

## Semi-Rigid Cable: Design Considerations

### **Introduction:**

Semi-Rigid cables can be soldered directly to PCB's and are an excellent solution to transmitting amplified signals across PCB's. The cables offer outstanding shielding and insertion loss characteristics, thus improving system performance and increasing talk-time.

### **Considerations:**

**Solderability:** Bare copper outer conductors will oxidize over time, potentially reducing solderability. Many end users specify a coating for the copper jacket in order to facilitate soldering onto their circuit boards. Coating options include solder plating, tin plating and "protected" bare copper.

We recommend "protected" or tin plated copper for improved solderability. Protected cables employ a chemical corrosion inhibitor which is applied to the copper conductor. The chemical bonds to the copper and will provide an effective barrier to corrosion for up to 12 months without loss of solderability.

**Dielectric Expansion:** Standard PTFE dielectrics will extrude under elevated temperatures such as typical circuit board reflow profiles. Any extrusion may cause damage to nearby components, failure of center conductor solder joint, or in rare cases catastrophic failure of the copper outer conductor itself. Dielectric extrusion can be eliminated through the use of "LL" dielectrics made from expanded PTFE. The "LL" material is mechanically stable under temperature extremes making it an ideal choice for reflow applications.

**Lead Forming:** Installation onto thru-hole or SMT circuit boards may be improved by forming center conductor leads at right angle to, or coplanar with the bottom of the copper outer jacket. Lead forming is best accomplished by automated "hands-free" techniques which ensure repeatability and minimal added assembly cost.

**Assembly Forming:** Densely packaged circuit boards often require a cable route with bends. Automated techniques or bending are recommended for the same reasons as lead forming above.

**Marking:** Marking may be applied to the cable outer jacket via ink jet technology to allow location finding by "Pick and Place" vision systems. While feasible, this technique currently carries a large NRE cost.

**Packaging:** Cables must arrive at the end user's assembly line free from defects. Packaging is often the most critical and overlooked parameter for insuring cable quality. Typical techniques include: Custom plastic trays with individual troughs for each cable assembly, Styrofoam trays etched to cable configuration, PVC tubes cut to extract part length, and card board boxes with foam rubber inserts.