

## “Multilayer Printed Circuit Requirements for the Automobile Industry in the Age of High Speed”

By

Paul Waldner, Multiline;

Victor Gallego, Indubond;

John Johnson, Averatek

Today’s multilayer PCB requirements for the Communication and Automobile Industries are converging because of the signal-speed requirements required of 5G communication networks and the opportunities that such broadband communications offer for the pursuit of the auto industry’s “Holy Grail”, the autonomous, self-driving vehicle.

The PCB industry must deliver multilayer circuits composed of dielectric materials capable of ever higher signal frequencies with ever greater reliability. The signal processing capability of today’s high density IC packages combined with the requirement for reliability of the automobile industry and the high frequencies required of radar and broadband communications circuits means that the PCB fabricator is faced with unprecedented requirements in the lamination of multilayer packages at extremely high temperatures (approaching and sometimes exceeding 400 degrees C) while maintaining the kind of registration requirements previously only known to the Networking-and-Communication’s Industry.

We would like to present a new technology to laminate multilayers at very high temperatures with a control of temperature per panel previously thought to be impossible. Conventional Multilayer presses require huge amounts of energy pushed into a relatively high stack of to-be-laminated panels from a huge mass of metal that had to be heated up even before the panels could begin to be heated up. This meant that the temperature gradient of a stack of laminates could be as high as 40 degrees C from the outside-panels in the stack to the inside-panel. Indubond’s press technology can heat every panel in a stack to exactly the same temperature at exactly the same time.

Multiline’s technology of registering those panels is old, but still necessary to insure the best registration of multilayers composed of differing materials no matter how hot the press. Pin-lam combined with data collection of inner-layer movements at every point in the fabrication process is worth discussing again.

The signal integrity of high speed circuits is also helped by as near-to-perfect rectangular cross-sections of the tracks that comprise the way from sensors to processors to output devices. Multiline would like to introduce to Europe a new semi-additive process which is designed to improve signal integrity while making it easier to improve resolutions of tracks and gaps.