The transition phase

- The transition to lead-free products will be challenging.
- Manufacturing may require duplication of equipment lines, component part numbers and various assembly processes.
- While component and board suppliers are working to qualify their products for the higher lead-free temperatures, some mixing of lead-free soldering materials with tin-lead components, and vice versa, may occur.
- For the forward compatible case, there may be issues attaching lead containing components with lead-free solder alloy.
- For the backward compatible case, the tin-lead solder alloy may not attach to certain types of lead-free components such as BGAs (Ball Grid Arrays) -new lead-free component manufacturing part numbers will be needed in this case to ensure they are not assembled with tin-lead solder.
- OEMs, EMS companies and component suppliers are working together to determine the effectiveness of combining lead-free component parts with tin-lead solder paste and vice-versa.

Typical Transition Proceedure for Lead-free Product

1. Product Review

- **Complexity of Product and End-Of-Life of Product (2006)**
- **SMT (Quantity and Type)**
- **Wave (Quantity and Type)**
- **PCB (Material and Surface Finish)**
- **Components (Material and Surface Finish)**

2. Bill Of Material Component Scrubbing (Temperature rating, lead-free component specifications: lengthy task initially)

- **Materials Component Engineering Support**
- **Consigned/ Turnkey components**

3. Prototype Builds (Manufacturing and reliability trials)

4. Pilot Builds (Manufacturing and reliability trials)

5. Production

Progress made

- While there are still a number of challenges to be resolved by the industry, steady progress has been made.
- Contract manufacturing companies like Solectron have already gained experience in both prototyping and volume manufacturing of lead-free products.
- The manufacture of lead-free products for the networking, server and military industries poses the next great challenge, as more testing needs to be done on the more complex, high-end products.
- The logistics of lead-free implementation (component part numbers and temperature ratings, lead-free labelling) is the biggest challenge