

Technology Profile Fact Sheet

Title: Via Construction to Dampen Cavity Modes in Printed Circuit Boards

Aliases: None

Technical Challenge: Vias are used extensively in printed circuit board (PCB) construction to connect signals from the surface to internal layers and to provide connectivity between layers in the PCB. However, high speed signals that transit through these vias can launch propagating modes in cavities that are created within the PCB. There is very little damping present within the PCB laminate stack to attenuate these modes once they are launched, resulting in noise coupling with other signals that propagate along the vias. Although this drawback can be reduced by using buried vias or by increasing the number of layers for routing, either approach adds considerable expense to the PCB manufacturing process.

Description: This invention constitutes a significant addition to known technology. It modifies the construction of existing vias by addition of a radio frequency (RF) absorbing layer to the copper metallurgy that is currently used to connect different layers. By suitable choice of material thickness and resistivity, these modified vias will absorb RF energy rather than reflecting it, thereby reducing the level of noise coupling within the PCB.

In conventional PCB processing, the PCB laminates are stacked and cured, followed by mechanical drilling to define the through vias. The entire assembly is then immersed into a seed bath, and a uniform layer of copper is plated everywhere. In the proposed modification, the laminate is stacked and drilled as before. However, two additional steps are inserted. The first is a selective deposition of plating of a resistive material, which does not occur on the copper, but does coat all other surfaces. Second, the insulating layer is fortified by exposing the material to oxidation. (If the copper oxidizes also, the copper oxide is easily removed without affecting the insulating layer.) The process flow then continues as in the traditional method.

Demonstration Capability: Not at this time.

Potential Commercial Application(s): This invention is potentially applicable to any manufacturer of digital or analog systems that operate at high rates or frequencies.

Patent Status: A patent application filed has been filed with the USPTO.

Reference Number: 1493