

Abstract

Due to the rigorous requirements dictated by the automotive industry, ECU software must undergo intensive development and testing procedures. The AUTOSAR standard dictates the requirements that ECU software modules must fulfill. The assignment was the software testing of the I-PDU Multiplexer module, which is a Basic Software module located in the AUTOSAR communication stack.

To successfully test the I-PDU Multiplexer module, an understanding of the AUTOSAR standard was necessary, with special emphasis on modules responsible for communication. Utilizing software testing principles, such as black box testing and code coverage analysis, and becoming familiar with the interfaces of the I-PDU Multiplexer was essential for testing of the module. To be able run extensive tests, a ThyssenKrupp Presta AG developed modeling tool was used to create several configurations in order to assemble diverse and distinct parameters for the module. Using the above mentioned knowledge, the construction of the testing environment and the implementation of the test cases could begin.

The test cases were categorized into separate test suites according to the tested functionality. Three distinct test suites with several test cases, were used to effectively examine the testable requirements of the module. The documentation of the test cases and the tagging of the requirements were also an essential part of the assignment.

All the testable requirements were successfully inspected, owing to the comprehensive test cases. Consequently, 100% branch coverage was reached and all the testable requirements were met. The module is deemed fully tested by requirements set by AUTOSAR and the Quality Management constraints set by ISO 26262.