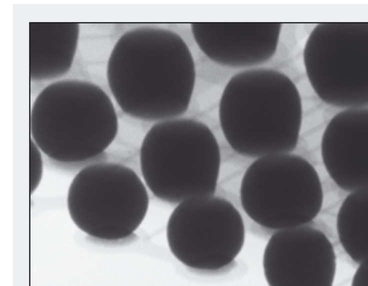
X-RAY AND CT TECHNOLOGY FOR ELECTRONICS INSPECTION

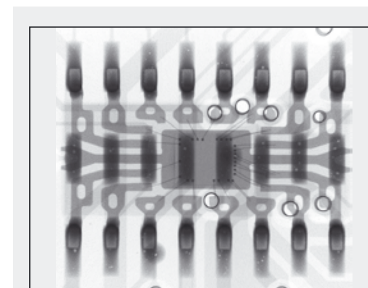
XT V SERIES

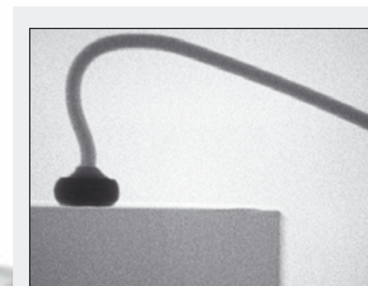
Electronics inspection made easy

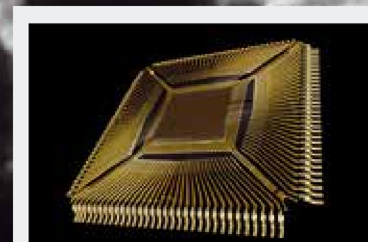
There is an increasing demand for flexible, high-resolution and cost-effective X-ray inspection systems to cope with the evolution of ever-shrinking geometries within electronics components and to comply with tighter quality standards.

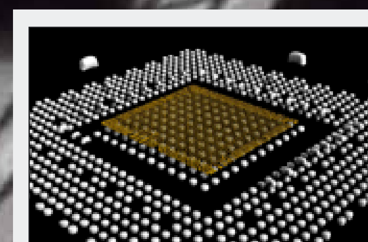
The XT V series enable insights into printed circuit board assemblies, components, or electrical devices in an intuitive, non-destructive inspection process. X-ray inspection provides many benefits to manufacturers and researchers, accelerating throughput and improving product quality whilst reducing costs.


Head-in-Pillow defect


Top view QFN


Ball bond


CT image of package


Graphics processing unit (GPU)

A wealth of applications

With the constant demand for component miniaturization and 3D packaging technologies, modern X-ray inspection systems must provide the sharpest images and a vast range of applications in order to increase productivity.

SMD (SURFACE MOUNT DEVICES)	
BGA (Ball Grid Array) QFN (Quad-Flat No-leads) QFP (Quad Flat Package)	- BGA diameter and circularity - BGA and PAD array void analysis - Head-in-Pillow - Cold or dry joint - Missing BGA - Bridging - Form solder connection - Solder balls
THROUGH-HOLE	- Filling of PTH - Cracks in through holes - Bridging between pins
IC BONDING	
Wire bonding (Au or Cu) Flip chip C4 (Controlled Collapse Chip Connection)	- Broken wire - Wire sweep analysis - Broken wedge bond - Lifted ball bond - µBGA void analysis - Cold joint - Package void analysis
WAFER LEVEL INTERCONNECTIVITY: WLFP OR WL-CSP, 3D PACKAGING, SYSTEM IN PACKAGE (SIP)	
TSV (Through Silicon Via) Micro-bumps Cu-pillar	- Voids in Cu filling - Remaining edge fluid - Voids analysis - Cold joint

Besides electronics inspection, XT V systems are also suited for X-ray and CT inspection of a wide variety of smaller components. The large tray can hold different samples for serial NDT analysis:

Micro-Electro-Mechanical Systems (MEMS, MOEMS) often used in consumer electronics such as smartphones, these can include accelerometers, pressure sensors, gyroscopes, action buttons, etc.

Series radiographic inspection of small components such as cables, harnesses, plastic parts, LED lights, switches, medical parts, etc.

XT V 160

PREMIUM X-RAY INSPECTION

Specifically designed for use in production lines and failure analysis laboratories, the XT V 160 can be configured with a choice of premium system components to optimize the performance for your needs. Besides manual real-time inspection, the inspection process can be fully automated to maximize productivity.

- High-performance 160kV / 20W source
- Submicron feature recognition with minimal maintenance
- Intuitive automated inspection and analysis tools
- Various high-end detectors for every application
- Ready for digital slicing with X.Tract
- Ready for 3D CT

XT V 130C

COST-EFFECTIVE X-RAY INSPECTION

The XT V 130C is a highly flexible and cost-effective electronics and semiconductor inspection system. The system features a 130 kV/10 W in-house manufactured souce, a globally recognized open tube design with integrated generator, and a high-resolution imaging chain.

- Reliable 130kV / 10W source
- Micron-level feature recognition with minimal maintenance
- Ideal for real-time imaging
- Ready for 3D CT

At the core of X-ray technology

Nikon's market-leading Xi microfocus X-ray sources are the core of our technology, providing a sharp, stable and bright image. In-house manufacturing combines market-leading performance with strict quality control.

The open tube design with integral generator reduces cost of ownership and improves reliability, with minimal maintenance required.

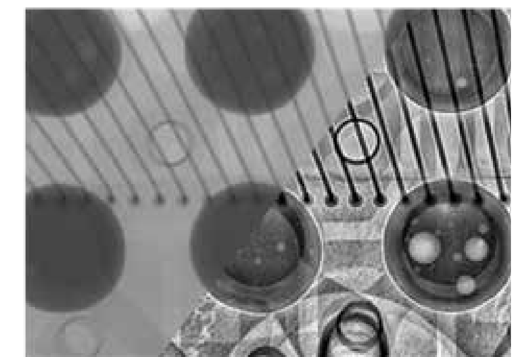
The XTV series system configuration, with the X-ray source below the sample tray and the tilting imager above, is controlled through user friendly Inspect-X software or via precise joystick manipulation.

Intelligent motion control keeps the region of interest in view throughout 360° sample rotation, even at an extreme oblique angles and high magnification.

HIGH CONTRAST FILTER
POWERFUL IMAGE ENHANCEMENT

High Contrast Filter enables operators to identify defects quickly and with confidence. Compared to standard filters, which may overexpose lower-density areas when visualizing defects in high-density areas, High Contrast Filter normalizes the contrast across the whole image, revealing details in both high and low-density areas in a single clear image. It also works in real-time, facilitating interactive visual inspection of fine defects.

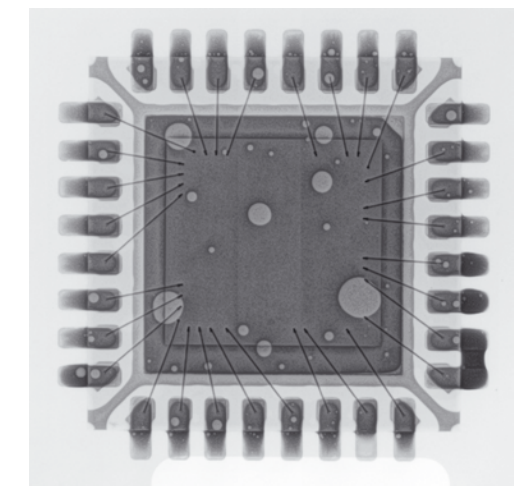
Raw radiograph



HIGH CONTRAST FILTER

DIAMOND WINDOW
LESS NOISE AND FASTER SCANS

The Diamond Window improves contrast across the full operating range, making fine defects easier to spot. Enhanced image brightness reduces image noise, particularly for low-density features.



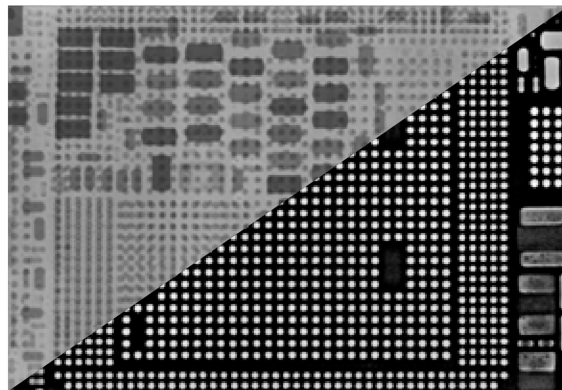
High-resolution digital slices

X.Tract provides CT-quality inspection results of complex, multi-layer electronics assemblies without slicing them. With virtual micro-sectioning, X.Tract reveals defects that are typically obscured in complex components such as Package on Package (PoP) devices on double-sided boards.

Switch between radiography and X.Tract during live inspection, or add X.Tract scans to intuitive inspection programs for fully automated analysis. With X.Tract, users gain better insights leading to reduced false call rates and higher productivity.

REPORTING

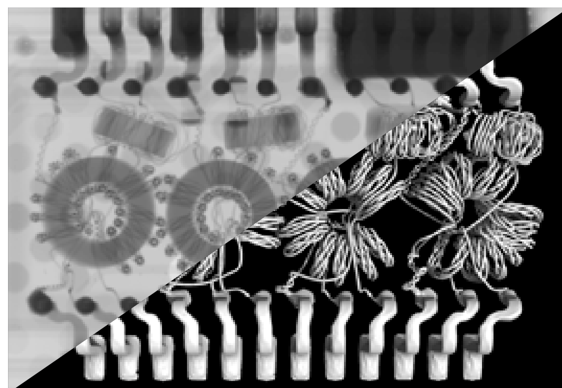
Inspect-X provides a suite of easy-to-use tools and customizable HTML templates for endless real-time or automated reporting possibilities. Reports can be easily shared with colleagues or suppliers to facilitate decision-making. Results are available for offline analysis and troubleshooting on validation station.



EXTRACT HIDDEN FEATURES

X.Tract extracts high-resolution digital slices in any direction, without cutting the sample. Defects that are obscured in complex devices are made clearly visible.

Automatically inspect and analyse double-sided PCBAs, Package-on-Package (PoP) and other multi-layer devices slice by slice, with no need for destructive grinding and polishing.



RAPID 3D ANALYSIS

Select a component using the intuitive Inspect-X user interface and generate 3D datasets in minutes. Inspect results immediately using the built-in viewer, and quantify defects using the PCB Analysis Suite.

Integrate X.Tract scans into inspection programs for fully automated inspection and analysis – ideal for high-resolution automatic defect recognition (ADR), even on challenging multi-layer parts.

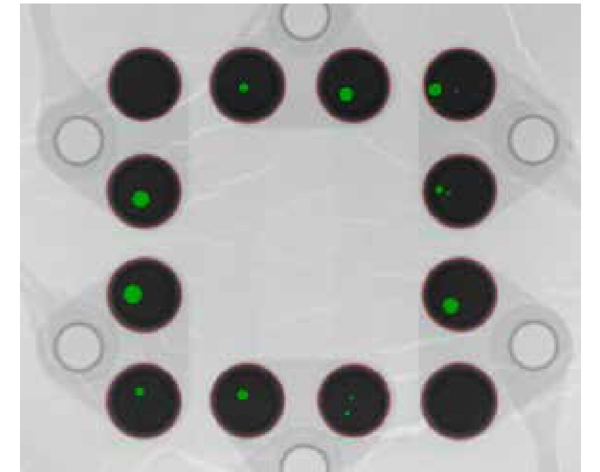
Focusing on productivity

AUTOMATED INSPECTIONS

Set up automated inspection program in minutes with the intuitive Inspect-X interface – no programming required!

The PCB Analysis Suite is capable of advanced measurement and analysis of BGA, bond wires, PTH and complex packages such as PoP on multi-layered boards, with automated pass/fail inspection and reporting.

Interactive Visual Check and Golden Sample actions allow operators to make sentencing calls on critical features from within an automated inspection.

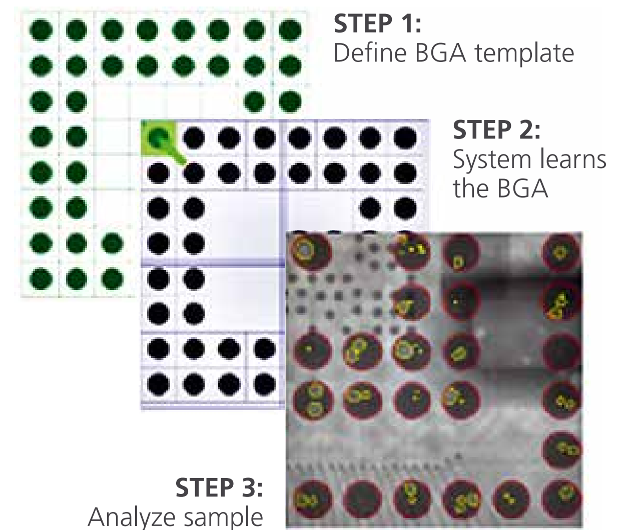


POWERFUL ANALYSIS TOOLS

The BGA device inspection functionality is an 'all-in-one' tool offering automatic analysis of voiding ball circularity, ball count, bridging, and pass/fail detection.

With its powerful image processing algorithm, the tool gives accurate results even in complex board assemblies with underside components.

The tool allows creation of an internal library of BGA templates using a wizard or via file import to reduce the time taken to build automated pass/fail inspection routines.

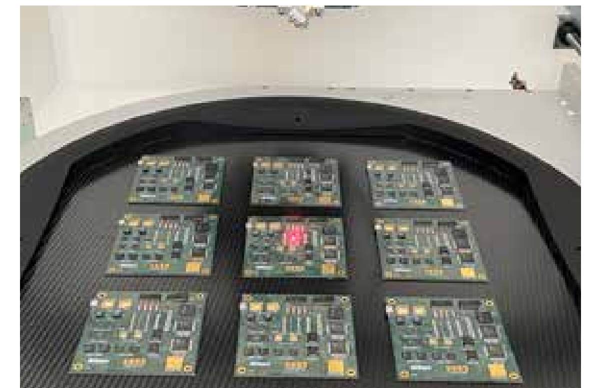


PROTECTION FEATURES

Automatic collision avoidance prevents physical damage to both the system and parts under inspection, even at maximum magnification.

Low Dose Collimator minimises X-ray exposure, enabling detailed batch inspection of semiconductor devices.

ESD Safety Upgrade keeps samples safe from harm, compliant with global standards.



Specifications

	XT V 160	XT V 130C
Maximum kV	160 kV	130 kV
X-ray source	Open tube with replaceable filaments for unlimited lifetime	
High voltage generator	Integrated generator - no HV cable maintenance required	
Feature recognition	Submicron	Micron-level
Imaging system	Premium flat panel detector with true 16-bit analog to digital conversion	
Detector active area	244 x 195 mm (8 x 10") 146 x 146 mm (6 x 6")	130 x 130 mm (5 x 5 ")
Manipulator	Fully programmable 5-axis collision-free manipulator	
Viewing angle range	Up to 82° in any direction	Up to 79° in any direction
Sample tray	Carbon fibre tray, 580 mm (22.8") diameter	
Max. sample weight	Heavy duty tray available	
Display	High-quality 4K display	
Cabinet dimensions (W x D x H)	1,260 x 1,789 x 1,904 mm (50 x 70 x 75")	
System weight	2,100 kg (4,630 lbs)	
Radiation safety	<1 µSv/h at the cabinet surface	
ESD safety	ESD-safe to industry standards with optional ESD Safety Upgrade	
Control	Inspect-X control and analysis software	
Automated inspection	Included	Optional
3D reconstruction capability	Optional 3D CT & X.Tract	Optional 3D CT
Primary applications	Automated and real-time electronics and semiconductor inspection for R&D, QA, QC and failure analysis	Real-time electronics inspection

XTV Series_XR-XTV-2510EN – Copyright Nikon Metrology NV 2025. All rights reserved. The materials presented here are summary in nature, subject to change, and intended for general information only.

NIKON CORPORATION
1-5-20, Nishioi, Shinagawa-ku, Tokyo 140-8601, Japan
Tel: +81 3 6743 5742
https://industry.nikon.com

ISO 14001 Certified
for NIKON CORPORATION

NIKON METROLOGY EUROPE NV
Interleuvenlaan 86
3001 Leuven, Belgium
Tel: +32 16 74 01 01
Sales.NM@nikon.com

NIKON METROLOGY UK LTD.
UNITED KINGDOM Tel: +44 1332 811 349
Sales.UK.NM@nikon.com

NIKON METROLOGY SARL
FRANCE Tel: +33 1 60 86 09 76
Sales.France.NM@nikon.com

NIKON METROLOGY GMBH
GERMANY Tel: +49 211 4544 6951
Sales.Germany.NM@nikon.com

NIKON METROLOGY, LLC
12701 Grand River Road
Brighton, MI 48116 U.S.A.
Tel: +1 810 220 4360
Sales.NM-US@nikon.com

NIKON METROLOGY - MÉXICO
Sales.NM-US@nikon.com

NIKON PRECISION (SHANGHAI) CO., LTD.
CHINA Tel: +86 21 6841 2050 (Shanghai branch)
CHINA Tel: +86 10 5831 2028 (Beijing branch)
CHINA Tel: +86 20 3882 0551 (Guangzhou branch)
Web.Nis@nikon.com

NIKON INSTRUMENTS KOREA CO. LTD.
KOREA Tel: +82 2 6288 1900
NIK.Sales@nikon.com

NIKON SINGAPORE PTE. LTD.
SINGAPORE Tel: +65 6559 3651
NSG.Industrial-sales@nikon.com

PT. NIKON INDONESIA
INDONESIA Tel: +62 213 873 5005
PTN.Instruments@nikon.com

NIKON SALES (THAILAND) CO., LTD.
THAILAND Tel: +66 2633 5100
NST.Inst@nikon.com