

LPKF Prototyping System Helps Racing Team Gain Competitive Edge



Challenge:

Keeping up with Competitive Demands of Racecar Engines

With budgets of over \$20 million per year for Formula One race cars, racing teams are always under immense pressure from sponsors and fans to perform at the highest level. As a result, racing teams are continually looking for competitive advantages in all facets of their racing operations. This is especially true for racecar electronics, where fractional deviations in quality can mean the difference between a victory lap and second place.

A competitive Formula One engine supplier based in Germany takes its racing electronics very seriously. The company has remained competitive over the years and continually seeks to put themselves over the edge, especially when it comes to electronic engine controls.

Solution:

LPKF In-house Circuit Prototyping System

To meet the rapidly changing demands in the Formula One racing industry, a leading engine supplier relies on LPKF's circuit prototyping system for instant turnaround of prototype circuits and breadboards.

The German supplier uses an LPKF ProtoMat® prototyping system, which mechanically etches circuit layouts onto a wide range of substrates straight from the circuit layout data. Since circuit boards for motor control electronics are high-density etched multi-layer boards, and Formula One racecar engines are no exception, the manufacturer uses the LPKF system not only for prototypes but also for breadboards, experimental designs and customizations. As a typical engine control system contains over 20 such sub-circuits, the LPKF system is extensively used to test a variety of sensors and accurately verify sub circuit designs.

Results:

In House Design Verification and Experimental Circuits Result in High Quality and Efficiency

By using the LPKF systems, the racing team is able to test, verify, and modify sub-designs quickly and identify problems while still in the design process. This allows the team to focus on quality as their top priority in the final prototype board production, rather than being forced to spend extra money for express charges for external board production services.



The LPKF system also creates PCBs that are used for component qualification, enabling components to be

quickly checked and cleared for use in engine controls. The engine supplier believes that the LPKF system provides them with significant advantages over having to rely on a lengthy outsourcing option by increasing quality and efficiency. The system also enables the design team to perform instant customizations at any time during the day (or night).

As the team's engineering manager states:

"Being able to test, verify and modify sub-designs quickly while they are still in the design process gives our group the chance to focus on quality without worrying about the significant risk of error that comes from prematurely pushing boards through production. No doubt, the LPKF system provides us with the leading edge on quality, as well as stability and performance."

In addition to quick and efficient in-house design verification, the LPKF PCB prototyping system also allows the Formula One team to create experimental circuitry instantly. With the LPKF system, the supplier has the option to experiment in a safe, in-house environment that facilitates rapid prototype creation, analysis, and redesign, justifying circuitry experimentation. This ultimately results in a certain competitive advantage. For example, a wave of redesigns were able to be completed fairly quickly using the LPKF system after the active suspension and traction control features on the race cars were eliminated by the Formula One's regulatory body.

As the German Formula One engine manufacturer looks to capture the title for many seasons to come, the group will continue to rely on the LPKF prototyping system to give them that extra competitive edge for their electronics.



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LPKF Laser & Electronics AG manufactures machines and laser systems used in electronics fabrication, the automotive sector, and the production of solar cells. Around 20 percent of the workforce is engaged in research and development.