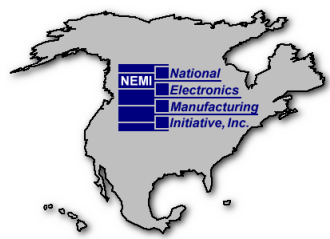


High-End Electronics Focus Group



David Cavanaugh
Benchmark



High-End Electronics Focus Group

- **David Cavanaugh, Benchmark Chair**
- **Ed Miguel, Connor Winfield**
- **Stephen Walters, Spirent Communications**
- **Don Larsen, McDATA Corp**
- **Brian Toleno, Henkel**
- **Rick Charbonneau, Agile Software**
- **Edward Bull, Helix Tech.**
- **Greg Montello, Teradyne**
- **Frank Grano, Sanmina-SCI**
- **Mike Watters, Vitesse**
- **Bryan Roecker, Pemstar**
- **Richard Poor, Bose**

Connect with and Strengthen your Supply Chain



High-End Electronics Focus Group (Cont.)

- **Jasbir Bath, Solectron**
- **Kirit Shah, IBM**
- **Steve di Loreto, Plexus**
- **Allan Saadus, Sony**
- **Ty Bolenbaugh, Intel**
- **Michael Brown, Advanced Energy**
- **Vivek Gupta, Intel**
- **Ketan Kala, QLogic**
- **David Bush, QLogic**
- **Bryan White, Avaya**
- **Satya Iyer, Smart Modular Tech.**

Connect with and Strengthen your Supply Chain



High-End Electronics Focus Group

- **Brainstorm on questions/concerns affecting High-end devices (2 pages)**
- **Overall Problem Statement:**

What is the successful path for using Pb free/mixed metal technology with regard to processing and reliability for high-end electronics?

(What can go wrong?)

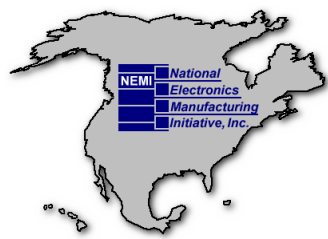
Connect with and Strengthen your Supply Chain



Definitions

- **High-end:**
 - **Cost**
 - **Complexity (thickness, thermal mass, layers, etc.)**
 - **Performance (functionality, 24/7 performance)**
 - **MTBF (high)**
 - **Life-time (long, 10+ years)**
- **Mixed-metal:**
 - **Sn/Pb paste with Pb-free finishes**
 - **SAC paste with Sn/Pb lead finishes**
- **Lead-free:**
 - **SAC alloy with different lead-finishes: Sn/Bi, Sn, Ni-Pd-Au, Sn-Cu, Sn-Ag**

Connect with and Strengthen your Supply Chain



Break into two questions/projects

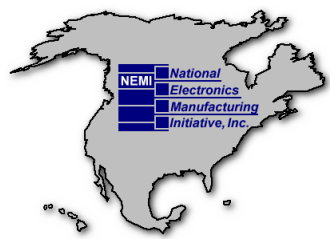
#1: How-to/can you successfully manufacture a high-end device using Pb-free materials and processes?

- Process needs to be established by mid-next year, this problem is imminent

#2: What is the effect of mixed-metal technology and complete Pb-free material systems on the reliability of high-end systems?

- Collect, collate, and analyze current research as it pertains to high-end electronics
- Physics of failure, failure analysis

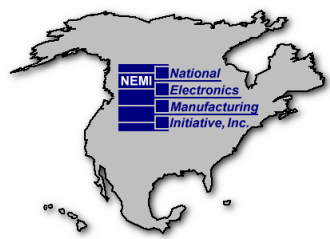
Connect with and Strengthen your Supply Chain



Plan

- **Design/Define test vehicle (TV)**
 - The card from Hell
- **Determine successful process parameters (SMT and Wave)**
 - **Definition of success:**
 - Component availability
 - Good solder joints
 - No SMT defects
 - Meet J-STD-020C
 - **Deliverables:**
 - Record lessons learned
 - Defects
 - Failure Analysis
 - Reworkability
 - Process Guidelines

Connect with and Strengthen your Supply Chain



Plan (con't)

- **Use TVs for reliability testing**
 - **Need to determine temp cycling criteria for high-end devices**
 - **Success**
 - **Meets or exceeds Sn/Pb reliability under same conditions**
 - **Deliverables**
 - **Reliability**
 - **Physics of failure**
 - **Failure analysis**

Connect with and Strengthen your Supply Chain