The NukAlert-ER Quick Start Guide

The NukAlert-ER may be powered by two "AA" batteries (alkaline or Ni-MH) and/or a USB power source (computer or universal cell phone charger). Turn the unit on by pressing and holding the On/Sleep button for 5 seconds. The unit will initialize and display the current radiation Dose Rate. When the unit is first powered by installing batteries or connecting to a USB power source before batteries are installed, it will turn on automatically without pressing the ON/Sleep button.

You should see the yellow light blink and hear corresponding clicks at least a few times per minute, indicating proper operation and normal harmless background radiation. Up to a few clicks per second can be expected from normal background radiation. Some high background locations or flying in an airliner at cruising altitude can cause as many as 10 clicks per second without being a cause for alarm.

Because the NukAlert-ER covers an enormous range of radiation intensity (the billion fold range between harmless and deadly), it is imperative to understand the measurement units described in the Dose Rate section of the next page.

The Mute button:
The Mute button toggles the Geiger clicking sound on or off. It will not mute any other sounds.

The "OK" button:
The "OK" button is used to accept menu options or to temporarily silence (snooze) alarms that are sounding. When The Dose Rate is being displayed, pressing the "OK" button causes an asterisk "*" to appear beside the reading and remain for the duration of the selected averaging period as a guide to determine when the indication has fully stabilized. While in the settings menu, parameters that are shown in parenthesis may be adjusted by pressing "OK" and then using the arrow keys. When the desired value is shown press "OK" again to accept the adjustment, or "ESC" to restore the original value.

The "ESC" button:
The "ESC" button is used to back out (escape) from a menu or sub-menu selection. Repeated pressing of the "ESC" button always pages back to Dose Rate screen.

The "Left" & "Right" arrow buttons:
The arrow buttons are used to page through the menu and sub-menu selections and to adjust settings. The NukAlert-ER presents the user with 8 main menu screens that are chosen with the "Left" or "Right" arrow buttons.

The main menu selections are:
- Dose Rate
- Accumulated Dose
- Time Remaining to Preset Dose
- Count Rate
- Raw Counts
- History
- Battery State
- Settings

Dose Rate:
This main menu selection displays the rate of radiation dose accumulation. The quantity of radiation a person absorbs is called a dose. Radiation **dose** is expressed on the NukAlert-ER display in units of either "**R**" (Roentgens), or "Sv" (Seiverts). The default unit is **Roentgens**. Units may also be shown on the NukAlert-ER display with a "**n**" (nano) prefix for billionths, a "**u**" (micro) prefix for millionths, a "**m**" (milli) prefix for thousandths, and a "**K**" (Kilo) prefix for thousands. The "**Dose Rate**" is a measure of how rapidly a dose is being absorbed. For example, a dose rate of 2R/hr (2 Roentgens per hour) will result in a dose of 6R being absorbed in three hours. At 2mR/hr (2 milli Roentgens per hour) it would take over 4 months to receive the same 6R dose. A typical normal background rate is between 10uR/hr and 100uR/hr. In an airliner at cruising altitude one would typically see 400uR/hr. due to cosmic rays from outer space. Airline crews work in such radiation fields for hundreds of hours per year without panic. A dose of more than 100R absorbed over a short time period (days) is likely to cause a person to develop symptoms of acute radiation sickness, while lower doses rarely cause acute illness. The average American has a 24% chance of lifetime fatal cancer. A 100R dose increases that cancer risk 8%, while a 10R dose increases lifetime fatal cancer risk less than 1%.

Accumulated Dose: This main menu selection displays the total dose of radiation accumulated by the instrument while it is turned on and the amount of time that has elapsed. The dose reading can be reset to zero in the "Settings" menu.

Time Remaining to Preset Dose: This main menu selection displays the time remaining at the current dose rate until a preset dose chosen in the settings menu will have been accumulated. This function will not appear in the main display screens unless it has been initialized in the "Settings" menu. If the Dose Alarm is enabled, the alarm will sound when the preset dose has been accumulated.

Count Rate: This main menu selection displays the number of Geiger pulses observed per second or per minute, depending on the radiation intensity.

Raw Counts: May be used for precise long term background measurements.

History: This main menu selection enters a sub-menu that allows the user to review or clear the history memory. The results of the last 500 periods of radiation measurements are kept in the unit's memory with the most recent measurements overwriting the oldest. The History may also be read through USB by a PC App.

Battery State: The battery voltage is displayed along with an estimated percentage of battery capacity remaining. If a USB connection is delivering power a (USB pwr) message will be displayed, and the batteries will not be drained.

Settings: Refer to the detailed user's manual.

Alarms:
The NukAlert-ER can be set to alarm when the Dose Rate or Accumulated Dose are above a preset threshold value. The threshold values are selected and alarms enabled in the settings menu. Both rate and dose alarms sound after their respective threshold is exceeded and may be temporarily silenced (snoozed) by pressing the OK button. The rate and dose alarms operate independently and concurrently. Both rate and dose alarms will resume sounding after the snooze period and may be re-snoozed indefinitely.

Snooze periods for rate and dose alarms:
5 minutes below 1mR/hr
3 minutes between 1mR/hr and 1R/hr
1 minute 1 R/hr and above

The Dose snooze/alarm cycle will continue until one or more actions below:
1. The user turns off the Dose alarm in the settings menu
2. The user raises the Dose alarm threshold above the current accumulated dose
3. The user resets the Accumulated Dose in the settings menu

The Rate snooze/alarm cycle will continue until one or more actions below:
1. The currently measured rate drops below the Rate alarm threshold
2. The user turns off the Rate alarm in the settings menu
3. The user raises the Rate alarm threshold above the currently measured rate

How to use the NukAlert-ER:
In a radiation emergency the instrument should be used sealed in a ziplock plastic bag to avoid getting contamination on or in the unit. The NukAlert-ER may be used as a stand alone instrument, or it may be connected through its USB port to a computer or companion device allowing its data to be collected, displayed on large screens and/or sent over the internet. The NukAlert-ER Gateway communication device is available from www.nukalert.com/

A link to download a free open source PC App for USB communication with the instrument may also be found on the NukAlert web page www.nukalert.com/

In a radiation emergency:
If the Dose Rate shows any amount of uR/hr (micro R per hour) you are not in life threatening radiation. Remain calm, download the resources listed at the end of this document if possible. If the Dose Rate shows less than 10 mR/hr (milli R per hour) you are not in the Hot Zone. Unless the radiation level increases, you may spend days in that radiation level without harm.

In the event of a terrorist nuclear attack:
The following from the NCR Planning Factors for Nuclear Terrorism may be useful:
http://www.fas.org/irp/agency/dhs/fema/ncr.pdf

Immediately find the nearest and strongest building and go inside to avoid radioactive dust outside. - Go deep inside. If better shelter, such as a multi-story building or basement can be reached within a few minutes, go there immediately.

If you are in a car, find a building for shelter immediately. Cars do not provide adequate protection from radioactive material.

Go to the basement or the center of the middle floor of a multi-story building
(for example the center floors (e.g., 3 – 8) of a 10-story building).

Resist your natural instinct to evacuate from a dangerous area as you are likely to be much safer sheltering in place while the radiation outside weakens.

Put building walls, brick, concrete or soil between you and the radioactive material outside, and increase the distance between you and the exterior walls, roofs, and ground, where radioactive material is settling.

Stay inside. Do not come out until you are instructed to do so by authorities

Air does not become radioactive, only the dust emits radiation. Avoid breathing dust by breathing through a cloth. If visible dust is not in the air, this is unnecessary.

Use the NukAlert-ER to find the lowest Dose Rate location in your shelter. Radiation levels can vary enormously over short distances and may increase or decrease with time as the dust settles. Keep evaluating your shelter and probing for better locations.

Useful Resources:
"What To Do If A Nuclear Disaster Is Imminent!": www.ki4u.com/guide.htm
Civil Defense resources: www.ki4u.com/goodnews.htm
Radiation Dose Chart: http://xkcd.com/radiation/
Physicians for Civil Defense: www.physiciansforcivildefense.org/