

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

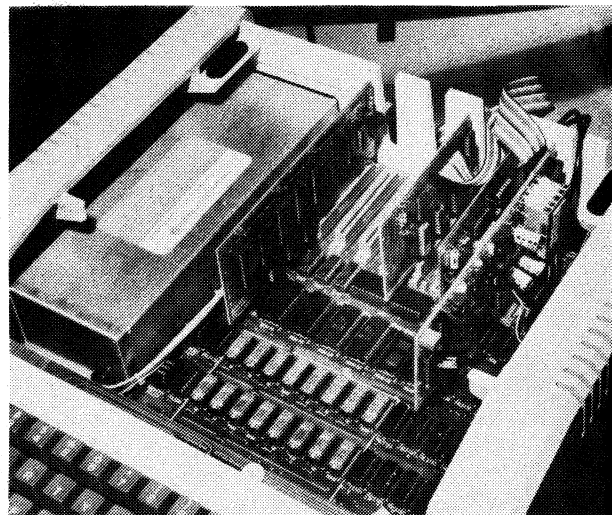
you can have a grid of 280 x 160 points with four lines of ordinary text display.

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 H PLOT 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. . . .



Sorry Mal...

Life is meant to be easy
... un-complicate your life,
buy an 'Apple' today.

By the way

Dick

— Apple II
needs no comparison —
try these features
for magic (not sorcery).

THE 16K APPLE II PLUS

— 'READY FOR THE FULL U.C.S.D.
PASCAL FIRMWARE CARD'

AT OUR LOW PRICE

\$1595.00 TAX PAID

★ 14 'GENERAL' B/W MONITOR \$149.00

★ 16K MEMORY EXPANSION \$154.00

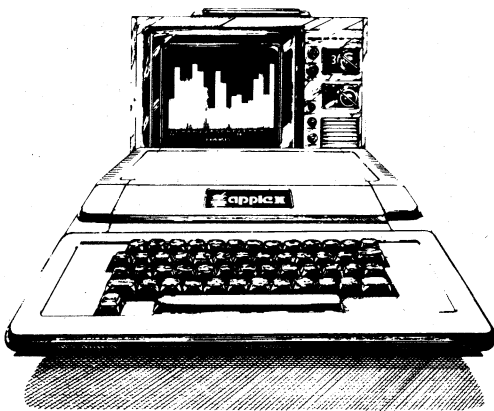
★ ALL OTHER PERIPHERALS AND SOFTWARE

— CONSULT OUR PRICE LISTS —

apple II PLUS

— Standard features as listed

- ★ 16K User RAM (on board expandable to 48K)
- ★ 12K ROM (2K monitor plus 10K floating point extended basic including graphic commands — the famous 'Applesoft')
- ★ 230/50v switching power supply and Eurapple Pal Conversion (Pal Colour Card for easy connection to your domestic colour TV optional)
- ★ Low resolution graphics **plus** 16 bright colours
- ★ High resolution graphics **plus** 6 bright colours
- ★ 40 x 40 or 192 x 280 pixels for the best graphics in the micro business
- ★ On board connector for 2 games paddles to put life in your simulations (joystick optional)
- ★ On board speaker, software addressable to support music and sound
- ★ Mixed upper and lower case characters with graphics (software generated)
- ★ And more



 **apple computer**
Authorized Dealer

AND

ComputerLand®

It's your move — grab a piece of the future — drop in at the Computerland near you and sink your teeth into an 'Apple' — Computerland

Computerland — Sydney 29 3753, Adelaide 223 5083, Melbourne 62 5581, Perth 321 4671, Brisbane 221 9777, Hobart Management Technology 34 4522