



LS 3000

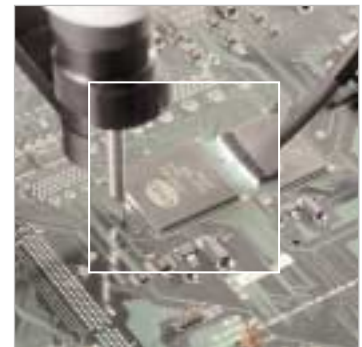
OPTICAL INSPECTION SYSTEM



LCD SCREEN



RIGID-PROBE



FLEX-PROBE



SOLUTIONS FOR THE ELECTRONICS INTERCONNECTION PROCESS

LS 3000

LS 3000

The LS 3000 from PACE is the newest, cost effective, optical inspection system specifically designed for today's electronics. Its primary use is for inspection of area array devices (PBGA, CSPs, Flip Chips, LGAs, CBGAs, etc.). However, the LS 3000 has a wide range of other inspection uses on any SMT or thru-hole based PCB. The LS 3000 is ideal for periodically monitoring the performance of production or rework reflow equipment. It is also a critical inspection/monitoring instrument for R&D labs and process development departments when developing new processes or troubleshooting problems.



The LS 3000 Rigid-Probe with back lighting inspecting a PBGA

The LS 3000 features a high resolution CCD chip camera and incorporates industrial quality endoscopic components to acquire images. The video signal can be sent to a stand-alone monitor or can be routed to a PC via a video acquisition card. The system comes standard with front lighting through the endoscope and with back lighting from one fiber light gooseneck and one endpiece. Both, back and front lighting, can be adjusted independently. An optional dual gooseneck for back lighting is also available. The camera head on the LS 3000 can be moved in the Y direction using a fine adjustment knob on the side of the system which allows the user to scan an entire side of a device with ease.

THE LS 3000 PROVIDES THE ABILITY TO IDENTIFY, EVALUATE AND CORRECT ROOT CAUSES AT A PROCESS LEVEL

IDENTIFY THE PROBLEM

The LS 3000 allows for defects to be observed that are not readily identified by other, more expensive, technologies using non-destructive means and also allows for hidden joints to be thoroughly inspected.

EVALUATE THE PROBLEM

High quality information and accurate data leads to successful decisions. The LS 3000 delivers up-close visual information that compliments data provided by X-ray inspection systems allowing the user to make the best decision based on a complete set of data. Reference image library in optional software assists in the decision making process.

CORRECT YOUR PROCESS BASED ON COMPLETE DATA

Recurring defects mean there is a problem with your process. The right solution can only be implemented when defects are fully identified and the causes of those defects are evaluated and fully understood.

THE LS 3000 VERIFIES YOUR PROCESS INTEGRITY SO YOU CAN HAVE ABSOLUTE CONFIDENCE IN YOUR PRODUCTION OR REWORK PROCESS.

YOU MAY NOT BE SEEING THE COMPLETE PICTURE EVEN WITH AOI AND/OR X-RAY!

The LS 3000 is an optical inspection device that allows you to clearly see the solder joints under area array devices. AOI has limited usefulness for determining the quality of solder joints under an area array device as they are not visible. X-ray is able to see through area array devices and can identify a wide variety of defects, however, X-ray cannot readily identify cold solder, poor wetting, fractured solder joints, or contamination deposits. In fact, these types of defects will often pass through a functional test, as there is often mechanical contact at the joint, but will fail under use as a result of heating and or CTE differences. The LS 3000 can identify cold solder, poor wetting and fractured solder joints plus any type of defect an X-Ray system can identify, other than a void.

DO TIGHT OR UNUSUAL SPACES NEED INSPECTION?

No Problem! The LS 3000's optional flex probe is ideal for investigating the under side of array devices, looking behind leads of QFPs, PLCCs, and other components, as well as looking inside of connectors when connections are under the part. The LS 3000 also provides a lockable storage drawer for storing additional optical probes and lighting accessories.









The Optional LS 3000 FLEX-PROBE with back lighting

DEFECT INSPECTIONS

	AREA ARRAY DEFECT TYPE										
	MIS-REGISTRATION	OPENS	BRIDGING	MISSING SOLDER BALL	COLD SOLDER	INSUFFICIENT SOLDER	VOIDS	FRACTURED JOINT	EXCESSIVE FLUX OR CONTAMINATION	WARPED PART	SHAPE OF SOLDER FILLET
VISUAL INSPECTION	MARGINAL	NO	NO	NO	NO	NO	NO	NO	MARGINAL	MARGINAL	NO
X-RAY INSPECTION	YES	MARGINAL W/O ANGLED VIEWING	YES	YES	MARGINAL	YES	YES	NO	NO	YES	NO
OPTICAL INSPECTION	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES

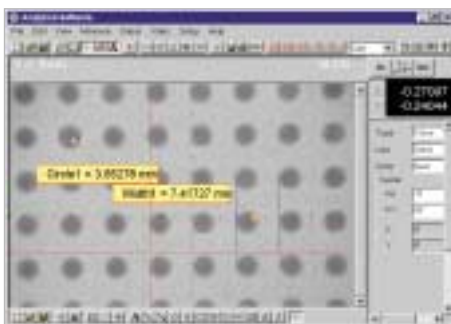
EXAMPLES OF DEFECTS

GOOD SOLDER JOINT  <p>Note smooth shiny surface of ball and good fillets on the top and bottom.</p>	SOLDER BRIDGE  <p>2 solder balls that have flown together.</p>	IRREGULAR SHAPED JOINT  <p>Most likely caused by either poor initial alignment or the part moved before solder re-solidified. Note rough surface of solder indicating incomplete reflow.</p>
EXCESSIVE FLUX  <p>Rosin flux left at bottom of solder ball after reflow.</p>	OPEN  <p>No connection between part and PCB at this joint.</p>	LCC FILLET  <p>LCC Fillet on surface mount part</p>

LS 3000 SOFTWARE OPTIONS FROM PACE

When coupled with the TF 3000 Rework System, the LS 3000 can be used to identify, evaluate and document quality. The TF 3000 or optional software allows images to be captured and stored electronically, defect analysis reports to be created (PDF format), and a reference library of defects is also standard. Examples of common defects are included with the software that operators can refer to and compare the live image of their work with the reference image. When integrated with the TF 3000 BGA/CSP Rework system from PACE, the LS 3000 Inspection System can actually teach operators how to identify defects as part of the rework process. The library can be added to and modified so you can provide images of the actual work to the operator for immediate comparison.

IMAGE ANALYSIS SOFTWARE



The Optional PC Video Inspection Package provides Live Video Interface to Computer for Inspection, Measurement, Documentation and Communication requirements. Live images at 30 frames per second displayed on your Computer Screen eliminate fatigue and eye strain for inspectors.

Dimensional Measurement capabilities include Edge Detection for Distance, angles, line width, area, radius and diameter measurement. Flexible Data format for SPC processing. Image overlay, split screen and comparison screens enhance inspection capabilities. Image annotation and report writing with images provide fast and accurate documentation and communications.

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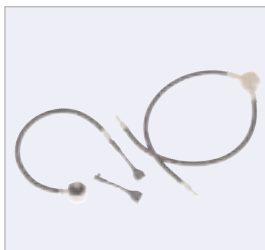
OPTICAL PROBES



ACCESSORY STORAGE



GOOSENECK LIGHTING



SPECIFICATIONS		LS 3000
PART NUMBERS	120 VAC 5amps 230 VAC 5AMPS	8007-0401 8007-0402
DIMENSIONS		H: 510mm (20") W: 635mm (25") D: 660mm (26")
WEIGHT		32Kg (70Lbs)
MAGNIFICATION		100x - 375x with object 3.3mm (.13") away from probe using a 381mm (15") diagonal monitor
FIELD OF VIEW		1.5mm (.06") - 6.35mm (.25") with object at 6.35mm (.25") away from probe using 381mm (15") diagonal monitor
FOCUS DISTANCE		0 - 228mm (9") with 381mm (15") Diagonal Monitor
MINIMUM STANDOFF HEIGHT (distance between top of PCB to underside of component)		.05mm (.002")
MINIMUM DISTANCE BETWEEN COMPONENTS		2.54mm (.1")
OPTICS PROBE		Fiber-optic rigid probe with stainless steel protective cap.
LIGHTING TYPE		Adjustable Metal Halide Light Sources
MAXIMUM PCB SIZE		510mm (20") x 610mm (24")
CAMERA		Hi-Resolution CCD Camera
AGENCY APPROVALS		CE
OPTIONAL ACCESSORIES		Flexible Optical Probe, 0.4mm (.015") diameter P/N 1106-0047-P1 Dual Fiber Light Gooseneck P/N 6007-0021-P1 15" LCD Flat Panel Monitor P/N 7015-0010 RIGHT ANGLE LIGHT BAR: 12.7mm (.5") Wide P/N 1106-0048-03-P1 25.4mm (1") Wide P/N 1106-0048-02-P1 38.1mm (1.5") Wide P/N 1106-0048-01-P1



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PACE products meet or exceed all applicable military and civilian EOS/ESD, temperature stability and other specifications, including MIL-STD-2000, ANSI/J-STD-001, IPC 7711, IPC 7721 and IPC-A-610.

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