Counterfeit IC Detection

Team 162
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The measurement board that we are designing will help in the detection of counterfeit electronics. Current methods involve either expensive test equipment or experienced test engineers. Our test board will be low-cost and easy to use. There will be a controller circuit that manages all the tests that will be FPGA-based. this FPGA will interpret all data from the devices under test and transmit the data collected to a computer for a statistical analysis.

**Technical Specifications**

**Current Board**
Provide means for oscilloscope to measure current
Powered by DC power supply
Provide reset and clock
I/O for all ports

**Measurement Board (Modifications of Current Board)**
The I/O or microcontroller should be easily accessed by FPGA
The clock ringing should be reduced for more accurate results
Provide a means to measure leakage current

**Measurements**
The tests that will be conducted on the designed board will be tested using advanced equipment to better understand the specifications for the design of the board.

The tests should all be automated and take <5mins per chip.
Test will be conducted on at least 150 microcontrollers
Classification of the test chips should be done

**Statistical Analysis**
- Should be able to perform golden model classification
- Should be able to cluster groups for no golden model scenarios.

**Leakage Current**
- Measure at 10 Different Supply Voltages Ranging From 2.5V to 5V
- Accuracy of <10uA

**Transient Current**
- Initial Measurements should sample at >1GHz
- Final Measurements should sample <50MHz
- All Units Under Authentication should start in the same state and execute the same instructions for measurements on different UUA
- Accuracy of <1mA

**Speed Measurements**
- Speed should be measured for at least 5 different programs
- Accuracy of <2MHz

**Environmental Parameters**
• Test should be conducted at room temperature
• Room temperature should vary <5 degrees C in between measurement of different chips

**Automation**
User supplies part information to parts database
Parts database should get built as more users enter in part information, namely:
  • Package Type including number of pins
  • Pinout
  • Special requirements for operation
Program should generate to the netlist
  • Pull down resistors to ground
  • Option for internal/external clock
  • Reset switch connected to reset input
  • Sense resistor on the high side supply
Program should generate bill of materials, including
  • Part number
  • Manufacturer
  • PCB Footprint