

microSTAR[®] ii

Track dose delivered to PCB critical component during X ray inspection

X-ray inspection systems are widely used in many industry sectors such as:

- electronics assembly, electronics packaging and semiconductors industry,
- smartphone and computer manufacturing industries,
- energy, aerospace and automotive industries.

Non-destructive testing of semiconductor devices and PCB allow investigation of hidden areas such as the wire bonding and the quality of post solder reflow of components such as BGAs.

During X-ray inspection, high magnification images of micron level should be displayed. This leads the electronic components to be highly irradiated.



microSTARii reader

Too high a dose may damage some components

For the manufacturer and integrator of PCB, the danger of the radiation dose during X-ray inspection could be the physical damage caused by high dose.

The other potential concern is for subtler failure such as bit flips, loss of program, leakage, etc., with probability of failure being difficult to assess and with physical damage remaining invisible or difficult to detect.

Components of concern are semiconductor devices such as Flash memory, DRAM, microprocessors (...) with potential failure starting from 500 mGy (Si).

Therefore, it is important to monitor the dose being received by these items during the X-ray inspection process and make sure that dose thresholds are not exceeded. Those thresholds should consider the dose integrated during the product lifetime.

LANDAUER proposes microSTARii dose monitoring system which allows to monitor the dose received by the PCB. The small size of the nanoDot and robustness allows easy installation at the desired location on the PCB.

LANDAUER's OSL-Based Dosimeters

The most trusted technology for measuring occupational radiation dose, now customized for PCB dosimetry applications.

More informations on www.landauer.eu.



nanoDot[®]

- **Quick set up** in the X-ray inspection cabinet (wireless dosimeter)
- **Compact** 10 x 10 mm and **easy** to fix nanoDot dosimeters directly on the component to be monitored
- **Small and portable** reader
- Measurement in **Gy (Si)**
- **Radiotransparent**



microSTARii system

A user-friendly, accurate reader nanoDot dosimeters

The microSTARii system is based on LANDAUER OSL (Optically Stimulated Luminescence) technology and is originally designed for dose verification and measurement in medical radiation therapy and radiation imaging.

It includes:

- a microSTARii reader,
- nanodot dosimeters,
- A PC based software.



microSTARii system

> microSTARii READER

■ **Compact, lightweight, portable**

■ **Plug-and-operate**

Unlike TLD based system, it doesn't require any gas and heating.

■ **Quick reading**

The process requires two steps only:

1. put the detector in the drawer of the microSTARii,
2. display of the dose.



microSTARii reader

Dimensions	Height = 103 mm Length = 152 mm width = 206 mm
Weight	2.33 kg
Power supply	110 - 220 V 1.5 A / 50 - 60 Hz
Gas	No
Operating Environment	5 °C to 40 °C < 70 % RH non-condensing
Storage Environment	-20 °C to 60 °C < 90 % RH non-condensing

Connectors	USB
Dosimeters	nanoDot Dosimeters
Accuracy	+/- 5 %
Precision	5 %
Repeatability	≤ 1.0 %
Lower Limit of Detection	≤ 0.05 mSv

nanoDot® dosimeters

A simple, flexible solution for measuring PCB radiation dose

LANDAUER's nanoDot OSL-based dosimeter is the most effective tool to independently verify the dose delivered during X-Ray inspection and confirm the dose delivered does not exceed the manufacturers component prescribed threshold. It can be used in such facilities like:

- X ray non-destructive testing laboratories,
- PCB manufacturing industries.

The nanoDot dosimeter allows you to get an immediate dose measurement. It consists of just one 4 mm diameter sensor of aluminium oxide powder doped with carbon ($Al_2O_3:C$). Each detector is identified on the front by a unique code.

When read, the dosimeter is removed from its sachet and inserted in the drawer. Reading can start immediately.



nanoDot

ADVANTAGES

■ Know and traceable sensitivity

Its sensitivity is indicated by a serial number.

■ Minimal angular or energy dependence making it suitable for tomography application

■ Non-destructive readout

■ Can be sterilised

The nanoDot badge is delivered in plastic pouch to avoid any contamination.

■ A wide range of application

Dosimeter can be placed anywhere on the PCB.

It can be taped on both side of the PCB simply on the component of interest.

■ A single point measurement

Ideal for measuring dose at a point of interest, even in challenging conditions.

■ Wireless

No cable to pull through the cabinet/ wall.

■ Radiotransparent

The nanodot is not visible on the X ray inspection image.



nanoDot
Dot for single point
measurement



nanoDot
in plastic pouch

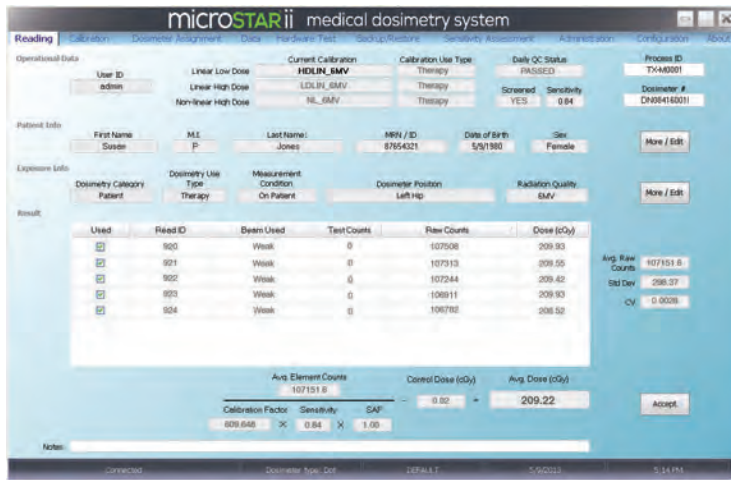
TECHNICAL PERFORMANCE

The precision of dose results depends on the calibration parameter configured. They can be expressed in absorbed dose (Gy, Kerma in air). However, the potential damaged of the X ray will be better understood knowing the deposited energy in the component at risk. Our scientific expert can help you to convert the Kerma in air dose to the deposited dose knowing the inspection geometry, the beam and the components characteristics. microSTARii Software will allow to automatically convert and archive the measurement value for a given inspection process.

Type of radiation	Measurement range	Minimum value	Maximum value
Photons (X- and gamma rays)	From 15 keV to 25 MeV	0.05 mGy	13 Gy

Width	10 mm
Height	10 mm
Thickness	2 mm
Pouch	45mmx40mm

microSTARii dosimetry software



LANDAUER's software originally designed for medical dosimetry applications allows for streamlined analysis and reporting.

ADVANTAGES

- **Built-in and automated QC functionality** for efficient implementation of the Dosimetry Quality Assurance Program
- **PCB-centric workflow**, with additional fields for PCB and exposure information
- **Automated re-reading capability** for improved accuracy and efficiency

