

# Built-in Self Test for Switch and LED

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**Abstract**—This paper presents a Built-in Self Test for Switch and LED. It is a self test mechanism in a system which tests its constituents i.e. the four switches and the four LED's via a predefined algorithm on its own for proper operation. It configures the LED's when the switches are turned off and the switches when no internal testing operation is being performed on the LED's. It helps in independent testing of the system without any external help and makes the system robust, offering many advantages that one could count of. BIST is fast becoming an alternative solution to the rising costs of external electrical testing.

**Index Terms**—BIST(Built-in Self Test), LED, switch, independent.

## I. INTRODUCTION

A built-in self-test (BIST) or built-in test (BIT) is a mechanism that permits a machine to test itself. It helps in having lower repair cycle times and keeps the system running for longer duration until an unknown error which cannot be configured by the system occurs. It caters to limited technician availability and also lessens the need of one, to a large extent. The cost of testing using Automated Testing Equipment(ATE) is drastically reduced. Hence external intervention in its operation is also reduced to a great extent. BIST is commonly placed in weapons, avionics, medical devices, automotive electronics, complex machinery of all types, unattended machinery of all types, and integrated circuits.

## II. THE MODEL

### A. Design Methodology

Clock and Switch inputs are provided to the system and the LED's are placed at the outputs. A flag is placed in the system to test LED's at F=0 and testing switches when F=1. After slowing down the clock for LED testing(F=0), the LED's are made to glow one after the other and then turned off in a FILO manner using the slower clock. The switches are tested(F=1) if the output LED's reflect the input values switched on. Figure 1 describes the working flow of the model.

### B. RTL Diagram

Figure 2 shows the RTL schematic of the model upon RTL Analysis in Xilinx Vivado .

### C. Waveform of Operation

Figure 3,4 show the waveform simulation.

## REFERENCES

- [1] <https://github.com/Amreen-Kaur/bist>

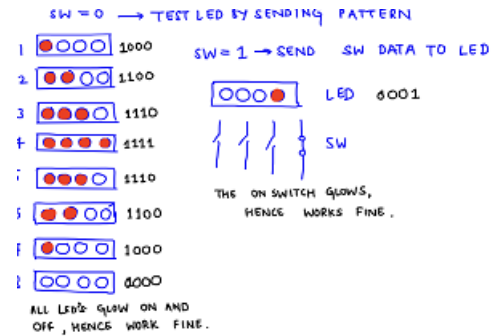


Fig. 1. BIST Design

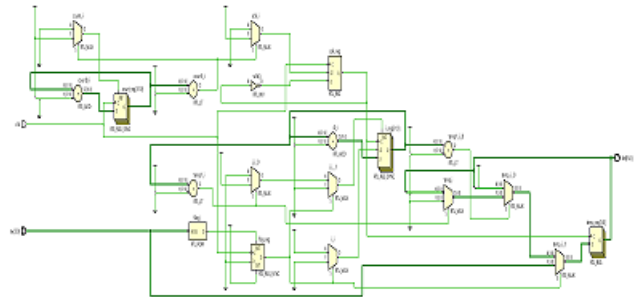


Fig. 2. RTL Schematic



Fig. 3. Waveform for LED testing.

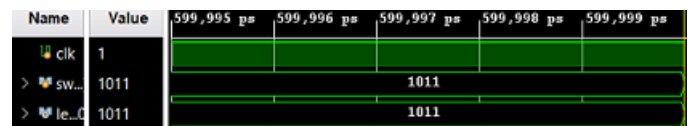


Fig. 4. Waveform for Switch testing.