



Agilent *Medalist* x6000

Automated X-ray Inspection (AXI)

Data Sheet

Industry-Leading 3D Inspection Throughput Delivers Reduced Conversion Costs, Reduced Capital Expenditure and High Defect Coverage

- The Agilent *Medalist* x6000 AXI system offers extensive simultaneous 3D X-ray inspection of double-sided panels at throughput rates that match most line rates of medium to high complexity printed circuit board assemblies (PCBA).
- Provides uncompromised 3D inspection for maximum fault detection up to 95% of all manufacturing defects.
- Designed for in-line or off-line automated X-ray process testing of lead or lead-free solder joints on PCBAs, with user configurable pass-thru or pass-back loading.
- Enables successful implementations through an easy-to-learn and easy-to-use development environment providing faster time-to-market with high quality results.
- Digital cross-sectional X-ray images of solder joints are automatically generated and analyzed. The dynamic analysis measures joint characteristics and compares results against both learned and user defined thresholds.



Key System Parameters

Performance

Total panel test cycle time¹	Maximum image acquisition rate	32.3 cm ² /sec (5 in ² /sec)
	Typical image acquisition rate ²	25.8 cm ² /sec (4 in ² /sec)
	Positioning, alignment and automatic system adjustments ³	20 sec
Minimum feature detection capability	Joint pitch ⁴	0.3 mm & up (0.012 in & up)
	Short width ⁵	0.045 mm (0.0018 in)
	Solder thickness	0.0127 mm (0.0005 in)

¹ This is an estimate of time from one panel load to when the system is ready to load the next panel. Panels above 17 inches (43.1 cm) long require repositioning and realignment.

² Image acquisition rate is dependent on component's opacity.

³ Panel setup contains all panel movement for load, unload, X-ray barrier control, mechanical positioning and compensation, automatic system adjustments, and panel alignment. Alignment time is dependent on the size of the panel. Left to right pass through mode.

⁴ Assuming pad width is 50% of pitch.

⁵ The reported values for minimum feature detection assume that the feature is in a single plane of focus and that there are no X-ray absorbers in the X-ray path or in the immediate area of the feature other than those found in a typical multi-layer printed circuit board.



Agilent Technologies

Defect detection capability

All typical components found in manufacturing of electronic PCBAs, such as:

- ≥ 0.4 mm Ball Grid Array (BGA)
- Column Grid Array (CGA)
- Ball Grid Array (BGA) – non-collapsible and collapsible
- Chip Scale Package (CSP)
- ≥ 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 Through-hole (PTH)
- Quad-Flatpack No Lead (QFN)
- Small Outline Transistor (SOT)
- Heat sinks

Defects detected ¹

- Shorts
- Opens
- Missing component
- Non-wetting
- Billboards
- Tombstones
- Lifted leads
- Solderball
- Void (BGA, Paste)
- Insufficient solder
- Reversed tantalum capacitor
- Excess solder

¹ Not all defects are applicable to all types of component solder joints.

Test development environment

Medalist x6000 User Interface	Microsoft® Windows®-based software solution used to define system and panel setups, perform verification and editing of CAD, setup tests and thresholds, and execute test programs.
Off-line test development software	Optional off-line test development software enabling application development on an off-line PC
CAMCAD Professional	Optional software available to translate CAD data to Agilent's format. Contains integrated input filters for industry leading CAD systems.
Typical test development time	<ul style="list-style-type: none">• Less than 30 minutes to translate and verify CAD data (using CAMCAD Professional)• 4 hours to 1.5 days to develop application
Multiple levels of login privilege	<ul style="list-style-type: none">• Operator• Developer• Service• System administrator

Line integration

Configurable board flow	<ul style="list-style-type: none">• Right or left flow-through• Right or left pass-back• Automatic panel width adjustment for fast line changeover
Transport heights	Transport height levels between 823 mm – 980 mm (32.4 in – 38.6 in)
Line communication standard	SMEMA
Bar code readers	Compatible with most industry standard manual or automatic bar code readers

System

System controller	Integrated controller with Dual Core Intel® Xeon® processors
Operating system	Microsoft® Windows® XP Professional
Data communication interfaces	USB, RS-232, 10/100/1000 Ethernet
Data storage devices	CD/DVD RW
System footprint	1.52 m x 1.93 m (60 in x 76 in)
Integrated monitor and keyboard tray	Configurable for left or right of system. Adjustable for either sitting or standing positions
Total system weight	3220 kg (7100 lb)
Average system floor loading weight/ service area	371 kg/sqm (76 lb/sq ft)
Concentrated loads	805 kg (1775 lb) on 152 mm (6 in) diameter pad, 4 pads on 131 cm (52 in) x 110 cm (43 in) centers

Test reporting and repair

Test result reports	<i>Medalist</i> Quality Tool provides powerful pre-configurable views, context-sensitive drill-downs, PC-based charting, and straightforward export to Microsoft® Excel®.
Repair tools	<i>Medalist</i> Repair Tool provides an intuitive, graphical interface enabling operators to quickly locate and validate a given defect call.

Allowable panel characteristics

Panel size (width x length)¹	Maximum ²	457 mm x 609 mm (18.0 in x 24.0 in)
	Minimum ³	102 mm x 127 mm (4.0 in x 5.0 in)
	Aspect ratio	Length ≥ 0.5 x panel width
	Maximum panel inspectable area	445 mm x 609 mm (17.5 in x 24 in)
Panel thickness	Maximum	3.2 mm (0.125 in)
	Minimum ⁴	0.5 mm (0.020 in)
Panel clearance	Top clearance ⁵	25.0 mm (1.0 in)
	Bottom clearance ⁵	50.0 mm (2.0 in)
	Panel edge clearance	3.0 mm (0.118 in) on parallel edges of the panel
	Panel width tolerance	±0.7 mm (0.0275 in)
Panel weight²	Maximum	4.5 kg (10.0 lb)
	Minimum	0.03 kg (0.066 lb)
Maximum acceptable panel temperatures (at time of load)	40°C (104°F)	
Panel warp (after reflow and wave soldering)	Warp of less than 1% per unit of linear measurement.	
	Maximum downside panel warp cannot exceed 2.0 mm (0.08 in).	
	Maximum upside panel warp cannot exceed 1.0 mm (0.04 in).	
Maximum number of PCBs per panel	No restriction	

¹ Panels are handled on width edges. Panels with edge cut outs may require the use of a carrier.

² Maximum panel size dimensions and weight must include carrier if applicable.

³ Smaller panels are possible with the use of panel carriers. A carrier can only have one panel.

⁴ With panels of this thickness, imaging results can be affected by PCBA layout.

⁵ Measured from the bottom of the panel including a maximum warp.

Power and environmental

Voltage requirements	200-240 VAC three phase; 380-415 VAC three phase wye (±5%) (50 Hz or 60 Hz)
Total harmonic distortion (THD)	THD <5%, single harmonic <3%
Ground to neutral voltage	Voltage <1 VRMS
Momentary voltage	Interruptions, defined as: voltage drop on one or more phase conductors below 180 VAC for greater than 10 ms
Primary power rating	2.8 kVA
Maximum inrush current	58 amps RMS
Circuit breaker rating	10,000 amps interrupting capacity (AIC) for voltages up to 240 VAC, 14,000 AIC for voltages greater than 240 VAC
Wiring requirements	Reference the Agilent <i>Medalist</i> x6000 Installation Guide for hookup wiring configurations, full load amperes, circuit breaker size/# poles and conductor size Note: local electrical wiring codes take precedence
Air requirements	552 kPa (80 psi) compressed air
Temperature requirements	16-30°C, 60-86°F
Humidity requirements	Relative humidity 20-60%

Safety

Design

The system is designed to prevent electrical, mechanical, or radiation hazards to the operator. The system is fully certified to meet all U.S. Federal specifications regarding the use of cabinet X-ray systems in an industrial environment. All design requirements meet or exceed 21 CFR 1020.40, subchapter J. The system meets the applicable international government radiation emission standards (including German and Japanese standards).

Safety interlocks

Redundant safety interlocks are used to eliminate the possibility of accidental X-ray exposure or physical harm.



www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Related Web Resources

For more information on Agilent *Medalist* x6000 Automated X-Ray Inspection, please visit: **www.agilent.com/find/x6000**

Microsoft and Windows are U.S registered trademarks of Microsoft Corporation.

Phone or Fax

Americas

Canada	(877) 894-4414
Latin America	305 269 7500
United States	(800) 829-4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East

Austria	0820 87 44 11
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 € fixed network rates
Germany	01805 24 6333**
	**0.14 €/minute
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland (French)	41 (21) 8113811 (Opt 2)
Switzerland (German)	0800 80 53 53 (Opt 1)
United Kingdom	44 (0) 118 9276201

Other European Countries:

www.agilent.com/find/contactus

Revised: October 24, 2007

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2008
March 13, 2008
5989-6348EN

