



IBM Systems and Technology Group

# Panel Discussion: Connector/ PCB Mechanical Interactions

11/20/09

# Panel

- PCB Manufacturers

- ▶ Alex Stepinski - Sanmina, (Owego, NY)
- ▶ Steve Billiet - TTM (Chippawa Falls)

- Connector Suppliers

- ▶ Ken Stiles - Molex (Lisle, IL)
- ▶ Scott Feeser - Amphenol (Harrisburg, PA)

- Assembly

- ▶ Chris Goodall - Celestica, (Toronto, Ontario)
- ▶ Jim Wilcox - IBM ISC Engineering, Card Assembly (Endicott, NY)

# PCB Mechanical Attributes – Assembly Impact

- **Flatness, edge taper, site dish**
  - [IPC-A-610D: 0.75%; IBM: 1.0%, 0.5%(BGA+SMT connector)]
  - ▶ solder paste printing uniformity
  - ▶ LGA contact uniformity
  - ▶ large body BGA assembly, esp. MCM applications (>120mm)
- **Warpage, bow & twist**
  - ▶ ICT, mechanical assembly flexure (Pb-free interconnect requires reduced assembly board strain)
  - ▶ Elevated temperature dimensional stability
  - ▶ Board moisture level – who controls it?
- **Tooling hole location**
  - ▶ local fiducial optical drilling for critical connector locations
- **Compliant pin hole dimensions**
  - ▶ no common or limited set of drilled hole diameters
  - ▶ inadequate hole diameter specification by supplier
  - ▶ PTH backdrilling constraints = f(pin compliance configuration)?

# Topics:

- How can a common thickness variation specification be developed between multiple PCB suppliers?
  - ▶ IBM uses a significant volume of LGA connectors in our system designs which are sensitive to variations in PWB thickness variations. Presently we have part number control individual suppliers to compensate for PWB thickness variation. Can a common specification be developed?
- What issues do ECAT assembly teams experience with PWB's incoming to assembly.
  - ▶ PWB card edge taper impacts to stencil?
  - ▶ LGA positional tolerances?
  - ▶ Multiple part number control based on PWB manufacturing process variations?
- As connector manufacturers design connectors, how is the mechanical strength and tolerances of the PWB
  - ▶ The connector industry is migrating to more compliant pins to minimize Rohs process impacts. With SI teams requesting reduced via stubs driving backdrills or sub composites, how can minimum mechanical strength of PWB's be specified?
  - ▶ Connector manufacturers are being asked to provide allowable design loads for connectors in all three axis (6 DOF's) for connectors assembled to PWB's as an assembly. How should the minimum PCB strength be defined for these applications
- For compliant pin components assembled into PWB assemblies. How is the maximum load (stress?) determined that can be on a compliant pin (i.e. actuation, Shock and vibration, etc)? Is this an industry standard?
  - ▶ Are there unique ECAT concerns that are missed in PWB assembly designs?
- 1 mm LGA connectors have become standard in the PWB assembly process. What is the smallest contact grid you foresee and what is the limitation driving that LGA pitch
  - ▶ Is the contact count for a fine pitched LGA driven by drill spacing, lithography, PCB shrinkage (i.e. tolerance control), etc?