

STEM Works

Printed Circuit Board (PCB) Laminate

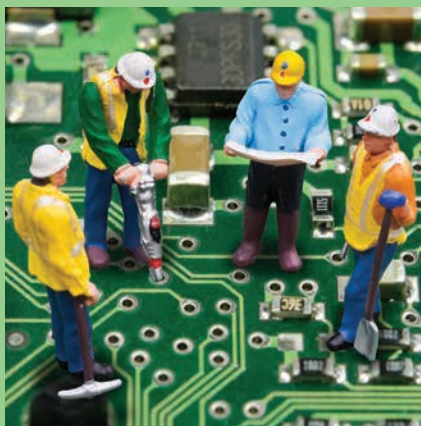
A planar structure composed of thin metallic (electrically conductive) layers bonded to insulating layers, which may be polymer, glass, ceramic or polymer filled with glass or ceramic. The PCB provides CTE-matched mechanical support for mounting electronic components and, when suitably patterned, provides conductive pathways enabling the construction of small, yet complex, reproducible and efficient circuits. The architecture lends itself to the application of high volume photolithographic board processing and pick-and-place circuit assembly for reduced manufacturing costs.

1903 German inventor Albert Hanson describes the concept of multiple-layer flat foil conductors laminated to an insulating board.

1913 A patent for a print-and-etch fabrication method (subtractive process) is granted to Arthur Berry in the U.K.

1918 Max Schoop is awarded a patent in the U.S. for an additive process, a method of flame-spraying metal onto a board through a patterned mask.

1936 Austrian engineer Paul Eisler, considered by some to be the father of the printed circuit – as we know it today – invents the PCB using photolithographic techniques as part of a radio set. This technology is adapted by the U.S. military for the production of anti-aircraft proximity fuses in World War II. The need for robust ordnance fosters the development of ceramic substrates and conductive inks.



April 6, 1938

Polytetrafluoroethylene (PTFE), a revolutionary new thermoplastic polymer, is discovered by Dr. Roy Plunkett at the DuPont Research Laboratories. First generation PCBs for microwave applications are a composite of PTFE and woven glass.

1950s G-10/FR-4 substrate material is introduced. A thermosetting industrial fiberglass composite laminate consisting of continuous filament glass cloth material with an epoxy resin binder has the characteristics of high strength, low moisture absorption, excellent electrical properties and chemical resistance.

1950s & 60s

PCBs are common in consumer electronics; simple single-sided PCBs are the dominant variety and are still in use today.

1970s to present

Multi-layer PCBs are widespread with advancements in isolation techniques and via technology. Since the 1980s, surface-mount construction replaces through-hole for cheaper assembly and smaller, more versatile multi-use circuits. Performance of polymer-based boards is tailored and enhanced, especially at higher frequencies, through the use of low profile ED copper conductors, low loss plating, various polymer chemistries and different fill materials (e.g., glass – random, woven, microsphere; ceramics and fibers).

Sponsored By:



ROGERS
CORPORATION

WWW.ROGERSCORP.COM