

# ELECTRONICS

## Australia

HiFi, Radio & Computers

FEBRUARY, 1979

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**REVIEWED INSIDE:  
THE APPLE-II COMPUTER**

**FREE LIFTOUT  
MINI-CATALOG**

# ELECTRONICS

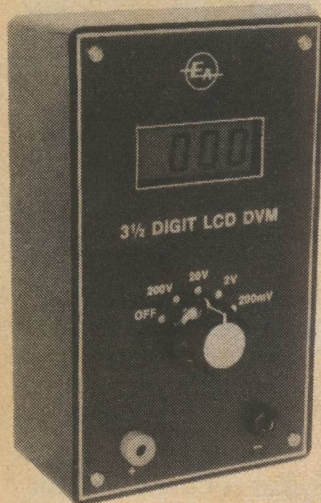
## Australia

VOL. 40 No. 11

FEBRUARY, 1979

Australia's largest selling electronics & hi-fi magazine

STOP PRESS: Latest figures published by the Audit Bureau of Circulations (period April 1-September 30, 1978) show our circulation as in excess of 43,500 — documenting a lead of more than 15,000 over our nearest rival!



Built around a new Intersil evaluation kit, our new 3½-digit DVM features LCD readout, 10M input impedance, and four measuring ranges from 200mV to 200V. The details are on p54.

### 9kHz Whistle Filter . . .

Rid your AM/FM tuner of whistles with our new 9kHz whistle filter design. See page 58 for details.

### On the cover

The colour graphics display of the Apple II microcomputer system featured this month is nicely complemented by pretty Sungravure staffer Sharyn Keeble. For a detailed review of the Apple II by an experienced user, turn to p93. (Apple II system pictured is by courtesy of Computerland Australia.)

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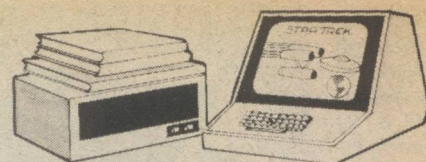
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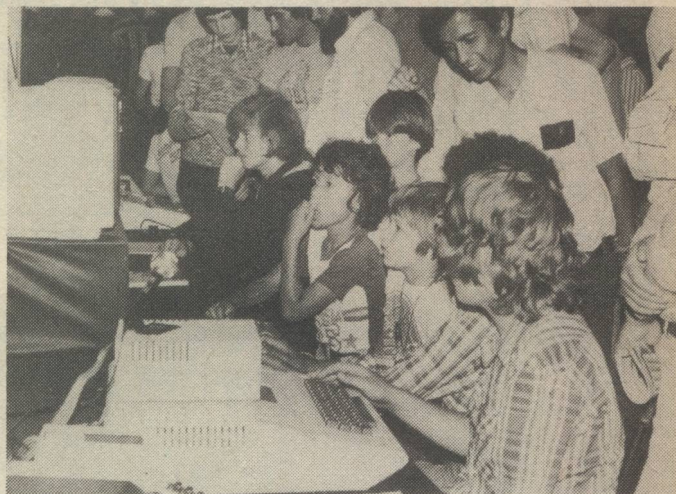
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# Microcomputer News & Products



## Melbourne's computer show



Despite its suburban venue, Melbourne's first Home Computer Show was voted an outstanding success by exhibitors and organisers alike. Held in the Box Hill Town Hall over the weekend December 9-10, the show attracted capacity crowds; at times the front doors had to be shut, to allow those inside to thin out before more were admitted.

When the doors finally shut on the Sunday night, just on 5700 people had paid to see and use the latest in home and small business computers. Although most had come from the Melbourne area, a significant number had travelled much further distances. Some had even flown in from in-

terstate.

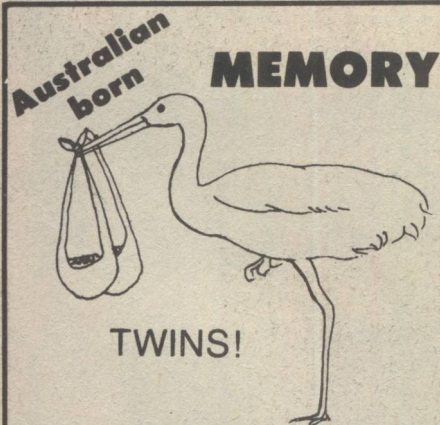
ABOVE LEFT: Near the Futuretronics stand — it was hard to get any closer!  
ABOVE: Young enthusiasts at the Computerland stand.

For virtually all of the weekend crowds were many rows deep around most of the stands. Almost every exhibitor provided visitors with the opportunity to try out equipment for themselves, and young and old alike accepted the challenge. At times the only problem was to prise young enthusiasts away from the terminals, to let others have a try!

A number of the exhibitors were selling direct to the public, and reported healthy sales of items such as video

games and instructional books. Others reported many orders and preliminary inquiries.

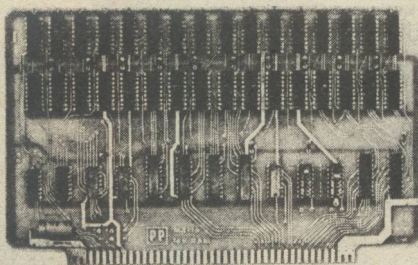
Many of the names on the stands will be well-known to EA readers: SM Electronics; Pennywise Peripherals; AJF Systems and Components; Sontron Instruments/The Byte Shop; ASP Microcomputers; Futuretronics; Abacus Computer Store; Rod Irving Electronics; Strand Electric; Dick Smith Electronics; Electronics Today International; Delta Scientific Electronics; RML Computers; Computerland



**PP Pennywise Peripherals**

19 SUEMAR STREET,  
MULGRAVE, VIC. 3170  
PH. (03) 546 0308

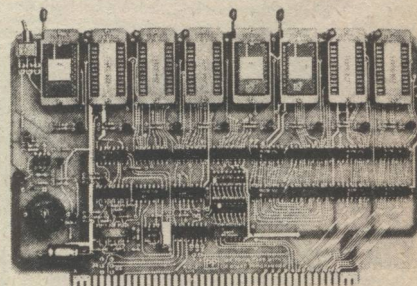
### 16K STATIC RAM



- Uses 2114 1K x 4 STATIC RAMS.
  - Only 1.2 @ 5 V typical for 16K.
  - Motorola Exorciser Bus as on D2.
  - 8K blocks switch addressable.
  - PCB plated through with solder resist.
- |                           |           |
|---------------------------|-----------|
| PCB + support ICs Kit     | \$97.20*  |
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| 16K (450 nS) ass & tested | \$392.40* |
- P&P \$3.00 (add 15% if sales tax applicable)

DEALER ENQUIRIES WELCOME

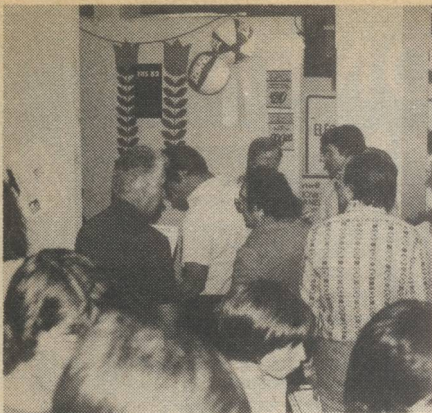
### 16K PROM + PROGRAMMER



- For INTEL 2716/TEXAS 2516 2K x 8.
- Single +5 V supply, 25 V generated.
- Read PROMs and execute programs as for a normal PROM card.
- Program any location with a single store instruction.
- Same Bus, address selection etc as for 16K STATIC RAM CARD.

Ass & tested with ZIF sockets	\$197.30*
Ass & tested with Low IF skts	\$236.20*

2716 PROMs & 2114L RAMs also available.

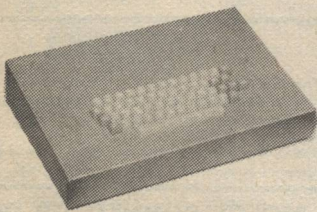


Outside the Tandy TRS-80 stand — again it was hard to get closer!

Australia; South West Electronics; Box Hill Technical College; Honeywell; The Dindema Group; AJ & JW Dicker; Tandy International; Warburton Franki Industries; and Informative Systems.

All told, the show was such a success that the organisers are now giving serious thought to running a similar show in Sydney, early this year.

### Low cost terminal



E & M Electronics has added a new model to its range of VDU products: a low cost interactive teletypewriter replacement which connects to a standard video monitor or TV receiver. Designated the EME-20, the new terminal incorporates the EME-2 module announced in the August 1978 issue. It also features a Hall-effect keyboard for improved reliability.

The EME-20 provides three serial communications options: TTL, 20mA current loop or RS232C, available via a standard 25-way D connector at the rear. Also at the rear are two switches, one selecting baud rate and the other half or full duplex. Baud rates available are 110, 300, 1200 and 9600, although other speeds are also available. A solid state alarm is mounted at the rear of the unit, providing an audible signal in response to the BEL control character.

The terminal is available in both a fully wired and tested version and a kit version. The fully assembled version sells for \$540, with optional RF modulator extra; the kit version (EME-20K) sells for \$450 and includes the modulator components.

Further information is available from E & M Electronics Pty Ltd, 136 Marrickville Road, Marrickville, NSW 2204. Telephone (02) 51 5880.

# Verbatim

## MINI FLEXIBLE DISKS

MD 525\* TRS80 COMPATABLE

\*SPECIFY SECTORING OR SYSTEM

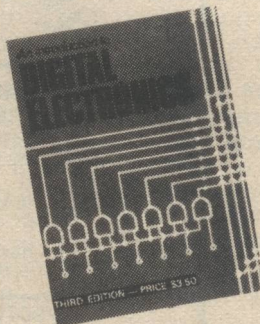
1-9 \$4.25

10up \$4

P&P Incl — add 15% sales tax

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## An introduction to Digital Electronics

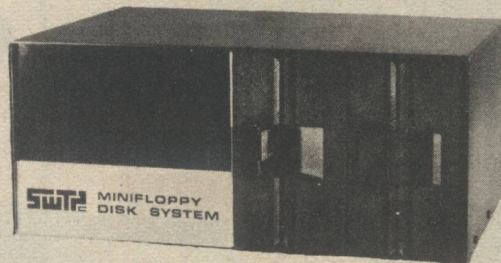
You don't need any previous knowledge of digital electronics — the book starts you right from scratch, and covers all of the basic concepts you need.

Available from "Electronics Australia", PO Box 163 Beaconsfield, NSW 2014. Price \$3.50 plus 60c pack and post. Also from 57-59 Regent St, Sydney.

# MICROCOMPUTER

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*Offers colour graphics, up to 48K of RAM:*

# The Apple-II system

The Apple-II is one of the latest generation of compact desk-top computers. Offering high resolution colour graphics and a variety of other features, it has become very popular in the USA and is collecting quite a following here as well. Here is a review of the Apple-II written by an experienced user.

**by IAN P. PHILLIPS**

Villanova College, PO Box 231, Coorparoo 4151.

There I was with several thousand dollars burning a hole in my pocket. I knew I had to buy three small computers, but what kind should I buy?

Much of the money was provided by a grant under the Special Projects Program of the Schools Commission for me to do development work in CAI (Computer-Assisted Instruction). The fact that I was using taxpayers' money was itself a heavy responsibility. I could not afford to be wrong.

I had another reason for not wanting to be wrong. For several years I had been sure that computers could be used as great instructional media. I didn't really want to teach students about computers, but rather to use computers to help students learn about English, chemistry, etc.

The machines had to be reliable, easy to operate, easy to expand. They had to be disarmingly simple in appearance and rugged enough to withstand the press of young, excited fingers. Repair facilities has to be readily available.

It was after I had actually ordered the Apples that I began to get the jitters. How could I have been so silly as not to order an S-100 machine? But I calmed my fears with soothing philosophical reveries about the precariousness of human existence, about the nature of judgement itself and about Apples.

The Apple-II Computer is, as it turns out, a very simple machine. It is a single-board computer based on the 6502 microprocessor. On that board is the 6502 and supporting circuits, 8k of ROM and sockets for 4k more, sockets for up to 48k RAM, complete video circuitry including two kinds of colour graphics, audiocassette interface, a two-inch speaker, a socket to accept the keyboard cable and a "Game I/O"

*Here is the Apple-II together with optional colour TV receiver, floppy disc drive and video game controls. (Pictured by courtesy Computerland Australia).*

socket. Also on the board is a "mother-board" section for the 50-line Apple-bus with eight connectors soldered in.

The case includes this main board together with a keyboard and a power supply. In Australia, the machine comes with a 240V power supply and with an extra board which converts NTSC colour to PAL colour. I bought our machines with 16k of RAM installed, and I could not recommend less.

The video output is uppercase only in 24 lines of 40 characters. In graphics mode you can have a grid of 40 x 40 little squares, each one being able to be set to any of 16 colours. Below this grid remain four lines of ordinary text display. In high resolution graphics mode

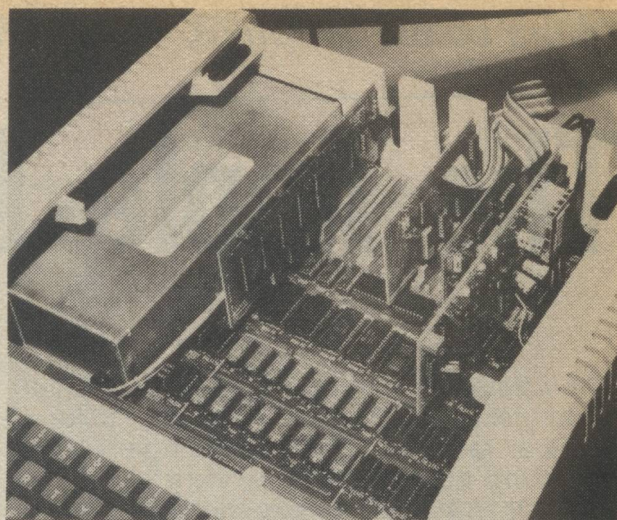
you can have a grid of 280 x 160 points with four lines of ordinary text display.

I have been disappointed with the RF output and must recommend that video monitor be used. I believe that the colour is of no great value for anything except games, but that the high resolution graphics does have great potential. Apple Computer Inc is certainly doing a great deal to help simplify the difficult task of programming in graphics. Their latest version of BASIC allows such a statement as HPlot 1,49 to 200,142 which plots a line joining the two points.

The keyboard is sturdy and well-constructed. However, the RESET switch is a key on the keyboard and it is adjacent to the RETURN key. Things have a habit of coming to a grinding halt at precisely the wrong moment because the student pressed RESET when he meant to press RETURN. It is such a poor design feature that I have at last decided to "do a hack" and shift the RESET key.

The audio-cassette interface at 1500 bits per second is surprisingly fast and surprisingly reliable. If you are very





*In the picture at left, the attractive young lady is the only item not available in an Apple system! Above is a view inside the Apple itself. (Courtesy Computerland).*

careful about using the digital counter on the recorder, there should be no problems. I have students as young as 10 years old using the machines, and they can handle the cassette interface well. It is certainly the least convenient part of the system — but that is true for all computers of this class. We are waiting for the good fairy to provide discs.

The Game I/O connector is a 16-pin IC socket which provides four TTL lines out, three TTL lines in, a strobe, +5V supply and lines for four pots. It is one of the best features of the Apple. It is therefore a shame that it is so poorly located. It is virtually inaccessible if you have boards plugged into nearby connectors on the motherboard.

There are a number of plug-in peripheral boards already available for the Apple. The NTSC-PAL board comes as standard in Australia. There is a wire-wrap prototyping or "hobby" board available from Apple for less than \$30. It looks like good value for anyone able to deal with hardware innovation.

There are two other boards available from Apple — a parallel printer interface and a 300 baud serial interface. They are particularly flexible and well designed boards, and very easy to interface to your software. But to my mind they are ridiculously overpriced at more than \$200 each. Happily there are independent manufacturers offering parallel and serial boards at very much cheaper prices. These do not offer quite the same ease of use as the boards manufactured by Apple, but the savings are considerable.

Another board available from an independent manufacturer is one that enables remote control of electrical devices by sending signals along the AC power line. Still another board enables the programming of 2716 EPROMs.

These EPROMs can then, with an adapter, be plugged into the empty ROM sockets on the main board or into the sockets of Apple's own ROM/PROM board.

The Apple-II has considerable and useful software. The on-board ROM contains a cut-down BASIC, and a powerful monitor. Integer-BASIC is a very convenient piece of software, although limited to 16-bit integer arithmetic. In many other respects it is an improvement on standard BASIC. It allows variable names up to 100 characters long. It allows multi-statement lines, it has strings and it has good debugging facilities. Its most convenient feature is that it is there when you power-up, and no glitch can overwrite even one bit of it.

Another version of BASIC, called APPLESOFT, comes on cassette. It occupies 10k of RAM and is the 6502 version of Microsoft BASIC, also known as Altair BASIC. Apple have added extensions, particularly in the area of graphics. It is a very good extended version of the language, with 9-digit precision. It is now available on a plug-in ROM board for \$120 (not bad for 10k!). We now have just one of these boards. It is great — when we get rich, we'll buy two more.

The on-board ROM includes a 2k monitor, plus a "mini-assembler". The monitor allows for examining and changing any memory location. You can move a block in memory, verify a block, read and write cassettes, trace and single step any program. You can set input/output ports, set normal or inverse video, and do hex arithmetic. The mini-assembler and dis-assembler are limited in scope, but very adequate for a surprisingly large number of purposes.

The Apple-II is, then, a very im-

pressive machine, one well-suited to being used in a CAI project. Our progress here is very slow, but that has more to do with the nature of the institutional process than with the Apple. My principal task is to persuade teachers with no knowledge of or interest in computers that such machines can be very useful tools. To this end, I have just completed a software package for the Apple which will enable the most inexperienced person to write quite powerful tutorials.

While the Apple-II is a great machine, life is never without its upsets. Our first one developed a puzzling intermittent fault. Our Sydney supplier, Electronic Concepts (otherwise known as Computerland) returned it to us early in June, unable to find the fault. Meanwhile we procured two more Apples from them, one of which never operated owing to a faulty IC. This machine was instantly replaced. The first computer was still causing problems and Electronic Concepts replaced it at the end of July.

I would be surprised if other purchasers of the Apple-II had as much bad luck as we had. But our experience would make me very wary of buying from anyone but a thoroughly reputable dealer with good repair facilities and plenty of stock.

What about those early jitters I had? Well, the Apple-II is still not S-100. Not only do I not have the jitters about that, but I now cannot remember what was supposed to be so great about S-100.

The best feature of the Apple-II is that it is a single-board machine and thus has greater inherent reliability. I love the BASIC-in-ROM, and the graphics facilities are superb. The Apple-II is not without flaws and it is not as cheap as the PET, but it is available off the shelf now and it is a very good computer. I wish we had a dozen; maybe if that good fairy. . . .