CT007-M
User's Manual

Serial Number 100 and Higher

Environmental Instruments Canada Inc.
http://www.eic.nu

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1 Introduction

The CT007-M microR meter is a very sensitive gamma radiation detector intended for measuring low levels of radiation or for locating sources. The CT007-M is a small and light instrument with a small sensor housing on the back of the unit. The CT007-M can be used independently as a stand-alone device, or it can be wirelessly connected to the GammaGuard smartphone App using Bluetooth Low Energy.

When the CT007-M is connected to the GammaGuard app, readings are displayed on the smartphone. This allows measurements to be taken in locations not in direct line of sight of the device display. A telescoping handle is available for probing at a distance. The smartphone can be mounted to the handle, enabling one-handed operation. The Smartphone provides a large display with access to a feature-rich GammaGuard app. The Bluetooth connection has a range of approximately 40 meters. The telescoping handle can be extended with an ordinary painter's pole. The GammaGuard app allows you to save data to a file on the smartphone and upload to other platforms. Earphones connected to the smartphone can be used to improve the ability to hear beeps or alarms in noisy environments.

2 Device Overview

Figure 2.1 CT007-M Front Face Plate

An overview of the front and back face plates, and controls is given in Figure 2.1 and 2.2. The CT007-M controls include:

1. OLED Screen – displays readings in units of CPM, µSv/h or mRem/h, and detector information;

Figure 2.2 CT007-M Side and Back View

2. Buzzer – a beep tone represents multiple detected counts. “Count tones” can be enabled or disabled on the GammaGuard app. “Counts per Tone” can also be configured. A value of Ten (10) is reasonable for background radiation. The device also beeps if the battery is low;

3. Button – ***short press*** (up to 2 seconds) to toggle the screens and ***long press*** (2 to 9 seconds) to wake the device or put the device into low power sleep mode;

4. LED – blinks at the same frequency as configured for the tone indicator. You can enable or disable the “count light” through the settings on the GammaGuard app;
5. Battery Door – see “Battery Change” section for changing batteries;
6. Sensor Housing – The centre of the detector is the centre of the Sensor Housing indicated by the yellow ‘X’ in Figure 2.3.

Figure 2.3 CT007-M Back

3 Basic Operation

Basic operation of the CT007-M is as follows:

1. Power unit on by long pressing (2 to 9 seconds) the button on the front face plate.

After a few seconds, the indicator light will illuminate for one second and the display will start showing the readings.

2. The CT007-M detector is now operating! By short pressing (up to 2 seconds), step through the screens for different measurement unit readings.

The detector will now automatically start radiation detection. The OLED screen has 4 screen displays:

1) Count Rate (CPM, CPS)
2) Dose Rate (μSv/h or mRem/h)
3) Total Counts and Total Dose (C, μSv or mRem)
4) Device Information (name, mac address, version number & battery percentage)
5) Screen Off to save battery. The detector is still operating while the screen is off.

Individual screens, except the blank screen, can be disabled from the app.

4 App Usage

The CT007-M can be wirelessly connected to *GammaGuard*, via Bluetooth Low Energy to:

- View detailed and interpreted detector data
- Switch measurement display modes between count rate (CPM, CPS) and dose rate (μSv/h, mRem/h)
- Set alarms for elevated levels
- Change device settings, such as the conversion factor, enabling device count tone or device alarm
- Log your data with GPS coordinates
- Update your detector firmware

GammaGuard is available for both Android and iOS system.

For iOS users, search the App Store and install the "GammaGuard 2.0" app. ***It has to be 2.0*** to work with the newer devices.

For Android, search the Play Store and install the "GammaGuard" app. ***Don't use the "Legacy"*** version, it does not work with the newer devices.

For both Android and iOS, you can go to www.gammawatch.com and follow the links on home page to get to the correct version of the app.

When prompted, allow the app to use Location Services. It will not work without!

Figure 4.1 App Icon

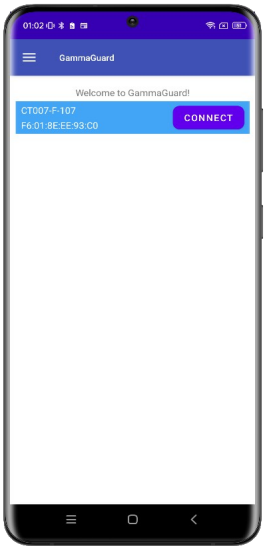

Figure 4.2 Detector Type Select

Click the *GammaGuard* app icon. It shows the welcome screen as in Figure 4.2.

The app will direct the user to the “Connected Devices” screen. All nearby supported Bluetooth Low Energy devices will be listed. Choose the device called “CT007-M-##”, where ## is the unit number for the detector.

Upon connecting, the device display on CT007-M will be turned off automatically and the user will then use the smartphone UI for display. Short pressing the button will turn the device display back on while it’s connected to the smartphone.

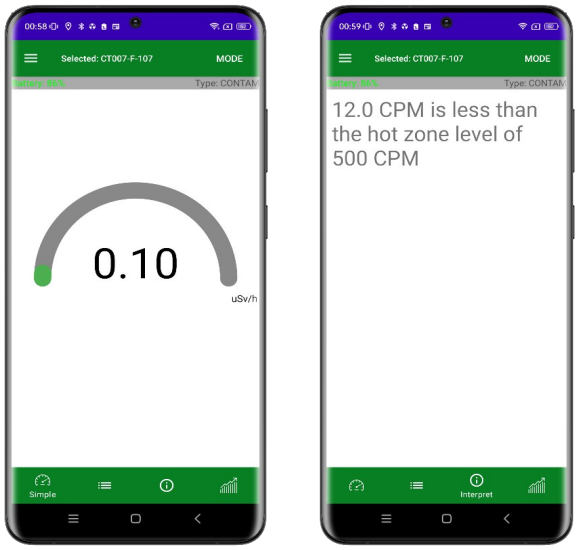

Figure 4.3 “SIMPLE” & “INTERPRET” Screens in Gamma mode

Upon successful connection, the simple dose rate gauge is displayed, similar to left figure in Figure 4.3. Available display options are ***Simple***, ***Detailed, Interpret and Graph***.

The ***Interpret*** screen interprets the current dose rate for non-technical users.

The MODE switch, located in the top right of the status bar, allows you to switch between the ***Dose Rate*** (μSv/h, mRem/h) and ***Count Rate*** (CPS, CPM). The selected operational units are applied to the other displays

Tapping the menu icon ≡ on the top left corner, brings up the GammaGuard app menu, seen as the left figure in Figure 4.4. You can chose options including “App Settings” and “Device Settings” (CT007-M). Updated device settings are in effect until the batteries are removed from the device.

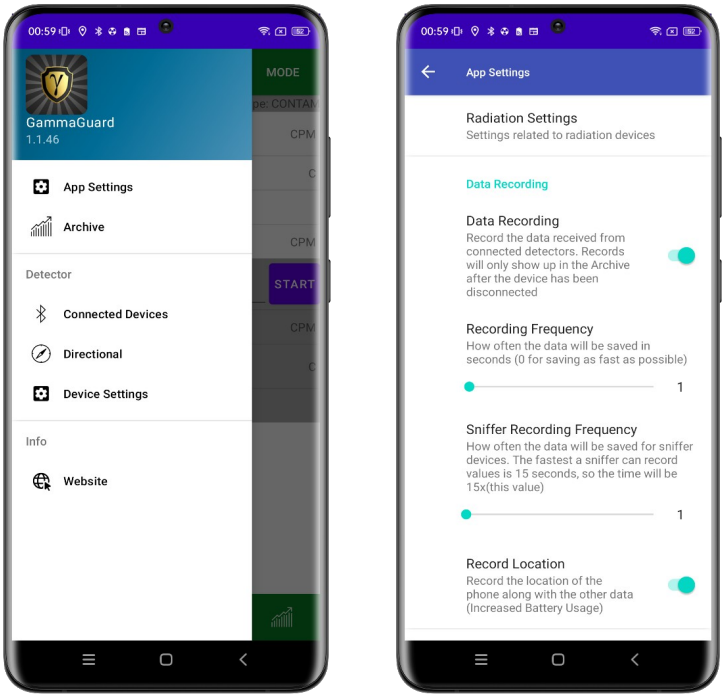

Figure 4.4 Menu Bar and Setting Screen

5 Changing Batteries

The CT007-M uses two AA batteries. Follow these steps to replace the batteries:

1) Unscrew the battery door screw;
2) Open the battery door;
3) Replace two AA batteries;
4) Close the battery door, make sure the hinge catches;
5) Drive the battery door screw back in while holding the door closed with your thumb.

Note: It is good practice to remove the batteries if the device is to be stored for more than two (2) months.

6 Other Useful Information

6.1 Data Logging

By checking “Data Recording” in settings, measurement data will be saved on the smartphone and can be graphed and exported. Adjusting the “Recording Frequency” in settings allows users to set how often data is saved.

6.2 Data Share by Email

If you would like to share the data, from the Archive menu, identify the data you wish to share. Select “Export,” followed by the preferred data type, **and** the ‘share’ option. Then select “Export” to proceed. You will be prompted to save the data locally as a file, then your method to share. If you select “email”, your email app will open and the saved file will appear as an attachment. (This assumes that you have previously configured your email application.)

6.3 (Optional) External Accessory Kits

A telescoping handle is provided for access at a distance. The smartphone can be clipped to the handle, enabling one-handed operation. The Smartphone provides a large display with access to a feature-rich menu.

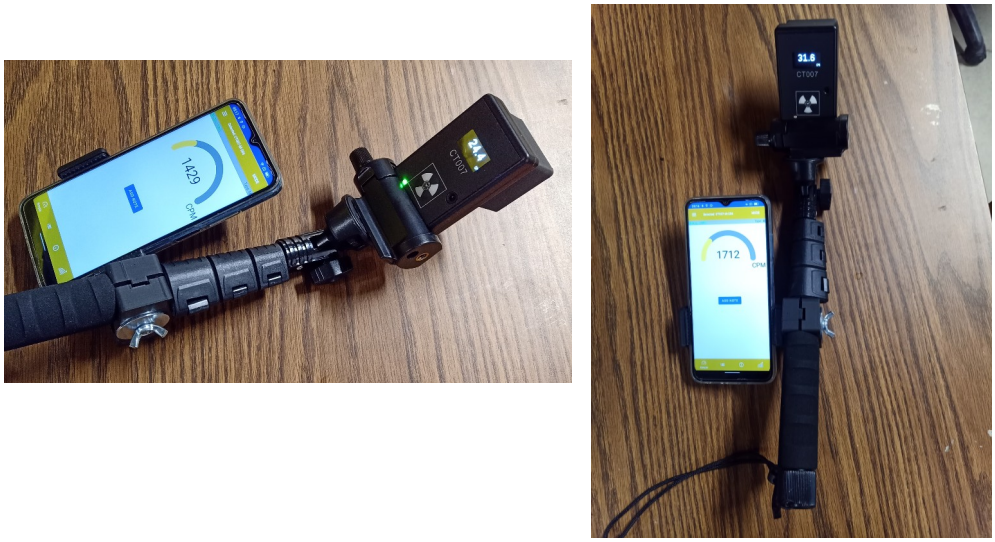

Figure 6.1 Telescope Handle

To attach the CT007-M to the telescope handle, loosen the clip by turning the wheel on the side. Once the CT007-M is in place, use the wheel to tighten the clip around the device.

Figure 6.2 Telescope Handle Detector Attach Joint

The Bluetooth connection to your Smartphone has a range of approximately 40 m and the telescoping handle can be extended with an ordinary painter pole.

Figure 6.3 Painter Pole Attached

6.4 One Year Limited Warranty

This limited warranty applies to CT007 series radiation detectors, purchased from Environmental Instruments Canada Inc. or authorized vendors.

Warranty covers defects in material or workmanship under normal use for a period of one year after receipt of the product. During this one year period, EIC Inc. will repair or replace the product at no charge.

**Exclusions: This warranty does not cover damage caused by abuse, neglect, or misuse. This includes damage from drops, or impact. The warranty will be rendered void if the product has been repaired or altered by anyone other EIC Inc.*

There are no warranties, express or implied, including without limitation any implied warranty of merchantability or fitness. If the product does not perform as warranted herein, purchaser's sole remedy shall be repair or replacement, at the option of EIC Inc. In no event will EIC Inc. be liable for damages, lost revenue, lost wages, or any other incidental or consequential damages, arising from the purchase, use, or inability to use product.

To obtain this warranty service, please contact us at: admin@eic.nu.

7 Support and Contact

7.1 Troubleshooting/FAQ

If you have any difficulty with the product or questions, please visit our troubleshooting and frequently asked question pages on our GammaWatch website:

http://www.gammawatch.com/trouble-shooting/

http://www.gammawatch.com/frequently-asked-questions/

7.2 Contact Us

If you are unable to find the information you are looking for on our website or you need further assistance and technical support, please don't hesitate to contact us.

Phone	+1(306) 974-6055
Online Contact Form	http://www.gammawatch.com/contact-us/
E-mail	admin@eic.nu
Facebook Group	CT007 Users Group
Address	202-135 Robin Cres. Saskatoon, SK S7L 6M3, Canada

8 Safety Information

1. It is the end users' responsibility to follow local country regulations, including operation within legal frequency channels, output power, cabling requirements.

2. Before you work on any Environmental Instruments equipment, be aware of the hazards involved with electrical circuitry, and be familiar with standard practices for preventing accidents. The installer should be familiar with network structures, terms, and concepts.

3. Keep this product away from water, fire, humidity, or hot environments.

4. We cannot guarantee that no accidents or damage will occur due to the improper use of the device. Please use this product with care and operate at your own risk!

5. Not certified for use in an explosive atmosphere.

6. In the case of device failure, please disconnect it from power. The fastest way to do so is by removing the batteries.

7. Improper use of device battery may result in fire or explosion. Do not heat, open, puncture, mutilate, or dispose of your device or its battery in fire. Do not leave device in direct sunlight for an extended period of time. Doing so may cause damage or melt the battery.

8. Do not try to repair of modify the device yourself. Opening and/or repairing your device can present electric shock, device damage, fire, personal injury, and other hazards.

9. This device should not be used by children.

10 FCC Information

Federal Communication Commission Interference Statement

FCC ID: X8WBT832

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Exposure to Radio Frequency Radiation: This Environmental Instruments Canada Inc. equipment complies with the FCC radiation exposure limits set forth for an uncontrolled environment.

Innovation, Science and Economic Development Canada

FCC ID: 4100A-BT832

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science, and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : 1) L'appareil ne doit pas produire de brouillage; 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Les dispositifs fonctionnant dans la bande de 5 150 à 5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Exposure to Radio Frequency Radiation: This Environmental Instruments Canada Inc. equipment complies with the FCC radiation exposure limits set forth for an uncontrolled environment.
Exposition aux rayonnements de radiofréquence : cet équipement Environmental Instruments Canada Inc. est conforme aux limites d'exposition aux rayonnements IC définies pour un environnement non contrôlé.

CE Compliance

CE Declaration of Conformity: Hereby, Environmental Instruments Canada Inc. declares that the radio equipment type CT007-M is in compliance with Directive 2014/53/EU and 2011/65/EU (RoHs), including Commission Delegated Directive (EU) 2015/863. The full text of the EU declaration of conformity is to be provided by request.

This Environmental Instruments Canada Inc device meets Maximum TX power limits per ETSI regulations. For more detailed information see Declaration of Conformity.

Max Transmit Power: 1.42 dBm
Exposure to Radio Frequency Radiation: This Environmental Instruments Canada Inc equipment complies with the European Union radiation exposure limits set forth for an uncontrolled environment.

Manufacturer: Environmental Instruments Canada Inc, 135 Robin Cres., Unit 202 Saskatoon, SK Canada S7L 6M3

Product Specifications:
Powering Source: 2x AA Batteries
Nominal Battery Voltage: 1.5V
Battery Operating Temperature Range: -20°C to 54°C (-4°F to 130°F)
Product Operating Temperature range: -10°C to 40°C