**APPLICATIONS**

- **High Resolution Gamma-ray Spectroscopy:** Compact solution for HPGe portable or special configurations.
- **Scintillation Detectors:** Scintillator/photodiode and scintillator/photomultiplier combinations.
- **Neutron / Gamma Discrimination:** Particle ID with CsI or other detectors.

**OVERVIEW**

The microDGF is a complete, low power digital pulse processor the size of a credit card. This variant of the microDXP is specifically designed for use with high resolution gamma-ray detectors, such as HPGe. It replaces both the spectroscopy amplifier and MCA functions, and is intended for both portable and embedded applications. Digital filtering is implemented in a field programmable gate array (FPGA), and a digital signal processor (DSP) controls the MCA and onboard memory. All operating firmware is stored in non-volatile memory and is factory preloaded, but can also be upgraded in the field. The microDGF differs from the microDXP by providing a 16k channel MCA and front-end analog circuitry designed to match the low noise and high dynamic range of HPGe detectors. Most other gamma-ray detector types (solid state or scintillator) can be operated successfully with either the microDGF or microDXP.

**FEATURES**

- Digitization: 14 bits at 40 MSPS or 80 MSPS
- Peaking Time range: 0.1 to 24 μs at 40 MSPS
- 16k channel spectrum
- USB 2.0 communications
- Customizable user digital I/O
- Complete instrument control via XIA’s ProSpect software and Handel drivers

**SUPPORTED DETECTORS AND PREAMPLIFIERS**

**Preamplifiers:** RC-feedback preamplifiers with up to ± 600 mV pulse height and ± 4.5 V total input range w/o attenuation; larger signal ranges with input attenuation.

**Detectors:** HPGe, CdTe, CZT, LaBr₃(Ce), NaI(Tl), CsI(Tl), SrI₂:Eu are readily supported.

**DEVELOPMENT KIT**

The microDGF USB 2.0 / RS232 development kit enables rapid design of systems incorporating the microDGF. The kit includes the microCOMU interface circuit board that routes power and communication signals to the microDGF, and is designed for both development and OEM implementation.
SPECIFICATIONS

ADC
• The microDGF’s speed and power consumption are set by the digitizing rate of the 14-bit ADC.
• The standard digitizing rate is 40 MSPS, (80 MSPS option)

Spectroscopy Amplifier
• All settings are digitally controlled, including gain, peaking time and other filtering and pile-up inspection parameters.
• Peaking Time Range: 100 ns to 24 µs with standard 40 MSPS ADC: 50 ns to 12 µs with 80 MSPS ADC.
• Gain: Two analog gain options are available, combined with a digital fine gain adjustment of ± 6dB:
• Variable Gain (default): Switched variable gain with a 25.5 dB range to match the detector and preamp type.
• Fixed Gain (optional): Factory set using precision resistors to match specific detector and preamplifier type. (Lower power consumption and cost).

MCA
• Spectrum size: 16K channels, 24 bits.
• Statistics: Input counts detected, output counts to the spectrum, live time and real time.
• Run Control: Automatic run termination according to configurable user presets.

SAMPLE PERFORMANCE

Mixed gamma source spectrum from HPGe detector with microDGF

Energy resolution at 1.3 MeV vs count rate for HPGe detector with microDGF

SOFTWARE
XIA provides ProSpect, a software package that controls all microDGF settings and acquires MCA and diagnostic data, and Handel, a comprehensive set of C libraries that simplifies integration of the microDGF into the customer’s embedded applications.

NRE CUSTOMIZATION
The onboard DSP can make spectral calculations in real time and control external equipment based on results. XIA will be pleased to quote NRE costs for developing special purpose microDGF code.