wacom Technology Paper BAMBOO™

How the Wacom cordless, batteryless pen works

The Bamboo Pen looks and feels just like a normal pen and does not contain batteries, cables or magnets, which have to be renewed. Instead it utilises the electromagnetic resonance technology developed by Wacom, in which the tablet and pen communicate with each other via electromagnetic waves. Horizontal and vertical antennas under the tablet surface alternate between transmit and receive mode every 20 microseconds.

In transmit mode, an electromagnetic signal activates an oscillating circuit consisting of a coil and capacitor inside the pen. The oscillating circuit in the pen tip supplies power to the pen, while also functioning as a transmitter. The information from the pressure sensor and from the side switch is first of all transmitted to the chip via the modulator. Then the information is sent to the modulator, which in turn transmits a signal to the oscillating circuit in the pen tip. In receive mode the signal is then sent to the tablet. The antennas in the tablet receive the oscillation energy that is generated by the oscillating circuit enabling the position, pressure and other information to be determined.

A simple analogy for this patented technology is that of a piano tuner using a tuning fork to tune a piano. As the tuning fork is brought into proximity of the appropriate vibrating piano string (if the fork is of the same frequency) it will begin to borrow energy from the vibrating sting and resonate, generating a tone. In much the same way, as the Bamboo pen comes close to the tablet surface, the coil of the pen begins to resonate, generating its own frequency back to the tablet. When it hears the pen, it tracks the pen's location with unprecedented accuracy. The tablet then sends location and pressure information to the computer along with a signal indicating whether the pen tip or the eraser is being used.