Ethernet Interface Electronics for Spectral Data Acquisition

PD-ETH01V1

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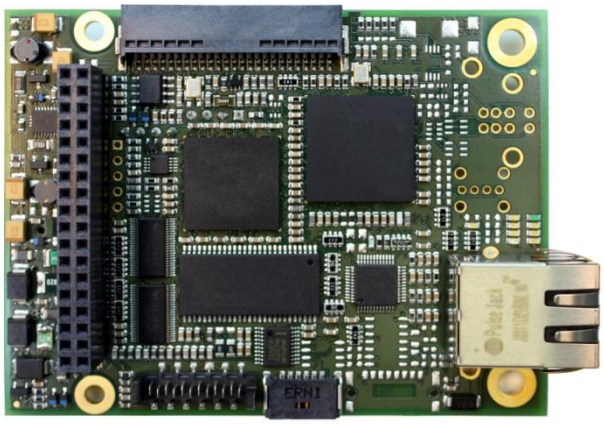


Short Description

- Powerful and compact digital spectral data acquisition controller with Ethernet interface
- Ethernet 802.3 10/100 Base-T
  (10 or 100 Mbit/s, 100 Mbit/s recommended)
- Compatible to standard Ethernet networks as used in office buildings or production sites
- Ideal for distributed systems and decentralized monitoring
- Long distance communication / data transfer (up to 100m without repeater, almost unlimited with repeater)
- Expanded spectral data buffer for improved data transfer reliability
- Front End Electronics can be mounted in sandwich configuration on top of the Ethernet Interface Electronics
- Input from device:
  Front End Electronics in /EMB version
- Output to device:
  PC with Ethernet network connection and Windows 7, Vista, or XP
- External I/O:
  - illumination control
  - scan synchronization
  - universal digital I/O
    (3 outputs and 3 inputs)
- External power supply (5 V_{DC})

General

The PD-ETH01V1 Interface Electronics is a powerful and compact digital spectral data acquisition controller with an Ethernet network interface. The product is directly compatible to all Front End Electronics (FEE) which comply to tec5 specification *'Interface_18*2'* (FEEs in version /EMB = 'Embedded').

Using the Ethernet Interface Electronics, the PC controls the Frond End Electronics and the spectral sensor connected to it. Once parameterized and started by the PC, the data acquisition controller provides a fully autonomous management of the selected readout cycle.

An integrated I²C bus allows additional information transfer between connected electronics (e.g. parameters or coefficients, identification / version).

PC and Power Requirements

For operation, a PC connected to an Ethernet network, a free network connection port and Windows 7, Vista, or XP is required.

The PD-ETH01V1 Interface Electronics is a 'self powered' device (not powered by the network). Thus, a supply voltage of **+5 V_{DC}** (±10%, typically < 300 mA for PD-ETH01V1 board only) has to be provided by an external supply for operating the Interface Electronics.

The **±12 V_{DC}** supply voltage is not used by the PD-ETH01V1 itself but it is only forwarded from the Power connector to the Front End Electronics connector. It has to be applied for configurations with Front End Electronics of type FEE-HS (FEE-CCD), it is not required for FEE-1M (FEE-1M generates all voltages required for it's internal use and the sensor electronics from +5 V_{DC}). For power consumption of Front End Electronics and sensor units / preamplifiers refer to the components data sheets.

AdminTool Installation

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

Getting started with AdminTool

Start the test program AdminTool via Start / Programs / tec5 SDACQ function library / SDACQ32 Admin or click on the shortcut icon, if installed. After the program start set the IP address and select the type of your operating electronics 'PD-ETH01' from the list. By clicking Search, the AdminTool searches for devices of that type attached to your system. If the search process was successful, the message „1 (or more) operating electronics found and opened" appears. To display the hardware configuration, click the button ‚Show Config'. Sensor parameters may be checked or modified in menu 'Sensors'.

The menu 'Measurement' is intended to verify that the spectral data acquisition works correctly:

- Set integration time (e.g. 30 ms)
- Set number of spectra to average (e.g. 1)
- Set mode (e.g. ‚continuously')
- Set delay time between two data acquisitions
- Select display type ‚Table' or ‚Chart'
- Start acquisition via button ‚Get spectra'
- Stop acquisition via button 'Stop'

More detailed information can be found in the 'Help' menu.

Features / Specifications

Data Acquisition:

- Software selectable sensor readout operating methods:
  - SyncToContScan
  - StartNewScan (*)
  - ExternalTriggerSlope / ExternalTriggerPulse (*)
  - GetBufferedScan (asynchronous acquisition mode)

  (*) = with or without cleaning
  Acquisition of single spectra or a burst of n spectra
- Timer controlled integration time
- Continuous data stream via Ethernet during measurement, therefore, continuous data acquisition possible
- 16 kByte FIFO spectra data buffer

Periphery I/O:

- Integrated illumination control: trigger output for triggering of flash lamps
- Trigger input for external synchronization of spectral data acquisition (e.g. when using a chopper wheel)
- Universal digital I/O: 3 outputs, 3 (latched) inputs

Miscellaneous:

- Plug & Play: configuration by software
- On board I2C bus for configuration data exchange
- Non volatile memory for configuration data storage

Interfaces:

- Interface to Front End Electronics (*'Interface_18*2'* for FEEs in version 'Embedded')
- Ethernet 10/100 Base-T RJ45 receptacle interface
- External I/O interface for trigger and digital I/O
- Power connector
- I2C Bus connector
- Auxiliary connector

Environmental conditions:

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

Interfaces

On the PCB, there is a 36 pin header connector for direct attachment of the FEE on top of the Ethernet Interface Electronics. The 12 pin MICS 12 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 accessed at the 36 pin connector alternatively (for simplifying system cable connections). The pinout of the first 9 pins of the External I/O connector allows easy conversion to the tec5 standard 9 pin SUB-D connector using a 1:1 ribbon cable.

External I/O connector type: Lumberg MICS 12

Pin	Signal-Type	Signal, Comment
1	Input	Digital Input 1, CMOS
2	Output	Supply voltage output +5V / <500mA (fused)
3	Input	Illumination control voltage input (ICVI)
4	Output	Digital Output 1, CMOS
5	Input	External Scan Trigger Input (ESTI)
6	Output	Digital Output 2, CMOS
7	Input	Digital Input 2, CMOS
8	-	Ground
9	Output	Illumination control output (ICO)
10	-	Ground
11	Output	Digital Output 3, CMOS
12	Input	Digital Input 3, CMOS

Power connector type: Molex KK 7395-4
(Plug type: KK 6471-4)

Pin	Signal-Type	Signal, Comment
1	Power-I/O	+5 V_{DC}, Standard Power Input
2	Power-I/O	+12 V_{DC}, Standard Power Input
3	Power-I/O	-12 V_{DC}, Standard Power Input
4	-	Ground

I2C Bus connector type: AMP Quick 0-828549-4 (90°)

Pin	Signal-Type	Signal, Comment
1	I2C-Bidirect.	I2C-SDA, Serial data
2	-	Ground
3	I2C-Bidirect.	SCL, Serial clock
4	Power-Output	+5 V_{DC} (*)

Auxiliary connector type: HLE-109-02-G-DV-LC
This connector may be used for connecting to additional electronics modules, which are prepared to be mounted under the PD-ETH01V1 (i.e. PSU2). In this case, a socket connector is plugged into the auxiliary connector from the PCBs bottom side.

Pin	Signal-Type	Signal, Comment
1	-	Not connected
2	-	Not connected
3	Power-Output	+5V_INTERN (typically +5V_{DC} from power connector (*)
4	-	Ground
5	Power-I/O	+5 V_{DC}, Alternat. Power Input
6	-	Ground
7	Power-I/O	-12 V_{DC}, Alternat. Power Input
8	Power-I/O	+12 V_{DC}, Alternat. Power Input
9	Output	Digital Output 1, CMOS
10	Input	Digital Input 1, CMOS
11	Output	Digital Output 2, CMOS
12	Input	Digital Input 2, CMOS
13	Output	Digital Output 3, CMOS
14	Input	Digital Input 3, CMOS
15	Input	Illumination control voltage input (ICVI)
16	Output	IO_FLASH, internal illumination control, CMOS
17	Input	External Scan Trigger Input (ESTI)
18	Output	Illumination control output (ICO)

(*): No separate current limitation

Hint: The source for Input Signals (External-I/O / FEE-interface / Auxiliary connector) can be selected by software (Default: FEE-interface).

Illumination control

The Ethernet 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 500R (internal) or 1000R (external).

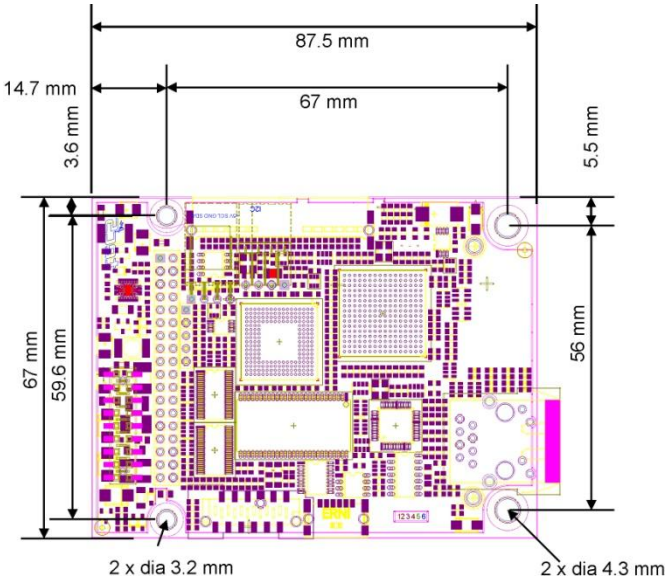
The ICO's pulse polarity and operation mode can be controlled by software. In case of output released, alternatively a scan-synchronized pulse (pulse width approx. 60 µs) is generated at the beginning of the integration time window of each data scan directly after the EndOfScanPulse of the previous scan or after the StartScanPulse.

External Trigger Capabilities

Normally, a sensor scan cycle is triggered by the PC. For synchronizing the sensor readout to an external event the External Scan Trigger Input (ESTI) can be used. Two different modes are available: pulse (active low, falling edge) and slope mode (each slope). The external trigger functions can be controlled by software.

Design

The Ethernet Interface Electronics is a PCB with the dimensions 87.5 mm x 67 mm (same as FEE).



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.