

# “The Little Genius” Scanning Densitometer Nuclear Associates Model 07-444



## Introduction

“The Little Genius” stands head and shoulders above all other densitometers when it comes to performance, reliability and economy. The only hand-held scanning densitometer in the industry with built-in scanning and single-point (spot) measurement capability, it literally does the work of two densitometers.

## Applications

“The Little Genius” measures and stores daily film data for up to 20 different x-ray film processors for 31 days in its own built-in memory. Use it to generate and print control charts and D-Log-E curves directly to a printer without using external software and a computer. Set base-line (target) and tolerance levels for each control chart parameter either manually or automatically by scanning and averaging up to 9 different film strips. So smart, it reads not only our film strips, but “the other guys” too.

## Specifications

**Measuring range** 0 to 4.0 OD units

**Accuracy** 0 to 3.0 OD  $\pm 0.02$  OD units; 3.0 to 4.0 OD  $\pm 1\%$

**Repeatability**  $\pm 0.02$  OD units

**Power requirements** 6 AA batteries, 1.5 V alkaline; 110 VAC with AC power converter

**Spectral response** Centered at 540 nm

**Aperture size** 1.0 and 2.0 mm

**Dimensions** 3.2 (w) x 7.1 (d) x 2.75 in (h)  
(8.1 x 7 x 18 cm)

**Weight** 2.8 lb (1.3 kg)

### Optional accessories

**RS-232 Interface Cable**, 7 ft (2m) (Model 802013)

**9-Pin Adapter** (Model 169072)

**25-Pin Adapter** (Model 169071)

**Non-Powered Serial Parallel Converter**  
(Model 88-444)

### Available model(s)

**07-444** “The Little Genius” Scanning Densitometer, includes RS-232 interface cable, and a 9-pin and 25-pin adapter

**07-446** “The Little Genius” Scanning Densitometer, includes AutoSTPP X-Ray Film Processor QC Software, RS-232 interface cable, and a 9-pin and 25-pin adapter

### Available AC adapters (specify with order)

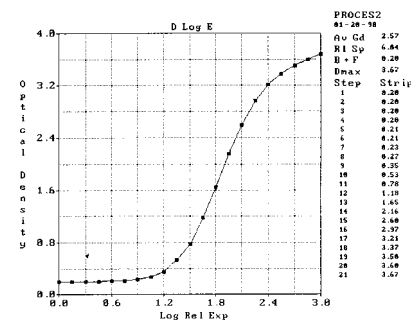
| Model                     | Description          | Typical geo. region |
|---------------------------|----------------------|---------------------|
| 14-301                    | 110 VAC 9 VDC 500 mA | USA, Japan          |
| 14-399                    | 230 VAC 9 VDC 500 mA | Europe              |
| 14-415                    | 230 VAC 9 VDC 500 mA | UK                  |
| 14-415 and 14-416 adapter | 230 VAC 9 VDC 500 mA | Australia           |

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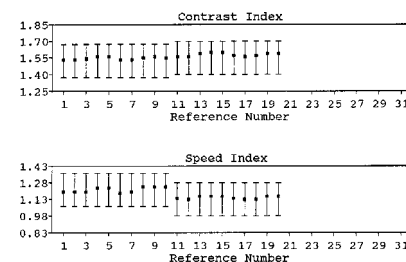
Diagnostic Imaging

- The only hand-held scanning densitometer in the industry with built-in scanning and single-point (spot) measurement capability, it literally does the work of two densitometers

- “The Little Genius” quickly and easily generates control charts and D-Log-E curves, without the use of external software



D-Log-E curve generated by “The Little Genius” without external software



## Features

- Saves time
- Increases accuracy of readings
- Provides vital information in seconds
- Includes built-in scanning and single-point measurement capabilities
- Available with AutoSTPP X-Ray Film Processor QC Software

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

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# Hand-Held Deluxe Digital Clamshell Densitometer

## Nuclear Associates Model 07-443

- Features a self-contained light source
- Fast and accurate results
- Lightweight and portable

### Features

- Two aperture choices: 1 and 2 mm
- Easy touch pads
- Battery operated
- Easy read display

### Introduction

Get all the benefits of state-of-the-art features in a compact, hand-held unit. Become a "speed reader" with this accurate, rugged portable Clamshell Densitometer. It has today's most-wanted features for "go-anywhere" quality control testing...from darkroom to darkroom, and from lab to field.

### Applications

It's easy to use. Just lift the "shell" and insert the test film; close the "shell" and press the READ button. The measured optical density appears on the three-digit liquid crystal display. The self-contained light source makes it convenient to use...anywhere.

A carrying/storage case and a calibrated five-step density tablet are included.



### Specifications

**Range** 0.0 to 4.0 OD

**Accuracy**  $\pm 0.02$  OD

**Reproducibility**  $\pm 0.01$  OD

**Temperature range** 50° to 104°F (10° to 40°C)

**Apertures** 1 and 2 mm

**Measuring length** Throat: 5.3 in (135 mm)

**Display** Three-digit, .5 in LCD with a low-battery indicator

**Zero range** Auto zeros to density 0.0

**Sensor** High-efficiency silicon photodiode

**Controls** Zero pushbutton: zeros unit

Power on/off switch

READ pushbutton: initiates READ sequence

Calibration control: screwdriver adjustable 20-turn potentiometer used to calibrate against a known step tablet

**Light source** When turned on during measurement, provides extremely long life with minimum spectral and intensity degradation. Reduces heating to a minimum

**Power requirements** Four 1.5 V AA batteries (approx. 3,000 exposures)

**Dimensions** 3.2 (w) x 7.1 (d) x 2.4 in (h)  
(8.1 x 18 cm x 6.1 cm)

**Weight** 1.81 lb (0.82 kg)

### Optional accessories

**Rechargeable AA NiCad Battery** (Model 87-443-2000). Battery life: approximately 1,200 to 1,500 read-cycles, per recharge

**Battery Charger** (Model 87-443-1000)

**Battery and Charger Kit** (Model 87-443-2140), includes four AA NiCad batteries and one battery charger

**Carrying Case** (Model 89-443)

### Available model(s)

**07-443** Hand-Held Deluxe Digital Clamshell Densitometer, includes five-step density tablet and carrying case

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# Hand-Held Dual-Color Sensitometer

## Nuclear Associates Model 07-417



### Introduction

This compact, precision instrument is ideal for maintaining consistent, high-quality film processing. By evaluating control films on a daily basis, the technologist can identify processor variations before they affect clinical radiographs. Also, processing conditions in multiprocessor departments may be standardized. In the past, this was difficult in departments using varied film-screen combinations in different areas. With this sensitometer, proper exposure of either blue- or green-sensitive x-ray film is easily accomplished, with no need for internal adjustments.

Nuclear Associates' Hand-Held Dual-Color Sensitometer features a 21-step density wedge with 0.15 OD increments. The 21 density-gradient steps are numbered for convenience. An innovative, dual-color, electroluminescent light source provides precisely-controlled repeatable exposures. The desired color is selected with a front-panel switch.

### Applications

To make an exposure, the platen is raised and a sheet of film is inserted beneath it until the film stops are reached. The platen is lowered and the exposure switch is depressed. An audible buzzer is activated during the exposure. To prevent double-exposures, a two-second delay is engaged before the next exposure can be made. When battery replacement becomes necessary, the unit will not expose film. Battery life is approximately 10,000 exposures.

Processor variations are monitored by comparing the control film to previously processed films. Speed, contrast, and base-plus-fog values can be graphically plotted for easier comparison.

### Specifications

**Light source** Dual-color electroluminescent  
Blue 455 nm  $\pm$  10 nm; green 520 nm  $\pm$  10 nm

**Repeatability**  $\pm$  0.04 OD log exposure from unit to unit

**Stability**  $\pm$  0.02 OD log exposure per year at 10° to 45°C

**Exposure area** 21 steps, each 5 x 10 mm

**Tablet densities** 0.05 to 3.05 OD in 0.15 OD increments

**Exposure time** Adjustable, 50 to 500 ms typical

**Exposure adjustment** Separate external screwdriver adjustments  $\pm$  0.5 OD on each color

**Controls** Push-to-expose button with buzzer monitor and two-second delay to prevent double exposures

Blue/Green rocker switch

Power switch--none required. Unit draws no power on standby

**Power requirements** Two 9 V alkaline transistor batteries

Optional AC power converter

Approximate battery life 10,000 exposures

**Dimensions** 5.25 (w) x 7.625 (d) x 3.625 in (h) (13.34 x 19.37 x 9.21 cm)

**Weight** 2.5 lb (1.14 kg)

**Optional accessories**

Carrying Case (Model 89-417)

**Available model(s)**

**07-417** Hand-Held Dual-Color Sensitometer



- Helps maintain optimum film processing conditions
- Easy selection of blue or green light emission
- Lightweight, portable, battery-operated

### Features

- Repeatability:  $\pm$  0.04 OD log exposure from unit-to-unit
- Stability:  $\pm$  0.02 OD log exposure per year at 10° to 45°C
- Numbered, 21-step density wedge

### Available AC adapters (specify with order)

| Model                     | Description           | Typical geo. region |
|---------------------------|-----------------------|---------------------|
| 14-407                    | 110 VAC 12 VDC 400 mA | USA, Japan          |
| 14-431                    | 230 VAC 12 VDC 640 mA | Europe              |
| 14-432                    | 230 VAC 12 VDC 640 mA | UK                  |
| 14-432 and 14-416 adapter | 230 VAC 12 VDC 640 mA | Australia           |

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# Portable Digital Thermometer

## Model 07-402

- Affordably priced...includes a detachable probe
- Displays minimum/maximum readings
- Hold/freeze function
- Auto shut-off
- Battery eliminator jack for a 9 volt VDC converter
- Checks film processor solution temperatures quickly and accurately
- Large, easy-to-read, backlit digital display of temperature in Centigrade or Fahrenheit
- Accuracy:  $\pm 0.5\%$
- State-of-the-art detachable immersion probe saves time and allows use of multiple probes with one display unit

### Specifications

**Temperature range** - 40° to 300°F (- 40° to 150°C)

**Resolution** 0.1°F

**Accuracy**  $\pm 0.5\%$  over entire range

**Display** Four-digit LED, plus decimal point

\* Factory re-calibration available.

### Introduction

This hand-held thermometer is a battery-powered unit with a detachable immersion probe. Temperature readings appear in Centigrade or Fahrenheit with  $\pm 0.5\%$  accuracy. The LED display eliminates problems that can result from the misreading of stem-type thermometers.

### Applications

Detachable immersion probes are time-savers for x-ray departments that have several film processors. The use of multiple probes, each remaining in a specific tank, also eliminates the possible cross-contamination of chemicals. This improved version of the digital thermometer includes many convenient features and capabilities. You can quickly and easily display the lowest and highest temperatures measured by the probe since the unit was turned-on. Our digital thermometer also enables you to "freeze" the current temperature reading on the display. The thermometer display can be easily illuminated, making it perfect for use in the darkroom. You can also program the Portable Digital Thermometer for auto or manual shut-off.

The Portable Digital Thermometer (Model 07-402) is a shock resistant, solid-state unit that needs no adjustments to maintain accuracy. Calibration is traceable to the National Institute of Standards and Technology (NIST)\*. The unit includes a high-impact plastic case with a recess for storing one probe, and is equipped with a power jack that will accept the optional AC power supply. The jack should be used when the unit will be in use for extended periods of time (in order to prevent battery failure).



**Battery** Standard 9 V alkaline or equivalent

### Dimensions

**Thermometer** 3 (w) x 8 (d) x 1.125 in (t)

**Display Area** 2 x 0.94 in

**Probe** 6 in long

**Weight** 7.44 lb (3.38 kg)

### Optional accessories

**Immersion Probe** (Model 07-403)

**Waterproof Probe** (Model 07-401), will not be damaged in chemistry or water

### Available model(s)

**07-402** Portable Digital Thermometer, with one probe

# B-D Digital Thermometer

## Model 07-404

More sensitive and responsive than glass thermometers. Just depress the ON/OFF button... immerse the thermometer... and a beep-signal will indicate the measurement is complete. The digital reading remains on display even when the thermometer is removed. After the measurement is recorded, turn the power off.

A convenient "memory feature" remembers the last temperature reading, even after the thermometer has been turned off. The long-life battery will last for thousands of readings (about 300 hours). A Low Battery Indicator will be displayed when battery needs replacing.

### Specifications

**Temperature range** 90° to 108°F

**Accuracy**  $\pm 0.2^\circ\text{F}$

**Power** 1.55 VDC alkaline battery

**Dimensions** 0.75 (w) x 5.1 (l) x 0.43 in (t)  
(19 x 130 x 11 mm)

**Weight** 0.35 oz (10 mg)

### Available model(s)

**07-404** B-D Digital Thermometer



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# Film Processor Quality Control Kit

## Nuclear Associates Model 18-445



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- Contains the essential tools for performing the necessary QC tests

### Introduction

Thorough, precise film processor quality control is an important part of ensuring the acquisition of high quality radiographs, while minimizing radiation exposure to patients. Our goal is to provide you with the equipment you need to detect changes in image quality before they become significant enough to affect diagnosis or radiation dose to patients.

#### The Film Processor Quality Control Kit (Model 18-445) includes:

- Hand-Held Dual-Color Sensitometer (Model 07-417)
- Hand-Held Deluxe Digital Clamshell Densitometer (Model 07-443)
- Portable Digital Thermometer (Model 07-402)
- *Basics of Film Processor QC* Videotape (Model 49-780)
- Carrying Case (Model 89-423)

#### Available model(s)

**18-445** Film Processor Quality Control Kit

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# Digital Densitometer

## Nuclear Associates Model 07-424

- Large illuminated surface
- Density range is 0.00 to 4.5 D
- Three apertures: 1, 2, and 3 mm
- RS-232 interface available

The Digital Densitometer is an easy to use precision instrument that quickly measures the optical density of film. And with its optional RS-232 interface, you have the capability to automatically transfer the data to a computer for storage and retrieval.

Constructed of rugged steel and compact enough to fit on any crowded worktable, it offers exceptional accuracy ( $\pm 0.02$  optical density). The optical density value is displayed in bright LED numerals on the detector arm. The sample table is 6.125 x 10.50 inch with a 4.75 x 5.50 inch illuminated section. It will accommodate film up to 14 x

17 inch and provides ample room for positioning any selected area under the detector.

The detector is a hermetically-sealed silicon photodiode. The detector lamp is at full brilliancy only during the actual measurement, thus preventing heating problems and ensuring very long lamp life with minimum wavelength shift or other degradation. When necessary, the lamps are easily replaced. The densitometer includes a five-step optical density tablet.



### Specifications

**Density range** 0.00 to 4.5 D

**Accuracy**  $\pm 0.02$  density. Reference tablet supplied

**Response time** Two seconds at 3.00 density

**Zero drift** Negligible

**Apertures supplied** 1, 2, and 3 mm D. Anodized aluminum

**Throat** 8.2 in length (21 cm). Easily measures to center of 14 x 17 in (35.6 x 43 cm) film

**Illuminated table** 4.75 x 5.50 in (12 x 14 cm)

**Diameter of aperture holder** (area obscured) 0.730 in

**Spectral response** 5000-5500 Å peak of bell-shaped curve

**Detector illumination** Incandescent lamp with spectral compensation filter. Lamp is at full brilliancy only during measurement

**Table illumination** Four #37, low voltage, wedge-base lamps

**Digital readout** Three 0.4 inch high light-emitting diode (LED) numerals on detector arm

**Detector** Hermetically-sealed, silicon photodiode

**Zero control** Allows wide range adjustment for different apertures and density subtraction

**Power** 110/220 V, 50/60 Hz

**Dimensions** 6.3 (w) x 13.4 (d) x 4.9 in (h) (16 x 34 x 12.5 cm)

**Weight** 7 lb (3.2 kg)

#### Optional accessories

**Carrying Case** (Model 89-424)

**Apertures**, set of three (Model 07-413)

**Replacement Lamp** (Model 07-424-1000)

**Step Tablet** (Model 07-424-9996)

**RS-232 Interface Cable**, 7 ft (2 m) (Model 802013)

**9-Pin Adapter** (Model 169072)

**25-Pin Adapter** (Model 169071)

#### Available model(s)

**07-424** Digital Densitometer, includes step tablet

**07-424-220** Digital Densitometer, 220 V, includes step tablet

**07-440** Digital Densitometer with RS-232 interface, includes step tablet

**07-440-2200** Digital Densitometer with RS-232 interface, 220 V, includes step tablet

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