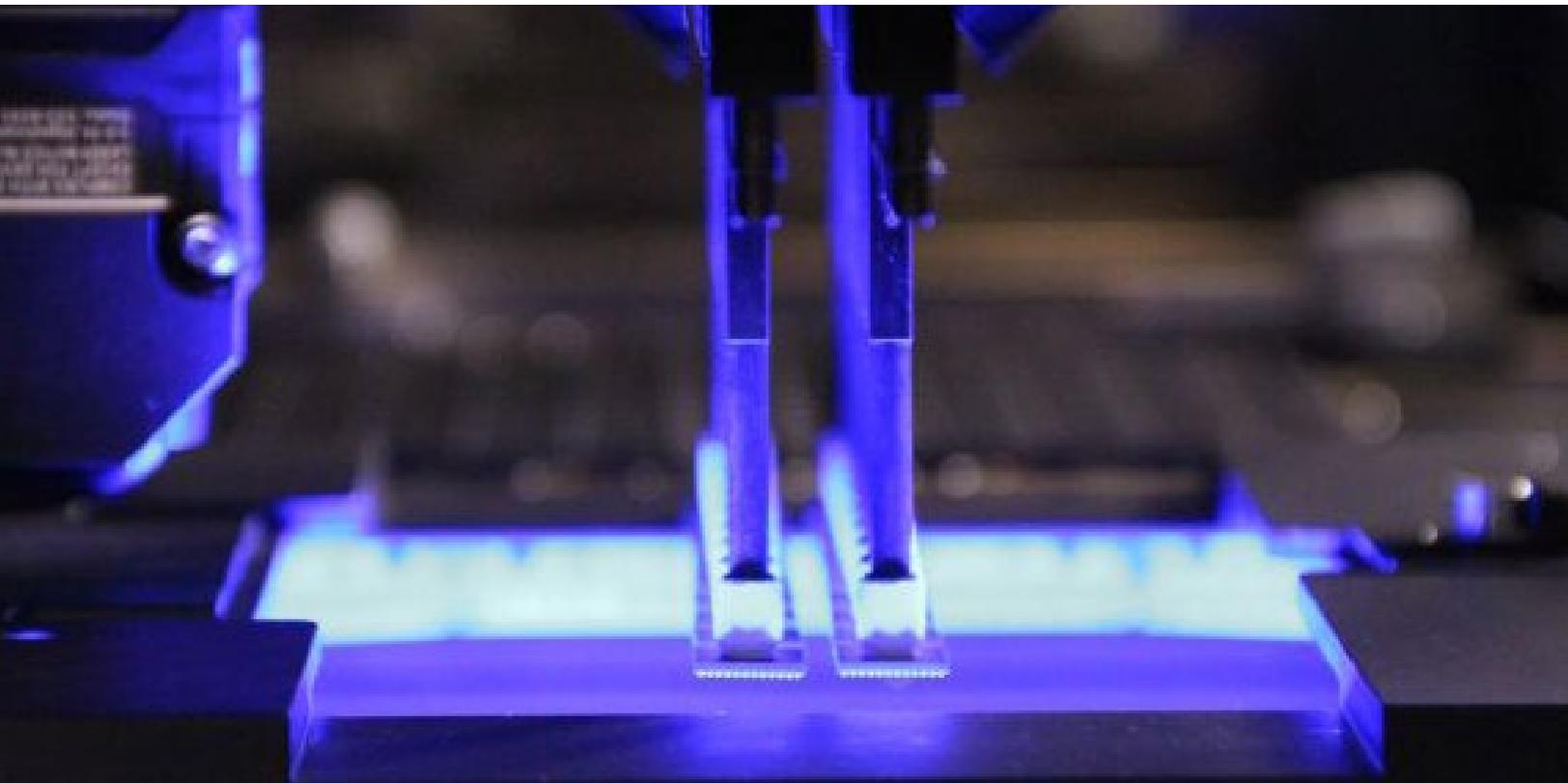


# ICOS™ T890

Packaged IC Inspection and Metrology

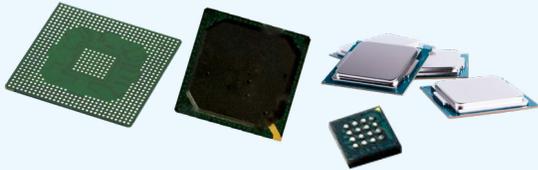


## Largest Device Range

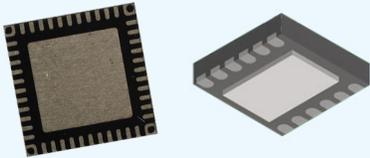
+ Leads: TSOP, QFP



+ Balls: BGA, CSP, WLP



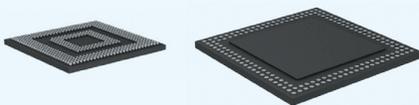
+ Pads: QFN, BCC



+ Lands: LGA



+ PoP: Interconnect

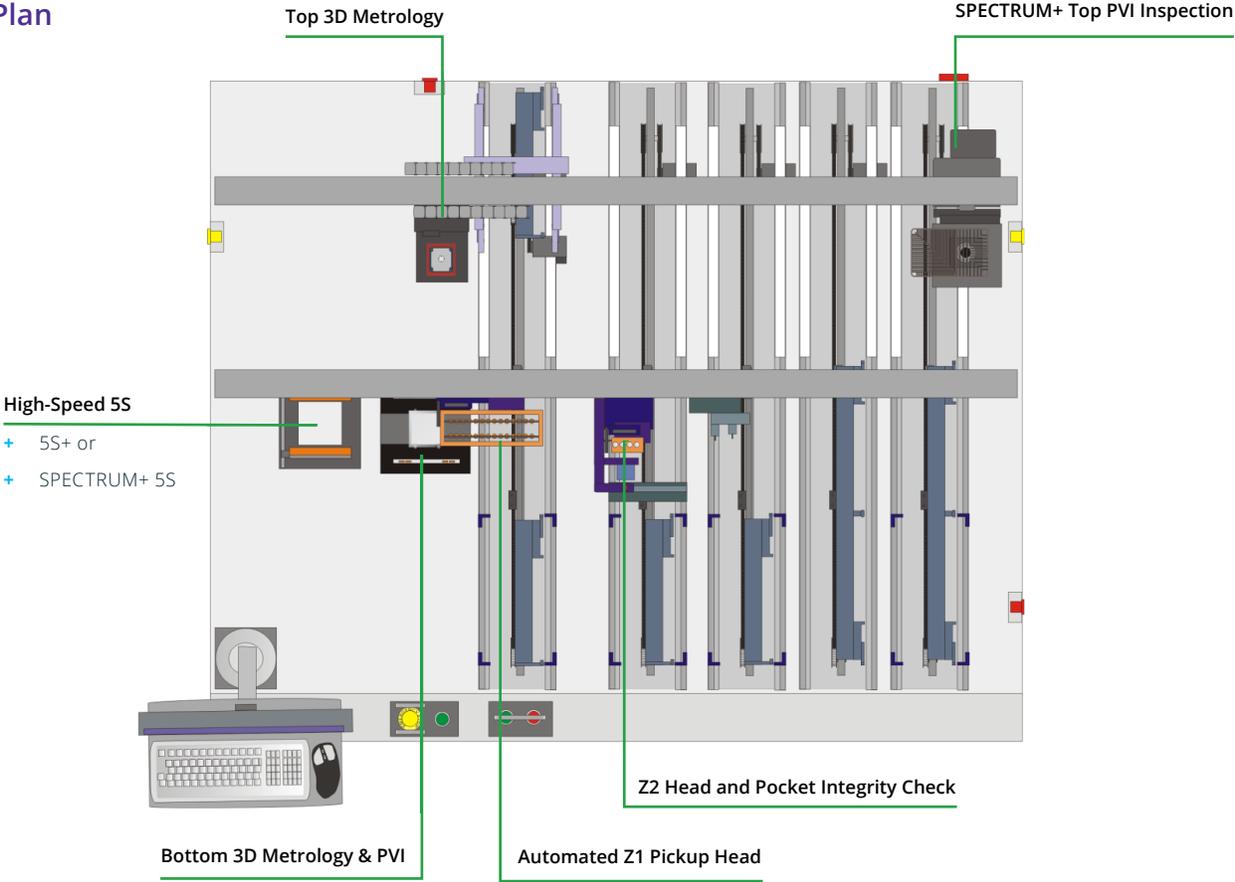


# ICOS™ T890



With the T890, KLA's ICOS division introduces a new standard in the inspection of packaged semiconductor ICs. The tool was designed to address the many new challenges the industry is facing: increase in device complexity, decrease of time-to-market and tougher quality requirements. It consolidates decades of experience, research and development into one single tool—making it the most accurate inspection machine on the market today.

### Floor Plan



### 4 Inspection Stations

To cope with the increased complexity of semiconductor devices and higher sensitivity requirements, the T890 is the first of its kind, equipped with four optical stations, each performing a specific inspection task.

### COO: Process Parallelism

High-throughput operation of four independent inspection stations, with parallel operation of the top inspection and sorting stations, enables cost-effective component inspection.

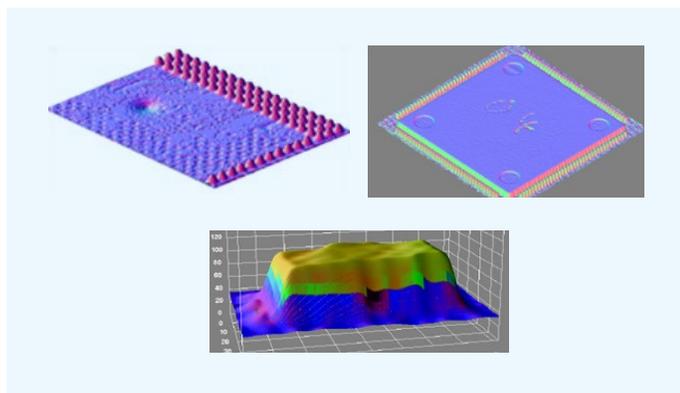
# Packaged IC Inspection and Metrology

## Increased Sensitivity

### SIGMA: Groundbreaking 3D Metrology

The new-generation ICOS 3D module provides unprecedented inspection capability at unseen accuracy.

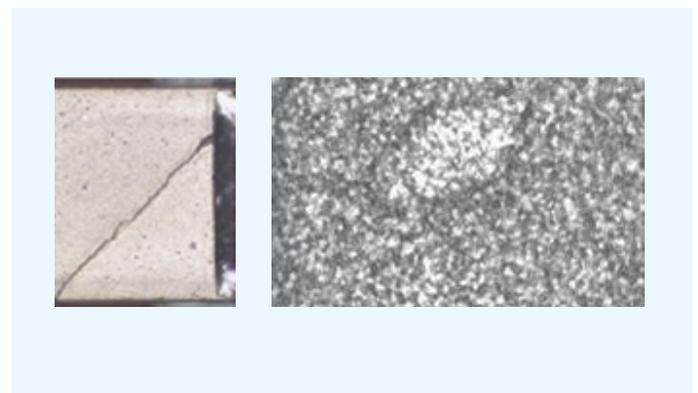
- + Best accuracy in back end industry
- + 3D inspection of any object: balls, leads, passive devices, solder pads, etc.
- + 3D scan of surfaces to detect and measure dents, bulges
- + Multirow inspection of TSOP and QFP devices
- + Embedded SPECTRUM+ 2D inspection
- + Accurate component height measurement



### SPECTRUM+: Advanced 2D Inspection

SPECTRUM+ is the latest-generation 2D Package Visual Inspection module. It can be applied to inspect both the top and bottom of the device. It can also be embedded inside the SIGMA module.

- + Very high-resolution capability
- + Large FOV with increased homogeneity
- + Color inspection to find defects like discoloration on EMI shields, exposed bond wire, plating defects, etc.
- + Embedded xCrack+™ option to detect fine cracks in silicon or mold
- + Color review imaging



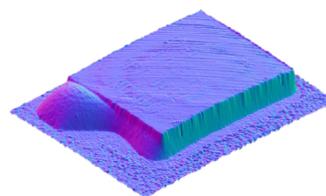
### HS5S+ and SPECTRUM+ 5S

High-speed, device side inspection is available in different resolutions and with or without color inspection depending on production requirements.



### Top 3D Inspection

The T890 allows users to perform top 3D inspection fully embedded in the floor plan of the tool. Multiple inspections are available, such as capacitor height, dent underfill and top PoP 3D inspection.

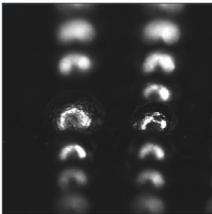


# Packaged IC Metrology

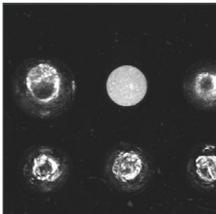
## 2D & 3D Metrology

### BGA, CSP, SGA Balls and Solder Pads

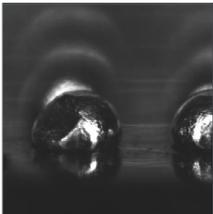
The BGA/CSP ball inspection system inspects BGA and CSP devices for critical items such as coplanarity, ball presence, position, offset, pitch, extra ball, body width, ball damage and discolored balls.



Coplanarity



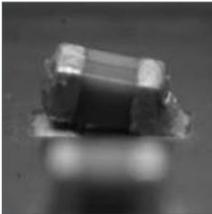
Missing Ball



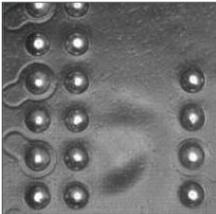
Side Smashed

### Generic Shapes

With the latest SIGMA 3D metrology, it is possible to inspect generic features on the device such as passive components and surface dents.



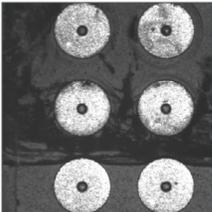
Capacitor Height



Surface Dent

### LGA Lands

The LGA 3D measurement inspects the correctness of the LGA pad grid by measuring 2D and 3D items such as pad coplanarity, offset, pitch and width.



LGA Defect

### QFN Pads Lands

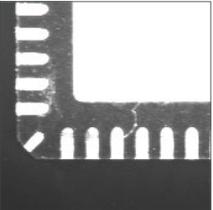
This application inspects QFN and other “leadless” packages. The system measures pad position, size, pitch, etc. In addition, it checks body size and edge straightness to control the sawing process.



Bleed on Pad



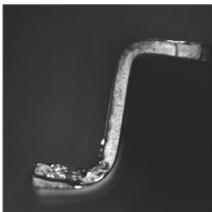
Chipped Edge



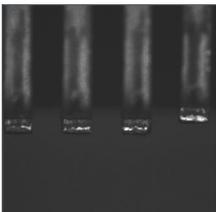
Package Cracks or Scratches

### QFP/SOP Leads

The Lead 3D application performs 3D inspection of all gull wing components. It can inspect for items such as lead coplanarity, offset, skew, pitch, length, width, span, sweep, slant, terminal dimension, body standoff and foot angle.



Foot Angle



Coplanarity



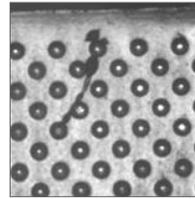
Span

# Packaged IC Inspection

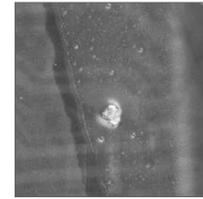
## Top & Bottom Package Visual Inspection (PVI)

### SPECTRUM+

State-of-the-art inspection of the package surface. This option scans the device for voids, scratches, pits, package incomplete fill, nonhomogenous molding, foreign material, chips and similar defects. Due to the highly flexible illumination, a variety of surface materials can be inspected: plastic mold, exposed silicon, metal surfaces, substrate, etc.



Fiber



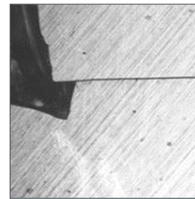
Contamination



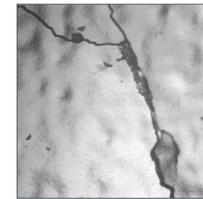
Chip-out

### xCrack+™

This option on SPECTRUM+ allows the detection of  $\mu$ cracks in silicon or mold.



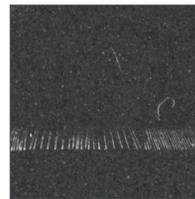
Silicon  $\mu$ Crack



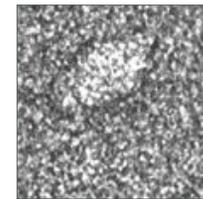
Mold  $\mu$ Crack

### Color Inspection

With this option, defects like discoloration on EMI shields, exposed wire bond copper, plating defects, etc., can be detected.



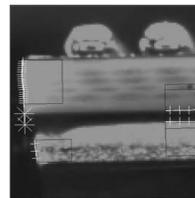
Exposed Wire



Exposed Copper

## 5S Inspection

With the High-Speed 5S+ and SPECTRUM+ options, the sides of the devices can be inspected for voids, delamination, cracks, etc.



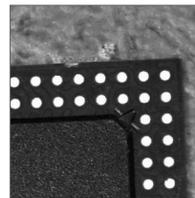
Delamination



Void

## Top 3D PoP Inspection

2D+3D inspection of PoP lands or balls.



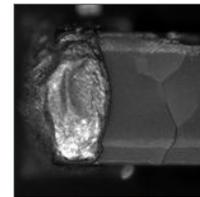
PoP lands

## Passive Device Inspection

The PVI software allows for easy setup of complex passive device matrices on flip-chip BGA. Passive devices are inspected for presence/absence, chip-out and cracks.



Presence/Absence



$\mu$ Crack



#### KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

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