IST

INTERCONNECT STRESS TEST

Fast repeatable PWB reliability testing using IST

PWB interconnect solutions inc.
IST testing systems and services

Polar GmbH® Instruments

Interconnect Stress Test (IST)

is rapidly emerging as the preferred test methodology for the assessment of Printing Wiring Board interconnect.

Because PCB industry wide studies over the last ten years have concluded that compared to traditional methods, (thermal oven/liquid to liquid/sand bath/ solder float), **IST** methods are:

- Faster
- Repeatable & reproducible Easy to characterize
- Simulate the products expected
- assembly/environmental conditions
- Cost effective
- Reduces the need for micro sectioning
- Simplify data analysis & interpretation

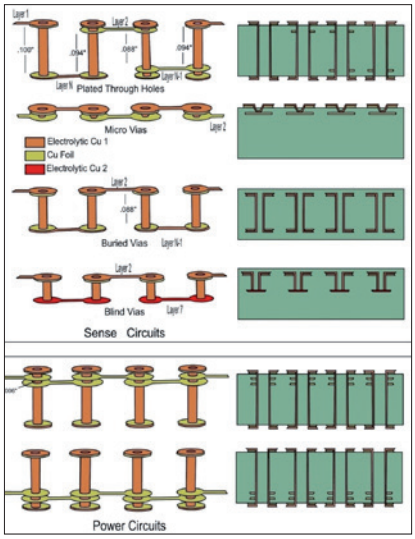
IST is an accelerated stress test method that overcomes the limitations of thermal oven or liquid/liquid methods, IST has the capability of effective/rapidly quantifying the integrity of both the Plated Through Hole (PTH) and the unique ability to identify the presence and levels of post separations within the multilayer board. **IST** creates a uniform strain from within the substrate, the interconnects ability to distribute and redistribute this strain provides an indication of integrity. The plated barrels and inner layer junctions are "exercised" until the initial failure mode/mechanism is uncovered. Following several years of intense evaluation, the IPC have approved the **IST** technology as the first electrical test methodology for assessing plate through hole integrity and for the detection of post separation. The IST methodology is issued in the IPC-TM-650 Test Methods Manual.

By integrating heating elements and sense traces into a custom coupon design, **IST** is able to extract reliability information without the need to resort to traditional oven/ Liquid to Liquid methods. Both power and sense elements are embedded into the test coupon structure

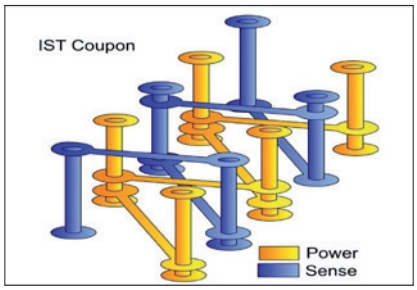
IST is able to interrupt testing just prior to the failure occuring thus allowing more detailed analysis of the fault mechanism than with traditional methods.

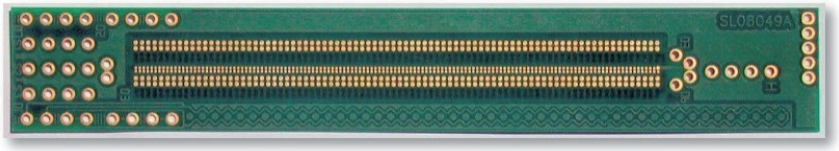
About PWB Interconnect Solutions

PWB Interconnect Solutions Inc. is an advanced technology company which offers a revolutionary method for assessing the quality of printed circuit boards (PCB). Their patented interconnect stress test (IST) technology has the unique ability to identify the presence and severity of post separation of both the plated through hole (PTH) and vias within multilayer PCBs. **IST** technology offers significant advantages over traditional test methods while providing microsection analysis with precise fault locations.

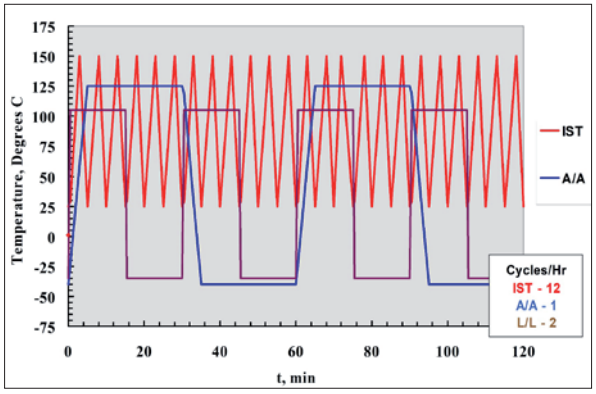


IST tests all types vias on PCBs

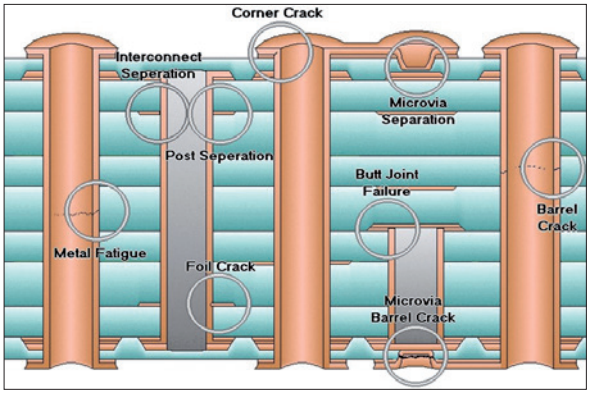




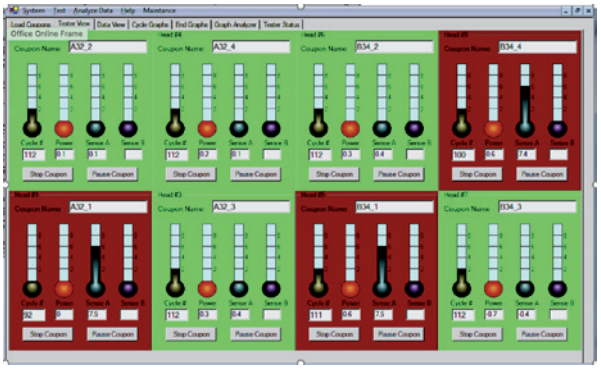
IST coupon



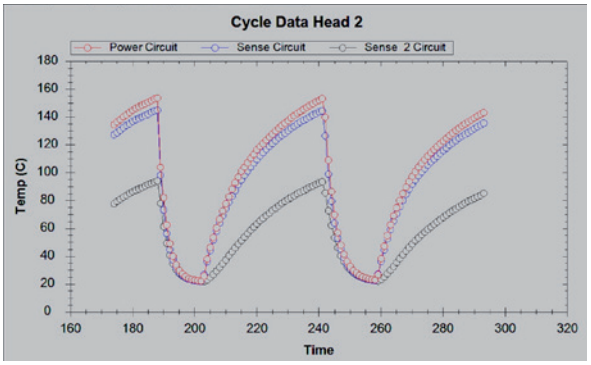
Comparison IST vs. Air/Air or Liquid/Liquid, number of cycles over time



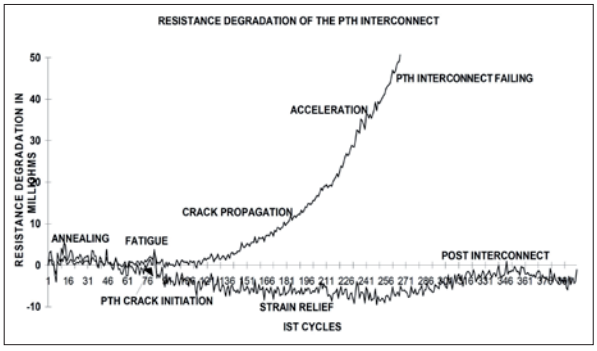
Typical failure modes in a PCB



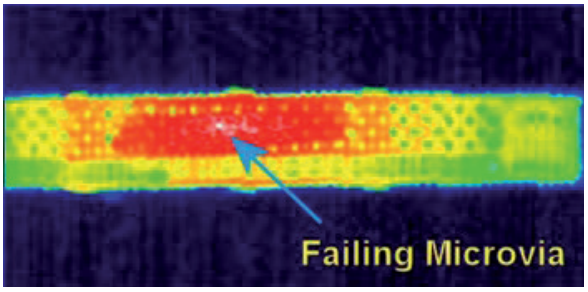
Coupon status display for all 8 heads



IST coupon temperature profile vs. time in seconds

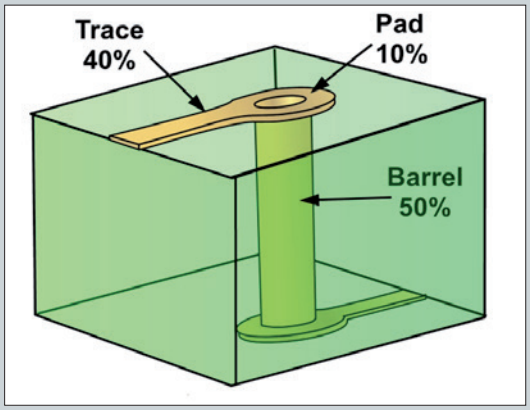


Resistance change vs. number of cycles

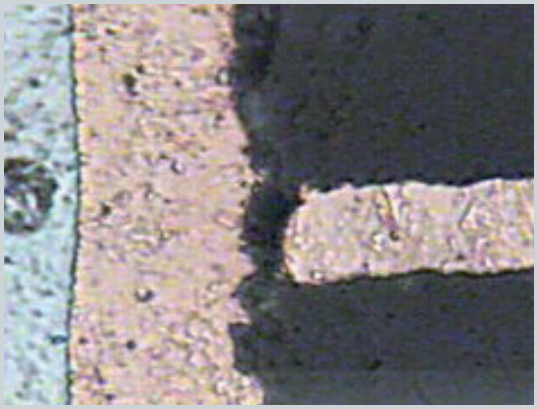


location on IST coupon using a thermal camera

Typical damage patterns on Plated Trough Holes (PTH)

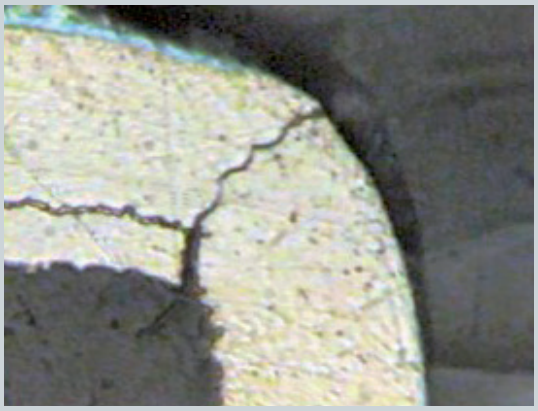


PTH resistance distribution



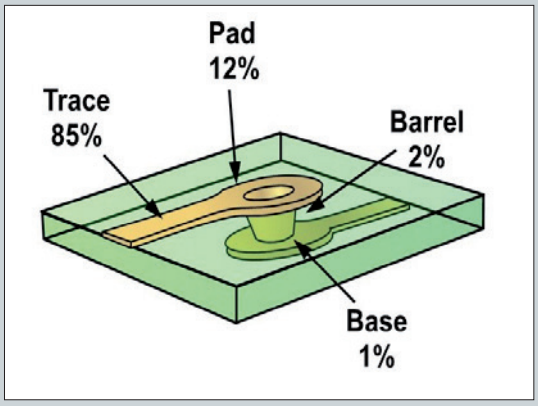
PTH post seperation

PTH barrel crack

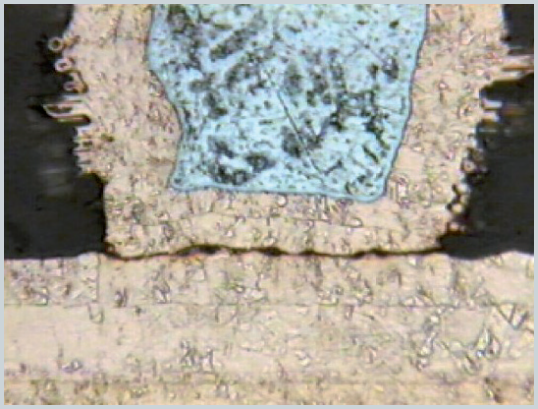


PTH knee crack

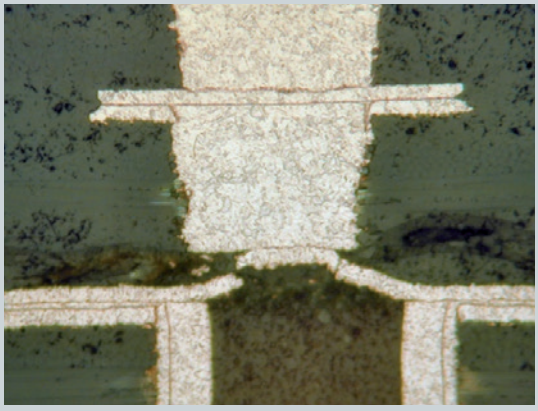
Typical damage patterns on microvias:



Microvia resistance distribution



Microvia target pad seperation



Microvia target pad fracture

Microvia corner crack

IST System comprising of 19" rack and coupon compartment

IST

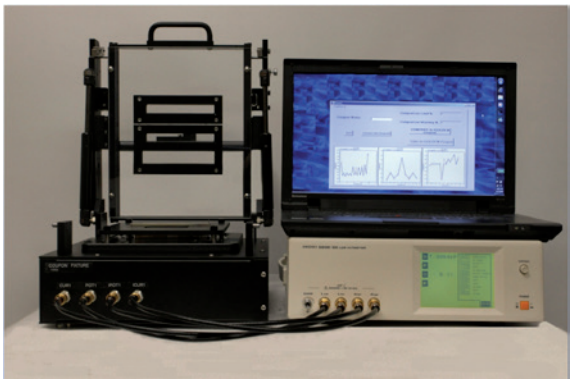
Revolutionary reliability test method.

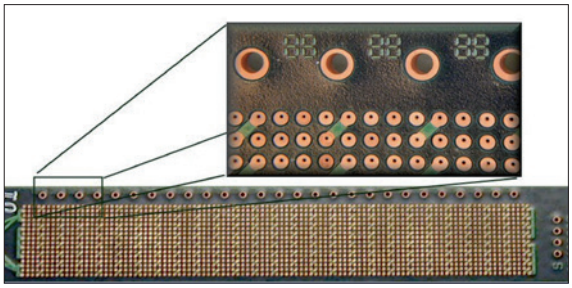
IST Technology is now capable of providing to the Printed Wiring Board Industry a new revolutionary method of testing which has the following characteristics

- **IST** removes the ambiguity
- **IST** accelerates throughput
- **IST** reduces overall cost, and
- **IST** improves customer satisfaction
- **IST** technology is the first test system capable of quantifying various types of post separation and PTH degradation that occur simultaneously or independently

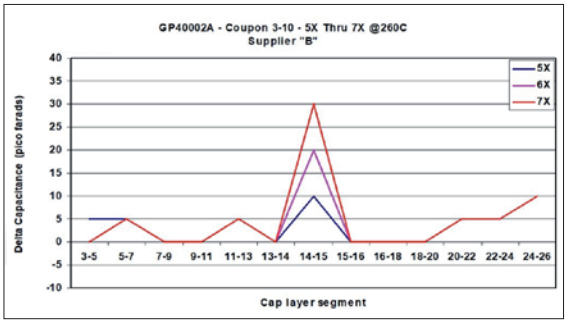
DELAM Tester

Each IST coupon features special delamination test structures for the purpose of recording capacitance values between layers. If during reflow simulation or regular IST testing, delamination occurs, the optional DELAM Tester will detect delamination as a relative change of capacitance to „as received".

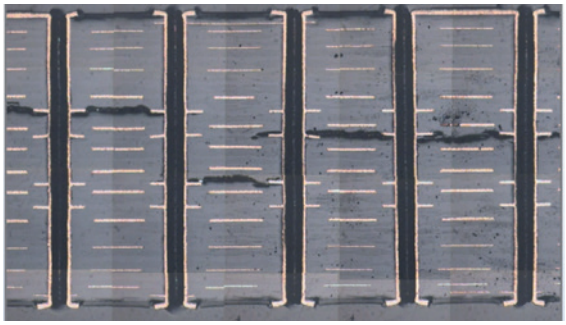




IST coupon with delamination test structures



relative change of capacitance after delamination



cross section of coupon showing delamination

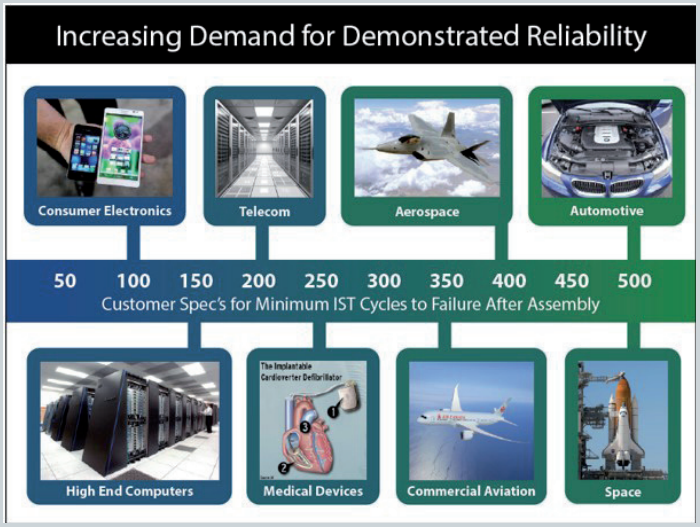
How often do I need to IST test? The answer is very much related to who's asking the question. There are typically three levels of customers that require IST test data;

1 PWB Manufacturers
2 Component Assembly/ Contract Manufacturers
3 OEM's or End Use Customers.

The activities requiring **IST** data for each customer level is as follows:

Combining an innovative coupon design incorporating both heating and resistive sense elements.

IST delivers cost effective reliability testing in a much more cost effective and time effective package. Backed by extensive IPC studies, the **IST** is a revolutionary alternative to traditional oven / liquid thermal shock techniques. Of special interest is the ability to stop testing just at or before the point of failure. **Polar Instruments** GmbH provides both sales and after sales support to PWB clients in Europe. If you need more information on reliability test please contact us at the address below.



The activities requiring IST data for each customer level is as follows:

1

Activity	Frequency
New Technology Introduction	During development & Pre-production phase
Product Baselining	During initial introduction phase
Process Monitoring	Ongoing following baselining activities
Chemical/Material Characterization	As Required
Process Troubleshooting	As Required
Correlation Studies	During initial development phase
Customer Assurance	As Required
Product Prescreening	Prior to long term (air to air) testing

2

Activity	Frequency
Impact of assembly/ rework stresses	Ongoing following baselining activities
PWB vendor base capability studies	During initial pre-production phase
Process/Product Troubleshooting	As Required
New Technology/Process Introduction	During development & Pre-production phase

3

Activity	Frequency
Technology/Design change impact studies	During initial pre-production phase
Product Troubleshooting	As Required
PWB vendor base capability studies	During development & Pre-production phase
PWB vendor base qualification	As per the supplier procurement specification

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