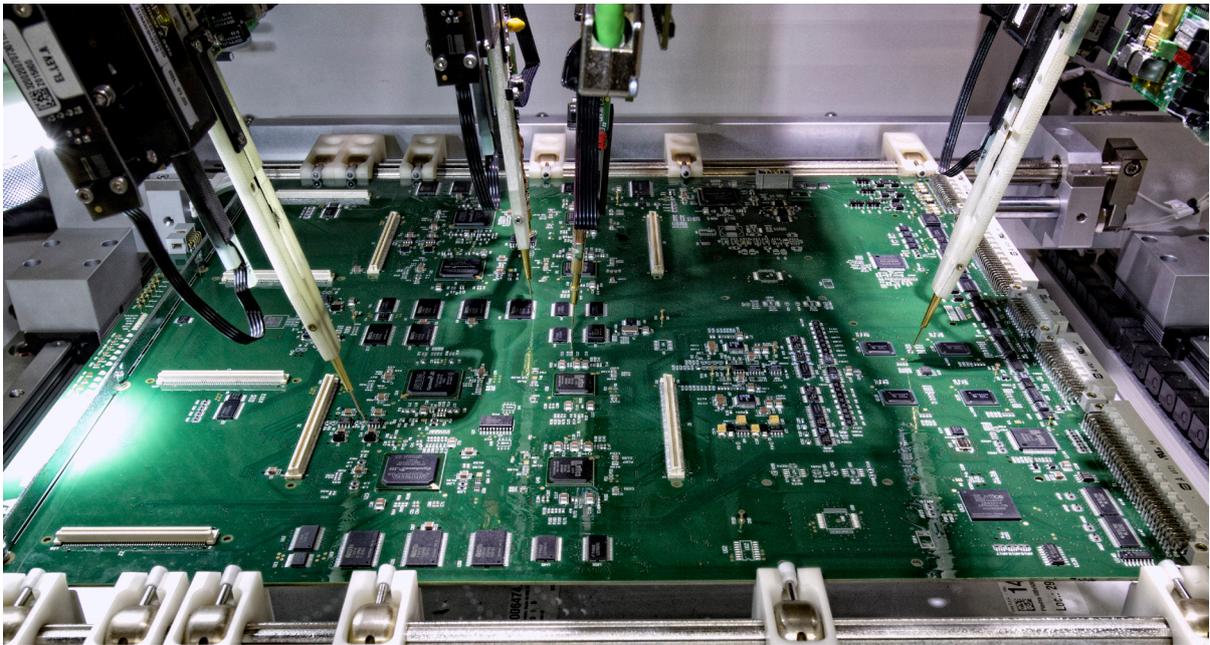


Only one test per net.  
Are you ready to boost your throughput?

# NZT 2.0 Nodal Impedance Test

FOR SPEA FLYING PROBE TESTERS



**4030**  
Maximum throughput

**4060**  
Full performance

**4020**  
Maximum saving

Forget traditional test and all the time that requires. Revolutionize the way you test. Reduce the necessary tests from many to **only one per net**, greatly **increasing your throughput**.

**SPEA NZT 2.0** is a net-oriented test technique, developed in whole by SPEA in order to **reduce the test time** for flying probe testing **up to 80%**, while guaranteeing **100% of short circuits coverage** and detecting also the **latent failures** not covered by the in-circuit testing.

**SPEA NZT 2.0** is the result of more than 10 years of enhancements made by SPEA: the **new hardware and software** technology offers **higher accuracy and stability**, a **faster test** execution, and a full **optimization of the test time**, by combining NZT test and in-circuit test.

# NZT 2.0

## Faster test, better coverage

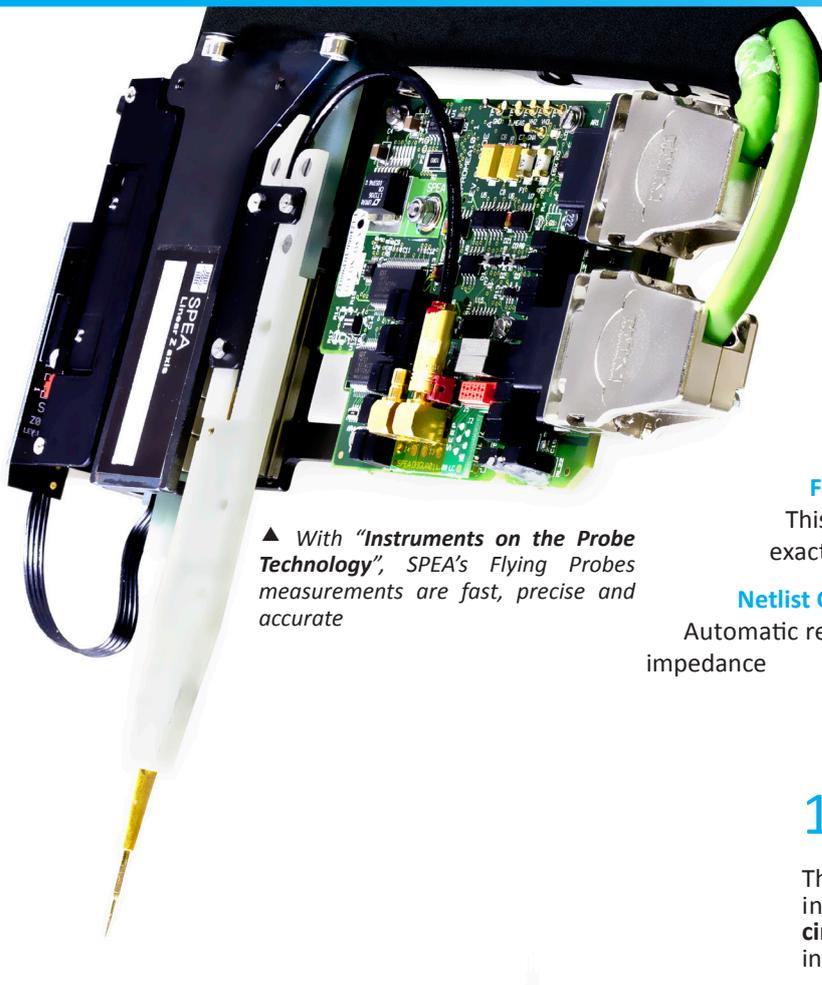
Forget traditional test and all the time it requires: **SPEA NZT 2.0** is ready to change the way you test.

**NZT 2.0** is the innovative test technique based on the measurement of the **nodal impedance value** on the nets, **independently from the single components** on the board.

Instead of physically checking the absence of process errors (as short circuits or open pins) and performing parametric test on each component, **NZT 2.0** checks that **each single net capacitance, resistance and junction voltage** behaves coherently with golden board values. In this way, for a board of around 1000 nets, just 1000 tests are required to check for all possible short circuits.

Then, if a fault is pointed out, the system automatically performs, on the **components connected to the net**, the required **ICT test** to find out the error that alters the net behavior.

Full test coverage in the shortest time: this is **SPEA NZT 2.0**.



▲ With "Instruments on the Probe Technology", SPEA's Flying Probes measurements are fast, precise and accurate

## NZT 2.0 Main Functions

### Test Program Optimization

The analog test program eliminates the tests that are already covered by the NZT 2.0 test. These are automatically determined by Leonardo software, and will no longer be run.

### Golden Board Detection

Safe determination of the golden board, through the certification of short circuits absence.

### Fault Identification

This function determines – through selective analog tests - the exact causes of the faults that are pointed out by the NZT 2.0.

### Netlist Generation

Automatic rebuild of the board netlist, through the measure of all nets' impedance

## 100% Test Coverage

The **SPEA NZT 2.0** can check all the types of failure on the nets, including **hidden faults not detectable through the in-circuit test** as, for example, those concerning the I/O stages of integrated circuits (side effect), or stray impedance on the ICs.

The main **diagnostic advantages** deriving from using this test technique are the following:

- **100% coverage of possible short circuits**, not depending on the location and physical distance among the tested points (unlikely the algorithms normally used for short test on flying probes)
- **Fault detection on non-contactable areas of the board**
- **Test of all the components on the board**: active, discrete and passive
- **Trace continuity failures** (even if both ends of a trace are not accessible)

The **combination of SPEA NZT 2.0 and in-circuit test**, in addition to the test time optimization, makes the flying probe **test coverage higher than a bed-of-nails tester**.

## Some defects NZT 2.0 can detect:

- Short circuit between adjacent points
- Short circuit between non-adjacent points
- Wrong value error
- Open pin
- Errors on I/O stages
- Parasitic stray impedance (IC degraded)
- Leakage on printed circuits
- Bus line impedance

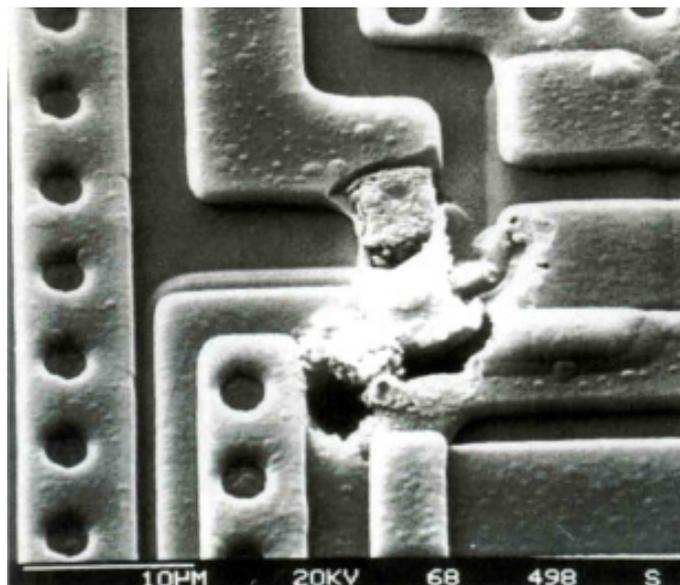
# Extreme accuracy

## with SPEA “Instruments on the Probe Technology”

**SPEA NZT 2.0's** effectiveness is guaranteed by the extreme **measurement accuracy** of the SPEA instrumentation, resulting from **more than 10 years of enhancements** on this technique application.

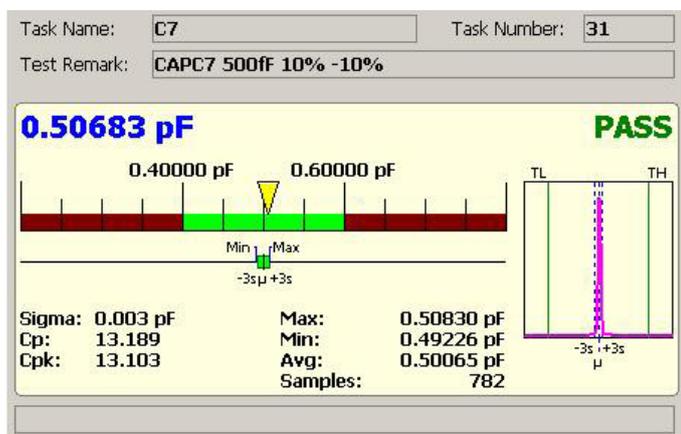
The **measurement electronics** - which is based on fast and powerful DSPs - is positioned **directly on the probe**, to avoid the signal transmission through long cable lines, and performs measurements with **0.1 pF resolution** (0.5 pF accuracy).

The measurement of such **small values** is **crucial** in the application of a net-oriented test technique, because the values to be measured are often very small: for example, in case of **tracks joining two connectors, nets concerning non-connected pins of ICs, or anomalies bound to analog or digital I/O stages of ICs**.



▲ Anomalies on the I/O stages of ICs are often due to **electrostatic discharges**. The components are becoming more sensitive to this phenomenon, as their integration increases and the insulating oxide layers are thinner.

◀ Example of impedance measurement with NZT 2.0. The very low sigma highlights the extreme measurement precision. Test time: 0.5 ms.



# Easy to use

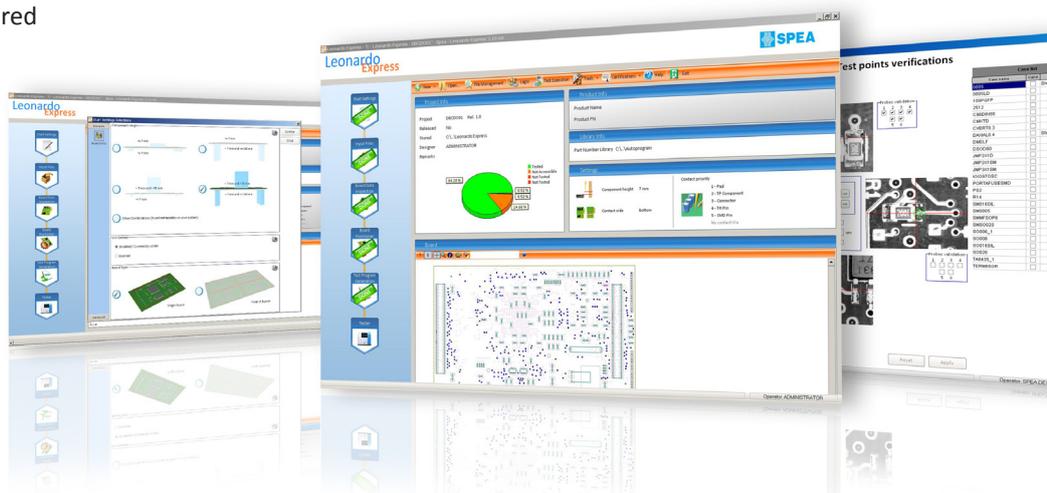
## with Leonardo Express OS

**SPEA NZT 2.0** test is easy and fast:

- The acquisition of the net impedance value is based on the **auto-learn from a golden board**
- The test program generation is completely and homogeneously **integrated in the Leonardo Express** (or Leonardo Advanced) environment
- In case of a lack of documentation, the netlist can be automatically generated quickly
- **No debug on the test program** is required

**SPEA NZT 2.0** is ideal in those situations - **reverse engineering, repair centers** - where it is required to quickly generate a test program without having the board information (CAD files, electrical diagrams, ...).

The board netlist is automatically generated by the **NZT 2.0**.



# NZT 2.0

## Main advantages

- **Up to 80% test time reduction**, compared to the complete in-circuit test execution on flying probe system. Just contacting one net **simultaneously performs** all the measurements required by the NZT test of the **connected components**.

- **NZT + reduced ICT**. The **in-circuit test program is quickened** without losing test coverage, by eliminating all the tests that are already covered by the **NZT 2.0**. The optimization is maximized because the **probe moves are reduced** when executing **NZT and in-circuit test in a combined way**. The in-circuit measurements are performed only on other **components connected to the defective net**, as found by the NZT. Result: fault is identified.

- **Increased test coverage**. Through the **NZT 2.0** test, it is possible to **also test non-contactable areas** of the boards, detecting 100% of the possible short circuits and also detecting **hidden faults** (not covered by the in-circuit test) related to digital components functionality.

- **Ideal for reverse engineering**. **NZT 2.0** does not need board data. Measuring all nets' impedance, the flying probe **automatically rebuild the board netlist**. A powerful tool for **repair centers**: reverse engineering of boards without CAD files, electrical diagrams or any other information is not a problem with **NZT 2.0**.

- **Reducing** the test number (typically 1/7 compared with conventional test, depending on the UUT), **NZT 2.0** is ideal for testing **delicate surfaces**.

### FAST

Test time reduction: 80%

0.5 ms per test

Fault ID: parametric test only when faults are detected on the net

### COMPLETE

100% short circuit coverage

Test of non-contactable areas of the board

Test of active, passive & discrete components, open pins, I/O, parasitic impedance, leakage

### EASY

Golden Board acquisition

Easy and direct programming

No need for board data

### ACCURATE

0.1 pF resolution  
0.5 pF accuracy

Measurement performed on junction tracks between connectors

Measurement performed on nets concerning non-connected pins of IC's

