



Types of Robustness Test According to DO-254 Guideline for Avionic Systems

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What is DO-254?

- RTCA DO-254 is a safety-critical guideline for aircraft electronic hardware, which consists of five Design Assurance Levels (DAL) to make flights as safe as possible and to prevent time and financial losses.
 - DAL A (Catastrophic)
 - DAL B (Hazardous)
 - DAL C (Major)
 - DAL D (Minor)
 - DAL E (No safety effects)



Robustness Tests

- Robustness testing has two main goals:
 - Guarantee that the product functions properly in normal conditions.
 - Tests and identifies the hardware design limitations that are outside of the requirements to ensure how the system reacts to abnormal conditions.



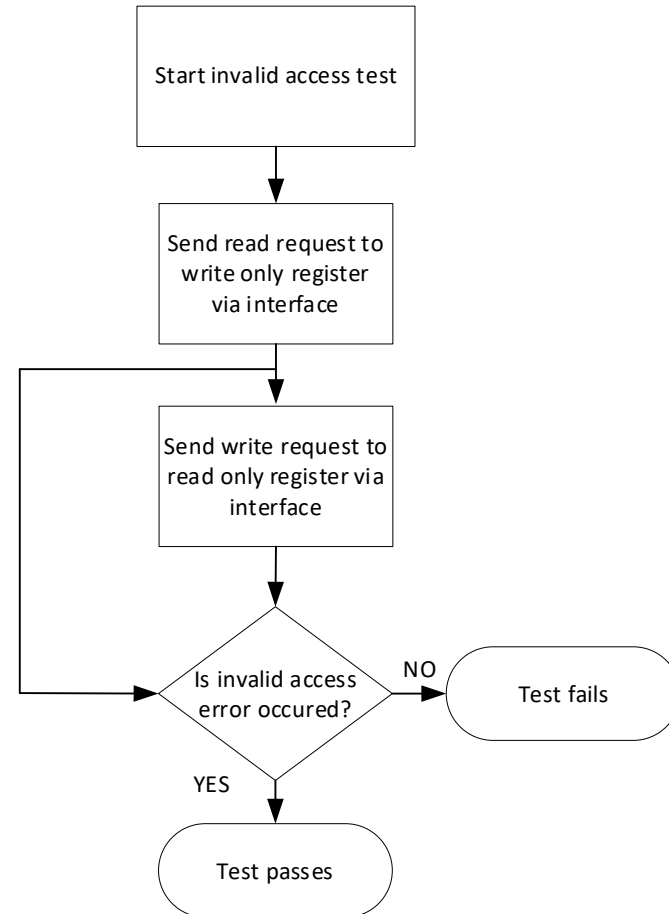
Robustness Test Types

- Invalid Access Error Tests
- Clock Robustness Tests
- Reset Robustness Tests
- Glitch Filter Tests (Data Disruption Tests)
- Invalid State Transition Robustness Tests

Invalid Access Error Tests

- Receiving incorrect combinations of inputs
- Toggling inputs that are not listed in the associated requirement
- Unexpected combinations of inputs

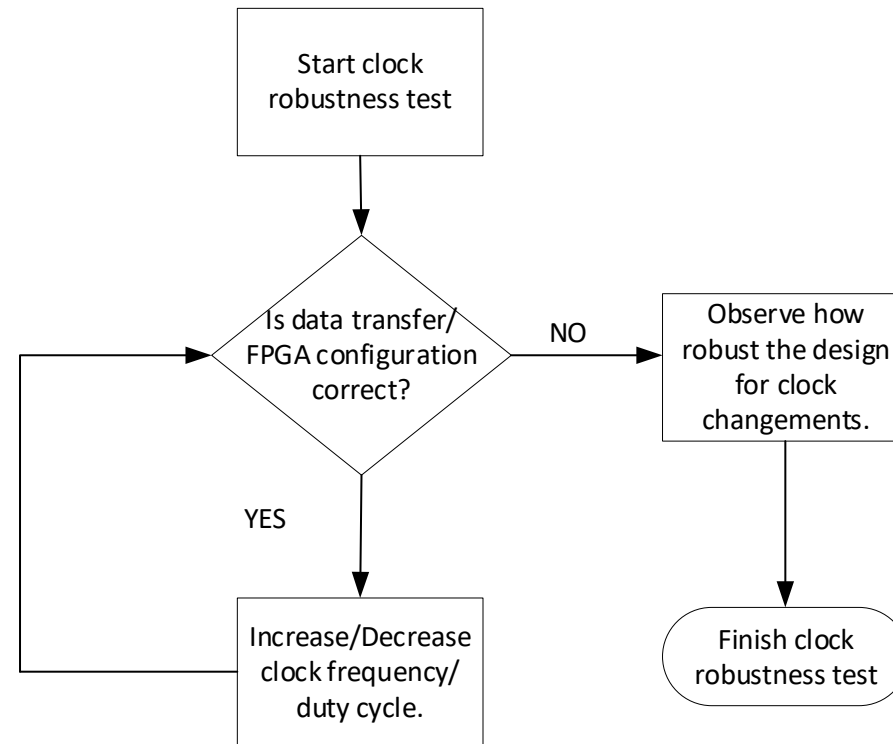
Invalid Access Error Tests



Clock Robustness Tests

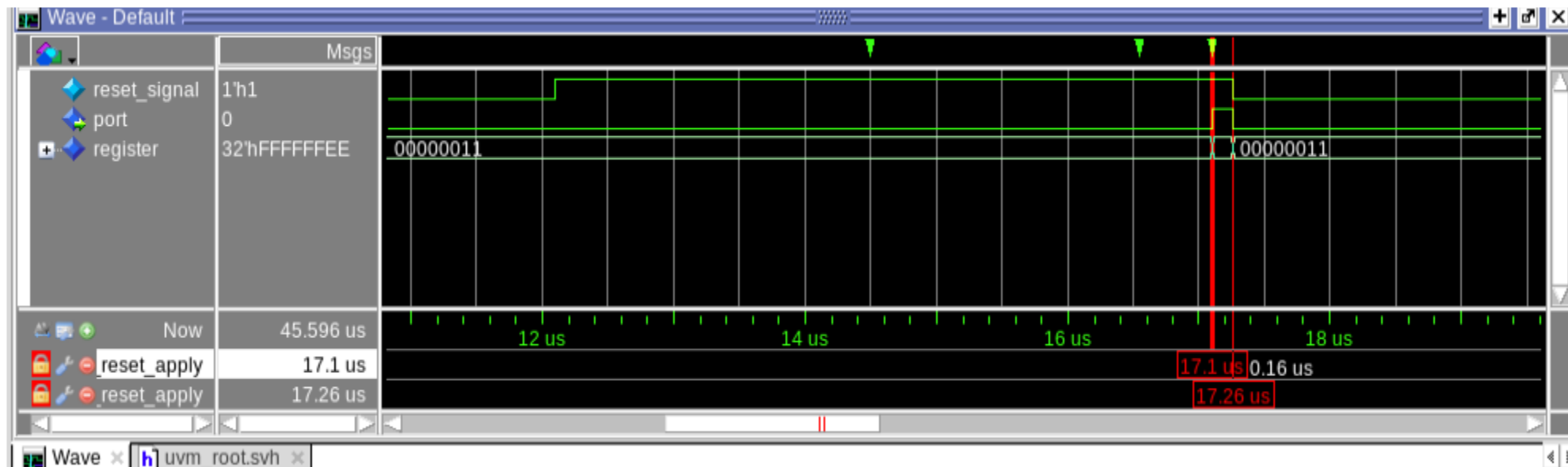
- Variation of the system clock duty cycle and/or frequency between given tolerances and beyond the tolerances
- Invalid input timing (e.g., setup and hold violations)
- Asserting and de-asserting input signals between clock edges given to systems

Clock Robustness Tests

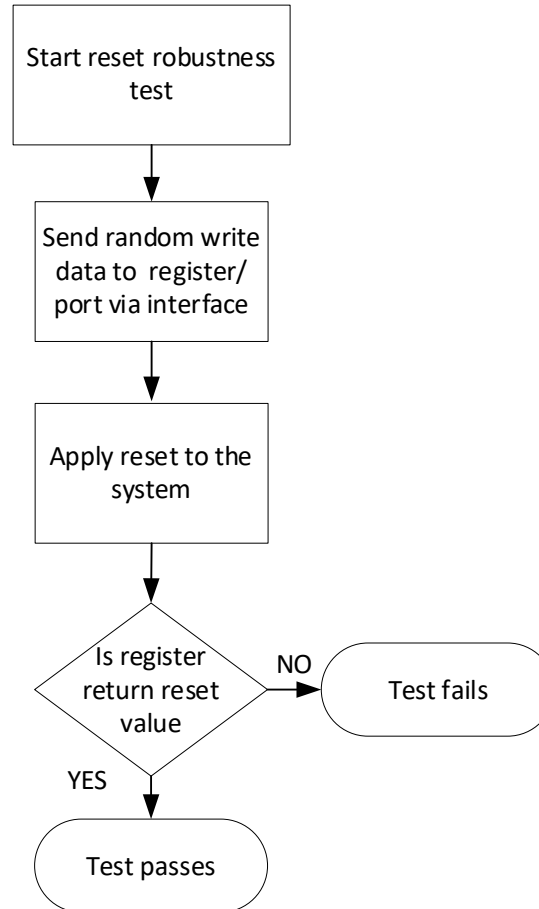


Reset Robustness Tests

- Application of reset input to the FPGA while the system is working under normal conditions.

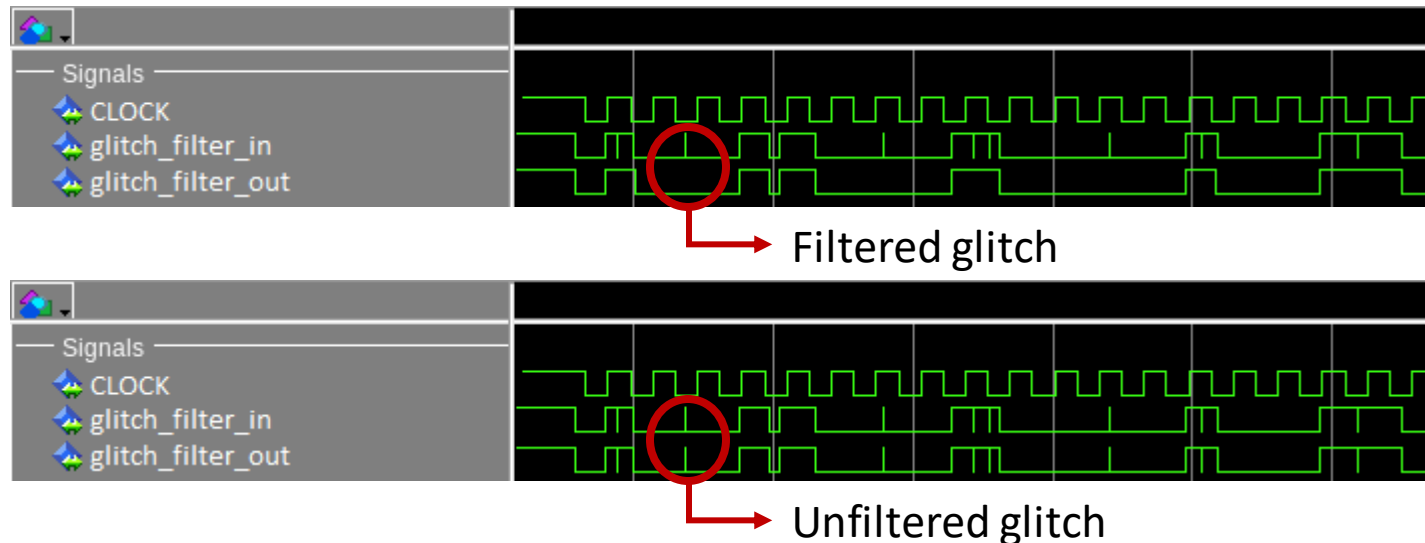


Reset Robustness Tests



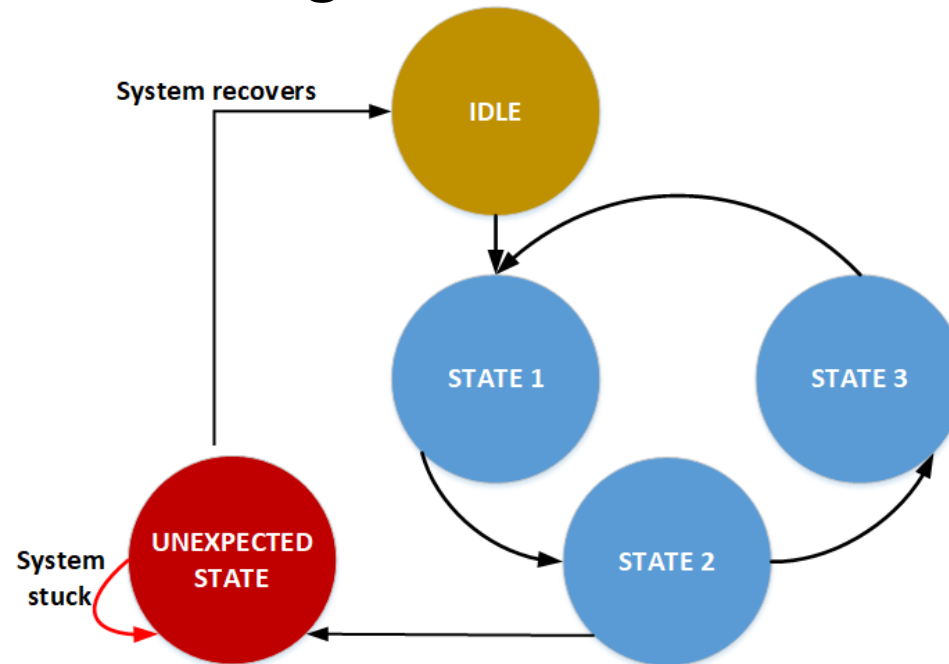
Glitch Filter Tests (Data Disruption Tests)

- Data ports are driven to disrupt the data transfer temporarily, while data transfers are continuing for different interfaces.



Invalid State Transition Robustness Tests

- The system would be forced to enter an unwanted state rather than the states mentioned in design blocks.



Questions?