Non-destructive Imaging for Advanced Packaging

ZEISS Xradia 515 Versa 3D X-ray Microscope

ZEISS Xradia 515 Versa 3D X-ray microscope (XRM) is the most cost-effective model of the Versa XRM family, with resolution maintained for large samples. With the best-in-class Versa platform, it enables high resolution and non-destructive imaging capabilities for semiconductor package development and failure analysis.

The workhorse for 3D imaging

ZEISS X-ray microscopes remove major technical hurdles for 3D imaging, achieving high contrast and submicron resolution. Xradia 515 Versa uses a unique two-stage magnification technique that enables you to achieve Resolution at a Distance (RaaD).

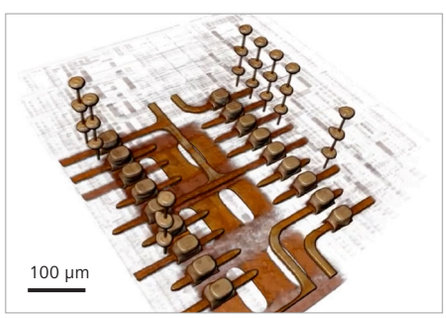
Combined with the flexibility and stability of the Versa XRM platform, this unparallelled versatility ensures high image quality and fast time-to-results.

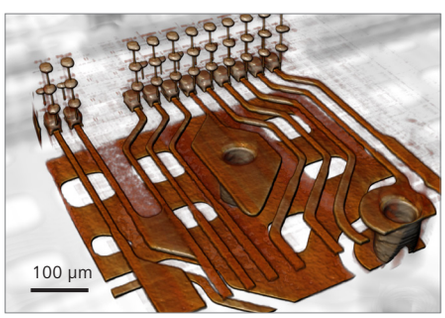
These 3D imaging innovations empower a broad range of applications with diverse sample sizes, geometries, and compositions. The versatility enables vital capabilities like interior tomography, phase contrast, *in situ* imaging and correlative FIB-SEM workflows. ZEISS 3D X-ray microscopes are built on upgradeable, extendable, and reliable platforms that help protect your capital investment.

AI-powered Reconstruction for High-throughput Imaging

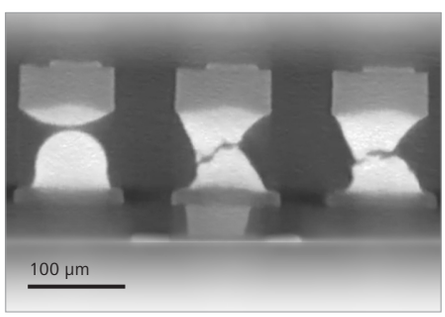
The optional ZEISS DeepRecon Pro module delivers 4X faster scan time and improves image quality.

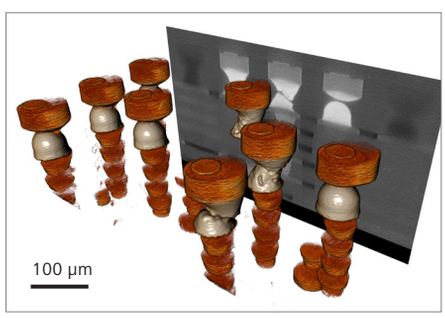
ZEISS DeepScout module enables high-resolution recovery at large fields of view (FOV), saving numerous long scans to cover the FOV.





3D XRM images of stacked die package interconnects in a commercial DDR4 DRAM package.





Solder non-wets and cracks in flip chip package visible in a 2D virtual slice (left) and extracted from a 3D XRM dataset (right).

ZEISS

Seeing beyond

Benefits

- Non-destructive 3D imaging
- Visualize buried defects and structures
- Reduce the need for physical cross-sections
- Guide correlated FIB and SEM workflows
- Achieve high failure analysis success rates
- RaaD for highest resolution at the largest working distance from source (unique to ZEISS)
- Proprietary ZEISS optics provide high contrast
- Motorized sample positioning for efficient multi-site imaging
- SmartShield for sample protection and setup optimization
- Scout-and-Scan control system for easy-to-use workflow set-up, ideal in multi-user environments
- Program up to 14 samples at a time to run sequentially with optional Autoloader
- XRM Python API for customized instrument control
- Continuous access to advanced reconstruction technologies such as DeepRecon Pro and DeepScout for enhanced performance (e.g., throughput, image quality)

Specifications

Imaging	ZEISS Xradia 515 Versa	ZEISS VersaXRM 615	ZEISS VersaXRM 730
Spatial Resolution [a]	0.7 µm	0.5 µm	0.45 µm
Resolution Performance (ZEISS resolution target at 160 kV/LE6)			0.5 µm
Resolution at a Distance (RaaD) [b] (at 50 mm working distance)	1.0 µm	1.0 µm	0.7 µm
Resolution at a Distance (RaaD) [b] (at 100 mm working distance)			0.75 µm
Minimum Achievable Voxel [c]	70 nm	40 nm	40 nm

X-ray Source			
Architecture	Sealed transmission, fast activation		
Voltage Range	Spot size stable, 30-160 kV		
Maximum Power Output	10 W	25 W	25 W

Detector System			
ZEISS X-ray microscopes feature an innovative detector turret with multiple objectives at different magnifications. Each objective features optimized scintillators that deliver the highest absorption contrast details.			
Standard Objectives	0.4×, 4×, 20×	0.4×, 4×, 20×	0.4×, 4×, 20×
Optional Objectives	40×, FPX	40×, FPX	FPX, 40×-P [d]
Flat Panel Detector	Optional, Step Mode	Optional, FAST or Step Mode	

Stages	
Sample Stage, load capacity	25 kg
Sample Stage Travel, X, Y, Z	50 mm, 100 mm, 50 mm
Stage Travel, rotation	360°
Source Travel, Z direction	190 mm
Detector Travel, Z direction	290 mm

Versa Features			
Scout-and-Scan Control System	■	ZEN navx	ZEN navx
SmartShield	SmartShield	SmartShield (Lite)	SmartShield (Lite)
Automated Filter Changer			■
High Aspect Ratio Tomography (HART)			■
Autoloader	Optional	Optional	Optional
Wide Field Mode		4×	4×
GPU CUDA-based Reconstruction	Dual	Dual	Dual

Advanced Reconstruction Toolbox			
DeepRecon Pro (2-year license)	Optional 1 year or perpetual license	■	■
High Performance Workstation	Optional	■	■

[a] Spatial resolution measured with ZEISS XRM 2D resolution target, normal field mode, optional 40× or 40×-Prime objective.
[b] RaaD working distance defined as clearance around axis or rotation.
[c] Voxel is a geometric term that contributes to but does not determine resolution, and is provided here only for comparison. ZEISS specifies resolution via spatial resolution, the true overall measurement of instrument resolution.
[d] 40×-Prime objective

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