

# PCB Symposium, 2009

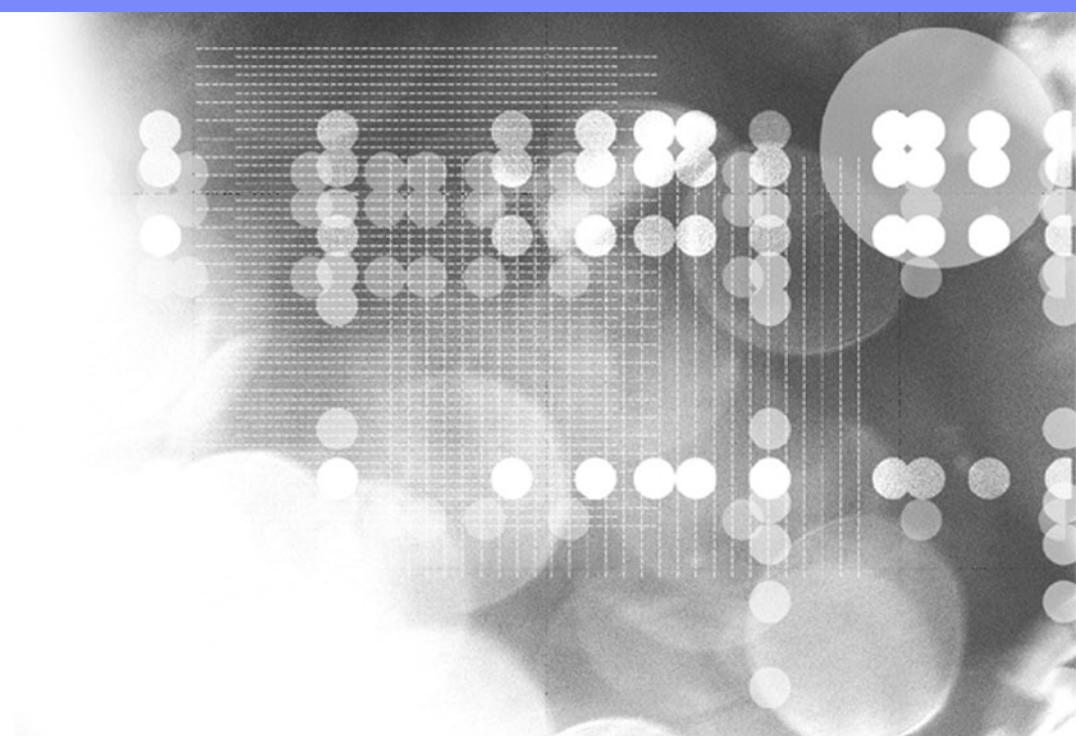
## Electrical Characteristics

### Panel Discussion

#### Panelists:

- George Dudnikov, Sanmina-SCI
- Brian Butler, Introbotics Corp.
- Doug Eng, PPG Fiber Glass
- Steve Makow, IBM
- Michael Cracraft, IBM

Panel Chair: Roger Krabbenhoft, IBM



## PCB Symposium, Panel Discussion

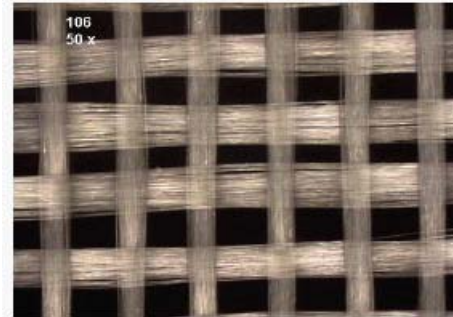
- **Suggested Topics For Discussion**
  - Impedance, The “Real Story”
  - Differential Pair Skew Reduction Techniques
  - Layer to Layer Registration Control
    - “Functional Registration”
  - Loss Reduction Alternatives
  - Loss Characterization Techniques for The Production Floor
  - PTH Stub Reduction Techniques

## PCB Symposium, Panel Discussion

- Impedance, The “Real Story”
  - Traditional Testing Method Limitations
  - Testing Isolated Coupon Nets No Longer Enough On Large Size PCBs
  - Functional Nets Across x/y Space
  - Embedded Launch Structures

# PCB Symposium, Panel Discussion

- Differential Pair Skew Reduction Techniques
  - Varying Laminate Properties Driven by Glass Cloth Weave
  - Use of Spread Glass
  - Use of Rotated Images on Panel
  - Design Parameters
    - Diagonal
    - Zig-Zag

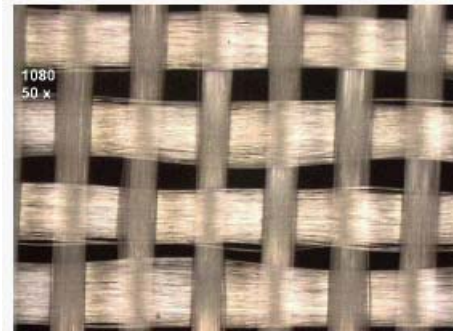


**Glass Style: 106**

Plain Weave

Count: 56x56 (ends/in)

Thickness: 0.0015 (in)



**Glass Style: 1080**

Plain Weave

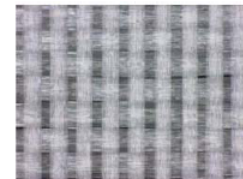
Count: 60x47 (ends/in)

Thickness: 0.0025 (in)

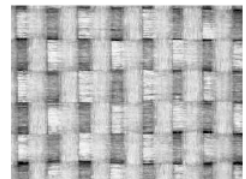
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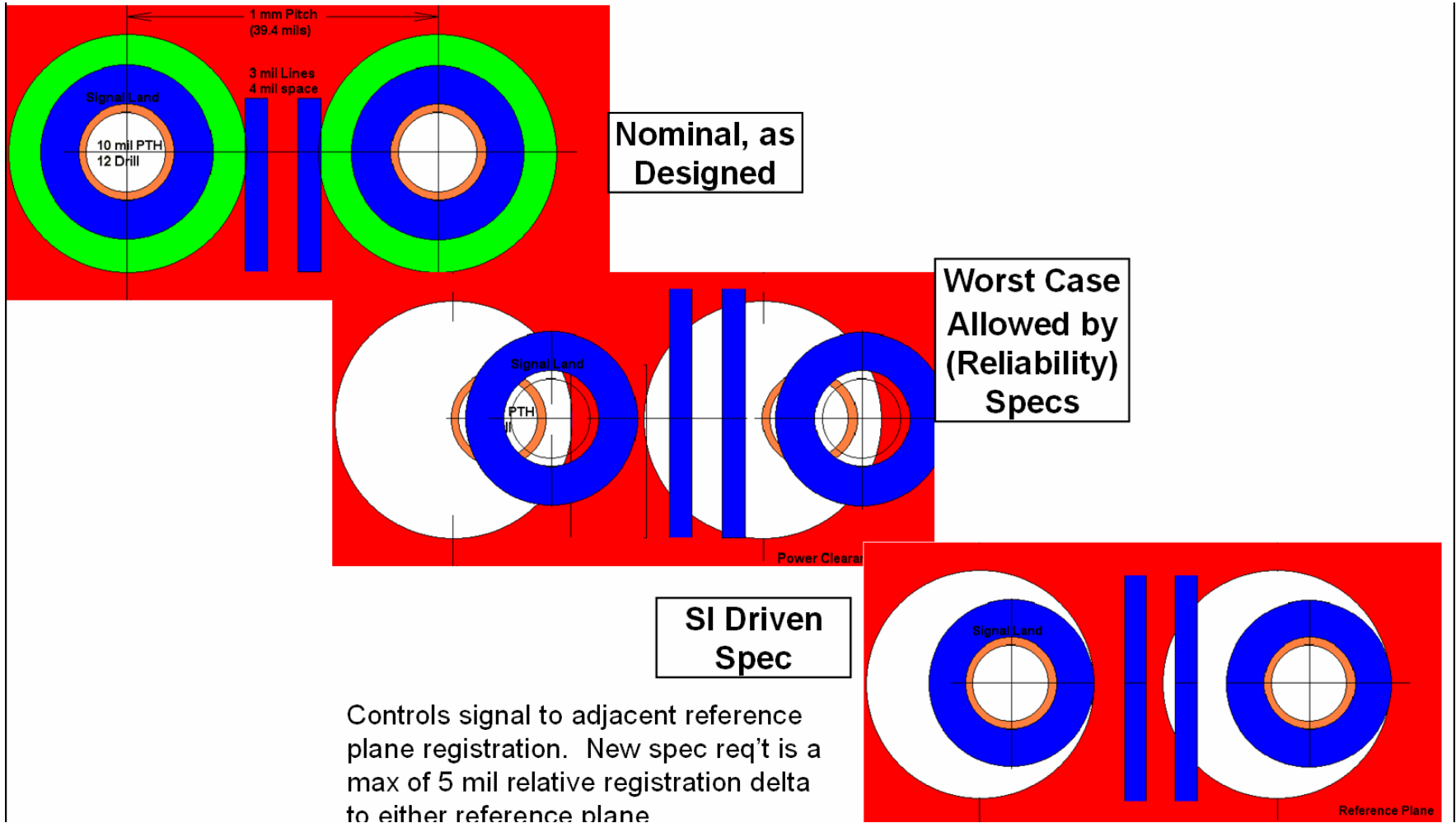


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# PCB Symposium, Panel Discussion

## Layer to Layer Registration Control



# PCB Symposium, Panel Discussion

- Loss Reduction Alternatives
  - **Reduced Loss Laminates**
    - **Cost / Performance Tradeoff**
  - **Cu Foil Profile**
    - **Extend Laminate Performance**
  - **Trace Width Tradeoff**
    - **High I/O Count → Layer Count**
    - **Board Thickness → PTH Aspect Ratio**

## PCB Symposium, Panel Discussion

- Loss Characterization Techniques for The Production Floor
  - **Traditional Lab Characterization → Volume Limitation**
  - **SPP Technique Implementation (Introbotics)**
  - **Historic Challenges With VNA Use In Production**



# PCB Symposium, Panel Discussion

- PTH Stub Reduction Techniques
  - **Cost vs. Performance vs. Design Flexibility**
    - **Backdrilling**
    - **Subcomposite**
    - **Traditional Blind/Buried Via**
    - **'P3' Buried Via (Solve Wiring Challenges)**
    - **zInterconnet**