

# **RC22 Wand Radiation Detector Operating Manual**

PORTABLE

RADCOMM SYSTEMS CORP.

75-86-001 REV3.0 - 3/17/2020

Revision History			
Revision	Date	ECO	Description
Rev 1	Feb.6, 2009	-	Initial Release
Rev 2	Apr.30,2009		
Rev 3	Feb.21,2020	ECO1245	LCD change

**Product Manual - Disclaimers:**

Due to our efforts to continuously improve this product; specifications, dimensions, operating features and procedures described in this manual are subject to frequent changes. The printed version of this manual reflects only the configuration current at the time of printing. The most current version of the manual is provided in electronic format on the Product Support CD supplied with the instrument. Please refer to the electronic version of the manual for the most accurate interpretation. Contact RadComm Radiation Detection Systems at [www.radcommsystems.com](http://www.radcommsystems.com)

**CONFIDENTIAL DISCLOSURE**

USERS ARE HEREBY NOTIFIED THAT THIS MANUAL CONTAINS TECHNICAL INFORMATION OF A PROPRIETARY NATURE. THIS INFORMATION IS NECESSARY FOR TECHNICALLY KNOWLEDGEABLE USERS TO UNDERSTAND SYSTEM OPERATION AND TO SATISFY THEMSELVES THAT THE SYSTEM IS PERFORMING CORRECTLY.

RADCOMM ACCEPTS THAT IT IS THE RIGHT OF SUCH USERS TO BE PRIVY TO THIS INFORMATION. HOWEVER THIS DOCUMENTATION IS PROVIDED SOLELY FOR THE BENEFIT OF OWNERS OF THE SYCLONE PORTABLE DETECTOR AND DISSEMINATION OF THE DETAILED TECHNICAL INFORMATION PROVIDED MAY BE CONSIDERED AS LEGALLY CONTRAVENING THE NORMAL SUPPLIER/CUSTOMER RELATIONSHIP.

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## 1.0 INTRODUCTION

The occurrence of radioactive material in scrap shipments is increasingly becoming a common problem. Radioactive material occurs in many forms, shapes and sizes and is utilized in every application one could possibly think of; level control gauges in a steel making operation, thickness gauges in aluminum plants for measuring the thickness of foil, smoke detectors, medicine, watch dials, etc. There are also applications where radioactive particles commonly found on Earth are transferred as small particles to processing equipment, thereby contaminating parts such as oil pipe, heat exchangers, "I" beams in mines, etc. For the most part the majority of radioactive material is of low intensity and usually does not pose an immediate exposure problem. However, there are millions of radioactive sources that are presently being used in a variety of applications, where VERY SMALL quantities of radioactive material with VERY HIGH intensity levels WILL pose an immediate danger if personnel are exposed. For these reasons any detection should be handled as though it were a HIGH intensity source.

RadComm radiation detection systems have been designed to detect very low radiation intensity levels from material while buried in scrap. These systems will detect GAMMA and NEUTRON radiation. There are other types of radiation that are virtually impossible to detect when buried in scrap because of distance and the shielding effect of intervening scrap material.

The RC22 Wand series of radiation detectors consists of a family of 3 detectors as detailed in the chart below.

	Length(inches)	Detector Size
Standard 2" head	49-68	193 cc
Long 2" head	68-99	193 cc
Standard 3" head	49-68	442 cc

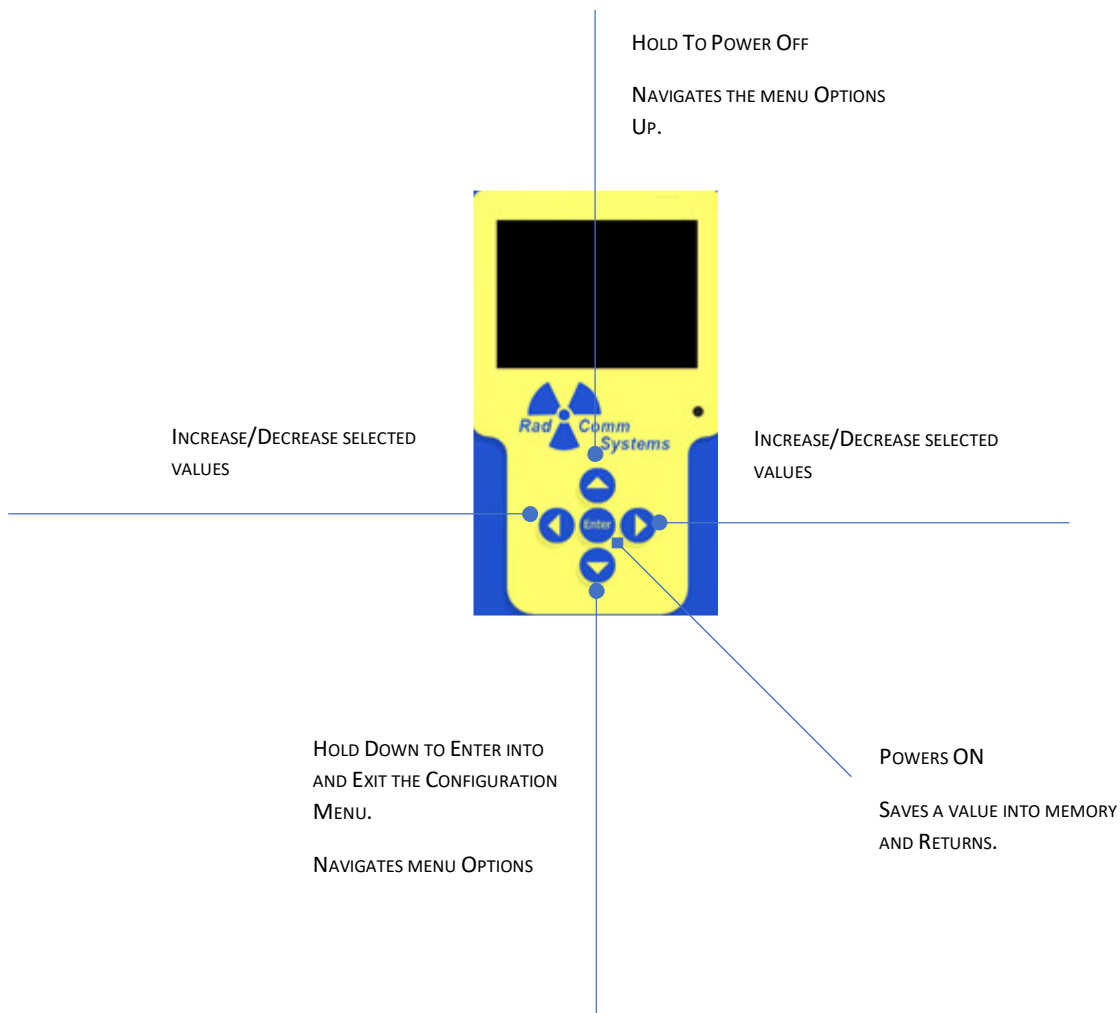
This manual explains the use and features of all three versions.

## 2.0 GETTING STARTED

### 2.1 KEYPAD

The Keypad allows the user to

1. Power On/Off
2. Navigate the UI screen
3. Make parameter selections
4. Increase or decrease selected values
5. Save or Cancel



## 2.2 POWER ON/OFF

### 2.2.1 POWER ON

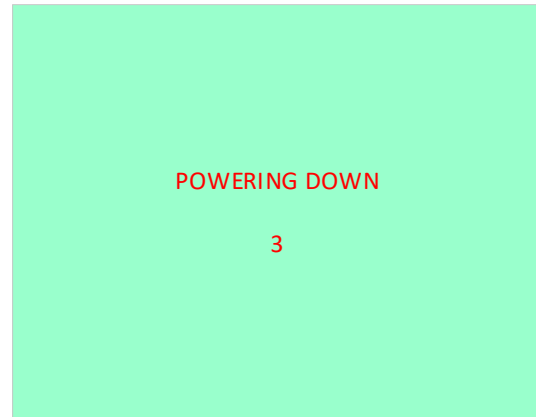
To power on RC22 wand, PRESS and RELEASE the ENTER button.

During the powering up cycle of RC22 wand, the welcome screen including the serial number, version number will be displayed momentarily. This serial number can also be viewed in the Information screen and should be noted when dealing with the factory. After power up, the unit begins the self-testing including memory test, LED test, and Learning Background procedure.



### 2.2.2 POWER OFF

1. To power off, **Push UP** and **Hold** the joystick for 3 seconds.
2. When the joystick is held in the Up position, a 3 second countdown begins.
3. The RC22 Wand turns off.



## 2.3 STARTING SELF-TEST

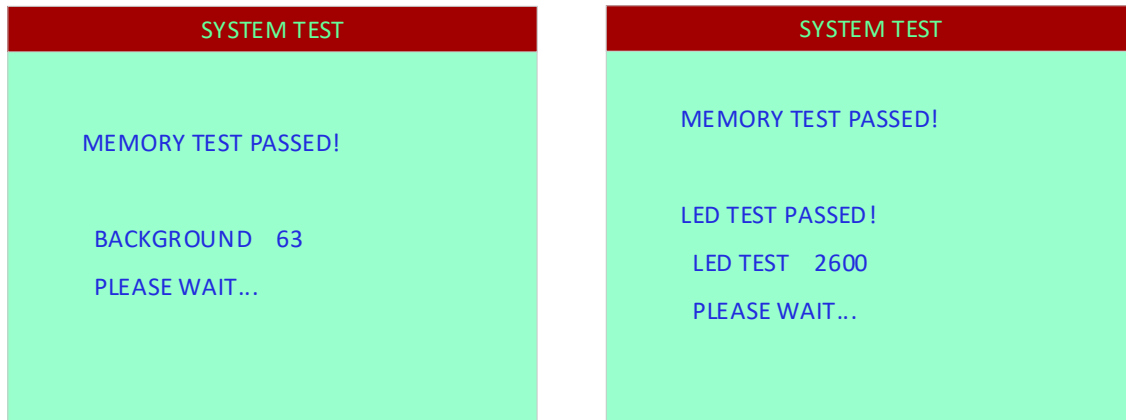
Every time when the RC22 Wand is power on, it does a self-test and learns the background.

### 2.3.1 BACKGROUND LEARN

During startup the RC22 Wand learns its background. This background is displayed in the System Test screen.

### 2.3.2 LED TEST CHECK

LED test checks the alarm algorithms to ensure the device is ready to scan.

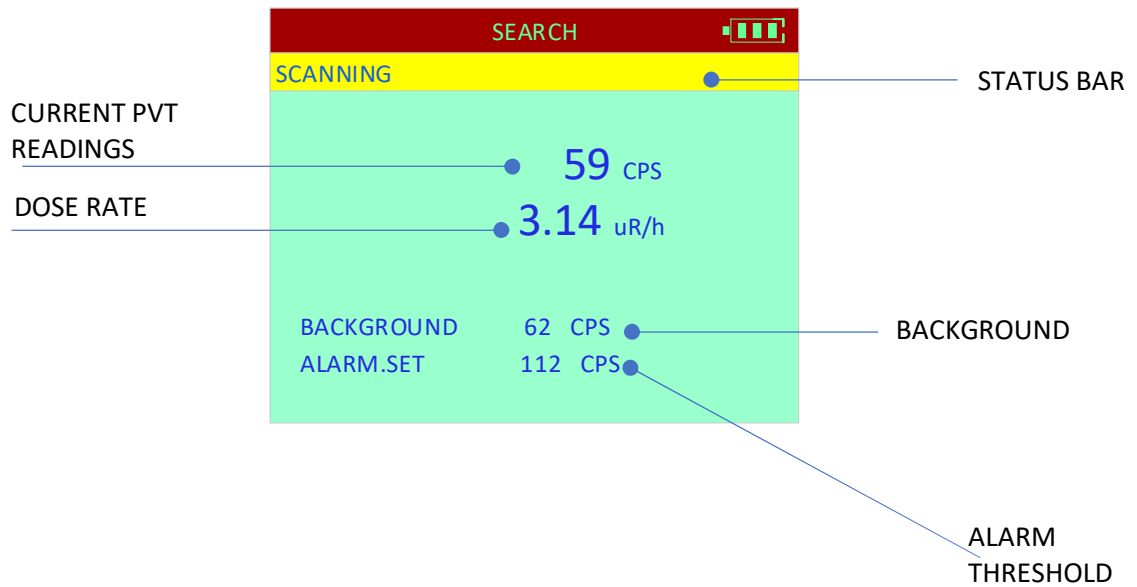


### 2.3.3 CALIBRATION REQUIRED

If the system requires calibration, 'CALIBRATION REQUIRED' will be displayed on the bottom of the System Test screen. This message will appear when LED test fails.

## 3.0 OPERATION

### 3.1 SCREEN READINGS



	Displays the current readings in CPS and Dose Rate/Exposure Rate.
BACKGROUND	Displays the background value learned during Power On.
ALARM THRESHOLD	Displays the alarm threshold. This threshold can be changed in the configuration screen. The RC22 Wand has 3 Alarm Threshold settings.

## 3.2 STATUS BAR

### 3.2.1 SCANNING

The RC22 wand is in normal operation. Ready for search and find.

### 3.2.2 CPS EXCEEDS THRSH!

This message is displayed when the RC22 wand is alarming. The RC22 wand alarms when the current PVT readings are higher than the ALARM SET.



### 3.2.3 HIGH DOSE RATE. MOVE AWAY!

When the dose rate reading is higher than  $10\mu\text{Sv/h}$ , this message is displayed.

### 3.2.4 SYSTEM IS OUT OF RANGE!

This message is displayed when the dose rate is higher than  $50\text{mSv/h}$ . In such case, the unit has overloaded its scanning capacity.

## 4.0 CONFIGURATION

To enter into the configuration screen, hold the joystick down for 2 seconds. After 2 seconds it displays the Configuration screen.

The configuration screen displays settable options. To navigate these options, use the buttons **UP/DOWN**. Clicking the button **UP/DOWN** highlights the setting to change.

Using the button **RIGHT/LEFT** on the selected options changes the setting.

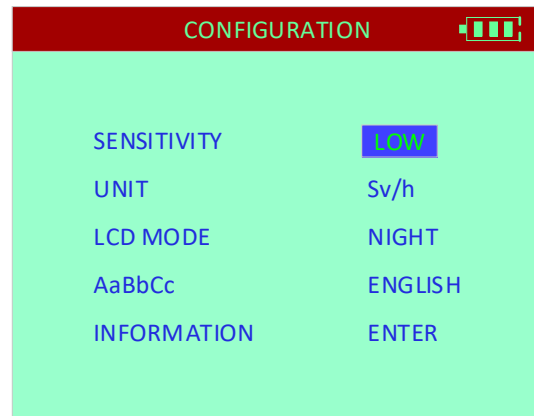
Once the changes are made, **HOLD DOWN** to save.

The configuration screen displays the following options.

### 4.1 SENSITIVITY

There are 3 alarm thresholds, which correspond to the level of sensitivity, normally LOW, MED and HIGH. Low level threshold equals to 12 Standard Deviation of ambient background ( $12\sqrt{BG}$ )+ambient background.

LOW	$BG + 12\sqrt{BG}$
MED	$BG + 8\sqrt{BG}$
HIGH	$BG + 4\sqrt{BG}$



### 4.2 UNIT

Unit toggles between R/h or Sv/h.

### 4.3 LCD MODE

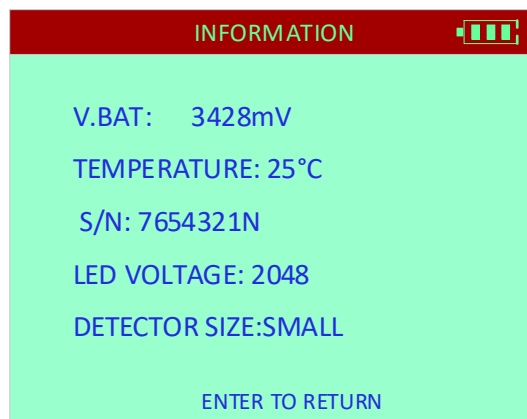
Toggles the display between NIGHT and DAY.

### 4.4 LANGUAGE (AaBbCc)

Currently, English only.

### 4.5 INFORMATION

INFORMATION provides the User with detailed information about the systems Operational parameters.



## APPENDIX 1: BATTERY RECHARGING

The battery symbol shows three blocks indicating the approximate remaining power. When the battery power is at approximately 40 minutes left, the RC22 Wand will issue a short beep once every 1 minute and the last battery block will flash. Remove the two high capacity “D” cells from the RC22 Wand by unscrewing the bottom cap. Place in two fully charged “D” cells into the unit and screw the cap tightly in place. Place the discharged batteries into the charger and plug in the charger. The batteries supplied with the unit usually take about 10-14 hours to charge fully and last for about 15 hrs on a full charge. Two sets of batteries are supplied with the unit so that one set can be ready charged or charging, allowing the Wand to be used continuously.

## APPENDIX 2: LIST OF EQUIPMENT SUPPLIED

Wand Carrying Case

NiMH Battery Charger with cord

2 Spare High Capacity “D” Batteries

1 Spare Rubber End Cap Protector

RC22 Wand Radiation Detector

1 Rubber End Cap Protector installed

2 Installed High Capacity “D” Batteries

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## APPENDIX 3: WAND HEIGHT ADJUSTMENT

The RC22 Wand radiation detection system features an adjustable length rod that allows the user to adjust the length of the detector. The detector can be incremented in steps of 15 cm (6 inches) each, providing the user with a length ranging from

124 cm (49 inches) to 173 cm (68 inches) - Standard

173 cm (68 inches) to 251 cm (99 inches) - Long

To adjust the length of the detector the operator needs only to press the button on the adjuster and slide the unit to the appropriate height. The length will automatically lock into place when the length meets one of the preset hole settings.

## APPENDIX 4: RADIATION SAFETY PROCEDURE

A qualified radiation safety professional should be consulted and a formal response to radioactive sources should be developed. The following section, Reacting to High Counts, is provided as a guideline only in helping develop this procedure. RadComm is not responsible for any use or misuse of the RC22 Wand.

## APPENDIX 5: REACTING TO HIGH COUNTS

Table one shows the action to take relative to the counts displayed on the RC22 screen. When approaching a suspected source, the RC22 Wand must always be held between the operator and the suspected source. When sources are to be isolated, an appropriate container for radioactive sources must be used.

Low indicates that the source may be safely approached and removed from the area. Under no circumstances should an enclosed source be further exposed or opened. Caution indicates that the source may be hot and should only be handled by a qualified radiation professional. Isolate indicates that the entire load should be isolated with no attempt to remove the source. Only qualified radiation professionals should attempt to isolate and remove the actual source.

SMALL (2 inch diameter) Readings in CPS	LARGE (3 inch diameter) Readings in CPS	Distance From Contact Of The Source Of Radiation Measured In Meters				
		On Contact	< 1m	< 2m	< 5m	> 5m
1 to 1,800	1 to 3,960	LOW	LOW	CAUTION	UNUSUAL	ISOLATE
1,801 TO 3,600	3,961 TO 7,900	LOW	CAUTION	UNUSUAL	ISOLATE	ISOLATE
3,601 TO 10,750	7,901 TO 26,650	CAUTION	CAUTION	ISOLATE	ACTION	ACTION
10,751 TO 28,750	23,651 TO 63,250	ISOLATE	ISOLATE	ACTION	ACTION	ACTION
>28,751	>63,251	ACTION	ACTION	ACTION	ACTION	ACTION

**Table 1: CPS and Action to Take**

## APPENDIX 6: WARRANTY

RadComm RC22 Wand is warranted to be free of defects in material and workmanship for a period of one year from date of shipping. This warranty covers parts and labour only. RC22 Wand must be returned to RadComm for repair at the customer's expense. This warranty covers system malfunctions that fail under normal operating conditions and does not include failures caused by negligence, abuse or accidental damage. This warranty is void if factory applied serial numbers have been removed or altered. Use of the RC22 Wand or components for purposes for which they were not intended voids the warranty. This warranty is limited to repair or replacement of RadComm components only and does not cover business losses resulting from the use of RadComm systems howsoever caused. The rechargeable batteries are not covered by this warranty.

## APPENDIX 7: GUIDE FOR USING RECHARGEABLE NIMH BATTERY

**(Standard Safety Precautions Must Be Followed)**

### **NiMH Battery Charging Precautions**

- When you reach the early last battery indicator, it is telling you to charge the battery soon. When the low battery flashing and audio warning beeping is heard, you **MUST TURN OFF** the wand and charge the battery. Do not wait until the wand shuts itself off because battery damage may occur.
- It is recommended to check the battery indicator on the screen regularly.
- Never charge the battery in an environment greater than 35°C or less than 0°C. The battery will not charge properly if the environment temperature is above 35°C or below 0°C.
- Charge the battery in an open ventilated area and far away from combustible items. Always charge the batteries on surfaces that are not flammable. Do not charge a full battery again.
- Never use an electrical outlet whose voltage is outside the rating marked on the AC adaptor. Doing so can create the danger of fire or electrical shock.
- Never try to modify the AC adaptor power cord, or subject it to sever bending, twisting, or pulling. Doing so creates the risk of fire and electrical shock.
- Never touch the AC adaptor while your hands are wet. Doing so creates the risk of electrical shock.
- For indoor use only. Keep the charger away from water and other liquids and never let them get wet. Moisture creates the danger of fire and electrical shock.

- Should you ever notice smoke or a strange odor coming out of the charger, immediately unplug the charger from the power outlet. Using the charger under these conditions creates the danger of fire and electrical shock.
- To reduce the risk of electrical shock, unplug the charger from the outlet before attempting cleaning or when not in use.
- Do not use solvents to clean the unit. It may damage the surface and the plastic parts of the unit. Clean the unit gently with soft dry cloth only.
- Never try to open the case of the charger or attempt your own repairs. High voltage internal components create the risk of electrical shock when exposed.
- Charge NiMH rechargeable batteries only. Do not charge any other kind of batteries not specified as they may burst and cause personal injury and damage.

### **NiMH Battery Handling Precautions**

Incorrect use or handling of batteries can cause them to leak or burst or cause serious damage to your charger. Be sure to note the following important precautions to avoid problems with batteries.

- Never, under ANY circumstances, let the positive and negative battery leads touch. It can lead to cell damage or fire.
- Always make sure that the battery polarity is correct. The + and – as marked on the batteries should match the markings on the charger itself. Improper loading of batteries, creating the danger of personal injury property damage.
- Do not expose batteries to direct heat or dispose of them by burning. Doing so can create the danger of explosion.
- It is normal for batteries to become warm as they charge or discharge.
- If electrolyte from the battery enters eyes, immediately wash eyes with running cold water and get medical attention.
- Please recycle the batteries when they reach the end of their life cycle.
- Charging time: 10~14 hours.