Isolated multifunction data acquisition board, 16-bit

**APCI-3120**

**16/8 single-ended/**
**8/4 differential inputs, 16-bit**

**8/4 analog outputs, 14-bit**

**Optical isolation of the inputs and outputs, 500 V**

**Automatic analog acquisition**

**8 digital I/O, 24 V, isolated, timer**

**Graphical display of the measured data**

**Features**

- PCI interface to the 32-bit data bus
- Monitoring program for testing and setting the board functions

**Analog inputs**

- 16 single-ended/8 differential inputs or 8 single-ended/4 differential inputs
- 16-bit resolution
- Optical isolation, 500 V
- Data transfer rate: 100 kHz
- Input voltage: 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 DMA for analog data acquisition
- Overvoltage protection
- Input filter: 160 kHz

**Analog acquisition**

- Acquisition of one single channel, several channels or 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 scan) is started through signal switching from 0 to 24 V at digital input 0.
- Interrupt: end of single channel, end of multichannel, end of scan list

**Analog outputs**

- 4 or 8 analog outputs, optical isolation 500 V
- Setting time 30 µs typ.
- 14-bit resolution (13-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)
- Driver capacity: 5 mA/500 pF
- Short-circuit protection, EMI filter

**Digital**

- 4 dig. inputs, 4 dig. outputs, 24 V, isolated

**Timer**

- As cyclic time counter or as watchdog

**Safety features**

- Optical isolation 500 V min.
- Creeping distance IEC 61010-1 (VDE411-1)
- Overvoltage protection ± 12 V
- Protection against high-frequency EMI
- Input filter: 160 kHz
- Noise neutralization of the PC supply

**EMC tested acc. to 89/336/EEC**

- IEC 61326: electrical equipment for measurement, control and laboratory use

**Applications**

- Industrial process control
- Industrial measurement and monitoring
- Multichannel data acquisition
- Control of chemical processes
- Factory automation
- Acquisition of sensor data
- Laboratory equipment
- Current measurement
- Instrumentation

**Software drivers**

A CD-ROM with the following software and programming examples is supplied with the board.

**Standard drivers for:**

- Linux kernel version 2.4.2, Windows XP/2000/NT/98
- Realtime drivers for Windows XP/2000/NT/98
- Monitoring program ADDIMON

**Drivers for the following application software:**

- LabVIEW 5.0

**Samples for the following compilers:**

- Microsoft VC++ 5.0 • Microsoft C 6.0
- Borland C++ 5.01 • Borland C 3.1
- Visual Basic 5.0
- Delphi 4 • Turbo Pascal 7.0

**On request:**

- RTX • VxWorks • LabWindows/CVI 5.01 • Diadem 6/7
- Embedded NT • DasyLab 6/7

**ADDIPACK functions on request:**

- Limited write/read function on the I/O signals
- Current driver list on the web: www.addi-data.com
**Analog inputs**

- **Number of inputs:** 16 single-ended/8 differential inputs or 8 single-ended/4 differential inputs
- **Resolution:** 16-bit resolution
- **Optical isolation:** 500 V through optical couplers from the PC to the peripheral
- **Input ranges:** per software programmable for each channel
  - 0-10 V, ±10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V
  - 0-20 mA optional
- **Data transfer rate:** 100 kHz
- **Gain:** software programmable (1, 2, 5, 10)
- **Common mode rejection:** DC at 10 Hz, 90 dB minimum
- **Relative precision (INL):** ± 4 LSB
- **Diff. non-linearity (DNL):** 16-bit
- **Input impedance (PDA):**
  - 10^12 Ω/10 nF single-ended,
  - 10^12 Ω/20 nF differential against GND
- **Band width (-3 dB):** limited to 159 kHz with low-pass filter
- **Trigger:** through software, timer, external event (24 V input)
- **Data transfer:** Data to the PC through FIFO memory, I/O commands, interrupt at EOC (End Of Conversion) and EOS (End of Scan), DMA transfer at EOC
- **Interrupts:** End of conversion, at timer overrun, End of scan

**Analog outputs**

- **Number of outputs:** 4 or 8
- **Resolution:** 14-bit resolution
- **Optical isolation:** 500 V through optical couplers
- **Output range:** 0-10 V, ±10 V switchable through software
- **Setup time at 2 kΩ, 1000 pF:** 30 µs
- **Overvoltage protection:** ±12 V
- **Max. output current/Load:** ±5 mA/500 pF, 2 kΩ
- **Short-circuit current:** ±26 mA
- **Output voltage after reset:** 0 V

**Digital I/O**

- **Number of I/O channels:** 4 digital inputs, 4 digital outputs, 24 V
- **Optical isolation:** 1000 V through optical couplers
- **Inputs current at 24 V:** 3 mA typ.
- **Input range:** 0-30 V
- **Output range:** 5-30 V
- **Max. switching current:** 5 mA typ.

**Noise immunity**

- **Test level:** - ESD: 4 kV
  - Fields: 10 V/m
  - Burst: 2 kV/4 kV Netz
  - Conducted radio interferences: 10 V

**Physical and environmental conditions**

- **Dimensions:** 175 x 99 mm
- **System bus:** PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
- **Place required:** 1 PCI slot for analog I/O, 1 slot opening for digital I/O with FB3000
- **Operating voltage:** +5 V, ±5 % from PC
- **Current consumption:** from 997 to 1030 mA typ. dep. on board version
- **Front connector:** 37-pin SUB-D male connector
- **Additional connector:** 16 pin male connector for connecting the dig. I/O
- **Temperature range:** 0 to 60 °C (with forced cooling)

**ORDERING INFORMATION**

- **APCI-3120**
  - Isolated multifunction data acquisition board, 16-bit. Incl. technical description and software drivers and monitoring program.

**Versions**

- **APCI-3120-16-8:** 16 SE/8 diff. inputs, 8 analog outputs
- **APCI-3120-16-4:** 16 SE/8 diff. inputs, 4 analog outputs
- **APCI-3120-8-8:** 8 SE/4 diff. inputs, 8 analog outputs
- **APCI-3120-8-4:** 8 SE/4 diff. inputs, 4 analog outputs

**Options:**

- **Please specify the number of channels to be supplied with the required option.**
- **Option SF:** Filter for 1 single-ended channel
- **Option DF:** Precision filter for 1 diff. channel

**Pin assignment – 37-pin SUB-D Male connector**

**Pin assignment – 16-pin male connector**

**ADDI-DATA connection**

| Option PC | Current input 0(4)-20 mA for 1 channel |
| PC-SE | for single-ended PC-Diff | for differential |

**Connection**

- **PX 901-A:** Screw terminal board with transorb diodes, for connecting the analog I/O
- **PX 901-AG:** Same as PX 901-A with housing for DIN rail
- **PX 901-ZG:** Screw terminal board for connecting the dig. I/O, for DIN rail

| ST010 | Standard round cable, shielded, twisted pairs, 2 m |
| ST011 | Standard round cable, shielded, twisted pairs, 5 m |
| PX 901-ZG | Ribbon cable for digital I/O |