Multifunction board, optically isolated, 16 SE / 8 differential inputs, 4/8 analog outputs, 16-bit

APCle-3121 / APCle-3123

PCI Express interface
16 single-ended / 8 differential inputs, 16-bit
8/4 analog outputs, 16-bit
Optical isolation of inputs and outputs, 500 V
PCI Express DMA, programmable gain
Trigger functions
8 digital I/O, 24 V, optically isolated, timer, watchdog

Features

Analog inputs
- 16 single-ended / 8 differential inputs
- 16-bit resolution
- Optical isolation 500 V
- Throughput: 100 kHz
- Input ranges: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V, 0-20 mA (option) freely programmable through software for each channel
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel
- PCI Express DMA for analog data acquisition
- Overvoltage protection
- Input filters: 159 kHz

Analog acquisition
- One single channel, several channels, several channels through scan list
- Automatic analog acquisition through cyclic timer control
- Acquisition through scan list: up to 16 entries with gain, channel, unipolar/bipolar
- Acquisition triggered through software, timer, external event
- Trigger functions:
  - Software trigger or external trigger: the analog acquisition (single or sequence) is started through signal switching from 0 V to 24 V at the digital input 0.
  - Interrupt: end of single channel, end of multichannel, end of scan list

Analog outputs
- 8 or 4 analog outputs, optically isolated 500 V
- Voltage or current outputs
- 16-bit resolution (15-bit for 0-10 V)
- Output voltage: ± 10 V, 0-10 V (through software)
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation)
- Output current ± 5 mA max. for voltage outputs
- Current outputs: 0-20 mA, min. load 10 Ω, max. load 560 Ω, at 20 mA
- EMI filters

Digital
- 4 dig. inputs including 1 interruptible input
- 4 dig. outputs, 24 V, optically isolated

Timer / Watchdog
- 2 timers, incl. 1 which can be used as a watchdog

Safety features
- Optical isolation 500 V min.
- Creeping distance IEC 61010-1
- Overvoltage protection ± 40 V, analog inputs
- Protection against high-frequency EMI
- Input filters: 159 kHz
- Noise neutralisation of the PC supply

Applications
- Industrial process control
- Industrial measurement and monitoring
- Multichannel data acquisition
- Control of chemical processes
- Factory automation
- Acquisition of sensor data, current measurement
- Laboratory equipment, instrumentation

Software drivers
A CD-ROM with the following software and programming samples is supplied with the board.

Standard drivers for:
- Linux
- 32-bit drivers for Windows 8 / 7 / Vista / XP / 2000
- Signed 64-bit drivers for Windows 8 / 7 / XP
- Real-time use with Linux and Windows on request

Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDPACK functions
- Analog input • Analog output • Digital input
- Digital output • Watchdog • Timer

On request:
Further operating systems, compilers and samples.

Driver download: www.addi-data.com/downloads

New! aPCIe-3123
64/32-bit drivers
PCI Express boards, analog – APCIe-3121 / APCIe-3123

Specifications

**Analog inputs**
- **Number of inputs:** 16 single-ended / 8 differential inputs or 8 single-ended / 4 differential inputs
- **Resolution:** 16-bit
- **Optical isolation:** 500 V through opto-couplers from PL to peripheral
- **Input ranges:**
  - 0-10 V, ± 10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V, 0-40-20 mA (optional), software-programmable for each channel
- **Throughput:** 100 kHz
- **Gain:** Software programmable (x1, x2, x4, x16)
- **Relative precision (VIN):** ± 0.1 % max. (ADU converter)
- **Drift, non-linearity (VIN):** ± 0.1 % max. (ADU converter)
- **Temperature range:** Limited to 175 °C with heat sink fitted
- **Data transfer:** Data to the PC through FIFO memory
- **Voltage after reset:** 0 V
- **Current outputs after reset:** 0 mA

**Analog outputs**
- **Number of outputs:** 8 or 4
- **Resolution:** 16-bit
- **Optical isolation:** 500 V through opto-couplers
- **Output range:**
  - ± 10 V, ± 10 V switchable through software (0-20 mA optional)
- **Overvoltage protection:** ± 15 V
- **Max. output current per load:** ± 5 mA, 2 kΩ
- **Short-circuit current:** ± 20 mA (short time)
- **Output voltage after reset:** 0 V
- **Current outputs**
- **Resolution:** 15-bit
- **Output range:** 0-20 mA
- **Total load (at 20 mA):** 10 kΩ, ± 20 nA
- **Output current after reset:** 0 mA

**Digital I/O**
- **Number of I/O channels:** 4 digital inputs, 4 digital high-side outputs, 24 V
- **Optical isolation:** 1000 V through opto-couplers
- **Input current at 24 V:** 10 mA typ.
- **Input range:** 0-32 V
- **Supply voltage:** 8-32 V
- **Max. switching current:** 90 mA typ.

**EMC – Electromagnetic compatibility**
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC test report is available on request.

**Physical and environmental conditions**
- **Dimensions:** 168 x 99 mm
- **System bus:** Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
- **Space required:** 1 x 16-pin male connector PCI Express slot
- **Operating voltage:** ± 2.5 V, ± 12 V from PC
- **Front connector:** 37-pin D-Sub male connector
- **Temperature range:** 0 to 60 °C (with forced cooling)

APCIe-3121 / APCIe-3123
Multifunction board, optically isolated, 16 SE/8 differential inputs, 4/8 analog outputs, 16-bit, for PCI Express. Incl. techn. description and software drivers.

**Versions**
- **APCIe-312x-16-8**
  - Version with 16 SE / 8 diff. inputs, 8 analog outputs
- **APCIe-312x-16-4**
  - Version with 16 SE / 8 diff. inputs, 4 analog outputs
- **APCIe-312x-8-8**
  - Version with 8 SE / 4 diff. inputs, 8 analog outputs
- **APCIe-312x-8-4**
  - Version with 8 SE / 4 diff. inputs, 4 analog outputs

**Current**
- **APCIe-3121-16-8C**
  - Version with 16 SE / 8 diff. inputs, 8 analog outputs
- **APCIe-3121-16-4C**
  - Version with 16 SE / 8 diff. inputs, 4 analog outputs
- **APCIe-3121-8-8C**
  - Version with 8 SE / 4 diff. inputs, 8 analog outputs
- **APCIe-3121-8-4C**
  - Version with 8 SE / 4 diff. inputs, 4 analog outputs

**Options**
- **Please indicate the number of channels**
- **Option SF:** Precision filter for 1 single-ended channel
- **Option DF:** Precision filter for 1 diff. channel
- **Option PC:** Current input 0(4)-20 mA for 1 channel
- **PC-SE:** for single-ended PC-Diff: for differential

**Accessories**
- **PXK01-A:** Screw terminal panel for connecting the analog I/O
- **PXK01-AG:** Same as PXK01-A with housing for DIN rail
- **PX_BNC:** BNC connection box for connecting the analog I/O
- **PXK01-ZG:** Screw terminal panel for connecting the dig. I/O
- **ST010:** Standard round cable, shielded, twisted pairs, 2 m
- **ST011:** Standard round cable, shielded, twisted pairs, 5 m
- **FB3000:** Ribbon cable for digital I/O

**Ordering information**

Phone: +49 7229 1847-0  info@addi-data.com
Fax:  +49 7229 1847-222  www.addi-data.com

16-pin male connector

Pin assignment – 37-pin D-Sub male connector

Pin assignment – 16-pin male connector

ADDI-DATA connection

Simplified block diagram

1. The analog inputs have a common ground line
2. Each analog output has its own ground line

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