

COUNTING DEVICE WITH Si SEMICONDUCTOR DETECTOR  
FOR SELECTIVE ALPHA ACTIVITIES MEASUREMENTS

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This paper describes a portable counting device with Si semiconductor detector for selective measurements of specific alpha activities.

Basic electrical characteristics of the device as well as the results of measurements are pointed out.

Device comprises a detecting module with a silicon surface barrier detector, an amplifier-shaper stage and an integral discriminator. The amplifier - shaper stage consists of a low-noise resistive feedback preamplifier, a pulse amplifier and a shaper.

Choice of the optimal time constants for the CR-RC shaper is based on detector and preamplifier noise as well as on the maximum counting rate. Energy discrimination level for integral counting and the detector supply voltage were determined in accordance with the optimization of the selective alpha detection conditions.

Supply voltage is obtained from a battery by means of a DC-DC converter and the device is designed for application in wide temperature interval.

Efficiency of alpha radiation detection for a thin  $^{239}\text{Pu}$  source was 19%. Background of the counting device was  $7 \cdot 10^{-4} \text{ imp s}^{-1}$ , while the background in the field of  $23 \text{ nC kg}^{-1} \text{ s}^{-1}$  gamma radiation was  $2 \cdot 10^{-3} \text{ imp s}^{-1}$ .