



GQ GMC-500/GMC-500+ Geiger Counter User Guide



GQ Electronics LLC

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Overview

The GQ GMC-500/GMC-500+ digital Geiger Muller Counter is designed to be a portable and convenient device. It can be used as industrial, commercial maintenance, research, evaluation, simulation and other analytical or scientific applications in areas such as industrial plants, public utilities, universities, laboratories, and electronic repair shops. The device comes with built in audible and visual signals for the level of radiation detected. It can be used for radiation detection and monitoring both indoor and outdoor, as well as in other similar environments. It features automatic data recording. It can continually monitor the radiation and log the data each second into internal memory. When connected to a PC, software can download the radiation history data to the computer and the user is able to analyze those data later. The GQ GMC-500 installed a high contrast black/white LCD module, one front LED indicator and one analog data port. The analog data port can be connected to any third party device application as data input.

The GMC-500 installed a WiFi module, user is able to log the data via WiFi wirelessly.

The GMC-500+ installed a second high dose sensor tube to ensure the detection range up to ten times higher.

The device is equipped with an USB port, utilized for communication and external power supply/charging of the internal rechargeable Li-Ion 3.6V/3.7V battery.

The internal rechargeable battery can be charged with the a standard USB port, USB charger or with a computer USB port. Using the external power, continuous data monitoring is possible. Using either power adapter you will not have to worry about the batteries charge condition or any data loss.

The main board also has a real time clock on board for time related data logging purposes.

The GMC-500+ installed multiple sensors to ensure full scale/range measurement and higher accuracy. .

Specifications:

Range of dose rate indications, $\mu\text{Sv/h}$	0.00 to ~4250 (0.00 to ~42500 on GMC-500+)
Range of exposure dose rate indications, mRem/h	0.00 to ~425 (0.00 to ~4250 on GMC-500+)
Range of registered beta radiation energy MeV	0.25 to 3.5
Range of gamma radiation energy, MeV	0.1 to 1.25
Range of registered X-ray radiation energy MeV	0.03 to 3.0
Reproducibility of indication	10%
Alarm levels by CPM	0 to 655350 (continuously) 0 to 982980 (GMC-500+)
Alarm levels by $\mu\text{Sv/h}$	0.00 to 4250 (42500 on GMC-500+)
Alarm levels by mRm/h	0.00 to 425 (4250 on GMC-500+)
Date indication	YYYY-MM-DD (continuously)
Time indication	HH-MM-SS (continuously)
Elapsed time indication	99 years(maximum)
Timed Count	1 Second to 256 days(programmable)
Scheduled Timed Count	0 Second to 256 days(programmable)
Radiation detection	β, γ, x
Detectable Radiation Range	0.1 ~ 3 MeV
Instrument Background	< 0,2 pulses/s
Working Voltage	3.6-3.7V
Display	LCD dot matrix, back lighted
On board Memory	1M Bytes flash memory for data storage
Power: Consumption	25mW – 125mW (count rate dependant)
Power: Supply	3.7V Li-Ion battery / USB power
Dimensions	135 x 78 x 25 mm(5.25"x 3" x 1")

Packing List:

1. GMC-500/GMC-500+ main unit.
2. USB cable
3. Quick start guide
4. Download link for SoftGeigerCounter software and USB driver for Windows 32 and 64 bits (see Quick start guide)
5. Download link for a complete user guide in pdf version.

How it works?

The GQ-500/GMC-500+ Geiger Counter installed Geiger tubes to detect radiation.

When the radiation pass through the Geiger tube, it triggers electrical pulses for the CPU to register as count. The basic count rate unit is CPM(Count Per Minute). The CPM count rate indicates the radiation level and it can be converted to a other traditional radiation units, such as $\mu\text{Sv/h}$ or mR/h .

After unit turned on for one minute, it will show the background radiation reading. The background radiation reading (in CPM) indicates the nature radiation detected at that minute. This reading may change from time to time and location to location. To get accurate reading, user may need to get an average value over a longer time period.

The GM-500 built-in intelligent algorithm always select one of the most adequate sensors to measure the target, so that to guarantee the accuracy of the measurement.

Caution

1. Avoid doing measurements when battery low.
2. Do not get the Geiger counter wet. Use sealed plastic bag to void wet.
2. Avoid doing measurements in direct sunlight.
3. Avoid directly contact the radioactive material. Use sealed plastic bag if needed.
4. Turn off the unit when not in use.
5. Keep it in a protective pouch after use.
6. When the unit not in use, store it in a dry place or box. This will avoid mechanical part be oxidized, such as button or battery contacting points.

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Background Safe Levels

Suggested background readings levels:

1. **Safe level.** Less than 50CPM or $0.325\mu\text{Sv/h}$. Means no worry at all.
2. **Attention level.** 51CPM – 99CPM. OR $0.326\mu\text{Sv/h}$ – $0.65\mu\text{Sv/h}$. Means you need to find out why .
3. **Warning level.** More than 100CPM or more than $0.65\mu\text{Sv/h}$. Means do not stay in this area for long period.

Hardware setup

There are four buttons on the front of the unit: **S1, S2, S3 and S4 (from left to right)**

1. Power up the unit. Pressing the S4 (power) key for 3 seconds will turn on the unit. Check the battery level. Charge the battery fully when first time use. It may take a few hours to get the battery fully charged. Check the battery icon on the display, a fully charged battery icon will be filled with solid color, without flashing.
2. Set date/time. Press the S4 key to enter the menu and set the date and time. This is very important for time stamping the recorded data. Do not skip this step. Most of the data are related to the date and time.
3. Set the backlight timeout in second, in order to minimize the power consumption. Set the power savings mode. If the power savings mode is ON, then the LCD display will be turned off after 30 second if no key is being pressed during this period.
4. Now the unit is ready to use. You should see the background CPM rate in absence of a radioactive source.

Note: There is a transparent protective sheet covering the units surface. Users need to remove it to get better view of the LCD display.

Software

Before connecting the GMC-500/GMC-500+ Geiger Counter to a computer, download the application software and install the USB driver.

1. The unit needs an USB driver in order to communicate with the application software. Running **GQGMCGeigerCounterUSBDriverV4.exe** will install the USB driver.
2. GMCDataViewer.exe is for viewing the data on a computer.
3. SoftGeigerCounterGMC500.exe is a soft copy of GMC-500 demo software.

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