

Project Note

Design review: electronics in a measuring device

A medical equipment manufacturer was developing a new measuring device to determine blood-sugar levels. Zühlke reviewed the design of the electronic components and suggested ways of optimising several details.

Task

A medical equipment manufacturer completed the design phase of a new generation of meters that allow type 2 diabetes patients to measure their own blood sugar levels. Independent experts from Zühlke were asked to review the design of this advance and to point out potential problems that could later occur in handling by users and in assembly. The developers also welcomed any suggestions from the outside experts on ways to optimize the product. The review covered mechanics, plastics engineering, optics, electronics and assembly technology. The electronics review is explained here.

Implementation

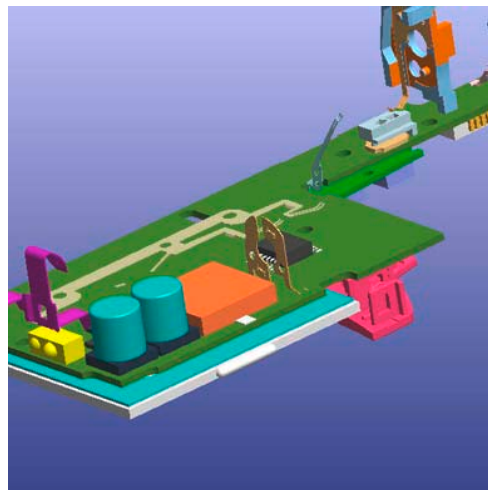
First, the engineers extracted the sub-circuits from the wiring diagram and depicted them in a way that made assessment easier. They examined the dynamic behaviour of the DC/DC converters, taking into account the component tolerances, and pointed out gaps in the specifications. The theoretical considerations were then simulated using MathCad.

A 150-question checklist based on years of Zühlke experience was used to conduct a critical examination of the entire circuitry. This checklist was also made available to the customer for use in other development projects.

Special attention was paid to EMC requirements to avoid damage from electrostatic discharge. Zühlke pinpointed the endangered areas with the device closed, partially open and completely open. The last review point pertained to the integration of the circuit board in the mechanical system of the device. It was important to ensure that no collisions occurred between the inserted components and the mechanical system.



Diagnosics



Tools

Simulation:
MathCad

Customer benefits

- Following Zühlke's review, the manufacturer was able to launch a product on the market that was even safer and more reliable and of better quality.
- A thorough review of the electronic circuit design by experienced experts assured the customer that the device would function trouble-free, reliably and safely even under difficult conditions.
- The customer's development team improved its own expertise while working on the project with Zühlke experts.

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