BUILT TO CONNECT

Tips for Designing Reliable, Cost Effective Cable Assemblies and Harnesses

Customers come to TLC Electronics with a wide variety of applications and needs. These needs can include cable requirements (EMI protection and jacketing), insulation type, unique voltage or amperage requirements, tight tolerances, tie wraps, and labels. Each of these needs can add cost, so it is important to reconcile what is actually needed for your application in order to minimize the cost of your new cable assembly.

Wire specifications – Although the cost of wire tends to be low relative to the total cost of an assembly, there are steps that can be taken to further reduce this impact. When picking out a wire, consider that any customizations or special requirements are going to add material cost: Special wire colors, Teflon or other non PVC insulators, high voltage, high strand count, high temperature rating, as well as other 'special' wire requirements all drive up the material cost.

Cabling requirements – Sometimes cable is required in place of discrete wire. This will have a higher material cost, and requires more manual labor to strip and crimp. Generally, cabling does costs more as a result. If your project is price sensitive, you can work with your TLC representative to confirm whether cabling can be replaced with discrete wiring.

IDC vs Crimp vs Solder – Each of these has their own advantages, but generally the labor required from lowest to highest is IDC, Crimp, then Solder. IDC connectors have made large quality gains in the last several years and now oftentimes outperform crimps in pull testing. Additionally, material cost of an IDC connector is lower than that of a traditional crimp terminal connector.

Tolerances – Tight tolerances can multiply the labor cost of a part. In our experience, quite often it is completely avoidable; cable assemblies are likely to be designed with some flexibility in mind. What this likely means is that the overall length of a two-foot assembly can be ±1.0 inch rather than ±0.1 inch. Holding a tight tolerance slows the measuring and cutting down is likely to be unnecessary for most applications.

Tie wraps – How many are needed? At what spacing? How tight are the tolerances? Your answer to these questions affect the labor, which will add to the overall cost of the part.

Shrink tube – Shrink tube can be a costly adder, especially if there are tight tolerances (see item 4 above). There is labor to cut, apply, and shrink the tube. If the tolerances are tight, then a technician must hand shrink the parts. This quickly drives up the labor cost.

Labels – Much like shrink tube, this can be a costly and often overlooked aspect of cable assemblies. The material cost of a label can vary a bit, but they all require labor to print and apply. Oftentimes, these are used to ensure the end assembler connects the harness to the appropriate location. This same effect can be achieved by other methods such as keying or color coding connectors.

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Consult TLC for your harnessing questions and concerns

Harnessing tends to get left out of the majority of the design work until the end. This can make it extremely difficult to design a cost effective harnessing solution for your product. The earlier you consult an experienced cable assembly professional in your design process, the better.

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