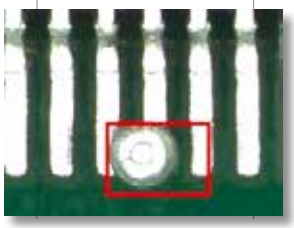
TRI innovation

# TR7500 SIII 3D
## SERIES

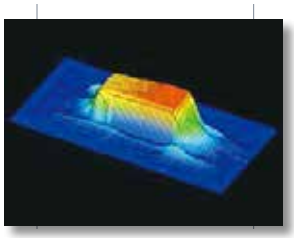

AUTOMATED
OPTICAL INSPECTION

# TR7500 SIII 3D FEATURES

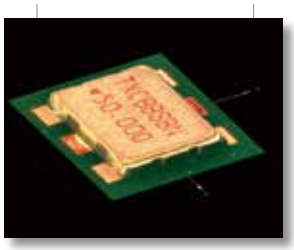
Defects



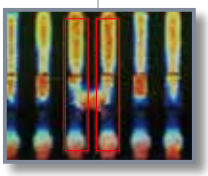
Foreign Material



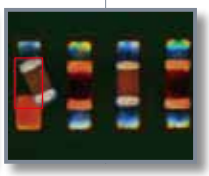
Lifted Components



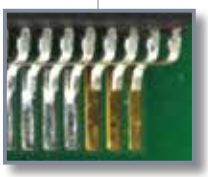
Metal-cased Reflective Components



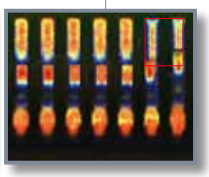
Bridging



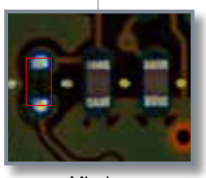
Skew



No Solder

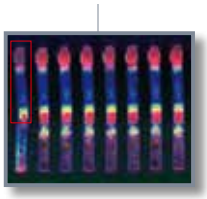


Lifted Lead

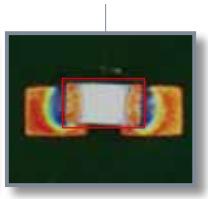


Missing

Tombstoning



Lifted Pin



Upside Down

## TR7500 SIII 3D AOI with Total Inspection Coverage

The TR7500 SIII 3D AOI combines the best of 2D and 3D technologies with new generation software to revolutionize PCB assembly inspection.

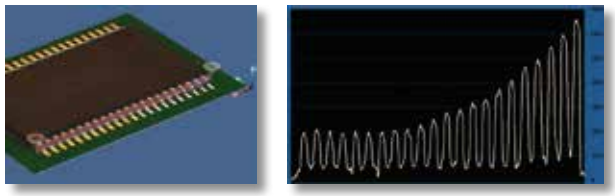
### Complete Coverage at Full Speed

Combination of five multi-angle color cameras and true 3D profile measurement eliminates blind spots even on complex automotive and smartphone assemblies. TR7500 SIII 3D inspection range covers everything from basic SMT components to large thru-hole capacitors, switches, connectors and hidden joints.

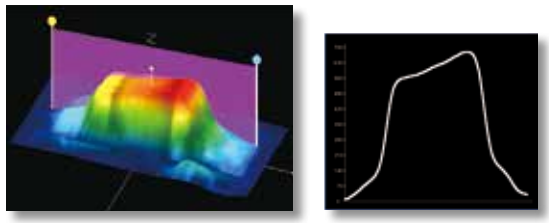
### Wide Range 3D Inspection

Military grade blue 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. TRI's 3D coverage extends all the way to miniature 03015 bottom-terminated chips.

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.



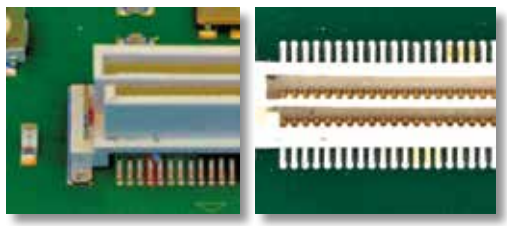
IC Lead Inspection Using 2D + 3D Technologies Efficiently Reveals Lifted Leads



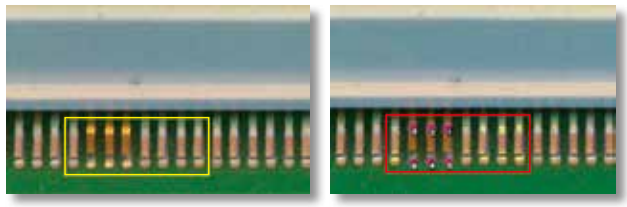
3D Chip Inspection Reveals Defects on Both Small and Oversized Components

### Multi Angle Color Cameras

New generation color angle view cameras make side view inspection a breeze. Finding complex solder joint defects hidden from top view has never been easier, and new color space processing ensures reliable defect detection.



Hidden bridge defect on connector joints can only be revealed by angle view camera.

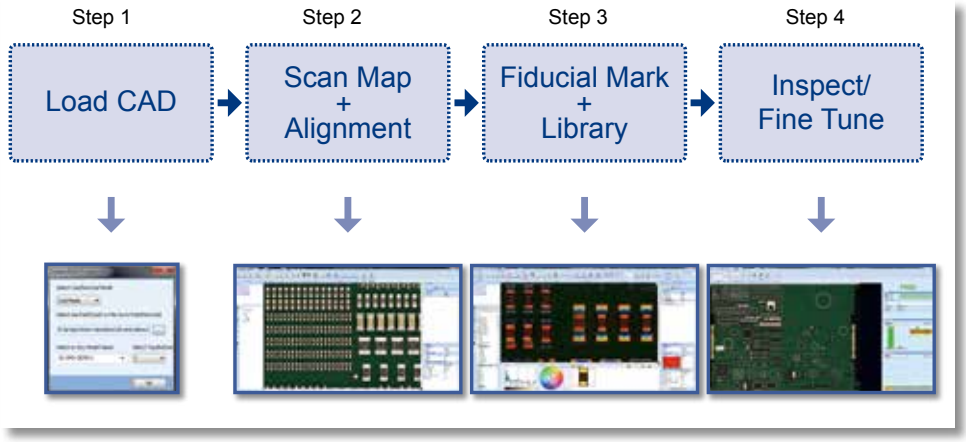


Lifted leads clearly identified using angle view camera.

## Intelligent Easy Programming Interface

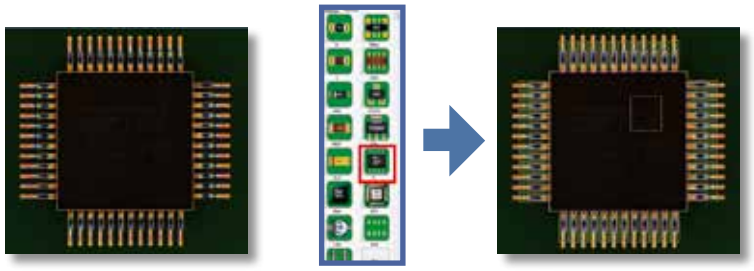
New intelligent programming process significantly reduces programming time using intelligent component library and integrated board warp compensation.

### Programming Flowchart




### Smart Library + Model Library

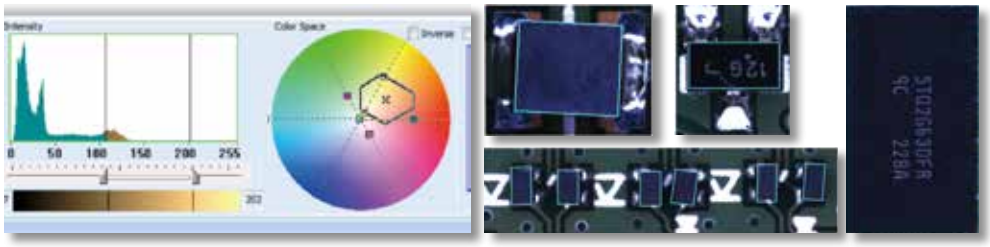
Smart Library speeds up programming by automatically allocating inspection windows for IC leads.



Auto Locate Pins | Model Library | 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.



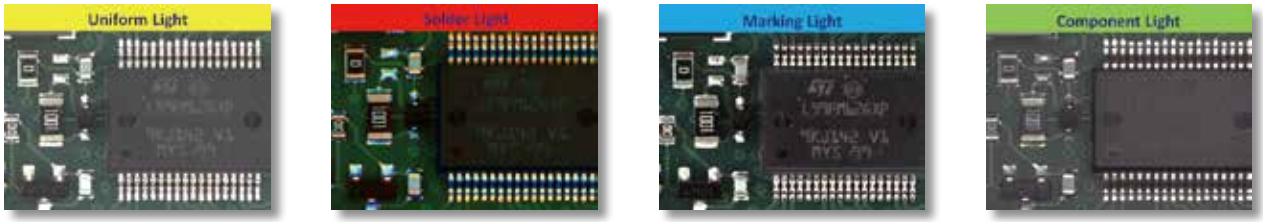
Color Differentiation Analysis for Black Resin Parts

### Extra Components and Foreign Material

Statistical image processing can help prevent many quality issues caused by foreign material and extra components found on the PCB assembly. TRI's specialized inspection algorithms can detect irregular contamination and help maintain production quality.

### Multi-phase Lighting

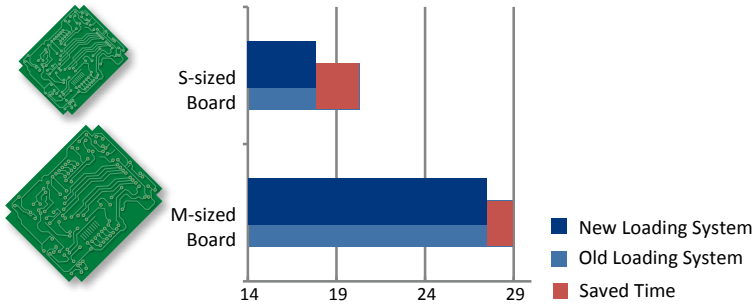
Four individual lighting phases improve inspection of individual defect types using specialized lighting conditions. High speed camera allows inspection at constant speed even with multiple lighting phases.



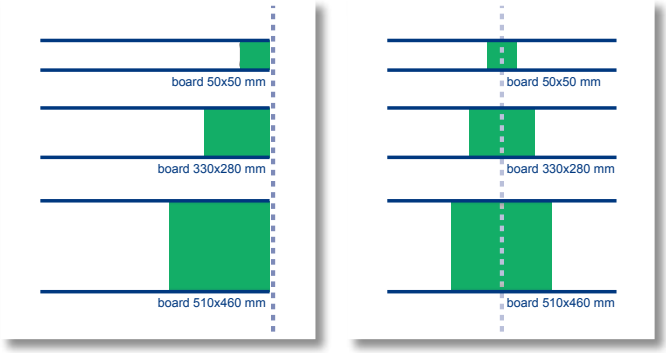
## Intelligent Auto Conveyor System

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.)

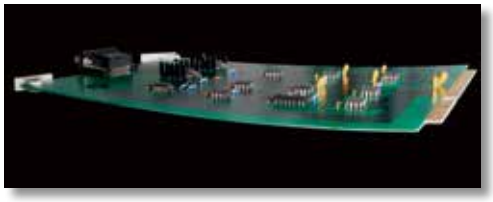



- Automatic adjustment of conveyor speed based on board size & weight saves time for manual adjustment and training.
- Automatic conveyor width adjustment (Optical direct adjustment system without returning to default position).

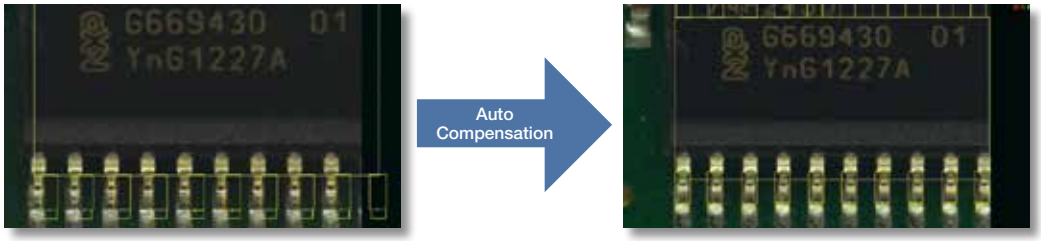



### Auto Warp Compensation

Board warping reduces automated inspection stability and requires additional fine tuning. TR7500 SIII automatically compensates for any warping and keeps inspection windows fully aligned.



Board Warping




Automated Board Warping Compensation Effectively Readjusts Inspection Window Position

## SMT Line Integration

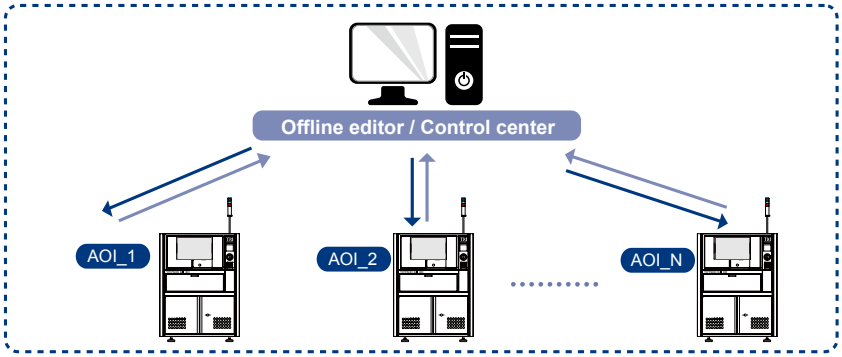
Centralized production line management increases operator productivity and response time. TRI's integrated solution includes the following four components.

• 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.

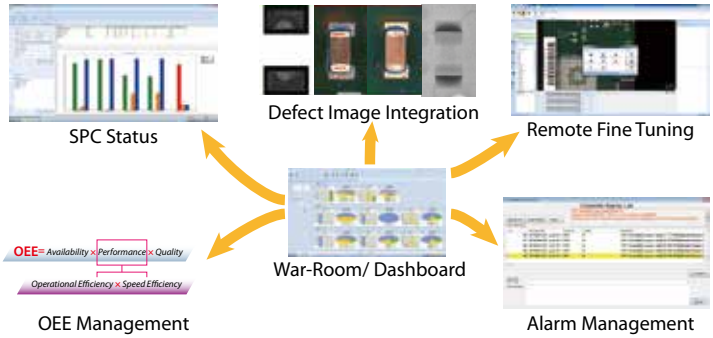
• Control Center

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.




• Yield Management System 4.0

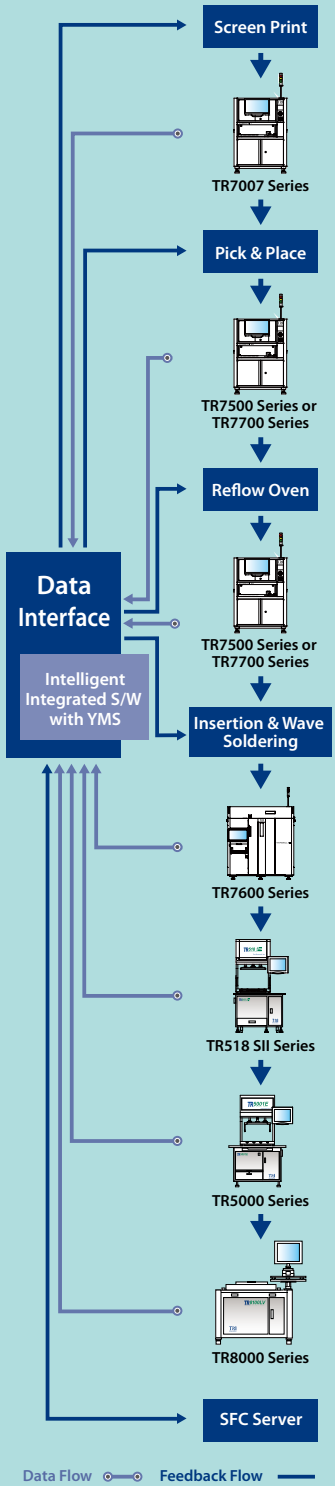
YMS 4.0 provides real-time inspection status across SPI, AOI and AXI systems and monitors SPC and Alarm status, and supports remote fine-tune throughout the SMT line. The centralized inspection management provides top 5 to 10 defects and defective images, OEE review and management, issue and root cause drill down line by line, by station and by process, which improves quality and productivity analysis. YMS 4.0 supports Industry 4.0 initiative.




• 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

# SPECIFICATIONS

## Optical & Imaging System

| | | | | | | |
|---|---|---|---|---|---|---|
| Top View Camera | 4 Mpix high speed color camera | | | | | |
| 4 Angled View Cameras | 1.3 or 6.5 Mpix (factory setting) | | | | | |
| 3D Laser Sensor | Dual 3D Laser sensors | | | | | |
| Lighting | Multi-phase RGB+W LED | | | | | |
| Optical Resolution* | 10 µm | | | 15 µm | | |
| Laser Resolution* | 10 µm (optional) | 20 µm | 50 µm | 10 µm (optional) | 20 µm | 50 µm |
| Imaging Method | Dynamic Imaging with true 3D profile measurement | | | | | |
| 3D Inspection Range | 20 mm | | | | | |

* Factory setting

## Imaging/Inspection Speed

| | 2D | 2D+3D |
|---|---|---|
| 15 µm (cm²/sec) | 120 | 40 - 60** |
| 10 µm (cm²/sec) | 60 | 27 - 39** |

** depending on board size and laser resolution

## Pre-/Post-Reflow Inspection Functions

| | |
|---|---|
| Component | Missing, Tombstoning, Billboarding, Polarity, Rotation, Shift, Wrong Marking (OCV), Defective, Upside Down, Lifted Component, Extra Component, Foreign Material |
| 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

| | TR7500 SIII 3D | TR7500L SIII 3D | TR7500 SIII 3D DL |
|---|---|---|---|
| PCB Size | 50 x 50 – 510 x 460 mm (1.97 x 1.97 – 20.1 x 18.1 in.) | 50 x 50 – 660 x 460 mm (1.97 x 1.97 – 26.0 x 18.1 in.) | 50 x 50 - 510 x 250 mm x 2 lanes (1.97 x 1.97 - 20.1 x 9.84 in. x 2 lanes) 50 x 50 - 510 x 550 mm x 1 lane (1.97 x 1.97 - 20.1 x 21.7 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 | 15 mm (0.59 in.) / 25 mm (0.98 in.) / 48 mm [(1.89 in.) optional**] | | |
| Bottom | 40 mm (1.58 in.) | | |
| Edge | 3 mm (0.12 in.) | | |

** (1) Top clearance for Laser Resolution @ 50 µm is 25 or 48 mm (optional)
(2) Top clearance for Laser Resolution @ 20 µm is 25 mm
(3) Top clearance for Laser Resolution @ 10 µm is 15 mm

## Dimensions

| | TR7500 SIII 3D | TR7500L SIII 3D | TR7500 SIII 3D DL |
|---|---|---|---|
| Dimensions (W) x (D) x (H) | 1100 x 1670 x 1550 mm (43.3 x 65.7 x 61.0 in.) (not including signal tower, height: 520 mm) | 1300 x 1630 x 1655 mm (51.2 x 64.2 x 65.2 in.) (not including signal tower, height: 520 mm) | 1100 x 1770 x 1550 mm (43.3 x 69.7 x 61.0 in.) (not including signal tower, height: 520 mm) |
| Weight | 1010 kg (2227 lbs) | 1250 kg (2756 lbs) | 1150 kg (2530 lbs) |
| Power Requirement | 200 – 240 V, single phase, 50/60 Hz 3 KVA | | |
| Air Requirement | 72 psi - 87 psi (5 - 6 Bar) | | |

## Options

Barcode Scanner, Offline Editor, OCR & Yield Management System (YMS 4.0), YMS Lite



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**C-7500 SIII 3D-EN-1605**