



Kromek GR1-A and GR1

Kromek GR1 User Guide

The GR1 is intended to be used in conjunction with the K-Spect and MultiSpect Analysis software running on a Windows-based (XP/Vista/7) personal computer.

The GR1 connects to the USB port of the computer. It is powered via the USB connection so no external power supply is required.

Inside the GR1, signals from the CZT detector are processed and digitized, and the digitized pulse height data is transferred to the computer via the USB.

The K-Spect software receives the data and performs the spectrum acquisition, display, analysis and storage functions. The GR1 and K-Spect software together form a complete gamma-ray spectroscopy system.

K-Spect can be downloaded by visiting www.kromek.com; click on the downloads tab and follow the on-screen instructions.

K-Spect Software Installation

1. Installing K-Spect software

- Open the “K-Spect Installer” zip file.
- Double-click or run the Setup.exe file.
- Follow the on-screen instructions.

2. Run K-Spect

Double click the K-Spect desktop shortcut or select the K-Spect program under the Windows Start menu. The K-Spect window will appear with a blank spectrum displayed.

GR1 Operation

Connect the GR1 to the computer’s USB port via an appropriate USB cable. A cable is supplied with the unit, but other standard USB cable with a mini-B 5-pin connector will work.

Within a few seconds, the K-Spect software will recognize the GR1 and indicate that the device is connected with a message in the status bar at the bottom of the K-Spect window.

After the GR1 is connected for about 1 minute, valid signals are generated and spectra can be acquired. However, for best performance, the unit should be allowed to stabilize for about 5 minutes before use.

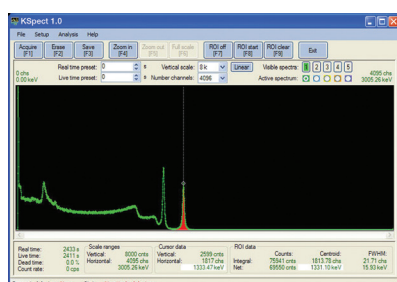
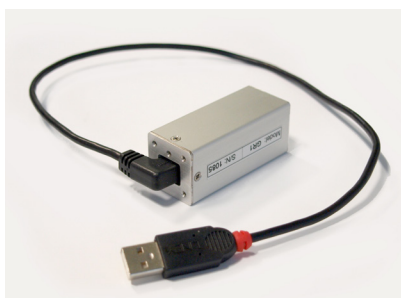
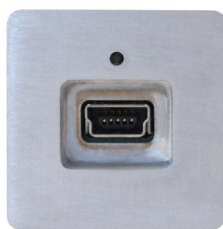
Click the “Acquire” button to start acquiring a spectrum.

The gain of the system is fixed so that the full spectrum is always acquired, with full scale (4096 channels) equals to slightly above 3 MeV. The LLD (lower level discriminator) can be set by selecting “Setup” and then “Set LLD”.

The cursor will change color to red and a “LLD” label will appear. Move the LLD as desired to cut out low-energy part of the spectrum or the noise peak. More details on the operation of K-Spect can be found under the ‘Help’ menu.



**GR1
Gamma Ray
Spectrometer**



Kromek GR1-A User Guide

The Advanced GR1 (GR1-A) is a USB-powered gamma spectrometer employing the same 1x1x1 cm³ co-planar grid CZT detector and electronics as used in the GR1 but having auxiliary input/outputs which greatly increase its operational flexibility.

In addition to the mini USB connector used to connect the device to a Windows based personal computer running the K-Spect or MultiSpect Analysis spectroscopy application, three MCX connectors are provided on the rear panel of the unit as shown below.

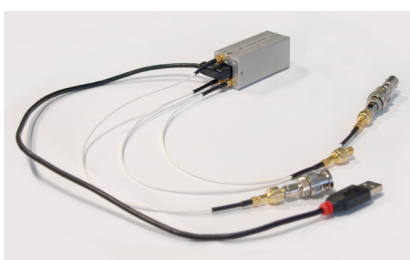
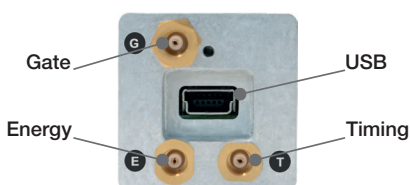


These connectors provide the following functions:

Energy output: Shaped and buffered detector output pulses with amplitude proportional to energy suitable as the input to an external MCA.

Timing output: A logic pulse triggered by each detected event and coincident with each output pulse.

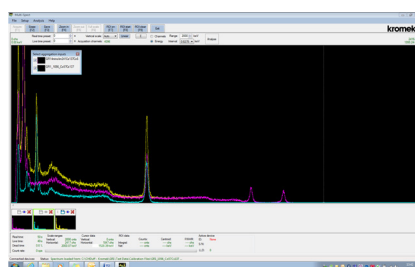
Gate input: Used to suppress pulse height output via the USB interface to K-Spect for anticoincidence. Energy and timing outputs are unaffected.



Details of the corresponding three signals are given below.

Software

MultiSpect Analysis is included on a flash disk and can be downloaded by visiting: www.kromek.com click on the downloads tab and follow the on-screen instructions. Please check for updates.



Specification (GR1 and GR1-A)



Detector	10mm x 10mm x 10mm CZT detector
Energy range	30 keV to 3.0 MeV
Energy resolution	<2.5% FWHM @ 662 keV
Electronic noise	<10 keV FWHM
Maximum throughput	30,000 counts/s
Number of channels	4096 (12 bit)
Differential non-linearity	< ± 1%
Power consumption	250 mW
Dimensions	25mm x 25mm x 63mm
Weight	60 gram
Temperature	0 - 40°C

Additional specification for GR1-A only



Energy Output	Rise time	3 μs
	Decay time	10 μs
	Output impedance	< 150 Ω
Timing Output	Shape	TTL compatible rectangular pulse
	Amplitude	4.5 – 5.0 V
	Duration	8 μs
	Output impedance	< 150 Ω
	Timing Resolution	< 100 ns
Gate Input	Threshold	3 V
	Maximum input voltage	5 V
	Input impedance	5 kΩ
	Timing	Input must be above threshold from at least 0.5μs before the energy signal maximum to at least 2μs after it.
	<i>Note: In the absence of any connection the gate input is held low and all pulses are processed normally.</i>	