

Agilent Technologies  
Model 7890



# 13

## PRINTED CIRCUIT BOARD TEST & INSPECTION

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- **Ease of Use**
- **AutoDebug**
- **VTEP v2.0 Test Suite**
- **Automatic Guard**
- **Press-down and Vacuum Fixture**

The Agilent *Medalist* i1000 In-Circuit Test (ICT) system is a revolutionary platform targeted for maximum cost effectiveness. It offers award winning state-of-the-art features with the answer to most test challenges faced by today's manufacturers. Advanced defects coverage features coupled with a simplified software model shortens the learning curve of new users, making this an ideal investment for manufacturers who need a cost effective ICT solution. Here are some feature highlights:

### Ease of Use

It's back to the basics with the *Medalist* i1000 software to help new users get up to speed in the shortest time possible. Following the development model of a typical Manufacturing Defects Analyzer, the user can now get a fixture and program up and running in just a few days. Simplified graphical user interfaces allow the user to quickly make changes to individual tests during debug, with a comprehensive toolset of menus and buttons complete with AutoDebug features. This allows inexperienced users to start using the system quickly.

### AutoDebug

With the *Medalist* i1000, unpowered passive analog components can be debugged with the click of a button, so even someone with limited ICT experience can perform a complete analog test debug in a matter of hours. AutoDebug fine-tunes tests so boards pass reliably in production. Statistical measures (CPK) are employed to determine the stability of the test. This automatic feature can reduce the normal debug process which takes days, to just a few hours.

### VTEP v2.0 Test Suite

*Medalist* VTEP v2.0 is a suite of vectorless test solutions which encompasses the new Network Parameter Measurement technology as well as the original *Medalist* VTEP technology and the award-winning *Medalist* iVTEP. Bringing all these solutions together into VTEP v2.0 means having the best vectorless test in your hands. An industry first, Network Parameter Measurement technology detects defects on power and ground pins while iVTEP focuses on ultra low value measurement of signal pins (<5 fF) on Integrated Circuits (ICs). Furthermore, having the original *Medalist* VTEP as its core means enabling measurements which are 4X more sensitive and 5X better in standard deviation. As technology advances with shrinking packages and faster signaling speeds, VTEP v2.0 is a necessity to meet the challenges of today and beyond.

### Auto Guard

The Auto Guard feature is a tool for the production test engineer as well as test programmer. It automatically selects different guard points based on board topology for the user during the debug process. This eliminates the need for the user to manually check the schematics for each possible guard points and will significantly reduce the overall debug time.

### Press-Down and Vacuum Fixture

The *Medalist* i1000 offers users two different fixture options. The first option uses a typical MDA-type fixture with cable connections. This provides users with affordable fixture options. The second option employs a vacuum-type fixture and a mechanical fixture lock-down system using electrical motors. This cable-less design provides fast fixture swapping time while maintaining high signal integrity.



### Key Literature & Web Link

[www.agilent.com/find/i1000](http://www.agilent.com/find/i1000)

### Ordering Information

Contact your Agilent sales representatives to configure solutions to meet your manufacturing requirements: [www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)

- Test development improvements
- AutoDebug
- AutoOptimizer
- Flexibility to convert from Mux to UnMux pin cards
- VTEP v2.0

The Agilent *Medalist* i3070 is the next generation In-Circuit Test System (ICT) that provides significant return of investment with unparalleled test coverage and robustness. Our solution enables up to 20% more output while boosting coverage by expanding on our award winning vectorless test innovations, extending the performance of the world's most proven In-Circuit Test Platform.

The *Medalist* i3070 combines all the features of the state-of-the-art Agilent 3070 with the advanced architecture and streamlined usability of the *Medalist* i5000 making it the most flexible and stable In-Circuit Test System in the world that is the fastest-to-learn and easiest-to-deploy. An intuitive point-and-click interface, automated test debug and optimization tools, and a host of other features, accelerate every aspect of test programming and deployment.

The *Medalist* i3070 has exciting new test features that achieve unprecedented coverage. Here are some highlights:

### Test Development Improvements

The algorithm for test development has been improved. For resistors and capacitor tests, wires selection and test options selection has been improved in the IPG such that they reduce the test times of these tests. It is possible for a typical board to see 20% improvements to the analog test time. The node sequencing in the shorts test has been recalculated to reduce the occurrence of phantom shorts.

### AutoDebug

AutoDebug was introduced with the i5000. This feature is now available for the i3070. Using a set of rules that a user can modify, the AutoDebug feature will base on a known good board to modify each analog test for stability. The set of rules mimic the actions that a user will take during the debug process. A different set of rules is available for each component type, thus allowing for more accuracy in the debug. Statistical measures (CPK) are employed to determine the stability of the test. This automatic feature can reduce the normal 3 day debug process to about 4 hours.

### AutoOptimizer

The AutoOptimizer feature is a tool for the production test engineer. With wear and tear of the fixture during the production process and changes in process parameters, it may be necessary for the production test engineer to modify test options. The AutoOptimizer can optimize the test times for these tests with a click of a button, reducing the test times by 10 to 50 percent per test. AutoOptimizer checks to see that tests are stable up to a user specified CPK. It's great for cleaning up programs that have been modified during production runs, allowing tests to once again run fast and reliably.

### Flexibility to Convert Form Mux to UnMux Pin Cards

The i3070 provides a single software stream and compatible hardware to allow the user to use both HybridPlus Mux pin cards as well as Hybrid144 UnMux pin cards.

### VTEP v2.0

*Medalist* VTEP v2.0 is a suite of vectorless test techniques which encompasses the new Network Parameter Measurement technology as well as the original Agilent *Medalist* VTEP technology and the award-winning *Medalist* iVTEP. The new Network Parameter Measurement technology is a world-first, allowing users to detect opens on power and ground pins on connectors – something which many industry players had previously considered as beyond existing test capabilities.



E9901D  
E9902D  
E9903D  
E9905D

### Key Literature & Web Link

[www.agilent.com/find/i3070](http://www.agilent.com/find/i3070)

### Ordering Information

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N7280A

- High throughput 3D X-ray analysis to meet in-line speeds
- Double-sided inspection on a single pass
- High PCBA solder defect coverage
- Able to inspect large PCBAs
- Easy-to-use development environment
- Statistical learning to speed test development



The focus of the *Medalist* x6000 is to reduce the manufacturers' PCBA conversion costs. In order to do this, the system provides the highest possible 3D inspection throughput, low false call rates, easy-to-use while maintaining the high level of defect coverage provided by X-ray inspection.

The x6000 utilizes an innovative imaging architecture that provides a high speed inspection solution. For many PCBAs, the x6000 throughput meets the manufacturing line rates. This high speed enables two key benefits: reduced capital investment and high defect coverage. The high speed directly reduces the number of systems required to meet manufacturing volumes. As a secondary effect, this enables manufacturers to test the entire board using 3D X-ray high defect detection rate. Today's solutions often require manufacturers to sample test. This approach can allow defects to escape to functional test steps where the PCBA failure diagnostics can be lengthy and expensive.

To reduce the test development costs and barriers to outsourcing, the x6000 brings a new test development environment. This new environment enables new programmers develop applications with high coverage and low false calls. The tuning portion of the interface uses a statistical learning technique that quickly and accurately sets basic thresholds to levels which maximizes coverage and minimizes false calls. Total test development time can be less than 1 day for a complex application.

### Specifications

#### Throughput Performance Specifications

**Total Test Speed:** 3.5 in<sup>2</sup>/sec<sup>1</sup>

#### Defect Detection and Reporting Capability

Solder defects such as shorts, opens, missing, voiding, and others are detected for typical solder joints for components such as:

- ≥0.4 mm Ball Grid Array (BGA)
- Chip Scale Packages (CSPs)
- Column Grid Array (CGA)
- Ball Grid Array (BGA) – noncollapsible and collapsible
- ≥0201 Chip: capacitor, resistor
- Polarized capacitors
- SMT Connector and Sockets
- Direct FET
- Fine Pitch and Standard Gullwing
- JLead
- Leadless Chip Carrier (LCC)
- Metal Electrical Face (Melf)
- Plated Throughhole (PTH)
- Quad-Flatpack No Lead (QFN)
- Small Outline Transistor (SOT)
- Heat Sinks

#### Panel Specifications

**Maximum Panel Size:** 457 mm x 609 mm (18.0 in x 24.0 in)

**Minimum Panel Size:** 102 mm x 127 mm (4.0 in x 5.0 in)

**Maximum Panel Thickness:** 3.2 mm (0.125 in)

**Minimum Panel Thickness:** 0.5 mm (0.020 in)

**Top Clearance:** 25.0 mm (1.0 in)

**Bottom Clearance:** 50.0 mm (2 in)

**Panel Edge Clearance:** 3 mm (0.118 in) on parallel edges of the panel

**Maximum Panel Weight:** 4.5 kg (10 lb) (including applicable carrier)

**Minimum Panel Weight:** 0.03 kg (0.066 lb)

#### System Dimensions

**System Footprint:** 1.5 m x 1.9 m (60 in x 76 in)

**Total System Weight:** 3220 kg (7500 lb)

#### Power Specifications

##### Voltage Requirements

- 200 – 240 VAC three phase
- 380 – 415 VAC three phase wye (±5 %) (50 or 60 Hz)

#### Accessories

##### Associated Training and Consulting Products

These accessories provide the necessary training and consulting to achieve successful implementations:

- x6000 Basic Maintenance Training
- Repair Image Interpretation Training
- x6000 Test Development Training
- x6000 Basic Operator Training
- x6000 Implementation Success Package

##### Paperless Repair and Data Analysis Tools

In addition to the basic system, a whole product solution provides integrated PCBA repair and data analysis tools. The *Medalist* Repair Tool provides state-of-the-art tools to enable repair operators to quickly and efficiently review X-ray failures. The *Medalist* Quality Tool enables process engineering to track inspection trends, spot areas to improve, and provides a feedback loop to improve applications:

- Direct Connect Repair Tool
- Intelligent Test Framework Software
- Quality Tool Viewer License

#### Key Literature & Web Link

[www.agilent.com/find/axi](http://www.agilent.com/find/axi)

#### Ordering Information

Contact your Agilent sales representatives to configure solutions to meet your manufacturing requirements: [www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)

<sup>1</sup> Total test speed varies depending panel size. Estimates include image acquisition, alignment, and board handling time. Per panel Load/Unload times can be reduced by using carriers with multiple panels.

- Imaging chain technology changes provide increased inspection speeds, demonstrating the ability to keep up with ever-increasing line rates
- Algorithm advancements provide greater image clarity to low contrast components, leaving users with better defect analysis capability and lower false call rates
- User-friendly programming, universal and self-learning algorithms, geometric pattern matching, and click and drag optical character recognition and verification
- The system utilizes revolutionary 3D Solid Shape Modeling (SSM) for inspection needs
- Operator interfaces available for Simplified and Traditional Chinese, Japanese, Hungarian, German, and English language formats
- Optional head swap conversion kit for 3D solder paste inspection

The Agilent *Medalist* SJ50 Series 3 is a cost-effective, fast, easy-to-use and highly reliable imaging platform that provides full coverage which can be flexibly deployed at multiple locations on the surface mount technology manufacturing line to detect and prevent defects.

The SJ50 is an extremely versatile platform that provides algorithms for post-paste 2D solder, pre and post-reflow components, and solder joint inspection. Through scalable resolution, the SJ50 Series 3 is capable of inspecting the most challenging of components, including 01005.

### Key Literature & Web Link

[www.agilent.com/find/aoi](http://www.agilent.com/find/aoi)

### Ordering Information

Contact your Agilent sales representatives to configure solutions to meet your manufacturing requirements: [www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)



N5054D  
N5065D

# Printed Circuit Board Test and Inspection

642

## Automated Solder Paste Inspection Systems

N4774D  
N5090D

- Performs 100% 3D inspection, giving critical volume and location information for all deposits
- Identifies solder paste defects at the most cost effective process step
- Maximizes throughput with no compromise to detection performance
- Measurement data combined with statistical tools provides users with real-time process control
- User friendly programming environment

The Agilent *Medalist* SP50 Series 3 is a high-speed inline or offline solder paste inspection system designed specifically for the SMT manufacturing marketplace.

The SP50 Series 3 provides automated 3D paste inspection for process characterization and defect prevention.

### Key Literature & Web Link

[www.agilent.com/find/aoi](http://www.agilent.com/find/aoi)

### Ordering Information

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