

PD-PCIe01V1

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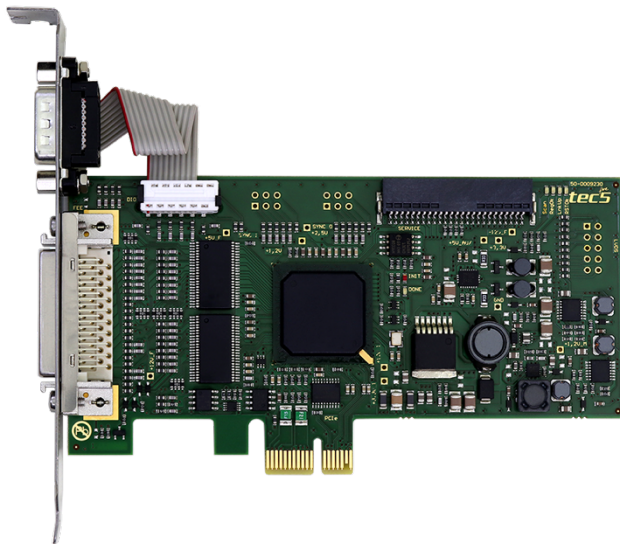
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Short Description

- Digital spectra acquisition controller/ buffer
- Add-on card for x1 PCI Express [PCIe] bus with a standard or low profile bracket
- Supports tec5 configurations and spectrometer systems based on FEE-HS and FEE-1M frontend electronics
- Input from device: 'Interface_40' Front End Electronics via 2m / 5m cable
- Output to device: PC / Windows 8, 7 [32bit, 64bit / Vista / XP with dedicated driver
- External I/O for illumination control and scan synchronization or general purpose
- Compatible replacement for tec5 PD-PCI01 PCI bus interface card for spectroscopy for supported configurations

General

The OEM Interface Electronics PD-PCIe01V1 is a digital spectral data acquisition controller and data buffer with an x1 PCIe bus interface. The board is directly compatible to all Front End Electronics [FEE] which comply with tec5 specification 'Interface_40' [FEE-HS and FEE-1M].

Combined with other modules from the tec5 range of OEM electronics for spectroscopy, the PCIe Bus Interface Electronics supports photodiode arrays and Spec-

tral Sensors based on NMOS, CCD or InGaAs diode array technology. In this way, the UV-VIS to NIR spectral ranges [180 nm – 2500 nm] can be covered by ready-to-use subunits.

Once parameterized and started by the PC, the board's data acquisition controller provides a fully autonomous management of the photodiode array readout cycle. During spectral data acquisition the PC is able to perform other jobs. The state of data acquisition is accessible at any time by reading the status of the spectra data buffer. An integrated I²C bus allows additional information exchange between attached electronics modules [e.g. parameters or coefficients, identification / version].

Features / Specifications

Data Acquisition:

Software selectable sensor operating modes [Single Scan, Single Cycle, Continuous Scan, Burst Scan, SyncToContScan, etc.].
Crystal clock controlled integration time.
64 K words on-board FIFO buffer for spectral data, readout of FIFO data during measurement, allowing continuous data acquisition.

Periphery I/O:

Integrated illumination control output for triggering flash lamps.
Trigger input for synchronization of spectral data acquisition [e.g. when using a chopper wheel].
Universal digital I/O signals available:
2 outputs and 2 inputs at the External I/O-connector,
3 outputs and 3 inputs at the connector to the Front End Electronics.

Miscellaneous:

Plug & Play: configuration by software.
I²C bus controller for configuration data exchange.
Non volatile memory for configuration data storage.

Interfaces:

Interface to Front End Electronics.
External interface for trigger and digital I/O.
PC interface: x1 PCIe plug.

Environmental conditions:

Temperature range operating: 0 °C ... +60 °C
Temperature range storage: -40 °C ... +70 °C
Humidity [@25°C, non condensing]: 10 % ... 90 %

Interfaces

The slot bracket contains a 40 pin Mini Delta connector and a 9 pin Sub-D connector. The 40 pin connector is used for linking the FEE to the Interface Electronics. The 9 pin external I/O-connector provides control signals for triggering additional devices like flash lamps or synchronization of the readout procedure. Most signals of the external I/O-connector can be also accessed at the 40 pin connector [for simplifying system cable connections].

External I/O-connector type:
9 pin Sub-D connector [pin type]

Pin	Input /Output	Comment
1	Input	Digital input 1, TTL
2	Input	Illumination control voltage input [ICVI]
3	Input	External scan trigger input [ESTI], TTL
4	Input	Digital input 2, TTL
5	Output	Illumination control output [ICO]
6	Output	Supply voltage output +5V / <500mA
7	Output	Digital output 1, TTL
8	Output	Digital output 2, TTL
9	---	Ground

Illumination control

The PCIe Bus Interface Electronics provides two connections for activating a light source [e.g. a flash lamp]:

- ICVI: illumination control voltage input and
- ICO: illumination control output.

The voltage range of the ICO signal is either GND to +5V [internal] or GND to ICVI-voltage, if an external source > +6V [24V max] is connected to ICVI. Its output resistance is 470R [internal] or 940R [external].

ICO can be locked [0] or released [1] by software. In case of output released, a negative pulse is generated right after the start of the integration time window of each data readout scan. The pulse appears directly after the EndOfScan pulse of the previous “dummy” scan with a pulse width of 45 µs, timed by an internal monoflop.

External Trigger Capabilities

In many standard applications, a sensor scan cycle is triggered internally by the PC. The External Scan Trigger Input [ESTI] can be used to synchronize the sensor readout to an external event. Two different modes are available: pulse mode [active low, falling edge] and slope mode [both edges]. The external trigger functions can be controlled by software.

Mechanical Design

The PCIe Bus Interface Electronics is a low profile plug-in board for the PC x1 PCIe bus with the format 128 mm x 68.9 mm. In standard version, the card is shipped with a full-height bracket. Alternatively, a low-profile bracket version may be ordered from tec5.

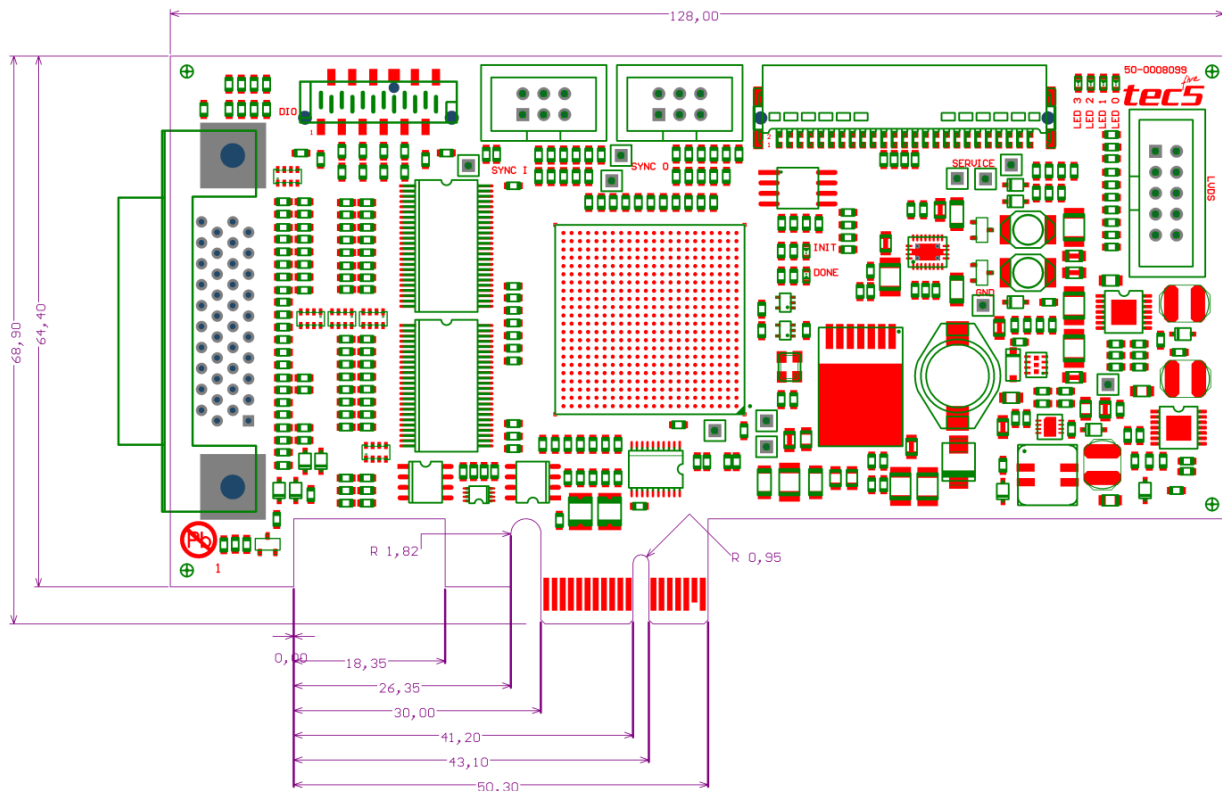


Figure 1: PCB Dimensions

Getting Started

PC Requirements

For operation, a PC with Windows 8, 7 [32bit, 64bit] / Vista / XP operating system with a free PCIe slot is required. It is recommended to install the Windows driver before installing the hardware in your PC.

Driver Installation

In Windows Explorer, select the CD-ROM drive and change to directory 'Software & Drivers\Operation Electronics drivers\PD-PCIe01V1\Windows XP-Vista-7'. Locate the correct installation file for your operating system: pdpcie01-driver-x64.exe for a 64 bit OS or pdpcie01-driver-x86.exe for a 32 bit OS. By starting the installation program, the WDM driver is installed on your system.

Interface Card Installation

Caution: The interface card and parts of your PC are sensitive to electrostatic discharge. Relevant handling precautions must be observed whenever handling the PD-PCIe01! Shut down the operating system, turn off the PC and disconnect it from the mains plug before proceeding.

Refer to the manual of your PC for instructions to open the case. Locate a free PCIe X1 slot or, alternatively, a longer slot for installation of the PD-PCIe01V1. Install the card according to the instructions of the computer's manual.

AdminTool Installation

Change to directory 'Software & Drivers\Software-Tools\Admin-Tool' on the tec5 CD-ROM and execute sdacq32at.exe from this directory. Follow the instructions of the setup program.

Getting started with AdminTool

Start the test program AdminTool: Start / Programs / tec5 SDACQ32 AdminTool / SDACQ32Admin or click to the Shortcut Icon.

After the program start select the operating electronics type "PD-PCIe01V1" from the list. A mouse click on "Search" starts the program search for attached devices of that type. If the process is successful, the message „1 [or more] operating electronics found and opened“ appears.

Click on the button 'Show Config' to display the hardware configuration. The sensor parameters may be displayed or modified in the menu 'Sensors'. The menu 'Measurement' may be used to acquire spectral data for test purposes.

To start an acquisition...

- Set integration time [e.g. 30 ms]
- Set number of averaged spectra [e.g. 1]
- Set acquisition mode [e.g. 'continuous']
- Set data acquisition interval [e.g. 100 ms]
- Select display type 'Table' or 'Chart'
- Start acquisition by button 'Get Spectra'
- Stop acquisition by button 'Stop'

More detailed information is available in the 'Help' menu.

User Information

General

The information in this data sheet has been checked carefully. However, no responsibility is assumed for inaccuracies. tec5 reserves the right to make changes to any portion of this document without notice.

Each product is tested carefully before being shipped. If, however, problems should occur while initial operation or during later operation, please first check your specific settings and correct installation [connectors].

Warranty

The warranty period for this product is 12 months. The warranty begins on the day of delivery. Within the warranty period, tec5 will repair free of charge any faulty functioning of the product resulting from faulty design or defective material. All other claims are excluded, in particular consequential damage.

Handling

The electronics is partly constructed in CMOS technology and is thus sensitive against electrostatic discharge. Take appropriate precautions whenever handling the component. Please switch off the power before connecting or disconnecting the product.