A VERSATILE DIGITAL TESTER USING FPGA PLATFORM  
PROJECT CODE: B02-08  

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Introduction  
Integrated Circuits (IC) is very common nowadays. In order to provide a good IC products in assembly line, an IC tester is needed. Tester can be divided into 2 categories:  
- High Cost  
- Small Size  
- Difficult to use  
- Slow  
- Limited Function supported  

Aim and Objective  
In this project, we aim to develop IC tester with the following advantages:  
- Lower price  
- Higher accuracy  
- Portable  
- Convenience  
- User friendly  
- Support user defined functions  
- Support different type IC  

Methodology  
System Diagram  
Hardware Level  
PC, RS-232, FPGA, CABLE, DUT  
Software Level  
PC, MicroBlaze, Standard, RS-232, DUT  

Functional Test Procedure  
1) User input the parameter of the IC, the testing vector and expected test result.  
2) Send the setting to MicroBlaze Processor via Serial Port.  
3) Verify the received data completeness and store to RAM.  
4) Control logic start to test the IC.  
5) Collect the result to all output pin.  
6) MicroBlaze Processor analyses the result and sends back to computer via RS-232.  
7) Computer displays the result to DUT.  

Voltage Selector & External supply voltage Input  
Different type of integrated circuit chips required different supply voltage. To solve this problem, a voltage selector and external supply voltage pin are implemented on the Device Under Test Board.  

Technical Challenge  
- Problem: transmission of data may occur errors or data loss and it affects the correctness of the result.  
- Solution: Encoding and acknowledgement are needed.  
- Problem: inconvenient for user to input the signal at large quantity.  
- Solution: using waveform based to provide flexibility.  

Result  
Our tester can perform testing on different types of chips, including:  
- Arithmetic and Logic Units  
- Sequential Logics  
- Buffer and Binary Counters  
- Multiplexers and Decoders  
- Logic Flipflet Blocks  
- Simple Logic Gates  
It supports up to 100000 test cycles with a period of about 500 ns.