Product Portfolio

Automated X-Ray Inspection Systems
Nordson MATRIX, founded in 2004 and headquartered in Munich (Germany), is a market leading global supplier of high speed Automated X-ray Inspection systems (AXI) to ensure the quality of critical electronic devices/components, electronic printed circuit boards and fully assembled devices manufactured by its customers. The product portfolio ranges from offline configurations for high quality analysis up to fully automated high speed inspection solutions integrated into the production line.

Nordson MATRIX is part of the Nordson Corporation (NASDAQ: NDSN) which includes the Nordson DAGE and Nordson YESTECH families of test and inspection products.
Our core message

We are a supplier of reliable and robust high-speed automated inline X-ray inspection system solutions for a multiple line and factory roll-out which can withstand 24/7 production in various and changing manufacturing environments.

Your solution provider

By using X-ray and CT technology, our in-house developed inspection software platform (“MIPS”) combined with an advanced hardware design, MATRIX inspection solutions enable large-scale manufacturers to maintain a high production yield. This helps to increase the overall process efficiency and to effectively reduce manufacturing costs at a fast ROI on the equipment.

Your application is our key driver

The customization of our products through innovative inspection algorithms, optimized hardware configurations and technological advancements is one of our core expertises which allows us to align to your individual inspection needs and to adapt continuously to new market requirements.

Product portfolio

- Inline / Island of Automation
  - X#-series
    - Flexible AXI
  - X-series
    - High-Speed AXI
  - XS-series
    - High Resolution AXI with minimal footprint
- Manual load / Island of Automation
  - XCT-series
    - High Resolution AXI with CT technology
  - XT-series
    - Universal AXI
- Inspection Software
  - MIPS Suite
    - MATRIX Inspection and Process Control Software Suite
Inline / Island of Automation

The X#-platform series is an inline automated X-ray system which covers a wide range of AXI applications. It is a flexible platform with very versatile fields of use depending on the application requirements. The inspectable applications range from component level inspection for wire bonds, large SMT boards, high-power electronic modules up to fully assembled modules.

Characteristics
- Flexible AXI system for inline and island of automation configurations
- Microfocus X-ray tube (sealed tube / maintenance free)
- Multiple programmable motion system with servo drives
- Digital CMOS flatpanel detector
- Automatic grey-scale and geometrical calibration
- Barcode scanner for serial number and product type selection
- Full product traceability via customized MES-Interface

Additional options
- Flexible setup for inline pass through or same-side in/out configuration
- Combination with line scan camera for high throughput
- Auto BQR scanning station (x-y gantry)
- Low dose radiation filter

Standard configurations
- SMT setup for component and solder joint inspection on PCB
- High resolution setup for chip level assembly
- Final Assembly and Test (FATP) setup for complete modules and consumer products
- High Power setup for power hybrid/IGBT devices and battery
- Semi-Backend setup for semiconductor applications & wire bond testing

Technologies
- Transmission X-ray imaging (2D) with patented Slice-Filter-Technique™
- Off-axis technology (2.5D)
- 3D SART (Simultaneous Algebraic Reconstruction Technique)

Models depending on the type of product & inspection task
- X2# Transmission (2D) + SFT™
- X2.5# Transmission (2D) + SFT™ + Off-axis (2.5D)
- X3# Transmission (2D) + SFT™ + Off-axis (2.5D) + 3D SART

Subassemblies
- Power devices
- Cooling plates
- Sensors

Final Assembly Test (Consumer)
- Batteries
- Wire-Sweep
- Bondtest

LED

PTH Inspection
Multi-layer void inspection (SART)
Final product inspection

X#-series
Flexible automated X-ray inspection platform
The X-platform series is a dedicated high speed inline automated X-ray inspection system for the inspection of PCB-assembly boards for single/multipanel or samples in trays. The system offers market leading inspection speed and is ideal for low-mix high-volume production environment.

Characteristics
- High speed AXI system for inline configurations
- Microfocus X-ray tube (sealed tube / maintenance free)
- Multiple programmable motion system with servo drives
- Digital CMOS flatpanel detector
- Automatic grey-scale and geometrical calibration
- Barcode scanner for serial number and product type selection
- Full product traceability via customized MES-Interface

Highlights
- Hardware setup dedicated to PCB inspection
- High speed setup for inline pass through configuration
- High oblique angle

Additional options
- Barcode scanner for serial number and product type selection
- Auto-ISR scanning station (x-y gantry)
- Low dose radiation filter

Standard configuration
- SMT setup for component and solder joint inspection on PCB, hybrid or chip level assembly processes

Technologies
- Transmission X-ray imaging (2D) with patented Slice-Filter-Technique™
- Off-axis technology (2.5D)
- 3D SART (Simultaneous Algebraic Reconstruction Technique)

Models
depending on the type of product & inspection task
X2 Transmission (2D) + SFT™
X2.5 Transmission (2D) + SFT™ + Off-axis (2.5D)
X3 Transmission (2D) + SFT™ + Off-axis (2.5D) + 3D SART

Models
- BGA HiP in 2.5D
- PTH inspection
- QFN inspection
The XS-platform series is a small-footprint high-resolution automated X-ray inspection system concept designed for sophisticated high-speed inspection of semiconductor samples, wire bonds and PCB-assembly boards for single/multipanels or samples in trays. The inspectable applications range from component level inspection to mid-sized SMT boards.

Characteristics
- High speed AXI system with minimum footprint for inline setups
- Micro-focus / submicron X-ray tube (sealed tube / maintenance free)
- Resolution down to <1 µm
- Multiple programmable motion system with servo drives
- Digital CMOS flatpanel detector
- Automatic grey-scale and geometrical calibration
- Full product traceability via customized MES-Interface

Additional options
- Same-side load/unload configuration
- Barcode scanner for serial number and product type selection
- Auto BCR scanning station (x-y gantry)
- Low dose radiation filter

Standard configuration
- SMT setup for component and solder-joint inspection on PCB, hybrid or chip level assembly processes
- Semi-Backend setup for semiconductor applications, wire bond test (pre & post), light & complex PCB’s and flex circuits

Technologies
- Transmission X-ray imaging (2D) with patented Slice-Filter-Technique™
- Off-axis technology (2.5D)
- 3D SART (Simultaneous Algebraic Reconstruction Technique)

Models
- depending on the type of product & inspection task
- XS-2  Transmission (2D) + SFT™
- XS-2.5 Transmission (2D) + SFT™ + Off-axis (2.5D)
- XS-3 Transmission (2D) + SFT™ + Off-axis (2.5D) + 3D SART
The XCT-series systems are manually loaded, automated X-ray CT systems which offer a solution for a variety of CT applications. These systems provide the highest possible flexibility in order to satisfy individual customer needs. Depending on the application, they can be equipped with different types of tubes and detectors to offer high-resolution or high-power solutions.

Unlike most CT systems, the XCT-1000 features both volume analyzing and automatic processing of the slices. As the newest feature, this machine is available with a super high resolution setup, offering a CT voxel size less than 1µm. It is especially suitable for the inspection of small to medium production volumes or for the use in laboratory environments, production sampling or failure analysis. The applications range from consumer electronics and automotive Li-ion batteries, component level inspection for wire bonds, micro-solder-joints on PCB’s, casting parts and semiconductors.

Characteristics
- Offline inspection System
- Micro- or nanofocus X-ray tube (sealed tube / maintenance free)
- Digital flatpanel detector
- Multiple programmable motion system
- Automatic grey-scale and geometrical calibration
- Barcode scanner for serial number and product type selection
- Full product traceability via customized MES-Interface

Highlights
- Full volume reconstruction
- Automatic slice analyzing
- Generation of report files after each inspection
- Customized part holders

Standard configurations
- High Power setup for battery inspection
- High Resolution setup for electronics and semiconductor applications

Technologies
- Transmission X-ray imaging (2D) with patented Slice-Filter-Technique™
- Off-axis technology (2.5D)
- CT-Technology

Models
depending on the type of product & inspection task

XCT-1000 Transmission (2D) + SFT™ + Off-axis (2.5D) + CT
The XT-series provides the advanced inspection capability of Nordson MATRIX’s inline system in a smaller footprint manual load/island of automation system. The platforms are designed for flexibility and ease of use for a wide variety of products requiring 2D and 2.5D automated X-ray inspection.

The XT-6/XT-6A platform is a highly flexible automated X-ray inspection system with minimum footprint and a parallel-kinematic Hexaglide manipulation unit for extreme-angle off-axis image acquisition with high resolution. It is suitable for high-quality X-ray analysis of electronic assemblies and material analysis of parts that require flexible part manipulation with multiple inspection angles. For batch modes and volume inspection the XT-6 can be equipped with a single-sided conveyor setup and magazine load/unload station (XT-6A).

Characteristics:
- Flexible AXI system for manual load and island of automation configurations
- Microfocus X-ray tube (sealed tube / maintenance free)
- Extreme angle shot capability (up to 65 deg)
- Multiple programmable motion system with servo drives
- Digital CMOS flatpanel detector
- Automatic grey-scale and geometrical calibration
- Barcode scanner for serial number and product type selection
- Full product traceability via customized MES-Interface

Additional options:
- Barcodereader
- Heavy duty transport system
- Low dose radiation filter
- Hybrid or chip level assembly setup

Standard configurations:
- SMT setup for component and solder-pint inspection on PCB

Technologies:
- Transmission X-ray imaging (2D) with patented Slice-Filter-Technique™
- Off-axis technology (2.5D)

Models:
- XT-6(A) Transmission (2D) + SFT™ + Off-axis (2.5D)

Void detection
Final product inspection
PTH inspection

XT-series
Universal automated X-ray inspection platform
When using a programmable bar code scanning station the system can adjust the position of the scan avoiding the need to change the position of the rigidly mounted scanners. This increases the flexibility especially for pallet changes with different products. The system is no longer limited by the speed that the bar code reader can recognize the bar codes and therefore the input speed can be increased turning out in a higher throughput.

**BCR-1000**  
**Handling option for the X#-series**  
The BCR-1000 is an upgrade kit to the standard input conveyor for the X#-series systems that allows automated scanning of product bar codes.

**BCR-2000**  
**Handling option for the X/XS-series**  
The BCR-2000 is an additional conveyor option for the X/XS-series systems that allows for automated scanning of product bar codes.

The MIPS software suite provides a complete and overall solution for a wide variety of X-ray applications. MIPS software lineup contains specific components for different tasks from the very beginning of the inspection process (CAD creation and import) to the very end (statistical data analysis). This approach leads to a flexible and effective software environment which aligns perfectly with the outstanding capabilities of the Nordson MATRIX AXI product portfolio.

**Highlights**
- Modular and easy-to-handle software environment for quick program generation and new product introduction both on-the-fly and offline
- Unique and automated calibration procedures ensuring machine-to-machine program portability and a working global library structure
- Highly customizable algorithm library for full defect coverage and minimal false calls rate
- Full palette and combination of inspection techniques from simple transmission imaging to highly complex inline and offline 3D inspection
- Comprehensive statistical tools for process control and feedback, but also for good/bad sorting optimization
- Smart factory integration through comprehensive and customized traceability implementation
- Closed loop communication between inspection, verification, repair and fine-tuning process
- Custom solutions for handling, bad-part sorting and marking
- Operator training tools to grant audit save end-of-line decisions

**MIPS Suite**  
**MATRIX Inspection and Process Control Software Suite**

**MIPS Tune** - Image processing unit for offline test program generation
**MIPS Verify** - Defect verification and repair suite
**MIPS DPMO** - Statistical software tool

**MIPS Trainer** - Operator training tool

**MIPS**  
**INSPECTION SOFTWARE**
Technologies

X-ray inspection technologies

2D - Transmission
- High speed inspection technique with up-to 5-6 images/sec. and with best high-resolution capability
- Transmission is two-dimensional image capturing with a fixed detector position
- Movable sample tray and movable X-ray tube for different magnifications

SFT™ - Slice Filter Technique
- MATRIX's patented inspection technique to separate top and bottom side for double-sided PCB assembly applications
- High speed technique using first side image to filter out from double-side image

2.5D - Off-axis
- AXI on programmable angle shots up to 60 dgr (used for high performance BGA and PTH inspection)

3D - SART
- 3D-Tomosynthesis to generate multiple horizontal slices used for high-dense doublesided and multi-chip modules (e.g.: MCM,LGA)

Line Scan
- Fastest inspection technique using continuous scan via line scan detector to generate a large area X-ray image

CT
- Computer Tomography
- Creating equiangular projections during 360 dgr rotation of the sample
- Full volume reconstruction and generation of slices
Global sales & support contacts

EUROPE

Germany
Headquarter/Sales and Support/Demo Office
Matrix Technologies GmbH
Dornacher Str. 5
85622 Feldkirchen, Germany
Phone: +49.89.2000.338.200
info@nordsonmatrix.com

Sales and Support/Demo Office (NDT systems)
Matrix Technologies GmbH
Bavenstedter Straße 82
31135 Hildesheim
Germany
Phone: +49.5121.875.8428
info@nordsonmatrix.com

Hungary / Eastern Europe
Sales and Support/Demo Office:
Matrix Technologies GmbH
Cziráki street 32
EMG Industrial Area, Block nr. 10
1163 Budapest
Hungary
Phone: +36.30.876.5038
hungary@nordsonmatrix.com

NORTH AMERICA

USA
Sales and Support/Demo Office:
Nordson MATRIX
2747 Loker Avenue West
Carlsbad, CA 92010
Phone: +1.760.930.3301
serviceusa@nordsonmatrix.com

SOUTH AMERICA

Brazil
Sales and Support office:
Rua Veneza, 289
13283-654, Vinhedo-SP
Phone: +55.19.99980.0505
brazil@nordsonmatrix.com

ASIA

South East Asia
Sales and Support/Demo Office:
Nordson Advanced Technology (Singapore) Pte. Ltd.
2 Corporation Road #03-10/11/12
Corporation Place
Singapore 618494
Phone: +65.6552.7533
sea@nordsonmatrix.com

China
Sales and Support/Demo Office:
Suzhou Nordson Electronics Equipment Co. Ltd
Building 7, no. 666, Jianlin Road
Sub Industry Park of Export Processing
Zone of Suzhou New & Hi-tech District (S.N.D.)
Suzhou City, Jiangsu Province, PRC
Phone: +86.512.6665.2008
china@nordsonmatrix.com

Japan
Sales and Support/Demo Office:
Nordson Advanced Technology (Japan) K.K.
West Tower-17F, TOC Ariake Bldg.,3-5-7, Ariake
Koto-ku, Tokyo
135-0063 Japan
Phone: +81.3.3599.5920
info@nordsonmatrix.com

Korea
Sales and Support/Demo Office:
90, sagimakgol-ro, Jungwon-gu Seongnam-si
Gyeonggi-do, korea,13211 Nordson (Korea) Ltd
Phone: +82.31.736.8321
info@nordsonmatrix.com

Taiwan
Sales and Support/Demo Office:
Nordson Advanced Technology LLC, Taiwan Branch
3F, No. 657-12, Chung Chen Rd.,
Hsin Chuang Dist., New Taipei City, Taiwan
Postal Code: 24257
Phone: +886 963 004 675
cs.taiwan@nordson.com

India
Sales and Support/Demo Office:
C3, # 861, Poonamallee High Road,
Kilpauk, Chennai, Tamilnadu
Postal Code: 600010
Phone: +91 44 43539024 / +91 44 43539025
sea@nordsonmatrix.com

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