

# TR7700 SIII Plus SERIES



AUTOMATED  
OPTICAL INSPECTION

# TR7700 SIII Plus

## FEATURES

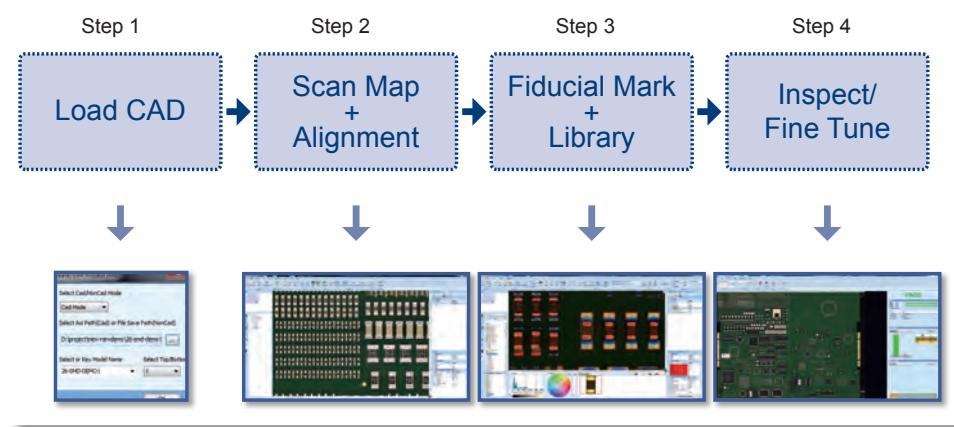
### Premium AOI with World Class Performance

TR7700 SIII Plus combines advanced high precision camera system and TRI's exclusive multi-phase lighting to capture full PCB panel images in unprecedented detail. Next generation inspection software combines excellent defect detection and easy automated CAD-based programming into a reliable state-of-the-art AOI solution.

### Intelligent Easy Programming Interface

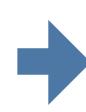
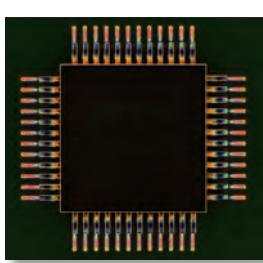
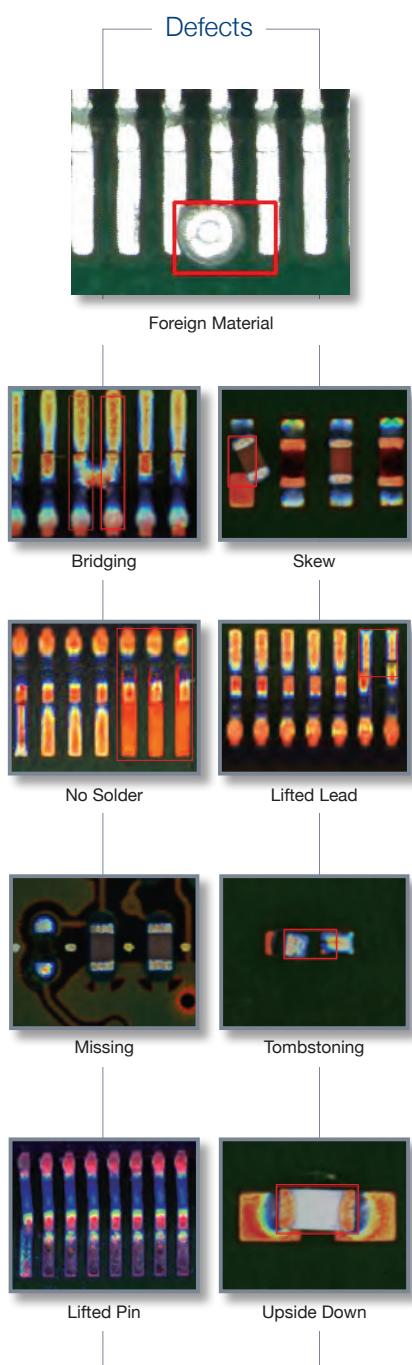
New intelligent programming process significantly reduces programming time using automated component library and integrated board warp compensation.

Programming Flowchart



### Auto Library + Model Library

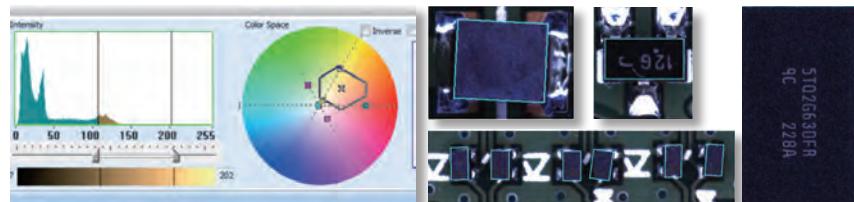
Auto Library speeds up programming by automatically allocating inspection windows for IC leads.



Component Programming Complete

## New Color Space Algorithms

TRI's new adaptive algorithms use color space processing to increase inspection accuracy, reduce false calls and improve inspection results while reducing time necessary for inspection fine tuning and the number of alternative images required.



Color Differentiation Analysis for Black Resin Parts

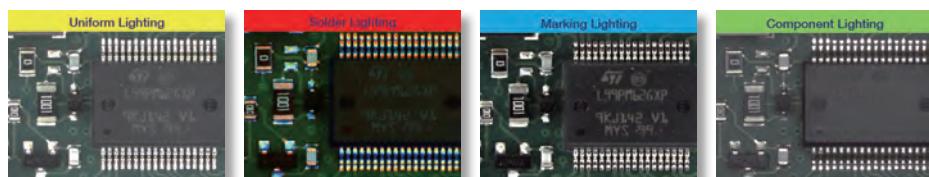
## High Speed with Multi-phase Lighting

### High speed

- 15 µm: 120 cm<sup>2</sup>/sec (18.6 in<sup>2</sup>/sec)
- 10 µm: 60 cm<sup>2</sup>/sec (9.3 in<sup>2</sup>/sec)

### Multi-phase Lighting

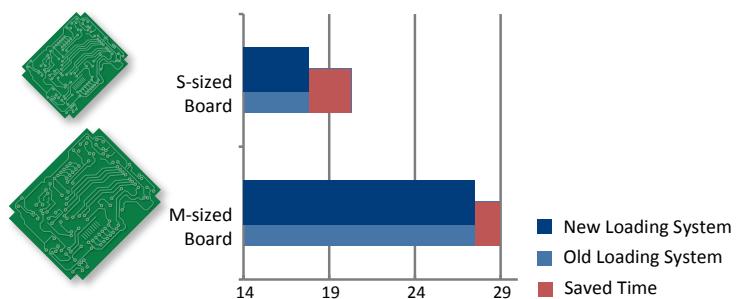
Four individual lighting phases improve inspection of individual defect types using specialized lighting conditions. High speed camera allows inspection at constant speed even with multiple lighting phases.



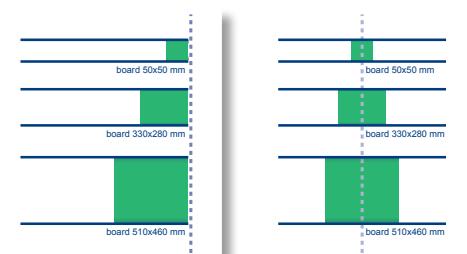
## Intelligent Auto Conveyor System

IACS automatically optimizes board stopping position in the conveyor, reducing load and unload time by up to 2.5 seconds, depending on board size.

- Reduced load & unload time (saves 0.5-2.5 sec. per board.)



- Automatic adjustment of conveyor speed based on board size & weight saves time for manual adjustment and training.
- Automatic conveyor width adjustment (Optical direct adjustment system without returning to default position).

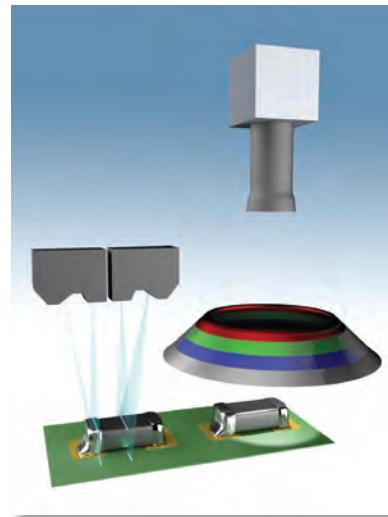


## TR7700 SIII Plus 3D AOI Upgrade for Total Inspection Coverage

The optional TR7700 SIII 3D AOI upgrade extends high performance 2D inspection with advanced 3D technology with new generation software to revolutionize PCB assembly inspection.

### Complete Coverage at Full Speed

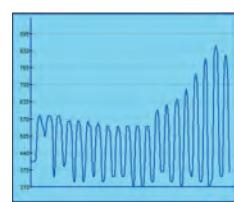
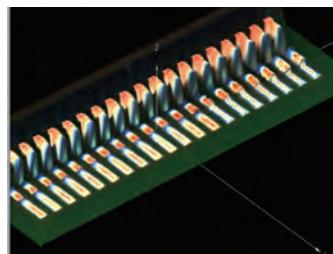
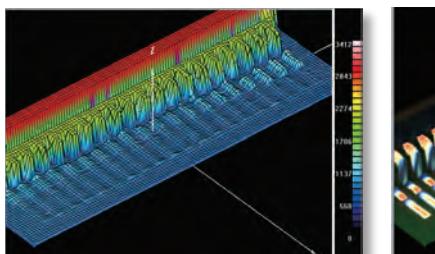
Combination of ultra-high-speed color camera and true 3D profile measurement completely inspects even complex automotive and smartphone assemblies. TR7700 SIII 3D inspection range covers everything from basic SMT components to large thru-hole capacitors, switches, connectors and hidden joints.



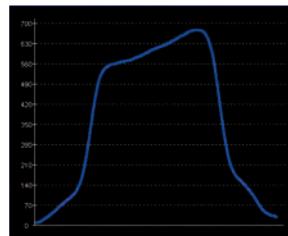
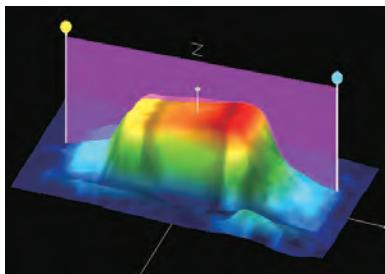
### TR7700 SIII 3D Inspection Upgrade

Accurate laser sensor goes beyond other 3D technology boundaries. Its high measurement range ensures that components up to 20 mm high can be inspected with maximum precision. Working with laser light also eliminates problems with black or mirror-like components on low contrast background.

Interactive 3D models help operators quickly review found defects, such as lifted BGA components, IC leads, connectors, switches and other mounted devices for enhanced post-reflow inspection.



IC Lead Inspection Using 2D + 3D Technologies Efficiently Reveals Lifted Leads



3D Chip Inspection Reveals Defects on Both Small and Oversized Components

## SMT Line Integration

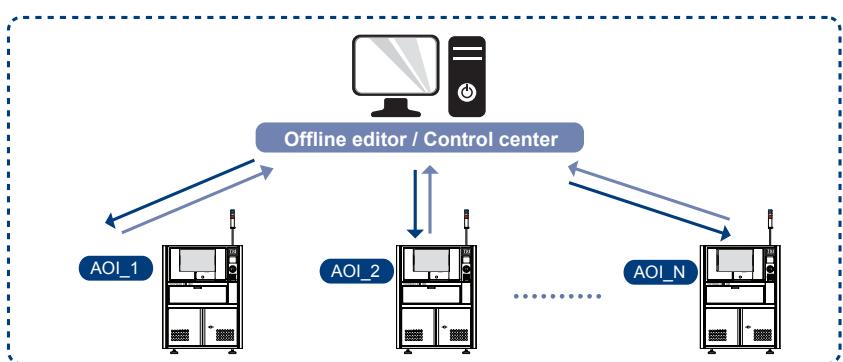
Centralized production line management increases operator productivity and response time. TRI's integrated solution includes the following four components.

- Offline Editor

This application allows for centralized independent adjustment and fine tuning of inspection algorithms on previously scanned images while providing immediate feedback. The completed program can then be uploaded to the in-line inspection machines to improve inspection stability and accuracy.

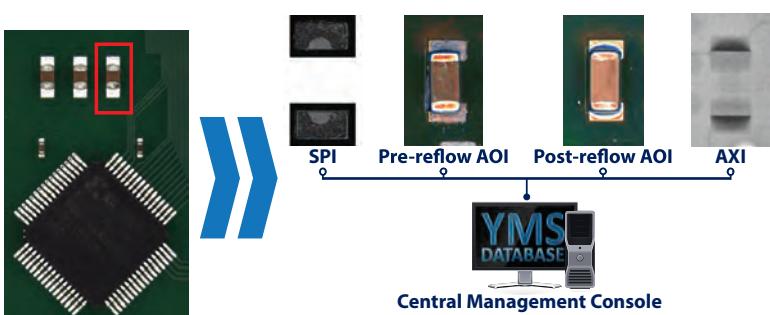
- Control Center

The core component at the heart of a production facility, the control center allows real-time monitoring and operation of multiple inspection machines across production lines.



- YMS Lite

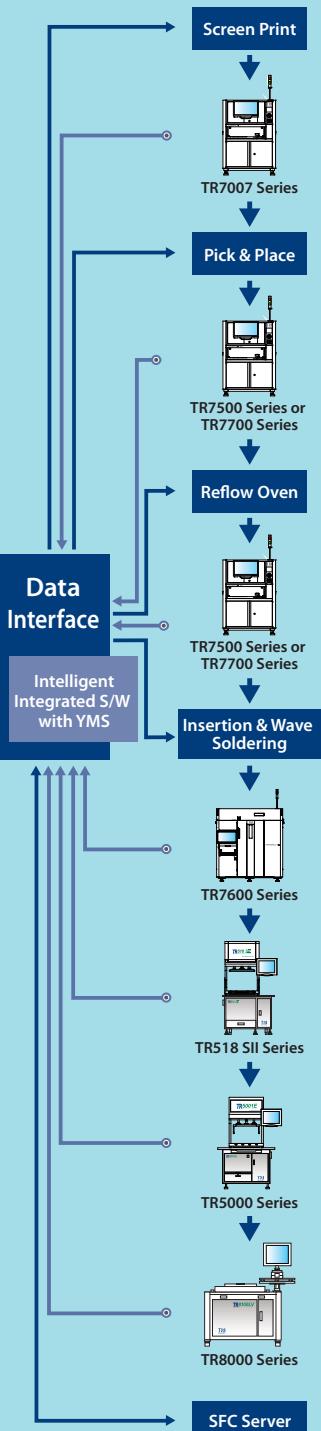
TRI's Yield Management System links inspection data from SPI, AOI and AXI systems to trace defect roots throughout the PCB assembly line. Modular architecture provides centralized inspection management, real time defect monitoring with analysis and defect knowledge management necessary to identify problems and implement solutions to maximize production yields.



- Quality Validation

Fully automated collection of good/failed images from a complete production run allows testing, tuning and verification of adjusted program parameters without reloading tested boards. This allows engineers to save inspection time when fine tuning and significantly speeds up New Product Introduction (NPI).

## Yield Management System\*



- Inspection results and data integration
  - Real time SPC and production yield management
  - Quality reports and closed loop tracking
  - Support defect component analysis and improvements
  - Knowledge Management (KM)
  - Productivity and Quality Management
- \* Optional

# S P E C I F I C A T I O N S

Test Research, Inc.

## Optical & Imaging System

Top View Camera	4 Mpix high speed color camera
3D Laser Sensor	High resolution and high measurement range (optional)
Lighting	Multi-phase RGB+W LED
Optical Resolution	10 or 15 µm
Imaging Method	Dynamic Imaging
3D Inspection Range	20 mm (with 3D Laser Sensor upgrade optional)

## Imaging/Inspection Speed

	2D	2D+3D (optional)
15 µm	120 cm <sup>2</sup> /sec	40 – 60 cm <sup>2</sup> /sec
10 µm	60 cm <sup>2</sup> /sec	27 – 39 cm <sup>2</sup> /sec

\*depending on board size

## Pre-/Post-Reflow Inspection Functions

Component	Missing, Tombstoning, Billboarding, Polarity, Rotation, Shift, Wrong Marking (OCV), Defective, Upside Down, Extra Component
Solder Joint	Excess Solder, Insufficient solder, Bridging, Through-hole Pins, Lifted Lead, Golden Finger Scratch/Contamination

## X-Y Table & Control

Ballscrew + AC servo with motion controller

X-Y Axis Resolution 1 µm



## PCB & Conveyor System

Min. PCB Size	50 x 50 mm (1.97 x 1.97 in)			
Max. PCB Size	TR7700M SIII	TR7700 SIII Plus	TR7700L SIII	TR7700 SIII DL
	330 x 280 mm (13.0 x 11.0 in)	510 x 460 mm (20.1 x 18.1 in)	660 x 610 mm (26.0 x 24.0 in)	510 x 310 mm x 2 lanes (20.1 x 12.2 in x 2 lanes) 510 x 590 mm x 1 lane (20.1 x 23.2 in x 1 lane)
PCB Thickness	0.6 - 5 mm			
PCB Transport Height	880 - 920 mm (34.6 - 36.2 in)			
Max. PCB Weight	3 kg (6.61 lbs)			
PCB Carrier/Fixing	Step motor driven & pneumatic clamping			
Clearance				
Top	25 mm (0.98 in)		25 mm (0.98 in) [48 mm optional]	
Bottom	40 mm (1.58 in)		40 mm (1.58 in)	
Edge	3 mm (0.12 in) [5 mm optional]		3 mm (0.12 in) [5 mm optional]	

## Dimensions

	TR7700M SIII	TR7700 SIII Plus	TR7700L SIII	TR7700 SIII DL
Dimensions (W) x (D) x (H) /Weight	850 x 1250 x 1500 mm (33.5 x 49.2 x 59.1 in) (not including signal tower, signal tower height: 520 mm)	1100 x 1670 x 1550 mm (43.3 x 65.7 x 61.0 in) (not including signal tower, signal tower height: 520 mm)	1300 x 1633 x 1654 mm (51.2 x 63.4 x 61.4 in) (not including signal tower, signal tower height: 520 mm)	1100 x 1670 x 1550 mm (43.3 x 65.7 x 61.0 in) (not including signal tower, signal tower height: 520 mm)
	760 kg (1676 lbs)	1080 kg (2382 lbs)	1240 kg (2735 lbs)	1150 kg (2535 lbs)
Power Requirement	200 - 240 V, single phase, 50/60 Hz 3 kVA			
Air Requirement	0.6 MPa (87 psi)			

## Options

Barcode Scanner, Repair Station, Offline Editor, OCR, Yield Management System 2.0 (YMS 2.0), YMS Lite, Support Pin, 3D AOI Upgrade Package

\* Optional 3D upgrade for TR7700 SIII Plus, TR7700L SIII, TR7700 SIII DL adds 3D inspection capability on entire inspectable PCB area.

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