

The USB Operating Electronics is used to operate Si and InGaAs detector arrays as well as array based Spectral Sensors (e.g. Carl Zeiss MMS / MCS). It consists of a Front End Electronics and a USB interface board.



USB Operating Electronics

Front End Electronics

The Front End Electronics serves as a coupling unit for a detector array (via a suitable tec5 preamplifier) or a Spectral Sensor to the USB interface electronics. It generates the control signals for the sensor and digitizes the analogue video signal.

The following Front End Electronics are available:

- FEE-HR (for Si PDAs, high resolution version)
- FEE-HS (for Si PDAs, high speed version)
- FEE-CCD (for Si CCDs)
- FEE-NIR (for InGaAs arrays)
- FEE-xxx (for Si and InGaAs PDAs plus Si CCD at 0.5 ... 1MHz pixel readout rate, in prep.)

USB Interface Electronics

The USB interface electronics controls the FEE and generates, with quartz accuracy, the sensor integration time. The digitized video signals of the detector array are acquired and transferred via USB to the computer. The interface complies with USB 2.0. Synchronization to external events (e.g. chopper) or triggering of a shutter / light source can be done with additional input and output signals.

The USB board is directly connected in sandwich configuration with the related Front End Electronics. The operating power is supplied separately.

Supported Detectors and Sensors

tec5 preamplifiers are available to adapt different detector arrays to the Operating Electronics. Supported arrays:

Silicon based detector arrays from Hamamatsu type S390x by preamplifier DZA-S3901-4, type S593x by DZA-S5930-1 as well as CCD sensors of series S-701x or S-703x by DZA-S701x or DZA-S703x

InGaAs diode arrays from Perkin-Elmer Optoelectronics, Sensors Unlimited and Hamamatsu by preamplifier DZA-VVIR-x

MMS Spectral Sensors from Carl Zeiss are supported directly, no preamplifier required.

Electronic Sensor Multiplexer

As an option, Electronic Sensor Multiplexers are available for SI (NMOS) detector arrays. These add-on boards allow the operation of up to 8 detector arrays with just one Operating Electronics:

- MUX-4P (for FEE-HS or -HR) handles up to 4 Sensors with 2 Sensors read out simultaneously
- MUX-8A (for FEE-HS) for up to 8 Sensors with 2 to 8 Sensors read out simultaneously.

Software

32 Bit device drivers for the Windows 98/2000/XP operating systems as well as the AdminTool program for test operation of the hardware are included with each USB Operating Electronics.

Additional software components:

- Programmer Interface for languages C / C++ / Visual Basic and Delphi (includes 32 Bit Spectral Data Acquisition library SDACQ32MP, program examples in MSVC und MSVB)
- LabVIEW Instrument Drivers
- Spectral data evaluation/ processing software MultiSpec^{View}, MultiSpec^{Calc}, MultiSpec^{Pro}



株式会社 スペクトラ・コープ

〒164-0011 東京都中野区中央4-4-5第一小林ビル

Tel: 03-5328-2858 Fax: 03-5328-2859

URL <http://www.spectra.co.jp>

Technical Data (Short Version)

Front End Electronics

Type FEE-HS (Si PD arrays)

- 15 Bit resolution, accuracy 14 Bit
- Noise of electronics incl. ADC: typ. 1 LSB
- Conversion rate 187.5 kSamples/s,
=> at 256 pixels: readout time 1.4 ms
- Integration time: 1.5 ms - 6500 ms

Type FEE-HR (Si PD arrays)

- 16 Bit resolution, accuracy 15 Bit
- Noise of electronics incl. ADC: typ. 1 LSB
- Conversion rate 80 kSamples/s,
=> at 256 pixels: readout time 3.2 ms
- Integration time: 3.5 ms - 6500 ms

Type FEE-CCD (Si CCD arrays)

- 16 Bit resolution, accuracy 15 Bit
- Noise of electronics incl. ADC: typ. 1 LSB
- Conversion rate 187.5 kSamples/s,
=> at 532 pixels: readout time 4.5 ms
- Integration time: 4.5 ms - 6500 ms

Type FEE-NIR (InGaAs arrays)

- 16 Bit resolution, accuracy 14 Bit
- Noise of electronics incl. ADC: typ. 1 LSB
- Conversion rate approx. 80 kSamples/s,
=> at 256 pixels: Readout time 3.3 ms
- Integration time: 0.1 ms - 1500 ms

Type FEE-xxx (for all above mentioned arrays)

- 16 Bit resolution, tbd.
- Noise of electronics incl. ADC: tbd.
- Conversion rate approx. 0.5 – 1MSamples/s,
in preparation

Interfaces

- To preamplifier / Spectral Sensor: 10 pin MICA connector for digital control & SMB for video signal
- To USB: 40 pin header connector, FEE slips on the USB Interface Board

USB Interface Electronics

The Scan Controller on the PC interface electronics supports the following operating modes:

- **Single Scan**
consists of one detector array reset scan (dummy scan), waiting during integration time with subsequent data scan (readout of video signal and data storage in FIFO)
- **Burst Mode**
consists of one reset scan followed by a defined series of consecutive data scans,
- **Synchronization to Continuous Scan**
detector array is read out permanently at the programmed integration time. After request from the PC the next performed scan is saved and provided
- **MultiChannel Mode**
CCD array is read out in a quasi 2D mode (partially line binning mode)

Features

- Integration time from 0.1 ms to 6.5 s, increments of 1/10 ms
- Real-time data transfer for all operation mode configurations
- 3 digital outputs for universal use (e.g. shutter control, trigger signal for scan synchronous activation of a flash lamp)
- 2 digital inputs, e.g. usable for external synchronization

Interfaces

- To Front End Electronics: 40 pin header connector, FEE slips on the USB Interface Board
- To external interface: 10 pin header connector
- To PC: USB 2.0 port, compatible to USB 1.1
- To power supply: +5V, +12V, -12V required (has to be provided by user)

Available Versions

OEM bundle consisting of one specific FEE board and USB interface board plus cable

- Dimensions (Sandwich): 88 x 67 x 30 mm³

Evaluation Line unit, housed in compact desktop enclosure, with or without Spectral Sensor, incl. power supply (please see Product Information Evaluation Line for details)

User Support

For specific applications or custom designed instrumentation, the standard Operating Electronics can be modified.

