware excludes sales tax	—	—
Multiplan	395.00	295.00
Microspooler	Call	Call
Microsoft Word	499.00	399.00
Home Accountant Plus	198.00	179.00
Optimum	Call	Call
Quadboards	Call	Call
64k upgrade chips	110.00	99.00
Colour Board	360.00	320.00
Persyst Boards	Call	Call
AST Boards	Call	Call
Microsoft Mouse	259.00	235.00
Other hardware	Call	Call
TAVA PC — 99.9% compatible	—	call
FLOPPY DISKS	—	—
Le Floppie (10) SSDD	49.95	37.95
2 Pack Le Floppie	10.00	8.95
Le Floppie (10) DSDD	80.00	59.95
Verbatim (10) SSDD	49.95	39.95
Verbatim (10) DSDD	80.00	49.95
Le Disk	Call	Call
MONITORS inc. sales tax	RRP	Micromail
Kaga Green	\$269.00	\$249.00
Teco Green Screen	249.00	199.00
Teco Amber Monitor	275.00	220.00
Sanyo Anti Glare Green	299.00	279.00
Kaga Green/IBM PC Monitor	327.00	309.00
RGB + Composite Video Colour	463.00	435.00
RGB Colour 640 x 262	775.00	725.00
Ingersoll Colour	495	469
PRINTERS including sales tax	—	—
Amust DT 80	449.00	369.00
BMC	449.00	375.00
Star Gemini 10x	599.00	459.00
Super 5 CP80	499.00	369.00
Star Gemini 15x	955.00	795.00
Uchida Daisy Wheel 20 CPS	799.00	649.00
SP 2000 Daisy Wheel	995.00	745.00
Juki 6100 Daisy Wheel	995.00	895.00
NEC Pinwriter 1	1007.00	895.00
NEC Pinwriter 3	1220.00	1125.00
NEC 2000	1310.00	1210.00
MODEMS including sales tax	RRP	Micromail
Cicada 300	\$250.00	200.00
Cicada 300T	275.00	230.00
Cicada for Commodore 64	275.00	215.00
Cicada 300T for Commodore 64	295.00	239.00

## apple

Hardware excluding sales tax	RRP	Micromail
CED parallel card	135.00	99.00
Vision 80	Call	Call
Automatic Ice	Call	Call
Microsoft Z-80, CPM	545.00	420.00
Other hardware	Call	Call
Software includes sales tax	—	—
Six S Accounting	Call	Call
Bank Street writer	\$98.95	\$86.95
Homeword	105.00	89.95
Zardax	324.00	258.00
Bank Street Speller	105.00	95.00
D Base II	825.00	589.00
Home Accountant	105.00	89.95
Ultima III	—	89.95
Master Type	64.96	54.95
Graphics Magician	84.95	75.95
Wizardry	81.95	69.95
Choplifter	48.95	39.95
Loderunner	48.95	41.95
Flight Simulator II	56.95	48.95
Sargon III	avail.	74.95
Zork 1, II, III	60.95	50.95
PFS File, Graph, Report, Write	175.00	149.00
CPM + Wordstar + 64K	745.00	545.00
Witness	72.95	65.95

## MEMOTECH

Call for Specials	RRP	Micromail
<b>Sinclair</b>	—	—
ZX Spectrum 16K	299.00	229.00
48K	399.00	319.00
Microdrive	149.00	135.00
ZX-1 Interface	149.00	135.00
Coleco Adam System	995.00	975.00

Manufacturer's full warranty on all products.

## SANYO (16 bit)

Prices include sales tax	RRP	Micromail
MBC 550 PC + 160K Drive	\$1495.00	\$1395.00
MBC 550/2 PC + 320K Drive	1995.00	1850.00
MBC 555 PC + Dual 160K Drives	1995.00	1850.00
MBC 555 PC + Dual 320K Drives	2595.00	2450.00
Micropro Wordstar/Calcstar	195.00	180.00
Micropro Mailmerge + Spellstar + Infostar	295.00	275.00
More hardware and software	Call	Call
<b>JOYSTICKS</b>	—	—
Superjoy	24.95	17.95
Superchamp	29.95	27.95
Triga Command	24.95	18.50
Wico 3 way joystick	49.95	45.95
Wico Apple II joystick adaptor	34.95	31.95
Atari Redball	49.95	45.95
CPM Software	Call	Call
Microsoft Software	Call	Call
Typequick	80.00	70.00

**FOR ALL PRODUCTS NOT LISTED CALL (02) 467 1933**

Order by phone Sydney 467 1933 Australia Wide (008) 23 0200 (Toll Free)

24 Hour Service Bankcard and MasterCard Welcome

Visit our showroom and shop at No. 1-303 Pacific Hwy, Lindfield NSW 2070. Open Saturdays

Shipping and handling charges:

— Sydney — \$5.00, anywhere in Australia — \$10.00

Courier delivery. Prices subject to change without notice.

Or send cheque or money order to  
**Micromail No. 1-303 Pacific Hwy  
Lindfield NSW 2070**

Members receive: Discount vouchers  
for future purchases. Free cassette  
or diskette. Microgram quarterly publication.

Atari is a trademark of Atari Inc. Apple is a trademark of Apple Computer Corp. IBM is a trademark of International Business Machines.

# BLUDNERS



In the April edition the wrong number was published for Philitronic Components and Services. It should read (03) 654 1327, not (03) 639 1402.

The correct address for Typewriter World is 672 George Street, Sydney, NSW 2000.

Last month we forgot to publish the winner of the March Prize Puzzle. The winner is Mr NR Sheehan of Riddells Creek. Your prize will be with you shortly.

Now for the good ones. In TJ's Workshop (April issue), L Zolin passed

on his tip of 'Trouble-free saving'. That was all very well, but we forgot to publish the listing so here goes . . .

```

60000 pn$="0"FILENAME"
60001 na$="FILENAME"
60002 pt=var(left$(pn$,1)):if pt=0 then pt=1:goto 60004
60003 if pt=1 then pt=0
60004 pq$=right$(str$(pt),1)+na$
60005 open 15,8,15,"i0":print#15,"s0:"+pn$:input#15,a,b$,c:printb$:"pn$:",",c
60006 if a>19 then print "scratch error":goto 60009
60007 savepn$,8:input#15,a,b$,c,d:if a>19 then print "save error":goto 60009
60008 verifypn$,8:input#15,a,b$,c,d:if a>19 then print "verify error"
60009 print "DOS status = "a;" "b;" "c/d:close 15:print "END"
60010 poke 631,13:poke 198,1:print "60000 pn$="chr$(34)pq$chr$(34)"DOS":end
    
```

For those of you trying to run 'HIRES EDITOR' (MicroBee program in May APC), don't bother. Lines 00100 to

00350 were missing, so we're making amends by publishing the missing listing

and including a tip to speed up the painfully slow printing routine.

```

00100 cls:underline:print "HIRES screen editor" and printer routine for LPVII (Seikosha family)"LKS 040329":normal
00110 print "Special function keys: ESC=cursor right TAB=cursor up BS=cursor left LF=cursor down" "CTRL+L toggles between the graphic and character modes."
00120 print "Top r/h corner shows graphic bytes free and" "draw 1) / erase (-1) flag toggled by DEL in graphic mode." "In character mode DEL resets the byte under cursor to graphic."
00130 print "To start printing, press BREAK and then CTRL+P" "Printer must be on line! CTRL+P will return to editor" "Number in r/h top corner shows number of graphic line printing"
00140 curs 960:print "Press any key to continue":if key="" then 140
00150 cls:hires:poke 220,64:U=128
00160 rem Screen display
00170 plot 0,0 to 479,0 to 479,255 to 0,255 to 0,0
00180 P1=3.14159:X=240:Y=128:plot X,255 to X,0:plot 0,Y to 479,Y:SQ=60/63:R1=128:for Y0=0 to P1 step P1/1E2:H=INT(R1*Cos(Y0)*SQ):V=INT(R1*Sin(Y0)):set X+H,Y+V:set X-H,Y-V:next Y0
00190 curs 16,15:print "C I R C L E scaled for printer":curs 15,2:print "HIRES screen editor LKS 040329":for A=1 to 16:curs 3,A:print [I3 A]:curs 53,A:print [I3 A]:next A
    
```

```

00200 rem Screen editor
00210 F=-1:X=240:Y=128
00220 poke 140,1:on error goto 540
00230 rem Character mode
00240 Z=(255-Y)/16*64+X/8
00250 if Z<0 then let Z=0 else if Z>1022 then let Z=1022
00260 gosub 520:print chr$(0)
00270 K=asc(key):if K=U then 270
00280 if K=3 then 560
00290 if K=12 then 370
00300 if K=9 then let Z=Z-64
00310 if K=27 then let Z=Z+1
00320 if K=8 then let Z=Z-1
00330 if K=10 then let Z=Z+64
00340 if K<32 then 250 else if K=127 then let K=U:Z=Z-1
00350 print [R1 K]:Z=Z+1:goto 250
    
```

The printing routine can be speeded up by replacing graphic blanks, which have to be sent to the printer as five bytes, by character blanks, which need only one byte. The following line will achieve this:

```
00605 FOR A=S TO S+1023:IF PEEK(A)=U THEN POKE A,32:NEXT A ELSE NEXT A
```

To minimise Graphic-on-character errors in the Graphic mode, the following line will do the reverse:

```
00375 S=61440:U=128:FOR A=S TO S+1023:IF PEEK(A)=32 THEN POKE A, U:NEXT A ELSE NEXT A
```



# THE BEST DOESN'T HAVE TO COST A FORTUNE



## LINGO

- ★ Dual Slim Drive
- ★ 6502 & Z80 Co-Processor
- ★ 128K RAM Memory
- ★ Selectable 40/80 Text Display
  - ★ Centronic Printer Output
  - ★ RS-232C Serial I/O
  - ★ RGB Colour & Pal Video Output
- ★ 6 Expansion Slots
- ★ Upper & Lower Case
- ★ Numeric Pad & Function Keys
- ★ Auto/Fast Auto Repeat Keys
- ★ 4 Directions Cursor Control
- ★ Japanese Manufactured

## LOCKABLE STORAGE BOX



**DX-85**  
**5 1/4" FLOPPY**  
**DISKETTES STORAGE.**  
**90 DISKS \$35 (inc. Tax)**

## Peripherals.

	Tax paid
80 Column Interface Card	\$78.00
Z 80 Card	\$70.00
Disk Drive Controller Card	\$70.00
Voice Synthesiser (S.A.M.)	\$45.00
Pal Interface Card	\$70.00
Wildcard	\$90.00
16K Ram Card	\$70.00
Printer Card	\$75.00
Joystick	\$40.00

**LINGO COMPUTER.** Apple compatible.  
**LINGO PC 128. \$1950 (inc. Tax)**



West Australia and N.T. Distributor.  
 107 Richmond St. Leederville 6007.  
 Telephone: (09) 443 1270.

\*Dealer enquiry welcome.  
 \*Mail orders welcome.

- ▶ **PRINTER CP-80** ..... **\$350 (inc. Tax)**
- ▶ **TURBO DISK DRIVE** ..... **\$275 (inc. Tax)**

## THE SOFTWARE HOUSE

"HELPING COMPUTERS COME TO TERMS WITH PEOPLE"

### QUALITY SOFTWARE

- TEACH/M
- SELECT
- ABSTAT
- GRAPHPLAN
- STATPRO
- ASCOM
- CP/M Tutor
- Word Processing
- Statistical Analysis
- Spreadsheet/graphics
- Stats/Graphics/Dbase
- Communications Facility
- DATAVU
- RL1
- KNOWLEDGEMAN
- PROJECT SCHEDULER
- UNIFORM
- WRITER'S PACK
- Rel. DB/Report/Data Entry
- Rel. DB with COBOL interface
- Sophisticated Database
- Project Control/Reporting
- Disc Conversion Utility
- WordStar Companion

The Software House is the major Australian & New Zealand distributor for a wide range of quality software products for which we offer full support and back-up. Our aim is to provide computer users with the most efficient, simple and cost effective software products available. We are continually adding new products to our range so if you have any enquiries or wish to obtain a copy of our catalogue, please do not hesitate to call us.

### THE SOFTWARE HOUSE

80 Mount Street, Heidelberg, Victoria 3084. Telephone: (03) 459 7877. Telex: 38432 UFIVE

## INTRODUCING COMPAT

THE ALL NEW professionally designed WORKSTATION for your PERSONAL COMPUTER and its PERIPHERALS, featuring:

- \*unique slide-out keyboard/desk
- \*good keyboard and monitor height
- \*combined flap & manuals/notes rest
- \*internal four point power socket
- \*rear wiring port; removeable legs
- \*quality flap stay & desk runners
- \*CHOICE OF FINISH: white, beige, pine, teak, or walnut melamines

desk only: **\$225**



h:310  
 d:590  
 w:900mm

delivered **FREE** ANYWHERE IN AUSTRALIA

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY/TOWN \_\_\_\_\_  
 STATE \_\_\_\_\_ PHONE \_\_\_\_\_  
 QUANTITY( ) FINISH \_\_\_\_\_  
 Signed: \_\_\_\_\_  
 Cheque ( ) Bankcard ( ) Visa ( )

## SPACESTATION COMPUTER FURNITURE

414 STIRLING HIGHWAY, COTTESLOE, WESTERN AUSTRALIA  
 POSTCODE: 6012 PHONE: (09) 384.8499

# LAZING AROUND



by J J Clessa

## Quickie

If I spend one quarter of my money and give away three quarters of the remainder, I have 30c left. How much did I have to start with?

## Prize puzzle

The telephone numbers of two friends of mine are most unusual. Each number is a six-digit perfect square, the square root of which is equal to the sum of the two three-digit numbers formed if the

original number is split into two halves.

To illustrate, if the number is 1 2 3 4 5 6, then  $1\ 2\ 3\ 4\ 5\ 6 = (123 + 456)^2$ .

Can you tell me what the two telephone numbers are?

Answers, on postcards only please, to: Prize Puzzle June 1984, Lazing Around, APC, 77 Glenhuntly Road, Elwood 3184 to reach this office not later than 15 July '84.

## April prize puzzle

As frequently happens, it turns out that a

solution exists of which we were unaware, so there are two solutions. They are:

- 1 Peter ..... \$512 or 388.80
- 2 Paul & Albert ..... \$320 or 64.80
- 3 Sally & Mary ..... \$200 or 10.80
- 4 Michael ..... \$125 or 1.80

The winning entry came from NR Sheehan of Riddells Creek. Well done, Mr Sheehan, your prize will be with you shortly.

## EPSON

deForest is the Australian Epson specialist.



## Software sale

ATARI  
**50% OFF**  
all Atari software in stock!

deForest has one of the largest ranges of



## BOOKS



We have one of the largest computer book libraries anywhere. Well over 200 titles—all top subjects, no rubbish!

# deForest Software

26 Station Street, Nunawading, Vic., 3131. Phone: (03) 877 6946

APC7/84

The world's most compact printer...

**Features:** Full graphics • Battery or mains operation (adaptor is included). • 80 columns standard, 132 columns on command • Optional connecting cables available for many popular P.C.'s



at the world's most compact price.

including Commodore and Apple • Roll paper feed • Centronics Parallel or RS232C Interface • Simple to install • Self diagnostics • Silent operation • 30 cps • plain or thermal paper

**CAULFIELD BUSINESS COMPUTERS**

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

**THE HR-5 IS THE SMALLEST, MOST VERSATILE FULLY FUNCTIONAL HEAT-TRANSFER THERMAL PRINTER YOU CAN BUY**

# NETWORK NEWS

**Q: When is a bulletin board not a bulletin board?**  
**A: When it's a Citadel — Peter Tootill and Steve Withers explain.**

As the name suggests, most computerised bulletin boards are modelled on the pen and paper bulletin boards found in your local supermarket. Citadel adopts a different metaphor — "that of a building consisting of a series of independent rooms, each of which hosts a discussion devoted to a particular topic" (David Mitchell, one of the developers of Citadel).

Citadel has a number of interesting features including provision for networking to other Citadel systems and both private and closed-group messages. Privacy is achieved by "hiding" the name of the room, making the room "invisible" to users who don't know its name.

Several people are experimenting with Citadel in Australia, but we don't know of any that are open to callers. If you have a Bell modem (and don't care about the phone bill), try these US numbers:  
 0011 1 206 839 4759 (SPACE Citadel)  
 0011 1 206 329 0436 (Ckcms Citadel)  
 0011 1 206 527 7638 (Eskimo North Minibin)

## Network Jargon

The idea of parity (in the context of communications) is to increase the probability of a message being transmitted without errors caused by noise on the line. To be more precise, parity checking allows the detection (but not correction) of any single bit error in a character.

Last month we used the transmission of the word 'KEY' to discuss start and stop bits, so we'll stick with that example. You may recall that using the ASCII code, the letters are represented as follows:

Letters	Decimal code	Binary code
K	75	1001011
E	69	1000101
Y	89	1011001

What would happen if a 'blip' of line noise coincided with the last bit of the letter 'K', causing the receiving computer to see it as an 0 instead of a 1? Quite simply, it would read the character as a 'J' (decimal 74) instead of a 'K'. This type of error can be detected by using a parity bit.

Let's start by looking at even parity. The idea is that there should be an even number of 1s in the character. In the case of the letter 'K' there are an even number of 1s, so the parity bit should be an 0. On the other hand, 'E' has three 1s, so we must add another 1 as the parity bit. Odd parity works the other way round, of course. The generation and checking of

parity bits is usually performed by the serial I/O chip along with the start and stop bits.

The trouble with parity bits is that they only warn you when an odd number of bits have been affected, and they don't tell you which bit(s) were corrupted. What makes things worse is that there is no obvious course of action when a parity

Time Mins	Night/Sunday Rate 6pm-9pm				
	25-50km	50-85km	85-165km	165-745km	over 745km
1	\$0.06	\$0.12	\$0.20	\$0.30	\$0.40
2	\$0.12	\$0.24	\$0.40	\$0.60	\$0.80
3	\$0.18	\$0.36	\$0.60	\$0.90	\$1.20
4	\$0.24	\$0.48	\$0.80	\$1.20	\$1.60
5	\$0.30	\$0.60	\$1.00	\$1.50	\$2.00
10	\$0.60	\$1.20	\$2.00	\$3.00	\$4.00
15	\$0.90	\$1.80	\$3.00	\$4.50	\$6.00
20	\$1.20	\$2.40	\$4.00	\$6.00	\$8.00
25	\$1.50	\$3.00	\$5.00	\$7.50	\$10.00
30	\$1.80	\$3.60	\$6.00	\$9.00	\$12.00
35	\$2.10	\$4.20	\$7.00	\$10.50	\$14.00
40	\$2.40	\$4.80	\$8.00	\$12.00	\$16.00
45	\$2.70	\$5.40	\$9.00	\$13.50	\$18.00
50	\$3.00	\$6.00	\$10.00	\$15.00	\$20.00
55	\$3.30	\$6.60	\$11.00	\$16.50	\$22.00
60	\$3.60	\$7.20	\$12.00	\$18.00	\$24.00
65	\$3.90	\$7.80	\$13.00	\$19.50	\$26.00
70	\$4.20	\$8.40	\$14.00	\$21.00	\$28.00
75	\$4.50	\$9.00	\$15.00	\$22.50	\$30.00
80	\$4.80	\$9.60	\$16.00	\$24.00	\$32.00
85	\$5.10	\$10.20	\$17.00	\$25.50	\$34.00
90	\$5.40	\$10.80	\$18.00	\$27.00	\$36.00

Time Mins	Economy Rate 9pm-8am				
	25-50km	50-85km	85-165km	165-745km	over 745km
1	\$0.05	\$0.10	\$0.17	\$0.25	\$0.34
2	\$0.10	\$0.20	\$0.34	\$0.50	\$0.68
3	\$0.15	\$0.30	\$0.51	\$0.75	\$1.02
4	\$0.20	\$0.40	\$0.68	\$1.00	\$1.36
5	\$0.25	\$0.50	\$0.85	\$1.25	\$1.70
10	\$0.50	\$1.00	\$1.70	\$2.50	\$3.40
15	\$0.75	\$1.50	\$2.55	\$3.75	\$5.10
20	\$1.00	\$2.00	\$3.40	\$5.00	\$6.80
25	\$1.25	\$2.50	\$4.25	\$6.25	\$8.50
30	\$1.50	\$3.00	\$5.10	\$7.50	\$10.20
35	\$1.75	\$3.50	\$5.95	\$8.75	\$11.90
40	\$2.00	\$4.00	\$6.80	\$10.00	\$13.60
45	\$2.25	\$4.50	\$7.65	\$11.25	\$15.30
50	\$2.50	\$5.00	\$8.50	\$12.50	\$17.00
55	\$2.75	\$5.50	\$9.35	\$13.75	\$18.70
60	\$3.00	\$6.00	\$10.20	\$15.00	\$20.40
65	\$3.25	\$6.50	\$11.05	\$16.25	\$22.10
70	\$3.50	\$7.00	\$11.90	\$17.50	\$23.80
75	\$3.75	\$7.50	\$12.75	\$18.75	\$25.50
80	\$4.00	\$8.00	\$13.60	\$20.00	\$27.20
85	\$4.25	\$8.50	\$14.45	\$21.25	\$28.90
90	\$4.50	\$9.00	\$15.30	\$22.50	\$30.60

# PUBLIC NOTICE

# P

## PORCHESTER Computers announces:

1. We have the best printer prices in Australia!!!
2. The incredible EXECUTIVE 816 hard disk system is now available. A 10 Megabyte hard disk, and an 800K floppy disk are packaged into this briefcase system.

### THE TRULY BUSINESS PORTABLE COMPUTER



816 1.6MB SYSTEM  
\$3,555 inc

816-10 10MB SYSTEM  
\$5,355 inc

#### THE EXECUTIVE 816

is a powerful business system and comes to you complete with a large range of ready-to-run business software including: Debtors, stock control, creditors, general ledger word processing, database, mail merging, supercalc spreadsheet, membership, office costing, job costing, & communications.

The standard 816 has twin floppy disk drives with a large 1.6Mbytes AND NOW!

The 816-10 has a full 10 MEGABYTES Hard Disk PLUS an 800K floppy.....



Don't buy elsewhere!!!

We have the best prices and service. 6 months warranty on every printer!

<b>DT-80/BX-80 PRINTERS</b>	
\$257 ex	\$299 inc
<b>GEMINI 10X PRINTERS</b>	
\$369 ex	\$449 inc

### PRINTER CABLES!

TO SUIT: APPLE II/Ile  
IBM PC  
TANDY COMPUTERS  
COMMODORE 64  
MICROBEE  
PLUS OTHERS!

MONITORS - BMC HI-RES  
Green screen monitors for Apple, 816, Morrow  
Full 18 Mhz for clear 80 column display.

\$148 ex      \$175 inc



- Delivery Australia Wide (\$10.00 anywhere)
- Mail Order - Country Orders our Specialty!
- Phone Order (BANKCARD, MASTERCARD)
- 6 Months Warranty all items
- Dealer Enquiries Welcome

Phone SUE on (03) 417 6999

**PORCHESTER Computers (Aust.)**

169 VICTORIA PARADE, FITZROY, VIC. 3065



# NETWORK NEWS

error is detected. Some terminals display the letters 'pe' and others a 'splodge'. While some computers ignore the erroneous characters completely, others send back a message saying that a parity error was detected. For this reason most of the systems mentioned in this column don't use parity in an active way — they expect to see a parity bit, but they don't worry if it is an 0 or a 1. This means you can successfully talk to them using seven data bits and any sort of parity — odd, even, mark (always 1) or space (always 0) — or eight data bits and no parity.

If a system provides file transfer facilities, it's most likely that it will use the Christensen protocol. This relies on the use of eight data bits and no parity, so that's the setting you should use. The reason for using eight data bits is that this allows binary files to be transmitted efficiently. Other protocols convert bytes into two seven-bit characters, but this means transmitting twice as many characters and may seriously damage your phone bill.

If you don't know what kind of parity a system uses, our recommendation of eight data bits and no parity still stands, with seven bits and even parity as the next best guess. If neither of these work it's really a matter of trial and error, although we have never found a system that uses seven data bits and no parity.

## STD ready reckoner

The chart shown should help you keep track of the cost of calling bulletin boards outside your local call area. It's based on the average costs per minute quoted by Telecom on June 2 1984. We wanted to make the chart more accurate, but despite several phone calls to Telecom and a visit to one of their Business Offices, the average cost was the only information they could (or would) provide. Until they provide more details of their charging algorithm, and we update the chart, bear in mind that calls are metered in 15c units.

## System Listings

You will notice a few changes to the overseas listings this month. There are some new numbers and a slightly different layout, but the biggest change is that we no longer list systems which are known to have restricted hours. On the other hand, just because a system is on our list doesn't necessarily mean it is a 24 hour, seven days a week service.

A European magazine lists a bulletin board on Sydney's 997 exchange — as

we aren't sure of its accuracy we're not listing the number until we've confirmed that it exists. If any readers know of such a system, please send us whatever details you have.

## Australian systems

### Micro Design Lab RCPM

Telephone: (02) 663 0150. Hours: 5pm-7am weekdays. 24 hours weekends.

### MI Computer Club BBS

Telephone: (02) 662 1686. Program downloading. Hours: 24 hours daily.

### Sydney Public Access RCPM

Telephone: (02) 808 3536. System Operators: Barrie Hull and David Simpson. Hours: 24 hours daily.

### Software Tools RCPM

Telephone: (07) 378 9530. Hours: 24 hours daily.

### MICOM CBBS

Telephone: (03) 762 5088. System Operator: Peter Jetson. Hours: 24 hours daily.

### Gippsland RCPM

Telephone (051) 34 1563. System

Operator: Bob Sherlock. Hours: 24 hours daily.

### Sorcerer Computer Users Association CBBS

Telephone: (03) 836 4616. System Operator: Bruce Alexander. Program downloading for SCUA members. Hours: 24 hours daily.

### Perth RMPM

Telephone: (09) 367 6068. Hours: 6pm-9pm WST.

### Adelaide Micro User Group BBS

Telephone: (08) 271 2043. Hours: 10am-10pm, weekends and public holidays only.

### Darwin RCPM

Telephone: (089) 277 111. Hours: 24 hours daily.

## New Zealand systems

### NZ Micro Club RBBS

Telephone: 0011 64 9 762 309. System Operator: Chris Cotton, Hours: 24 hours daily. Software up/downloading.

This information is correct and current to the best of our knowledge. Please send corrections and updates to: Steve Withers, C/- Australian Personal Computer, 77 Glenhuntly Road, Elwood, Vic 3184.

## Overseas systems

### North America

#### SYSTEM

Forum 80  
CBBS  
F88S  
A88S  
ABBS Ottawa  
MA88S Fort Walton Beach  
Bull-80 Alabama  
SPACE Citadel  
Ckcms Citadel  
Eskimo North Minibin  
Conn-80

#### NUMBER

0011 1 816 861 7040  
0011 1 312 545 8066  
0011 1 312 677 8514  
0011 1 703 255 2192  
0011 1 613 725 2243  
0011 1 904 862 1072  
0011 1 205 492 0373  
0011 1 208 839 4759  
0011 1 206 329 0436  
0011 1 208 527 7638  
0011 1 212 441 3755

#### NOTES

TRS-80 Color Computer

### Europe

ELFA ABC-MONITOR, Sweden  
ABC-Banken, Sweden  
ABC-MONITOR, Sweden  
CBBSD Gothenburg  
CBBS Sweden\*  
XD-88S Helsinki  
Commodore BBS, Finland  
Tedas, Munich  
Decates, Germany

0011 468 730 0706  
0011 463 511 0771  
0011 468 801 523  
0011 463 129 2160  
0011 463 169 0754  
0011 358 072 2272  
0011 358 116 223  
0011 49 89 596 422  
0011 49 66 154 51433

Half duplex

Password required  
75/1200 baud

### UK

CBBS South West  
Forum-80 Hull  
Liverpool Mailbox  
BASUG  
Computer Answers  
CBBS Surrey  
Blandford Board

0011 44 626 890 014  
0011 44 482 859 169  
0011 44 511 428 8924  
0011 44 742 667 983  
0011 44 1 631 3076  
0011 44 4862 25174  
0011 44 258 54494

### Africa

Connection 80, CapeTown  
TRShop, CapeTown  
Clan Computers, Durban  
Peters Computers, Johannesburg  
Peters Computers, Johannesburg  
War Games, Johannesburg

0011 27 21 457 750  
0011 27 21 5367  
0011 27 31 66356  
0011 27 11 834 5134  
0011 27 11 834 5135  
0011 27 11 642 3722

\* After receiving the tone and connecting your modem, either type <C/R> or <COM C/R>. The system then asks for a password which is 'cbbs' in lower-case letters. If you only get a '>' from the system, it needs resetting, so type <I> C/R.



# BENCHMARKS

A list of Benchmarks used when evaluating micros is given below.  
An explanation can be found in the February '84 issue.

```
100 REM Benchmark 1
110 PRINT "S"
120 FOR K = 1 TO 1000
130 NEXT K
140 PRINT "E"
150 END
```

```
100 REM Benchmark 2
110 PRINT "S"
120 K = 0
130 K = K + 1
140 IF K < 1000 THEN 130
150 PRINT "E"
160 END
```

```
100 REM Benchmark 3
110 PRINT "S"
120 K = 0
130 K = K + 1
140 A = K/K*K + K - K
150 IF K < 1000 THEN 130
160 PRINT "E"
170 END
```

```
100 REM Benchmark 4
110 PRINT "S"
120 K = 0
130 K = K + 1
140 A = K/2*3 + 4 - 5
150 K < 1000 THEN 130
160 PRINT "E"
170 END
```

```
100 REM Benchmark 5
110 PRINT "S"
120 K = 0
130 K = K + 1
140 A = K/2*3 + 4 - 5
150 GOSUB 190
160 IF K < 1000 THEN 130
170 PRINT "E"
180 END
190 RETURN
```

```
100 REM Benchmark 6
110 PRINT "S"
120 K = 0
```

```
130 DIM M(5)
140 K = K + 1
150 A = K/2*3 + 4 - 5
160 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
```



# 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.

Melbourne	3rd Australian Personal Computer Show Contact: Australian Exhibition Services. Tel: (03) 267 4500	July 18-21, 1984
Melbourne	Ausgraph '84 Contact: Australasian Computer Graphics Association Tel: (03) 341 6944	September 18-21, 1984
Dallas, USA	PC World Expo Contact: Conference Management Group Tel: (617) 879 0700	October 3-5, 1984
Melbourne	EPOS '84 Contact: Retail Management Development Program Tel: (03) 536 2386	October 15-18, 1984
Brisbane	Computer Expo '84 Contact: Robert Woodland Exhibitions Tel: (07) 372 3380	November 8-11, 1984



# 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 are paid for at the rate of \$20 per page of published listing. Send contributions to:

APC programs, 77 Glenhuntly Road, Elwood, Vic 3184.

This month's programs offer a great selection of games and utilities.

'Function Keys' provides Atari owners with ten programmable function keys — without hardware mods! For the Commodore 64, a utility to obtain split screen graphics by the use of raster interrupts. 'BBC Sected', a powerful disk recovery program for the BBC micro — a tool which no disk-based BBC owner should be without.

'Balloon' is a game for the Commodore 64 where you guide a balloon through a maze which gets harder and harder. For the VZ 200, your lethal trail is your weapon (and your opponent's)

'Blockout'. And finally, 'Monster Hunt', a game for the VIC 20, is full of fire-breathing dragons and googles to keep you digging your way to safety.



Games

Scientific/mathematic

Business

Toolkit/utilities

Educational/Computer Aided Learning



## Balloon

by A Roe and D Ponting

In this game for the Commodore 64 you must guide a balloon around a maze, trying to reach the top left-hand corner of the screen. There are 2 separate mazes. When the second maze is completed, an

earthquake effect is introduced to make the game even harder.

You could replace one of the given mazes with one of your own and challenge a friend to complete it.

```

1 REM *****
2 REM *
3 REM * BALLOON
4 REM *
5 REM * COMPUTER : COMMODORE 64
6 REM * LANGUAGE : BASIC 2
10 REM * PROG.TYPE : MAZE GAME
11 REM * DATE : 6-11-83
14 REM *
15 REM *****
17 GOSUB2000
20 POKES3280,6:POKES3281,6:PRINT" " :HS=0:BAL=3:QQ=1
30 SC=1000
40 RESTORE:ONQQGOSUB10000,11000
50 SW(1)=14:SW(2)=13:SW(3)=15:SW(4)=13:DX=1:DY=2:N=2
    
```

## Now available, quality **sinclair** ZX Spectrum enhancements

Make your Spectrum talk



\$62.00

The amazing Currah microSpeech. An infinite vocabulary, using the sound amplifier in your TV for speech and Spectrum sound. Easy to use. Game and demonstration cassette included. Major software houses have compatible games.

Professional keyboard.



\$129.95

Stonechip keyboard. Full size long life keys, space bar, single key delete and extended mode, reset function, beep amp, load/save switch, etc. Complete Spectrum mounts in case with all ports repeated at rear.

Programmable joystick interface



\$52.00

From Stonechip Electronics. Programming switch allows each joystick function to simulate any key. Works with any game. No tapes or leads needed. All Atari compatible joysticks just plug in.

Printer interfaces.



Parallel \$105.00  
Serial 96.00

Connect your Spectrum to a full sized printer. Cable, plug and driving software included. Prints text or screen graphics. Parallel (Centronics) or serial (RS-232) available to suit all printers, including Brother, Dick Smith, Epson, Star, Tandy colour etc.

Lots more hardware and top software at great prices. Also enhancements for ZX-81, VIC-20 and C64. Send sae for catalogue



Australian distributor:

**dolphin computers**

99 Reserve Road, Artarmon, 2064 NSW  
Telephone: (02) 438 4933 Telex: 20677 EEDAUST

Enquire at your local computershop or mailorder from Dolphin. Mail orders p&p \$5.00 Sydney, \$6.50 Australia, enclose cheque/money order/Bankcard details. All items guaranteed. All prices include sales tax.

★ ★ Dealer enquiries welcome ★ ★

**NEW!**

Use Your Computer to  
Control Real World Equipment!



Only  
**\$159**

Tax incl.

**\$115 Kit**

(Does not include case.)

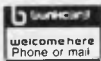
## COMPUTAControl Module

For the Dick Smith VZ200, Commodore 64  
and all other Z80 based computers.

### Applications:

- Sprinkler control in garden or nursery
- Memory mapable
- Model train control
- Slot car monitor
- Automate simple machines and processes
- Control robots

Available from



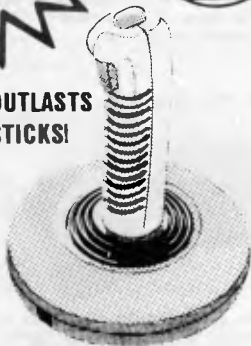
**MEYERTRONIX**

P.O. Box 65, Riverstone, 2765.  
Ph.: (02) 627 2510.

## 12 MONTHS GUARANTEE



**OUTPLAYS, OUTLASTS  
OTHER JOYSTICKS!**



Suits CBM64, VIC-20, Atari, Microbee,  
Apple, Colecovision.

### ASK A SUPERCHAMP OWNER! OR CONTACT:

VIC: S.A.T.A.S: COMPUTERPLAY  
(03) 5611078  
NSW: PROGRESSIVE SOFTWARE  
(02) 446393  
QLD: CHESS SALES QLD (07) 529633  
WA: GAMES WHOLESALE CO  
(09) 3496111

# PROGRAMS

```
1062 PRINT"*****"
1063 PRINT"*****1000*****"
1064 PRINT"*****"
1070 GOTO7000
2000 REM TITLE
2010 POKE53280,13:POKE53281,13
2020 PRINT"***"
2030 PRINT"          BALLOON FUN
2040 PRINT"*****  GUIDE YOUR BALLOON THROUGH THE MAZES!
      USING:-"
2050 PRINT"          F 5
2052 PRINT"          |
2055 PRINT"          |
2060 PRINT"          CBM ---|--- SHIFT
2062 PRINT"          |
2065 PRINT"          |
2070 PRINT"          F 7
2080 PRINT"*****YOU CAN ALSO MOVE DIAGONALLY.FOR EXAMPLE
      PRESS F5 AND CBM ***"
2085 PRINT"AT THE SAME TIME"
2090 PRINT"***** OR USE A JOYSTICK IN PORT 2 *****"
2100 PRINT"***** BONUS BALLOON FOR 5000 PTS"
2110 PRINT"***** CHOOSE KEYBOARD OR JOYSTICK CONTROL"
2120 INPUT"      (K - J)      *****":K$
2130 IFK$<"J" AND K$<"K" THENPRINT"*****" GOTO2120
2140 IFK$="J" THENK=1
2150 IFK$="K" THENK=2
2200 RETURN
2500 GOTO2500
4000 REM GAME OVER
4010 PRINT"*****" POKE$P+21,0
4015 POKE53280,2:POKE53281,2
4020 PRINT"*****" TAB(11)"G A M E   O V E R"
4025 PRINT"*****" TAB(11)"YOUR SCORE WAS"HI
4030 PRINT"*****" TAB(5)"*****" PRESS ANY KEY TO PLAY AGAIN *****"
4035 FORI=0TO50:GETA$:NEXT
4040 GETA$: IFA$="" THEN4040
4050 RUN
5399
6000 REM *** JOYSTICK ***
6005 REM *** CONTROL PORT 2 ***
6010 ONK GOTO6015,6040
6015 JV=PEEK(56320)
6020 IF(JVAND1)=0 THENSY=SY+2*(SY>1)
6025 IF(JVAND2)=0 THENSY=SY-2*(SY<255)
6030 IF(JVAND4)=0 THENSX=SX+2*(SX>1)
6035 IF(JVAND8)=0 THENSX=SX-2*(SX<350)
6037 GOTO6062
6040 K1=PEEK(197):K2=PEEK(653)
6042 IF(K1=6) THENSY=SY+2*(SY>1)
6044 IF(K1=3) THENSY=SY-2*(SY<255)
6046 IF(K2=2) THENSX=SX+2*(SX>1)
6048 IF(K2=1) THENSX=SX-2*(SX<350)
6062 ONFL GOSUB9000
6070 POKE$P,SX+256*(SX>255):POKE$P+16,(PEEK(SP+16)
      AND254)OR-(SX>255):POKE$P+1,SY
6073 IFSW=5 THENSW=0:POKE2040,SW(N):N=N+1:IFN=5 THENN=1
6074 SW=SW+1:SC=SC-1:GOSUB10230
6075 IFPEEK(SP+31)<0 THEN8000
6080 GOTO6010
6999
7000 REM DEFINE SPRITES
7010 SP=53248
7020 FORT=0TO191:READA:POKE832+T,A:NEXTT
7030 POKE2040,13
7040 POKE$P+21,1:POKE$P+39,7
7045 SX=310:SY=218
7050 POKE$P,SX+256*(SX>255):POKE$P+16,(PEEK(SP+16)
      AND254)OR-(SX>255):POKE$P+1,SY
7060 PP=PEEK(SP+31)
7499
7500 REM SET UP SID
7510 SO=54272
7520 FORT=0TO28:POKE$O+T,0:NEXT
7530 POKE$O+5,9:POKE$O+6,240:POKE$O+24,15:POKE$O,200
7599 GOTO6000
7600
7610
8000 REM HIT
8002 IFSX<68 AND SY<70 THEN9500
8005 POKE$O+4,33
8010 FORT=10TO35:POKE$O+1,T:POKE53280,T:NEXTT:POKE53280,6
8015 POKE$O+4,32
```

# PROGRAMS

```

8020 SX=310:SY=220: BAL=BAL-1: HI=HI+(250-SY): SC=1000:
GOSUB10220
8025 IFBAL<1THEN4000
8027 POKESP, SX+256*(SX>255): POKESP+16, (PEEK(SP+16)
AND254)OR-(SX>255): POKESP+1, SY
8030 PP=PEEK(SP+31)
8050 GOT06080
8999 :
9000 REM EARTHQUAKE
9010 POKE53270, (PEEK(53270)AND248)+X: X=X+DX: IFX=7 OR X=0
THEN DX=-DX
9100 RETURN
9499 :
9500 REM BONUS ! START NEW GAME
9510 IF SX>40 AND SY>56 THEN6080
9512 SX=310: SY=220: HI=HI+(1000-SC): SC=1000
9513 IFBAL<1 THEN4000
9515 PP=PEEK(SP+31)
9520 HI=HI+1000: Q0=Q0+1
9530 IFHI>5000 AND IH=0 THEN BAL=BAL+1: IH=1
9540 IFQ0>2 THENQ0=1: FL=1
9550 GOSUB10220
9555 POKES0+4, 17: FORNN=1 TO10
9560 FORT=20 TO40 STEP2: POKES0+1, T: NEXTT
9570 FORT=40 TO20 STEP-2: POKES0+1, T: NEXTT
9580 NEXTNN: POKES0+4, 16
9614 POKESP, SX+256*(SX>255): POKESP+16, (PEEK(SP+16)
AND254)OR-(SX>255): POKESP+1, SY
9615 PP=PEEK(SP+31)
9620 GOT040
9999 :
10000 PRINT "DN*****"
10002 PRINT "*****"
10004 PRINT "*****"
10006 PRINT "*****"
10008 PRINT "*****"
10010 PRINT "*****"
10012 PRINT "*****"
10014 PRINT "*****"
10016 PRINT "*****"
10018 PRINT "*****"
10020 PRINT "*****"
10022 PRINT "*****"
10025 PRINT "*****"
10027 PRINT "*****"
10030 PRINT "*****"
10035 PRINT "*****"
10040 PRINT "*****"
10045 PRINT "*****"
10050 PRINT "*****"
10060 PRINT "*****"
10070 PRINT "*****"
10080 PRINT "*****"
10090 PRINT "*****"
10095 PRINT "*****"
10199 :
10200 REM SCORE UP-DATE
10210 PRINT " TIME BALLOONS SCORE"
10220 PRINT "TAB(23)BAL" "TAB(32)HI"
10225 POKESP+21, 1
10230 PRINT "TAB(6)SC"
10290 RETURN
10999 :
11000 PRINT "DN*****"
11002 PRINT "*****"
11004 PRINT "*****"
11006 PRINT "*****"
11008 PRINT "*****"
11010 PRINT "*****"
11012 PRINT "*****"
11014 PRINT "*****"
11016 PRINT "*****"
11018 PRINT "*****"
11020 PRINT "*****"
11022 PRINT "*****"
11025 PRINT "*****"
11027 PRINT "*****"
11030 PRINT "*****"
11035 PRINT "*****"
11040 PRINT "*****"
11045 PRINT "*****"
11050 PRINT "*****"

```

# CICADA 300 Baud DATA MODEMS



- CICADA 300
- CICADA 300T with telephone
- CICADA 300 for use with Commodore 64 and Vic 20 computers



187 Allambie Road,  
Allambie Heights,  
NSW 2100.  
P.O. Box 184, Brookvale,  
NSW 2100.  
Telephone: (02) 451-5555  
Telex: AA22671

*Dealer enquires  
welcome.*

## DIRECT IMPORTS

Volume purchases, cutting out the middleman, bring really low prices — but the falling Australian dollar means costs are creeping up, so buy now.

### RABBIT (64/VIC-20) . . . \$69

The 1984 version that busts copy protection (Wonder why the software houses don't like it?). Loads 8k of data in 31 seconds instead of 3 minutes. Your Datasette becomes almost as fast as disk and one C30 cassette holds 300K (nearly two disks full).

### ARROW (64 or VIC-20) . . \$79

Half as fast again as the Rabbit, gives lengths of SAVES, etc in decimal and hex, built-in machine language monitor.

### AUTOMODEM (64/20) . . \$199

Made by Commodore, Auto-answer, Auto-dial, Full/half duplex, Bel 103, 300 baud. Fitted with Aust. phone plugs. Included FREE is \$200 of access and user time to US data banks, including GO CBM, the Commodore information service in Pennsylvania AND cassette of software. Plugs direct into your Commodore and needs no extra power source. NOT Telecom approved.

### FLIGHT SIMULATORS . . from \$27

\*Big Sales of 64 Simulators mean we can bulk buy and slash prices in half!

100% machine language for fast action. Fly and land at seven different US airports. Sound and color. Forward view. Instruments include altimeter, air-speed indicator, DME radar unit, VOR, compass, turn and bank indicator, fuel gauge and indicator for flap and retractable landing gear positions. Flight controls include up and down elevator, left and right rudder and aileron and throttle, flap and landing gear controls. (Disk for 64) \$35. TAPES for VIC-20 (+16K), Tandy 100 and NEC \$59 each. C64 TAPE (English) featuring instrument flying in a 30 seat prop-jet out of Norwich. You have to negotiate cross winds, military airzones and other hazards. 16 analog and digital read-outs. \$27.

APPLE II+ (48K DOS 3.3) \$85. Coast-to-coast (USA) IFR and VFR Flying with omni-range, DME, ADF and other navigation instruments PLUS approaches and scenery for any airport anywhere in the world can be keyed in using the programs included or we can arrange it at extra charge.

### ASTROLOGY SOFTWARE . \$85

For C64, APPLE II+ and IBM PC. Used by professional astrologers world wide for individual horoscopes for all times and places. Basically geocentric but can produce heliocentric analysis. Koch system of houses and Tropical Zodiac but Western Siderial Zodiac is optional. Prints very detailed diagrams (Disk). Complete with a detailed student guide that lets you learn professional astrology at your own pace by asking the computer questions like: What does a Gemini rising sign mean?

### VIC-TREE module . . . . \$149

(or \$199 including the Centronics/parallel cable and interface). Gives 42 added commands, reads disk directory while leaving memory untouched, formats a disk but doesn't affect work you're doing and converts Basic 4.0 programs to your 64. Latest version has PRINT USING — the command Commodore forgot!

### MSD DUAL DISK DRIVE \$1350

All metal, 12 months guarantee. One parallel and two serial ports and its own 6511Q microprocessor giving 16K ROM and 6K RAM. With interface for C64 and VIC-20. Reads ALL Commodore disks and is lightning-fast compared to 1541 or 1542 drives. The only real alternative to Commodore's 4040.

**FREIGHT, Packing, etc is a flat \$3 per order, irrespective of items, weight or quantity.**

**Chambers  
Computer Supplies**

**BANKCARD, VISA and MASTERCARD ACCEPTED  
(03) 700 2451  
48-50 MONKHOUSE DRIVE,  
ENDEAVOUR HILLS, MELBOURNE 3802**

## PROGRAMS

```

• 11060 PRINT"*          *****          *****          ****"
11070 PRINT"***
11080 PRINT"*****          ***
• 11090 PRINT"*****          *****
11095 PRINT"*****"
• 11100 GOSUB10200:RETURN
19999 :
• 20000 REM *** SPRITE BALLOON 1 ***
20002 DATA0,254,0,0,255,128,7,255,192,15,255,224
20003 DATA15,255,224,15,255,224,7,255,192,3,255,128
• 20004 DATA0,254,0,0,56,0,0,56,0,0,16,0
20005 DATA0,16,0,0,16,0,0,16,0,0,16,0
20006 DATA0,124,0,0,124,0,0,124,0,0,0,0
• 20007 DATA0,0,0,0
20020 REM *** SPRITE BALLOON 2 ***
• 20022 DATA0,254,0,0,255,128,7,255,192,15,255,224
20023 DATA15,255,224,15,255,224,7,255,192,3,255,128
20024 DATA0,254,0,0,56,0,0,56,0,0,16,0
• 20025 DATA 0, 60, 0, 0, 16, 0, 0, 32, 0, 0, 64, 0
20026 DATA 12, 128, 0, 63, 0, 0, 31, 128, 0, 15, 192, 0
• 20027 DATA 7, 128, 0, 0
20100 REM *** SPRITE BALLOON 3 ***
• 20102 DATA0,254,0,0,255,128,7,255,192,15,255,224
20103 DATA15,255,224,15,255,224,7,255,192,3,255,128
20104 DATA0,254,0,0,56,0,0,56,0,0,16,0
• 20105 DATA 0, 60, 0, 0, 8, 0, 0, 4, 0, 0, 2, 0
20106 DATA 0, 1, 96, 0, 0, 240, 0, 3, 248, 0, 3, 240
• 20107 DATA 0, 1, 224, 0
    
```



## Atari Function keys

by Paul Lay

'Function keys' provides programmable function keys on Atari micros. 16k is required on cassette-based systems and 32k for disk machines.

On the Atari, CTRL, SHIFT and any other key pressed simultaneously is normally ignored. This program modifies the keyboard interrupt routine to trap CTRL-SHIFT-key combinations and the deferred vertical blank interrupt routine, to allow these combinations to be used. The net result is that CTRL + SHIFT + a numeric key (0-9) can now be treated as a programmable function key.

To run the program, select KEYBOARD for input, then choose the key you wish to define and enter the string to be

assigned to the key. Note that any control characters will be displayed, so the 'cursor down' character, for example, will appear rather than the cursor moving down a line. When the function key is used, however, the control characters will have their usual effect. Note that the RETURN key, when pressed, will be displayed as an 'E' over an 'L' but will be interpreted as a RETURN.

Each key can be assigned up to 113 characters. The emulator occupies locations 1536 to 1704 inclusive of RAM page 6. The code for the function keys is placed 38 pages below RAM-TOP; this allows a GRAPHICS 8 screen to be used.

```

• 10 REM *****
• 20 REM *
• 30 REM * PROGRAMMABLE FUNCTION *
• 40 REM *
• 50 REM * KEY EMULATOR / EDITOR *
• 60 REM *
• 70 REM * (C) 1984 Paul Lay *
• 80 REM *
• 90 REM *****
• 100 REM
• 110 REM Machine Code For Emulator
• 120 REM
• 130 DATA 32,64,21,72,169,0,141,12
    
```

# PROGRAMS

```
140 DATA 0,169,6,141,13,0,173,106
150 DATA 0,56,233,38,141,205,0,169
160 DATA 0,141,204,0,160,125,162,6
170 DATA 169,7,32,92,228,160,51,162
180 DATA 6,120,140,8,2,142,9,2
190 DATA 88,104,96,138,72,173,204,0
200 DATA 208,63,173,9,210,162,9,221
210 DATA 149,6,240,8,202,16,248,104
220 DATA 170,78,190,255,169,0,141,138
230 DATA 6,141,139,6,138,72,162,7
240 DATA 14,139,6,10,144,3,238,139
250 DATA 6,202,208,244,141,138,6,173
260 DATA 139,6,24,109,205,0,141,139
270 DATA 6,104,170,189,159,6,141,204
280 DATA 0,104,170,104,64,173,252,2
290 DATA 201,255,208,14,174,204,0,240
300 DATA 9,189,0,122,141,252,2,206
310 DATA 204,0,76,98,228,223,222,218
320 DATA 216,221,219,243,245,240,242
330 DATA 0,0,0,0,0,0,0,0,0,0
340 FOR A=1536 TO 1704:READ B
350 POKE A,B:NEXT A:A=USR(1540)
360 REM
370 REM Emulator now executing
380 REM so run editor
390 REM
400 DIM CODE$(1280),SIZE(10),FN$(15),IN$(15)
410 FOR F=0 TO 9:SIZE(F)=0:NEXT F
420 GRAPHICS 0:OPEN #1,12,0,"E"
430 TRAP 430:? CHR$(125):POKE 16,64:POKE 53774,64:CLOSE #3
440 POKE 752,1:POSITION 10,2
450 ? "FUNCION KEY EDITOR"
460 POSITION 10,3
470 ? "-----"
480 POSITION 15,4:? "MAIN MENU"
490 POSITION 15,5:? "-----"
500 POSITION 9,7
510 ? "Enter Functions From"
520 POSITION 15,10:? "KEYBOARD"
530 POSITION 15,13:? "CASSETTE"
540 POSITION 15,16:? "DISKETTE"
550 POSITION 7,20
560 ? " SELECT  to choose option"
570 POSITION 10,22
580 ? " START  when ready"
590 A=0:B=1
600 COLOR 160:Z=A:GOSUB 1850
610 COLOR 32:Z=B:GOSUB 1850:B=A
620 C=PEEK(53279):IF C=6 THEN 660
630 IF C<>5 THEN 620
640 A=A+1:IF A>2 THEN A=0
```

## Media Copying & Format Exchange

Media Copying Services are offering copying/transfer of data and programs from one media to another.

Currently we can handle diskette and cassettes for around 200 computer systems, including:

- ★ most CP/M machines;
- ★ Sirius;
- ★ Commodore 64;
- ★ TRS-80 with CP/M;
- ★ IBM PC & work-alikes;
- ★ APPLE;
- ★ Many MS-DOS machines;

We offer a quick turn-around time at very competitive rates.

Orders for bulk copying welcome.

### MEDIA COPYING SERVICES

Melbourne:  
(03) 772 0781  
(03) 772 9177

Sydney:  
(02) 211 5058

## SOFTPAC ENTERPRISES

software for

### CBM 64 — VIC-20 SPECTRUM

unbeatable prices  
send for catalogue  
state computer type

**P.O. Box 2350  
Sth. Hedland  
W.A. 6722**

How can we tell you about 100  
computer games in one advertisement?

Strategy,  
Science Fiction,  
Fantasy,  
Adventure,  
Education,  
Sports & Arcade

APPLE II  
TRS 80  
VIC 20  
COM 64  
ATARI 4/800  
IBM PC  
PET

## GAMES for the HOME COMPUTER

- Avalon Hill's Micro Computer Games
- EPYX (Automated Simulations)
- Strategic Simulations • MORE!

### Mail Order Specialists

Write today for free catalogue  
COMPARE OUR PRICES . . .

## COMPUTER SIMULATIONS

134 COCHRANES ROAD, MOORABBIN, VIC 3189

PHONE: (03) 555 8886

DEALER ENQUIRIES WELCOME

### C W COMPUTERWARE

WE NOW STOCK  
THE ACT APRICOT

And the complete  
line of BOS

Business Software  
for the APRICOT

### C W COMPUTERWARE

333 Latrobe Street,  
Melbourne 3000

Telephone: (03) 602 1006

## PROGRAMS

```
650 FOR F=152 TO 0 STEP -8:SOUND 0,F,10,
14:NEXT F:GOTO 600
660 FOR F=254 TO 0 STEP -2:SOUND 0,F,8,1
4:NEXT F:SOUND 0,0,0,0
670 ? CHR$(125):POSITION 12,2
680 ? "-----":POSITION 12,1
690 M=256*PEEK(205):POKE 752,0
700 ON A+1 GOTO 710,1510,1770
710 ? "KEYBOARD ENTRY":POKE 764,255
720 ? :? :? "Enter KEY Number >";
730 INPUT #1,N:N=INT(N)
740 IF N<0 OR N>9 THEN 670
750 ? :? "Use OPTION To FINISH"
760 ? :? "Use START To DELETE"
770 ? :? " KEY ";CHR$(176+N);CHR$(160)
780 ? :POKE 766,1:OPEN #2,4,0,"K"
790 C=0
800 POKE 764,255
810 CH=PEEK(764):CN=PEEK(53279)
820 IF CN=6 THEN 950
830 IF CN=3 THEN 980
840 IF CH=255 THEN 810
850 C=C+1:IF C<=113 THEN 880
860 POKE 766,0:? CHR$(253);
870 POKE 766,1:C=113:GOTO 800
880 CODE$(128*N+C,128*N+C)=CHR$(CH)
890 IF CH=12 THEN ? CHR$(27);:FOR F=50 T
0 0 STEP -1:SOUND 0,F,10,14:NEXT F:GOTO
800
900 IF CH=39 THEN ? CHR$(210);:GOTO 800
910 IF CH=60 THEN ? CHR$(236);:GOTO 800
920 IF CH=124 THEN ? CHR$(213);:GOTO 800
930 IF CH=188 THEN ? CHR$(195);:GOTO 800
940 GET #2,B:? CHR$(B);:GOTO 800
950 POKE 766,0:? CHR$(126);
960 POKE 766,1:C=C-(C>0)
970 FOR F=200 TO 250:SOUND 0,F,6,14:NEXT
F:SOUND 0,0,0,0:GOTO 800
980 FOR F=0 TO 250 STEP 2:SOUND 0,F,8,14
:NEXT F:SOUND 0,0,0,0
990 SIZE(N)=C:POKE 766,0
1000 POSITION 8,17:? "Do You Want To Edi
t."
1010 POSITION 8,19:? "Any More Keys (Y/N
)">;
1020 GET #2,B
1030 IF NOT (B=89 OR B=121 OR B=78 OR B
=110) THEN ? CHR$(253);:GOTO 1020
1040 CLOSE #2
1050 IF B=89 OR B=121 THEN 670
1060 TRAP 1140:? CHR$(125):POKE 764,255
1070 ? :? " OPTIONS ":? :?
1080 ? "1...Return To BASIC ":? :?
```



# PROGRAMS

```

1090 ? "2...Save To Cassette & Return":?
:?:
1100 ? "3...Save To Diskette & Return":?
:?:
1110 ? "Please Select (1,2 or 3) >";
1120 INPUT #1,B:B=INT(B)
1130 IF B>=1 AND B<=3 THEN 1150
1140 ? CHR$(253):GOTO 1060
1150 ON B GOTO 1160,1320,1630
1160 ? CHR$(125)
1170 ? "Returning To BASIC ":?
1180 FOR A=1 TO 3
1190 POKE 1634+A,SIZE(A)
1200 IF SIZE(A)=0 THEN 1240
1210 FOR B=1 TO SIZE(A)
1220 POKE M+128*(A-1)+B,ASC(CODE$(A*128+
SIZE(A)+1-B))
1230 NEXT B
1240 NEXT A
1250 POKE 1704,SIZE(0)
1260 IF SIZE(0)=0 THEN 1300
1270 FOR B=1 TO SIZE(0)
1280 POKE M+1152+B,ASC(CODE$(SIZE(0)+1-B
))
1290 NEXT B
1300 POKE 16,192:POKE 53774,192
1310 GRAPHICS 0:NEW
1320 ? CHR$(125)
1330 ? "Save To CASSETTE ":?
1340 ? "Insert SAVE Cassette Then":?
1350 ? "Press RETURN";
1360 POKE 764,255
1370 IF PEEK(764)<>12 THEN 1370
1380 ? :? :OPEN #3,0,"C"
1390 FOR F=0 TO 9
1400 B=SIZE(F)
1410 ? #3,B
1420 NEXT F
1430 FOR F=0 TO 9
1440 IF SIZE(F)=0 THEN 1490
1450 FOR G=1 TO SIZE(F)
1460 B=ASC(CODE$(F*128+G,F*128+G))
1470 ? #3,B
1480 NEXT G
1490 NEXT F:CLOSE #3
1500 GOTO 1170
1510 ? "CASSETTE ENTRY"
1520 ? :? :? "Insert LOAD Cassette Then"
1530 ? :? "Press RETURN";
1540 POKE 764,255
1550 IF PEEK(764)<>12 THEN 1550
1560 ? :? :OPEN #3,4,0,"C"
1570 FOR F=0 TO 9

```



**FOR  
QUALITY  
COMPUTER  
PAPER IN ECO-  
NOMICAL MICRO  
PACKS LOOK FOR  
THIS LABEL!!!**

**Our extensive range of continuous Computer Paper and Address Labels is available at Leading Computer Shops now.**

- CPP 11x9½ — High Quality 70 g.s.m. White Bond Paper. With Micro Perforations, suitable for 80 Character Printers — for Program Listing, Word Processing, etc.
- CPP 11x15 — Good Quality 60 g.s.m. White Bond Paper, in Blue Half Shadow Format or Plain White, Suitable for 132 Character Printers — For Listing — Reporting — Layouts etc.
- CPP 11 4/6x9½ (A4) — High Quality 70 g.s.m. White Bond Paper, with Micro Perforations, Suitable for 80 Character Printers — For Professional & Business A4 size Letter Quality Word Processing.
- Pre-Printed Standard Formats also available.

Now you can buy Smaller Quantities of Paper to Suit Your Own Requirements!

Quality Micro Packs of	250 sheets	500 sheets	1000 sheets
11x9½/70gsm Word Processing Paper or boxes of 2,000 — \$37.20	\$7.85 Pk	\$15.39 Pk	\$29.50 Pk
11x15/60gsm Plain or BHS or boxes of 2,500 — \$45.70	\$8.45 Pk	\$16.60 Pk	\$31.50 Pk
11 4/6x9½/70gsm — A4 paper or boxes of 2,500 — \$48.70	\$8.28 Pk	\$16.40 Pk	\$31.15 Pk

**Computer Address Labels**  
37 mm x 102 mm — \$35.00 Pack of 2,000 Labels  
24 mm x 89 mm — \$23.15 Pack of 2,000 Labels

**Computer Binders**  
6 colours Available in Quality Flexible Plastic  
11x9½ — \$3.60 each 11 x 15 — \$3.60 each

**All Prices Include Sales Tax Plus Postage & Handling Charges**

**All Prices R.R.P.  
Dealer Enquiries Welcome**

**Phone (03) 584 5488**

96B Herald St. Cheltenham, Vic. 3192

## COMPUTER CHESS from COMPUTER PLAY

EXCLUSIVELY ENDORSED BY  
THE WORLD CHESS FEDERATION

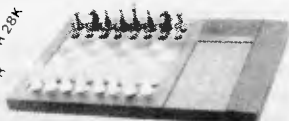
- VERY STRONG PROGRAMME
- FROM BEGINNER TO CLUB PLAYER
- CAN TEACH YOU TO PLAY CHESS
- FULLY PORTABLE 6 MONTHS BATTERY LIFE OR MAINS ADAPTOR
- EASY TO SET UP, VERIFY AND ADD PIECES

COMPANION 11  
SENSOR



- WORLD BEATER 24 LEVELS
- FOR BEGINNER TO CHAMPION
- BATTERY AND MAINS
- MORE POWER AND FEATURES THAN ANY OTHER CHESS COMPUTER

SUPERSTAR 28K  
SENSOR



AVAILABLE FROM ALL MAJOR DEPARTMENT,  
ELECTRONIC, GAMES AND VIDEO STORES  
THROUGHOUT AUSTRALIA.  
AUSTRALIAN DISTRIBUTORS: COMPUTERPLAY  
SCISYS, PO BOX 69, GLEN WAVERLEY 3150.  
PHONE: (03) 561 1078. TELEX: AA 30625  
ATTN: ME 269.  
WA: GAMES WHOLESALE CO. (09) 349 6111  
QLD: CHESS SALES QUEENSLAND (07) 52 9633

## WANTED PROGRAMS REWARD OFFERED

Become a Superstar overnight!

We buy original good quality machine code programs for all popular micros for Australian and international sales.

Games, Educational, Business or whatever.  
Turn your Work into Cash Contact

### COMPUTERPLAY SOFTWARE

Your source of software

P.O. Box 69, Glen Waverley 3150

Telephone: (03) 561 1078

### 68000/6500 PRICES SLASHED

65000	5MHz 64 Pin Digi 18 and 18 MHz avail	A528 40
65000P-1	1MHz Enhanced instruction set	8 50
65000P-2	2MHz	10 40
6500A	CPU 40 Pin Clock 6MHz	8 30
6511AQ	Single Chip Micro CPU RAM 32KHz R5222 1 micr	14 50
6540	Paralel Controller (RAM 23) O Host Slave F timer	10 20
6541AO	2MHz	11 20
65C1	CMOS PLA	7 50
6522	VIA 40 Pin Two 8 Bit I/O Ports	1 40
6522A	2MHz	5 50
6522A	COMBO 40 Pin 2MHz	6 93
6545A-1	CRT Controller	0 31
6551	ASIC 38 Pin 5V6 Prog. Board	
	Ref	6 03
65C31	CMOS ACIA	9 60
6551A	2MHz	6 66
6562	Single Chip Printer Controller (for Epson Series 200 and 500 Printer)	0 35
2116	2K + 4 EPROM 40Pin	4 20
25 2732	4K + 6 EPROM	8 05
2764	8K + 4 EPROM	12 03
5212	JK + 4 EPROM	7 00
OLUP 64	Socket for 6511 Q and 6541 Q	1 25
CRT57ALS	1 640MHz 2 50MHz	2 86
	3 768MHz 3 688MHz 8 00MHz 4 90MHz 12 00MHz	1 82

Plus Sales Tax, Postage and Pack (where applicable).  
Prepaid order less 4%

PO Box 6502, Goodna  
Q4300  
BRISBANE—AUSTRALIA  
Phone: (07) 288 2455  
Telex: AA43778 ENECON

**energy  
CONTROL**

## PROGRAMS

- 1580 INPUT #3,B
- 1590 SIZE(F)=B
- 1600 NEXT F
- 1610 FOR F=0 TO 9
- 1620 IF SIZE(F)=0 THEN 1670
- 1630 FOR G=1 TO SIZE(F)
- 1640 INPUT #3,B
- 1650 CODE#(F\*128+G,F\*128+G)=CHR#(B)
- 1660 NEXT G
- 1670 NEXT F:CLOSE #3
- 1680 GOTO 1060
- 1690 ? CHR\$(125)
- 1700 ? "Save To DISKETTE "?:
- 1710 GOSUB 1890
- 1720 ? "Insert SAVE Diskette Then":?
- 1730 ? "Press RETURN";
- 1740 POKE 764,255
- 1750 IF PEEK(764)<>12 THEN 1750
- 1760 ? :? :OPEN #3,8,0,FN#:"Saving Fil  
e >";FN#?:GOTO 1390
- 1770 ? "DISKETTE ENTRY"
- 1780 ? :? :GOSUB 1890
- 1790 ? "Insert LOAD Diskette Then"
- 1800 ? :? "Press RETURN";
- 1810 POKE 764,255
- 1820 IF PEEK(764)<>12 THEN 1820
- 1830 ? :? :OPEN #3,4,0,FN#:"Loading Fi  
le >";FN#?:
- 1840 GOTO 1570
- 1850 PLOT 13,9+Z\*3:DRAWTO 24,9+Z\*3
- 1860 DRAWTO 24,11+Z\*3
- 1870 DRAWTO 13,11+Z\*3:DRAWTO 13,9+Z\*3
- 1880 RETURN
- 1890 ? "Enter Filename ";:POKE 764,255
- 1900 INPUT IN#?:IF LEN(IN#)=0 THEN 189  
0
- 1910 IF LEN(IN#)<3 THEN 1930
- 1920 IF IN\$(1,2)="0:" OR (IN\$(1,1)="0" A  
ND IN\$(3,3)=":" AND (ASC(IN\$(2,2))>48 AN  
D ASC(IN\$(2,2))<53)) THEN 1950
- 1930 FN\$(1,2)="0:"
- 1940 FN\$(3)=IN#:GOTO 1960
- 1950 FN#=IN#
- 1960 RETURN



## BBC Sected

by R Nurse and S James

'Sected' is an abbreviation for sector editor. It provides similar features to 'Disk Doctor' for a disk-based BBC Model B and can be used with both 40- and 80-track drives.

Sected allows the user to examine and/or modify a disk, sector-by-sector, in either hexadecimal or ASCII modes. Its prime use is to recover corrupted disks by modifying the corrupted sectors. I

# PROGRAMS

found it every bit as useful and powerful as many commercial packages.

When the program is run, you will be prompted for the drive to be used; for single-drive systems, this will normally be drive 0. You are then asked for the start track and sector — that is, the first sector you want to examine. To look at the disk directory, for example, you would enter 0 for both track and sector.

The screen format (see screendump) comprises 16 lines of 16 columns: a total of 256 bytes, or one sector. The drive number, track and sector are shown at the top of the screen — together with a 'Loaded' message if the sector loads without error, or a 'Load-error' if the sector is physically damaged.

To modify the sector, use the cursor keys to move to the desired location. By entering a two-digit hexadecimal value the existing value can be overwritten. For those more familiar with ASCII, press SHIFT-FO and enter a character. The ASCII value of the character is then written to the cursor position, and the cursor moves one position to the right.

If you have modified a sector, and wish to save the changes, press the TAB key to save the edited sector to disk before loading a new sector. To move to a new sector, press SHIFT and the right or left cursor key. To move to a new track, press CTRL and the right or left cursor key.

To 'fill' an area of the disk with a character, move the cursor to the start of the area to be filled and press SHIFT + F1. You will then be prompted to move

the cursor to the end of the area to be filled and press SHIFT + F1 again. Next, enter a hex value if you are in hex mode, or press a key if you are in ASCII mode, and then TAB to save the sector to disk. RETURN then loads the sector again if you want to continue working on it.

To dump a sector to a printer, press SHIFT + F2. This option assumes an 80-column (or wider) printer and assumes automatic line-feeds. If your printer does not perform automatic line-feeds on carriage returns, add in a new line as follows:

```
65 X FX 6,0
```

Finally, to exit the program press ESCAPE. You will be asked if you wish to save the current sector (y/n) and then returned to Basic.

```

10 REM *****
20 REM *
30 REM *   SECTED - Disc Sector Editor
40 REM *   (C) R.Nurse & S.James 1984
50 REM *
60 REM *****
70 #FX226,200
80 MODE3
90 VDU23;8202;0;0;0;
100 VDU23,224,0,16,32,64,255,64,32,16
110 VDU23,225,0,8,4,2,255,2,4,8
120 #FX4,1
130 stemmZ=&900:endamZ=stemmZ+&FF
140 PROCac
150 ONERRORGOTO170
160
170 CLS
180 PRINTTAB(30)"DISC SECTOR EDITOR"
190 PRINTTAB(30)"-----"
200 PRINTTAB(25)"(C) R.Nurse & S.James 1984"
210 !&71=stemmZ:&73=0:&74=0:&75=3:REM Set up OSWORD block
220 ntrackX=40:REM No. tracks
230 INPUT"" Drive No.:"dr$
240 drZ=VALdr$:IFdrX<0 GOTO170
250 ?&70=drX
260 PRINT" Track(0-"ntrackX-1):";INPUT"tr$
270 trackX=EVALtr$
280 IFtrackX<0 ORtrackX>ntrackX-1 GOTO170
290 INPUTTAB(1)"Sector (0-9):"se$
300 sectX=EVALse$
310 IFsectX<0 ORsectX>9 GOTO170
320 PROCload(trackX,sectX)
330 #FX15,1
340 xxZ=5:yyZ=2:asciiz=0:noZ=0
350 CLS:Mode$="Hex ";PROCscprint
360 PRINTTAB(0,18)"Commands:"
370 PRINT"TAB - Save this sector onto disc";SPC(5);"RETURN";
SPC(4);"-Reload this sector from disc"
380 PRINT"SHIFT f0 -Change mode (Ascii-Hex)";SPC(4);"SHIFT f1
-Fill part of current sector"
390 PRINT"CTRL ";CHR$224;" ";CHR$225;" -Back,forwards a track";
SPC(6);"SHIFT;CHR$224;" ";CHR$225;" -Back,forwards a sector"
400 PRINT"SHIFT f2 -Print sector on printer"
410 ONERROR GOTO1660
420 REPEAT:PROCmove:UNTIL0
430 END
440
450 REM Check any keys pressed,move cursor
460 DEFPROCmove
470 keyZ=INKEY(0):IFkeyZ=-1ENDPROC
480 xxZ=0:yyZ=0
490 IFkeyZ=9 PROCsave(trackX,sectX):ENDPROC
500 IFkeyZ=13 PROCload(trackX,sectX):PROCscprint:ENDPROC
510 IFkeyZ=200 PROCswapmode:ENDPROC
520 IFkeyZ=201 PROCfillsect:ENDPROC
530 IFkeyZ=202 PROCprinter:ENDPROC
540 IFINKEY(-1) ANDkeyZ=136 PROCsect(-1):ENDPROC
550 IFINKEY(-1) ANDkeyZ=137 PROCsect(1):ENDPROC
560 IFINKEY(-2) ANDkeyZ=136 PROCtrack(-1):ENDPROC
570 IFINKEY(-2) ANDkeyZ=137 PROCtrack(1):ENDPROC
580 IFkeyZ=136 xxZ=-3
590 IFkeyZ=137 xxZ=3
600 IFkeyZ=139 yyZ=-1
610 IFkeyZ=138 yyZ=1
620 IFkeyZ<127 ANDasciiz. PROCvalput(keyZ):xxZ=3:GOTO640
630 IFkeyZ>47 ANDkeyZ<58 ORkeyZ>64 ANDkeyZ<71 ANDasciiz=0
PROChexin:ENDPROC
640 IFxxZ=0 IFyyZ=0 ENDPROC
650 IFxxZ+xxZ<3 xxZ=45:yyZ=-1
660 IFxxZ+xxZ>50 xxZ=45:yyZ=1
670 IFyyZ+yyZ<2 yyZ=15
680 IFyyZ+yyZ>17 yyZ=15
690 PRINTTAB(xxZ,yyZ)" "
700 xxZ=xxZ+xxZ:yyZ=yyZ+yyZ
710 PRINTTAB(xxZ,yyZ)">"
720 ENDPROC
730
740 REM Input Hex Number
750 DEFFNinput
760 XXZ=POS:YYZ=VPOS
770 I$="":REPEAT
780 IIZ=GET:IFIIZ=127 A$=LEFT$(A$,LENA$-1)
790 IFIIZ=136GOTO830
800 IFIIZ=36GOTO820
810 IFIIZ<48ORIIZ>70 VDU7:GOTO780
820 I$=I$+CHR$IIZ:PRINTTAB(XXZ,YYZ)I$ "
830 UNTILIIZ=13 ORLENI$=2
840 IFI$="" GOTO760
850 =I$
860
870 REM Put value (VZ) into sector at present position of cursor
880 DEFPROCvalput(VZ)
890 rowZ=FNrow(yyZ):colZ=FNcol(xxZ)
900 val$=STR$VZ:IFLENAval$<2 val$="0"+val$
910 IFVZ<32 OR VZ>126 A$="" ELSEAS$=CHR$VZ
920 PRINTTAB(xxZ+1,yyZ)val$TAB(55+colZ,yyZ)A$
930 ?(stemmZ+rowZ*16+colZ)=VZ
940 ENDPROC
950
960 REM Save present sector onto disk
970 DEFPROCsave(trackX,sectX)
980 ?&76=&48
990 AZ=&7F: XZ=&70: YZ=0: CALL&FFF1
1000 ENDPROC
1010
1020 REM Swap between Hex & Ascii Modes
1030 DEFPROCswapmode
1040 IFMode$="Hex " Mode$="Ascii" ELSE Mode$="Hex "
1050 PRINTTAB(30,0)Mode$
1060 asciiz=l-asciiz
1070 ENDPROC
1080
1090 REM Put Hex number into sector
1100 DEFPROChexin
1110 vZ=?(stemmZ+FNrow(yyZ)*16+FNcol(xxZ))
1200 hex$=STR$(vZ MOD16)+CHR$keyZ
1210 PROCvalput(EVAL("&"+hex$))
1220 ENDPROC
1230
1240 REM Move to new sector
1250 DEFPROCsect(DX)
1260 IFNOZPRINTTAB(0,23)STRING$(50," "):noZ=0:REM Cancel fill
1270 sectZ=sectZ+DX
1280 PRINTTAB(40,0)STRING$(10," ")
1290 IFsectZ>9 sectZ=0:PROCtrack(1):ENDPROC
1300 IFsectZ<0 sectZ=9:PROCtrack(-1):ENDPROC
1310 PROCload(trackZ,sectZ)
1320 PROCscprint
1330 #FX15,1
1340 ENDPROC
1350
1360 REM Move to new track
1370 DEFPROCtrack(DX)
1380 PRINTTAB(40,0)STRING$(10," ")
1390 IFNOZ PRINTTAB(0,23)STRING$(50," "):noZ=0
1400 trackZ=trackZ+DX
1410 IFtrackZ>ntrackX-1 trackZ=0
1420 IFtrackX<0 trackZ=ntrackX-1
1430 PROCload(trackZ,sectZ):PROCscprint
1440 #FX15,1
1450 ENDPROC
1460
1470 REM Load track,sector
1480 DEFPROCload(TT,SSZ)
1490 ?&76=&53: ?&77=TT: ?&78=SSZ: ?&79=&21
1500 AZ=&7F: XZ=&70: YZ=0: CALL&FFF1
1510 ENDPROC
1520
1530 REM Display present sector

```

# PROGRAMS

```

1540 DEFPROCscprint
1550 VDU30
1560 IF?&7A<>0 Err%="Load Error":VDU7 ELSE Err%="Loaded"
1570 PRINTTAB(5,0)"Track: ";?&77" "TAB(15,0)"Sector: ";?&78"
"TAB(25,0)"Mode%
1580 IF?&7A COLOUR0:COLOUR129
1590 PRINTTAB(40,0)Err%:CHR%20:TAB(55,0)"0123456789ABCDEF"
1600 PRINTSTRING$(80,"=");
1610 CALLdump%
1620 PRINTTAB(xxZ,yyZ)">";
1630 ENDPROC
1640
1650 REM Error Detected
1660 *FX4
1670 IFERR<>17MODE7:CLS:REPORT:PRINTERL:END
1680 PRINTTAB(0,23)STRING$(45," ")
1690 COLOUR129:COLOUR0:PRINTTAB(0,23)"Save Sector?":VDU20
1700 A$=GET$:IFA$="Y":PROCSave(trackZ,sectZ)
1710 END
1720
1730 REM Machine Code for printing sector contents to screen
1740 DEFPROCmc
1750 DIM dump% 200
1760 FORTZ=OT0STEP2:PZ=dump%
1770 DOPTX:LDY#0
1780 .loop JSR num:JSR row:JSR chars:CPY#0:BNE loop:RTS
1790 .row LDY#0:JSR spc:.r1 LDA stmemZ,Y:JSR hex:JSR spc:INY:
INX:CPX#16:BNE .r1:JSR spc:RTS
1800 .num JSR spc:TYA:JSR hex:JSR spc:LDA#58:JSR &FFEE:RTS
1810 .chars TYA:SEC:SBC#16:TAY
1820 LDY#0:.c1 LDA stmemZ,Y:CMP#32:BCC nprint:CMP#127:BCS
nprint:.cont JSR &FFEE:INY:INX:CPX#16:BNE .c1:JSR &FFEE:RTS
1830 .nprint LDA#46:JMP cont
1840 .hex PHA:LSRA:LSRA:LSRA:LSRA:JSR hexnyb:PLA:AND#15:JSR
hexnyb:RTS
1850 .hexnyb CMP#10:BCC hexny1:CLC:ADC#7
1860 .hexny1 CLC:ADC#48:JSR &FFEE:RTS
1870 .spc LDA#32:JSR &FFEE:RTS
1880 .:NEXT
1890 ENDPROC
1900
1910 REM Fill part of present sector
1920 DEFPROCfillsect
1930 posZ=FNrow(yyZ)*16+FNcol(xxZ)
1940 COLOUR129:COLOUR0:PRINTTAB(0,23);IFnoZ=0 PRINTTAB(0,23)"Move
cursor to at her point, then press SHIFT f1":noZ=noZ+1:
p1Z=posZ+stmemZ:VDU20:ENDPROC
1950 p2Z=posZ+stmemZ
1960 VDU20:PRINTSTRING$(50," ")
1970 IFMode%="Ascii" CH%="Character" ELSECH%="Value"
1980 COLOUR129:COLOUR0:PRINTTAB(0,23)CH% to fill with:;
1990 IFMode%<>"Ascii" valZ=VAL("&"+FNinput) ELSEREPATEACH=BET:
UNTILCX<127:valZ= CZ
2000 VDU20:PRINTTAB(0,23)STRING$(30," ")
2010 IFp1Z=p2Z ?p1Z=valZ:GOTO2040
2020 FORTZ=p1Z TDp2Z STEP SBN(p2Z-p1Z)
2030 ?TZ=valZ:NEXT
2040 noZ=0:PROCscprint
2050 PRINTTAB(0,23)STRING$(20," ")
2060 ENDPROC

```

```

2080 REM Print sector on printer
2090 DEFPROCprinter
2100 *FX3,10
2110 IF?&7A Err%="Load Error" ELSE Err%="Loaded"
2120 PRINT TAB(5)"Track: ";?&77" ";TAB(15)"Sector: ";?&78" ";TAB(25)
"Mode: ";TAB(40)Err%;TAB(55)"0123456789ABCDEF"
2130 PRINTSTRING$(80,"=");
2140 CALLdump%
2150 VDU3: *FX3,0
2160 ENDPROC
2170
2180 DEFFNcol (XXZ) =(XXZ-3)DIV3
2190 DEFFNrow (YYZ) =YYZ-2
2200
2210 REM ** END OF LISTING **

```

```

Track:?? Sector:5 Mode:Hex Loaded 0123456789ABCDEF
-----
00 :00 00 00 05 08 00 00 04 1D F1 0B 33 30 29 22 44 .....30"0
10 :49 53 43 20 53 45 43 54 4F 52 20 45 44 49 54 4F ISC SECTOR EDIT0
20 :52 22 00 00 0E 1D F1 0A 33 30 29 22 20 2D 2D 20 R".....30"---
30 :20 20 2D 2D 20 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 00 .....
40 :00 C0 26 F1 27 0A 32 35 29 22 20 43 29 20 52 2E ..&.'.25)(C) R.
50 :4E 75 72 73 65 20 26 20 53 2E 4A 61 60 65 73 20 Nurse & S.James
60 :31 39 30 34 22 00 00 02 30 21 26 37 31 30 33 74 1984"....!671-st
70 :60 65 6D 25 30 3F 26 37 33 30 30 3F 26 37 34 mem?:?&73=0:?&74
80 :30 30 30 3F 26 37 35 30 33 30 3F 4 20 53 65 74 20 =0:?&75=3:. Set
90 :75 70 20 4F 53 57 4F 52 44 20 62 6C 6F 63 60 00 up BSMORP block.
00 :00 DC 1A 6E 74 72 61 63 60 25 30 34 30 34 20 ...ntrackZ=40:;
00 :4E 6F 2E 74 72 61 63 60 73 00 00 E6 19 E8 27 27 No.tracks.....
C0 :22 20 20 20 44 72 69 76 65 20 4E 6F 2E 3A 22 64 " Drive No:."d
D0 :72 24 00 00 F0 19 64 72 25 30 00 64 72 24 3A E7 r$....dr%=.dr$.
E0 :64 72 25 3C 30 20 E5 00 74 6A 40 00 00 FA 0C 3F dr%CO .tj0....?
F0 :26 37 30 30 64 72 25 00 01 04 26 F1 22 20 54 72 &78=dr%...&. Tr

```

```

Commands:
TAB - Save this sector onto disc RETURN -Reload this sector from disc
SHIFT F0 -Change mode (Ascii-Hex) SHIFT F1 -Fill part of current sector
CTRL -- -Back, forwards a track SHIFT --,- Back, forwards a sector
SHIFT F2 -Print sector on printer

```

Example of screen display during use



## Slalom by A Pearce

The player is given a time limit in which to glide down a slope dotted with trees, attempting to go through gates which frequently appear on the screen. In addition to these obstacles the course itself moves from side to side. On crashing into the trees or the fencing or even the side of the gate, the player loses a great deal of the remaining time allowed.

routine which shows the MicroBee's excellent implementation of programmable characters in scrolling the trees (which are printed at the bottom of the screen) and the other objects up the screen.

model 'Bee it might be wise to run the program without these commands anyway as it may well make the game faster.

If the user would prefer not to have a click of the speaker every time a tree goes past, remove the OUT commands in line 340 but leaving the other statements intact. If you own an older

The game is written totally in HIRES PCG graphics so that more experienced programmers can vary the DATA at lines 590 to 680 to create their own variations of the game as it suits them

```

100 REM *****
110 REM ** SLALOM! By Andrew Pearce 1984 **
120 REM *****
130 REM Do intro ...
140 POKE 220,1111:CLS:LORES:PLOT 0,0TO127,0TO63,20TO0,0:PLOT
62,19TO64,19:PLOT 59,18TO67,18:PLOT 55,17TO71,17:PLOT 52,16
TO74,16:PLOT 49,15TO77,15
150 PLOT 63,20TO63,0:PLOT 63,20TO27,0:PLOT 63,20TO99,0:PLOT
63,20TO43,0:PLOT 63,20TO83,0:CURS1,3:PRINT[A64 45]:CURS1,5
:PRINT[A64 45]

```



# 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.



### SPECIAL OFFER

Box of 10 Flexydisks 5.25, single sided, single density, in de Luxe library case.

### SYDNEY

MeCom Pty Ltd  
G.P.O. Box 2850  
Sydney 2001  
Telephone (02) 923 1611

### MELBOURNE

Perimedia Pty Ltd  
P.O. Box 157  
Macedon 3440  
Telephone (054) 26 1304

Comprehensive range in diskettes and computer tapes.

## 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

SIZE:  
Width 900mm  
Depth of top shelf 300mm  
Depth of bottom shelf 400mm  
Height of bottom shelf 670mm  
Peripherals NOT included

Cheques, Bankcard, Money orders payable to:



**\$99**  
Tax paid

**HOME COMPUTERS**  
**160 MAIN ROAD (BURWOOD HWY) UPPER**  
**FERN TREE GULLY 3156 Telephone: 758 2124**

Name \_\_\_\_\_  
Address \_\_\_\_\_  
State \_\_\_\_\_ Postcode \_\_\_\_\_  
Bankcard \_\_\_\_\_ Signature \_\_\_\_\_  
 Cheque enclosed  Bankcard

# Good News... gametronics

## 202 PROGRAMS FOR

# SINCLAIR ZX SPECTRUM

Beat That! We've tried, but we can't find anyone else with as great a variety of Spectrum software. Maybe we're bigger because we specialize in Spectrum. Maybe we're cheaper because we sell more than any other retailer. Whichever reason, you benefit with more to choose from, lower prices and our special offers.

### THIS MONTH — 10 TOP GAMES REDUCED

• 16/48K Naanas • 16/48K Space  
Zombies • 48K Knock-Out • 48K Cruise Attack • 48K Pat the  
Postman • 16/48K Cosmic  
Raiders • 48K Laser Warp • 48K  
Defendar • 48K Mad Martha  
(Adventure) • 16/48K Gold!  
(Adventure).

now only

## \$16.95

### THIS MONTH'S SPECIAL OFFER



So that's the one to buy:  
Sinclair ZX Spectrum, with  
full guarantee and  
service back-up, for  
only

**16K — \$225**  
**48K — \$315**

## AUSTRALIA'S SINCLAIR ZX SPECTRUM SPECIALIST

# gametronics

6/177 Toorak Road, South Yarra 3142. (03) 241 3031

Mail Order/Cheque, Money Order or Bankcard it.  
Please send me  your catalogue, and:

ITEMS \_\_\_\_\_ @ \$ \_\_\_\_\_  
\_\_\_\_\_ \$ \_\_\_\_\_  
\_\_\_\_\_ \$ \_\_\_\_\_  
Add \$8.50 P&P H/ware or \$2.50 S/ware: \$ \_\_\_\_\_  
\$ \_\_\_\_\_

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Signature \_\_\_\_\_  
Bankcard No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

MPA/APC634

# PROGRAMS

```

160 RESTORE700:FORA=1TO7:U=1:READA1$,A2$:IFA1$=" THENNEXTA
ELSEFORB=62TO32+ASTEP-1:U=U+1:CURSB,4:PRINTA2$;" ":CURSU,4
:PRINT" "A1$:FORC=1to10:NEXTC:NEXTB:NEXTA
170 FORA=1TO1250:NEXTA
180 INVERSE:NORMAL:RESTORE:P=63488+65*16:FORA=PTOP+16*10-1:
READB:POKEA,B:NEXTA:CLS:PRINT[A25 45];" Instructions ";
[A25 45]
190 PRINT"Hi all you ski fans! In this game you must glide down
a heavily":PRINT"wooded ski slope while going through as
many gates as you can."
200 PRINT"There is,however, a time limit which is kept and colliding
with a tree shortens this considerably.Also try to stay on the
course";
210 PRINT"- if you crash into the fencing you lose more time":
PRINT[A64 45]:CURS32,10:PRINT"< Left direction":CURS32,11
:PRINT"> Right direction"
220 PCG:CURS1,10:PRINT"ABCDE";:NORMAL:PRINT" You":PCG:
PRINT"FGGGGGGGGH";:NORMAL:PRINT" Gate":PCG:PRINT"IJ";:NORMAL:
PRINT" Tree"
230 CURS1,15:PRINT[A20 45];" Press any key to start ";[A19 45]
240 IFKEY$=""THEN240
250 CLS:S1=0:Z=0:J=0:PCG:L=32:T=12:M=2000
260 FORA=1TO15:CURS12,A:PRINTCHR$(130):CURS52,a:PRINTCHR$(130)
:NEXTA
270 IFP>0THEN300ELSELETP=INT(RND*10):IFP<4THENLETP=INT(RND*10)
:D=INT(RND*10):IFD>5THENLETD=-1ELSELETD=1
280 IFP=0THEND=0
290 IF M<=0THEN510
300 U=U+1:IFU>10THENCURSINT(RND*21)+T+2,16:PRINT"FGGGGGGGGGGGH"
:U=0
310 IFU>0THENCURSINT(RND*34)+T+2,16:PRINT"IJ"
320 CURSL-2,1:PRINT"ABCDE"
330 IFR=0THENGOSUB580
340 OUT2,0:OUT2,255:M=M-1:S1=S1+1
350 IFP>0ANDD=1THENLETT=T-1ELSEIFP>0ANDD=-1THENLETT=T+1
360 IFT<3THENLETT=T+1:P=0
370 IFT>2THENLETT=T-1:P=0
380 CURST,15:PRINTCHR$(130):CURST+40,15:PRINTCHR$(130)
390 IFPEEK(61440+L-5)=2ORPEEK(61440+L-6)=2ORPEEK(61440+L-4)=2
THENLETE=1:GOTO480
400 IFPEEK(61440+L+4)=2ORPEEK(61440+L+5)=2ORPEEK(61440+L+3)=2
THENLETE=2:GOTO480
410 IFPEEK(61504+L)=199THENLETJ=J+1:W1=FLT(INT(RND*20))*50:
CURSL-2,2:NORMAL:PRINTINT(W1):FORA=1TO50:NEXTA:CURSL-2,3:
PLAY8;9;4:PRINT" ":PCG:S1=S1+W1
420 IFPEEK(61504+L-1)<>32ANDPEEK(61504+L-1)<>199ORPEEK(61504+L-2)
<>32ANDPEEK(61504+L-2)<>199ORPEEK(61504+L)<>32ANDPEEK(61504+L)
<>199THEN470
430 POKE258,0:Q1$=KEY$
440 IFQ1$=","THENLETL=L-1
450 IFQ1$="."THENLETL=L+1
460 GOTO 270
470 PLAY1:Z=Z+1:FORA=1TO7:FORB=1TO25:NEXTB:OUT2,0:OUT2,255:NEXTA
M=M-100:GOTO 270
480 IFE=1THENLETL=L+3
490 IFE=2THENLETL=L-3
500 PLAY10:FORA=1TO7:FORB=1TO25:NEXTB:OUT2,0:OUT2,255:NEXTA:GOTO 270
510 R=0:PLAY5;6;5;6;4;5;6;5;4;5;6;4;5;10:NORMAL:CLS:PRINT[A27 45];
" Game Over "; A25 45 :IFS1>H1THENLETH1=S1
520 PRINT:PRINT:PRINTTAB(12);"No. of gates completed -"J:PRINTTAB(18)
;"No. of trees hit -"Z:PRINTTAB(29);"Score -"S1:PRINT[A64 45]
:PRINTTAB(27);"Hi Score -"H1
530 CURS20,15:PRINT"Would you like another go?"
540 Q1$=KEY$:IFQ1$=""THEN540

```



# Who's keeping up with Commodore?

The Commodore EXECUTIVE 64. A personal, portable computer with outstanding graphics, colour, music and astonishing computing capability, all in an easy-to-carry case.

The Commodore EXECUTIVE



64 is designed for the movers of this world. Designed to give you the power. Power at your fingertips. The power of 64K memory. The power to keep up. In the office. At home. Or in your home away from home.

**commodore**  
COMPUTER  
Keeping up with you.

Commodore Business Machines Pty. Ltd.  
5 Orion Road, Lane Cove NSW. 2066. (02) 427 4888.  
Please send me more information on the Commodore Executive 64™

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

BMS/CC 152 Postcode \_\_\_\_\_ Phone \_\_\_\_\_ A.P.C.



# PROGRAMS

```

550 IFQ1$="Y"ORQ1$="y"THEN250
560 IFQ1$="N"ORQ1$="n"THENCLS:END
570 GOTO 540
580 PLAY 10,2;12;13;10;10;17;15;13;10:R=1:RETURN
590 DATA 0,0,0,192,48,12,3,0,0,0,0,0,0,0,0,0
600 DATA 252,48,48,48,48,50,50,50,50,60,51,51,48,48,48,48
610 DATA 0,0,0,60,195,0,0,0,60,255,255,255,255,60,0,0
620 DATA 63,12,12,12,12,204,204,204,204,60,204,204,12,12,12,12
630 DATA 0,0,0,3,12,48,192,0,0,0,0,0,0,0,0,0
640 DATA 192,192,192,192,192,240,252,192,252,240,192,192,192,192,
192,192
650 DATA 0,0,0,0,0,0,0,255,255,0,0,0,0,0,0,0
660 DATA 3,3,3,3,3,15,63,3,63,15,3,3,3,3,3,3
670 DATA 0,1,2,4,9,2,4,9,18,4,9,18,36,8,0,1
680 DATA 128,192,160,144,200,160,144,200,164,208,200,164,140,136
128,192
690 DATA "a","l","l","o","S","m"," "," ","*","*","*","*","*","*"
700 REM ***** This Program Takes up 3422 Bytes *****

```



## Blockout

by B Pritchard

Blockout is a game for the unexpanded VZ 200 which will work with joysticks or from the keyboard. The object of the game is to trap your opponent by boxing him/her/it, in with the lethal trail that you (and your opponent) leave as you move around the screen.

The main points of the program are:

- Lines 10 to 30 are a short machine language which will set the whole screen white when called.
- Lines 185 to 190 initialise the variables.

- Line 195 sets up the screen.
- Line 200 checks to see if the computer has to move (otherwise it gets the players move from the keyboard or the left joystick).
- Lines 205 to 240 process the left player's movements.
- Line 245 collects the right player's move from the keyboard or the right joystick.
- Lines 250 to 285 process the right player's move.
- Lines 300 to 325 check if either

player has hit a line or run off the edge of the screen.

- Lines 400 to 440 calculate and display each player's score.
- Lines 500 to 595 control the computer's movements.
- Lines 1000 onwards are the instructions and keyboard controls.

```

0 REM *****
1 REM **   BLOCKOUT   **
2 REM **   BY         **
3 REM ** B.PRITCHARD **
4 REM **   29/4/84   **
5 REM *****
10 FORI=-28687TO-28674
15 READA:POKEI,A
20 NEXT
25 DATA33,0,112,17,1,112,1,255,7,54,85,237,176
,201
30 POKE30862,241:POKE30863,143
35 CLS:PRINTTAB(7) "*** BLOCKOUT ***":PRINT
40 INPUT"INSTRUCTIONS";A$
45 IFLEFT$(A$,1)="Y"THEN1000
50 INPUT"ONE OR TWO PLAYERS";PL
55 IFPL<>1ANDPL<>2THEN50
60 IFPL=2THEN75
65 RI$="YOU":LI$="I"
70 GOTO185
75 INPUT"LEFT PLAYER'S NAME";LE$

```



# PROGRAMS

```
80 INPUT"RIGHT PLAYERS NAME";RI$
185 X1=1:Y1=0:X2=-1:Y2=0
190 AX=0:AY=32:BX=127:BY=32
195 MODE(1):X=USR(0)
200 IFPL=1THEN500ELSEA=PEEK(27000):AA=(INP(43)
AND31)
205 IFA=239THENX1=-1:Y1=0
210 IFA=253THENX1=1:Y1=0
215 IFA=247THENX1=0:Y1=-1
220 IFA=223THENX1=0:Y1=1
225 IFAA=27THENX1=-1:Y1=0
230 IFAA=23THENX1=1:Y1=0
235 IFAA=30THENX1=0:Y1=-1
240 IFAA=29THENX1=0:Y1=1
245 B=PEEK(26700):BB=(INP(46)AND31)
250 IFB=223THENX1=-1:Y1=0
255 IFB=247THENX1=1:Y1=0
260 IFB=253THENX1=0:Y1=-1
265 IFB=239THENX1=0:Y1=1
270 IFBB=27THENX1=-1:Y1=0
275 IFBB=23THENX1=1:Y1=0
280 IFBB=30THENX1=0:Y1=-1
285 IFBB=29THENX1=0:Y1=1
300 AX=AX+X1:AY=AY+Y1
305 IFA X<0ORAX>127ORAY<0ORAY>63THEN400
310 IFPOINT(AX,AY)<>2THEN400
315 BX=BX+X2:BY=BY+Y2
320 IFBX<0ORBX>127ORBY<0ORBY>63THEN405
325 IFPOINT(BX,BY)<>2THEN405
330 COLOR3:SET(AX,AY)
335 COLOR4:SET(BX,BY)
340 GOTO200
400 BS=BS+1:W$=RI$:GOTO410
405 AS=AS+1:W$=LE$
410 CLS:PRINTW$;" WON":PRINT
415 PRINT"LEFT SCORE","RIGHT SCORE"
420 PRINT:PRINTTAB(3)AS,TAB(3)BS
425 PRINT@451,"PRESS ANY KEY TO CONTINUE"
426 PRINTTAB(10)"(N=NEW GAME)"
430 A$=INKEY$:IFA$=""THEN430
435 IFINKEY$=A$ORINKEY$=""THEN435
440 IFINKEY$="N"THENRUNELSEPOKE27000,0:POKE26700,0
:GOTO185
500 IFRND(40)<>1THEN510
505 IFRND(2)=-1THENX1=RND(3)-2:Y1=0ELSEX1=0
506 IFX1=0THENY1=RND(3)-2
510 IFA X+X1<0ORAX+X1>127ORAY+Y1<0ORAY+Y1>63THEN
525
515 IFPOINT(AX+X1,AY+Y1)=2THEN245
525 IFA X-1<0ORAY<0ORAY>63THENA 1-1ELSEIFPOINT
(AX-1,AY)<>2,A 1=1
530 IFA X+1>127ORAY<0ORAY>63THENA 2-1ELSEIFPOINT
(AX+1,AY)<>2,A 2=1
535 IFAY-1<0ORAX<0ORAX>127THENA 3-1ELSEIFPOINT
```

# IF YOU CAN'T GET AN IBM PC, SETTLE FOR SOMETHING BETTER.

Once you discover the performance and the power of the Corona PC's,<sup>TM</sup> you'll quickly see the difference in today's standard for micro computing in the IBM-compatible world. Because the Corona PC's go beyond the standard to give you much more of what you're looking for in an IBM-compatible PC.

- Powerful, low-cost desktop and portable computers.
- 16-bit, fully compatible with IBM PC standard.
- Crisper, cleaner display and higher resolution graphics (640x325 pixels).
- 128K byte memory, room for 512K bytes on main board.
- Fast-access 320K byte floppy, communication and printer ports and 4 expansion slots are included.
- RAM-disk software.
- Includes MS-DOS<sup>1</sup>, GW BASIC<sup>2</sup>, PC Tutor<sup>3</sup>, and MultiMate<sup>4</sup> professional word processing system.
- Optional hard disk.
- Fully supported direct by AWA.



Corona PC's are available through AWA's continually expanding dealer network. For further information, ring AWA, or clip the coupon.

NSW (02) 922 3300    ACT (062) 47 7522  
 VIC (03) 529 4133    QLD (07) 369 3577  
 WA (09) 321 9334    TAS (002) 34 4532  
 SA (08) 79 9581    Auckland 76 0129

## AWA COMPUTERS

To: Corona PC Co-ordinator, AWA Computers,  
 132 Arthur St, North Sydney, N.S.W. 2060  
 Yes! Please send me more information on the powerful Corona PC.

Name: .....

Position: .....

Company: .....

Address: .....

City: ..... Postcode: ..... Tel: .....

# PROGRAMS



## Split screen graphics

by A Dilley

Many Commodore 64 owners may have heard or read about raster interrupts, and how useful they can be. The following listing from Andrew Dilley demonstrates the use of raster interrupts to obtain split screen graphics.

The value contained in the raster register is the number of the horizontal lines being drawn on the TV screen. The screen is divided up into horizontal lines with line numbers 50-250 on the screen window and the others on the border.

Suppose a program is written that tells the 64 to switch to bit map mode at one point and then back to normal at another. Only those lines drawn after the switch will be produced in the new mode; the rest will be unchanged.

To save the computer having to mon-

itor the position of the raster all of the time, interrupts are used. Normally these occur every 1/60th of a second and are used to update the TI jiffy clock, flash, cursor, and so on.

However, two things allow the interrupts to be utilised. First, the address of the interrupt routine is held at memory location 788 and 789. By changing the values held here, it is possible to redirect the computer whenever an interrupt occurs.

Secondly, there is a register in the Vic chip (53274) which allows the conditions under which the interrupt occurs to be selected. These can be light-pen interrupts, sprite collision interrupts and — yes, you guessed it — raster interrupts.

Once the computer has been told to provide raster interrupts, it needs to be told when. This is done by giving it a raster compare value. When the raster value matches the compare value, an interrupt is triggered. The compare value is stored in the same location in memory from which the actual raster position is read.

The demonstration program shows the split screen effect with bit mapped graphics. By changing the one memory location, the sixth item of data on line 640 from 20 to 40, the routine will give the split screen effect in extended colour mode.

The high-resolution screen is placed at 8192 and part of the 64's character set is copied into memory starting at 14336.

```
95 PRINT "J"
100 GOSUB 500 :REM LOAD MACHINE-CODE
110 GOSUB 300 :REM CHARACTER SET
120 GOSUB 400 :REM CLEAR HI-RES
130 POKE 53272,(PEEK(53272)AND240)OR14:REM THIS GETS OUR
CHAR. SET
140 POKE 252,199:POKE 253,15
150 SYS 12*4096
160 PRINT"#####"
170 PRINT" SPLIT-SCREEN GRAPHICS"
190 FOR I=1024 TO 1023+40*19:POKE I,16+6:NEXT
192 REM THIS SETS THE COLOUR OF THE HI-RES SCREEN
200 FOR X=0 TO 319
210 Y=INT(75+70*SIN(X/10))
220 B=320*(INT(Y/8))+8*(INT(X/8))+(Y AND 7)
230 POKE 8192+B,PEEK(8192+B) OR 2+(7-(XAND 7))
240 NEXT
250 PRINT"O UNDER THIS 'SCREEN' YOU CAN SEE THE"PRINT"
CHARACTER SET."
260 FOR T=1 TO 1000:NEXT
270 FOR I=200 TO 250:POKE 252,I:NEXT
280 FOR T=1 TO 1000:NEXT
290 FOR I=250 TO 200 STEP-1:POKE 252,I:NEXT
295 GOTO 260
300 PRINT "--COPYING CHARACTERS FROM ROM TO RAM"
310 POKE 56334,PEEK(56334)AND254
320 POKE 1,PEEK(1)AND251
330 FOR I=0 TO 64*8
340 : POKE I+14336,PEEK(I+13*4096)
350 NEXT
360 POKE 1,PEEK(1)OR4
370 POKE 56334,PEEK(56334)OR1
380 RETURN
400 PRINT "--CLEARING HI-RES SCREEN"
410 FOR I=8192 TO 8192+6144
411 REM DON'T CLEAR ENTIRE HI-RES SCREEN, SO AS TO LEAVE
ROOM FOR CHAR. SET
420 : POKE I,0
430 NEXT
440 RETURN
500 PRINT "--LOADING MACHINE-CODE"
510 S=12*4096
```

# PROGRAMS

```
(AX,AY-1)<>2,A3-1
540 IFA Y+1>63ORA X<0ORA X>127THENA 4=1BI 3BI FCI 4
      (AX,AY+1)<>2,A4-1
545 IFA 1=1ANDA 2=1ANDA 3=1ANDA 4=1THENA 1=0:A 2=0
      A 3=0:A 4=0:GOTO 245
546 A 1=0:A 2=0:A 3=0:A 4=0
550 R=RND(4)
555 IFR=1ANDA X<-1ANDA Y<-1ANDA Y>64THENIFFPOINT
      (AX-1,AY)=2,580
560 IFR=2ANDA X+1>128ANDA Y<-1ANDA Y>64THENIFFPOINT
      (AX+1,AY)=2,585
565 IFR=3ANDA Y-1<-1ANDA X<-1ANDA X>128THENIFFPOINT
      (AX,AY-1)=2,590
570 IFR=4ANDA Y+1>64ANDA X<-1ANDA X>128THENIFFPOINT
      (AX,AY+1)=2,595

575 GOTO 550
580 X1=-1:Y1=0:GOTO 245
585 X1=1:Y1=0:GOTO 245
590 X1=0:Y1=-1:GOTO 245
595 X1=0:Y1=1:GOTO 245
1000 PRINT@64," AS YOU MOVE AROUND THE SCREEN"

1005 PRINT"YOU WILL LEAVE A TRAIL."
1010 PRINT" YOU CANNOT RUN INTO YOUR TRAIL"
1015 PRINT",OR YOUR OPPONENTS TRAIL,OR RUN"

1020 PRINT"OFF THE EDGE OF THE SCREEN."
1025 PRINT"(DOUBLING BACK INTO YOURSELF IS"
1030 PRINT"THE SAME AS RUNNING INTO YOUR","TRAIL"
1035 PRINT" WHEN PLAYING ONE PLAYER ONLY"
1040 PRINT"(AGAINST THE COMPUTER),USE THE"
1045 PRINT"RIGHT SET OF CONTROLS"
1050 PRINT@480,"PRESS ANY KEY TO CONTINUE";
1055 A$=INKEY$:IFA$=""THEN1055
1060 IFINKEY$=A$ORINKEY$=""THEN1060
1065 CLS:PRINTTAB(6)"KEYBOARD CONTROLS"
1070 PRINT:PRINT"RIGHT PLAYER:"

1075 PRINTTAB(14)"(M)=LEFT"
1080 PRINTTAB(14)"(,)=RIGHT"
1085 PRINTTAB(14)"(.)=UP"
1090 PRINTTAB(14)"(SPACE)=DOWN"
1095 PRINT:PRINT"LEFT PLAYER:"
1100 PRINTTAB(14)"(Z)=LEFT"
1105 PRINTTAB(14)"(X)=RIGHT"
1110 PRINTTAB(14)"(C)=UP"

1115 PRINTTAB(14)"(V)=DOWN"
1120 PRINT@ 480,"PRESS ANY KEY TO CONTINUE";
1125 A$=INKEY$:IFA$=""THEN1125
1130 IFINKEY$=A$ORINKEY$=""THEN1130
1135 GOTO 35
```

# PROGRAMS

```
520 I=0
530 READ H$
540 IF H$="*" THEN RETURN
550 H=ASC(H$)-48:L=ASC(RIGHT$(H$,1))-48
560 H=H+7*(H>9):L=L+7*(L>9)
570 POKE S+I,16*H+L
580 I=I+1:GOTO530
600 DATA 78,A9,19,A0,C0,8D,14,03,8C,15,03
620 DATA AD,1A,D0,09,01,8D,1A,D0,A9,00,85,FB,58,60
630 DATA AD,19,D0,29,01,D0,03,4C,31,EA,8D,19,D0
640 DATA 78,AD,11,D0,49,20,29,7F,8D,11,D0,A6,FB,E0,02,D0,02,
  A2,00
650 DATA B5,FC,8D,12,D0,E8,86,FB,58,68,A8,68,AA,68,40,*
```



## Monster Hunt

by D Baulch

The 'Hunt' is a game for the VIC 20 with a 3k expansion and joystick. It is made in two parts: a loader program and the main program which is saved separately.

The idea of the game is to dig your way

underground and shoot the monsters. The googles can dig through the dirt but the dragons can't. However, the dragons can breathe fire, so watch out!

To run the Monster Hunt, enter the

loader program and save it. Then type in the main program and save that too. Rewind the tape and load and run the loader program. The loader program loads the main program from there.

### Listing 1: Loader program

```
0 REM*****
1 REM* *
2 REM* MONSTER HUNT *
3 REM* BY S HYDE & *
4 REM* D BAULCH *
5 REM* *
6 REM*****
10 POKE52,28:POKE56,28:POKE51,0:POKE55,0
20 FORI=7168TO7679:POKEI,PEEK(I+25600):NEXT
30 FORC=7168TO7303:READA:POKEC,A:NEXT
40 POKE36869,255
110 DATA56,84,56,16,58,63,250,140
115 DATA28,42,28,8,92,252,95,49
117 DATA51,204,51,204,51,204,51,204
120 DATA62,127,73,73,127,62,36,54
130 DATA124,254,146,146,254,124,36,108
150 DATA28,54,118,156,62,115,114,34
160 DATA56,108,110,57,124,206,76,58
180 DATA0,0,128,192,96,49,31,7
190 DATA1,7,15,27,125,223,254,252
200 DATA240,124,216,254,108,240,152,0
210 DATA0,0,1,3,6,140,248,224
220 DATA128,224,240,216,190,251,127,63
230 DATA15,62,11,255,54,15,25,0
240 DATA0,0,0,96,144,9,6,0
250 DATA0,0,0,96,148,14,4,0
260 DATA140,250,63,58,16,56,84,56
270 DATA0,73,42,0,99,0,42,73
300 POKE36879,8:PRINT"J"
310 FORXX=7790TO8163:POKEXX,2:NEXTXX
320 FORXX=38510TO38641:POKEXX,3:NEXTXX
```

# PROGRAMS

```

330 FORXX=38642T038773:POKEXX,4:NEXTXX
340 FORXX=38774T038883:POKEXX,2:NEXTXX
350 PRINT"#####"
360 PRINT"#####MONSTER HUNT!"
370 PRINT"#####"
380 ZZ=7768:FORXX=1T02:POKEZZ,0:GOSUB1000:POKEZZ,32:ZZ=ZZ+1:NEXT
410 FORXX=1T06:POKEZZ,0:GOSUB1000:POKEZZ,32:ZZ=ZZ+22:NEXT
420 FORXX=1T017:POKEZZ,0:GOSUB1000:POKEZZ,32:ZZ=ZZ+1:NEXT
430 FORXX=1T06:POKEZZ,0:GOSUB1000:POKEZZ,32:ZZ=ZZ-22:NEXT
440 POKEZZ,0:GOSUB1000:POKEZZ+1,0
450 FORXX=1T03:POKEZZ,0:GOSUB1000:POKEZZ,32:ZZ=ZZ+1:NEXT
460 GOTO2000
1000 POKE36878,15:POKE36874,200
1010 FORM=1T010:NEXTM:POKE36874,0:FORM=1T0100:NEXTM:RETURN
2000 PRINT"#####KILL THE MONSTERS"
2010 PRINT:PRINT"#####LURKING IN"
2020 PRINT:PRINT"#####THE CAVERNS"
2030 PRINT:PRINT"#####GOOGLES 200FTS"
2040 PRINT:PRINT"#####DRAGONS 200FTS"
2050 PRINT"#####PRESS PLAY AND WAIT.###"
2060 POKE631,131:POKE198,1

```

## Listing 2: Main program

```

0 POKE36879,8:FORE=900T0903:POKEE,0:NEXT:S=0:HI=0:M=3:POKE37879,255
1 V1=36874:V2=36875:V3=36876:V4=36877:V5=36878:POKEV5,15:S=PEEK(900)*256+PEEK(90
1)
2 POKE36869,255:DIMCH(2,2),DF(2,2),MOX(7,4):HI=PEEK(902)*256+PEEK(903)
3 POKEV4+1,9
4 HI=1000:A$="VIC"
5 SC=7680:POKE52,28:POKE51,0:POKE56,28:POKE55,0
6 :POKEV3,0
100 FORE=0T02:FORT=0T02
101 READCH(E,T):NEXT:NEXT:FORME=0T02:FORU=0T02:READDF(ME,U)
103 NEXTU,ME
104 DATA9,1,9,9,9,9,9,0,9,0,-22,0,-1,0,1,0,22,0
105 DD=3:X=10:Y=14:P=SC+X+Y*22
107 FORE=0T05:FORT=0T04:READMOX(E,T):NEXT:NEXT:DATA5,7,8,10,5,6,7,12,10,5,5,7,4,
13,5
108 DATA6,7,17,13,5,3,2,6,19,3,4,2,14,19,3
115 PRINT"Q"
117 FORE=7834T08163:POKEE,2:NEXT:FORE=38554T038663:POKEE,3:NEXT
118 FORE=38664T038664+5*22:POKEE,4:NEXT:FORE=38774T038883:POKEE,2:NEXT:GOSUB8500
121 PRINT"#####";FORE=1TOM:PRINT" ";NEXT:FORE=M+1TOM+10:PRI
NT" ";NEXT:GOTO125
122 GOSUB8500
125 GOSUB9000
130 IFFRTHENGOSUB9500
137 IF(X1ANDY1)OR(X1=0ANDY1=0)THEN180
139 POKEP,32
140 X=X+X1:Y=Y+Y1:IFX>21THENX=X-X1
141 IFX<0THENX=X-X1
142 IFY<6THENY=Y-Y1
143 IFY>21THENY=Y-Y1
145 P=SC+X+Y*22:G=PEEK(P)
160 IFG=2THENS=S+INT((Y-2)/5)*5
170 CK=CH(X1+1,Y1+1):IFCK<9THENCH=CK
175 POKEP,CH:POKEP+30720,1
178 PRINT"#####SCORE", "###"R$:PRINT"#####S,HI
180 FORE=0T05
190 CA=MOX(E,0):CO=MOX(E,1):XM=MOX(E,2):YM=MOX(E,3):NC=MOX(E,4)
195 IFPEEK(SC+XM+YM*22)=16THENPOKESC+XM+YM*22,32:XM=0:YM=0
197 IFXM=0ANDYM=0THEN320

```



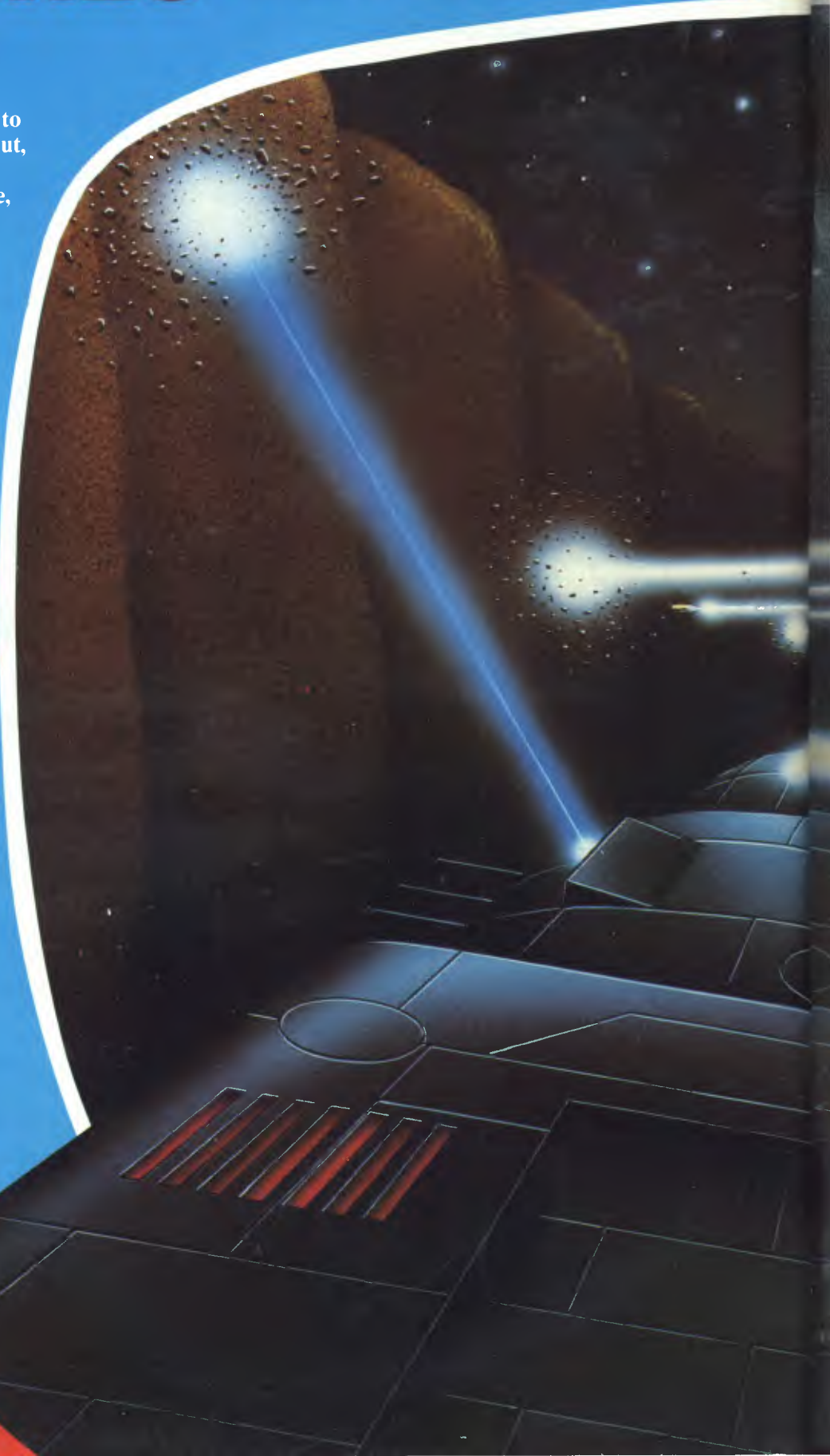
# PC GAMES **BLASTS YOU INTO**

Lots of micro magazines pretend to take computer games seriously. But, seriously, as a person with the perspicacity to read this magazine, you know better.

Yet you still want to play games with your micro, rather than let your micro play games with you. So that's why from mid-July onwards, you can buy a special magazine produced by Computer Publications called PC Games. It's for the micro enthusiast, so it won't drone on about obscure operating systems for business machines you've never heard of, let alone use — PC Games is devoted exclusively to making sure you get the most out of your PC. Every month there will be loads of program listings, tips, competitions, puzzles, reviews of machines and add-ons and by far the largest section ever published in Australia covering the very latest in games releases (ie, what's great and what's . . . well . . . not so great).

No matter which PC you own, PC Games will tell you everything you've ever needed to know about micro entertainment. Make sure you don't miss out. Shoot down to your newsagent on July 19.

**PC GAMES  
ON SALE  
JULY  
19**





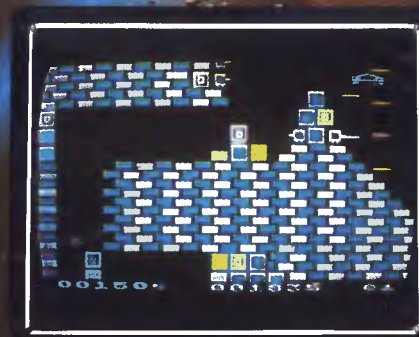
# THE WORLD OF MICRO ENTERTAINMENT



STACKS OF PROGRAM LISTINGS . . .



PCG GAME OF THE MONTH . . .



AND — LOOK OUT FOR VIDEO NASTIES

Another  
COMPUTER PUBLICATIONS  
magazine

# ADVERTISERS INDEX

ACT.....OBC	Compsoft Australia	GS Webber & Associates... 84	New Generation Computer
A&M Computer	(Brisbane)..... 104	High Technology..... 126	Store..... 16
Solutions..... 10,119	Compufurn..... 20	Hi-tech Software..... 68	New Generation Micro
AID Systems..... 84	Computer Edge..... 146,147	Home Computers..... 171	Services..... 125
Applied Technology..... 38,39	Computermax..... 56	IMA Computer Co..... 120	Nissei Sangyo..... 71
Arcom Pacific..... 57,115	Computer Play..... 162,168	Imaging..... 36,40	Osborne Australia..... IFC,1
Ashton Scholastic..... 60	Computer Print &	Intelligence (Aust)..... 50	Ozi Soft..... 83,144
ASP..... 72	Paper Co..... 167	Interfaceware..... 46,47	Perimedia..... 171
Australian Exhibition	Computer Simulation..... 166	JW Ross..... 141	Philitronic..... 123
Services..... 5	Computerware..... 166	KJ Computer Services..... 126	Porchester
Automation Statham..... 88	Corgi Bantam..... 137-140	Lemic Advanced	Computers..... 102,103,157
AWA Computers..... 176	Cubby Hole..... 154	Electronics..... 4	Rexel Wilson Jones..... 97
Bananasoft..... 142	CW Electronics..... 96	Magmedia..... 30,31	Rifa..... 79
Barry Judd..... 142	Cybox Computing..... 149	Mailsoft..... 44	Robs Computer Centre... 22,23
Barson Computers	Database Management	Maxwell Office	Rod Irving..... 131
..... 12,13,150,151 & Insert	Services..... 58	Equipment..... 63,77	Rolvi..... 142
Bayne & Trembath..... 109	Data Parts..... 26,27	Media Copying Services... 165	SCA Software Computers of
BS Microcomp..... 64	Deforest Software..... 155	Megatron Computer	Australia..... 160
BVP..... 118	Dick Smith Electronics..... 112	Industries..... 132	Scientific Devices..... 65
Calcutronic..... 20	Digital Source	Melbourne House..... 74,75	Softpac Enterprises..... 166
Case Communication	International..... 128	Memorex..... 9	Stoneage Computers..... 99
Systems..... 24,25,62	Distributed Data	Micro Allsoft..... 144	System Solutions..... 117
Caulfield Business	Processing..... 43	Microbuff..... 52,98	Technical Book and
Systems..... 155	Dolphin Computers..... 161	Micro Educational..... 90-95	Magazine Co..... 78
Centre Industries..... 163	Eastern Micro	Micromail..... 152	Ted's Computers..... 20
Chambers Computer	Electronics..... 106,107	Micropro Computers..... 124	The Computer Spot..... 141
Services..... 164	Energy Control..... 168	Microprogramming..... 77	The Software House..... 154
Comma Computers..... 53	Future House..... 82	Microtrix..... 184	Uni Co-op Bookshop..... 84
Commodore..... 173	Futuretronics..... 86	Multisoft..... 33	Western Technology..... 4
Compak Computer	Gambit Games..... 109	Myertronix..... 162	Wordworks..... 100
Centre..... 14,15,18,19	Gametronics..... 171	Nashua..... IBC	Y Micro..... 154

## MICROMASTER PC

A new computer designed for the user: high performance with all the storage you will ever need.

The MicroMaster PC is based on a 6MHz Z-80B for the best performance in its class. Floppy disk drives are fast and quiet in operation with varying capacities depending on requirements. The new high drives are supported giving 2.4 Mbytes of storage. Standard 8-inch floppies can also be used for data interchange with other computers. An upgrade to an internal hard disk is easy because the interface is already provided.

Advanced features such as time-of-day clock and an operating system that supports all hardware facilities make this a truly integrated system. A vast range of software is available to suit users' needs.



microtrix




Contact us for further information

**Microtrix Pty. Ltd.**

24 Bridge Street, Eltham 3095 Telephone: (03) 439 5155

Postal Address: P.O. Box 158, Hurstbridge 3099

**DEALER ENQUIRIES  
WELCOME**



When you can't  
afford mistakes.

There really is a difference  
in diskette brands.

It's in the way they are  
made.

Because the computer  
industry cannot afford  
variation in the quality of  
diskettes, at Nashua we  
looked for, and found a  
way to ensure absolute  
consistency.

Here's how we do it.

Quality Circles.

At Nashua we've found  
the best way to attain this  
'consistency' is to ensure  
that at each stage of  
production our diskettes



are statistically checked to  
make sure the quality is  
'built-in' every step of the  
way.

Rather than long  
production lines, we have  
'Quality Circles' – small  
groups of people whose job  
it is to make sure that each  
Nashua diskette is right in  
the first place.

The result is a diskette  
with such consistency, that  
it is chosen by those people  
who can't afford mistakes.

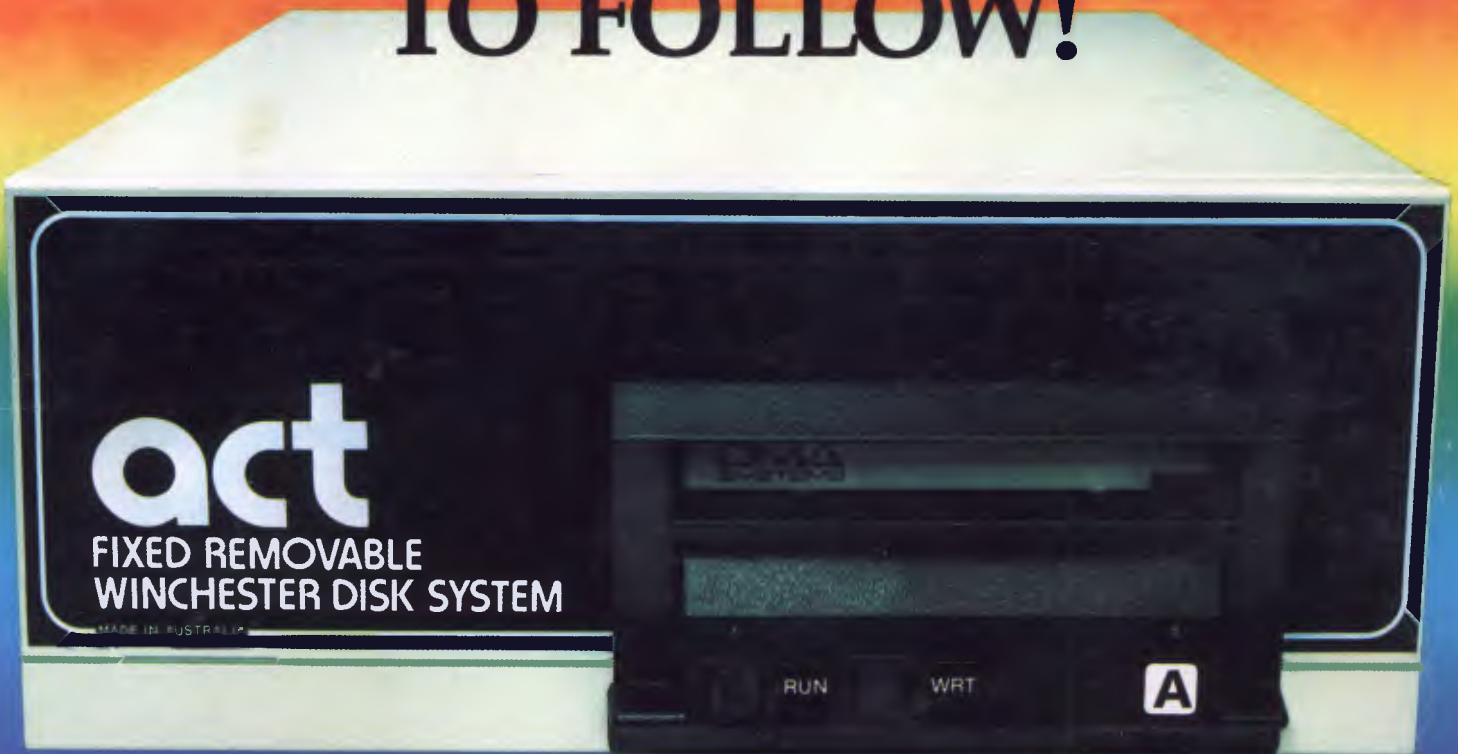
Phone Sydney 958 2044,  
Melbourne 428 0501,  
Brisbane 369 4244,  
Adelaide 42 0021, Perth  
328 1888, Hobart 34 3761,  
Darwin 81 6204.



**Nashua**

There really is a difference.

# ANOTHER HARD ACT TO FOLLOW!



## Act's fixed removable disk systems give you MEGABYTES IN THE PALM OF YOUR HAND

### COMPATABILITY

No matter which micro you have, you can make it ACT. The ACT fixed removable winchester is compatible with most micros —

- APPLE I & II • COLUMBIA P.C.
- CORONA/WORDPLEX • DEC RAINBOW 100 • HEATH/ZENITH H89/Z89 • HITACHI PEACH • IBM P.C. • KAYPRO • MICROBEE
- MORROW MICRO-DECISION • NEC APC • NORTHSTAR ADVANTAGE & HORIZON • OSBORNE I & EXECUTIVE
- SANYO MBC-1000 & 555 • SIGMA/OKI MODELS 20 & 30 • SIRIUS • SUPERBRAIN I/II • TANDY II & III • TIME OFFICE
- TOSHIBA T-300 • XEROX 820
- PANASONIC JB-3001 • AND OTHERS.

### A GREAT STORAGE SYSTEM

Combine the best of two storage systems — the speed and capacity of a hard disk and the mobility of a floppy.

You can backup the days data, remove the disk and store it safely or carry it interstate in your briefcase — a great storage system!

### AUSTRALIAN

You don't have to pay more to buy Australian!

ACT is manufactured in Australia and supported by an Australian organisation committed to backup support and service. It's a professional ACT.

A DIVISION OF AUSTRALIAN PROTECTION INDUSTRIES

# act

Australian Computer and Telecommunications  
75 Willoughby Road, Crows Nest, NSW 2065.  
Telephone 02 439 6300, Telex AA 24816

### DISTRIBUTORS.

Direct Data, 1065 High Street, Armadale, Victoria 3143. Telephone 03 20 6949.

Computer Mart, 356A King William Street, Adelaide, South Australia 5000. Telephone 08 51 5363.