



**The Test Connection, Inc.**

**GETTING TO THE POINT**

WWW.TTCI.COM

## Hot off the Press...



Owings Mills, Maryland, December 14, 2007, The Test Connection, Inc. (TTCI) a leader in electronic production test and test development application solutions, announced today, that they are now International Traffic in Arms Regulations (ITAR) registered. Meeting ITAR Certification certifies that TTCI has met requirements pertaining to organization structure, documentation, corporate policy, training and procedures to permit the company to handle, use and transfer information controlled by ITAR and the U.S. Munitions list.

TTCI now has the right to manufacture and ship military and aerospace products for export. Companies receiving this certification demonstrate that they have knowledge and understanding to fully comply with the Arms Export Control Act (AECA) and International Traffic in Arms Regulations as well as having corporate procedures and controls in place to ensure compliance.

The list of ITAR-controlled technologies often changes. As a ITAR certified partner, TTCI will stay updated to ensure our complete compliance. If you need more information, please contact Bert Horner for any inquiries.

## Joining The Team...

The Test Connection Inc. is excited to be adding the sales representation of Network Electronics Marketing, Inc. to our sales team. Network electronics will be our sales representation for the southwestern part of the United States. Network Electronic Marketing is an Electronic Distributor and Manufacturing Representative providing marketing and sales for leading edge materials, Interconnect Technologies and Printed Circuit Board Products.

**Network Electronic Marketing, Inc.** Phone:480-994-8242  
<http://www.networkelectronic.com>



## Folsom's Fast Facts

### Small boards only need very inexpensive fixtures?

For small boards the fixture portion of costs can be unexpectedly high. TTCI is working with our fixture building partners to break out of this box. In the past, the only strategy to save money on a test fixture for small, low node count boards, was to combine multiple boards onto a single fixture. But sometimes the multiple boards aren't available at the same time. The new solution is a two piece fixture kit. The master piece sets on the tester, has the vacuum port and over clamp. The unique board inset mates to the master piece and provides the bed of nail test access to the board to be tested. New boards can be added, each with its own unique insert, at any time.

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## Which Is Better: Flying Probe or ICT?

By: Bert Horner

With the newly 2008 upon us, comes new challenges that PC board manufacturers face in determining the quality of the product they build. Electrical testing has always been an essential test tool used in this determination. When traveling into different production environments in 2007, the most common question asked of me was "Which is better, Flying probe or ICT?"



A complete look at the testing that one can use throughout the PCB assembly process might be in order. Depending on the product, the following test strategies that one can use are: Automated Optical Inspection (AOI), Automated X-Ray Inspection (AXI), In-circuit Test (ICT), Flying Probe Test (also known as probers), Functional Test, System Test, and Environmental Stress Testing. In more recent years, the test strategy that has been the industry's workhorse is ICT.

A comprehensive ICT can identify: shorts and opens (impedance variations between electrical circuits or nodes); passive device values such as resistance, capacitance and inductance; and orientation and function of bipolar devices such as diodes and transistors. To enhance the accuracy of these sensitive measurements, a guarding technique is applied to offset shunted currents that can cause errors. The biggest advantage of ICT is the testing of the operation of digital components and boundary scan devices. Digital testing of digital devices allows the verification of part alive and working correctly. Realizing this testing is not a parametric test like Functional Testing.

On average, an ICT program and fixture for a "Bed-Of-Nails" test takes four to six weeks to develop. A prober program, which is developed from existing CAD files, can be created and debugged in a few days. The method for achieving the interface between a UUT and ICT is a bed-of-nails test fixture. Hundreds of spring probes are precisely positioned to make electrical contact with targets on the UUT. A target can be a lead of a through-hole part, a test pad specifically designed for tester access, or via inherent in the board design. Most flying probe tests can be modified and debugged with less cost and fewer schedule delays, than ICT.

The flying probe was named for the rapid fixtureless movement of the probes. The "probers" use movable probes to access test points, vias, component pads, and fine-pitch parts. Flying Probes typically have four or more probes that move simultaneously across the top and bottom of the board. Some systems use stationary probes for bottom-side board access in lieu of bottom-side flying probes. A movable head uses X, Y, and Z coordinates to navigate the probes in a three-dimensional space to test points.

A prober can use the same test points as an ICT but can also target other items such as component pads or traces. Offering smaller allowable distances between test points than that possible with ICT, which allows more flexibility to boards with DFT challenges. Also, the prober system allows the flexibility of PC board engineering changes (ECNs) without a major impact to cost.

When weighing the options of what kind of electric testing one is going to use, here are some considerations to factor in:

### **In-Circuit Testing**

- Product must have DFT met.
- Requires a test fixture or test interface.
- Design changes are limited by cost and time.
- Excellent fault detection and isolation.
- Short test times.
- Good for high production volumes.
- Works with a board handler system.
- Can work with Boundary Scan (1149.1).

### **Flying Probe Testing**

- Board access is easily accommodated.
- Good fault detection and isolation.
- Quick test program development times.
- Excellent for low volumes and prototype production.
- Longer test times.
- Vision system available for un-testable devices.
- Limited functional device testing.
- Can work with Boundary Scan (1149.1).

When looking at the relative benefits of both of these test techniques, one needs to weigh the factors of design stability, time to market, cost of development, cost of test per unit and design suited for testability. In some cases neither of these work, but in more cases one of these two test methodologies will help with process feedback, help your product become better and help increase profitability.

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## Upcoming Events

- January 16, 2008 in Austin, TX. TTCI will be exhibiting at the Agilent Technologies User's (ATUG) Meeting.
- April 1-3, 2008 in Las Vegas, NV. TTCI will be attending the IPC Printed Circuit Expo & APEX show.
- April 27-30, 2008 in Austin, TX. TTCI will be attending the Teradyne User's Group (TUG) Meeting.
- April 30-May 1, 2008 in Boston, MA. TTCI will be exhibiting at the NEPCON East show.
- May 8, 2008 in Cleveland, OH. TTCI will be exhibiting at the **oldest** Agilent Technologies User's (ATUG) Meeting.

**In the works.....**TTCI will be hosting an upcoming SMTA Meeting (Capital Chapter) sometime this first quarter of 2008.

For more information about these events, please contact Bert Horner.

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## Other News

The Test Connection's boundary scan partner JTAG Technologies will be hosting two technical seminars on boundary scan basics and showcasing the latest methods for test development. Please visit the link below to see more information these two locations: <http://jtag.com/en/About/Events/Seminars>.

### **Tuesday - January 22<sup>nd</sup>, 2008**

#### **Dallas, TX**

Radisson Hotel Dallas - North Richardson  
Continental breakfast: 8:00 – 8:30am  
Session one: 8:30 – 10:00am  
Session two: 10:30am – noon

### **Thursday - January 24<sup>th</sup>, 2008**

#### **Austin, TX**

Renaissance Austin Hotel  
Continental breakfast: 8:00 – 8:30am  
Session one: 8:30 – 10:00am  
Session two: 10:30am – noon

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The Test Connection, Inc. (TTCI) has been supporting the electronics test arena for over 27 years by offering printed circuit test solutions. Our services range from offering: **In-Circuit Test (ICT)** development and board testing services for Agilent 3070 and Teradyne (Formerly GenRad) TestStation/228X test systems, **Flying Probe** development and board testing services on our Digitaltest MTS500 flying probe test system, **Boundary-Scan Test** Solutions with the JTAG Technologies system and TTCI is the U.S. Distributor of the **LED Testing** tool: Feasa LED Analyser. Also, TTCI's newest offering is the InteFun 2700. The InteFun 2700 is our **Functional Test** solution that "integrates" PXI/PXIe with In-Circuit Test.

## Have a Suggestion??

Suggestions on what type of news you would like to hear about are welcome. Please contact [newsletter@tci.com](mailto:newsletter@tci.com) with your suggestions or other informational requests on topics you would like to see discussed in **Getting To the Point**.