Model GSearch – Gamma Nuclide Identification System

Gamma Nuclide Identification System named as GSEARCH, is the recent addition to the nuclear instruments offered by Para Electronics Manufacturing Division of Electronic Enterprises (India) Pvt. Ltd. GSEARCH offers users a state of art design of a portable, handheld, battery operated instrument equipped with a 51mm dia x 51mm thick NaI(Tl) detector with 1K Channel MCA.

Micro processor based, high speed, Successive Approximation ADC allows user to use GSEARCH for high dose rates ranging up to 50 KHz. A 320 X 240 pixel, colour LCD shows a crisp display of spectrum, dose rate and the identification screens. Menu driven system based on WIN CE OS and touch screen design, make the operation of GSEARCH user friendly. Data storage on SD card enables storage of spectra for later use.

The key feature of GSEARCH is the identification of Gamma Radio Nuclides. 4 groups of Library based nuclides are provided for search. A very efficient algorithm for detection and display of radio nuclides either for single or multiple peaks, enables GSEARCH to complete the detection and identification within few seconds depending upon the incident dose rate.

Typical Applications

- Emergency Response
- Radiation Safety
- Health Physics
- Industrial and Medical
- Homeland Security
- Research Laboratories

Specifications (GSearch)

Performance Specifications

Dose rate range	:	10 µR/Hr to 1 R/Hr
Dose rate Units	:	µR/Hr or µSv/Hr, user selectable
Minimum Detection Limit	:	2.5 µCi of Cs137 at a distance of 50 cm in 20 seconds 1 µCi of C060 at a distance of 50 cm in 20 seconds
Sensitivity for Cs137 Source	:	>500 CPS/µS/Hr
GM Tube sensitivity	:	1.5 CPS/mR/Hr
Background	:	6-10 µR/Hr

Technical Specifications

NaI(Tl) Detector :

51 mm dia x 51 mm thick NaI(Tl) Crystal, NaI(Tl) Detector Integral Assembly with 14 pin socket
PMT : NaI(Tl) Crystal mounted on 2" dia PMT with wrapped mu metal shield
Resolution : 8% or better at 662 KeV
Internally Mounted

GM Detector

Energy Compensated GM Tube
Size 25.4 mm L x 13.5 mm dia
Internally PCB mounted

HV Supply

0 to 1200 VDC software programmable
Temperature coefficient +/-0.01% / deg C

Voltage divider for NaI(Tl) detector

12 stage, Wired 14 pin Socket

Preamplifier

Rise time	:	Less than 100 nSec
Fall Time	:	50 µ Sec
Polarity	:	Positive

Spectroscopy Amplifier

1 µ Sec Semi Gaussian pulse shaping
Internal PZ adjustment
Software programmable Fine gain in 256 steps
Output 0 to 5V uni-polar semi Gaussian, Internally connected to ADC
Count Rate, Max 50 KHz

1024 channel MCA

10 bit Successive Approximation ADC with a clock frequency of 100 MHz
ADC Conversion less than 10 µS
Differential Non-linearity Less than 1%
32 bit data per channel
Control, acquisition, processing and display via on-board microcontroller
Software programmable LLD (0 to 5V) in 256 steps
Software programmable ULD (0 to 5V) in 256 steps

Processor based Single Board Computer

CPU	:	On Board Processor, 400 MHz
RAM	:	64 M Byte SDRAM, 32 bit Bus @ 100MHz Clock
Flash	:	512MB/1GB NAND Flash, 2 M Byte NOR with BIOS
Display	:	3.5" Color LCD-TFT, 1024x768, 64K colors
Interface	:	USB Host/Client, SD Card Interface
OS	:	Windows CE- 6

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Specifications (GSearch)

Display Modes
Spectrum
Dose Rate
Identification
Gross Level

Indicators
Red and Green LEDs for
Normal and Alarm condition
Audio Buzzer for alarm condition

Nuclide Libraries

Natural : ^{40}K, ^{226}Ra, ^{232Th}, ^{238}U

Medical : ^{18}F, ^{67}Ga, ^{51}Cr, ^{75}Se, ^{89}Sr, ^{99}Mo, ^{99m}Te, ^{103}Pd, ^{111}In, ^{123}I, ^{125}I, ^{133}I, ^{153}Sm, ^{201}Tl, ^{133}Xe

Industrial : ^{57}Co, ^{60}Co, ^{133}Ba, ^{137}Cs, ^{192}Ir, ^{204}Tl, ^{241}Am

SNM : ^{233}U, ^{235}U, ^{237}Np, Pu

Battery
Type : Li-Polymer, 5Volts/50WHr Universal Power Pack
Operation : At least 8 hours continuous operation on battery after fully charged condition
Charging Time : 3 ½ hours from 0% condition
Energy Meter : 0-25-50-75-100% displayed on demand

Mechanical
Enclosure : ABS or Powder coated Aluminium
Size : 261 mm L x 128 mm H x 148 mm W
Weight : 2.5 Kg
Climate Test : Compliant with IS-9000

GPS facility is available at extra cost. GPS co-ordinates (Longitude, Latitude & Altitude) are displayed on screen.
For field applications, GPS co-ordinates will be stored with dose rate in a file.

Expert Mode

Dose Rate Mode

Identification Mode

Gross Level Mode

Due to continuous R&D, specifications are likely to change without notice

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