

High Performance Model

# 3D SPI

AUTOMATED OPTICAL INSPECTION

## TR7007Q Plus SERIES



High Precision Platform for Reliable Gauge R&R



Enhanced 2D Light for Improved Imaging



Smart Programming: Algorithm based Inspection



EtherCAT - Faster Communication



Smart Board Warpage Control



Real Time SPC Trends



# TR7007Q Plus S



## High Performance 3D SPI Solution

The TR7007Q Plus 3D SPI platform is equipped with an improved motion controller (EtherCat) and an enhanced 2D lighting module. The TR7007Q Plus can accurately inspect low solder bridges and compensate board warpage for eliminating local PCB deformation.

## Inspection for

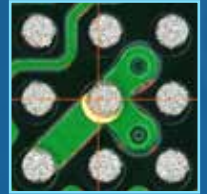
- **Solder Paste**
- **Bumps**
- **Flux**
- **Bare Board**

## New Lighting Module

The TR7007Q Plus platform has an enhanced 2D Lighting module for improved imaging. The captured inspection images have higher contrast and higher uniformity.

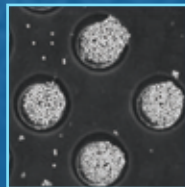


TR7007Q



TR7007Q Plus

## Precise 3D Technology



Shadow-free Inspection

TRI's imaging technology provides an optimized 3D Shadow Free Fringe Pattern Technology with up to Quad Imaging Projectors. Total Solder Paste Defect coverage including low solder bridges inspection.

## Smart Programming

Ready to Inspect in 5 Steps, quickly setup high-mix or low volume applications. TRI's SPI Software has preloaded Smart Inspection Libraries to ensure fast changeovers, minimal idle time and the reduction of operator's work load.



Load SPI File



Set Board Size



Set Board Offset



Set Fiducial Marks



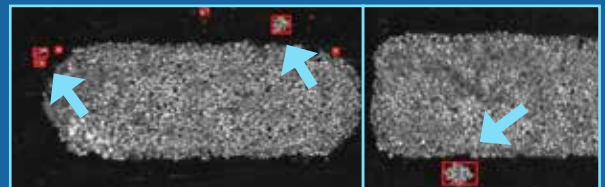
Set Thresholds

## High Resolution Inspection

The 3D SPI can detect minute solder defects such as low solder paste bridges under  $45 \mu\text{m}$  and detecting the presence of foreign objects.



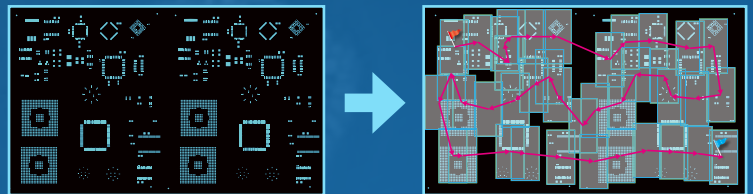
Low Solder Bridge Inspection



Foreign Object Inspection

## Optimized Performance

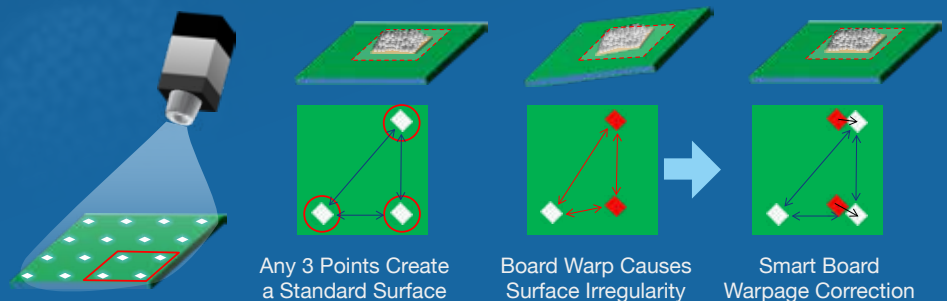
Accurately inspect your PCBs with Dynamic Imaging, TRI's Optimal Scanning Path, to achieve the best available inspection while maintaining competitive imaging speed. The smart route optimization reduces the number of FOVs necessary to inspect every board, saving inspection cycle time.



Smart Route Optimization

## Smart Warpage Technology

Inspect with maximum stability with TRI's Smart Board Warpage compensation technology. TRI's Smart Warpage locates fiducial marks and compensates local board warpage.



Any 3 Points Create a Standard Surface

Board Warp Causes Surface Irregularity

Smart Board Warpage Correction

## Closed Loop Ready

TRI SPI systems share inspection results with connected MES and SMT line equipment to help improve production yields and stabilize production quality while minimizing line stops and reducing production costs. TRI systems offer data feeds to a feedback and a feed-forward loop.



## YMS 4.0

Yield Management System 4.0 (YMS 4.0) is TRI's Smart Central Monitoring Solution that interconnects test and inspection solutions from SPI, AOI, and AXI to ICT. YMS 4.0 promotes continuous improvement of the production line's yield rate by offering statistical analysis of production line defect rates, reviewing and fine-tuning inspection results, and identifying component defect trends and emerging production issues.



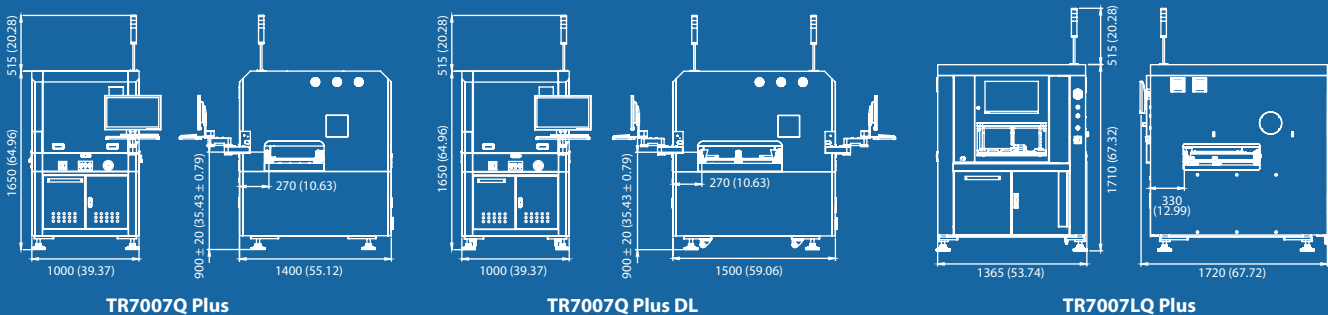
Defect Image Analyzer

Live Inspection Status

Line View Monitoring

Model	TR7007Q Plus	TR7007Q Plus DL	TR7007LQ Plus
Camera	4 MP Camera Link 12 MP Camera Link 12 MP CoaXPress	10 μm / 15 μm 5.5 μm / 10 μm / 15 μm 6 μm / 10 μm	10 μm / 15 μm 10 μm / 15 μm 10 μm 6 μm / 10 μm / 15 μm
Imaging System	3D Technology Lighting	Quad/Dual Digital Fringe Pattern Projector Enhanced 2D Lights (RGB+W)	
FOV	4 MP Camera Link 12 MP Camera Link 12 MP CoaXPress	10 μm: 20.3x20.3 mm (0.8x0.8 in.), 15 μm: 30.5x30.5 mm (1.2x1.2 in.) 5.5 μm: 22.5x16.5 mm (0.89x0.65 in.), 10 μm: 40.6x30.7 mm (1.6x1.21 in.), 15 μm: 61x46 mm (2.4x1.81 in.) 6 μm: 24.3x18.4 mm (0.96x0.72 in.), 10 μm: 40.6x30.7 mm (1.6x1.21 in.), 15 μm: 61x46 mm (2.4x1.81 in.)	
Inspection Functions	Defects Detected Measurement	4 MP Camera Link: Up to 3 FOV/sec, 12 MP Camera Link: Up to 1.8 FOV/sec, 12 MP CoaXPress: Up to 2.6 FOV/sec Insufficient Paste, Excessive Paste, Shape Deformity, Missing Paste & Bridging Height, Area, Volume and Offset	
Mechanical Stage	Stage Type Motion Control XY Resolution Z Resolution	XYZ-Axis Ball Screw EtherCAT 0.5 μm 1 μm	
Inspect Performance	Volume Repeatability Height Repeatability Height Accuracy Max. Solder Height Height Resolution Min PCB Size	Calibration Target (at 3σ) <1% Calibration Target (at 3σ) <1% Solder GR&R (±50% Tolerance) <<10% at 6 σ 10 μm/15 μm: 1.5 μm; 5.5 μm/6 μm: 1 μm (on Calibration Target) 10 μm/15 μm: 420 μm/750 μm; 5.5 μm/6 μm: 210 μm/310 μm (on Calibration Target) 10 μm/15 μm: 0.45 μm; 5.5 μm/6 μm: 0.22 μm 50x50 mm (1.97x1.97 in.)	
PCB & Conveyor System	Max PCB Size PCB Thickness PCB Transport Height Max PCB Weight PCB Carrier / Fixing	10, 15 μm: 510x310 mm (20.08x12.20in.) x 2 Lanes 510x590 mm (20.08x23.23in.) x 1 Lane 0.6 - 5 mm (0.02 - 0.20 in.) 880 - 920 mm (34.65 - 36.22 in.) 3kg (6.61 lbs.), Optional: 5 kg (11.02 lb) Belt/Pneumatic	
	4 MP Camera Link Top 12 MP Camera Link Clearance 12 MP CoaXPress Bottom Edge	10 μm/15 μm: 50 mm (1.97 in.) 5.5 μm: 25 mm (0.98 in.), 10 μm/15 μm: 50 mm (1.97 in.) 6 μm: 25 mm (0.98 in.), 10 μm/15 μm: 50 mm (1.97 in.) 40 mm (1.57 in.) 3 mm (0.12 in.) Optional: 4 mm (0.16 in.) / 5 mm (0.20 in.)	
Weight		775 kg (1,708.58 lb)	825 kg (1,818.81 lb)
Power Requirement		200 - 240 VAC, Single Phase, 50/60 Hz, 3 kVA	
Air Requirement		72 psi - 87 psi (5 - 6 bar)	
Optional		SPC, Offline Editor, Gerber Tool, Barcode Scanner (Linear & 2D) and Support Pins, Closed Loop Function, Yield Management System (YMS 4.0), Linear Encoder Module	

Unit: mm (in.)



## Global Network

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