



# Apple IIe

**Many wonder at its longevity, but the Apple II is still amongst the most versatile of small microcomputers, and has more add-ons available than any other**

In many ways the Apple II is the machine that started everything, because although it wasn't the first microcomputer available, it was as a result of the release of this machine that facilities such as colour, high resolution graphics and built-in sound became accessible to the home computer user. However, although these features are important, the really significant features of the Apple II, which made (and continue to make) the machine so phenomenally popular, are much less obvious at first glance.

The most apparent feature was the standard of the documentation, which deliberately set out to make every aspect of the machine as clear as possible to its users. This was in direct contradiction to the attitude of the few other companies in the field at the time, who maintained (and in some cases still do maintain) a strict silence about the inside of their products. As a direct result of this freely accessible information, the other significant feature of the Apple II became well known.

This second facility was the row of 'expansion connectors' that occupy the rear section of the machine's motherboard. It is the flexibility of organisation of these slots that has made possible the wide range of add-on products that are available for the machine. This diversity has in turn led to the use of the Apple II in a multitude of different ways.

Many computers have some form of expansion connector, of course, but generally only one or two, and these often appear as a fairly small area of memory. The Apple has seven on the latest version (the IIe) and eight on the earlier models (II and II+), each of which appears to the CPU as two sections of memory (one quite small, and the other a very useful 2 Kbytes).

Consequently, a peripheral card that is plugged into the Apple can have 2,048 bytes of controlling program on board. This makes using such a card very simple, since there is no need to link special driver programs or re-write the operating system.

A wide selection of cards is now available for the Apple II, ranging from relatively simple input/output interfaces to very advanced cards, such as light pens and large RAM cards that can expand the memory to a Megabyte or more. However, because the 6502 can address only 64 Kbytes, the memory is arranged in 64 Kbyte 'banks', one of which is selected at a time. Complete computers with advanced 16- or 32-bit CPU chips can even

be plugged in to run in parallel with the machine's 6502 processor, and can create a system that has as much (or more) computing power than a mini-computer.

Naturally, a very large range of software has been developed to make use of this wealth of hardware, and now the library of Apple programs is easily the world's largest — even bigger than the list of programs that use the standard CP/M operating system. In fact, the CP/M library can be included on the Apple's list, because even though the Apple has a 6502 processor, it can run CP/M programs with the help of one of the most popular add-ons — a Z80 card. (CP/M will run only on a Z80 microprocessor). Once one of these has been plugged into an Apple slot, the machine will function as a perfectly normal CP/M computer.

Although quite small and unassuming in appearance, the Apple II is a machine that tends to be the subject of superlatives. It is the home computer with more different operating systems (11), languages (at least 27), and text editors (a dozen or more) than any other machine.

The story of the Apple II is far from completed; in 1984 an entirely new operating system for the machine was released. It was given the name ProDOS and incorporated many features that made the Apple II's performance surpass in some respects that of more expensive systems.

## Apple Keyboard

The keyboard has been designed to the highest standards, with word processing in mind. The keys are properly sculpted, and the cross-section forms an arc for ease of use. The two keys marked with the Apple logo on either side of the space bar are control keys used in applications programs. At first sight, the Reset key might seem to be unfortunately close to the Delete key. However, to reset the computer, it is necessary to hold down CTRL and then press Reset.



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