Features

- Fully computer controlled
- Fast ADC
- Integrated 0.5K/1K/2K/4K MCA
- Adaptive matched filtering
- Gaussian filtering
- Zero specific dead time
- Programmable shaping time
- Programmable gain
- Peripheral I/O control
- Suitable for SDD, Si(Li), HPGe and other semiconductor detector types.
- Ethernet, USB, RS232 or RS485 communications interfaces

Description

The DPP/MCA (DSP-Spectrometer) is a state of the art, high performance digital pulse processor, combined with a Multi-channel Analyzer. It is intended for use in systems, where high-performance signal processing and spectra capturing is required. The industry standard interface options provide users with great flexibility at reasonable cost.

A variety of options ranging from OEM modules to a ready-for-use stand-alone device are available.

A small footprint makes this device ideal for portable applications, as well as for customer-specific installations.

The DPP/MCA is fully supported by our SpectLab software. Software specifications are also available to developers.

Specifications

Interfaces

INPUT – accepts positive or negative signal from detector preamplifier with swing up to $\pm3V$. Input impedance Z = 1kΩ. Coupling: BNC or Lemo 00 series connector.

GATE – TTL/LVTTL input level. Coupling: BNC or Lemo 00 series connector. Software controlled signal polarity.

SCK, SDI, SDO – TTL/LVTTL 3-wire serial interface clock and data, used to control user-specific features of front-end electronics. Coupling: 2mm pitch plug.

I/O 0..7 – TTL/LVTTL user-specific I/O signals. Coupling: 2mm pitch plug.

+3.3v, GND – power output for external logic. 100mA max. Coupling: 2mm pitch plug.

Software controls

Signal shaping time – 0.25μs, 0.5μs, 1μs, 2μs, 4μs, 8μs
Coarse gain – 8x, 16x, 32x and 64x. Other values upon request.
Fine gain – 0...8x in 65535 steps.
P/Z control – digital control in 100 steps.
Base Line adjustment in 4096 steps.
MCA spectra size – 512, 1024, 2048, 4096 channels.
Real time preset – up to 2^{32} sec.
Live time preset – up to 2^{32} sec.

Communication

USB – Standard USB port using type B connector.
Ethernet – Optional Ethernet port using TCP/IP. Replaces USB interface.
RS485/RS232 – Optional. Replaces USB interface.

Performance

Integral non-linearity – < 0.1%
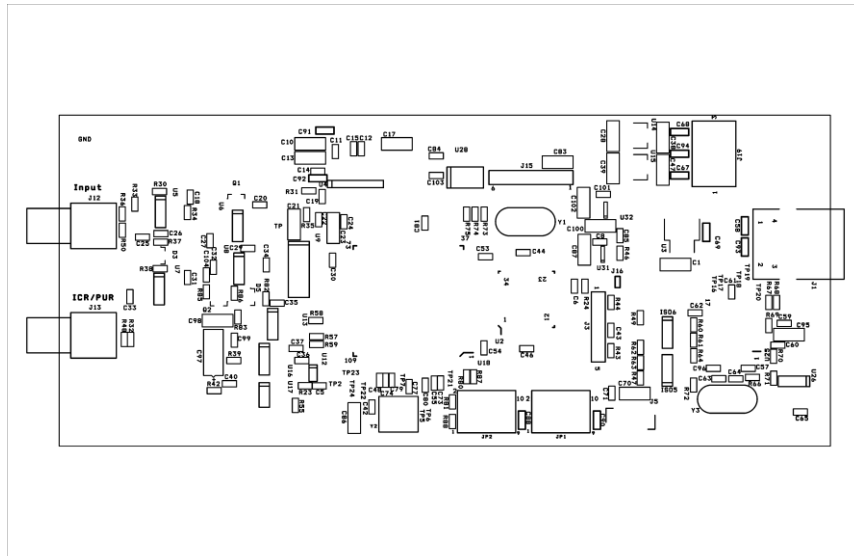Differential non-linearity – < 0.5%
Processing time – peaking time + 62.5ns

Power requirements

+ 12V, 180mA with USB interface.

Dimensions

140 x 60 x 20 mm (PCB OEM module)
150 x 70 x 30 mm (in metal housing)

JP1 pinout

PIN	Name	Comment
1	GND	Ground connection
2	SCK	3-wire serial clock, LVTTL
3	FRAME	LVTTL
4	SDO	3-wire serial data out, LVTTL
5	IO4	LVTTL
6	IO5	LVTTL
7	IO6	LVTTL
8	IO7	LVTTL
9	VCC	+3.3V
10	GND	Ground connection

JP2 pinout

PIN	Name	Comment
1	GND	Ground connection
2	USER1	LVTTL
3	USER2	LVTTL
4	IO0	LVTTL
5	IO1	LVTTL
6	IO2	LVTTL
7	IO3	LVTTL
8	SDI	3-wire serial data in, LVTTL
9	VCC	+3.3V
10	GND	Ground connection

J19 pinout

PIN	Name	Comment
1	+12V	+12V power supply
2	GND	Ground connection

Block Diagram

Anti-aliasing filter	Fast ADC	Programmable Gaussian Filters	Digital peak detector	MCA
Programmable differentiation, P/Z cancellation and gain	Servo DAC	CPU control	Matched Filter	Interface

Input from detector PA Max ±3V

USB*

Ethernet UTP*

12V DC from external power supply → Power supply +/-5V, 3.3V, 2.5V, 1.2V

Analog part

Digitally implemented
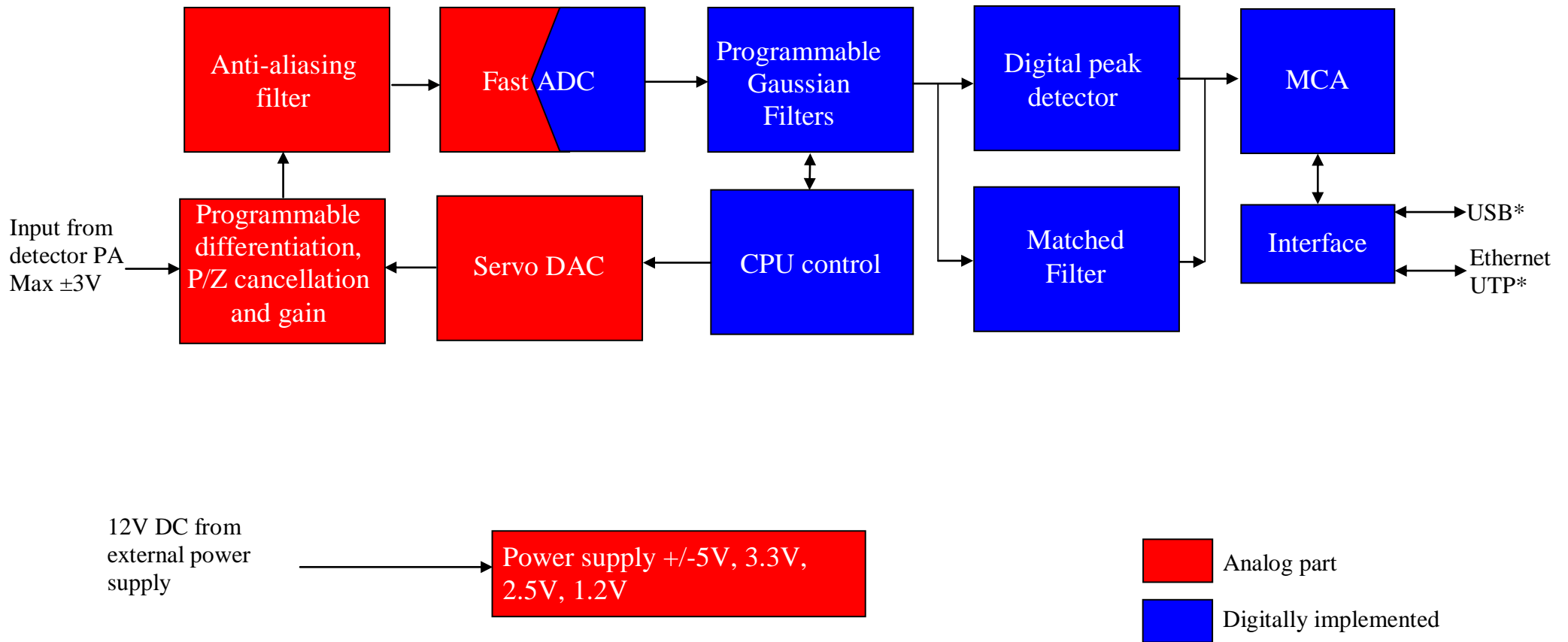
* Depending on interface option