

# Seeing is Believing™

## QUADRA



# QUADRA™ Series

**X-ray Inspection**

[www.nordsondage.com](http://www.nordsondage.com)

**Nordson**  
DAGE

# Your X-ray Inspection Partner

Founded in 1961, Nordson DAGE is part of the Nordson Corporation with annual revenues of over \$1.8 billion and more than 6,000 employees worldwide.

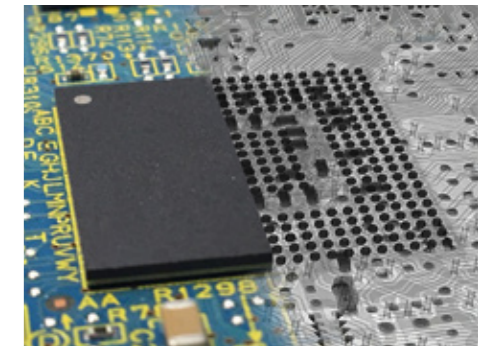
Nordson DAGE is the market leading provider of award winning X-ray inspection systems that help customers detect manufacturing defects early - ensuring product quality, maximizing return on investment and reducing long term costs.

Based in Aylesbury, UK, Nordson DAGE designs and manufactures every major component in its X-ray inspection system, including X-ray source, power supply and detector. This unrivaled level of vertical integration delivers unbeatable, world-class inspection solutions.



# Seeing is Believing

Quadra™ series X-ray inspection takes you beyond optical imaging, allowing you to non-destructively inspect obscured areas inside devices and components at up to 68,000 times magnification.

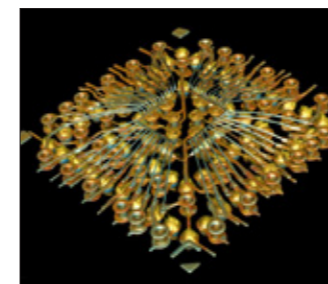


Optical → X-ray



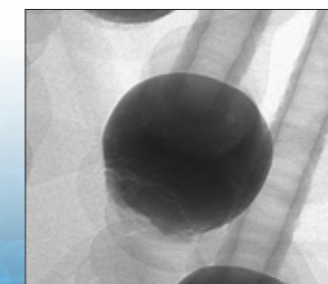
X-ray inspection image of a computer mouse

x20



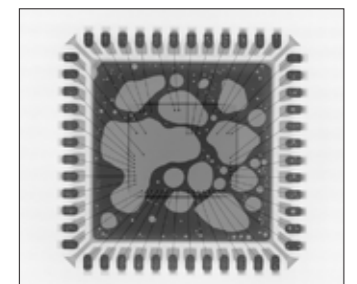
Bond wires in a BGA device

x500



Microcrack in a BGA solder ball

x68,000

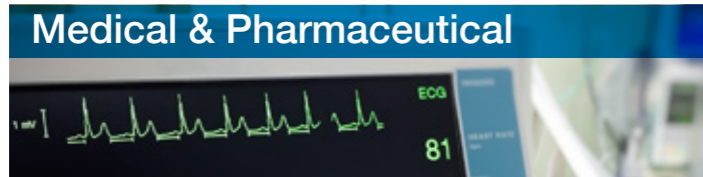


Voiding in a QFN package



Reconstruction of a 4mm long inductor package

# Your X-ray Inspection Solution



## Medical & Pharmaceutical

Inspect products non-invasively in 2D or 3D, perform root cause failure analysis.  
Offline inspection for contaminant detection and fill level measurement.



## Aerospace

Inspect electronic components for soldering quality (IPC-A-610) and wire bond integrity, including metal cored boards and copper backed BGAs.  
Perform component quality inspection for cracking, voids, counterfeiting and dimensional checks.



## Automotive

Inspect automotive components for wear and fatigue cracking. Inspect electronic components and PCBAs for soldering quality (IPC-A-610) and BGAs (IPC-7095).



## Energy

Measure voids in solar cells, inspect under-fill. Check for component cracking and wire bond integrity.

# QUADRA™



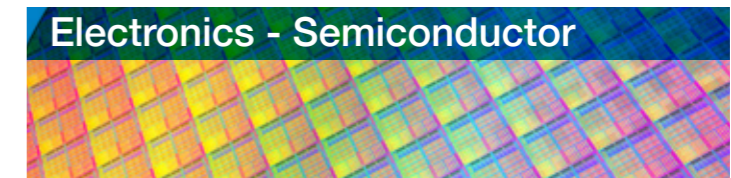
## Electronics - Assembly

Solder shorts, open connections, paste residue, voiding, cracking, solder reflow simulation  
Track inspection, plated through hole filling  
Counterfeit device screening.



## Electronics - Packaging

POP, QFN, QFP, BGA, flip chip  
Bulk and interfacial void measurement  
BGA alignment / ball size variation  
Missing solder / missing BGA balls  
Head in pillow identification  
Solder cracking / bridging / open circuit  
Component cracking / warping  
Bond wire integrity / attachment  
MEMS and passive component inspection.



## Electronics - Semiconductor

FO-WLP, 3D packaging  
Through Silicon Via (TSV) filling and voids  
Micro bump, copper pillar size and void measurement.



## Lighting

Detect micro-crack, wire bond defects, voiding and PCB quality. Inspect laser-diodes and LEDs.

# Turn Images into Solutions

# Simplicity as Standard

Quadra creates unbeatable images, making it easy to see even the tiniest detail and find defects quickly. The in-house designed high performance X-ray tube and detector allows feature recognition down to 100nm and magnification up to 68,000 times.

## Unique patented technology

QuadraNT™, Nordson DAGE's latest generation X-ray source is 10 times brighter and intrinsically more stable than conventional X-ray tubes. It utilises a LaB<sub>6</sub> emitter instead of a traditional tungsten filament, and an ion pump to maintain a higher quality vacuum. QuadraNT opens up a world of stable, high resolution images at all power levels.

## Unbeatable resolution

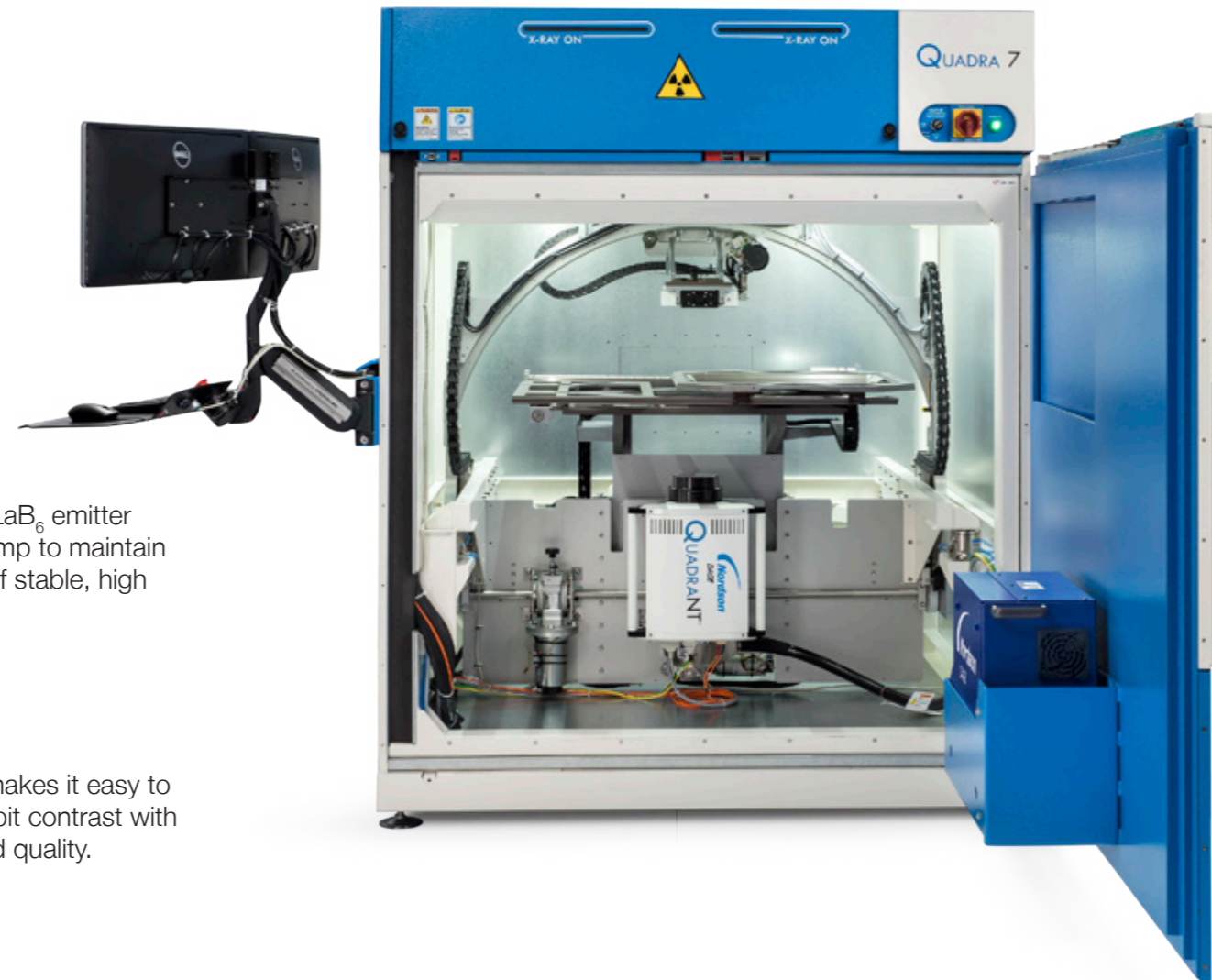
The Aspire™ Flat Panel detector from Nordson DAGE makes it easy to see even the smallest defects. Aspire FP combines 16 bit contrast with 6.7 megapixel resolution to produce images of unrivaled quality.

## Bring out the finest details

Over 30 advanced filters bring out the sharpest images and show the finest details, allowing you to find features and defects faster. HDR Imaging increases the dynamic range so defects in both dark and light areas can be seen clearly on one image.

## The complete picture

Understand your sample in 3D at high times magnification utilizing the  $\mu$ CT sample stage with computed tomography (CT).



X-ray inspection should be as easy and intuitive to use as possible. Quadra enables operators and occasional users to get incredible X-ray images quickly, easily and with minimal training.

## Ease of use

Get working quickly with Gensys™ proprietary control and measurement software which features an intuitive “point and click” user interface.

## Measuring the invisible with X-Plane®

Image slices allow hard to see defects such as interfacial voids to be found and measured easily. Only X-Plane generates CT image cross sections quickly and easily, anywhere on the sample tray without having to manually align.

## Ergonomically designed

Comfortable to use for prolonged periods without fatigue, Quadra is designed to SEMI S8 standards for ergonomics.

## Compliance

Inbuilt tools for dimension measurement, BGA void analysis, bump diameter and roundness, wire sweep analysis and through hole filling make quick work of finding and characterizing defects, helping you achieve IPC-A-610 and IPC-7095 compliance.



# Maintenance Free

Increase your return on investment, reduce your downtime and costs. Quadra is the only maintenance free inspection system. Regular preventative maintenance visits are no longer required to guarantee optimum X-ray performance.

## Unique, patented technology

Traditional transmission X-ray tubes use tungsten filaments which degrade quickly and require regular replacement and maintenance. QuadraNT™ tubes use proprietary filament free technology for continuous service.



QuadraNT 4th generation X-ray tube

## Lifetime repeatability

Stable performance is guaranteed since the filament is never changed. Inspection imagery is clear and repeatable, today, tomorrow and year after year.

## Oil free

Eliminate the risks of oil contamination in the X-ray tube, oil spills or leaks into the work environment. QuadraNT uses an oil free ion pump to maintain X-ray tube vacuum which never requires an oil change.

## Applications and training support

Technical applications, training and software support tailored to your specific requirements ensure you get the most from your Quadra.

## Annual performance compliance

Validate the performance of your Quadra for quality compliance purposes with an annual inspection, calibration and radiation safety check visit.

# The Quadra™ Series

## QUADRA™5

Choose Quadra 5 to easily acquire X-ray images at sub  $\mu\text{m}$  levels of feature resolution, for example for electronic assembly inspection or medical device quality control.

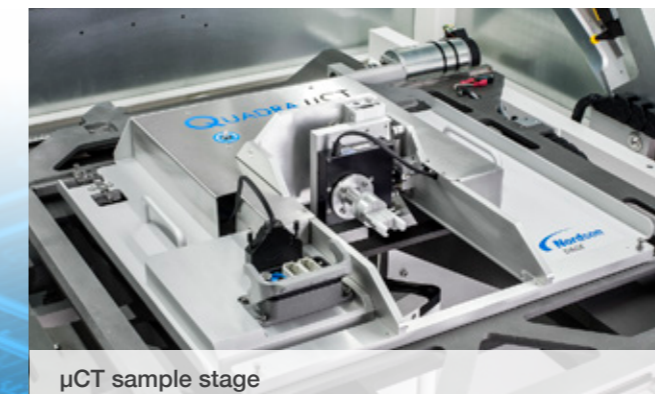
High quality images are acquired at 3 megapixel resolution and are displayed on a high resolution 24" monitor.

## QUADRA™7

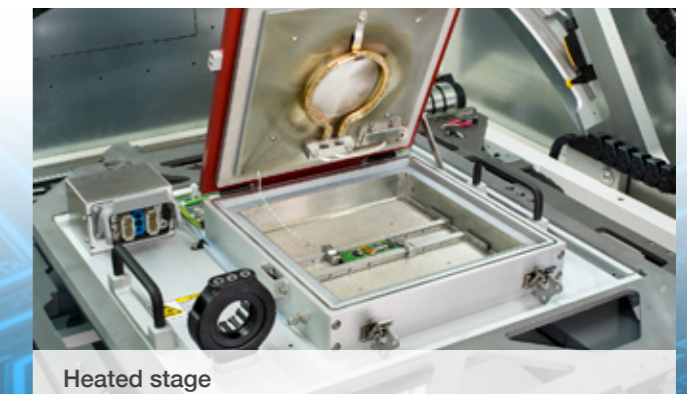
Quadra 7 represents the cutting edge of X-ray inspection performance, allowing features as small as  $0.1 \mu\text{m}$  to be resolved. Ultra high quality 6.7 megapixel images are displayed at full one-to-one resolution on two 4K ultra high definition monitors.

Choose Quadra 7 to ensure you see the clearest features, today, and for all your products in the future.

Accessories		QUADRA™5	QUADRA™7
X PLANE	View sample slices without additional CT hardware	Option	Option
$\mu\text{CT}$	Create high resolution 3D models with $\mu\text{CT}$ sample stage	Option	Option
Heated stage	Simulate reflow oven conditions, view solder process in real time	Option	Option
Template based analysis	Use existing design data to quickly create automatic inspection routines	Option	Option
Joysticks	For joystick navigation and zoom	Option	Option
Barcode reader	Track samples easily	Option	Option
Filtering tray	Reduce sample X-ray dose	Option	Option
Thin sample tray	Acquire clearer images of thin samples	Option	Included



$\mu\text{CT}$  sample stage



Heated stage

# Specifications at a Glance

	QUADRA™5	QUADRA™7
<b>X-ray Tube</b> QuadraNT™ filament free transmissive		
Feature recognition	0.35 µm 0.95 µm above 10W	0.10 µm 0.30 µm above 10W
Max power	10W (20W optional)	20 W
Voltage	30 - 160 kV	
<b>Detector</b> AspireFP™ Flat Panel Detector		
Resolution	3 MP	6.7 MP
Frame rate	25 fps	30 fps
Digital image processing	16 bit	
<b>Inspection</b>		
Oblique angle view	2 × 70° - No sample rotation required	
Anti vibration	AXIS - Active X-ray Image Stabilization	
Inspection area	510 x 445 mm (20 x 17.5")	
Sample size	740 x 580 mm (29 x 22.8")	
Geometric magnification	Up to x 2,500	
Total magnification	Up to x 45,000	Up to x 68,000
Display	Single 24" WUXGA 1920 x 1200	Twin 24" 4K UHD 3840 x 2160
Operation	Mouse point and click (joysticks optional)	
<b>Installation</b>		
Footprint (W x D x H)	1.57 x 1.50 x 1.90 m	
Weight	1,950 kg	
Power	Single phase 200-230 Vac, 50/60 Hz, 16A	
Air	5-8 bar clean dry for anti-vibration	
X-ray safety	< 1 µSv / hour	

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BR-QXR-130317-V2