

Western Electric Reports:

Laser drilling. We do it with mirrors.

Thin-film circuit boards in high capacity telephone transmission systems often require hundreds of connections to power and ground sources.

Plated through-holes have proven an efficient way to make these connections. Coated with conducting material, they connect the circuitry carried on one side of a ceramic substrate with power and ground on the other side.

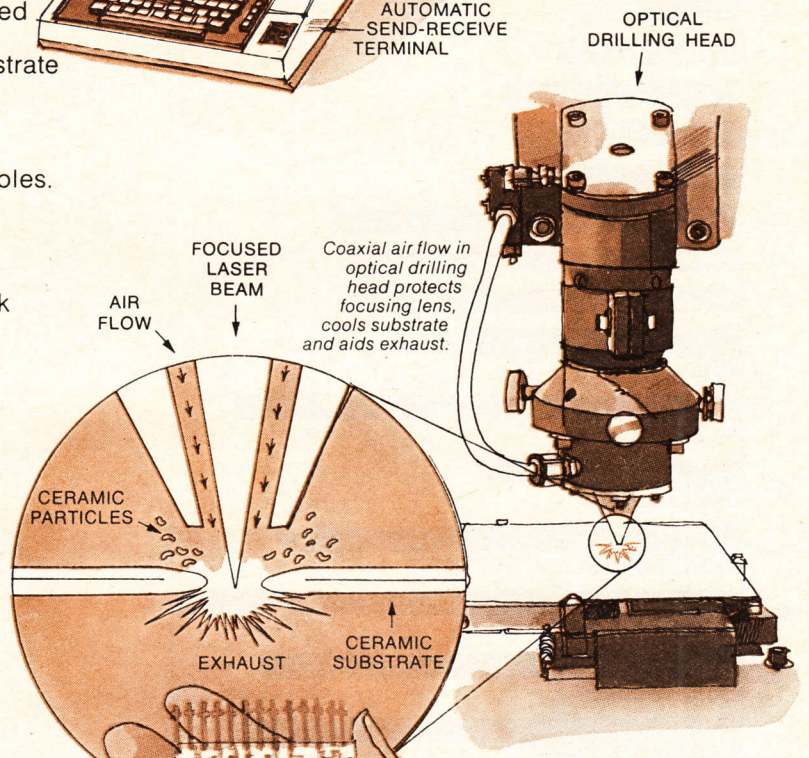
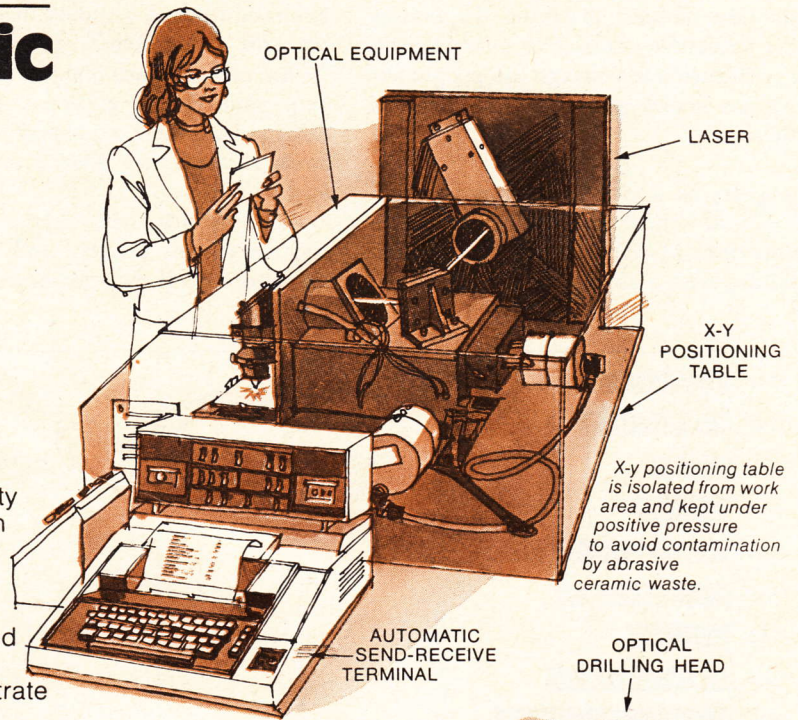
These holes could be punched in the ceramic before it is fired. But shrinkage during firing can move the positions of the holes.

And because of component density, the precise placement of each hole is critical. It can't be more than two mils off.

Engineers at Western Electric's Merrimack Valley Works in Massachusetts recently developed a high-speed method of drilling these holes *after firing* by using a conventional CO₂ laser.

A complex of mirrors on an x-y positioning table is shifted to play the laser beam across a stationary ceramic substrate in a predetermined pattern. The mirrors direct the beam from the laser head enclosure to the positioning table and manipulate it in the x-y axes. An optical drilling head coupled to the table focuses the beam onto the ceramic. The system is controlled by a mini computer coupled with an automatic send-receive terminal. Pattern storage on a cassette tape allows easy changeover and storage.

Benefit: Laser drilling of ceramic substrates after firing has greatly improved positioning accuracy of plated through-holes. And computer controlled laser drilling has doubled the production rate over conventional laser systems — up to five holes a second in closely spaced patterns.



Laser drilled through-holes supply power and ground to active devices on completed hybrid integrated circuit.



Western Electric

We make things that bring people closer.