



Automated X-ray inspection system

- **Transmission**
- **Off-axis**
- **3D SART**



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-Classification** technique with integrated automatic rule generation, graphical measurement & yield display for program optimization.

The verification software module **MIPS_Verify** with its closed-loop repair concept is capable of in-line or off-line verification 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 verification. **MIPS_SPC** is a process control tool for real-time and history statistics

SYSTEM FEATURES

- Transmission X-ray & 3D technology
- 130 kV microfocus X-ray tube (sealed)
- 5 axes programmable motion
- Digital Flat Panel Detector on u/v motion table for 360° angle-shot coverage
- In-line board handling with automated width adjust
- Pass-through mode with integrated lift conveyor technique
- Automatic grey-level and geometrical calibration
- Barcode scanner (1D/2D) for serial number and product type selection

FEATURES

MATRIX INSPECTION & PROCESS SOFTWARE

MIPS Hardware

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

MIPS Inspection Platform

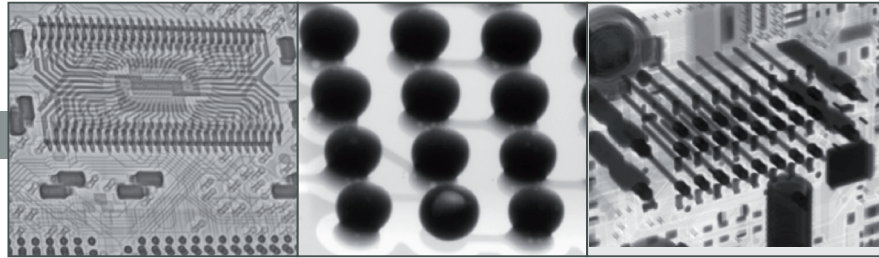
- Advanced algorithm library for solder-joint and component inspection
- Simultaneous Algebraic Reconstruction Technique (SART)
- Automatic Tree Classification (ATC) for Auto-Rule-Generation
- Off-line programming for AXI program generation & simulation, tuning and defect reference catalogue

Verification & process control

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



APPLICATIONS



ELECTRONIC COMPONENTS AND SOLDER-JOINTS

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

- All standard SMDs and THT/PTH components
- Specific 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 analysis is the highlight of the inline 3D system X3. 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 flexibility with respect to the acquisition setup.

SPECIFICATIONS

Physical Dimension

Dimensions 1535 mm (H) x 1800 mm (W) x 1572 mm (D)
 Feet adjusted, so conveyor height is 950 mm (SMEMA)
 Weight 3500 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

Motion System

High-speed sample table with linear drives (X,Y)
 Driving distance X,Y 510 x 405 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 - 7 microns
 X-Ray Tube Orientation End window tube

Digital Image Detector

Grey value resolution 14 bit
 Video output Camera link interface
 Detector Type A CMOS Detector (1,5k x 1,5k)
 Active inspection area 115 x 115 mm
 Detector Type B CMOS Detector (2k x 2k)
 Active inspection area 48 x 48 mm

Image Performance

Angle shot capability 0 – 45 dgr
 (A) Standard FOV high-speed setup
 Transmission FoV 0.4" (10 mm) to 2.0" (50 mm)
 Object resolution (@min. FOV) 8-10 µm
 (B) high-resolution setup
 Transmission FoV 0.4" (10 mm) to 1.2" (30 mm)
 Object resolution (@min. FOV) 3-5 µm

Sample Inspection Parameter

Max. board size (X)x(Y) 18"(460 mm) x 14"(360 mm)
 Min. board size (X)x(Y) 100 mm x 80 mm
 Max. inspection area (X)x(Y) 460 mm x 360 mm
 Max board weight: 2,5 kg
 Board thickness 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

Safety / Regulatory

Full safe, interlocked enclosure. Complies with all U.S. and International standards for cabinet radiography systems. CDRH directives / CE compliant.