



Radiological Emergency Response Solution

An effective response to a radiological emergency requires responders to deploy the appropriate instrumentation to determine if radioactive materials have been dispersed. If radioactivity is detected, first response personnel must then expeditiously determine the location of the radiation source(s), identify the type of radioactive isotopes involved, and quantify their intensities.

For optimal effectiveness, it is essential that first response teams, including police, fire and medical personnel, are equipped with highly sensitive portable instruments capable of rapidly, accurately and reliably detecting the presence of radiation in its various forms and alarming if the radiation levels or accumulated dose exceed acceptable limits.

Berkeley Nucleonics provides a synergistic solution for emergency response radiation detection with an instrumentation and training package that includes the handheld palmRAD 904 Nuclear Radiation Meter, the portable SAM 935 Surveillance and Measurement system and the BNC Radiation Detection Training seminar.

The BNC Solution bundles a palmRAD 904 for each first responder's utility belt, WMD case and/or emergency vehicle, and mobile SAM 935 units for comprehensive second tier support and analysis of the first response team's initial findings. BNC's radiation detection training provides personnel at all levels with the skills necessary to correctly operate instruments and interpret results, collect data and identify radiation hazards.



palmRAD 904 shown above. Used to locate radiation and measure in uR.

palmRAD 904

The palmRAD 904 handheld is a precision geiger-mueller meter that detects and measures alpha, beta, gamma and x-ray forms of radiation. The unit is built around a highly accurate halogen-quenched detector tube and is designed for emergency response, domestic preparedness, hazardous material safety, law enforcement and compliance verification applications.

The instrument fulfills a critical need for early responders who must determine if a particular area is a nuclear or radiological "hotzone." Initial responders are enabled to make informed decisions and establish perimeters expeditiously based on radiation activity information displayed on the palmRAD 904's easy-to-read LCD screen. Once potential hazards have been ascertained, second tier response personnel and more technical equipment can be deployed for confirmation and in-depth analysis.

SAM 935

The portable SAM 935 radiation Surveillance and Measurement system utilizes advanced gamma-spectroscopy technology to identify and measure more than 200 radioactive isotopes in real-time, including Special Nuclear Materials (SNM), medical and industrial isotopes, and radioactive sources commonly associated with radiation dispersal devices ("dirty bombs"). The system is also able to identify multiple radioactive sources concurrently, thereby neutralizing the threat of masked sources. Equipped with the SAM 935, second level response personnel are able to ID and measure the intensity of isotopes involved, determine risk scenarios and enact appropriate emergency procedures.



SAM 935 Radiation Surveillance and Measurement System

Radiation Detection Training Seminar

BNC's Radiation Detection, Surveillance and Measurement Seminar focuses on training personnel on optimal use of the SAM 935 Surveillance and Measurement system and the palmRAD 904 nuclear radiation meter for emergency response and anti-terrorism applications, as well as general techniques for health physics, environmental waste management, remediation and border security.

Berkeley Nucleonics Corporation 



Product Specifications

Model 935 Surveillance & Measurement System



SAM 935 Radiation Surveillance and Measurement System

- Energy range from 18 keV to 3 MeV
- Multiple trigger lists for different Isotopic applications (Anti-Terrorism, Environmental, Medical)
- Optional He3 neutron detector
- Detector options: internal or external detectors in three different sizes.
- Quadratic Compression Conversion (QCC) allows for identification of mixed isotopes in two seconds.
- Modifications of isotopes and their associated energy lines can be added, deleted, or changed in the field with no computer.
- Ideal for surveillance in high backgrounds (backgrounds are subtracted every second with QCC)
- Displays both isotope specifics and full dose rate (within 2 seconds)
- Prints MCA report directly to the screen or a printer.
- Hands-free operation with an early responder password lockout mode.

Functions Nuclide identification, spectrum analysis, dose rate (rem) calculation, total dose display, source finding

Integrated Electronics Digital Multi-Channel Analyzer, spectroscopy amplifier, power supply

Physical Dimensions Weight: 5 lbs. with 1" x 2" NaI and batteries. 2" L x 8 5/8" H x 2" W

Energy Range 18 keV - 3 MeV

Alarm Red and yellow LED; Speaker

Trigger Lists Multiple trigger lists for different field applications (Anti-Terrorism, Environmental, Medical)

Patented Technology Quadratic Compression Conversion (QCC) allows for identification of mixed isotopes in two seconds. Ideal for surveillance in high backgrounds (backgrounds are subtracted every second with QCC)

Customizability Modifications of isotopes and their associated energy lines can be added, deleted, or changed in the field with no computer needed. 128 Customizable Isotopes in the library 400 Customizable Energy Lines

Ease of use Password Lockout Mode for non-technical personnel Hands-free operation

Protection Water resistant & dust tight

Accessories External battery charger, AC car adapter, Pelican case, Analysis Software, Printer, Check Sources

Preamplifier Type: Charge Sensitive Input: Negative Current (anode)

Amplifier Type: Pseudo-Gaussian Shaping: Bipolar, 1.5 μ s peaking time Coarse Gain: 1x, 2x, 4x, 8x Fine Gain: 1.000 to 2.550 in steps of approximately 0.0006

ADC Type: Base Converter 14-bit Successive Approximation Conversion Modes: Linear - 256, 512, 1024 Channels QCC - 256, 512 Channels (U.S. Patent 5,608,222) LLD: 0 to 105% of full scale digitally adjustable in .1% intervals ULD: 0 to 105% of full scale digitally adjustable in .1% intervals Zero: -5 % to + 5% of full scale, digitally adjustable

Controller

Processor: 80C186 microprocessor at 20 Mhz Display: 240 X 128 high contrast black-and-white FSTN graphics with CCFL backlight Controls: 10-key custom keypad utilizing software programmable function keys Monochrome LCD, 10 1/2 x 5 1/2 cm I/O: DB9M RS-232 port for printer or computer connection Clock: Battery-backed-up clock/calendar

Power NiMH; Internal battery pack; external factory-supplied dual mode supply/charger, 12w; Continuous 110V Operation Available.

Internal Gamma Detector (if present)

1.5" x 2" NaI detector with integral HV supply HV control from 0 - 1200 V, but actual operating voltage is determined by the detector characteristics Maximum HV: 200 V higher than the specified operating voltage

Internal Neutron Detector (if present)

He - 3 proportional detector with polyethylene (UHME) moderator Gas Volume: 10.4 cc Gas Pressure 20 atm Integral HV supply and shaping amplifier Integral upper and lower level discriminators and logic output for Neutron recognition

External Gamma Detector (if present)

2" x 2" NaI detector with integral HV supply 3" x 3" NaI detector with integral HV supply HV control from 0 - 1200 V, but actual operating voltage is determined by the detector characteristic Maximum HV: 200 V higher than the specified operating voltage for emergency response.

Model 904 palmRAD



palmRAD 904 Nuclear Radiation Meter with Alarm

- Low cost rugged enclosure (stainless steel).
- Easy to use for first responders.
- Immune to radio frequency interference.
- Signals an above-average level threshold audio and visual alarm.
- Ability to detect for household radon.
- Personnel and area monitoring.
- Small and lightweight.

Sensor: Halogen-quenched geiger-mueller detector with mica end window (LND712); detects alpha, beta, gamma, and x-ray radiation. End window density is 1.5-2.0 mg/cm². Side wall is .012" #446 stainless steel.

Display: 4-digit liquid crystal display with mode indicators

Operating range: mR/hr: .001-50.00 mR/hr (Cs-137); CPM: 0-50,000; Total: 0-60,000 counts

Calibration: Cesium 137 (gamma)

Sensitivity: 1000 cpm/mR/hr referenced to Cs-137

Detects alpha down to 2.5 MeV; typical detection efficiency at 3.6 MeV is greater than 80%.

Detects beta at 50 keV with typical 35% detection efficiency.

Detects beta at 150 keV with typical 75% efficiency.

Detects gamma and x-rays down to 10 keV typical through the window. 40 keV minimum through the case.

Accuracy: \pm 10% typical; \pm 15% max.

Alert: User-adjustable alert level is set using three buttons

Count light: Red LED flashes with each count

Beeper: Chirps for each count (can be muted)

Outputs: Dual miniature jack sends counts to computers, data loggers, several educational data collection systems and other CMOS-compatible devices. Submini jack provides audio output to an external earpiece, amplifier, or tape recorder.

Power: One 9-volt alkaline battery

Size: 150 x 80 x 30 mm (5.9" x 3.2" x 1.2")

Weight: 225 grams (8 oz) including battery

Options: European SI units (mSv/hr)

Computer cable and software (IBM PC compatible)

3-Year Warranty & Service Agreement

Protective Travel Case with Belt Loop (included)

Certification: CE Certification for use in Europe.



Training

palmRAD 904 - Berkeley Nucleonics provides training and technical support for the palmRAD 904 by phone from the corporate headquarters in San Rafael, California. Guidance is provided on the optimal use of the instrument, setting alarms, basic nuclear and radiation theory, dose quantities and units, and measurement of alpha, beta, gamma and x-ray radiation. On-site training on use of the palmRAD 904 is available by arrangement. The number to call for assistance or to schedule on-site training is 800-234-7858.

SAM 935 - The Berkeley Radiation Detection, Surveillance and Measurement seminar provides attendees with a comprehensive understanding of the principles and techniques involved in radiation detection and isotope identification using the SAM 935 Surveillance and Measurement system.

The training is appropriate for Emergency Response, Health Physicists, Customs Personnel, Law Enforcement, Border Patrol Agents, Medical Personnel and others who utilize the SAM 935 for specialized applications.

The seminar is lead by recognized experts and provides attendees with a strong foundation in the the fundamentals of field detection, identification and analysis of radioactive materials for all applications.