Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4/8 analog outputs, 16-bit

APCI-3120
16 Single-ended/8 differential inputs, 16-bit
8/4 analog outputs, 14-bit
Optical isolation of inputs and outputs, 500 V
PCI DMA, programmable gain
Trigger functions
8 digital I/O, 24 V, optically isolated, timer
On-site calibration with the CAL3120 option

Features

Analog inputs
- 16 single-ended/8 differential inputs or 8 single-ended/4 differential inputs
- 16-bit resolution
- Optical isolation 500 V
- Throughput: 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 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
- 4 or 8 analog outputs, optically isolated 500 V
- Setup time 10 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 filters

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

Timer
- As cyclic time counter or as watchdog

Safety features
- Optical isolation 500 V min.
- Creeping distance IEC 61010-1
- Overvoltage protection ± 40 V
- Protection against high-frequency EMI
- Input filters: 160 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
Calibration tool (Option CAL3120): Do the fine adjustment fast and reliably and save the generated calibration report file. All you need is a highly precise calibration source and a precise digital multimeter (not included in the delivery content).

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 on request
- Microsoft VC++ • Microsoft C
- Borland C++ • Borland C
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DASYLab • DIAdem

On request:
Further operating systems, compilers and samples.

Driver download: www.addi-data.com, download menu
### Specifications

#### Analog inputs

<table>
<thead>
<tr>
<th>Number of inputs:</th>
<th>16 single-ended/8 differential inputs or 8 single-ended/4 differential inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>16-bit resolution</td>
</tr>
<tr>
<td>Optical isolation:</td>
<td>500 V through opto-couplers from PC to peripheral</td>
</tr>
<tr>
<td>Input ranges:</td>
<td>software-programmable for each channel 0-10 V, ±10 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V, ±20 mA optional</td>
</tr>
<tr>
<td>Throughput:</td>
<td>100 kHz</td>
</tr>
<tr>
<td>Gain:</td>
<td>Software programmable (1, 2, 5, 10)</td>
</tr>
<tr>
<td>Common mode rejection:</td>
<td>DC at 10 Hz, 30 dB minimum</td>
</tr>
<tr>
<td>Relative precision (PRL):</td>
<td>± 1.5% (PRL)</td>
</tr>
<tr>
<td>temp. non-linearity (TNL):</td>
<td>± 0.5% (TNL)</td>
</tr>
<tr>
<td>Input impedance (PIA):</td>
<td>10 × 1.1110 Ω off single-ended, 10 × 1.1110 Ω of differential against GND</td>
</tr>
<tr>
<td>Bandwidth (-3 dB):</td>
<td>Limited to 159 kHz with low-pass filter</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Through software, timer, external event (±24 V input)</td>
</tr>
<tr>
<td>Data transfer:</td>
<td>Data to the PC through FIFO memory</td>
</tr>
<tr>
<td>I/O commands, Interrupts:</td>
<td>(End Of Conversion) and EOS (End of Scan), DMA transfer at EOC</td>
</tr>
</tbody>
</table>

#### Analog outputs

<table>
<thead>
<tr>
<th>Number of outputs:</th>
<th>4 or 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>16-bit resolution</td>
</tr>
<tr>
<td>Optical isolation:</td>
<td>500 V through opto-couplers</td>
</tr>
<tr>
<td>Output range:</td>
<td>0-10 V, ±10 V switchable through software</td>
</tr>
<tr>
<td>Setup time to 2 kHz, 1000 pF:</td>
<td>1 µs at 10 V step</td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td>±12 V</td>
</tr>
<tr>
<td>Max. output current / load:</td>
<td>±25 mA / 500 pF, 2 kHz</td>
</tr>
<tr>
<td>Short-circuit current:</td>
<td>±25 mA</td>
</tr>
<tr>
<td>Output voltage after reset:</td>
<td>0 V</td>
</tr>
</tbody>
</table>

#### Digital I/O

<table>
<thead>
<tr>
<th>Number of I/O channels:</th>
<th>4 dig. inputs, 4 dig. outputs, 24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical isolation:</td>
<td>1000 V through opto-couplers</td>
</tr>
<tr>
<td>Input current at 24 V:</td>
<td>3 mA typ.</td>
</tr>
<tr>
<td>Input range:</td>
<td>0-30 V</td>
</tr>
<tr>
<td>Output range:</td>
<td>5-30 V</td>
</tr>
<tr>
<td>Max. switching current:</td>
<td>10 mA typ.</td>
</tr>
</tbody>
</table>

#### 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.

#### PC system requirements and environmental conditions

| Dimensions:                  | 169 x 99 mm                                                                     |
| System bus:                  | PCI, 32-bit 3.3 V acc. to specification 2.1 (PC/104)                            |
| Space required:              | 1 PCI slot for analog I/O, 1 slot opening for digital I/O with FB3000             |
| Operating voltage:           | ±5 V 25 % from the PC                                                           |
| Current consumption:         | From 710 to 790 mA typ. depending on the board version                           |
| Front connector:             | 37-pin D-Sub 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**

Multifunction board, optically isolated, 16 SE/8 diff. inputs, 4/8 analog outputs, 16-bit. Incl. technical description, monitoring program and software drivers.

#### Versions

- **APCI-3120-16-8**: Version with 16 SE/8 diff. inputs, 8 analog outputs
- **APCI-3120-16-4**: Version with 16 SE/4 diff. inputs, 4 analog outputs
- **APCI-3120-8-8**: Version with 8 SE/4 diff. inputs, 8 analog outputs
- **APCI-3120-8-4**: 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(0A-20 mA) for 1 channel
- **PC-SE**: for single-ended PC-DIFF: for differential

**Option CAL3120**: Only for 32-bit operation system. On-site calibration of the APCI-3120. Do the fine adjustment fast and reliably and then save the calibration report file.

#### Accessories

- **PX901-A**: Screw terminal panel for connecting the analog I/O
- **PX901-AG**: Same as PX901-A with housing for DIN rail
- **PX_BNC**: BNC connection box for connecting the analog I/O
- **PX901-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

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