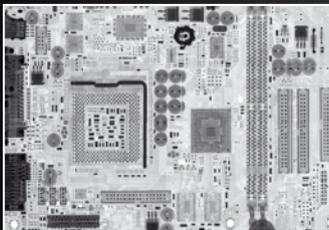
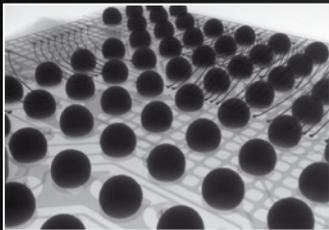




XT V Series



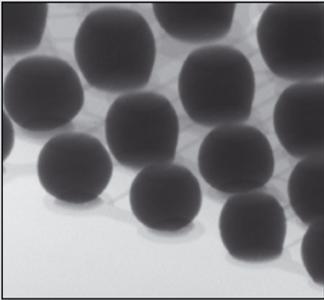
X-ray and CT technology
for electronics inspection

ELECTRONICS INSPECTION MADE EASY

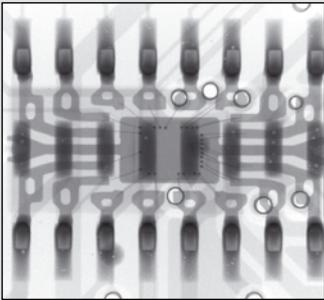


Today there is a growing demand for flexible, high-resolution and cost-effective X-ray inspection systems to cope with the demands of ever-smaller electrical components and to comply with tighter quality standards. With the XT V series, you can get the inside view of printed circuit boards, or electrical components in a smooth non-destructive process. By leveraging the benefits of XT V series, manufacturers can focus on accelerating lead times and improving product quality while reducing costs.

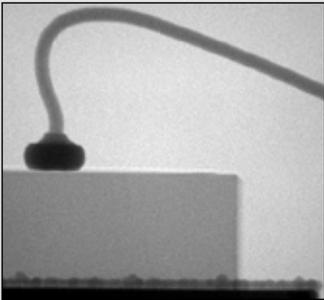
A WEALTH OF APPLICATIONS



Head-in-Pillow defect



Top view QFN



Ball bond



Connector (CT image)

With the advent of component miniaturization and 3D packaging technologies, modern X-ray inspection systems need to provide the sharpest images and relentless productivity to get the job done!

SMD (Surface Mount Devices)

BGA (Ball Grid Array)	- BGA diameter and circularity
QFN (Quad-Flat No-leads)	- BGA and PAD array void analysis
QFP (Quad Flat Package)	- 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)	- Broken wire
Flip chip	- Wire sweep analysis
C4 (Controlled Collapse Chip Connection)	- Broken wedge bond
	- Lifted ball bond
	- μ BGA void analysis
	- Cold joint
	- Package void analysis

Wafer level interconnectivity:

WLFP or WL-CSP, 3D packaging, System in Package (SiP)

TSV (Through Silicon Via)	- Voids in Cu filling
Micro-bumps	- Remaining edge fluid
Cu-pillar	- 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.

AT THE HEART OF THE IMAGE

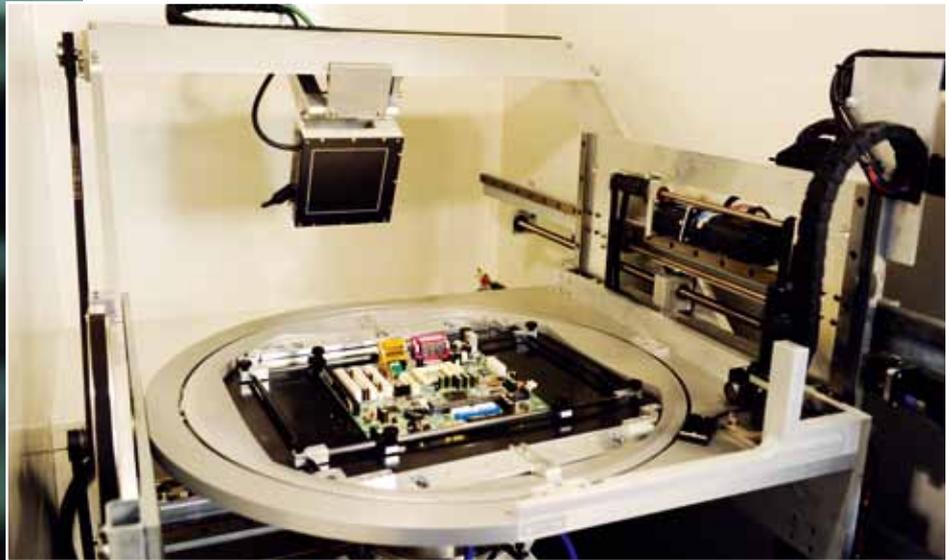
Nikon Metrology X-ray sources are at the heart of our technology and are designed and manufactured in-house. This allows Nikon Metrology to quickly move with the market and develop complete and innovative solutions to the application demand.

With an integrated generator and transmission target, the proprietary 130 kV and 160 kV microfocus Xi sources offers unrivalled advantages to the XT V system range.

Get deep insight in components at oblique angle views without compromising high resolution. And benefit from low cost of ownership, lower maintenance and higher reliability through open tube design and an integrated voltage generator eliminating the need for a high voltage cable assembly that requires regular maintenance.



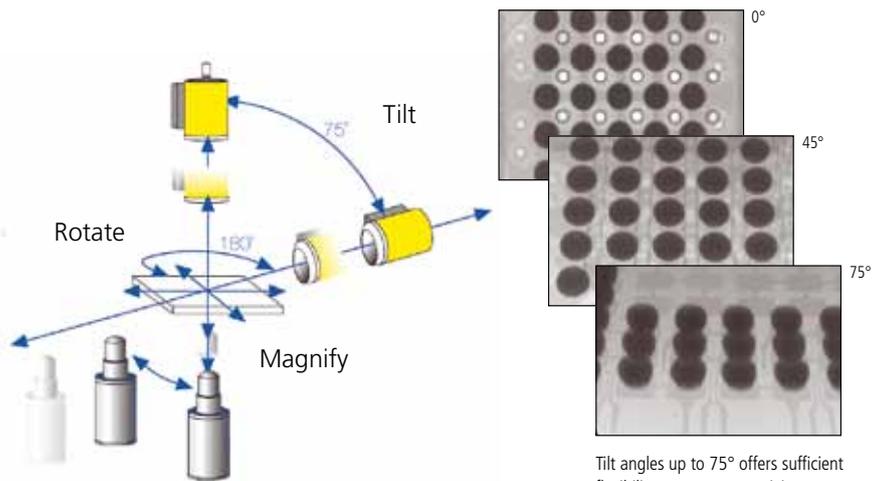
WITH INHERENT PRECISION



The XT V systems are supplied with a highly accurate sample manipulator with an optional precision CT rotate axis.

The vertical system configuration, with the X-ray tube below the sample holder and the tilting imager is controlled through user-friendly Inspect-X software or via precise joystick manipulation.

Capable of multiple rotations even at maximum tilt, the rotate table of the premium XT V 160 provides helicopter fly-around views of any region of interest even at maximum magnification.



Tilt angles up to 75° offers sufficient flexibility to trace connectivity

Under any combination of rotate, tilt and magnification, true concentric imaging of the XT V 160 ensures that the region of interest remains locked into the center of the field of view.

PREMIUM QUALITY



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.

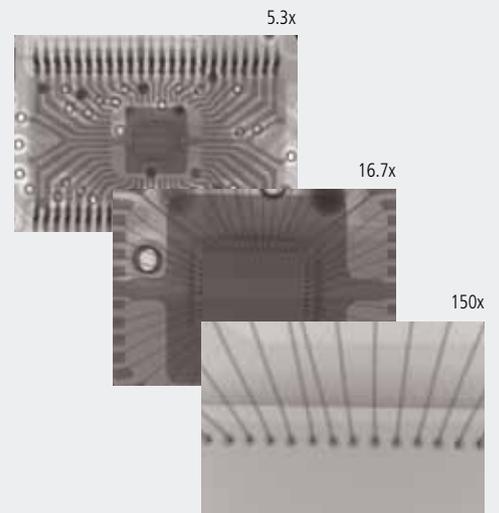
- Proprietary NanoTech 160kV / 20W microfocus source with submicron feature recognition
- 1.45Mpixel 12bit camera with dual field 4"/6" image intensifier
- Optional flat panel detector
- 5-axis manipulator (X,Y,Z, Rotate, Tilt)
- 360° fly-around views while keeping region of interest consistently locked into the center of the field of view
- Real-time imaging or automated inspection
- Ready for CT applications (option)

INTUITIVE TO USE

- Intuitive joystick navigation for real-time X-ray inspection
- Collision-free sample manipulation
- Large single 30" display or dual 22" display for combined system control and real-time analysis
- Industry leading Inspect-X software
- Short learning curve – operational within 1 day
- Local language support

HIGH-QUALITY IMAGES

- In-house designed and manufactured microfocus sources
- Up to 2400x geometric magnification to zoom in on the smallest details
- 500nm feature recognition on XT V 160
- 16bit image processing
- Max 75° tilt angle to detect cold joints and head-in-pillow
- Accurate control of the power and direction of the emitted X-ray beams



Superb image magnification enables users to zoom in on any specific item of interest

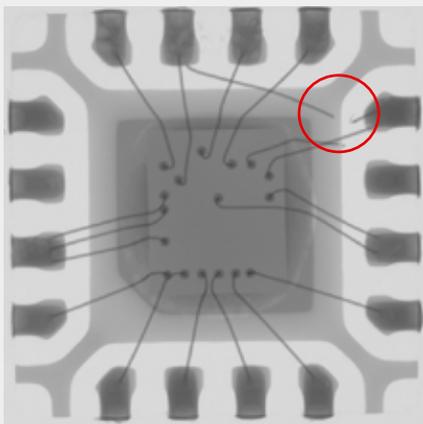
AND ECONOMICS

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 130kV/10W Nikon Metrology manufactured source, a globally recognized open tube design with integrated generator, and a high-resolution imaging chain.

Through a series of factory and field upgrades, the end user can configure these systems to their own needs with a rotating sample tray, a digital flat panel option, automated inspection software and the ability to add future-proof CT technology

- Proprietary 130kV / 10W microfocus source with 2µm feature recognition
- 1.45Mpixel 12bit camera with 6" image intensifier
- 4-axis manipulator (X, Y, Z, Tilt)
- Primarily focusing on real-time imaging



Broken bond wire

FOCUS ON PRODUCTIVITY

- Fast automated component inspection with immediate analysis and reporting
- Load position for quick and easy loading/unloading of sample
- Large door with automatic interlocked X-ray off function provides easy access to the inspection area
- Large tray to load multiple boards
- Barcode reader for automatic recognition of specimen serial number (optional)

LOW COST OF OWNERSHIP

- Unlimited source life time due to open tube design with user replacable low cost filaments
- Serviceable components are easily accessible
- Integrated source requires no high voltage cable
- No special floor treatment required

SAFETY AS A DESIGN CRITERION

- Continuous fail-to-safe monitoring
- Full protective enclosure requires no special badges or protective clothing
- Lead-lined cabinet fully complies to DIN 54113 radiation safety standards and CE regulation

REAL-TIME INSPECTION



Interactive and user-friendly software is essential in evaluating the complex internal structure of samples and performing accurate inspection.

Inspect-X has been completely designed with the X-ray user at its nucleus, resulting in intuitive and productive X-ray software. Inspect-X is based around end-user workflows reducing both the users' learning curve and minimizing number of unnecessary clicks.

Inspect-X provides all the means to guide you to obtain the required information, using the most advanced visualization and analysis capabilities. Developed to streamline the process of inspection and measurement, it runs first-article inspection in minutes, instead of hours or days.

INSPECT-X CONTROL SOFTWARE

- Workflow based – all necessary controls available to the user's workflow
- Various user access levels for supervisors and operators
- Quick access toolbar to most applicable functions
- Fast learning curve
- Board map for quick sample overview
- Collision avoidance between all components of the system and sample
- All functions included as standard; no add-on modules required

REAL TIME X-RAY INSPECTION

- On-screen joysticks and mouse gestures, as well as conventional intuitive joystick control, for interactive live part positioning
- Variable magnification and tilted viewing angle allow real time detection of defects such as head-in-pillow.
- Magnification, tilt and rotate in all positions whilst maintaining a region of interest consistently locked into the center of the field of view
- Real-time imager (30 frames per second) for interactive visualization

WITH ADVANCED ANALYSIS

BGA DEVICE INSPECTION

The BGA device inspection functionality is an 'all-in-one' tool offering automatic analysis of:

- Voiding
- Ball circularity
- Ball count
- Bridging
- 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 to reduce the time taken to build automated pass/fail inspection routines.

BOND WIRE ANALYSIS

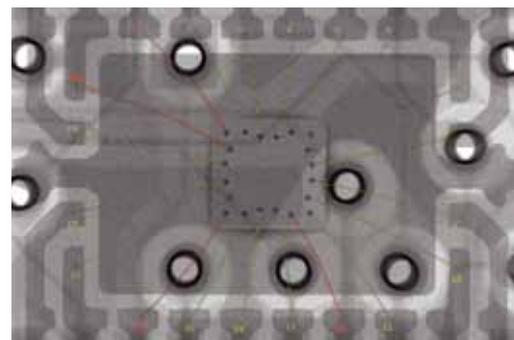
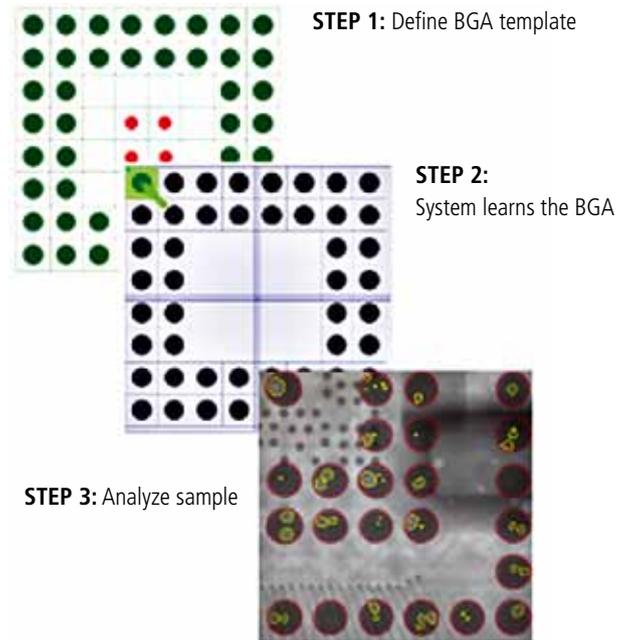
Featuring high magnification and (sub)micron feature detection, an XT V system equipped with Inspect-X is a winning combination for bond wire inspection. The new automated multi-bond wire tool provides repeatable inspection with the highest accuracy.

- Detect and sentence broken bond wires and wire sweep with pass/fail status
- Automatically analyze multiple bond wires on a device in a single inspection
- Component templates can be saved to -and recalled from- an internal library for quickly building a new inspection routine

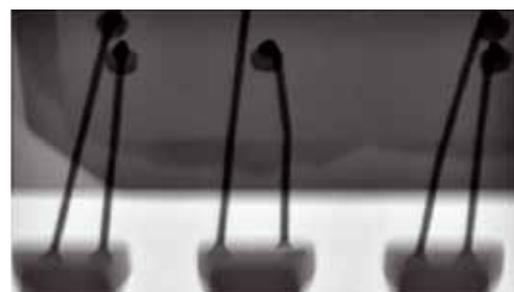
IMAGE ANALYSIS AND ENHANCEMENT

Taking quick and correct decisions requires crystal-clear and sharp images. Inspect-X offers the necessary functionality to reveal connection and assembly faults.

- User-configurable multi-point tone adjustment
- Image processing filters (sharpen, smooth, edge detect, emboss, background subtract, etc.)
- Image histogram

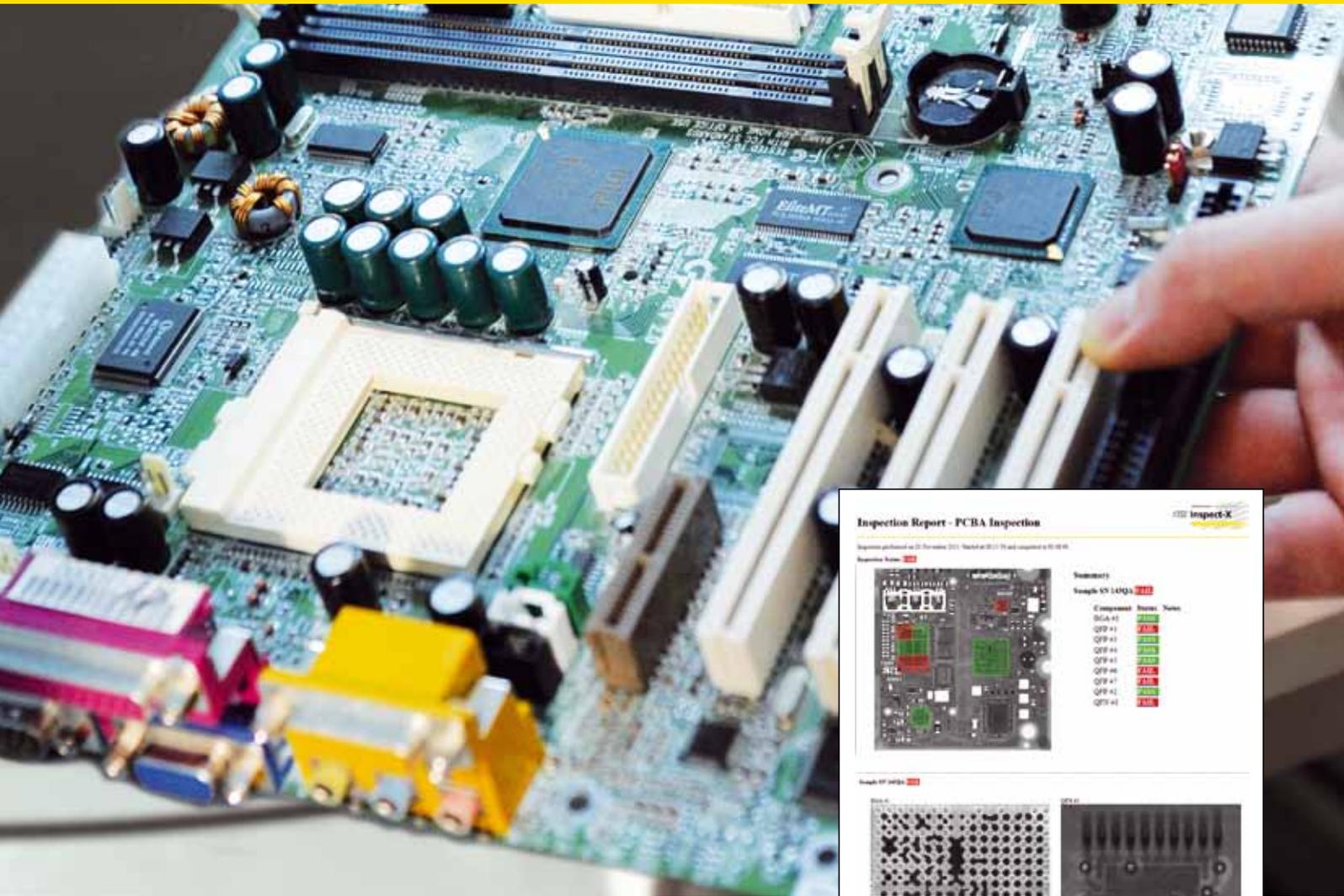


Bond wire analysis



Broken wedge bond visualized by utilizing tilt and magnification

INSIGHTFUL 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.

Inspection Report - PCBA Inspection

Inspection performed on 20-Nov-2015 10:11:25. Report on 20-11-25 and captured at 10:18:04.

Inspection Station: 2015

Summary

Component	Pass	Fail	Total
SCA-x1	2000	0	2000
QFP-x1	2100	0	2100
QFP-x1	2000	0	2000
QFP-x1	2100	0	2100
QFP-x1	2100	0	2100
QFP-x1	2100	0	2100
QFP-x1	2100	0	2100
QFP-x1	2100	0	2100

Sample 07 140Qs

FOCUSING ON PRODUCTIVITY

Operating in automated inspection mode, the XT V combined with Inspect-X is a productive X-ray solution for repeated inspection of PCBAs, semiconductor components and complex high density boards. Creation and execution of inspection routines is straightforward, utilizing the graphical interface or teach and learn. Users requiring detailed insight of (multi-layer) electronic components can benefit from the Computed Tomography functionality for a full 3D view of internal structure.



Intuitive icons help the user to interactively build an automated inspection routine

AUTOMATED INSPECTIONS

- Macros for automating simple repetitive tasks
- Inspection programs for automated inspection and analysis of full boards or multiple components
- Automated inspection programs require no programming skills, utilizing graphical interface or teach and learn
- Intelligent Program Control (IPC) for complete customizable system control
- Off-line validation station giving maximum efficiency of the X-ray system
- HTML reporting function, readable on any PC with no special software
- Switch seamlessly between radiographic (2D) and CT (3D) modes in one single software
- Visual check during automated inspection routine allows interactive inspection

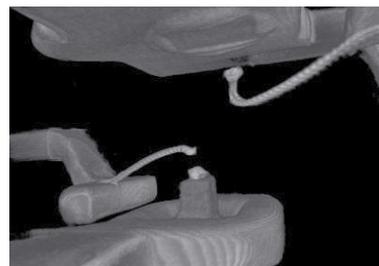


Macro-based recording enables the user to program for repeated inspection or batch analysis



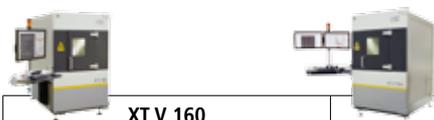
READY FOR CT

- CT acquisition and analysis as factory option or field upgrade
- Easy, user guided, CT data collection
- Fast Rescan – rescan in only two steps
- World-leading reconstruction times
- Automatic reconstruction of CT data streamed from XT V system
- Powerful CT analysis in the software of your choice



CT provides a 3D image of a broken bond wire

SPECIFICATIONS



	XT V 160	XT V 130C
Max kv	160 kV	130 kV
Max. electron beam power	20W	10W
X-ray source	Open tube transmission target	
Focal spot size ^{1,2}	1µm	3µm
Feature recognition ¹	500nm	2µm
Geometric magnification	2.5x - 2,400x	
System magnification	Up to 36,000x	
Imaging system (Standard)	1.45Mpixel 12bit camera with dual field 4"/6" image intensifier	1.45Mpixel 12bit camera with 6" image intensifier
Imaging system (Option)	1,45Mpixel 12bit camera with dual field 4"/6" image intensifier (XT V 130C) Varian 1313 or 2520 digital flat panel (14bit)	
Manipulator	5-axis (X, Y, Z, T, R)	4-axis (X, Y, Z, T)
Rotate axis	Included	Optional
Tilt	0 - 75 degrees	
Measuring volume	Largest square in single map 406 x 406mm (16x16") Absolute max 711x762mm (28x30")	
Max. sample weight	5kg (11lbs)	
Monitors	Dual 22" flat screen 1920x1080 pixels (standard) Single 30" flat screen 2560 x 1600 pixels (optional)	
Cabinet dimensions (WxDxH)	1,200 x 1,786 x 1,916 (48.0 x 71.3 x 75.4")	
Weight	1,935kg (4,266 lbs)	
Radiation safety	<1µSv/hr at the cabinet surface	
Control	Inspect-X control and analysis software	
Automated inspection	Included	Optional
Computed Tomography	Optional	
Primary applications	Real-time and automated electronics and semiconductor inspection	Real-time electronics inspection

¹ at 80kV, 80µA

² below 2W

XTV_SERIES_EN_0114- Copyright Nikon Metrology NV 2014. All rights reserved. The materials presented here are summary in nature, subject to change and intended for general information only.



NIKON METROLOGY NV

Geldenaaksebaan 329
B-3001 Leuven, Belgium
phone: +32 16 74 01 00 fax: +32 16 74 01 03
Sales.NM@nikon.com

NIKON METROLOGY EUROPE NV
tel. +32 16 74 01 01
Sales.Europe.NM@nikon.com

NIKON METROLOGY GMBH
tel. +49 6023 91733-0
Sales.Germany.NM@nikon.com

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

NIKON METROLOGY, INC.
tel. +1 810 2204360
Sales.US.NM@nikon.com

NIKON METROLOGY UK LTD.
tel. +44 1332 811349
Sales.UK.NM@nikon.com

NIKON CORPORATION

Shin-Yurakucho Bldg., 12-1, Yurakucho 1-chome
Chiyoda-ku, Tokyo 100-8331 Japan
phone: +81-3-3216-2384 fax: +81-3-3216-2388
www.nikon-instruments.jp/eng/

NIKON INSTRUMENTS (SHANGHAI) CO. LTD.
tel. +86 21 5836 0050
tel. +86 10 5869 2255 (Beijing office)
tel. +86 20 3882 0550 (Guangzhou office)

NIKON SINGAPORE PTE. LTD.
tel. +65 6559 3618

NIKON MALAYSIA SDN. BHD.
tel. +60 3 7809 3609

NIKON INSTRUMENTS KOREA CO. LTD.
tel. +82 2 2186 8400

More offices and resellers at www.nikonmetrology.com