Ask Les

Les Hymes

A View from the Assembly Side

Can designers and assemblers all just get along?

Q: *We are a small, relatively new operation that has grown quickly. We design and assemble our specialty products in-house and find that the printed wiring board designers seem to have little appreciation for some of the problems we have assembling and soldering their designs.*

Assembly department operators do not go to the design review meetings. However, they are often asked questions later and may be requested to make suggestions after production has started.

The designer and the fab vendor make most decisions, with minimal input from personnel in the assembly and soldering operations.

We assemblers are becoming discouraged since we continue to have problems producing the fast-changing designs. Designers generally do not request input from assembly personnel when a design change is made. This attitude affects shop morale and results in problems in the shop.

Can you suggest some actions we might take to improve this situation?

A: Your question reflects an awareness of the overall operating characteristics and intended function of the printed wiring assembly operation. Your comments also indicate that a disconnect may exist between the shop personnel and the design and management teams.

Three specific recurring problems that assemblers experience when dealing with designers and fabricators are:

1. Lack of knowledge and understanding of the impact of the board design and the characteristics of the board itself on the ability of an assembly shop to cost effectively produce a final product that meets the defined requirements and standards imposed;

2. Perceived inflexibility on the part of the designer;

3. Designers' unfamiliarity with the impact of potential material incompatibilities on the total process, product cost and time to market.

Increase Process Knowledge

The old "Make it like I designed it" philosophy generally does not work with the workforces of today. Shop personnel are, or should be, well versed in the technology of the assembly, soldering and cleaning processes being applied. Training in these areas is often required for employment and should also be provided on the specific equipment within the operation. Progressive managers provide in-depth on-the-job training and support continuing education to help employees maintain their knowledge of the technology.

Well-operated and informed assembly functions will generate fewer manufacturing defects and result in increased productivity in the first pass acceptable output. Total product life cycle costs and time to market will likely be reduced.

Design for Manufacture

For an assembly operation to be truly successful, an organizational commitment must be made to a rigorous design for manufacturing (DFM) process. One successful method is the Japanese "Poka Yoke" process of product design and assembly techniques that can drastically reduce the production of defective product by eliminating the possibility of assembly-generated errors.

Poka Yoke refers to an attitude and questioning process encompassing in-depth consideration of the assembly process during product design. Applying this approach can significantly eliminate human errors in the assembly operations.

The entire organization must understand the origin of the design cost drivers, such as the impact of hardware design; the component body and lead configuration; the termination base alloy and solderability preservative; and the soldering and cleaning practices.

Additional Suggestions

Once the operation as a whole understands the importance of design for manufacturing, shop employees should be encouraged to submit suggestions. This will establish a positive impact on morale and generate some good ideas.

In addition, the organization must be committed to doing it right the first time. Everyone must understand the negative impact on reliability, cost and time to market when rework is required on an assembly. ∎

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Send your process, technology or training question to lhymes@cox.net. Please type "ASK LES" in the subject line and indicate your name and company or institute affiliation. All questions may not be answered.