



UNIVERSITÄT ZU LÜBECK



bluepoint MEDICAL

Master in Biomedical Engineering

Thesis Title:

Development of a compact pulse oximeter circuit board test bench combining electrical and functional testing for automated in process quality control

Summary:

The thesis describes the qualification and verification of a compact prototype pulse oximeter circuit board test bench combining electrical and functional testing for automated in process quality control. The prototype is the initial output for the feasibility testing for development of the automated combined test bench. Two already verified test benches are the predecessors of this test bench. The electrical test is conducted by connecting the pulse oximeter circuit board with precision spring probes to the test board. Voltage measurements across different test point pads are conducted to verify the placement and soldering of all components on the circuit board. The functional test consists of sending SpO₂ simulated signals to the pulse oximeter circuit board to test the correct software responses. Detection and troubleshooting of errors in the early stage of test design is a major subject of this work. Furthermore, the operational combined test bench is compared with the currently applied test setups to qualify the test performance of the new test bench. As a mean of qualification, a measurement system analysis is conducted. The results from the qualification tests showed that the compact pulse oximeter circuit board test bench is not capable to fulfil the test requirements yet. The next version of the combined test bench is discussed on the basis of the analysis. Improvements of the circuit board design and the operator-system interface are suggested as a conclusion of this thesis. The objective is to improve the accuracy, repeatability, and reproducibility of the next version of the combined pulse oximeter circuit board test bench.

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