

# Tracing Paper

**Images drawn on paper can be transferred into your computer by means of a digitiser or graphics tablet**

Among the most powerful features found in the current generation of home computers are the graphics capabilities. With a few simple commands, designs and patterns can be created and colours changed. All this requires programming knowledge, as it is not yet possible to create an image on paper first and load it into the computer as a completed work. Light pens

**Cursor**  
This device is moved by hand to trace over the image that is being digitised

(see page 156) facilitate the editing and manipulation of an image once it is on the screen, but they cannot be used to copy a picture from a sheet of paper.

Designers of cars, aeroplanes and micro-processors as well as interior decorators, landscape gardeners and fashion designers can all benefit from a computer graphics system. Once the design is safely stored in the computer's memory, additions and alterations can be tried without wasting valuable raw materials. So what is needed is an input device that can translate the lines and curves of the drawing or design into a language that a computer can understand.

In the professional market the 'graphics tablet' has been around for almost as long as the computer. However, low-cost alternatives for the home user have only recently become available. High-precision graphics tablets, also known as 'digitisers' because they convert analogue shapes and images to digital information, use a wide variety of techniques to produce the required information. The most accurate systems can resolve an image to around 1/4mm (1/100th of an inch) — sufficiently accurate for engineers and draughtsmen. All digitisers feature a flat baseboard, onto which the image drawn or painted on paper is laid. A stylus, which may be an ordinary pen or a sophisticated electronic device, is then traced over the image. The position of the stylus is detected by the digitiser and transmitted as a changing pair of co-ordinates to the computer.

The two most accurate systems — magnetic and

**Cross-hairs**  
Cross-hairs and a magnifying glass help to position the cursor more accurately. Resolution to within 0.25mm is by no means uncommon

**Data Entry Buttons**  
Most cursors feature more than one push button — the means by which the operator can indicate that a particular point needs to be recorded. In an alternative mode, the digitiser will take continuous readings as the cursor is moved

**Emitting Coil**  
A high-frequency signal is given out by this coil and is picked up by the grid

capacitive — work by having a series of wire grids embedded in the baseboard of the tablet. In the magnetic system the stylus consists of a small magnifying glass with cross-hairs that is traced over the image. Surrounding the glass is a coil of wire that transmits a low-power, high-frequency signal. The signal is detected by the grids in the baseboard and provides a direct measure of the position of the stylus. The capacitive system works the other way around: a series of coded pulses is fed into a grid of wires and the signal is picked up by the stylus.

An alternative to these is the acoustic system. The stylus is electrostatically charged, and when touched to the baseboard, gives off a tiny spark. The time taken, for the acoustic wave created by the spark to reach two microphones, gives a measure of the stylus position. Amongst other things, this offers the possibility of digitising the third dimensions, by means of a signal passing

**Interface**  
Digitisers are usually interfaced to a computer by a standard serial or parallel port

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