write TO YOUR SCREEN

Say 'the pen is mightier than the mouse' and designers world-wide are bound to agree. Here is how technology makes the pen and the graphics tablet work together

Graphics designers all agree that when it comes to drawing, a mouse is a squeak of a tool. A digitiser is the preferred choice instead. Also called a graphics tablet, a digitiser is very handy and offers much more control because of its similarity to writing on paper.

A pointing device—usually a stylus (a pen-shaped device) or a puck—can be moved over the digitising pad to draw. Also known as a cursor or tracer, the puck is best used for tracing, while the stylus fits in almost anywhere.

In spite of its close resemblance to a mouse, a puck has few components of one. There is hardly any circuitry, no ball and its main aim is to offer comfort while drawing. The number of buttons on a puck ranges from 2 to 16. These buttons are programmable—they don't do any function by themselves, they instead simply send out a code that the software recognises and interprets.

A stylus has a minimum of one button located at its tip called the *tip-switch*. There usually is another switch along the side of the barrel, positioned such that it won't be pressed accidentally when using the stylus, but will be easy to reach when needed. Some styli come with ink cartridges and allow you to draw on paper what you draw on the screen. These styli can also carry an inkless dummy cartridge for times when drawing on paper is not necessary.

The new development in stylus technology though, is the pressure sensitive tip. This tip not only recognises pressure, it also measures it. A digital value corresponding to the pressure is sent back to the computer. The resolution range of this digital value varies and is typically between 64 and 256. This pressure sensitive capability is best used with paint software that can use it to simulate a real-life brush on screen.

However, from the viewpoint of usefulness and versatility, the most important distinguishing point between different pointing devices is the cord (or

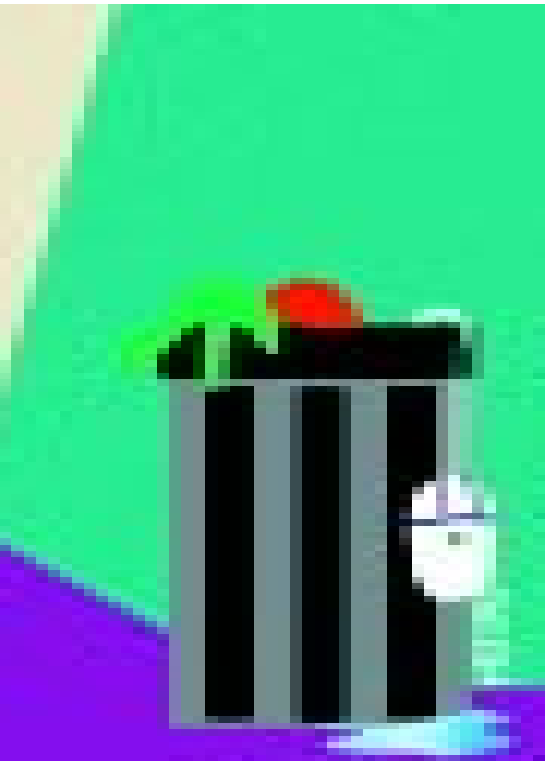
the lack of it). A cordless pointing device offers you the freedom of use without the hassle of connecting cords that come in the way of work. This setup makes it easy to switch between different models of styli or between a stylus and a puck. Until recently, most cordless styli required a power cell, which made them thick and heavy. Newer ones use a different technology that does away with this power source.

Resolution and Accuracy

Most digitisers claim to have an accuracy of about 1000 points per inch but are actually accurate to only about 100 points. Even at that degree, they far exceed human capabilities.

Speed & Size

The rate at which a digitiser can transmit data back to the computer varies. A lower rate of transfer results in jerky moves, but this is not a problem when the digitiser is being used for tracing, and if accompanied by a steady hand.



Size

The bigger the tablet, the more comfortable your working area will be. But though a larger digitiser is manna for graphics designers, it is more expensive and many a times does not even translate to a larger working area. Also regardless of the size, the resolution available and the technology used remain the same.

Most drivers and application software allow you to resize the working area of a tablet. The digitiser driver will normally allow you to define the area of the tablet that maps on to the monitor. A CAD application on the other hand, will allow you to define the area of the screen that the tablet is bound to. However, the comfort of working with a larger tablet compensates for these drawbacks.

Standards

A very pertinent detail that has to be considered before committing yourself to a digitiser. There is no point in buying a tablet that will not work with your choice of software. Thankfully though, most digitisers offer compatibility with the more popular models, and at the very lowest level, with the Microsoft mouse.

Technology

Tablets work on three technologies:

Electromagnetic technology: Most tablets use this technology. Hidden just under the surface of the tablet is a wire grid. The digitiser's circuitry sets up an electromagnetic field that sweeps across the grid. The pointing device acts as an antenna, receiving signals from the grid. By carefully comparing the signal reception against the sweep of the grid signal, the position of the pointer is calculated. This position is then transmitted to the computer.

Resistive technology: The wire grid is replaced with a thin coating of a conductive material. A voltage gradient is created across this film, which induces another detectable voltage inside the pointer device. The voltage on the film is pulsed in succession from the four edges of the tablet. The ratios of the induced voltages in the pointer are measured to calculate the position of the pointer. The height of the pointer above the tablet does not have any relevance here because this system works on the basis of ratios, not absolute distance.

Magneto-Strictive technology: In this method the energy induced in resonance circuits is measured to give the correct position of the pointer. The tablet's electromagnetic field excites an LC circuit (a tuned circuit combining an inductive coil and a capacitor) in the pointing device. The inductive coil also serves one more purpose: that of electrically coupling the pointing device with the tablet. When the LC circuit in the pointer discharges, the resulting signal flowing through its coil is picked up by a matrix of flat-wound coils in the tablet. The strength of the signals picked up by the tablet's coils helps determine the position of the pointing device.

Pressing a button alters the tuning of the LC network, and the resulting change in the phase angle is detected. Different buttons may alter the tuning differently.

Because the LC circuit in the pointer is passive, no power source is required for its operation. The coils in the pointer and those in the tablet need not be connected to each other either. This means that the pointing device, be it a stylus or a puck, is physically independent of the digitiser and does not require an internal power source.

The finishing stroke

Expensive technology and cumbersome cords made graphics tablets elusive for long. However, digitisers are now as elegant to use as real pens, and fit your pockets too.

Digitisers also make excellent replacements for your desktop mouse, so in a few years' time we can expect to see computers shipping with a digitiser as a standard accessory.

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