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RENA-Mini™

Unique solution for high-resolution multichannel gamma spectrometry development

The RENA-Mini™ is a multichannel ASIC platform that can be used for developing applications in:

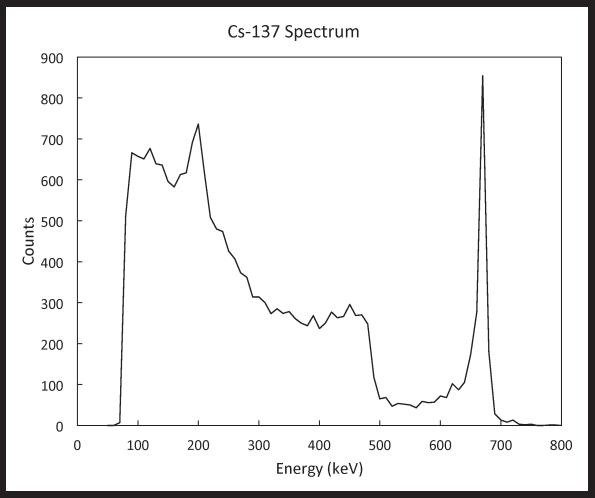
- High Energy Resolution Gamma Spectrometry
- High Dynamic Range Gamma Spectroscopy

The RENA-Mini™ development kit allows research for:

- Optimisation of detector design
- Application specific algorithm development
- Includes capability of charge sharing, depth and Compton corrections
- Detector timing

Benefits

- Easy to set up, flexible and customizable
- User configurable protocols
- Complete detector/ASIC system requiring only a computer for communication.
- Built in High Voltage supply can provide up 2000 volts
- Demountable Detector Fixtures available for fast detector interchange, does not require permanent bonding
- Available with light tight enclosure and carbon fibre window
- DLL available to work with LabView
- Powered entirely by USB
- Compact size: 46mm x 78mm x 168mm



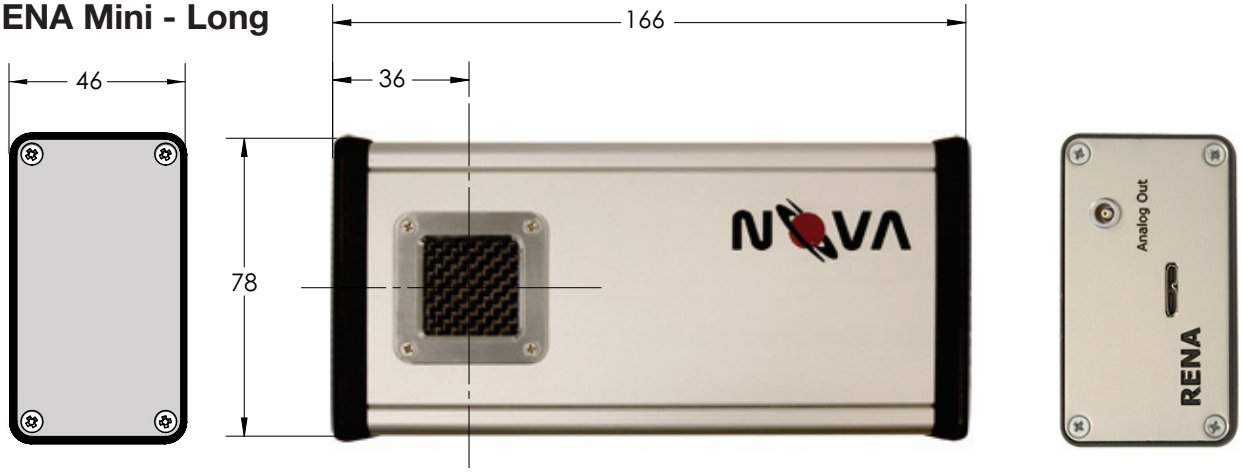
Optional Detector Specifications

- 20 x 20 mm detector with 8 x 8 pixel pattern (2.5 mm pitch) - Standard
- Thickness range 2-15 mm, 5 mm Standard
- Other sizes and pixel pitch patterns available
- Energy Range – 20 kHz to 3 MHz
- Energy resolution < 1% @ 662 keV
- Count rates up to 100kcps

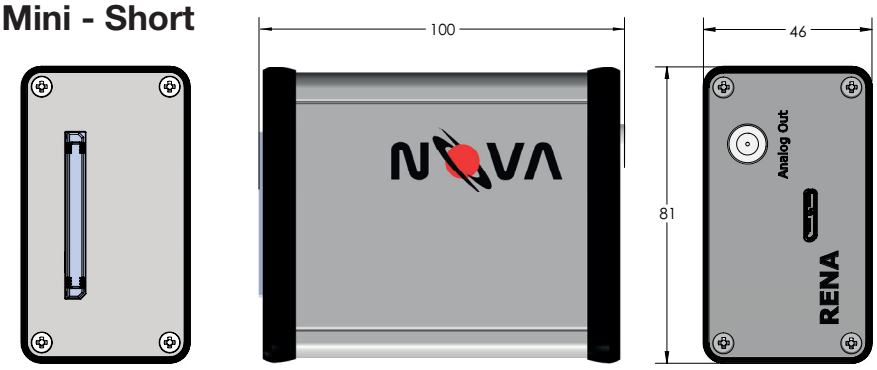
ASIC Specifications

- 72 independently configurable signal channels
- 16 selectable shaping time constants from 0.29 usec to 38 usec
- List mode data with 2.5 MHz timestamp clock
- Continuous feedback, channel is DC coupled to detector input, reset not required
- Input referred noise <250 e rms
- Signal linearity (input charge size to voltage output), +/-10%
- Two optimizations for detector capacitance (2pF and 9pF)
- Two input amplifier gain selections (9fC and 54fC maximum signal sizes)
- Two input amplifier feedback resistance selections (200MOhm and 1.2GOhm)
- Pole-Zero Cancellation with enable/disable control
- Selectable signal polarity on a channel-by-channel basis
- Power down enable/disable per channel
- Test signal input bussed to all channels, individual enable switch at each channel to connect test signal bus to input of channel via a small capacitor (75 fF)
- Selectable gain adjustment, 1.6x, 1.8x, 2.3x, and 5x per channel
- Two signal paths, one with a fast shaper filter for timing and one with a slow shaper filter for energy measurements
- Two adjustable 8-bit threshold DACs, one for each path in each channel
- Peak detector/follower circuit for slow path
- Timestamp circuit for fast path
- Two fully functional end channels that have internal nodes wired out as test pads to observe internal circuits functionality in more detail
- Capability to monitor in continuous (follower) mode the peak detector output of any given channel (for diagnostic use)
- Low-EMI signalling on all digital interfaces which must switch during signal acquisition, e.g., trigger, readout-initiate, reset
- Ability to wire several chips with simple scheme connected to a single controller
- Generalization of the “neighbour” readout mode using high-speed hit/read register to send hit pattern to and receive read pattern from external controller (FPGA). Sparse mode to work by default if no manipulation of the hit/read register is made during readout
- Differential analog output to allow direct connection between one or more RENA-3 ASICs and AD92xx or similar type A/D converters with only passive filter network
- Front-end saturation detection comparator senses large overload signals.
- Power consumption, <6mW/channel nominal

RENA Mini - Long



RENA Mini - Short



Kromek USA 833 Marlborough Avenue Suite 200 Riverside CA 92507-2133 USA
T: +1 (951) 781 7332 F: +1 (951) 781 4858 E: sales@novarad.com W: www.novarad.com

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