



TECHNICAL SPECIFICATIONS

bSCAN — a compact and advanced TLC Radio Chromatography Instrument

INTRODUCTION

The bSCAN is a compact and advanced instrument designed to perform Thin Layer Radio-Chromatography (TLC). Radio-chromatography is an analytical technique that allows the identification and quantization of different compounds in a radioactive mixture. Particularly, Radio TLC is a well established method in Nuclear Medicine laboratories for fast and accurate assessments in quality control (QC) of the radioactive pharmaceuticals used in nuclear medicine procedures. The technique is also widely used by the labeling laboratories and radiopharmaceutical producers.

The in-vivo behavior of the radiopharmaceuticals is dependent upon their quality, which today demands high standards of “**radionuclidic**”, “**radiochemical**” and “**chemical purity**” or particle sizing of the suspensions in the labeled compound. Radiopharmaceuticals must comply with both radiation and pharmaceutical standards in order to ensure their efficacious use and the imaging quality while minimizing the radiation hazard to the patients.

By using this single instrument, laboratories can test for two parameters of the QA/QC process, namely the **radiochemical** and **radionuclidic purity**.

The bSCAN comes with an advanced, intuitive and modern software. The software guides the user to perform both analyses in an easy and natural way.

The bSCAN instrument is compact in size and contains state-of-the art components, such as a fully-digital multichannel-analyzer (MCA) and a precise and well-shielded NaI(Tl) detector that provides superior energy resolution and therefore better radionuclide identification. The instrument uses a standard USB connection to communicate with the PC.

COMPONENTS

The bSCAN instrument is composed by the following components:

- The scanner instrument, which integrates:
 - A fully programmable displacement unit—scanner.
 - A NaI(Tl) scintillator detector, typical 1 x 1 inch crystal size. The detector is placed inside a properly shielded scanning head with a changeable set of collimators.
 - A compact and digital multichannel analyzer (MCA).
- The bSCAN software.
- A controlling PC (optional).

HARDWARE COMPONENTS

The bSCAN is a fully-programmable and therefore controllable scanner. Its main function is to sweep the detector across the chromatogram strip using a preset speed, as well as to accurately position the detector head at any point above the strip. The scanning motor allows a wide range of speeds, and as such the scanning speed can be set automatically from the desired scanning time. Routine instrument functions like parking, advance to start-up position and return to standby are all done automatically without user intervention. A reset button is provided on the front panel of the instrument allowing manual abort and reset operations to be done at any time.

The place that holds the strip holder is engraved 5 mm deep into the base plate of the scanner. The engraving place is 50 mm wide and 210 mm long, accepting therefore any strip-holder within these dimensions. A ruler is conveniently fixed along the scanning path of the instrument.

At the top of the front panel several controls and buttons are provided for quick and simple instrument operations. From left to right there is: the On/Off switch, which includes a backlight that shows the power status, then a button for Manual scan, and a Reset button. With the Manual scan button the scanner can be operated without the need of a controlling PC, in this case the scanning speed is fixed to approximately 0.5 cm/sec. The Reset buttons aborts any scan in progress and moves the head to the standby position. Additionally, the front panel has a blue LED that indicates when the scanner is busy; and a red LED that lights when the High Voltage for the detector is On.



FEATURES

- Performs both radiochemical and radionuclidic purity analysis using a single instrument
- Implements radio-TLC and energy spectrum acquisition and analysis
- Compact instrument with a size of (WxHxD) 38 cm x 35 cm x 25 cm
- Uses a NaI(Tl) detector properly shielded against background radiation with two sets of changeable collimators. A plastic detector can be used as well for PET radiopharmaceuticals
- Variable and automatic scanning speeds
- Modern and intuitive software for performing both analysis and setting or checking the status of the instrument
- Automatic saving of the spectrum for convenient latter review
- Automatic energy spectrum analysis with nuclide identification
- Software settings can be changed to satisfy user preferences
- Colorful and customizable measurement reports

Detector

The bSCAN is standard offered with a NaI(Tl) scintillation detector which provides higher energy resolution compared to similar instruments in the market. The typical detector crystal size is 1x1 inches (2.54 x 2.54 centimeters) which is ideal for high counting efficiency and not-so-high background. The detector is mounted on a well collimated head. The detector shielding is machined in lead (Pb) and has thickness of 10 mm (0.4 inc.) on its thinner parts. On the bottom part (front of the detector) a collimator shield piece is installed. Two collimation pieces are provided: one with aperture of approx. 1 mm (0.04 inches) and another with 3 mm. (0.12 inches). The collimators are fixed with just two screws and thus can be easily exchanged.

MCA

The bSCAN integrates a compact and yet very powerful multichannel analyzer (MCA) for the analysis of all electronic pulses originating from the scintillator detector. The MCA is integrated into the instrument itself, this arrangement also reduces the number of connecting cables and therefore minimizes parasitic noise signals. The MCA is digital and provides superior signal processing capabilities, improving energy resolution and spectrum stability in terms of long standing operations and high count rates.

The MCA operates in two modes: Multi-Channel Scaling (MCS) used for TLC data acquisition, and Pulse-Height Analysis (PHA) which is used for the energy spectrum analysis. The bSCAN software makes full use of both modes and provides superior possibilities, like easy energy calibration or narrow-window TLC counting.

The MCA can be set to acquire a spectrum of up to 4k (4096) channels in both acquisition modes. Each acquisition mode (PHA or MCS) can have its own independent spectrum storage length.

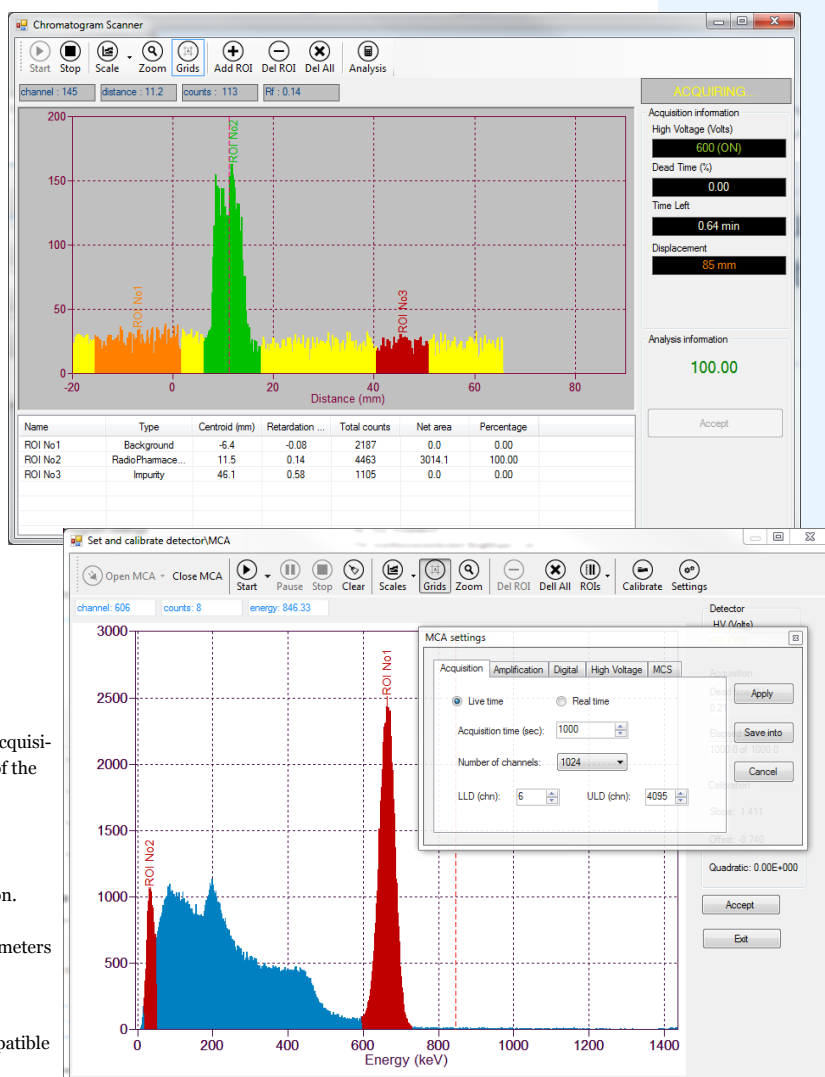
SOFTWARE DETAILS

An important part of the instrument is the software. The bSCAN software allows to carry-out all the complexity of both radiopharmaceutical analyses in a fast and intuitive way.

To summarize, the following basic functions, among many, are performed by the bSCAN software:

- Control of the displacement of the detector over the sample (strip) at a selected speed.
- Instrument (and individual components) setup, including energy calibration of the detector.
- Data acquisition of Chromatogram (TLC).
- Data acquisition for energy spectrum analysis.
- Spectrum visualization and analysis for both acquisition modes. Automatic nuclide identification of the energy spectra.
- Automatic spectrum storage into files.
- Automatic HTML-compatible report generation.
- User-defined setup, GUI and operational parameters
- Re-analysis of stored files.

The software runs under MS Windows, and is compatible with 32-bit and 64-bit processors.



BRIGHTSPEC

is a dynamic engineering company providing novel designs and innovative solutions in the field of nuclear electronics and software development for radiation detection.

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TECHNICAL SPECIFICATIONS

TLC Scanner

- ◆ MODEL: bSCAN-TLC201
- ◆ DIMENSIONS (WxHxD): 38 x 35 x 25 cm (15 x 13.7 x 9.8 in.)
- ◆ WEIGHT: 8.5 kg (19 lbs)
- ◆ POWER SUPPLY: 24 Volts, an external AC/DC power converter for 100-240 Volts is supplied.
- ◆ FUSES: 2 Amps, user-changeable.
- ◆ SCAN AREA: Strips of max 50 x 210 mm (2.0 x 8.3 in.)
- ◆ SCAN SPEED:
 - Automatic, from 0.1 to 2 cm/sec.
 - Fixed to ~ 0.5 cm/s (0.2 in/s) when using Manual scan mode
- ◆ SCANNER CONTROL: via USB connection. USB-B port connector on the back of the instrument.
- ◆ STRIP CARRIER: standard supplied with two plastic strip carries.
- ◆ FRONT SWITCHES AND INDICATORS:
 - On-Off switch with LED power-on indicator
 - Manual scan push-button
 - Reset push-button for scan reset operation.
 - Blue LED signaling BUSY state
 - Red LED signaling detector High Voltage is On.
- ◆ REAR CONNECTORS:
 - 24V DC socket.
 - USB-type B connector
- ◆ SHIELDING: Detector head providing minimum 10 mm of lead (Pb) around the detector

Detector

- ◆ TYPE: NaI(Tl) scintillator detector with integrated photomultiplier
- ◆ DETECTABLE RADIATION: Photons: Gammas and X-rays
- ◆ DETECTOR CRYSTAL DIMENSIONS: Typically 1x1 inches. Other sizes can be delivered upon request.
- ◆ TYPICAL ENERGY RESOLUTION: 7% to 8% at 662 keV

- ◆ COLLIMATION: Set of two (2) of 20 mm-thick (0.8 in.) lead (Pb) with apertures of 1 mm (0.08 in) and 3 mm (0.12 in.)

SPECTROMETER

- ◆ MCA TYPE: BrightSpec Topaz-Pico digital MCA, inside the instrument enclosure
- ◆ ACQUISITION MODES:
 - PHA (from 256 up to 4098 channels)
 - MCS (from 256 up to 4098 channels).
- ◆ DWELL TIMES— From 0.1 s to 24 hrs with 0.1 s resolution
- ◆ DATA COMMUNICATION: USB (2.0)

Software

- ◆ bSCAN version 1.0 or higher, compatible with MS Windows OS: Windows XP and Windows 7, for 32 and 64-bits processors.
- ◆ Software supplied with the bSCAN instrument on a CD-ROM with User's Manual

Standard package contents:

- bSCAN scanner
- Two sets of collimators: 1 mm and 3 mm aperture
- Two plastic Strip holders
- One standard EU three-point power cord
- Standard 100-240 Volts AC/DC power converter
- 2 meters long standard USB cable
- One NaI(Tl) scintillator detector with photomultiplier. Typical crystal sizes of 1 x 1 in.
- Other crystal sizes and/or detector types (e.g. plastic for PET analysis) can be supplied upon request.
- bSCAN software on a CD-ROM
- User's Manual

Optional

Desktop or Notebook PC running MS Windows 7, with 3 USB ports. Other specifics to be quoted.

Certifications

- ◆ The device is CE compliant

CE
CERTIFIED

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