Flying Probe impedance test - at fixture speed

Automated impedance measurement for volume coupon and panel testing

RITS520a

Repeatable, accurate, traceable
Precision airline verification
datalogging for SPC
Fast production throughput
Excellent R&R

polarinstruments.com
Automatic testing of controlled impedance PCBs and coupons

In response to the increasing volume of PCBs with controlled impedance, Polar Instruments has developed a turnkey system for automated impedance testing of PCBs and coupons in a production environment.

RITS520a automates the industry standard CITS500s (Controlled Impedance Test System) to give fast, repeatable volume testing of coupons and PCBs. CITS500s employs proven technology and is currently used worldwide for manual testing of controlled impedances.

Even if you have not had much experience of electrical or RF testing before, you will find RITS520a easy to use. The system is controlled via intuitive Windows software. Test set-up is straightforward, results data is automatically logged in accessible formats, and there is the option of a built-in report generator. We have found that system operators can usually be fully trained in just half a day.

High speed memory technology

Faster processors, accelerated graphics and faster communications require more system memory bandwidth. The evolving demands of multi-media applications and three-dimensional graphics functions in PC technology, mean that a high bandwidth memory is becoming essential to sustain system performance.

If you are a developer of high speed systems you will be familiar with the increasing need to impedance control traces, from memory modules through to backplanes. Accurate impedance traces are required, to ensure repeatable reliable system operation.

The challenge for the PCB industry is to develop reliable, repeatable processes for cost-effective volume manufacture of this next-generation technology.
Accurate, traceable measurement
RITS520a uses proven time domain reflectometry (TDR) techniques to measure the reflection of fast rise-time pulses. High precision reference airlines - traceable to NPL and NIST standards - ensure repeatable measurement accuracy to allow the trace impedances to be controlled.

You can be sure of the repeatability of the test measurement because RITS520a verifies its own calibration regularly. Unlike other impedance test systems, verification contact is between airline and probe tip, confirming the accuracy of the entire system, including the test probe. The system is able to make both single ended and differential measurements.

The calibration data is automatically logged for reference in the system log file and can be easily imported into Microsoft® Excel for inclusion in customer conformance reports.

Flying probe multi head technology
Multi head flying probe technology allows you to select one of six quick change probe options, from a range of probe pitches and differential or single ended footprints.

Working with your customers to optimise coupon and test trace footprints on the panels themselves will minimise the need for set up changes and further increase test speed.

The RITS520a has a panel capacity of 20" by 28" and can either accept a large quantity of test coupons for automatic testing or you may be working on high value boards which have built in impedance test structures, either way the RITS520a significantly reduces the amount of manual input required for testing, adding further to the high R&R of the system.

For multiple image panels it is easy to step and repeat the position data and test limits. The industry standard CITS software allows you to compensate for loss, check for differential trace imbalance, and because all the measurements are verified on a regular basis with traceable reference impedances you will be able to correlate your data across multiple systems.
**Datalogging and statistical process control**

RITS520a verifies impedance characteristics at each test point, logging results data and identifying each board as ‘pass’ or ‘fail’. In addition, with the powerful datalog report generator (DRG) option, you can record results in useful statistical formats, and generate reports automatically.

Minimum, maximum and average impedance measurements are logged, along with standard deviations for each batch and statistical process control values $C_p$ and $C_{pk}$. All data is saved in pipe-delimited ASCII format, for world-wide compatibility with popular analysis and reporting packages.

You can produce customer conformance reports, including pass only data, as well as reports showing all test results for internal records or analysis.

Manufacturers already using Polar’s TDR technology for impedance testing of PCBs include:

- CMK
- Daeduck
- DDi
- Gold Circuits
- Sanmina
- IBM
- Japan Circuits
- Nan Ya
- Samsung
- Siemens
- Tyco
- Viasystems
**RITS520a Probing System Specifications**

<table>
<thead>
<tr>
<th></th>
<th>Metric</th>
<th>Imperial</th>
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<tbody>
<tr>
<td>Probing area (max)</td>
<td>508 x 609mm</td>
<td>20” x 24”</td>
</tr>
<tr>
<td>PCB size (max)</td>
<td>514 x 711mm</td>
<td>20.25” x 28”</td>
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<tr>
<td>Test speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RITS520a</td>
<td>0.8s per test</td>
<td>0.8s per test</td>
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<tr>
<td>Z axis travel</td>
<td>10mm</td>
<td>0.4”</td>
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<tr>
<td>X-Y Positioning System Accuracy</td>
<td>+/- 0.04mm over 300mm</td>
<td>+/- 1.6 mil (0.0016”) over 12”</td>
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<tr>
<td>Repeatability</td>
<td>+/- 0.01mm (typical)</td>
<td>+/- 0.4 mil (0.0004”)</td>
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<tr>
<td>Resolution</td>
<td>RITS520a 0.032mm</td>
<td>1.2 mil (0.0012”)</td>
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<tr>
<td>Minimum pad size</td>
<td>RITS520a 0.5mm</td>
<td>20 mil (0.020”)</td>
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<tr>
<td>Probing force</td>
<td>142g (maximum)</td>
<td>5 oz (maximum)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>1520 x 1270 x 1750 mm</td>
<td>60” x 50” x 69”</td>
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<tr>
<td>Weight</td>
<td>300kg (approx)</td>
<td>660lb (approx)</td>
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**Prober Interface**
- PC Custom Interface board supplied (full length, 122mm height inc. edge connector)

**Measurement System**
- Range: 0 to 150Ω
- Accuracy: 1% at 50Ω, 1.25% at 75Ω, 1.5% at 28Ω and 100Ω
- Self Verification: Precision airlines mounted on table for auto-verification at probe tip
- Display Resolution:
  - Horizontal: resolution 0.2mm (0.008”)  
  - Vertical: resolution 0.03Ω

**Standard Accessories**
- External monitor and joystick plus all leads, cables
- Operator Manual

**Optional Accessories**
- Datalog Report Generator software (ACC230),
- Signal Integrity & Impedance design tools
- Laboratory test Fixtures
- Service Manual
- RITSCam Pro: CAD CAM Import software supports multiple format plus IPC-D-356 (ACC303)
- RITSCam Lite: Import software for IPC-D-356 (ACC304)

**Controller**
- Windows NT, Windows 2000 Professional
- 128MG RAM, full length ISA card interface

**Approvals**
- Conforms to applicable European Directives and is CE marked
- Polar Instruments Ltd is certified to ISO9001