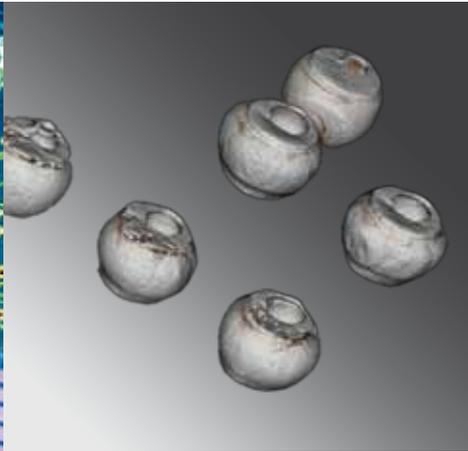


# Application:

## 3D inspection of ball grid array solder joints



- Inspection item:  
Assembled printed circuit board (PCB)
- Material:  
Solder including lead-free

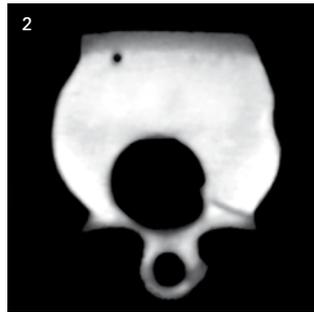
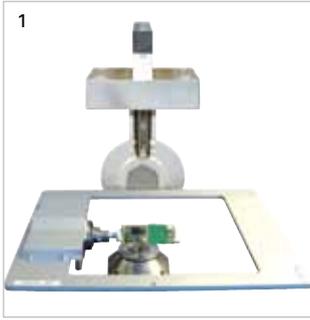
### Inspection task

The demand for shrinking devices with an increasing number of interconnections on smaller PCB surface area led to the implementation of ball grid arrays (BGA). These presented a great challenge for inspection of PCB assembly and semiconductor packaging.

BGAs are integrated circuit packages where solder joints are located on the bottom of the device. Therefore the solder balls are mostly hidden and more difficult to inspect. For process control, quality assurance and especially for electronics in safety critical applications, inspection of these components is absolutely vital.

Microfocus computed tomography ( $\mu$ CT) provides a real insight into the three-dimensional composition of components and assemblies. For challenging BGA inspections  $\mu$ CT-techniques enable the detection, assessment and localization of typical defects, such as size and location of voiding, shorts caused by excess material, opens due to insufficient material, micro-cracks and ball deformations: all of which are typical causes for electronic system failure or reliability problems.

YXLON. X-ray technology at its best.



- 1 Y.Cougar SMT with Y.μCT Modul
- 2 3D slice of a BGA ball with μ-via showing micro-crack and various voids
- 3 3D view of BGA balls with defects (voiding close to pad, small fractures)
- 4 Y.Cougar (I.), Y.Cheetah

## X-ray Inspection

In PCB assembly, 3D inspection enables the in-depth assessment of hidden BGA solder joint integrity. YXLON provides a range of versatile 2D/3D Feinfocus Solutions that offer advanced microfocus X-ray and μCT technology. The solutions commonly feature the Y.FGUI, an extremely easy-to-use software for system control and image analysis.

With the deployment of μCT even deeply embedded and stacked BGA solder joints can be assessed comfortably

through 3D viewing, virtual cross sectioning and slicing. The innermost structures can be shown and defects can be assessed regarding dimensions and location.

Additionally, the Y.QuickScan® – the ultra fast μCTsolution – enables scanning of BGA balls within a few seconds. Reconstruction at the computer is finished within a couple of minutes. Utilizing a unique combination of technologies to ensure high resolution and a fast scanning process, the smallest defects can be localized quickly.

Parameter	
X-ray source	Microfocus transmission tube
Detector	Flat-panel detector
Manipulation	Y.μCT Module incl. Y.QuickScan®
Systems	Y.Cougar, Y.Cheetah

**YXLON**

Technology with Passion

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