

The MXDPP-60 is a high performance OEM digital pulse processor that is designed for both benchtop and handheld applications. It includes an amplifier and a multi-channel analyzer. MXDPP-60 can work together with reset and RC-feedback preamplifiers to produce high quality pulse-height spectra. MXDPP-60 can be used with many semiconductor based detectors such as: SDD, PIN-diode, CdTe, CZT, Si(Li) and Germanium detectors. MXDPP-60 is configured for benchtop (BT) and portable (XT) instruments.

## Applications

- XRF applications
- X-ray and gamma-ray detectors
- Process control
- Scientific research
- Nuclear Monitoring
- Isotope identification

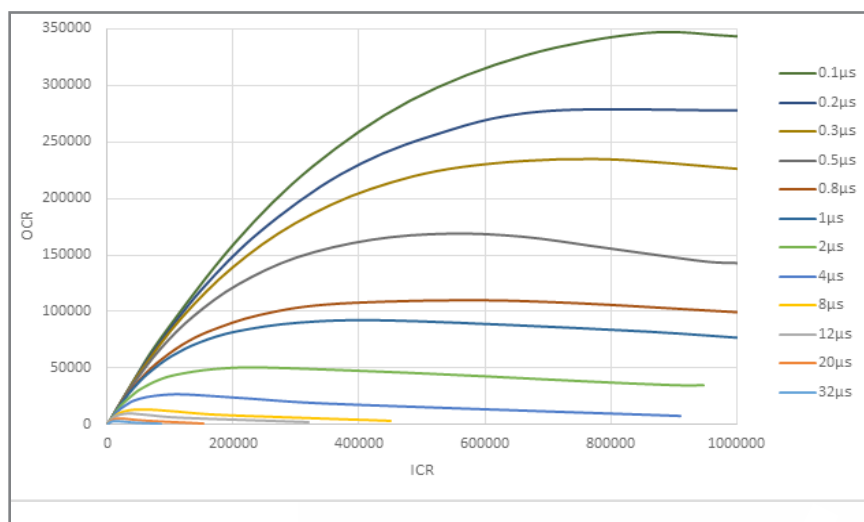
## Features

- Analog to digital converter (ADC) system (20 MHz, 16 bit)
- Two independently configurable fast channels
- Capable down to 0.1 $\mu$ s peaking time
- Positive/Negative step
- Configurable settings: HV bias, ramp polarity, temperature set point
- USB 2.0 Interface
- Certified Microsoft Windows Drivers: Windows 7, 8, & 10 (32 and 64 bit)
- Simple Command Structure:
  - Full Python Library and DLLs

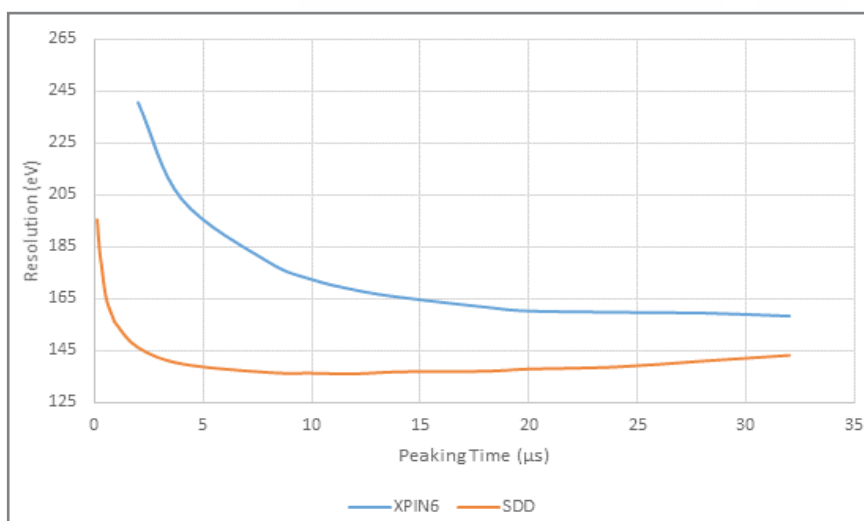
## Benefits

- Fast processing speeds
- Best pile-up rejection for wide range of energies
- Compatible with various detector types
- Change detector settings without changing jumpers
- High speed communication with a personal computer (PC)

## SDD OCR vs ICR



## Resolution vs Peaking Time



## Inputs:

- Detector signal input range -6V to +6V
- Software selectable signal polarity
- 2 auxiliary analog inputs
- 2 auxiliary software monitorable digital inputs

## Multi Channel Analyzer (MCA):

- 4G counts / channel maximum
- 4096 channels
- Live-time and Real-time acquisition (1msec to 49 days)
- Multiple preset functions:
  - Real Time    • Total Counts
  - Live Time    • Peak Counts

## Integrated non-volatile EEPROM Memory:

For persistent parameter settings between power cycles

## Outputs:

- 2 auxiliary analog outputs
- 2 auxiliary digital outputs
- Virtual oscilloscope for monitoring signal input and pulse shaping outputs

## Pulse Processing:

- Trapezoidal shaping
- Slow channel
- Two fast channels for pile-up rejection
- Programmable peaking time for all channels
  - Slow 0.01 to 63  $\mu$ s
  - Fast 0.05 to 12.4  $\mu$ s
- Adjustable holding time for slow channels
  - Slow 0.05 to 12.4  $\mu$ s
- Digital fine gain setting for adjustment of eV/channel with high resolution

## Preprocessor:

- 20 MHz 16 bit ADC
- Adjustable differentiator time constant for optimal performance

## EEPROM:

The Non-Volatile EEPROM memory holds the DPP parameters while the DPP is powered off. When the DPP powers on and goes through the boot sequence the parameters stored in the EEPROM are loaded into the active FPGA memory. The EEPROM is set to default settings at the factory. Default settings can be overwritten with USB serial commands.

## Communications:

Installing the MXDPP-60 drivers allows USB Serial communication to change settings, save settings to the EEPROM, obtain run-time statistics, and obtain spectra.

The MXDPP-60 also supports I2C communication.



## Power Supply:

- +5V  $\pm$ 10% 1A Max (includes power for detector)
- Integrated detector power supply
- $\pm$ 5V for XT style detectors,  $\pm$ 9V for BT style detectors
- Software adjustable detector bias supply
  - -200Vdc to +200Vdc

## Environmental:

- 0°C to 60°C operating temperature
- 40°C to 80°C storing temperature
- RoHS compliant
- Gain Stability: <0.01 channel / °C

## Connections:

USB mini connector for communication

### Benchtop Options (BT)

- Amphenol signal (BNC) connector
- Lemo power connector

### Portable Options (XT)

- PICO Blade Power and Signal Molex connector (XT P20 Detector)

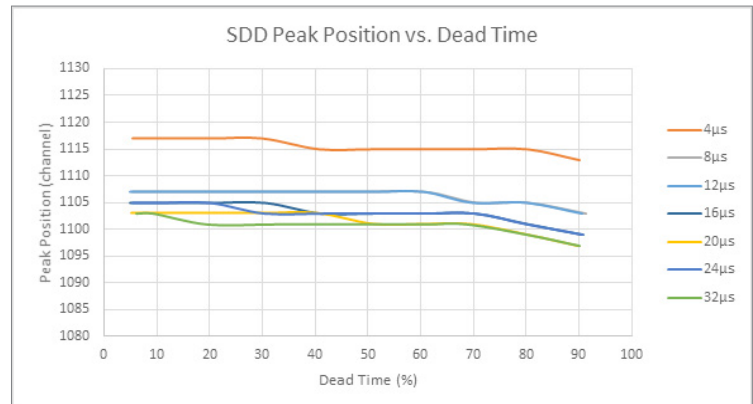
## Integrated Detector Temperature Controller (TC)

- Software selectable temperature setting
  - 0°C to -60°C
- Software monitor for detector temperature, TEC voltage, TEC current, and DPP temperature

## Export Classification

EAR99 export classification

## Peak Position vs Dead Time

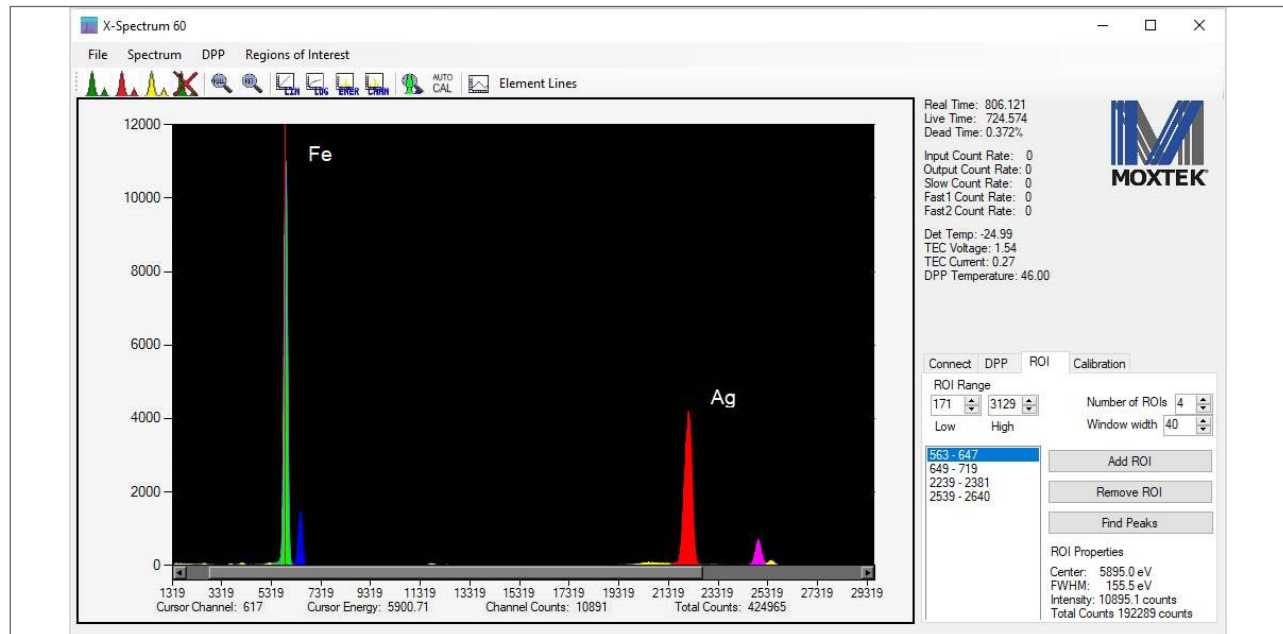


## Resolution vs Dead Time



## Free Evaluation Software (X-Spectrum60)

The X-Spectrum60 software provides such functionality as spectra acquisition and display, full control of the data collection process, DPP parameter tuning, two fast channels for advanced pile-up rejection, accurate device calibration, and input / output signal tracing with a virtual oscilloscope. The Software Development Kit (SDK) allows users to create simple scripts for flexible DPP parameter control and measurement automation. Communication with a PC is done via USB 2.0 interface.



X-Spectrum60 Screenshot

### Read/Write DPP Parameters:

- Factory Default DPP Configuration files for easy operation
- Fine Control of all DPP parameters for advanced users

### Read/Write Detector Settings:

- Predefined detector settings for Moxtek detectors
- Monitor and display detector temperatures, TEC voltage and TEC current

### Save Data:

- Save raw data to .csv file
- Save full data including ROIs, calibration, X-ray lines to .csv
- Save spectrum as image (.bmp, .gif, .jpg, .png, .tiff)

### Intuitive GUI Interface:

- Linear/Logarithmic Display
- Spectrum controls using mouse
- Integrated help for DPP parameters
- Copy & paste spectrum data to/from excel using windows clipboard

### Software Development Kit (SDK):

- Python
- C# / .NET
- LabView

### Scope Trace:

The digitized signal can be sampled at different stages of processing. The raw input, smoothed raw input, slow channel shaped pulse, fast channel shaped pulse, and fast2 channel shaped pulse can be sampled. Test pulses can be triggered to simulate X-ray events for diagnostic purposes.

### Basic XRF Analysis:

- Start/Stop acquisition controls
- Download spectra
- Automatic peak search
- 2 peak linear calibration
- Integrated X-ray line display
- Example spectra

## Ordering Information

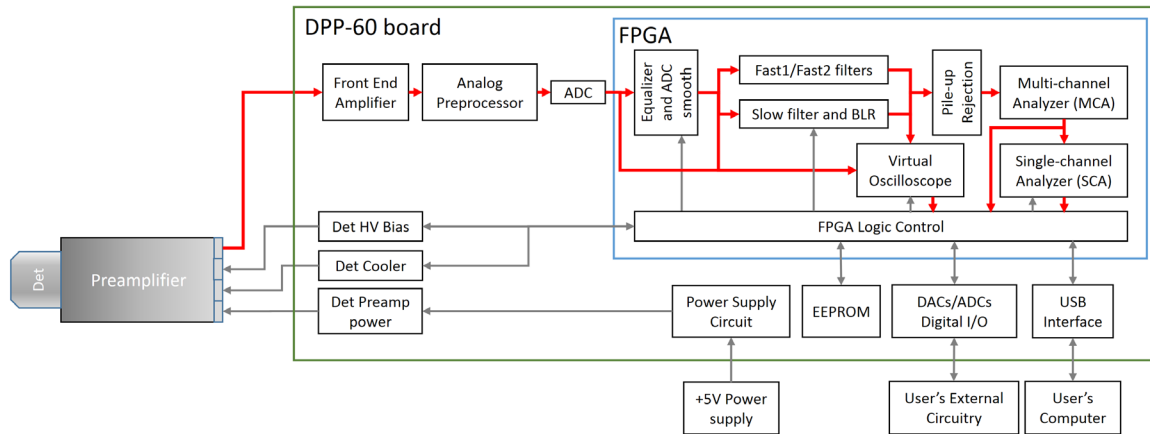
### Standard Configuration Includes

- MXDPP-60 digital pulse processor
- Detector power supply with HV bias
- X-Spectrum60 Software
- Product manual (PDF)
- Software development kit
- XPIN-XT cable kit (Flat Flex)
- USB cable
- 5 VDC power supply brick

| Part Number | Description                                      |
|-------------|--|
| DET00133    | Standard configuration including flat flex cable |
| DET00134    | Same as DET00133 plus LEMO and BNC connectors    |
| DET00135    | Same as DET00134 plus LEMO and BNC cables        |

- The DET00133 is best suited for handheld or portable applications
- The DET00134 and DET00135 are best suited for benchtop applications

## Block Diagram of MXDPP-60 and XRF System



## MXDPP-60 OEM Card Dimensions

