

Application Note

Gamma Nuclide Identification System— GSearch

Electronic Enterprises (I) Pvt. Ltd. , Para Electronics—Manufacturing Division

INTRODUCTION

We are running out of conventional energy sources. To overcome this problem Nuclear energy is very good solution for it, if it is used in a controlled environment. But on the other side the nuclear radiation is also hazardous to mankind. In the nuclear reaction, Gamma rays are most dangerous form of radiation emitted by a nuclear explosion, because of the difficulty in shielding them. Excess Gamma radiation can cause to cancer and hereditary diseases. Because of the gamma rays' penetration power and ability to travel great distances, it is considered the primary hazard to the general population during most radiological emergencies.

We need specialized equipment to detect the gamma radiation with the information

like the dose rate as well as the energy. Higher the Nuclear energy higher is the hazard. We cannot see or feel radiation hitting our body. However, we should have some kind of instrument to indicate the radiation levels.

sion of Electronic Enterprises (I) Pvt Ltd., to cater this requirement. GSEARCH is battery operated, portable, handheld instrument, equipped with 2"X2" NaI(Tl) detector with 1K Multi Channel Analyser.

GSEARCH consists of ARM Controller, Successive Approximation ADC, Spectroscopy amplifier, preamplifier and High Voltage. High speed ADC enables GSEARCH to respond dose rate upto 30K Hz. Its colour touch screen 320X240 pixel LCD displays various modes of GSEARCH like Gross Mode, Expert Mode and identification mode.



Gamma Nuclide Identification system Model GSEARCH is manufactured by Para Electronics Manufacturing Divi-

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GSEARCH ...

- Portable, standalone 1K MCA with 2" x 2" NaI(Tl) detector
- Useful for Low as well as High dose rate application
- Various operating modes improves capability of the unit
- GPS utility to store location details

ABOUT GSEARCH

GSEARCH, is a menu driven system based on WIN CE operating System. It can be interfaced with Ethernet, USB host and client, and SD card for data storage. Data storage enables the user to store the data and it can be retrieved and analysed later. Data transfer to PC/Laptop can be accomplished through Ethernet, USB etc.

GSEARCH consists of two detectors. For Low dose rate (upto 20mR/Hr) 2"X2" NaI(Tl) detector measures the dose rate. Use of 2"X2" NaI(Tl) detector improves the sensitivity of the unit. The moment dose rate crosses 20mR/Hr instrument automatically switches to GM Tube. High Dose rate is taken care by GM Tube. Use of two detectors serves the

measurement of low dose rate and high dose rate efficiently.

GSEARCH can also be equipped with GPS. This helps user to get dose rate information along with all the information like Latitude, Longitude, Altitude of the location and Time (from RTC of the unit).



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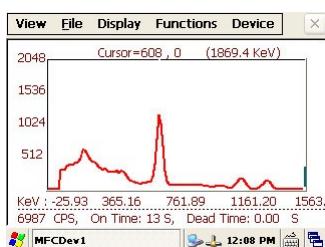
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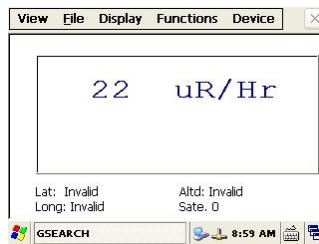
GSEARCH OPERATING MODES

Expert Mode (Spectrum Analysis Mode)



guish between the energies. In the identification mode it gives the name of the isotope along with its dose rate. It has built in libraries namely Industrial, Medical, Natural and SNM (special nuclear materials)

Dose rate Mode



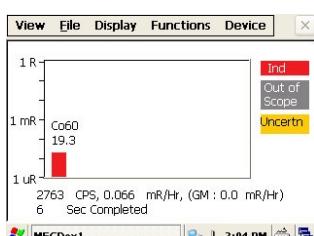
This mode enables user to carry out spectroscopy analysis of acquired spectrum. It provides all the functions required for spectroscopy application and gives information like peaks, FWHM etc.

Normally all the survey instruments exhibit the dependency of output on incident energy of radiation. It means identical dose rate generated by different isotopes generate different output depending upon the energy of the nuclide. This is mainly due to the response of NaI(Tl) detector. Typically, as the energy increases the response decreases. Hence, stan-

Typical Applications

- Nuclear Radiation Safety
- Health Physics
- Industrial
- Medical Research Labs
- Home Land Security

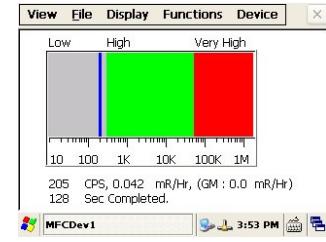
Identification Mode



GSEARCH is capable of doing spectroscopy, so it can distin-

dard survey meters are calibrated using either Cs137 or Co60 sources. GSEARCH, being able to detect the energy peaks, is able to compensate for this non linear response. Algorithm of GSEARCH is set such a way; it shows the corrected dose rate for all the energies. It shows the same dose rate (with in ± 5%) for all the different energies of same strength.

Gross Level Mode



In this mode, unit shows count rate in Log Scale.