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

Gözde Asena KILINÇ, Yavuz AKSU, Fatih BAYSAL

ASELSAN A.Ş.

accellera SYSTEMS INITIATIVE

2022 DESIGN AND VERIFICATION™ DVCON CONFERENCE AND EXHIBITION EUROPE
MUNICH, GERMANY
DECEMBER 6 - 7, 2022

INTRODUCTION (or REQUIREMENTS)

Robustness test cases characterize behavior of the design at the boundaries and beyond the boundaries of the specified operating limits.

Robustness tests should be done for safety critical systems to know how neatly hardware would react to situations not mentioned in the design requirements and also, unexpected cases that allowed by requirements. The design is regarded as robust, if the test passes for the tested conditions.

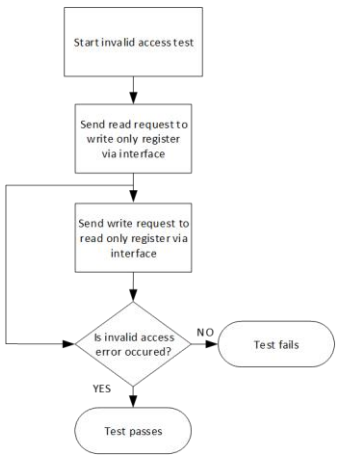
OBJECTIVES

There are different types of robustness test methods that are given below based on simulation in programmable logic devices (PLD) verification process.

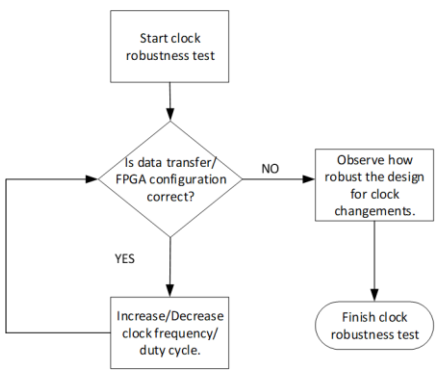
- Invalid Access Error Tests
- Clock Robustness Tests
- Reset Robustness Tests
- Glitch Filter Tests (Data Disruption Tests)
- Invalid State Transition Robustness Tests

RESULTS

Invalid Access Error Tests

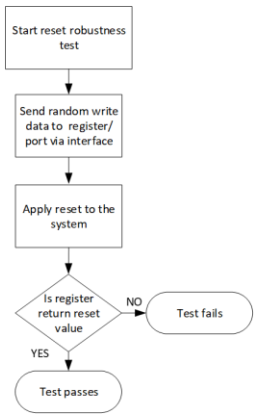


Clock Robustness Tests

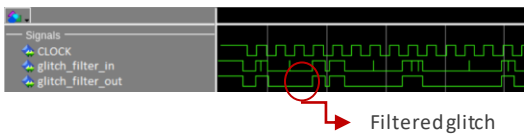


RESULTS

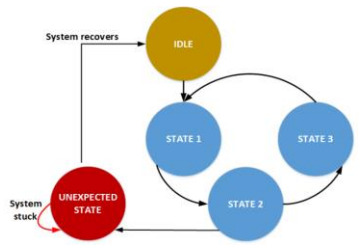
Reset Robustness Tests



Glitch Filter Tests



Invalid State Transition Tests



CONCLUSIONS

Robustness tests are the key in both civil aviation and military aviation to prevent catastrophic effects of any crucial avionic systems failure. Hence, several types of robustness methods are performed in simulation to create fault injections by driving the hardware with the conditions at and beyond the given limits by requirements and help designer to make more stable and reliable design after detailed analysis to decide whether the results are reasonable or have potential failure.

REFERENCES

[1] Brian Butka, Qualification of Tools for Airborne Electronic Hardware, 2013.

[2] Louie de Luna, Robustness Testing for DO-254 Designs, ALDEC The Design Verification Academy.

[3] Cypress Semiconductor Corporation, “PSoC Creator Component Datasheet”, 001-82876 Rev. *A, Revised November 19, 2012.

aselsan

Gözde Asena KILINÇ
E-mail: gakilinc@aselsan.com.tr

Yavuz AKSU
E-mail: yaksu@aselsan.com.tr

Fatih BAYSAL
E-mail: fbaysal@aselsan.com.tr