Sleeved Coaxial Printed Circuit Board Via
Technology #16374

Applications

Applications for this technology are found in single and multilayer PCB systems requiring:

- High isolation, low cross talk
- High dynamic range
- Cavity resonant critical designs
- Full duplex
- High noise or EMI immunity
- Close proximity between power and signal transmission lines

Problem Addressed

Printed circuit board (PCB) geometries include a top and bottom surface on which signal traces are patterned and components may be affixed. In a multilayer PCB additional layers are in-between for carrying signals from one point to another. These signals begin on one layer and move to another through traces and vias (conductive pathways for signal transmission). Due to current limitations, signals may emit EM radiation to the interior layers causing signal interference.

Technology

An improved PCB via was designed and fabricated, boasting higher insolation between traces, greater frequency invariance and tailored characteristic impedance.

This improved PCB via or ‘Sleeved Coaxial Printed Circuit Board Via’ uses a novel patented PCB processing method for fabrication. As a result neighboring signal transmissions are isolated from each other. Undesirable reflections and EM transmission interference from neighboring signal paths are mitigated or terminated.

This novel process was designed to be implemented using standard PCB fabrication techniques. The Sleeved Coaxial Printed Circuit Board Via is compatible with all basic traces; i.e. co-planar waveguide, microstrip and stripline.

In addition the resulting high EM suppression between neighboring signal paths permits close proximity of power and signal path shared real-estate. The single outer metal sleeve reduces shorting via count with reduced impedance inaccuracies and a more direct signal return path.

Advantages

- Higher isolation and EMI suppression between neighboring vias
- High density and close proximity of power and signal path shared real-estate
- Tuned and higher characteristic via impedance accuracy
- Reduced shorting via count and more direct signal return path
Categories For This Invention:

Electronics & Circuits  
Electronic Components  
Lincoln Laboratory

Intellectual Property:

Sleeved coaxial printed circuit board vias  
Issued US Patent  
9,635,761  
Sleeved coaxial printed circuit board vias  
US Patent Pending  
2017-0208695

Inventors:

Glenn Brigham  
Bradley Perry  
Patrick Bell  
Richard Stanley

Publications:

Isolation Improvement with Electromagnetic Band Bap Surfaces  
Lincoln Laboratory Journal  
2012  
Interactions between Vias and the PCB Power-Bus  
2009 20th International Zurich Symposium on Electromagnetic Compatibility  
January 12, 2009  
Simulation and Research of the PCB Vias Effects  
ICNC 2007. Third International Conference on Natural Computation  
August 24, 2007  
Noise Coupling between Signal and Power/Ground nets due to Signal Vias Transitioning through Power/Ground Plane Pair  
IEEE International Symposium on Electromagnetic Compatibility.  
2008  
Investigation of Crosstalk Among Vias  
IEEE International Symposium on Electromagnetic Compatibility  
2009

External Links:

Lincoln Laboratory  
https://www.ll.mit.edu/

Contact the Technology Manager: tlo-inquiries@mit.edu
Image Gallery: