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# MICROCOMPUTERS IN EDUCATION

The Ministry of Education in Victoria (and other States) has recommended a number of PCs for classroom use giving teachers guidelines to follow.

Mark Kosten reports on four of the contenders . . .

In Victoria, four main computers are recommended by the Ministry of Education: the Apple IIe, BBC Master series, IBM IX and Microbee Premium. There are four others noted as being suitable for more advanced computing: the Atari 1040ST, Apple IIGS, Commodore Amiga and the Apple Macintosh. Also, a version of Logo was tested on each to see how they handle this simple and common graphics language.

## Apple IIe

How many people have not heard of the Apple computer, the machine that really started the whole PC revolution? Until recently the Apple II was the mainstay of the line. Amazingly, the II series did not alter significantly from when it was introduced in 1977 until 1986. There were the Plus, Europlus (with PAL card) and IIe (with a redesigned motherboard and more memory). The IIC model is almost aberrant in this line of computers, being portable and without option slots.

Most recently the IIGS was unveiled, upgrading the Apple II series significantly.

The Apple IIe embodies quite an old architecture in the 8-bit 65C02 processor running at 1 MHz. Nevertheless, in these days of 32-bit superminis, I am continually amazed at how much can be squeezed out of so small and ancient a microprocessor.

Arguably, the great success of the Apple IIe is its open architecture. There are

seven slots inside the computer that allow the addition of a multitude of peripherals, such as co-processors, parallel and serial ports, and modems. Over the years the number of peripherals that work with the Apple IIe has grown very large, and many of them are education orientated. Its proven track record and availability of a huge amount of software and peripheral hardware mean that a school buying into this system is unlikely to make a mistake.

The Apple IIe system reviewed came with the now standard 80 column card and added memory to make a total of 128 kilobytes. It also had, as standard, a super serial card (RS232 port) and a disk drive controller card. The unit had a colour monitor and two 5 1/4 inch disk drives. The keyboard is miles ahead of the original mushy one, and includes a numeric keypad.

Connections are simple as the plugs are all different, so it is difficult to go wrong. Power for the disk drives comes from the system unit, so at most two power cables are necessary, one for the system unit and

the other for the monitor. I do not like the system-on switch which is hidden in the back next to the power cable.

A colour monitor was a long time coming for the IIe. The IIe could always generate colour but its quite good resolution was wasted on low resolution televisions. The supplied unit is very nice, making readable 80 column monochrome text.

Originally, the Apple IIe only had its operating system, called Applesoft, in ROM. It is an extended Basic that allows saving of programs onto a cassette player. Later, when disk drives became available, a DOS was released. It resides on a disk and is loaded during booting up. This DOS was finally upgraded to version 3.3 and was later changed significantly with the introduction of ProDOS.

ProDOS is a hierarchical filing system; it can divide a disk into separate directories that are linked in a tree structure, where the root is the top directory, and the branches sub-directories. This system is necessary when disk capacities become large and a single directory is not able to hold enough files.

Software is supplied on one disk, ProDOS on one side and System Utilities on the other. The ProDOS side is for systems with less than 128 Kbyte of memory (such as older Apple IIs). The System Utilities side is for Apples with 128 Kbyte or more. They are basically the same, except the Utilities disk has more features and Help.

It should be noted that to move from older DOS 3.3 disks to ProDOS it is necessary to physically copy files off one disk and onto another. If you do not have enough memory you need two disk drives. Also, binary files and random access Basic generated files will not copy properly. DOS 3.3 Basic programs will probably have to be altered to work on ProDOS since it is a new operating system with different characteristics.

It is quite easy to get the system up and running, although the colour monitor is a

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beast, weighing much more than the rest combined. Fortunately, the top of the system unit is very hard plastic and able to cope — even if my arms couldn't! The door on the disk drive are also very poor, requiring some manipulation to open and close them.

The Apple IIe is not ergonomic nor is it particularly fast. Its builtin graphics and sound are not exemplary. It is also more expensive than its immediate competitors. However, it does have mountains of software and hardware peripherals to overcome some of these limitations. The solution to this problem is clear — perhaps its time the IIe is put to rest and thus allow the Apple IIGS to become the mainstay?

### Product Details

Product: Apple IIe  
 From: Apple Computer Australia  
 16 Rodborough Rd,  
 Frenchs Forest 2086 NSW  
 (02) 452 8000  
 Price: \$1495 for Apple IIe with mono monitor, 5¼ inch Unidisk, Apple Logo and AppleWorks.



## IBM JX

The IBM JX is rather unusual as far as the IBM product line is concerned. It was made in Japan for the Asian and Australian markets *only* and significantly differs from other IBM PCs in appearance and functionality. The JX runs its own version of PC-DOS using 3½ inch disks and a slightly different colour graphics standard. The keyboard is very different. Indeed the standard version is a bit of a disaster in that a couple of keys from the IBM PC keypad are missing.

A better than average, medium resolution colour screen is standard on the JX. The colour graphics card is an improvement on the standard CGA card of the IBM PC in that it allows for 16 foreground colours, compared with 4 on a PC. The builtin tone generator has three voices (compared with one on a PC) which may be programmed in parallel to produce three-part harmony. An enhanced version of Basica (which resides in ROM) allows full access to the improved colour graphics and tone generation.

The JX uses the 8088 processor, but the motherboard is completely different to the IBM PC. Surface mount technology

