

# PCI Bus Interface Electronics for Spectral Data Acquisition



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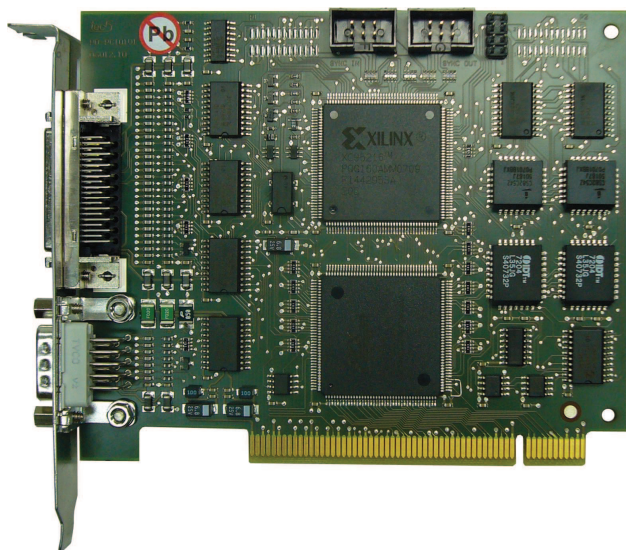
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## PD-PCI01V1

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### Short Description

- Digital spectra acquisition controller/buffer
- Add-on card for PCI bus
- Input from device: 'Interface\_40'  
Front End Electronics via 2m / 5m cable
- Output to device: PC / Windows 2000 / XP / Vista
- External I/O for illumination control and scan synchronization

### General

The OEM Interface Electronics PD-PCI01V1 is a digital spectral data acquisition controller and data buffer with a PCI bus interface. The board is directly compatible to all Front End Electronics (FEE) which comply to tec5 specification 'Interface\_40' (e.g. FEE-HS and FEE-1M).

Combined with other modules from the tec5 range of OEM electronics for spectroscopy, the PCI Bus Interface Electronics supports photodiode arrays and Spectral 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 I<sup>2</sup>C bus allows additional information exchange between attached electronics modules (e.g. parameters or coefficients, identification / version).

### PC - Requirements

For operation, a PC with Windows 2000 / XP / Vista operating system with a free PCI slot is needed.

Power requirements (supplied from PCI bus):

- +5 V: < 500 mA (without external electronics)
- ±12V: depending on external electronics (FEE, DZA, sensor)

### Installation of Driver & AdminTool

The interface card has to be installed before installing the driver.

#### Driver for Windows 2000 / XP / Vista:

During startup, Windows shows a message that it has found a new PCI device. Select the recommended option and choose CD-ROM drive. Change to directory 'Software & Drivers\Operation Electronics drivers\PCI-Card - MultiSpecDesktop\Windows 2000-XP-Vista' on the CD and continue. The installation of the WDM driver is started.

#### AdminTool:

Change to directory 'Software & Drivers\Software-Tools\Admin-Tool' on the tec5 CD-ROM and execute sdaq32at.exe from this directory. Follow the instructions of the setup program.

Reboot the PC after the installation is completed.

### 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-PCI01V1" 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.

To display the hardware configuration click on the button 'Show Config'. 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.

## Features / Specifications

### Data Acquisition:

- Software selectable sensor operating modes (Single Scan, Single Cycle, Continuous Scan, Burst Scan, Sync To Cont Scan, etc.)
- Crystal clock controlled integration time
- 4 K or 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 External I/O-connector,  
3 outputs and 3 inputs at connector to 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: PCI bus, 32 Bit

### Environmental conditions:

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

## Design

The PCI Bus Interface Electronics is a plug-in board for the PC PCI bus with the format 130 mm x 107 mm.

The current basic version '52' with PCI controller type PCI9052 replaces the older standard basic version 'STD'. An assembly version '52-64K' with an extended FIFO buffer of 64 K words is available.

## 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 PCI 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 can be software programmed to either GND to +5V or GND to ICVI-voltage.

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 a 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.

## 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.