GET TO KNOW
YOUR PCB DESIGN STAKEHOLDERS

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Get to Know Your PCB Design Stakeholders

Contrary to what many may believe, designing a printed circuit board is not a one-man job. Communication with many stakeholders is a critical part of the design process and an important responsibility of the EE/PCB Designer. With the role of electrical engineers quickly evolving, it is important to note successful PCB design is not done in a vacuum. A PCB design will only materialize successfully by a commitment from the EE to reach out and gather information from the PCB industry stakeholders listed below. Each stakeholder will be contributing their part to manufacturing the design and ensuring its overall success.

The Program Manager

Before the engineering process of a project begins, the Program/Project Manager (PM) considers all the resources which will be required to complete the project. On a well-run project, the PM will ensure certain EEs are well-informed about important details regarding the PCB. The program manager however, is not an expert in PCB layout and relies on the designer to query about any missing information in the design requirements at this essential phase. The two must define several important key factors upon which the layout will be based.

When conceptualizing the PCB project, a PM obtains specification for how the PCB is going to be used. Performance is a key factor in selection of parts, materials, and processes for the design. In the early stages of product definition, a designer must seek to identify a performance class for the PCB from the PM to get the layout pointed in the right direction.

The Electronics Engineer

Electronics Engineers (EEs) are well versed in circuit theory and the components which make circuits perform. They have spent their career devising creative ways to utilize electrical components in ways which would yield the greatest circuit performance at the lowest cost while providing for the requirements of many project stakeholders.

Since there is always so much in the way of design definition and specification required, there isn't much time to 'carve tracks' (although this is changing). Due to this reality, electronics engineers choose to collaborate on PCB design layouts. Traditionally, Electronics Engineers can provide PCB designers with either a rough draft or completed schematic diagram. However, the industry is now moving towards a hybrid role where the EE and PCB designer are one.

The Mechanical Engineer

Mechanical Engineers (MEs) work hard for months creating solid model designs for end-product. One of the parts the ME defines is the shape and size of the outline of the PCB, which is a critical component of the product. The ME touches base with EEs throughout the process to make sure the size and shape—the mechanical envelope—of the PCB works with all the electronic components the EE estimates will be required. Once the two stakeholders agree, the ME will freeze the PCB outline in the mechanical layout and begin designing other features around it, while the EE works capture the schematic and may begin the PCB layout using the PCB outline as an important starting point.

The PCB Fabrication Sales Engineer

The PCB Fabrication Sales Engineer (FSE) works for the bare-board PCB supplier. He/she works diligently to make sure the engineering customers and the supplier management personnel's questions are answered by the appropriate technical people. If an EE/PCB designer has a question about materials, hole sizing, or how to achieve a certain impedance requirement, the FSE connects the PCB designer with the

right technical person to provide the answers. If a purchasing agent wants to order a quantity of PCBs to be delivered to the assembly house within five days, they coordinate with their company's quoting department to establish a cost and timeline.

The Assembly Manufacturing Engineer

The Assembly Manufacturing Engineer (AME) is a master at figuring out how to put a lot of parts together in the fastest way possible — with the highest yield at the lowest cost — by using the best machines and processes. They are responsible for planning, coordinating, and performing the manufacturing engineering work for a project.

When working with AMEs it is important for designers to understand that while a PCB layout is designed only once, it can sometimes spawn thousands of PCBs from the bare board supplier. Therefore, it is important for designers ask AMEs the important things to consider about assembly before starting a PCB layout.

The Test Engineer

The Test Engineer (TE) works with the EE to define the parts of a PCB assembly that will need to be tested. In high volume production, the ability to test and measure specified features is critical to measuring success.

TEs also works with the AME to create automated test beds (or bed-of-nails test fixtures), which will be used to audit the success or failures of the AME's machinery and processes. Both the TE and the AME know machines, processes, and people are not perfect. There are thousands of things that can go wrong while manufacturing a PCB assembly. They know good design addresses the requirements for testing and auditing for manufacturing defects. Test engineers appreciate when a PCB design includes small test lands – etched copper "pads" they can probe with the pins on his test fixture. Testing software is used with the equipment and once "probed" the test machines can catch most errors that might be introduced during the PCB assembly process.

The Customer

The customer is the person you are designing the end-product for be it internally or externally. They can be the person setting requirements or the end-user. It is important to keep the customer in mind throughout the design process, so you can make design decisions that will support them. Great engineers approach PCB design from an end user's point-of-view.

The PCB Design Process

Just as there are established workflows to guide the progress of a PCB panel through each of its manufacturing process steps, there is an established workflow for the PCB design process. To design a successful PCB, it is important to understand these design process steps by building stakeholder relationships. Keep in mind how every decision incorporated into the design will feed the success of the ensuing steps (and people involved) in the manufacturing process.

Contacting Stakeholders & Manufacturing Representatives

There cannot be enough emphasis placed on the value of developing a solid relationship with the supplier representatives and technical personnel who will be manufacturing your PCB before beginning the design process. Establishing a working relationship with EMS providers before starting a design will ensure the designer has a resource for solid manufacturing feedback for the basis of important design decisions.

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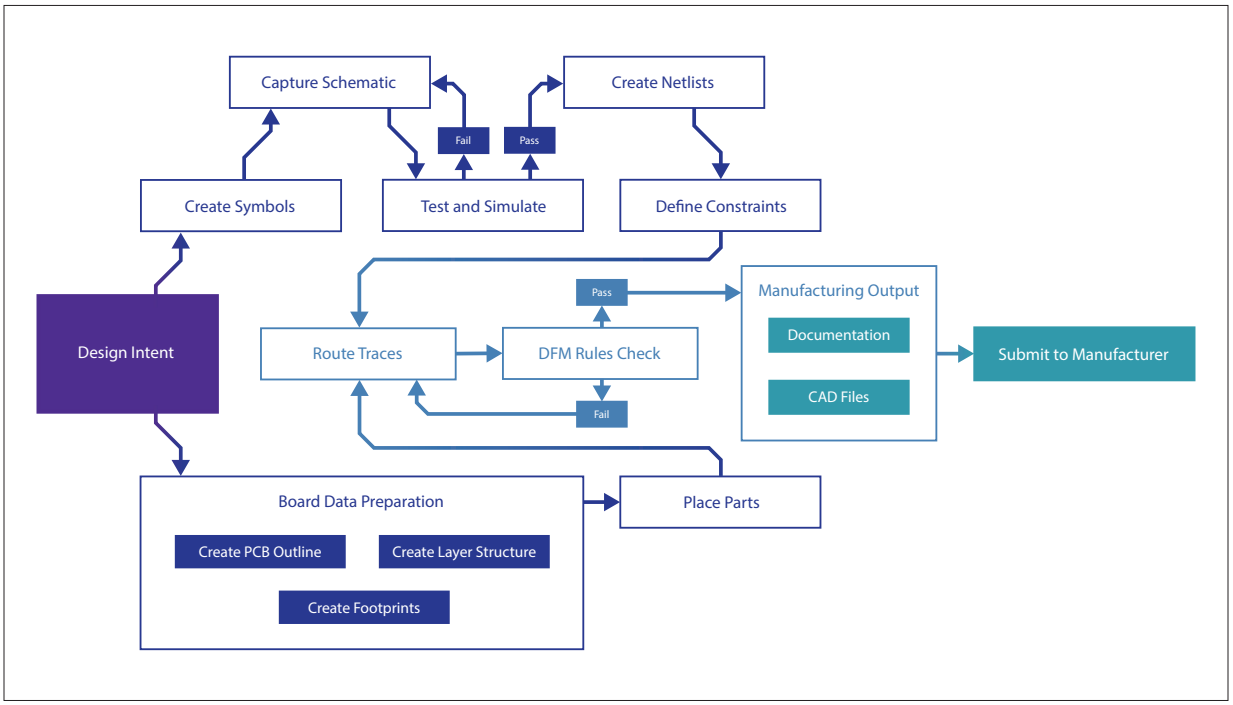

A great way to be introduced to the design and manufacturing community – its people, machinery, materials, process and software – is to attend one of the many PCB design and manufacturing industry tradeshows held throughout the year. Electronics tradeshows are renowned for being interactive and informative gatherings where one can eat, sleep, and breathe all things PCB. Virtually all stakeholder representatives are always on hand to answer questions and to show off their materials, processes, and machinery.

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