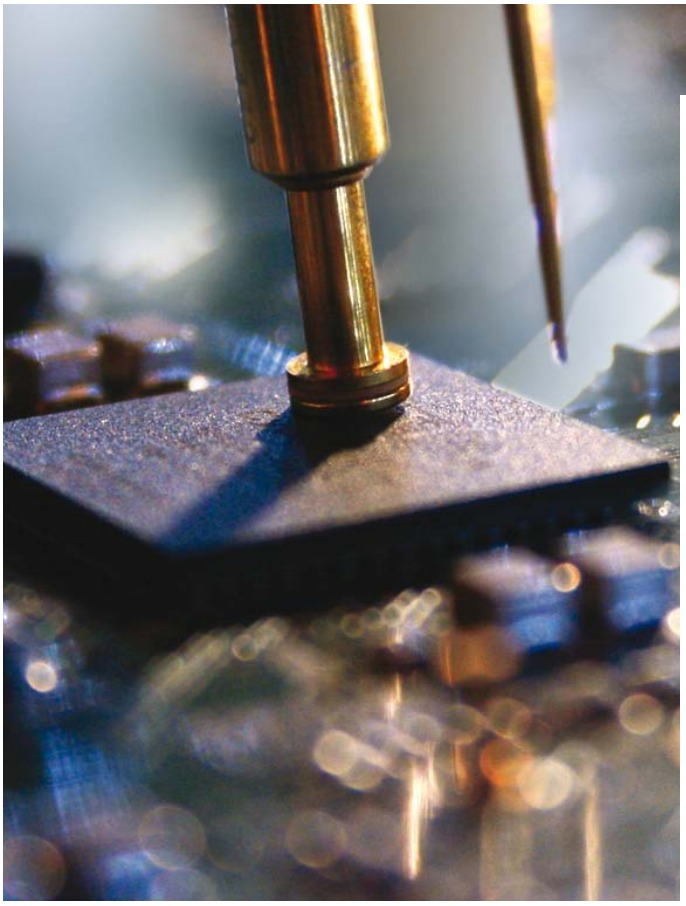
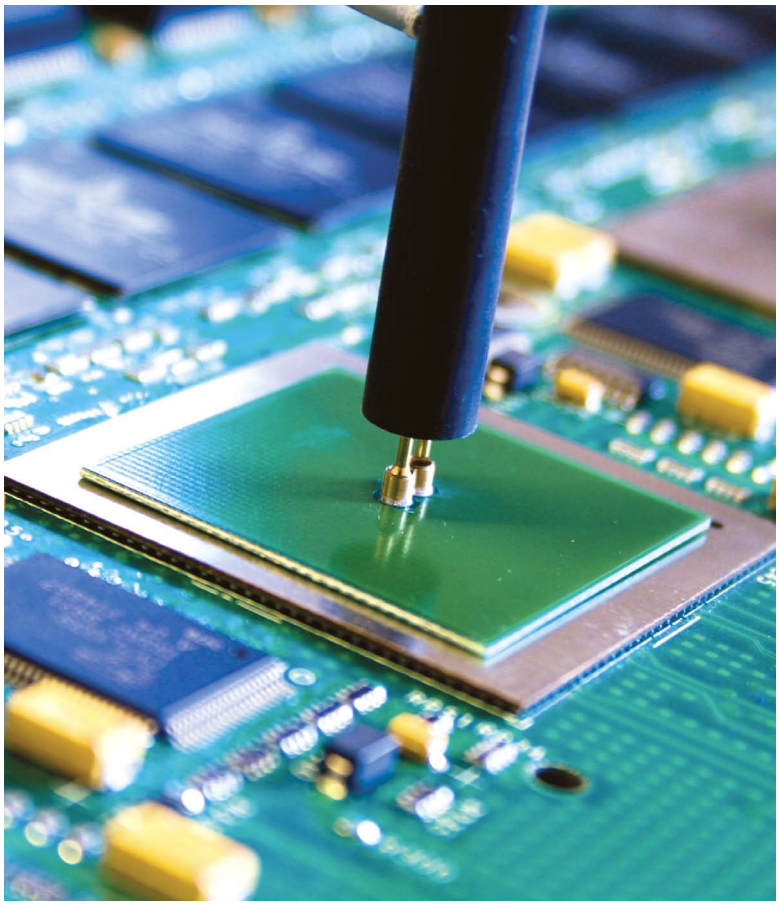
Open Pin Scan

Power-off Vectorless Test Techniques

for SPEA's Flying Probe & Bed-of-nails Testers





Open Pin Scan is SPEA's set of vectorless test techniques for detecting open pins and many more process faults on PCBs in a easy and fast way, without powering the board.

It consists of two complementary techniques, that are supported on all SPEA's board testers, either flying probe or bed-of-nails systems.

Together, they perform the most accurate and repeatable measurements also on BGAs, micro-BGAs, ultrasmall devices, connectors and capacitors.

4060
Flying Probe Tester

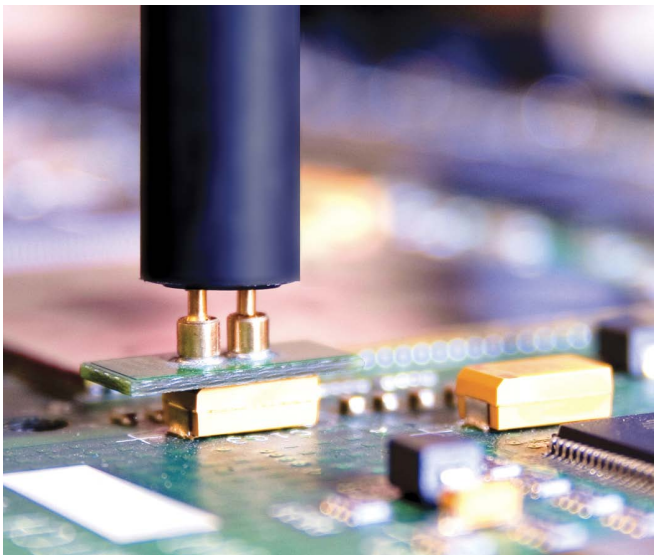
3030
Bed-of-nails Tester

SPEA

The Test techniques to find open pins

The **Open Pin Scan** techniques **detect open pins on SMT boards in an easy and fast way, without using test vectors and without the need to power the board**.

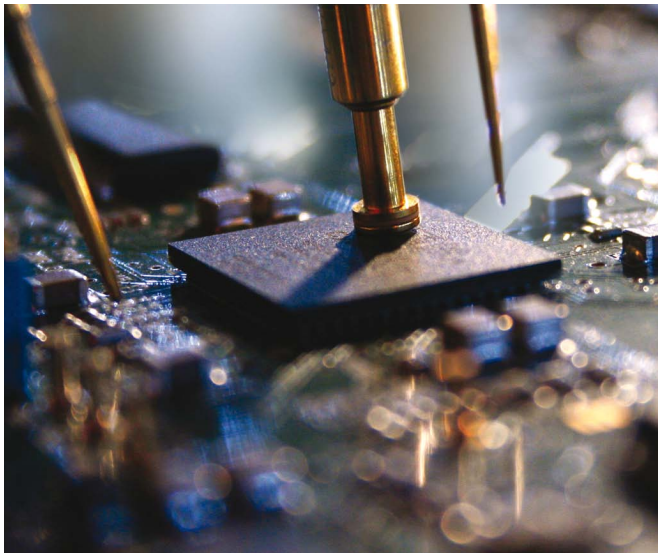
The use of two different techniques in parallel results in a much **better coverage of open-pin detection**, and furthermore allows detecting on the board many more process failures, such as **reversed capacitors and integrated circuits, or correct connectors assembly**.



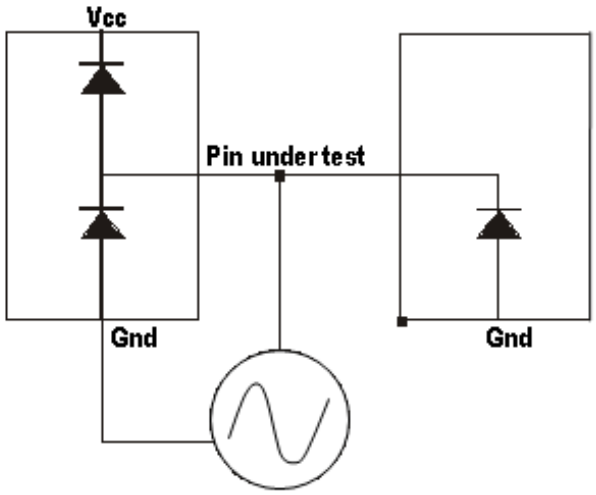
Open Pin Scan is used on a SPEA 3030 board tester to detect reversed polarized tantalum capacitors

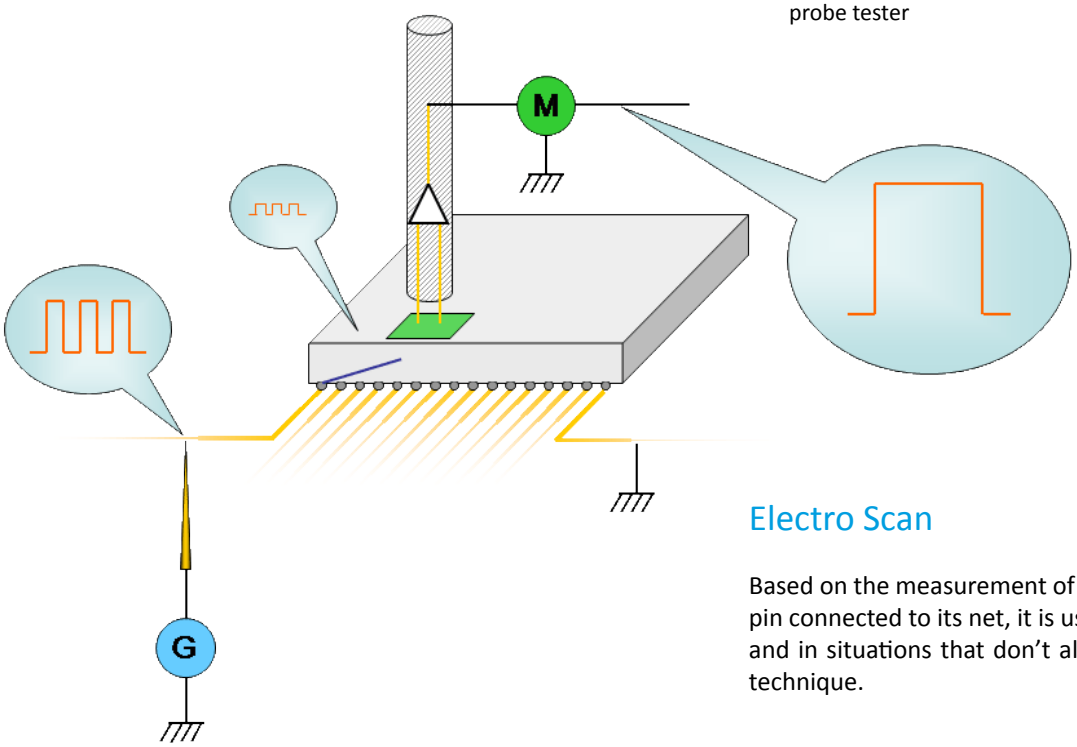
Junction Scan

Based on the measurement of the clamp diodes of the pins connected to their own nets, it is the simplest technique and it is used where **the pin of the integrated circuit is connected to an analog part or to a connector** and not to other digital components.
This technique allows the detection of broken clamp diodes, therefore it is very useful for board repair.



Open pin test by using Electro Scan technique on a SPEA flying probe tester





Electro Scan

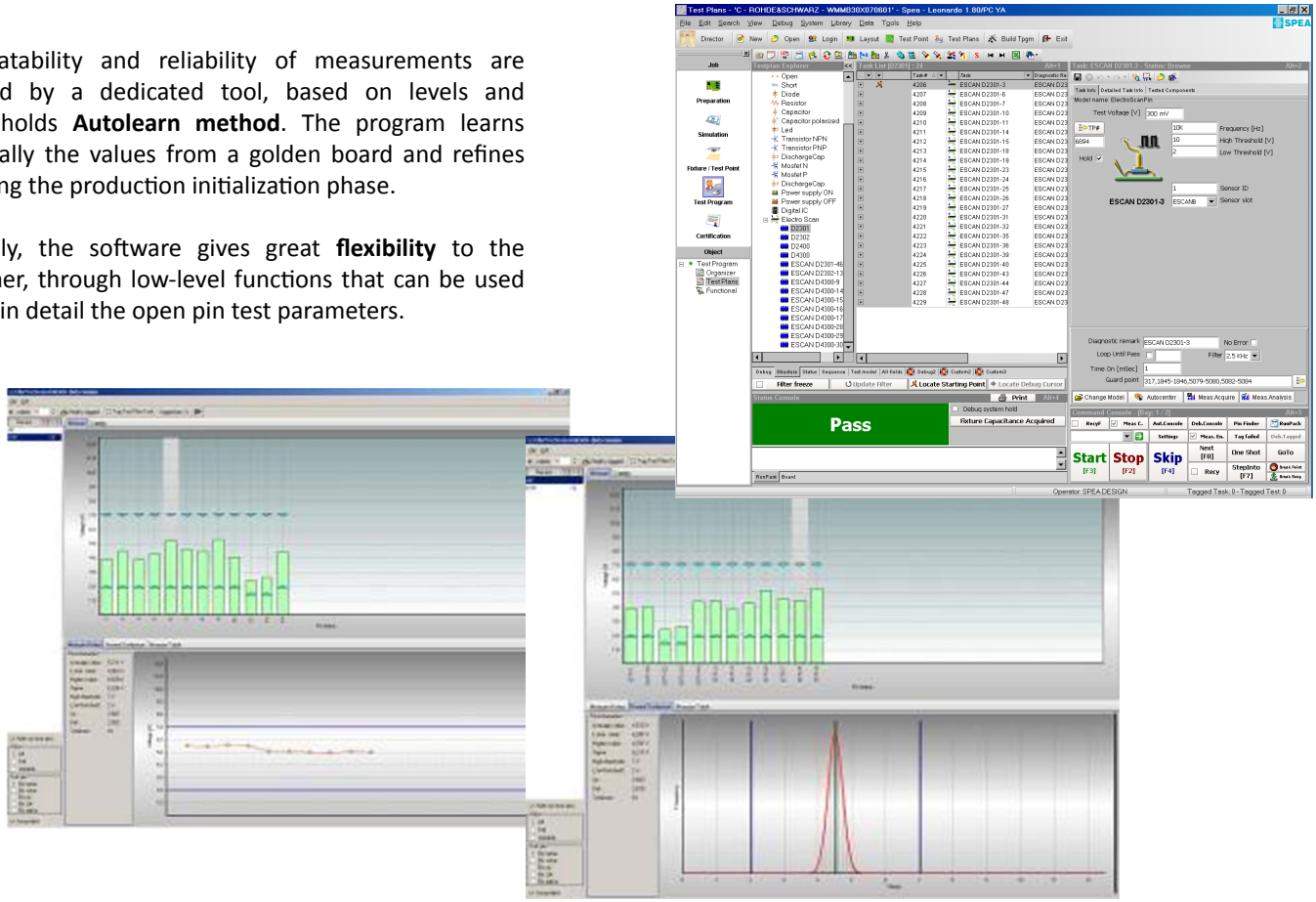
Based on the measurement of the electric field emitted by a pin connected to its net, it is used in **complex digital circuits** and in situations that don't allow to use the Junction Scan technique.

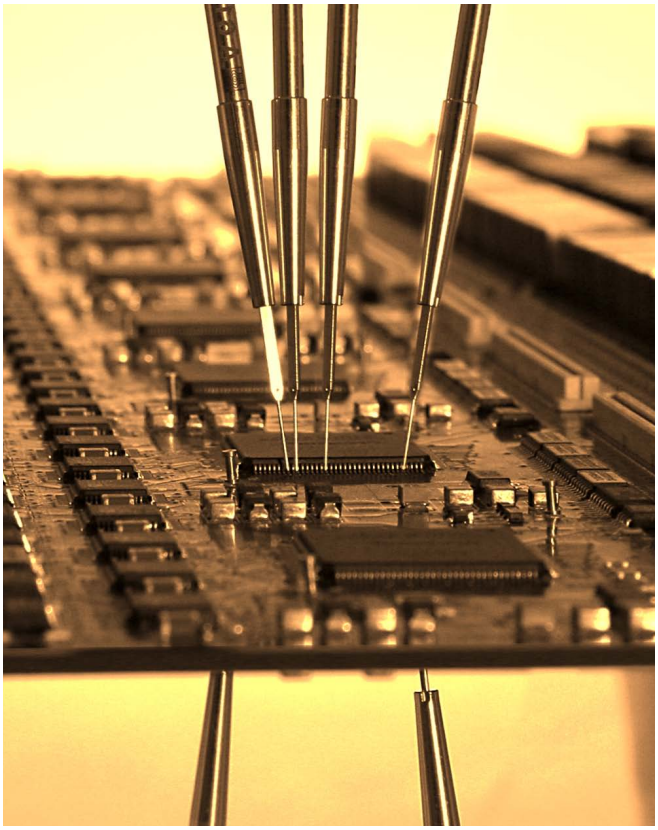
Autolearn

The Open Pin Test is automatically generated starting from the board data description. Leonardo software automatically selects the pins to be tested, choosing the best test technique to use.

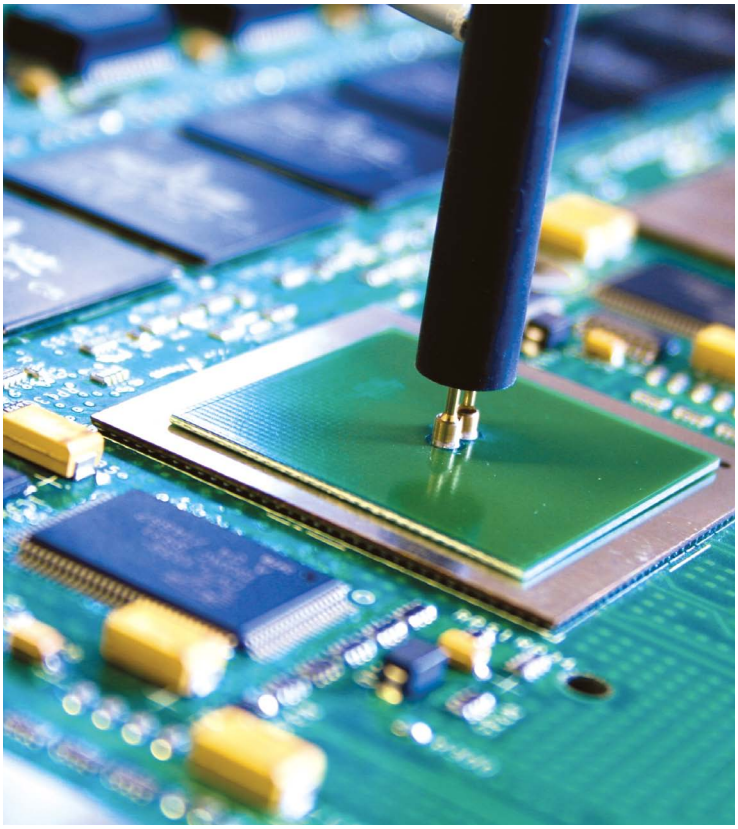
The repeatability and reliability of measurements are guaranteed by a dedicated tool, based on levels and test thresholds **Autolearn method**. The program learns automatically the values from a golden board and refines them during the production initialization phase.

Additionally, the software gives great **flexibility** to the programmer, through low-level functions that can be used to modify in detail the open pin test parameters.





Junction Scan technique is applied by SPEA flying probes to detect open pins on a BGA component



Electro Scan technique is applied by SPEA 3030 board tester to detect open pins on a BGA component

Open Pin Test for bed of nails and flying probes

The **Open Pin Scan** techniques can be applied on SPEA 3030 board testers as well on the full range of flying probe testers.

When using **Open Pin Scan** techniques on a bed of nails board tester, test pads are necessary, while on flying probe testers the very high accuracy in probe positioning enables to **check the connection of integrated circuit pins directly on the pad of the pin** to be tested, without requiring special test pads.

On the flying probes testers it is furthermore possible to apply **a further open pin test technique that does not require the board to be powered: the NZT**, based on the measurement of the nodal impedance. The technique consists in the accurate measurement of the capacitive and resistive values of each single net on the board, considering a reference point, so in case of not soldered pin, the measured impedance value changes.

SPEA Flying Probe Range

4030	4060	4020
Maximum throughput	Maximum performance	Maximum savings

SPEA Bed-of-nails Range

Test capabilities & Applications

Technique	Applications	Clamp Junction	Work on BGA pack	Faults detected
Junction Scan	All kinds of ICs with Clamp Junction	Yes	Yes	Open Pins ICs orientation
Electro Scan	ICs Connector pins Stray capacitors Polarized capacitors	No	No	Open pins Electrolytic capacitor polarity Presence of connector pins Stray capacitors presence

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