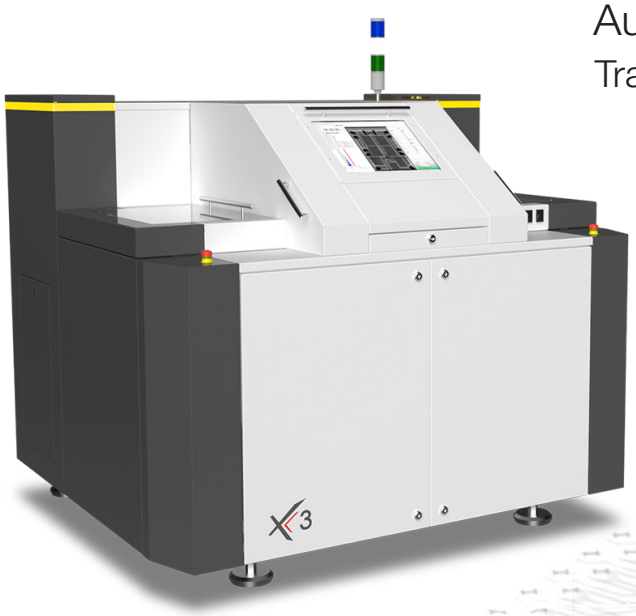
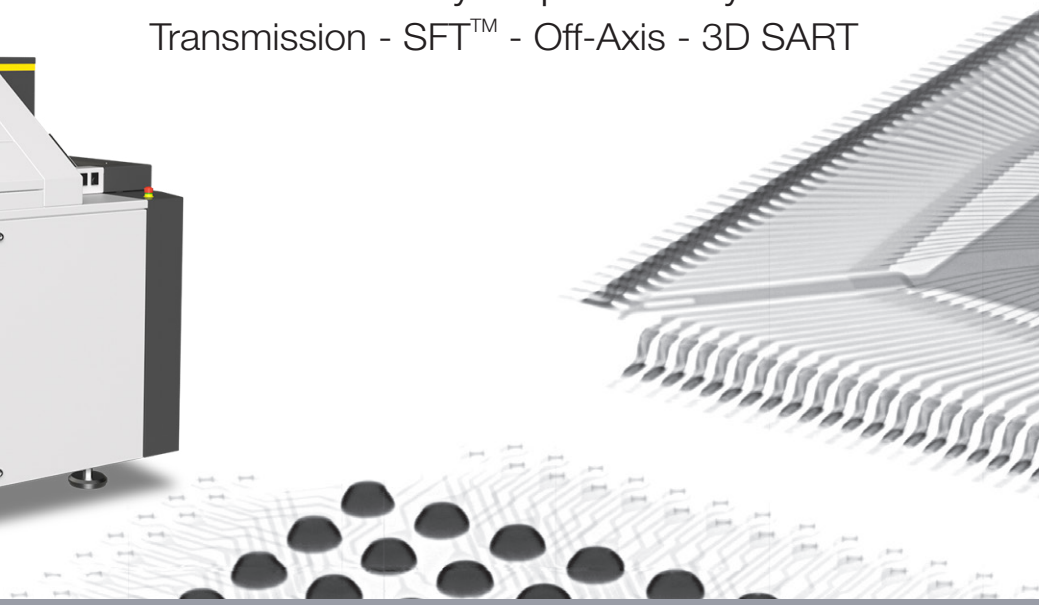
Automated X-ray Inspection System

Transmission - SFT™ - Off-Axis - 3D SART





X3

High-Speed In-line X-ray system

The **X3** is an automatic X-ray inspection system featuring combined Transmission and 3D Technology for sophisticated high-speed inspection in electronic production. The system is based on the motion concept of the MatriX X2.5 AXI system. A newly developed 3D reconstruction software generates slice images for 3D analysis of solder joints. Main applications are double-sided boards with critical overlapping areas.

MIPS_Tune is an off-line programming software package for test program generation with automatic CAD import or alternatively without CAD data. It features automated inspection list generation based on an advanced algorithm library for transmission and off-axis joint inspection. Proprietary **Tree-Classifcation** technique with integrated automatic rule generation, graphical measurement & yield display for program optimization.

The verifcation software module MIPS_Verify with its closed-loop repair concept is capable of in-line or off-line verifcation using a graphical board layout display and X-ray image with defect marking. **MIPS_Verify** supports parallel display of off-axis, transmission and optical images of the same defect for easy and reliable defect verifcation. **MIPS_SPC** is a process control tool for real-time and history statistics.

Features and Benefits

- High Speed AXI system for inline setup
  Transmission: up to 6 images/s
  Off-axis: up to 5 images/s
  3D SART: up to 1 position/s
- Microfocus X-ray tube (sealed)
- Digital Flat Panel Detector
- 5-axes programmable motion system with linear drive sample table for high-speed inspection mode
- Inline board handling with automated width adjust
- Pass-through mode with integrated lift conveyor technique
- Automated grey-level and geometrical calibration
- Barcode scanner (1D / 2D)

Inspection & Process Software

MIPS Hardware

- PC-Station with multi-core processor setup
- Windows 7 or Windows 10 platform

MIPS Inspection Platform

- Advanced algorithm library for solder-joint and component inspection
- Simultaneous Algebraic Reconstruction Technique (SART)
- Automatic Tree Classifcation (ATC) for Auto-Rule-Generation
- Off-line programming for AXI program generation & simulation, tuning and defect reference catalogue

Verifcation & process control

- MIPS_Verify link with closed loop repair
- MIPS_Proces with real time SPC

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Applications

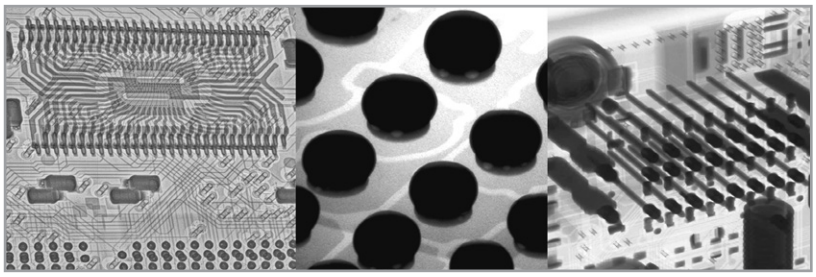
ELECTRONIC COMPONENTS AND SOLDER-JOINT

A unique advanced algorithm library is available for electronic applications, specifcally for component and solder-joint inspection on PCB, hybrid or chip level assembly processes.

- All standard SMD and THT/PTH components
- Specifc BGA and QFN algorithm
- Off-axis image analysis for BGA Head-in-pillow or THT/PTH Barrel Fill measurement
- Cooling plates/heatsink void inspection

ALGEBRAIC 3D RECONSTRUCTION

The newly developed algebraic reconstruction algorithm for 3D reconstruction is the highlight of the X3 system. It requires only few projections for generation of detailed, high resolution slice images. In addition the algorithm is independent of geometries and therefore offers optimum fexibility with respect to the acquisition setup.



Specifications

Facilities

Dimensions:
1535 mm (H) x 1800 mm (W) x 1572 mm (D)
Adjustable conveyor height (SMEMA)**:** 950 mm
Weight: 3.500 kg
Safe Operating Temperature: 15° - 32 °C
Power Consumption: max. 6 kW
Line Voltage: 400 VAC, 50/60 Hz 3 phase, 16 A
208 VAC, 50/60 Hz 3 phase, 25 A
Air: 5-7 Bar, < 2 l/min, filtered (30µ), dry, oil free

Part Handling / Motion

High-speed sample table with linear drives
Driving distance x,y: 510 x 410 mm
Position repeatability: +/-5 µm
X-Ray tube (z): 0 - 150 mm
Detector Axes (u,v): 220 x 200 mm
X-ray Source (sealed tube)
Energy: 130 kV/40 W
Focal Spot Size: 5 microns
X-Ray Tube Orientation: End window tube

X-ray Imaging

Grey value resolution: 14 bit
Video output: Camera link interface
Detector Type A: CMOS Detector (1,5 k x 1,5 k)
Active inspection area: 115 x 115 mm
Detector Type B: CMOS Detector (2 k x 2 k)
Active inspection area: 115 x 115 mm

Inspection features

Angle shot capability: 0 – 45 dgr
(A) Standard setup
Transmission FoV: 10 mm to 30 mm
Object resolution (@min. FoV): 8-10 µm
(B) High-resolution setup
Transmission FoV: 7,5 mm to 25 mm
Object resolution (@min. FoV): 3-5 µ

Sample Inspection Parameter
Max. board size: 18"x 14" (460 x 360 mm)
Min. board size: 100 x 80 mm
Max. inspection area: 18"x 14" (460 x 360 mm)
Max board weight: 5.5 lbs (2,5 kg)
Board thickness: 0.03" x 0.3" (0,8-5 mm)
Assembly clearance
Topside: (incl. board thickness): 30 mm
Bottom side: (excl. board thickness): 30 mm
Edge clearance for clamping: 3 mm

For more information, speak with your MatriX representative.

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