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# 1991

## Development of a technique for flip-chip interconnection with the resin substrate

~ Packaging ~

In January 1991, IBM Japan announced a technology to directly mount LSI components by a flip chip connection method on a printed circuit board (PCB) using built-up method capable of forming a high-definition interconnect pattern instead of high cost multilayer ceramic substrate.

By adopting the underfill resin that fills the gap between the directly mounted chip and the substrate, the fatigue failure life of the flip chip soldered connections caused by the difference in coefficient of thermal expansion between the chip and the substrate (chip: 3 ppm /°C, substrate: 17 ppm /°C.) was improved by more than an order of magnitude compared to the previous C4 connection (Controlled Collapse Chip Connection).

The build-up board is designed to have a built-up layer in which epoxy insulation layers and copper wiring layers are sequentially laminated on both sides of a normal printed circuit board as a core, and micro via-holes are opened by lithography process (laser is used later) in the insulation layer , and the upper and lower copper wiring layers are connected.

The figure below in the center shows the cross section of the build-up wiring board, the right side shows flip chip bonding with underfill resin, and the left side shows the design dimension schematics.

