



## Why Design PCB Assemblies with Testing in Mind?

Can you put a product that hasn't been fully tested on the market?

When it comes to Printed Circuit Board (PCB) assembly and manufacturing, most firms' answer is neither a strict yes or no.

This is because different PCB assembly companies have different policies concerning testing goals, methods, and costs.

For instance, many engineers who design PCB assemblies simply look for functional testing that determines whether the resulting system meets the system specification sheet. However, this does not necessarily mean that a third-party manufacturer will be able to create the end product that the PCB's original designers asked for.

In many cases, design and layout engineers simply assume that the PCB manufacturing process will be completely issue-free, letting them focus purely on adjusting the product specifications for functionality. However, if the manufacturer wishes to test the assembly after the fact, it may find that the board is missing the necessary contact points for testing, and will then have to push an inadequately tested PCB through to production – a risky gamble.

## Designing PCB Assemblies for Test Types

During the design phase, a PCB assembly technician must ask the following two questions:

- **Who is going to test this assembly?** PCB manufacturers will typically either have their own in-house testing facilities or rely on specialty third parties for the process. However, it is possible that a manufacturer expects the PCB prototype assembly team to test the board – something that must be discussed before any work actually takes place.

- **Which testing method will be used?** A common testing method employed by PCB manufacturers is the flying probe test. However, a manufacturer may seek more expensive bed-of-nails testing for a particular product. A combination of JTAG boundary scans, x-ray laminography, and visual inspection also offers comprehensive coverage.

One of the most important things to keep in mind when designing PCB assemblies for testing is that if the testing engineer is not considered in the design process, the resulting board may be [impossible to test](#). At the very least, testing the board will be a difficult and time-consuming process, leading to additional costs along the product development timeline.

If a manufacturer plans on using flying probe testing, then testing contacts must be incorporated into the board's design from the outset. Not only that, but serial testing requires that redundant modules are

laid out in such a way so that testing can be carried out independently – what if only one module has a fault, but its surrounding modules do not? Is there a way for an engineer to only test the (possibly) faulty module?

## **Reduce Testing Costs to Improve Profitability**

Testing a completed circuit board design can consume up to 30% of the project's overall costs. It's important that manufacturers determine which testing methods are the most effective for the project at hand. High stakes one-of-a-kind circuit boards upon which human lives depend, such as those used in the aerospace, military, or energy industries, should benefit from extensive testing that low-cost consumer electronics may not need.