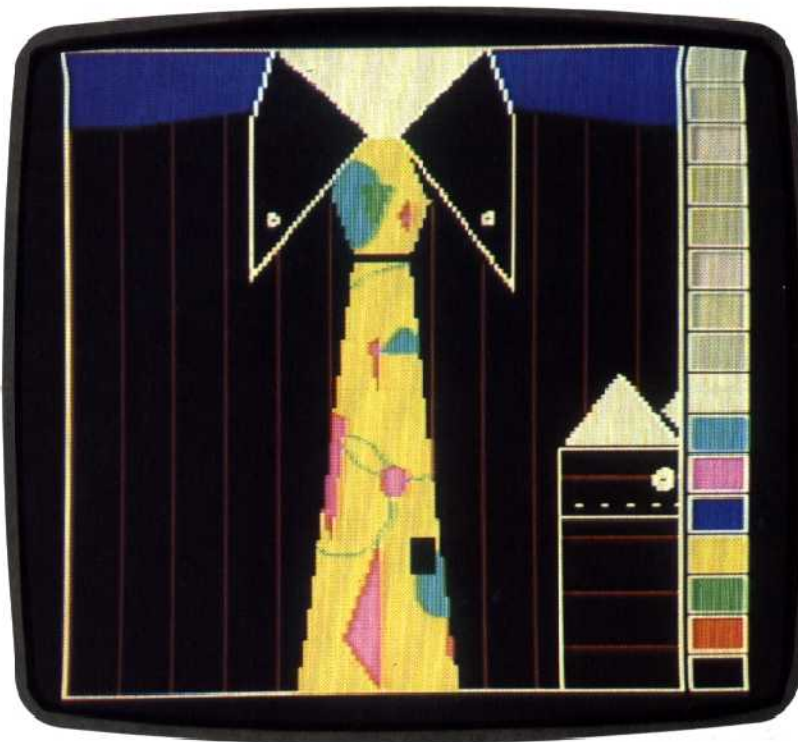


The Electronic Artist

Sophisticated or simple, computer images are all made up of thousands of tiny dots — and the computer has to remember the colour and brightness of every one

Micro Painting

Painting pictures with a microcomputer is easy with graphics software. These programs allow complex pictures to be drawn using commands typed in at the keyboard. The starting point is usually to position straight lines on the screen. Circles, triangles, squares and other pre-defined shapes can be added. Colour can be used both for lines and for whole areas of the screen. Areas can be painted by selecting a colour, either from a palette displayed on the screen or through the keyboard. The area enclosed by its boundary lines is automatically coloured. In some programs a 'brush' can be moved across the screen like a cursor. The large photograph shows the result of this 'building' process. (The software was 'Graphkey' on a BBC Model B)



You're skimming the rooftops in an aeroplane, one engine dead, a skyscraper looming in front of you — and the runway you're trying desperately to land on already has a plane burning in the middle of it. There it is in front of you on the television screen. That is just one form of computer graphics.

With educational programs, such as those designed to teach spelling or arithmetic skills to children, it is clear that unless a program produces an interesting visual display, the attention of young people will be unlikely to be held for long.

Business users of microcomputers will probably be dealing primarily with numbers representing amounts of money that have been received or spent, the stock held of particular items and so on. But this kind of information is far more readily understood and interpreted when shown pictorially. The computer's ability to 're-draw' a picture rapidly, so as to incorporate new information, different alternatives, and so on, and to produce 'hard' (printed) copies when required is also of immense value in many business applications.

The Computer's Canvas

How does a computer create pictures? To answer this question let us first look at the 'canvas' on which the computer works. A microcomputer produces images on its display screen by illuminating

or 'turning on' one or several dots at any of a number of positions on the screen. These dots are arranged in rows across the screen and in columns down it, so the location of any dot can be given by its position in row and column. Specific images (both pictures and print) are produced by the illumination of certain dots while the others remain unlit. This is true not only for monochrome screens, but for colour displays too. Here pictures are produced as a result of dots being made to assume the appropriate colours.

To display a single letter or number, the computer uses a rectangular array of dots. This array is known as a 'dot matrix'. On a typical microcomputer this is likely to consist of a block of eight rows each containing eight dots.

The number of dots on the screen is not the same for every microcomputer, but a fairly typical grid would consist of 192 rows each containing 256 dots — in other words 192 rows and 256 columns.

It is clear that the more dots on the microcomputer's display screen, the more detailed the images can become. The degree of screen detail that can be shown when displaying graphics is known as *resolution*. A computer that can display 192 rows each with 256 dots is said to have a resolution of 256 x 192. The higher the resolution — that is, the more dots that can be placed on the screen — the less 'grainy' the image.