Abstracts

Picosecond imaging circuit analysis of ULSI microprocessors

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Picosecond Imaging Circuit Analysis (PICA) is a high speed backside emission based tool used for timing analysis of ULSI circuits. It was invented at IBM in 1996, and has been used since then to help deliver microprocessors profitably. As a fault localization tool, PICA has been used to find and diagnose stuck at faults, races, shorts, and leaking devices as well as many other failure mechanisms. The combination of timing resolution on the order of 20 ps, and submicron spatial resolution enables the probing of many individual transistors in parallel in complex high speed circuit designs. The timing analysis from PICA can also be used to debug and improve designs while running chips at speed by measuring the timing at which transistors switch, and comparing the results to simulated values. Here we describe the technique as well as demonstrate its use during the debug of an I/O circuit defect found on the IBM System/390 G5 microprocessor.

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