

Project Note

Optical barcode scanner for miniaturised measuring device

Using new technologies, Zühlke developed an integrated optical sensor for recognizing barcodes on consumables used in medical equipment. Functionality was substantially improved while the product footprint was reduced.

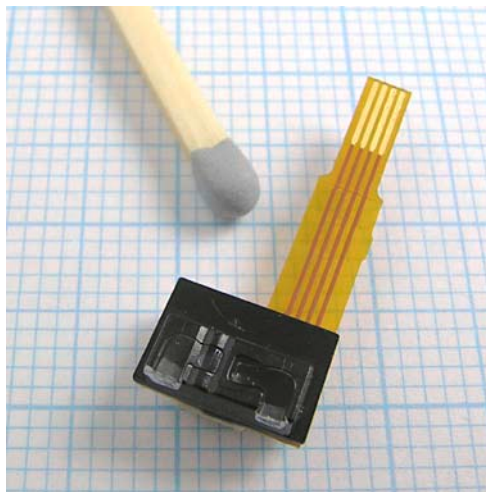
Task

A manufacturer wanted to use consumables with a barcode imprinted on them in a new generation of medical measuring devices. An integrated sensor was to read and recognise the barcode as it passed by the sensor. To increase the reliability of recognition over standard components, Zühlke was engaged to develop a barcode scanner especially for this application and integrate it into the overall system.

Implementation

In cooperation with the customer, Zühlke's optical experts defined the requirements for the sensor and devised several possible solutions. They proceeded systematically, utilising Zühlke's development process for optical systems. The engineers conducted initial simulations and tolerance analyses already during the design phase to detect potential technical risks. Based on this analysis, they selected the chip-on-board technology, which features a high degree of positioning accuracy and a small footprint.

The preferred sensor design was worked out in detail and verified with a functional model. Based on measurements and supplementary optical simulations, the experts optimised the sensor in terms of stray light and devised a design for the optics component that was compatible with plastics. The optics unit was produced using 2-component injection moulding. This allowed mechanical elements to be added while also simplifying the unit's integration and installation into the overall system. As a result, the company had an extremely short time-to-market for an optical sensor that is reliable even when produced in large quantities and that is inexpensive to manufacture.



Technical Data

Footprint:
7.5 x 7.5 x 3.1 mm³

Technologies:
2-component injection moulding

Chip-on-Board

Optics development tools:
ZEMAX (optics design)

FRED (stray light und optical loss analysis)

Customer benefits

- With their broad range of optical expertise, the Zühlke specialists ensured an innovative and low-cost solution.
- Zühlke's risk-driven optical development process guaranteed a systematic approach and minimised the development risk.
- The use of new technologies increased the degree of integration and the reliability of the component.

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