NSM Industrial Solutions Pvt. Ltd.

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Test Design Guide for ICT (In-Circuit Testing)

Objective

ICT (In-Circuit Test) is intended to detect following

- Whether all components are assembled or not.
- Whether assembled components are of correct specification or not.
- There should not be any unintended shorts and isolations in the circuits.

Test Type

Based on the Component being tested, Appropriate Test Type need to be selected from below options.

- DC Resistance
- Continuity
- Capacitance
- Dissipation Factor
- Inductance
- Quality Factor
- Impedance
- Phase angle
- Equivalent Circuits Series/ Parallel
- Combination of all

Typical Test Selection

For Passive components like Resistors, Capacitors, Inductors, Their individual specification value in Ohm, Faraday and Henry can be tested, if required at particular test frequency.

For Diodes, Resistance can be tested in forward and reverse bias.

For FPGA/ CPLD/ ASICs/ MicroControllers, equivalent series/ parallel impedance can be tested at its various pins and frequencies.

Because, all components are soldered on PCBA, their actual measured value will change depending on series and parallel combination of other components. Hence, appropriate test criteria should be fixed by considering Schematic Design of PCBA.

Along with Schematic Design, It is also easy to take few known good samples, do measurement on it and then apply little Math to decide test criteria and their tolerances, for differentiating good and bad.

Shorts and Isolation

To Detect unintended Shorts and Isolations in the circuit, PCBA Netlist is to be considered as reference.

Feed in the Netlist into our system.
It will conduct all required tests and detect unintended shorts and unintended isolations in the circuit.

Summary

How many Test Points are required to perform ICT on any PCBA ?
Ans: Refer PCB Netlist.
Number of Test Points = Number of Nets in PCB.
E.g. If your PCB Netlist is having 44 Nets, You need 44 Test Points.

What tests to be performed on which test points ?
Ans: Consider PCB Schematic Design and take few known good samples. Do actual test on them, Apply Math and decide the test type and its tolerances.

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Thank you

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