

PRODUCT GUIDE

nukeALERT

MODEL 951 RADIATION DETECTOR



About Berkeley Nucleonics

Founded in 1963, Berkeley Nucleonics Corporation (BNC), is a leading manufacturer of precision electronic instrumentation for test, measurement and nuclear research. Headquartered in San Rafael, CA, BNC operates several manufacturing facilities and sales offices throughout the U.S. BNC's nuclear detection products serve industries involved in environmental monitoring, health physics, emergency response and power generation. BNC is committed to maintaining its tradition of technical excellence by providing responsive solutions to the rapidly changing nuclear industry and its customers. BNC products are manufactured and assembled in the U.S.A.

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Personal Radiation Detector – General Description of Operation

The **nukeALERT** is a highly portable, rugged, all-weather radiation detector that's small enough to wear on a belt yet powerful enough to quickly locate low-level radioactive sources, even in a warehouse full of boxes. Designed to discreetly monitor any environment without intrusion or disruption of civilian activities, the **nukeALERT** can be set to notify the user by vibration or audible alarm whenever gamma radiation exceeds natural background levels. The **nukeALERT**'s simple operation and highly readable display provide an automatically updated strength indicator in less than 1 second, allowing a rapid area sweep to identify the exact location of any radiation source.

When activated, the **nukeALERT** measures the background radiation count for 30 seconds, and then uses that value to establish a noise floor. Any radiological isotope that comes within range of the **nukeALERT** will activate the audio or vibration alarm, and the **nukeALERT** display will show a value from "1" to "9" or "H" (HOTZONE) to indicate the intensity of the radiation detected. The intensity corresponding to these numbers is shown on page 9. The audio and vibration alarms increase in repetition rate the closer the **nukeALERT** is brought to the radiation source. The source of the radiation can be quickly found by scanning the area and using the alarm as an intensity indicator. The range of detection can vary from hundreds of meters to just a few, depending on how large and powerful the radiation source is and how much material is between the source and the **nukeALERT**.

Features and Benefits

- All-temperature, all-weather detector
- Self-powered, with 2 year battery life
- Rugged (can survive a 3 foot drop onto concrete)
- Audible alarm or discreet silent operation
- Easy to use; no training required
- Automatic calibration to filter background radiation
- Adaptable for operation near x-ray machines
- Bright display operates in day or night

SPECIFICATIONS

Function	Gamma ray detection
Detector	Cesium Iodide Scintillator
Battery Life	2+ years @ 48 hrs/week
Batteries	2 AA Alkaline
Response Time	< 1 second
Notification	<ol style="list-style-type: none">1. Audio alarm; beeps increase based on radiation strength2. Vibration; vibration pulses increase based on radiation strength3. Flashing LED; flashes increase based on radiation strength, color changes from orange to red4. LED with readout "1" through "9" and "H" for the highest level (HOTZONE)
Calibration	Automatic when turned on
Calibration Biasing	16-position switch; allows manual setting for operation in high-radiation environments (Ex., near X-ray machines)
Placement	Belt clip or belt pouch
Size	3.75" x 2.5" x 1.25"
Weight	6.4 oz w/batteries
Environment	Heavy rain -10° F to 122° F, -23° C to 50° C Day or night visibility In loud or quiet environments Passes 3 feet drop test onto concrete

Designed and tested to meet U.S. Customs Service specifications

OPERATING INSTRUCTIONS FOR USER

The **nukeALERT** is shipped with batteries installed and is ready to use (See Battery Management section on page 8). Remove it from the shipping carton and familiarize yourself with the controls and displays on top of the unit and operating instructions on back label. To begin operation, move the **nukeALERT** power switch from the "Off" position to SPK (for SPEAKER which is the "on" position) and the unit will begin a power up and calibration sequence. During the 30 second calibration interval, the unit will measure naturally occurring background radiation and will calculate a threshold above which a radiological alert will be indicated to the operator. The LED display will flash during the 30 second calibration sequence. Following completion of calibration, a beep is sounded indicating the threshold level has been successfully calculated for that particular environment. Every 15 seconds thereafter, an LED in the lower center of the main display window will flash, indicating the unit is operating properly and is in detection mode. Because the **nukeALERT** auto-calibrates to the ambient radiation level, maximum sensitivity will be obtained if you turn the **nukeALERT** on at the location where you are planning to inspect.

If the **nukeALERT** finds that it is no longer detecting the background radiation levels that it expects over a period of time (such as if the operator takes it into a concrete building), the **nukeALERT** will recalibrate itself. The **nukeALERT** will beep and the LED will show a "racetrack" pattern for 30 seconds. When complete, the **nukeALERT** will beep and go into detection mode. This is performed to keep the **nukeALERT** at maximum sensitivity levels in all environments.

Alarms

The **nukeALERT** will alarm (either audibly if in SPK mode or will vibrate if in VIB mode) when the presence of gamma radiation exceeds the natural background levels. Alarms are visually displayed (LED window on top left of unit) in levels from 1 (low level of gamma photons present) to 9 (high level of gamma photons present) and will also change to a more intense color.

Operating Instructions-Alarms (continued)

In addition, when in SPK mode, an audible alert will sound in increasing intensity as the alarm level goes from 1 to higher levels. When unit is on, calibrated and in VIB mode, the **nukeALERT** will alarm by displaying the level on the LED window and activating the vibra-sender feature and the intensity of vibration will increase proportionately as the level of gamma radiation increases.

In addition to the visual LED window, audible alerts and vibration alerts, a small rectangular LED located directly below the BNC logo on top of the unit will flash slowly (and display an orange color) as a level 1 alarm is displayed on the larger LED and will increase in the rate of flashing as alarm levels increase through level 9 up to the maximum level H. Finally, the color of this flashing LED will change from orange to red at levels 6 through 9 and also at maximum level H.

In the event the operator changes work location during the course of their duties, it is recommended that the **nukeALERT** be turned off and turned back on (allows unit to automatically re-calibrate to the natural background radiation in the new location which can be significantly different from place to place). This simple and quick step will insure that the unit will be the most effective and sensitive to small increases of gamma radiation.

Internal Switch

Inside the back of the battery compartment of the **nukeALERT** is a small 16-position switch that can be adjusted with a long handheld screwdriver. **The majority of nukeALERT users will not require adjustment of this switch.** The purpose of this adjustment and switch is to allow adjustment of the background level radiation value if the user is operating in an environment where the background radiation swings back and forth frequently (such as in close proximity to an operating X-ray machine). This switch auto adjusts the "1" to "9" and "H" scale so that the operator in those environments does not constantly get false alarms. **This switch should only be adjusted by an informed operator.** If the switch level is set too high, it will desensitize the **nukeALERT** and potentially allow low-level radiation sources through that would be detected under normal operation.

A ballistic nylon case (with a clear plastic window on top flap) is supplied with each **nukeALERT**. The belt loop has a snap fastener allowing the user to affix the case/**nukeALERT** to a belt of up to 3" in width. The top flap on the case opens and closes easily using a Velcro® fastener and allows removal of the **nukeALERT** if required. If the operator prefers to utilize the optional belt clip assembly shown below, please contact the BNC Customer Service department (**800-234-7858**) or your sales representative. The belt clip fastens directly to the back of the **nukeALERT** and swivels while worn on belt or garment and allows quick release of **nukeALERT** to allow handheld operation.



The **nukeALERT** is designed to meet extreme environmental standards for rain, shock and vibration. The unit is sealed to reduce intrusion from dust, humidity and salt fog. The unit, including top display, may be cleaned safely with mild soap and water using a warm, wet cloth.

Battery Issues and Maintenance

The **nukeALERT** is powered by two AA Alkaline batteries (installed at factory) which under a normal duty cycle (on 8 hours a day in detection mode, off 16 hours) will operate in detection mode for two years without replacement. A low battery indicator (LED will display "L") will inform the operator that batteries should be replaced. While a certain reserve is designed into the **nukeALERT** once a low battery alert is displayed, batteries should be replaced (use small Phillips head screwdriver to release battery door on bottom of unit) as soon as possible to allow robust operation in the event future multiple alarms are encountered.

Failure Mode

If the unit is unable to achieve detection mode for any reason, a FAIL indicator will be displayed. The **nukeALERT** will continually display each character in sequence – "F", then "A", then "I" and then "L". If failure mode occurs (most likely due to a significant change in location of operation), turn power off to the **nukeALERT** and then turn unit back on and allow it to re-calibrate (in new location). If the **nukeALERT** continues to go into failure mode following attempt to re-calibrate, notify customer service for assistance.

Typical Calibration Data for nukeALERT

ALARM LEVEL	DOSE RATE mRem/hr
1	0.035
2	0.040
3	0.055
4	0.065
5	0.100
6	0.200
7	0.350
8	0.600
9	1.100
H	13.00



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