PRODUCTCATALOG 1/2014

Industrial Measurement and Automation

Distributed systems

Interference free PC boards

www.addi-data.com

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For us, 2014 is a special year: We are celebrating our 30th company anniversary!

During these 30 years, we were able to gain a lot of expertise.
Thank you for your trust!

This success is also a result of the values we have been living by: quality, flexibility, long-term availability, reliability and spirit of innovation. By choosing ADDI-DATA, you have chosen high-quality products which are available for years, expert technical advice and the possibility to adapt our products to your requirements.

And tomorrow? We would be happy to let you benefit further from our know-how and 30 years of expertise. We are looking forward to standing at your side for your future projects.

René Ohlmann
Managing Director, ADDI-DATA GmbH

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PCI EXPRESS®

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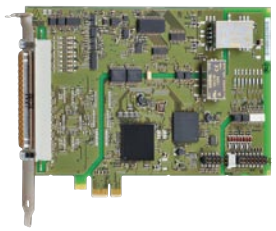
Fast processing of high data volumes



PCI EXPRESS®
PCI
CompactPCI™
CompactPCI® Serial

With ADDI-DATA measurement boards, you can precisely acquire numerous types of signals and sensor and thus control processes reliably. The extremely interference-resistant measurement boards are especially designed for the harsh industrial environment.

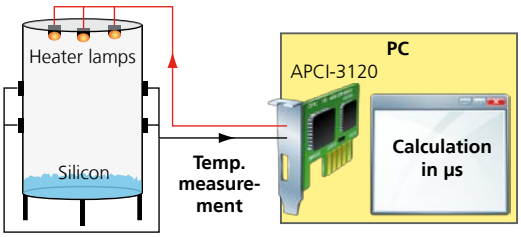
- DMA for more speed
- FPGA: onboard calculation of the measurement
- RTX real-time drivers for time-critical applications with Windows
- Measurement boards for the following signal types: digital, counter, analog, temperature, pressure, vibrations, length, motion control, serial interfaces

Temperature regulation for wafer production

Challenge
- PC-based solution
- Acquisition cycle 1 ms
- FPGA technology for taking load off the external software (algorithm)

Solution
- Analog I/O board APCI-3120 for the PCI bus for temperature measurement and PWM regulation
- Satisfies all requirements: Speed, precision and long-term availability
- Numerous protective circuits for the use in an environment with interferences

Heat regulation via analog and digital outputs



See also data sheet APCI-3120, page 180

Time-critical applications

PCI
CompactPCI™

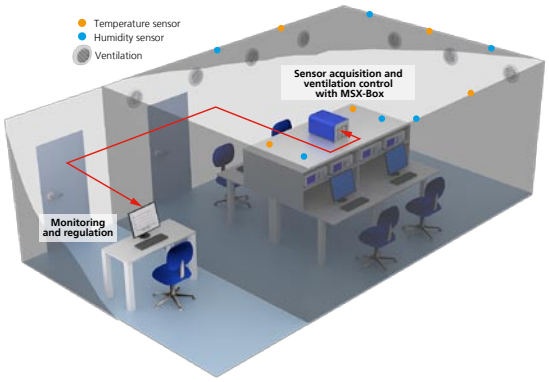
The Programmable Automation Controller system (PAC) MSX-Box has been especially developed for industrial measurement, control and automation applications in real time where processes have to be carried out within a defined time.

- Based on established standard technologies like PCI backplane or CompactPCI backplane
- Programmable, free programming tools
- Working with Linux operating system with RTAI extension
- No update obligations, no licence costs
- I/O PCI boards or CompactPCI boards from other manufacturers can be used

Intelligent monitoring of temperature and air humidity in clean rooms, laboratories and calibration rooms

Challenge
- Monitoring of the room atmospheric environment in real time
- Ensure constant values

Solution
- Definition of reference values for the room temperature and air humidity
- Real-time PAC system MSX-Box with temperature measurement and analog input board for the acquisition of sensor data
- Digital output board APCI-2032 for ventilation control



See also data sheet PAC system MSX-Box, page 22

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Measurement and control in the field

Relieve your PLC and expand its range of functionality with useful measurement tasks close to the sensor or the machine: the intelligent Ethernet systems of the MSX-E series are perfect for this!

- Robust metal housings, degree of protection IP 65/ IP 67
- Easy connection to PLCs and to the company network through Ethernet
- Integrated Modbus TCP/IP server – Modbus library in preparation
- High accuracy for precise control commands
- Onboard data calculation
- Synchronisation of several (same or different type) Ethernet systems in the µs range

NEW! MSX-E3121 as a substitute for a small PLC or in addition to a PLC

Analog and digital I/O for measurement and control tasks in one device!

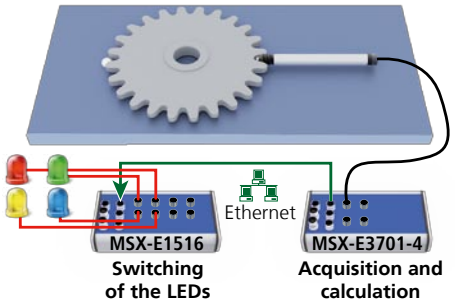
Precise and error-free diameter detection of gear wheels

Challenge

- Automation / replacement of a manual test station
- Improve the measurement accuracy
- Avoid measurement errors

Solution

- Real-time Ethernet system MSX-Box with counter-, analog I/O boards and serial interfaces
- Onboard data calculation, time stamp
- Several sensor transmission protocols: CAN, serial, etc



See also data sheet MSX-E3121, page 70

Measurement and control with EtherCAT, ProfiNet, VARAN

EtherCAT
PROFINET
VARAN

The x-ARTS real-time systems are I/O slave systems for EtherCAT, ProfiNET and VARAN for measurement and control tasks.

- Highly precise inputs
- Data acquisition faster than the bus clock, data buffering
- Starts the acquisition independently from the bus by using the 24 V trigger input
- Can be combined with external devices which are not connected to the bus

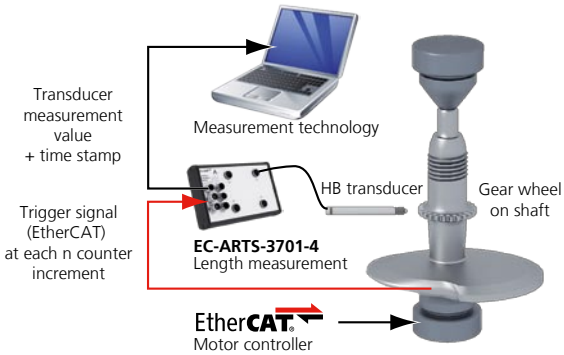
Extension of an optical shaft measurement machine with a tactile measurement device

Challenge

- Clear assignment of the measured values to the axis position
- Autonomous data transmission to the measure-ment machine
- High precision and interference-resistance

Solution

- EtherCAT system for the connection of half-bridge transducers to an optical shaft measurement machine
- 24-bit high resolution and numerous protective circuits
- Data package for the measurement system with measured data incl. time stamp



See also data sheet EC-ARTS-3701-4, page 19

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NEW PRODUCTS 2014

First CompactPCI Serial I/O boards

For the new CompactPCI Serial Bus, ADDI-DATA now presents the **CPCIs-1564** and the **CPCIs-1532**, the first digital I/O boards, 24 V for industrial I/O control. They have 64 or 32 I/O, interruptible inputs and up to 3 counter inputs. To avoid undefined states, the 32 outputs are set to "0" at power-on. Both boards are designed for an extended temperature range from –40 °C to +85 °C.

Also included in the CompactPCI Serial board range are a counter board with programmable functions, the **CPCIs-1711**, and 2 analog boards: the **CPCIs-3121** (16 inputs, 16-bit, and 8 outputs, 16-bit) and the **CPCIs-3131** (8 inputs, 24-bit, and 4 outputs, 16-bit).

Also new: 5 V and 12 V versions of digital I/O boards

PCI-Express: **APCIe-1564-5V-HS** and **APCIe-1532-12V**

PCI: **APCI-1564-5V-HS** and **APCI-1500-12V**.

Intelligent Ethernet systems: new functions and signal combinations

New functions and new signal combinations are now available! The range of counter systemse has been extended with the **MSX-E1731** for the acquisition of EnDat2.2 sensors. The **NPN** version of the **MSX-E1516** digital system can acquire values from bipolar transistors, which can amplify and switch high-current or voltage signals.

New types of applications are now possible with systems featuring new signal combinations on one device: force-path measurement with the **MSX-E3x17** and measurement and control with the **MSX-E3121** and **MSX-E3122** analog/digital systems. **Do you need your own customized signal combination? Contact us!**

Also new: Customized functions as firmware extensions. With the **XT-17x1-TickCounter** extension, an internal time base can be defined which is independent from the system time.

New EtherCAT systems

Two new EtherCAT systems have been added to the product range: the **EC-ARTS-3011** system has 16 analog, differential inputs. The inputs can be configured as current or voltage inputs. They are organised in 4 groups of 4 channels each. There is one multiplexer per group which means that 4 channels can be acquired simultaneously. The system has a 16-bit resolution.

The **EC-ARTS-3701-4** system for length measurement allows the simultaneous acquisition of 4 inductive displacement transducers – Half-Bridge, LVDT or Mahr transducers – with a 24-bit resolution. The system detects short-circuits or line break of the connected transducers.

64-bit

64-bit drivers / 64-bit ADDIPACK version

64-bit drivers for Windows 8/7/XP are now available for many PCI-Express, PCI, CompactPCI and CompactPCI-Serial boards. They belong to the new generation of drivers which can be used for both 64-bit and 32-bit applications. They are therefore optimally suited for applications scheduled to be switched from 32-bit to 64-bit.

ADDIPACK drivers are very useful when you have to administrate different board types.

The **64-bit version of ADDIPACK** is now available!

The concept is simple: the functions of all boards which are installed in the PC are listed as resources in an overview. The user selects the functions he needs without having to figure out from which board they come.

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Product overview

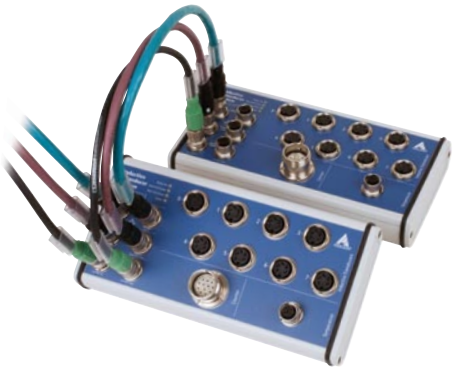
The distributed systems by ADDI-DATA have been developed especially for the harsh industrial environment and can be used directly in the field. They have high-precision inputs as an outstanding feature, save space and reduce the wiring significantly. All systems are available in the long term in order to safeguard your investment. You will find in our product range systems for the well-proven network buses Ethernet, EtherCAT, ProfiNET and VARAN – also in real-time versions.

Many different types of distributed solutions can be found on the market.
However, on closer examination there are not many systems which can actually cope with the high requirements of production facilities. Technology which may work perfectly in the laboratory is not intended for the use in an environment submitted to current or voltage peaks or electromagnetic disturbances. The distributed systems from ADDI-DATA are robust because they have been developed especially for the use in the field.

1. Industrial data loggers

The industrial data loggers of the MSX-ilog series are used for continual data acquisition and storage over longer periods of time. Diverse physical measurements can be acquired and shown. Data storage and visualisation take place parallel to one another. The data loggers from ADDI-DATA need no installation, are platform-independent and save expensive licence costs.

2. Intelligent Ethernet systems



Precision, autonomy and flexibility are key features of the intelligent Ethernet systems of the MSX-E series.
Measurement and control tasks can be effected reliably directly at the machine. If necessary, the signals can be processed onboard.
This saves resources from external PCs or PLCs.

3. Real-time open source PAC systems

The MSX-Box product range is used for measuring and controlling tasks in real time. Versions for PCI and for CompactPCI backplanes are available.
The user defines the functions of the Ethernet-based systems by selecting the corresponding PC boards.
In addition to flexibility, the systems offer another advantage:
you save licence costs.

4. Real-time Ethernet systems

ADDI-DATA offers I/O slave systems for EtherCAT, ProfiNET and VARAN. They feature highly-precise inputs. The systems can measure faster than the bus cycle and buffer the acquired data. Moreover, the measurement can be started independently from the bus, since by using the 24 V trigger input, the x-ARTS can be combined with hardware that is not connected to the bus.

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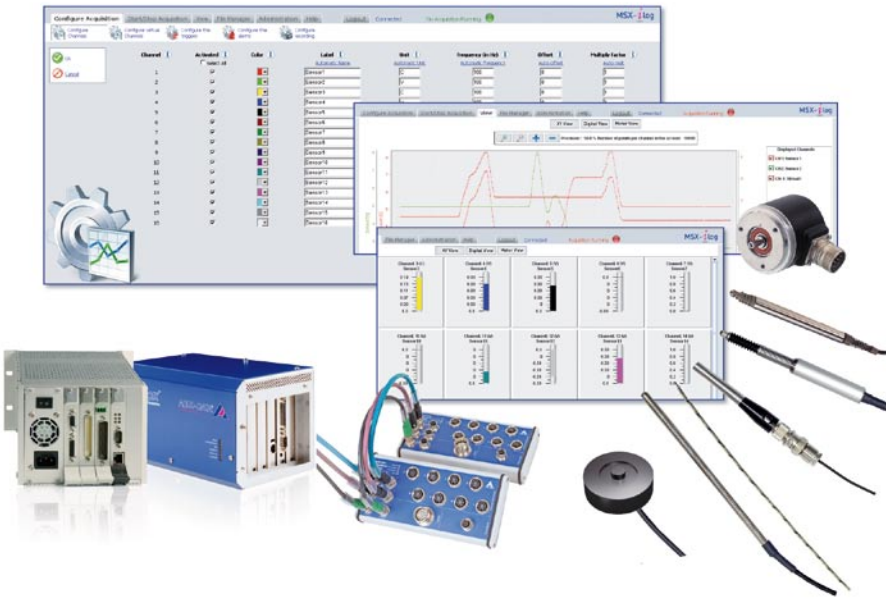
ETHERNET DATA LOGGERS

*i*ndustrial + *i*nternet technology + *i*ntelligent + *i*ntuitive + *i*ntegrated
= *i*nnovative data loggers from ADDI-DATA

Data recording and visualisation made easy



MSX-ilog

MSX-ilog data loggers from ADDI-DATA are used for continual data acquisition and storage over long periods of time. Diverse physical measurements can be acquired and shown in different display modes. Data storage and visualisation take place parallel to one another.

Different hardware versions

Different hardware versions are available to meet the various application requirements: Ethernet systems, PCI and CompactPCI solutions. The version with Ethernet systems is primarily designed for use in the field: the systems have numerous protective circuits and IP 65 protection levels and they can be used with an operating temperature from -40 °C to +85 °C. In order to safeguard your investments, MSX-ilog data loggers can be supplied by ADDI-DATA over many years.

BENEFITS

- Industry standard solutions
- One-time acquisition costs (no additional license costs)
- Independent from operating systems
- Software integrated in the hardware – no installation necessary
- Simple operation via the web-based user interface
- Recording of a number of signal types as physical measurement data
- Rapid acquisition

Application areas

- Environmental technology
- Aviation
- Research and development
- Engineering
- Building services
- Monitoring of infrastructure
- Energy industry
- Transport monitoring
- Stock control
- Chemicals

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Technical description see www.addi-data.com

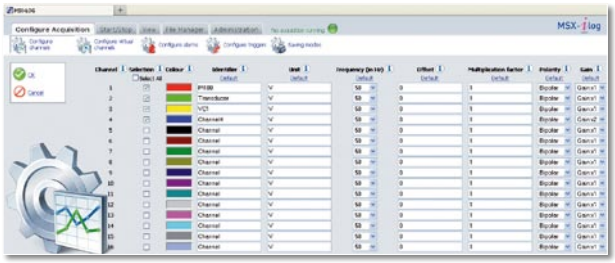
Functions

- Long-term recording of many signal types
- Visualisation: Live or recorded data using a curve diagram, display of value
- Setup of the test point without programming knowledge
- Web-based user interfaces without installation of programs
- Can be used as a stand-alone system

Configuration

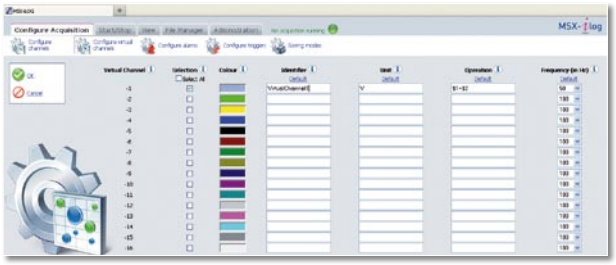
Real channels

• Channel selection • Colour • Identifier • Unit • Frequency • Offset • Multiplication factor • Polarity • Gain



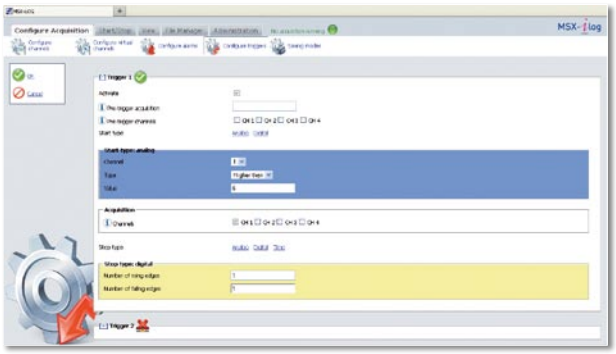
Virtual channels

• Channel selection • Colour • Identifier • Unit • Operation • Frequency



Triggers

• Activate trigger • Pre-trigger acquisition • Pre-trigger channels • Start/Stop type (digital, analog, stop time) • Channel selection

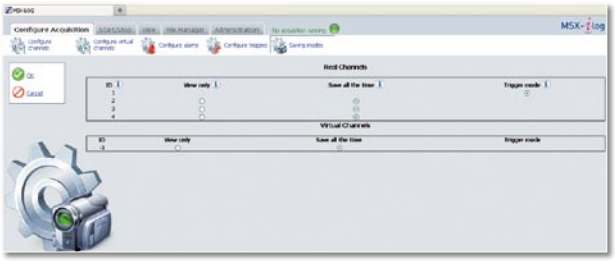


Alarms

• Channel selection • Bottom value • Top value

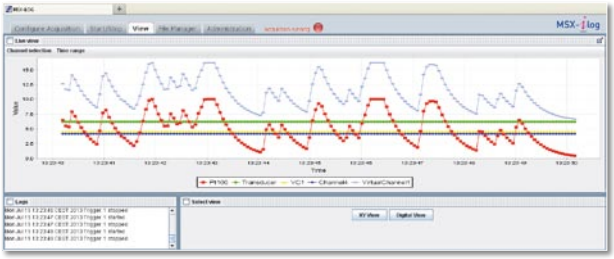
Saving modes

• View only • Save all the time • Trigger mode



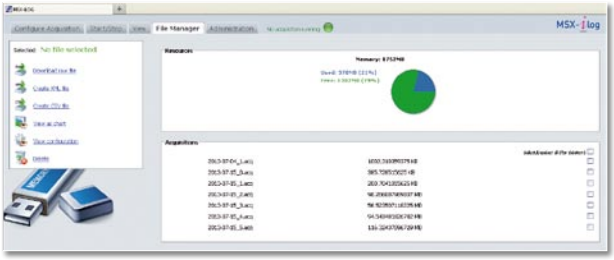
Live view

• XY view • Digital view



Exporting data

• CSV • XML • View as chart • View/load acquisition configuration • Delete acquisition files



Administration

• Software download • Auto start • System configuration • System reboot/shutdown • NTP/Time configuration

Bespoke solutions

In order to make the data recording as efficient as possible, it is important to adapt the measurement system as closely to your requirements as possible. This is not always possible with standard products. We are happy to advise on finding the optimum solution for your applications and perform the necessary adaptations for you. **Just ask us!**

Advice needed?
Then just call us at +49 7229 1847-0
or send an e-mail to: info@addi-data.com

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Ethernet data logger
16 differential analog inputs, 16-bit

MSX-ilog-AI-16

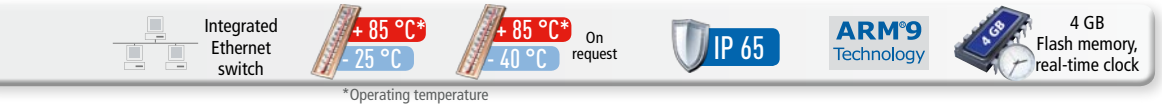
16 analog inputs, differential, 16-bit

Voltage or current inputs

Acquisition, visualisation and analysis in one device

No software installation needed

Automatic storing of measured values (4 GB build-in Flash memory)



*Operating temperature

RoHS 2002/95/EC

More information at www.addi-data.com

The intelligent Ethernet data logger MSX-ilog-AI-16 has 16 differential analog inputs, 16-bit, with a transfer rate of 1 kHz/channel. The parametering and visualisation of the measured values are carried out via an integrated web site. Thus no additional software installation is needed. The acquisition, visualisation and data storage take place automatically.

Features

- Onboard ARM®9 32-bit processor
- 4 GB memory, data remains stored at power loss
- The buffered real-time clock keeps the system time even without supply voltage
- Robust metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs
- 24 V digital trigger input

Analog inputs

- 16 diff. inputs, 16-bit, 5-pin M12 female connectors
- Sampling frequency max. 1 kHz, up to 4 simultaneous channels
- Input ranges: ± 5 V, ± 10 V (16-bit)
  0-5 V, 0-10 V (15-bit)
- Current inputs optional

Acquisition

- Automatic acquisition and recording of measured data
- Conversion of measured data into real values e. g. mm, bar, temperature, etc.
- Acquisition of virtual channels

Trigger

- Acquisition triggered via hardware or software
- 24 V hardware trigger
- Threshold trigger (when the defined level of the analog inputs is exceeded)
- Optional pre-trigger (records events which have occurred before the trigger event)
- Triggers from external hardware, e. g. MSX-E systems, are possible

Alarm functions

- Upper and lower limits of channels
- Data storage depending on alarms
- Can be combined with the pre-trigger

Analysis

- Online graphical analysis of measured data
- Data export (xml, csv)

Safety features

- LED status display for fast error diagnostics
- Optical isolation • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Applications

- Data logger • Long-term data recording
- Monitoring of infrastructure

Interfaces

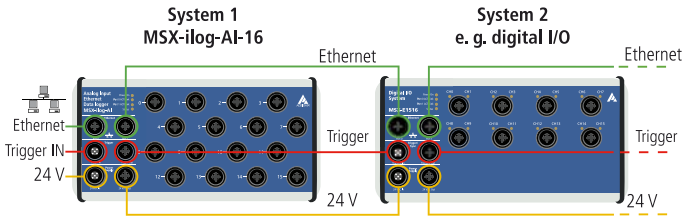
- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Trigger In/Out
- 24 V supply and cascading

Communication interfaces

- Web server (configuration and monitoring)
- Data server (TCP/IP or UDP socket) for sending acquisition data

Combination with external hardware

Ethernet and supply signals can be looped e.g. from the MSX-ilog-AI-16 to MSX-E systems. These can then react to the values measured by the MSX-ilog-AI-16 (e.g. via alarm or trigger) and acquire and switch distributed I/O signals. Monitoring or regulation tasks can be realised.



*Preliminary product information

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Specifications*

Analog inputs

Number/type:	16 differential inputs
Architecture:	4 groups with 4 channels each 4-port simultaneous converter with one 4-channel multiplexer per converter
Resolution:	16-bit, SAR ADC
Accuracy:	± 1.221 mV typ. (± 4 LSB) ± 2.442 mV max.
Relative precision (INL):	± 3 LSB max. (ADC)
Optical isolation:	1000 V
Input ranges:	± 5 V, ± 10 V software-programmable
Input frequency:	1 kHz per channel
Gain:	x1, x2, software-programmable
Common mode rejection:	80 dB min. DC up to 60 Hz (diff. amplifier)
Input impedance (PGA):	10^9 Ω // 10nF against GND
Bandwidth (-3 dB):	160 kHz limited through TP filters 16 Hz version with differential filter
Trigger:	Digital input, software-programmable
Offset error:	± 1 LSB (± 305 µV)
Gain error:	± 2.5 LSB
Temperature drift : V_{in}: input voltage in Volts (-10 V ≤ V_{in} ≤ +10 V) In the temperature range: from -40 °C to +85 °C	2.3 x V_{in} + 22.5 (µV / °C) typ. 4.5 ppm/°C FSR
Connectors for sensors	8 x 5-pin female M12 connector

Data storage

RAM:	64 MB
FLASH:	4 MB for system data
Extended FLASH memory:	4 GB (2 GB for measured data)
Buffered real-time clock:	approx. 4 weeks at 20 °C

Voltage supply

Nominal voltage :	24 V ⎓
Supply voltage:	18-30 V
Optical isolation:	1000 V
Reverse voltage protection:	1 A max.
Connectors	
24 VDC input	1 x 5-pin male M12 connector
24 VDC output	1 x 5-pin female M12 connector

Ethernet

Interface:	Ethernet acc. to IEEE802.3 specification	
Number of ports:	2	
Cable length:	150 m	max. at CAT5E UTP
Bandwidth:	10 Mbps	auto-negotiation
	100 Mbps	auto-negotiation
Protocol:	10Base-T	IEEE802.3 compliant
	100Base-TX	IEEE802.3 compliant
Optical isolation:	1000 V	
MAC address:	00:0F:6C:##:##:##, unique for each device	
Connectors	2 x 4-pin flange-type socket, D-coded M12 for Port 0 and Port1	

Trigger

Number of inputs:	1 trigger input
Number of outputs:	1 trigger output
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 to 30 V
Input current:	11 mA at 24 VDC, typical
Input frequency (max.):	2 MHz at 24 V
Connectors	
Trigger input :	1 x 5-pin flange connector M12
Trigger output:	1 x 5-pin flange-type socket M12

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.

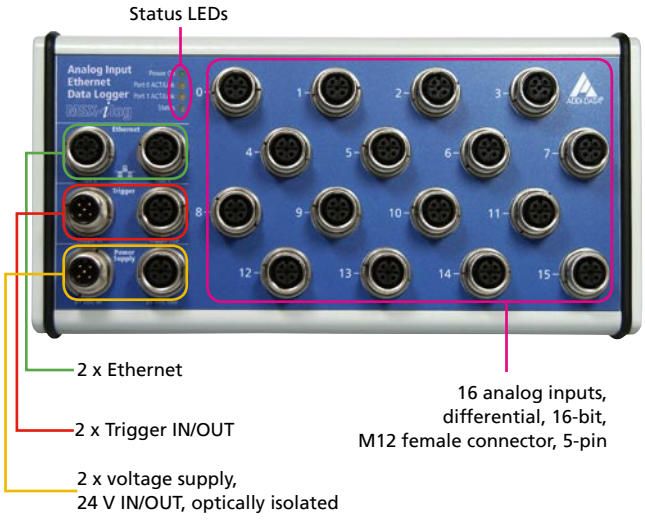
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	215 x 110 mm x 50 mm
Weight:	850 g
Degree of protection:	IP 65
Current consumption at 24 V:	160 mA
Operating temperature:	-25 °C to +85 °C (-40 °C to +85 °C on request)

System requirements

Standard browser (Internet Explorer, Firefox) with Java from version 1.6.x

Features



Ordering information

MSX-ilog-AI-16

Ethernet data logger, 16 analog inputs, differential, 16-bit. Incl. technical description.

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

* Preliminary product information

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Ethernet data logger for temperature measurement 16/8 channels for thermocouples or RTD, 24-bit

New!*

MSX-ilog

MSX-ilog-RTD / MSX-ilog-TC

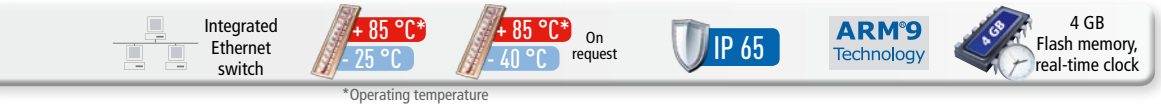
16/8 differential inputs

For thermocouples or RTD (Pt 100, Pt 1000)

Acquisition, visualisation and analysis in one device

No software installation needed

Automatic storing of measured values (4 GB build-in Flash memory)



*Operating temperature

RoHS 2002/95/EC

More information at www.addi-data.com

The intelligent Ethernet data logger MSX-ilog-RTD/TC has 8 or 16 differential inputs for thermocouples or resistance temperature detectors (RTD, Pt100/Pt1000). The parametering and visualisation of the measured values are carried out via an integrated web site. Thus no additional software installation is needed.
The acquisition, visualisation and data storage take place automatically.

Features

- Onboard ARM®9 32-bit processor
- 4 GB memory, data remains stored at power loss
- The buffered real-time clock keeps the system time even without supply voltage
- Robust metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs
- 24 V digital trigger input

Analog inputs

- 8-pin M12 female connectors
- 16/8 differential inputs for thermocouples or RTD, 24-bit
- Max. sampling frequency 1 kHz

Acquisition

- Automatic acquisition and recording of measured data
- Conversion into temperature (°C)
- Acquisition of virtual channels

Trigger

- Acquisition triggered via hardware or software
- 24 V hardware trigger
- Threshold trigger (when the defined level of the analog inputs is exceeded)
- Optional pre-trigger (records events which have occurred before the trigger event)
- Triggers from external hardware, e. g. MSX-E systems, are possible

Alarm functions

- Upper and lower limits of channels
- Data storage depending on alarms
- Can be combined with the pre-trigger

Analysis

- Online graphical analysis of measured data
- Data export (xml, csv)

Safety features

- LED status display for fast error diagnostics
- Optical isolation • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Applications

- Data logger • Long-term data recording
- Monitoring of infrastructure

Interfaces

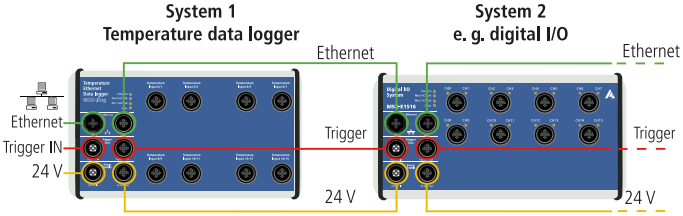
- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Trigger In/Out
- 24 V supply and cascading

Communication interfaces

- Web server (configuration and monitoring)
- Data server (TCP/IP or UDP socket) for sending acquisition data

Combination with external hardware

Ethernet and supply signals can be looped e.g. from the MSX-ilog-RTD/TC to MSX-E systems. These can then react to the values measured by the MSX-ilog-RTD/TC (e.g. via alarm or trigger) and acquire and switch distributed I/O signals. Monitoring or regulation tasks can be realised.



*Preliminary product information

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Specifications*

Analog inputs

Number of inputs:	16 or 8 differential inputs for thermocouples or RTD
Resolution:	24-bit
Optical isolation:	1000 V
Throughput:	max. 1000 Hz

Data storage

RAM:	64 MB
FLASH:	4 MB for system data
Extended FLASH memory:	4 GB (3.7 GB for measured data)
Buffered real-time clock:	approx. 4 weeks at 20 °C

Voltage supply

Nominal voltage :	24 V ⎓
Supply voltage:	18-30 V
Optical isolation:	1000 V
Reverse voltage protection:	1 A max.
Connectors	
24 VDC input	1 x 5-pin male M12 connector
24 VDC output	1 x 5-pin female M12 connector

Ethernet

Interface:	Ethernet acc. to IEEE802.3 specification	
Number of ports:	2	
Cable length:	150 m	max. at CAT5E UTP
Bandwidth:	10 Mbps	auto-negotiation
	100 Mbps	auto-negotiation
Protocol:	10Base-T	IEEE802.3 compliant
	100Base-TX	IEEE802.3 compliant
Optical isolation:	1000 V	
MAC address:	00:0F:6C:##:##:##, unique for each device	
Connectors	2 x 4-pin flange-type socket, D-coded M12 for Port 0 and Port1	

Trigger

Number of inputs:	1 trigger input
Number of outputs:	1 trigger output
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 to 30 V
Input current:	11 mA at 24 VDC, typical
Input frequency (max.):	2 MHz at 24 V
Connectors	
Trigger input :	1 x 5-pin flange connector M12
Trigger output:	1 x 5-pin flange-type socket M12

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.

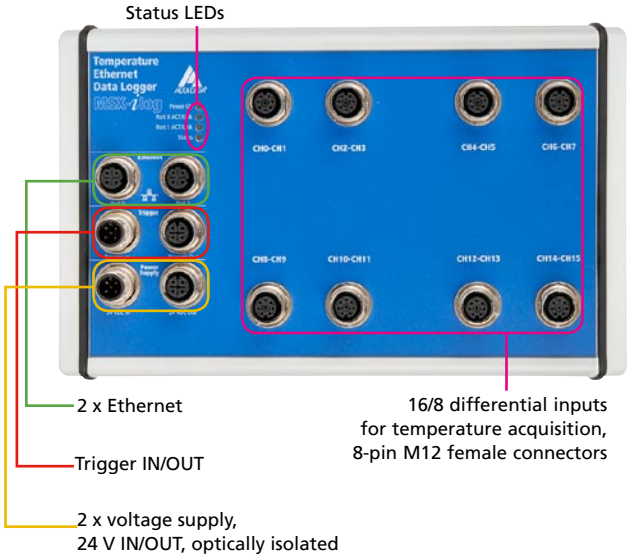
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	220 x 140 mm x 50 mm
Weight:	620 g
Degree of protection:	IP 65
Current consumption at 24 V:	150 mA ± 10 % typ. in Idle/Powersave
Operating temperature:	-25 °C to +85 °C (-40 °C to +85 °C on request)
Sensor connectors	
Analog inputs:	8 x 8-pin female connectors, M12

System requirements

Standard browser (Internet Explorer, Firefox) with Java from version 1.6.x

Features



Ordering information

MSX-ilog-RTD / MSX-ilog-TC

Ethernet data logger for temperature measurement, 16/8 channels for thermocouples or RTD, 24-bit. Incl. technical description.

Versions

MSX-ilog-RTD-16: for 16 RTD
MSX-ilog-RTD-8: for 8 RTD
MSX-ilog-TC-16: for 16 thermocouples
MSX-ilog-TC-8: for 8 thermocouples

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Options

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

* Preliminary product information

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Ethernet data logger
16 analog inputs, 16-bit, diff., 40 dig. I/O

New!*

MSX-ilog-AI16-DI040

16 analog inputs, differential, 16-bit

Voltage or current inputs

36 dig. inputs, 4 dig. outputs, 24 V

Acquisition, visualisation and analysis in one device

No software installation needed

Automatic storing of measured values (internal SSD hard disk)

RoHS 2002/95/EC

More information at www.addi-data.com

The intelligent Ethernet data logger MSX-ilog-AI16-DI40 has 16 differential analog inputs, 16-bit, with a transfer rate of 200 kHz as well as 36 digital inputs, 24 V. Four additional 24 V digital outputs are available for the switching of actuators and the transfer of signals.
The parametering and visualisation of the measured values are carried out via an integrated web site which is accessible over a standard browser (Internet Explorer, Firefox) with Java from version 1.6x. Thus no additional software installation is needed.
The acquisition, visualisation and data storage take place automatically.

Features

- 64-bit MIPS processor
- 128 GB memory (SSD hard disk), data remains stored at power loss
- The buffered real-time clock keeps the system time even without supply voltage
- Robust metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 16 diff. inputs, 16-bit, 37-pin D-Sub connector
- Sampling frequency max. 200 kHz
- Input ranges: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V
- Current inputs: 0-20 mA (option) can be combined freely with voltage inputs

Digital inputs and outputs

- 36 opto-isolated digital inputs, 24 V
- 4 opto-isolated digital outputs, 5 V to 30 V, open collector
- Output current for each channel max. 50 mA typ.
- 2x 37-pin D-Sub connector (1x 32 digital inputs, 1x 8 digital I/O)

Acquisition

- Automatic acquisition and recording of measured data
- Conversion of measured data into real values e. g. mm, bar, temperature, etc.
- Acquisition of virtual channels

Trigger

- Acquisition triggered via hardware or software
- 24 V hardware trigger (external)
- Trigger through timer (internal)
- Threshold trigger (when the defined level of the analog inputs is exceeded)
- Trigger from external software (Software trigger)
- Manual trigger (web interface)
- Optional pre-trigger (records events which have occurred before the trigger event)

Alarm functions

- Upper and lower limits of channels
- Data storage depending on alarms
- Can be combined with the pre-trigger

Analysis

- Online graphical analysis of measured data
- Data export (xml, csv)

Safety features

- Optical isolation 1000 V
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Applications

- Data logger • Long-term data recording
- Monitoring of infrastructure

Interfaces

- Fast 24 V trigger input
- Fast Ethernet (100 MBit/s)

Communication interfaces

- Web server (configuration and monitoring)
- Data server (TCP/IP or UDP socket) for sending acquisition data

*Preliminary product information

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Specifications*

Analog inputs

Number/type:	16 differential inputs
Resolution:	16-bit
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 optional
Input frequency:	200 kHz
Connector for sensors:	37-pin D-Sub connector

Digital inputs

Number:	36
Optical isolation:	Over opto-couplers, 1000 V
Nominal voltage:	24 V
Connectors:	2x 37-pin D-Sub connector (inputs 1-32 and 33-36)

Digital outputs

Number:	4
Output type:	Open collector
Optical isolation:	Over opto-couplers, 1000 V
Max. switching current:	50 mA typ.
Nominal voltage:	24 V
Connectors:	1 x 37-pin D-Sub connector (together with digital inputs 33-36)

Data storage

RAM:	128 MB
FLASH:	16 MB for system data
SSD hard disk:	128 GB (127 GB for measuring data)
Buffered real-time clock:	approx. 2 years at 20 °C

Voltage supply

Input voltage:	100 V - 240 V, AC, 47-63 Hz (other on request)

Ethernet

Interface:	Ethernet acc. to IEEE802.3 specification
Number of ports:	1
Cable length:	150 m max. at CAT5E UTP
Bandwidth:	10 Mbps auto-negotiation 100 Mbps auto-negotiation
Protocol:	10Base-T IEEE802.3 compliant 100Base-TX IEEE802.3 compliant
MAC address:	unique for each device
Connector:	RJ45

Trigger

Number of inputs:	1 trigger input (digital input 33)
Filter/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external

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.

System features

Housing:	Chromated aluminium, colour RAL 5010, "Enzianblau"
Heat dissipation:	Through programmable fan
Interface:	Ethernet acc. to IEEE802.3 specification
Housing dimensions:	278 x 170 x 165 mm
Temperature range:	0 – 50°C

System requirements

Standard browser (Internet Explorer, Firefox) with Java from version 1.6.x

Ordering information

MSX-ilog-AI16-DI040

Ethernet data logger, 16 analog inputs, 16-bit, diff., 40 dig. I/O. Incl. technical description.

Terminal panels / Connection cables

PX901-AG: Screw terminal panel with transorb diodes with housing for DIN rail for connecting the analog I/O

PX901-ZG: Screw terminal panel for connecting the digital inputs (channel 33-36) and outputs, for DIN rail

PX901-DG: Screw terminal panel with LED status display for DIN rail

ST011: Standard round cable, shielded, twisted pairs, 5 m

ST010: Standard round cable, shielded, twisted pairs, 2 m

Options

Option PC-Diff: Current input for 1 diff. channel 0(4)-20 mA

Option DF: Precision filter for 1 channel

MSX-SCREW: Assembly equipment for direct mounting on machines

MSX-RAILDIN: Assembly equipment for DIN-rail mounting

Additional analog inputs: on request

Additional digital I/O: on request

SSD hard disk with more storage space: on request

* Preliminary product information

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x-ARTS: ADDI-DATA Realtime Slave System

Real-time Ethernet systems for the field: precise, robust and reliable

The real-time component plays an important role in distributed control and regulation tasks. That's why ADDI-DATA has developed a new product family of real-time Ethernet systems: x-ARTS. These robust systems are designed for measurement, control and automation applications with various real-time requirements.

High level of protection

The x-ARTS are available for EtherCAT (EC-ARTS), ProfiNet (PN-ARTS) and VARAN (V-ARTS). They are particularly suited for use in the field, where interferences are an everyday event. In order to assure reliable operation, many protective mechanisms are built-in.

- Protective circuits such as optical isolation, etc.
- Robust metal housing
- IP 65 degree of protection
- Extended temperature range from -40 °C to +85 °C (oper. temperature)

The x-ARTS stand for quality and reliability. Like all other ADDI-DATA products, they are available for years. So for you, they make an all-around safe investment.

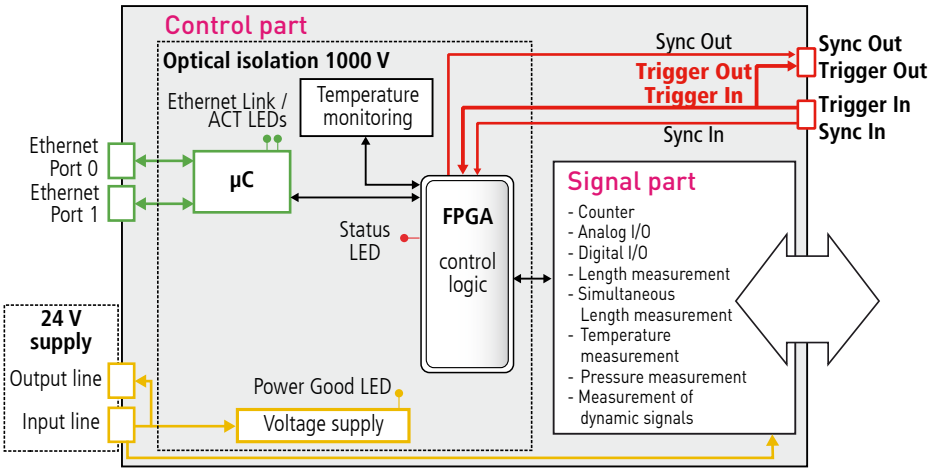
YOUR BENEFITS

- Precise, fast, robust, reliable
- Hot-plug enabled
- Long-term availability of the product

The optimal solution

The real-time Ethernet systems from ADDI-DATA in many respects make an optimal choice for measurement and automation tasks. They are characterised by highly precise inputs. The systems can measure faster than the bus cycle and buffer the acquired data. Moreover, the measurement can be started independently from the bus, since by using the 24 V trigger input, the x-ARTS may be combined with hardware that is not connected to the bus. For example, a light barrier can serve as a trigger signal.

In addition, several systems or signals can be synchronised with one another using the synchro line, all in a period of less than 1 µs. The x-ARTS can also tie together signals from various external devices, such as encoders and analog inputs, and in this way acquire values faster than the bus cycle. This increases the efficiency of your application. Various diagnosis possibilities, retrievable via Ethernet, can be set to work in the real-time Ethernet systems from ADDI-DATA.



The x-ARTS consist of a signal part and a control part with optical isolation.
The real-time connection can be accomplished through EtherCAT, ProfiNet or VARAN. Real-time Ethernet can be used looped-through or as a point-to-point connection.

* Preliminary product information

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ETHERCAT

More information:
www.addi-data.com

EtherCAT is appropriate for both hard and soft real-time requirements. It makes possible a large variety of topologies, such as lines, trees, rings, stars and combinations of these. Switches are thus made superfluous. In order to optimise the speed, processing the frame begins immediately, even if the frame still has not been entirely received. Sending follows the same principle. In order to assure precise synchronisation, even for widely separated network participants, the master clock is always compared to the slave clocks.

EC-ARTS-Systeme

The EC-ARTS are slave systems that are entirely compatible with EtherCAT. Programming of the systems is done through SDO (Service Data Objects).

Available functions

EC-ARTS-3011: Analog inputs (16-bit),
EC-ARTS-3701-4: 4 inputs (24-bit) for inductive transducers, LVDT, half-bridge, Mahr
Further systems in preparation: Temperature (RTD/TC, 24-bit), pressure (24-bit)

Examples of EC-ARTS applications

Various signals are acquired or output in a test bench in the automobile industry. In order to reduce cable complexity, distributed systems are used. The acquisition runs in real time in order to regulate precisely.
Advantage of EC-ARTS: can be mounted directly on the machine, precise data acquisition

PROFINET

ProfiNet supports both standard Ethernet and real-time connections. It is based on the provider-consumer model, which envisages granting equal rights to the network participants. This model stands in contrast to the standard master-slave process. Not only are process data transferred via ProfiNet, but functions such as web server, e-mail and FTP data transfer are also supported.
Basically, ProfiNet is divided into two function classes: ProfiNet CBA and ProfiNet IO. These are in turn broken down into three "performance classes". Classes RT and IRT are relevant to real-time requirements. RT is used for real-time I/O data traffic in automation technology. IRT is an asynchronous real-time communication that was developed especially for motion control applications.

PN-ARTS systems

The PN-ARTS systems from ADDI-DATA are suitable for the RT and IRT performance classes. That means that transfer rates of less than 1 ms (IRT) to 10 ms (RT) can be supported, depending on requirements.

Available functions

PN-ARTS-AI-16: Analog inputs (16-bit),
Further systems in preparation: Temperature (RTD/TC, 24-bit), pressure (24-bit)

Examples of PN-ARTS applications

Profi-Net is very well suited to support PLCs. Since it was in part developed by Siemens, the interaction of a PLC and ProfiNet devices is quite smooth. In this way, the PN-ARTS real-time systems can take on tasks that must be completed within a defined time period. They thus relieve the load on the PLCs.

VARAN

VARAN – Versatile Automation Random Access Network

The VARAN bus was completed as a hardware solution and developed for hard real-time requirements. It is characterised by high speed, short cycle times and minimal synchronicity jitters. The possibility of asynchronous access is unique. The information exchange consists of simple memory write/read commands. The bus manager coordinates the entire data traffic in order to avoid collisions. Data packets can be repeated within a cycle up until receipt of a valid back confirmation.
The VARAN bus can also transport standard Ethernet frames.

V-ARTS systems

The V-ARTS are slave systems that are completely compatible with VARAN. They are connected with the master by a point-to-point connection and can send 10 data packets per analog input.

Available functions

V-ARTS-AI-16: Analog inputs (16-bit),
Further systems in preparation: Temperature (RTD/TC, 24-bit), pressure (24-bit)

Examples of V-ARTS applications

V-ARTS are, for example, perfectly suited for hydraulic testing in the aviation sector. They assure that all measured values (100 kHz) are acquired and the data is safely transferred while the interplay with the control runs without interruption.

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EtherCAT analog input system
16 analog inputs, diff., 16-bit

New!

EC-ARTS-3011

16 analog inputs, differential, 16-bit

Voltage or current inputs

Simultaneous acquisition of 4 channels

Fast distributed data acquisition

M12 connector

RoHS 2002/95/EG | EtherCAT | + 85 °C* / - 40 °C | IP 65 | TWINCAT

*Betriebstemperatur

Features

- 64 MB onboard SDRAM for storing data
- Robust normed metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 16 diff. inputs 16-bit, M12 5-pin female connector
- Sampling frequency max. 100 kHz, up to 4 simultaneous channels
- Input ranges: ± 5 V, ± 10 V (16-bit)
  0-5 V, 0-10 V (15-bit)
- Current inputs optional

Acquisition modes:

- Untriggerted live signal
- Acquisition triggered through external motor controller
- Average mode

Applications

- Industrial process control and measurement
- Industrial measurement and monitoring
- Process monitoring
- Remote diagnosis
- Control of chemical processes
- Factory automation

Interfaces

- EtherCAT interface
- RS422 trigger interfaces
- 24 V supply

Specifications*

Analog inputs

Number/input type:	16 differential inputs
Architecture:	4 groups with 4 channels each 4-port simultaneous converter with one 4-channel multiplexer per converter
Resolution:	16-bit, SAR ADC
Accuracy:	± 1.221 mV typ. (± 4 LSB) ± 2.442 mV max.
Relative precision (INL):	± 3 LSB max (ADC)
Optical isolation:	1000 V
Input ranges:	± 5 V, ± 10 V (16-bit), 0-5 V, 0-10 V (15-bit) software-programmable, current inputs optional
Input frequency:	25 kHz per channel / 100 kHz max.
Gain:	x1, x2, software-programmable
Common mode rejection:	80 dB min. DC up to 60 Hz (diff. amplifier)
Input impedance (PGA):	10^9 Ω // 10nF against GND
Band width (-3dB):	160 kHz limited through TP filters 16 Hz version with differential filter
Trigger:	digital input, synchro, software-programmable
Offset error:	± 1 LSB (± 305 µV)
Gain error:	± 2,5 LSB
Temperature drift V_{in}: input voltage in Volts (-10 V ≤ V_{in} ≤ +10 V) in the temperature range from -40°C to +85°C:	2.3 x V_{in} + 22.5 (µ V/ °C) typ. 4.5 ppm/°C FSR

Power Supply

Nominal voltage:	24 V ⎓
Supply voltage:	18-30 V
Optical isolation:	1000 V
Current consumption at 24 V:	to be defined
Reverse voltage protection:	

Trigger

Number of inputs:	1 trigger input
Optical isolation:	1000 V
Signal type:	RS422

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.

System features

Interface:	EtherCAT
Dimensions (mm):	215 x 110 x 50
Weight:	850 g
Degree of protection:	IP 65
Operating temperature:	40 °C to + 85°C

EC-ARTS-3011 interface connectors

EtherCAT:	2 x 4-pin M12 female connector, D-coded for port 0 and port 1
RS422 interface:	1 x 5-pin M12 male connector, 1 x 5-pin M12 female connector
Voltage supply	
24 VDC input:	1 x 5-pin M12 male connector
24 VDC output:	1 x 5-pin M12 female connector

Sensor connectors for analog inputs

16 x 5-pin M12 female connector

Ordering information

EC-ARTS-3011
EtherCAT analog input system, 16 analog inputs, diff., 16-bit.
Incl. technical description and software drivers

* Preliminary product information

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ADDI-DATA® SPIRIT OF EXCELLENCE

EtherCAT system for length measurement, 24-bit 4 inductive transducers, LVDT, Half-Bridge, Mahr

New!

EC-ARTS-3701-4

Simultaneous acquisition of up to 4 inductive transducers

For Half-Bridge, LVDT or Mahr transducers

RS422 trigger interface

RoHS 2002/95/EG | EtherCAT | + 85 °C* / - 40 °C | IP 65 | TWINCAT

*Betriebstemperatur

Features

- Connection of all commercially available transducers (Half-Bridge, LVDT, Mahr)
- 4 channels
- 24-bit resolution
- Fast distributed data acquisition
- 16 MB onboard SDRAM for storing data
- Diagnostic possibility at short-circuits or line break of the transducers
- Robust metal housing
- Power Save Mode: Reduction of the power consumption when no acquisition runs
- RS422 trigger interface

Acquisition modes:

- Untriggered live signal
- Acquisition triggered by external motor controller
- Average mode

Transducer precision: Measurement example

Type TESA GT21, range ± 2 mm (Δ 4 mm),
16-bit precision

$$\frac{4\ \text{mm}}{2^{16}} = \pm\ 61\ \text{nm} = 0.061\ \mu\text{m}$$

Applications

- Gear wheel measurement • Gauge block measurement
- Sensor data acquisition
- Quality assurance, automatic component testing
- Industrial process control • Profile and surface measurement

Interfaces

- EtherCAT
- RS422 interfaces
- 24 V supply

Specifications*

Inputs for inductive transducers

Channel features	
Number:	4 simultaneous
Input type:	single ended
Coupling:	DC
Resolution:	24-bit
Sampling frequency f_s:	At primary frequency f_P of
$f_s = f_P$	5 kHz 7.69 kHz 10 kHz 12.5 kHz 20 kHz
Example with TESA GT21:	$f_s = f_P$ = 12.5 kHz
Input level	
Input impedance:	2 kΩ for HB 10 kΩ for LVDT 100 kΩ on request, 10 MΩ on request
Sensor supply (sine generator)	
Type:	Sine differential (180° phase-shift)
Coupling:	AC
Programmed signals:	
Output frequency f_P (primary frequency)	2-20 kHz depending on the transducer
Output impedance:	< 0.1 Ω typ., > 30 kΩ typ. in shutdown mode
Short-circuit current:	0.7 A typ. at 25°C with thermal protection

Voltage Supply

Nominal voltage:	24 V ⎓
Voltage supply:	18-30 V
Optical isolation:	1000 V
Current consumption at 24 V:	to be defined
Reverse voltage protection:	

Trigger

Number of inputs:	1 trigger input
Optical isolation:	1000 V
Signal type:	RS422

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.

System features

Interface:	EtherCAT
Dimensions (mm):	220 x 140 x 50
Weight:	530 g
Degree of protection:	IP 65
Operating temperature:	40 °C to + 85°C

EC-ARTS-3701 interface connectors

EtherCAT:	2 x 4-pin M12 female connector, D-coded for port 0 and port 1
RS422 interfaces:	1 x 5-pin M12 male connector, 1 x 5-pin M12 female connector
Voltage supply	
24 VDC input:	1 x 5-pin M12 male connector
24 VDC output:	1 x 5-pin M12 female connector

Connectors for connecting inductive transducers

4 x 5-pin M18 female connectors

Ordering information

EC-ARTS-3701-4
EtherCAT system for length measurement, 24-bit, 4 inductive transducers, LVDT, Half-Bridge, Mahr-compatible. Incl. technical description and software drivers

Versions
EC-ARTS-3701-HB-4: for 4 HB inductive transducers

* Preliminary product information

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ADDI-DATA® SPIRIT OF EXCELLENCE

Distributed data acquisition and control in real time

The MSX-Box is an open Programmable Automation Controller system (PAC).
It has been specially developed for industrial measurement, control and automation applications in real time where processes have to be carried out within a defined time.

PCI CompactPCI PROFIBUS Ethernet CAN

The concept

- Modular platform for distributed measurement, control and regulation applications in real time
- Based on established standard technologies like PCI backplane or CompactPCI backplane
- Non-proprietary system: I/O PCI boards or CompactPCI boards from other producers can be used.
- Low maintenance: Linux operating system with RTAI extension – no update obligations
- Reduced costs: no software licence costs
- No unnecessary multimedia features: Full machine time only for your application
- Optimise your system: Free access to the software down to the kernel source code for extensive adaptations of your measuring system
- Real-time development tools without additional costs
- Investment security: Long-term availability of the products thanks to the ADDI-DATA supply philosophy

PAC systems

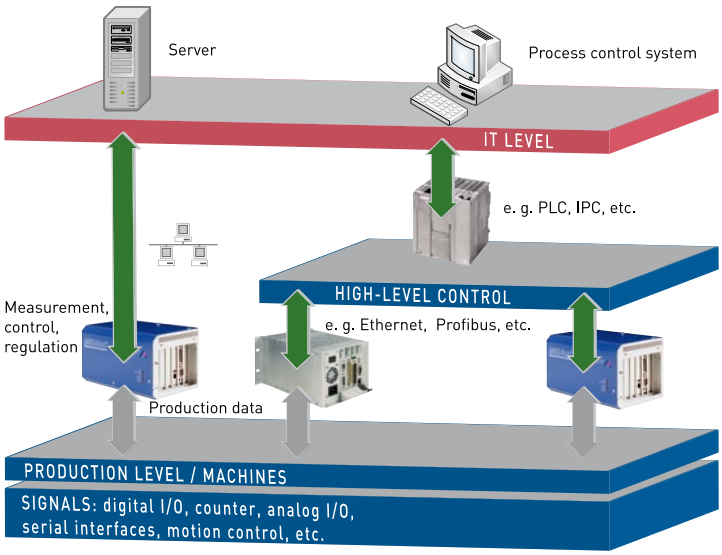
Programmable Automation Controller

PAC systems are mainly used for industrial measurement and control or regulation tasks as well as for motion control.

They execute several tasks simultaneously and in a deterministic way.

Core features of a PAC system:

- **Compact and robust design**
- **Programmable**
- **Standard Ethernet (TCP/IP)**
- **CPU board as system controller**
- **Different I/O modules**



Between the production and IT level

The MSX-Box acquires sensor and machine data, processes them, and controls or regulates the corresponding terminals.
The MSX-Box can be integrated into a higher-level control system via Ethernet or Profibus. By integrating the MSX-Box into the company network via Ethernet, data can be forwarded to software packages on the IT level for use in statistics or process optimisation.

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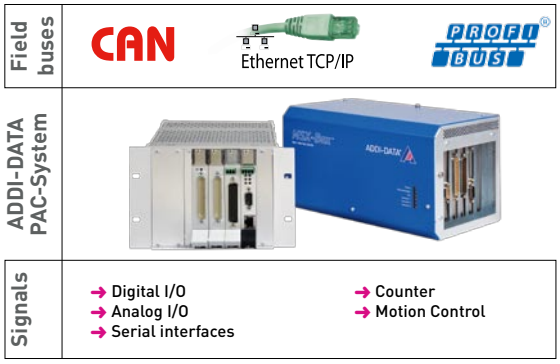
ADDI-DATA® SPIRIT OF EXCELLENCE

Integrated into the field level

Measurement and control systems that monitor entire processes and interact with machines or hardware must be capable of working with data of different origins.



Field buses and signals

With the MSX-Box, you can acquire signals from different field buses: CAN, Profibus, Ethernet, or signals from serial lines such as ultrasound sensors or scales.
The PAC system can also process the following signals:

- Digital I/O
- Counter: Incremental, SSI etc.
- Analog I/O
- Serial interfaces
- Motion control
- etc.

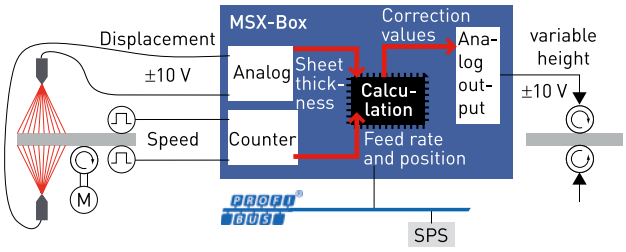
Good for retrofits, too

➜ The MSX-Box is suitable both for setting up a new automation project and for optimising existing installations. That means you continue to benefit from your familiar hardware, while still equipping your installation with the latest technology for more efficiency where it counts.

Application examples

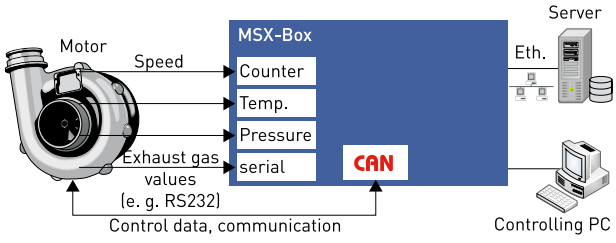
Example 1

In a steel plant, the MSX-Box is used to measure the thickness of sheets. Laser sensors (±10 V) are used to measure the sheet thickness. Simultaneously with the thickness measurement, incremental counters are used to determine the position of the sheet and the feed rate.
The deviation in sheet thickness is calculated in real time.
The result of the calculation is used to control the position of the rollers in the next process step and thus to produce sheets of a uniform thickness.
This information is then provided to higher-level control systems through a Profibus interface, e.g. for statistics, process analysis, or as specification values for downstream processes.



Example 2

During inspection of engines, different metrics are acquired based on different signal types: speeds, temperatures, pressures, exhaust gas values, etc. Using the integrated CAN interface, messages from the CAN bus can also be recorded.
To obtain a meaningful measurement result, all metrics must be acquired at defined points in time. The value of all metrics is then measured at time t.
To use the data for later evaluation, the MSX-Box stores the measured values in a database.



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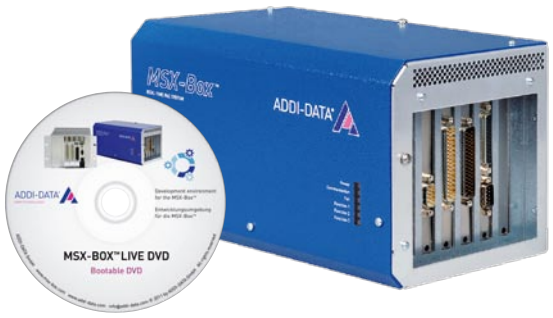
PAC system MSX-Box for the PCI bus



- Open and transparent Programmable Automation Controller system
- With free development tools
- Live DVD based on open source programs
- Real-time measurement system

PAC systems

Programmable Automation Controller

PAC systems are mainly used for industrial measurement and control or regulation tasks as well as for motion control.

They execute several tasks simultaneously and in a deterministic way.

Core features of a PAC system:

- **Compact and robust design**
- **Programmable**
- **Standard Ethernet (TCP/IP)**
- **CPU board as system controller**
- **Different I/O modules**

Set course for freedom

Experience with the MSX-Box what freedom of decision-making really means:

- **You** select the components of your PAC system: The MSX-Box is based only on reliable standard technologies like for example PCI backplane. Freedom also means that you can use any of the numerous standard PCI I/O boards.
- **You** decide, whether and when to update your operating system: Using the real-time operating system Linux with RTAI extension, no need to take care of updates. Save time and money!
- **You** have free access to the software down to the kernel source code: You can make extensive system adaptations and realize your own optimized measurement system.

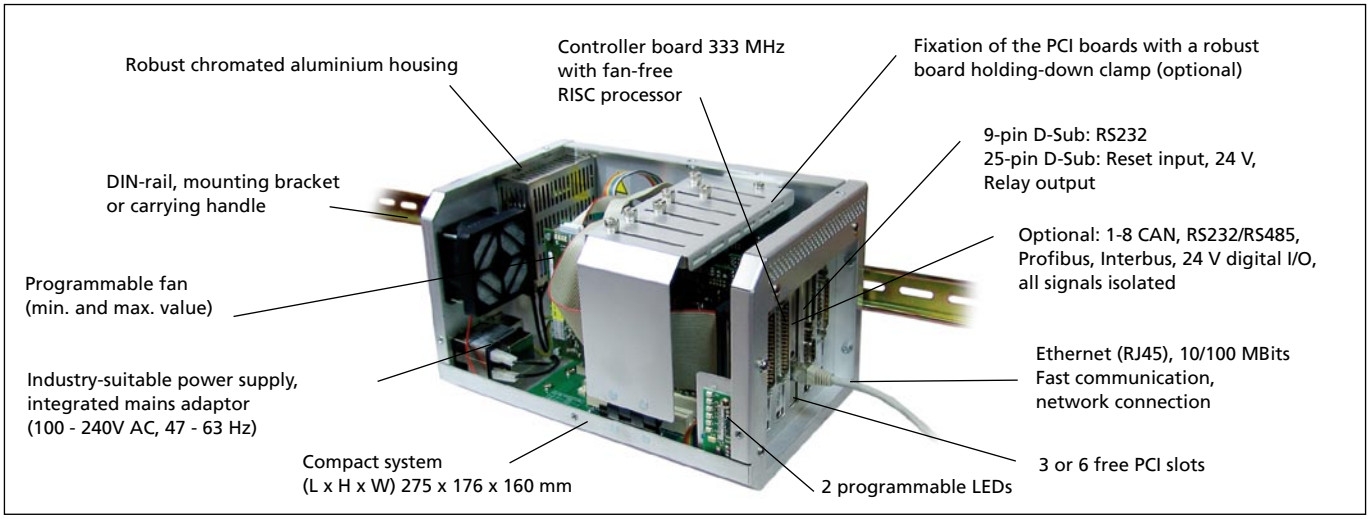
Boost your applications

Working with the MSX-Box that fits to your needs will boost your measurement and control applications.
The MSX-Box is supplied with development tools: You can realize even very complex tasks quite easily.

The most important advantage of a PAC system with such a transparent structure is that in case of emergency, you can react fast and efficiently.

Thanks to the long-term ADDI-DATA supply philosophy, you secure your investments for a long time.
Furthermore, the fact that the MSX-Box is supplied with free development tools limits the purchase price for serial equipment.

Experience today how to realize your applications of tomorrow:
www.msx-box.com



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ADDI-DATA®
SPIRIT OF EXCELLENCE

MSX-Box-500

PCI controller board

RISC processor:	64-bit MIPs, no fan
Clock:	333 MHz
Memory:	16 MB flash, 128 MB SDRAM, Option up to 256 MB
Installed OS:	Embedded RTAI Linux
Standard interfaces:	D-Sub 9-pin: 1 x RS232 D-Sub 25-pin: Reset input 24 V; „H" active 1 x relay output, free prog., closing contact
Optional:	D-Sub 25-pin.: 1-8 CAN, Master/Slave, isolated 1 x RS232/RS485, isolated additional bracket: 1 x Profibus/Slave, isolated 2 x Interbus/Master, isolated 4 x dig. input, 24 V/10 mA, isolated 3 x dig. output, 24 V/200 mA, isolated
Dimensions:	PCI half-size board

Mains supply unit

Input voltage:	100 V - 240 V, AC, 47-63 Hz (other voltage on request)
Output voltage:	5 VDC-40 W (max. 6 A) (other voltage on request)
Protection against:	Short circuit; overload, overvoltage
Connection:	2 m power cable

ATX backplane with 5 PCI slots

PCI slots:	Total amount: 5 Reserved: 1 x PCI controller board 1 x PCI Ethernet board Free: for 3 additional PCI half-size boards
Compliance:	PCI specification PICMG rev. 2.1.

MSX-Box-800

Same as MSX-Box-500 with 8 PCI slots on the ATX backplane, incl. 6 free slots for PCI I/O boards

Mains supply unit

Input voltage:	100 V - 240 V, AC, 47-63 Hz (other voltage on request)
Output voltage:	5 VDC/12 VDC/60 W (max. 6A)
Protection against:	Short circuit; overload, overvoltage
Connection:	2 m power cable

ATX backplane with 8 PCI slots

PCI slots:	Total amount: 8 Reserved: 1 x PCI controller board 1 x PCI Ethernet board Free: for 6 additional PCI half-size boards
Compliance:	PCI specification PICMG rev. 2.1.

For MSX-Box-500 and MSX-Box-800

PCI Ethernet board (RJ45)

Data transfer rate:	10/100 MBits

Extensive software support

Free development tools (GNU Compiler, Cygwin, samples in source code), Knoppix Live DVD development environment

Housing

Material:	Chromated aluminium, colour RAL 5010 blue „Enzianblau"
Heat dissipation:	Through programmable fan
Temperature range:	0 - 50°C
Temperature monitoring:	Configuration at delivery 5 °C to 45 °C, min. and max. value programmable through software. The temperature value can be monitored. Resolution: 0.5 °C
Front openings:	For 5 PCI-boards and 1 bracket (MSX-Box-500) For 8 PCI-boards and 3 brackets (MSX-Box-800)
Housing dimensions (L x H x W):	278 x 170 x 165 mm (MSX-Box-500) 292 x 170 x 292 mm (MSX-Box-800)
Weight:	approx. 2 kg (standard MSX-Box system) MSX-Box-500 approx. 3 kg (standard MSX-Box system) MSX-Box-800
Status display:	5 LEDs, incl. 2 freely programmable

Optional accessories

Board fixation:	Board holding-down clamp
Mounting possibilities:	• DIN rail • Removable mounting bracket • Carrying handle
Cable:	2 m Ethernet patch cable, shielded, RJ45 connector (PC ↔ MSX-Box)
Network card: MSX-ComboCard with additional functions:	• 2 x PCI FireWire IEEE 1394, 1 x internal, 1 x ext. connection, data transfer rate up to 400 Mbps • 2 x PCI USB 2.0, 2 external, 1 x internal connection, • 1 x RJ-45 LAN, 10/100 Mbps connection • 1 x 5-pin female connector, 12 V • Network card PCI 10/100 Mbps, 10Base-T, 100Base-TX, IEEE802.3, 802.3 u protocol, recognition of data transfer rate 10 Mbps or 100 Mbps, data transfer rate 10 Mbps and 100 Mbps, Chipset REaltek RTL8139, • 32-bit PCI system • 5 V voltage
Colours:	Other housing colours (according to RAL scale) and inscriptions (on request)

Ordering information

MSX-Box: PAC system, incl. development tools (GNU compiler, Cygwin, source code samples, ...) and technical description

Versions

MSX-Box 500: 5 PCI slots (incl. 2 slots reserved for controller and Ethernet board; 3 free PCI slots for half-size boards)
MSX-Box 800: 8 PCI slots (incl. 2 slots reserved for controller and Ethernet board; 6 free PCI slots for half-size boards)

Options

MSX-256MB: Memory extension up to 256 MB
MSX-485/ MSX-232: 1-port serial interface, RS485 or RS232, optically isolated
MSX-Basis: Basic equipment for options MSX-CAN, MSX-Profibus, MSX-IBS and MSX-DIO-IO
MSX-CAN-x: 1/2/4/8 x CAN bus, master/slave, optically isolated
MSX-Profibus: 1 x Profibus, slave
FB-Profibus: 9-pin D-Sub female connector for the option MSX-Box Profibus (please order separately)
MSX-IBS-x: 1/2 x Interbus-S, master
MSX-DIG-IO: 4 digital inputs and 3 digital outputs, 24 V.
All extensions are isolated and include a ribbon cable with a 9-pin D-Sub male connector with bracket
MSX-RTSYNC: for the synchronisation of several MSX-boxes (with time stamp)

Accessories

MSX-CLAMP-500/-800: Board holding-down clamp for board fixation
MSX-SCREW: Wall mounting for MSX-Box-500
MSX-SCREW-800: Wall mounting for MSX-Box-800
MSX-RAILDIN: DIN rail mounting
MSX-GRIP: Carrying handle
MSX-COMBOCARD: Network card LAN / USB /Firewire connection
MSX-COMBOGIGA: Network card Giga LAN /USB /Firewire connection
MSX-500-PS-12V/-24V: Mains power supply unit 12 V DC or 24 V DC
ST ETH-2: Ethernet patch cable 2 m, shielded, RJ45, between PC and MSX-Box
MSX-CBLRS232: RS232 cable, 1.5 m – 9-pin.
On request: Other housing colour or inscriptions on the front side

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PAC system MSX-Box for the CompactPCI bus

- Open and transparent Programmable Automation Controller system
- With free development tools
- Live DVD based on open source programs
- Real-time measurement system

PAC systems

Programmable Automation Controller

PAC systems are mainly used for industrial measurement and control or regulation tasks as well as for motion control.

They execute several tasks simultaneously and in a deterministic way.

Core features of a PAC system:

- **Compact and robust design**
- **Programmable**
- **Standard Ethernet (TCP/IP)**
- **CPU board as system controller**
- **Different I/O modules**

Set course for freedom

Experience with the MSX-Box-CPCI what freedom of decision-making really means:

- **You** select the components of your PAC system: The MSX-Box-CPCI is based only on reliable standard technologies like for example CompactPCI backplane. Freedom also means that you can use any of the numerous standard CompactPCI I/O boards.
- **You** decide, whether and when to update your operating system: Using the real-time operating system Linux with RTAI extension, no need to take care of updates. Save time and money!
- **You** have free access to the software down to the kernel source code: You can make extensive system adaptations and realize your own optimized measurement system.

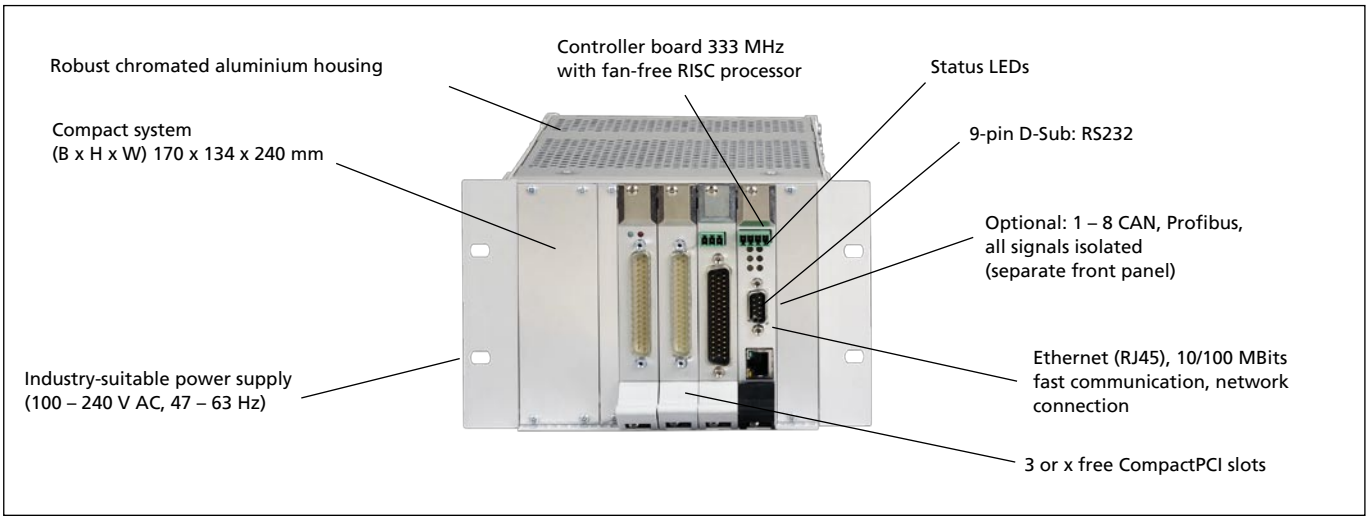
Boost your applications

Working with the MSX-Box-CPCI that fits to your needs will boost your measurement and control applications. The MSX-Box-CPCI is supplied with development tools: You can realize even very complex tasks quite easily.

The most important advantage of a PAC system with such a transparent structure is that in case of emergency, you can react fast and efficiently.

Thanks to the long-term ADDI-DATA supply philosophy, you secure your investments for a long time.
Furthermore, the fact that the MSX-Box-CPCI is supplied with free development tools limits the purchase price for serial equipment.

Experience today how to realize your applications of tomorrow:
www.msx-box.com



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MSX-Box-CPCI-400

CompactPCI controller board

RISC processor:	64-bit MIPS, no fan
Clock:	333 MHz
Memory:	16 MB Flash, 128 MB SDRAM, option up to 256 MB
Installed OS:	Embedded RTAI Linux
Standard interface:	D-Sub 9-pin: 1 x RS232
Safety features:	24 V reset input, H-active; Relay output, freely programmable, closing contact
Optional:	Additional front panel: D-Sub 25-pin: 1 – 8 CAN, Master/Slave, isolated D-Sub 9-pin: 1 x Profibus/Slave, isolated
Transfer rate:	10/100 MBits

Mains supply unit

Input voltage:	100 V – 240 V, AC, 47 – 63 Hz (other voltage on request)
Output voltage:	5 V (depending on the system)
Noise immunity:	Short circuit, overload, overvoltage
Connection:	Power cable, 2 m

CompactPCI backplane with 4 CompactPCI slots

CompactPCI slots:	Total amount: 4 Reserved: 1 x CompactPCI controller board Free: for 3 additional CompactPCI boards
Specification:	PCI specification PICMG rev. 2.1. PICMG2.0 R3.0 CPCI Core Specification V I/O +5V

MSX-Box-CPCI-xxxx

Same as MSX-Box-CPCI-400, but with a CompactPCI-Backplane with x slots, incl. x-1 free slots for CompactPCI boards

Mains supply unit

Input voltage:	100 V – 240 V, AC, 47 – 63 Hz (other voltage on request)
Output voltage:	5 V, 3,3 V, ±12 V (depending on the system)
Noise immunity:	Short circuit, overload, overvoltage
Connection:	Power cable, 2 m

CompactPCI backplane with x CompactPCI slots

Number of the CompactPCI slots according to requirements	Reserved: 1 x CompactPCI controller board, further slots free for CompactPCI boards
Specification:	PCI specification PICMG rev. 2.1. PICMG2.0 R3.0 CPCI Core Specification PICMG 2.6 Bridging Specification (according to requirements) V I/O +5 V

For MSX-Box-CPCI-400 and -xxxx

Extensive software support

Free development tools (GNU compiler, Cygwin, samples in source code …), Knoppix Live-DVD development environment.

Housing

Material:	Chromated aluminium
Heat dissipation:	Through programmable fan
Temperature range:	0 – 60 °C
Temperature monitoring:	Configuration at delivery: 5 °C to 45 °C, min. and max. value programmable through software. The temperature value can be monitored. Resolution: 1 °C
Front openings:	for 3 CompactPCI boards and 1 bracket (MSX-Box-CPCI-400) for x CompactPCI boards and 1 bracket (MSX-Box-CPCI-xxxx)
Housing dimensions: (L x H x W)	170 x 134 x 240 mm (without fan) (MSX-Box-CPCI-400)
Weigth:	approx. 2.5 kg (standard MSX-Box-CPCI-400 system)
Status display:	6 LEDs, incl. 4 freely programmable

Optional accessories

Cable:	Ethernet patch cable 2 m, shielded, RJ45 connector (PC ↔ MSX-Box-CPCI)

You will find a large range of adapted CompactPCI boards on page 228

Ordering information

MSX-Box-CPCI: PAC system, incl. development tools (GNU compiler, Cygwin, source code samples, ...) and technical description

Versions

MSX-Box-CPCI-400: 4 CompactPCI slots (incl. 1 slot reserved for the controller board; 3 free slots)
MSX-Box-CPCI-xxxx: x CompactPCI slots (incl. 1 slot reserved for the controller board; x-1 free slot)

Options

MSX-256MB: Memory extension up to 256 MB

MSX-Basis: Basic equipment for the options MSX-CAN, MSX-Profibus, MSX RTSync
MSX-CAN-x: 1/2/4/8 x CAN bus, master/slave, optically isolated, incl. FB-CPCI-CAN
MSX-Profibus: 1 x Profibus, slave
FB-Profibus: FB-CPCI-Profi (please order separately)
MSX-RTSYNC: for the synchronisation of several MSX-Boxes (with time stamp), incl. FB-CPCI-RTSync

On request: further housing dimensions

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Measurement and control directly in the field

The intelligent Ethernet systems of the MSX-E series are especially suited for industrial measurement, control and regulation tasks directly at the measuring point.
They are mounted in robust metal housings and comply with the degrees of protection IP67/IP 65/IP 40. Furthermore, they can be used in a temperature range from –40 C to +85 °C as they are equipped with many protective circuits. The Ethernet systems can be freely cascaded and synchronised in the µs range. Sensors can be connected directly to the measurement systems through screw connectors.

HIGHLIGHTS

- Designed for use in the field
- ARM®9 processor for intelligent systems
- Stand-alone operating
- Easy configuration

Driverless installation

The installation of the MSX-E systems is fast and easy: After connecting the systems just click on „import web services" in your compiler and enter the IP address of your MSX-E system. Then open the WSDL file, where all functionalities are described. After that you can access all system functionalities without driver installation. To get remote access to the system from a distant PC, each system has a SOAP server. The data transfer is realised with the network protocol HTTP.

Direct administration via PLC

The MSX-E systems can relieve PLCs by taking over fast measurement tasks. To administrate the systems from a PLC, the Modbus TCP Client library is available which enables a direct parameterisation of the systems, the installation of the measurement processes like for example the choice of the acquisition mode, start and stop commands or trigger functionalities and the administration and reading-out of system information.

Easy administration with ConfigTools

ConfigTools is a user-friendly tool with which all MSX-E systems in a network can be scanned and administrated and their status visualised. It is available for 32-bit and 64-bit Windows and Linux operating systems in German, English, French and Chinese.

ConfigTools features

- Automatic scan of all MSX-E systems in a network
- Administration of the MSX-E systems: IP address, firmware version
- System-specific plug-ins: for example sensor calibration and visualisation
- Plug-Ins clickable / selectable via buttons: for example upload / save configuration, firmware update
- Possibility of customised plug-ins
- Changes that are made are logged
- A direct access to the website of the MSX-E systems is possible

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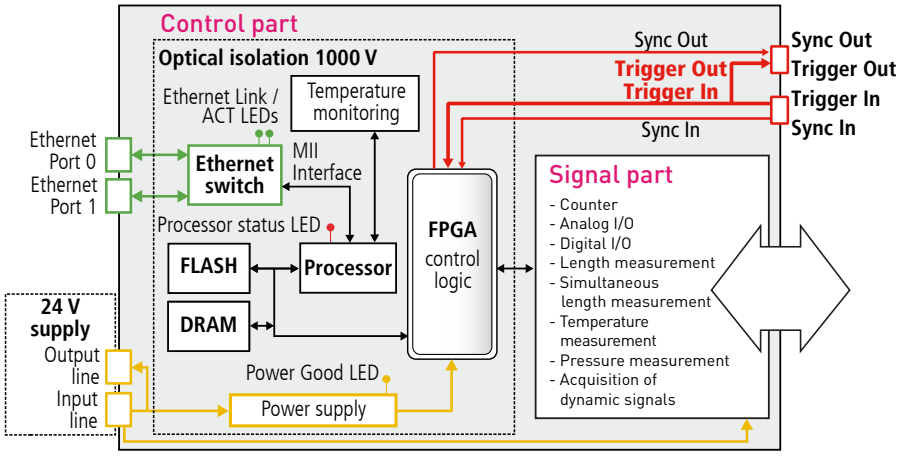
Measurement and control directly in the field

The MSX-E systems are organised in two parts:

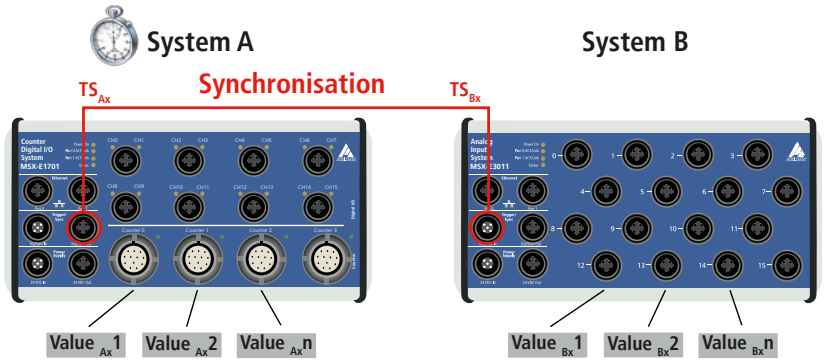
- The **control part** is common to all system types and allows a fast and reliable communication as well as signal processing.
- The **signal part** features the specific function of each system type: counter, digital I/O, analog I/O, length measurement etc.



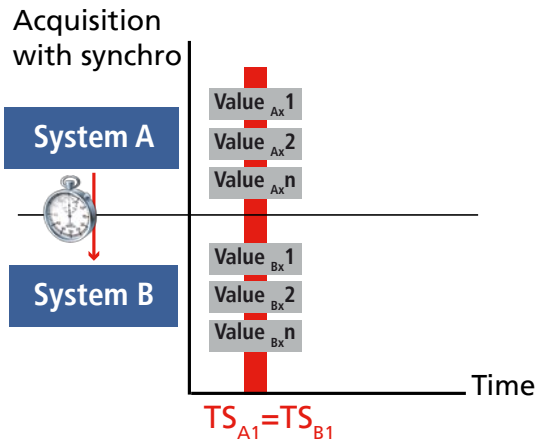
Time stamp

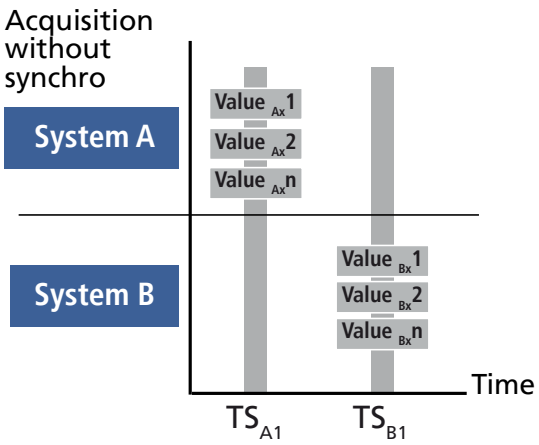
Several MSX-E systems can be synchronised with one another through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.

The combination of the **synchronisation** and **time stamp** allows a clear allocation of signals that were captured by several systems.



Without synchro: $TS_{Ax} \neq TS_{Bx}$
With synchro: $TS_{Ax} = TS_{Bx}$





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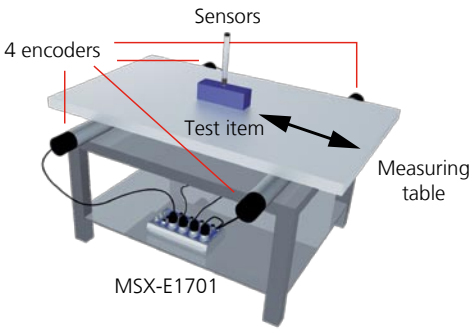
Intelligent Ethernet systems: Special functions

Synchro timer

With the „synchro timer function" you can choose whether a synchro trigger signal shall be generated and if yes define the frequency at which it shall be generated.



During the measurement of a test item the measuring table must move. To guarantee the parallelism of the axis there are two incremental encoders placed at each side of the table and connected to the counter system MSX-E1701. The cycle for the trigger which starts the acquisition is defined in the FPGA of the system. All counters are acquired simultaneously.

Synchro trigger

With the synchro trigger line a MSX-E system that serves as a Master can start a simultaneous acquisition on several other MSX-E systems, generate trigger events and synchronise the time.

Event logic for digital I/O

With the event logic of the digital I/O Ethernet system MSX-E1516 status changes of the inputs and outputs can be detected and logged.

Advantages:

- The generated data set contains the time stamp as well as the event mask, i.e. which input or output has generated the event, and the status of all inputs and outputs.
- The data set can be read out for example in databases for statistical purposes or in operating and machine data logging for process control.
- The "polling" on the inputs is not necessary anymore.
- Status changes are also registered when there is no Ethernet connection. The according data sets (events) can be read out as soon as the Ethernet connection is available again.

See more examples on www.addi-data.com

Function generator with analog outputs

The analog output system MSX-E3511 can generate up to 8 different analog signal curves like for example trapezoid signals, sine curves or sawtooth curves. Thus for example real processes or measuring processes can be simulated and automatic test processes can be realised at test benches.

Customisation

Hardware combination

Each Ethernet system has its specific functionality and can be freely combined with the other system types. Through synchronisation and cascading the systems work together fast and reliably. Create your own system combination according to your requirements!

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.

Software tools

The MSX-E Ethernet systems come with a CD with samples for .NET, C, LabVIEW, etc. and technical descriptions. For applications that run in the development mode we provide you with a Live-DVD including numerous free development tools and a cross compiler for ARM. The Live-DVD is based on the Eclipse development environment and the Ubuntu distribution.

Firmware adaptations

The functionalities of the MSX-E systems can be extended through a change in the firmware. Calculations like for example calculation of the average value, data conversion or digital filter etc. can be implemented.

Our service: We develop your applications

Save time and resources without forgoing the advantages of a customised solution.
Describe us your requirements and we will take care of the programming..

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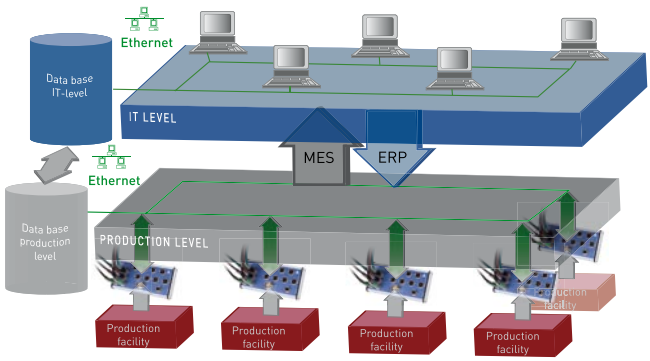
Measurement, Control, Regulation.

Discover the wide range of applications of the intelligent Ethernet systems!

Process optimisation and monitoring

The intelligent Ethernet systems MSX-E allow the direct connection to MES and ERP systems. The MSX-E systems acquire data directly at the measuring point, convert raw data into physical values and transfer them via the company network into the MES systems on the IT level.

Thanks to their integrated intelligence, the MSX-E systems can, in stand-alone operating mode, transfer measurement values, i.e. „meaningful" data and not raw data, directly to the MES.

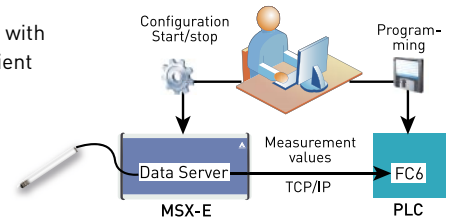


Extend the functionality range of PLCs with MSX-E systems

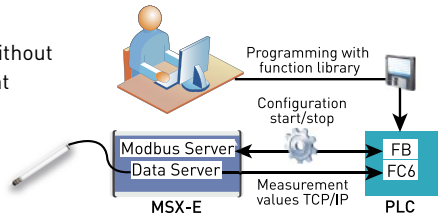
The MSX-E systems can be connected via Ethernet directly to a PLC and thus significantly extend its functionality. The actual measurement task is parameterised and stored on the systems via the website. With the autostart function, the systems load the measurement settings after booting and execute them independently, which makes additional programming unnecessary. The PLC accesses the data and stores it in a data block.

New! The Ethernet systems of the MSX-E series can now be managed directly from a PLC by means of a library. Frames enable the PLC to directly parameterise the MSX-E systems, to read system information and to start or stop measurements.

PLC connection with Modbus TCP Client Library

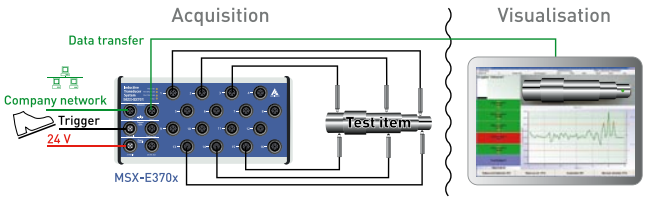


New!
PLC connection without Modbus TCP Client Library (option)



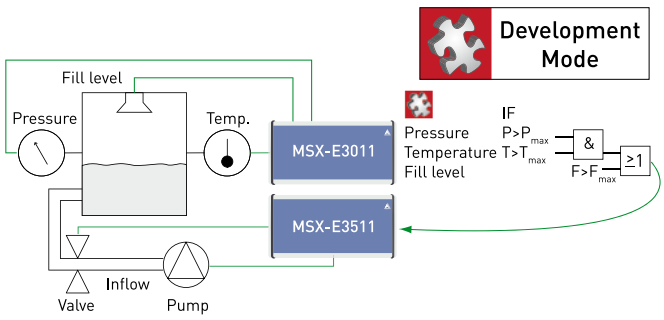
Data measurement and visualisation

For the visualisation of data acquired via the intelligent Ethernet systems MSX-E, ADDI-DATA offers two solutions: the software procella® by Q-DAS and SPC.kompakt by ProNES. There is no need for programming a connection to the hardware. The values acquired are directly recorded and displayed by procella® or SPC.kompakt. The graphical display allows the operator to distinguish fast and reliably between "good" and "incorrect" parts.



Stand-alone applications

The MSX-E systems feature a Development Mode which allows to realise and execute applications directly on the MSX-E systems. The MSX-E systems can access other MSX-E systems or any other Ethernet hardware through the Ethernet switch.
The connection via standard Ethernet allows to realise complex distributed measurement and control tasks on site, close to the test item. Such stand-alone applications would be suitable for fill level monitoring and regulation tasks.



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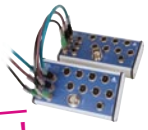

Overview of the Ethernet systems

	Digital I/O, 24 V			Multifunction counter				Analog I/O		Analog input			Analog output		Tempera-ture meas-urement
	MSX-E1516	MSX-E1516-NPN	MSX-E1516-5V-Input	MSX-E1701	MSX-E1711	MSX-E1721	MSX-E1731	MSX-E1741-1VPP	MSX-E3121	MSX-E3122	MSX-E3011	MSX-E3021	MSX-E3027	MSX-E3511	MSX-E3511-C	MSX-E3211
Intelligent through Arm©9 technology	✓			✓	✓		✓	✓	✓		✓			✓		✓
Ethernet	✓			✓	✓		✓	✓	✓		✓			✓		✓
Optical isolation 1000 V	✓			✓	✓		✓	✓	✓		✓			✓		✓
1 x trigger input / 1 x synchro input / time synchronisation	✓			✓	✓		✓	✓	✓		✓			✓		✓
Compare logic generates synchro trigger signal				✓	✓		on request	on request	on request		on request					on request
Timer function generates synchro trigger signal	✓			✓	✓		✓	✓	✓		✓			✓		✓
Cascading	✓			✓	✓		✓	✓	✓		✓			✓		✓
Degree of protection	IP 65			IP 65	IP 65		IP 65	IP 65	IP 65		IP 65		IP 67	IP 65		IP 65
Temperature range from – 40 °C to + 85 °C (Internal temperature of the system)	✓			✓	✓		✓	✓	✓		✓			✓		✓
Dimensions (mm)	215 x 110 x 50			215 x 110 x 54	215 x 110 x 54		215 x 110 x 50	215 x 110 x 54	260 x 140 x 50		215 x 110 x 50			154 x 110 x 54		215 x 138 x 50
Digital I/O, 24 V / 5 V, status LEDs	16 / 5			16	16		16		32							
Event logic	✓															
Input filter configuration through software	✓															
M12 female connector, 5-pin (for 2 inputs or outputs)	8			8	8		8		1 x 37 pin, D-Sub							
Multifunction counter				✓	✓		✓	✓								
Incremental counter inputs (A, B, C, D Signals) M23 female connector				4 x 12 pin												
Sin/Cos counter inputs (A, B, C signals), M23 female connector					4 x 12 pin 1 V_{pp}	4 x 9 pin 11µA_{pp}		✓								
EnDat 2.2-inputs, M12 female connector							4 x 8 pin									
5 V inputs, RS422, 24 V inputs (opt.)				✓			✓									
Max. input frequency				5 MHz	250 kHz		4.5 MHz clock speed	250 kHz								
Analog input (channels)								3 diff.	6 diff.		4 x 4, diff.					16/8 diff.
Resolution								24 bit	24 bit		16 bit					24 bit
Type								V / A	V / A		V / A					Thermo couples / RTD
Connector								63 x M12 female connector 5 pin	6 x M12 female connector 5 pin		16 x M12 female connector 5 pin					8 x M12 female connector 8 pin
Simultaneous acquisition											up to 4 channels					8 channels
Throughput								up to 100 kHz	up to 100 kHz		up to 100 kHz					up to 788 Hz
Input ranges								± 10 V, ± 1 V, ± 100 mV, ± 10 mV, 0-10 V, 0-1 V, 0-100 mV, 0-10 mV	± 10 V, ± 1 V, ± 100 mV, ± 10 mV, 0-10 V, 0-1 V, 0-100 mV, 0-10 mV		± 5 V, ± 10 V, 0-5 V, 0-10 V					
Current inputs (PC-Diff option): 0(4)-20 mA								✓	✓		✓					
Analog output, 16-Bit									4					8		
M12 female connector									2 x 4 pin					8 x 5 pin		
Output voltage: 0-10 V, ± 10 V									✓					✓		
Current outputs: 0-20 mA									✓					✓		
Length measurement																
Number of transducers (Half-Bridge, LVDT, Mahr)																
5-pin M18 female connector																
Simultaneous acquisition																
Temperature input for Pt100																
Page	34			38	38		42	46	70		62		66	78		82
Software	Current driver list on the web: **www.addi-data.com**															

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New! New!

Pressure measure-ment	Force distance measurement		Acquisition of dynamic signals	Length measurement				Protocol interpreter
MSX-E3311	MSX-E3017	MSX-E3317	MSX-E3601	MSX-E3711	MSX-E3701	MSX-E3700	MSX-E3701-DIO	MSX-E7511
✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓		✓	✓	✓	✓	✓	✓
on request				✓			on request	on request
✓				✓	✓	✓	✓	
✓			✓	✓	✓	✓	✓	✓
IP 65			IP 65	IP 65	IP 65	IP 40	IP 65	IP 65
✓			✓	✓	✓	✓	✓	✓
215 x 138 x 50			215 x 110 x 50	215 x 110 x 54	215 x 110 x 50	215 x 110 x 39	260 x 110 x 50	215 x 138 x 50
							32	
							✓	
							1 x 37 pin, D-Sub	
	✓	✓						Serial: RS232, RS422, RS485, 20mA CL
	✓	✓		1 x 12 pin				
	✓	✓						
	✓	✓						
				✓				
				5 MHz				
16/8 diff.			8 SE, diff., ICP					
24 bit			24 bit					
Strain gauges			V / A / ICP					
8 x M12 female connector 8 pin			8 x BNC					
8 channels			up to 8 channels					
up to 1 kHz			up to 128 kHz					
			± 5 V, ± 10 V					
			✓					
				24 bit	24 bit	24 bit	24 bit	
				8	4 / 8 / 16	4 / 8 / 16	16 only HB and LVDT	
				8	4 / 8 / 16	4 / 8 / 16	16	
				✓				
				✓				
86	54	58	90	94	98	98	104	108

Common specifications for all MSX-E systems

Voltage supply

Nominal voltage:	24 V ⎓
Supply voltage:	18-30 V
Optical isolation:	1000 V
Reverse voltage protection:	1 A max. (except MSX-E3711)
Connectors	
24 VDC input	1 x 5-pin M12 male connector (except MSX-E3700)
24 VDC output	1 x 5-pin M12 female connector (except MSX-E3700)

Ethernet

Interface:	Ethernet acc. to IEEE802.3 specification	
Number of ports:	2	
Cable length:	150 m	max. at CAT5E UTP
Bandwidth:	10 Mbps	auto-negotiation
	100 Mbps	auto-negotiation
Protocol:	10Base-T	IEEE802.3 compliant
	100Base-TX	IEEE802.3 compliant
Optical isolation:	1000 V	
MAC address:	00:0F:6C:##:##:##, unique for each device	
Connectors		
Ethernet:	2 x 4-pin female connector, D-coded M12 for Port 0 and Port 1 (except MSX-E3700)	

Trigger

Number of inputs:	1 trigger input
Number of outputs:	1 trigger output
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 to 30 V
Input current:	11 mA at 24 VDC, typical
Input frequency (max.):	2 MHz at 24 V
Connectors, common with synchro	
Trigger input:	1 x 5-pin M12 male connector (except MSX-E3700)
Trigger output:	1 x 5-pin M12 female connector (except MSX-E3700)

Synchro

Number of inputs:	1
Number of outputs:	1
Max. cable length:	20 m
Optical isolation:	1000 V
Signal type:	RS422
Connectors, common with trigger	
Synchro input:	1 x 5-pin M12 male connector (except MSX-E3700)
Synchro output:	1 x 5-pin M12 female connector (except MSX-E3700)

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.

DatabaseConnect

Database connection

DatabaseConnect is an easy-to-use database interface software which does not require any programming skills. DatabaseConnect stores measurement data which has been acquired through MSX-E Ethernet systems directly into databases via standard Ethernet. System requirements and other important product information see the datasheet on page 112.

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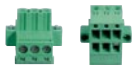
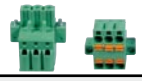
Accessories for the Ethernet systems

		Digital I/O, 24 V	Multifunction counter		
		MSX-E1516 MSX-E1516-NPN MSX-E1516-5V-Input	MSX-E1711 MSX-E1721 MSX-E1701	New! MSX-E1731	New! MSX-E1741
Cables: Temperature range from -25 °C to +80 °C; Bent cables and special length on request					
Voltage supply: Shielded cable, M12 5-pin female connector/open end, IP65 **CMX-20** (1,5 m), **CMX-21** (3 m), **CMX-22** (5 m), **CMX-23** (10 m), **CMX-29** (length on request)		✓	✓	✓	✓
Voltage supply – Cascading: Shielded cable, M12 5-pin female connector/male connector, IP65 **CMX-38** (0,6 m), **CMX-30** (1 m), **CMX-31** (3 m), **CMX-32** (5 m), **CMX-39_0,3** (0,3 m), **CMX-39** (length on request)		✓	✓	✓	✓
Trigger/Synchro: Shielded cable, M12 5-pin female connector/open end, IP65 **CMX-40** (1,5 m), **CMX-41** (3 m), **CMX-42** (5 m), **CMX-43** (10 m), **CMX-49** (length on request)		✓	✓	✓	✓
Trigger/Synchro – Cascading: Shielded cable, M12 5-pin female connector/male connector, IP65 **CMX-58** (0,6 m), **CMX-50** (1 m), **CMX-51** (3 m), **CMX-52** (5 m), **CMX-59_0,3** (0,3 m), **CMX-59** (length on request)		✓	✓	✓	✓
Ethernet: CAT5E-Kabel, M12 D-coded male connector/RJ45 connector **CMX-60** (2 m), **CMX-61** (5 m), **CMX-62** (10 m), **CMX-69** (length on request)		✓	✓	✓	✓
Ethernet – Cascading: CAT5E-Kabel, 2 x M12 D-coded male connector **CMX-78** (1 m), **CMX-70** (2 m), **CMX-71** (5 m), **CMX-72** (10 m), **CMX-79_0,3** (0,3 m), **CMX-79** (length on request)		✓	✓	✓	✓
Connecting peripheral equipment: Shielded cable, M12 8-pin male connector/open end, IP65 **CMX-81** (3 m), **CMX-89** (length on request)		✓	✓	✓	–
Connecting peripheral equipment: Shielded cable, M12 5-pin male connector/open end, IP65 **CMX-9x** (length on request)					✓
Connector					
SC-M12:	M12 5-pin connector for connecting open end cables	✓	✓	✓	✓
SC-M12-8:	M12 8-pin connector for connecting open end cables				
SC-M12-ABGW:	M12 5-pin 90° bent connector for connecting open end cables	✓	✓	✓	✓
SC-M12-BU-ABGW:	M12 5-pin 90° bent female connector for connecting open end cables	✓	✓	✓	✓
SC-M12-8-ABGW:	M12 8-pin 90° bent connector for connecting open end cables				
SC-M12-Y-M12:	5-pin Y-splitter cable with M12 connector to 2 x M12 female connectors	✓	✓	✓	
SC-M23:	M23 12-pin connector for the direct connection of rotary and linear encoders, digital transducers		✓	✓	✓
Screw connector binders for voltage supply: 3-pin binder, 5.08 mm grid					
	**SMX-10** 1-row screw connector, included in the delivery content	–	–	–	–
	**SMX-11** 2-row screw connector	–	–	–	–
	**SMX-12** 2-row spring-cage connector	–	–	–	–
Screw connector binders for trigger/synchro					
	**SMX-20** 3-pin binders, 5.08 mm grid, included in the delivery content	–	–	–	–
Options / Mounting					
	**MX-Clip** 2 clips for DIN-rail mounting or for direct mounting on units.	✓	✓	✓	–
	**MX-Rail** Assembly equipment for DIN-rail mounting. Please specify when ordering!	✓	✓	✓	✓
	**MX-Screw** Assembly equipment for direct mounting on machines	✓	✓	✓	✓
Options / Protection caps					
	**PCMX-10:** 5 x protection caps for M12 connector (4 x female, 1 x male)	✓	✓	✓	✓
	**PCMX-11:** 10 x protection caps for M18 connector	–	–	–	–
	**PCMX-12:** 1 protection cap for M23 connector	–	✓		✓
	**PCMX-13:** 10 x protection caps for M12 connector	✓	✓	✓	✓

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Analog I/O		Analog input		Analog output		Force distance measurement		Tempera-ture meas-urement	Pressure meas-urement	Acquisition of dynamic signals	Length measurement				Protocol inter-preter
MSX-E3121	New! MSX-E3122	MSX-E3011 MSX-E3021	MSX-E3027	MSX-E3511	New! MSX-E3511-C	MSX-E3017	MSX-E3317	MSX-E3211	MSX-E3311	MSX-E3601	MSX-E3711	MSX-E3701	MSX-E3700	MSX-E3701-DIO	MSX-E7511
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✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–

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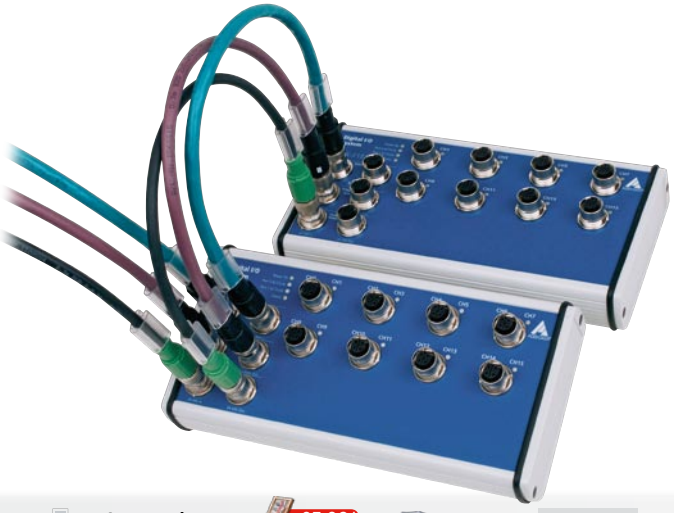
Ethernet digital I/O system
16 digital I/O, 24 V, with event logic

New!*
MSX-E 1516-NPN



MSX-E1516 / MSX-E1516-NPN

16 digital I/O, 24 V, status LEDs

Configurable inputs and outputs

Event logic for the inputs and outputs

24 V digital trigger input

M12 connectors

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

Timer function for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V
- Overtemperature and reverse voltage protection
- Internal temperature monitoring
- Filters on all inputs (software-programmable)
- Short-circuit protection
- Overvoltage protection 30 V
- Electronic fuse

Digital I/O

- 8 x 2 digital lines, 24 V, which can be parameterised as pairs of inputs or outputs
- Shutdown logic
- Watchdog for resetting the outputs to "0"
- At Power-On the outputs are set to "0"
- Electronic fuse
- Dual LED for each 24 V digital I/O with direction indication

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

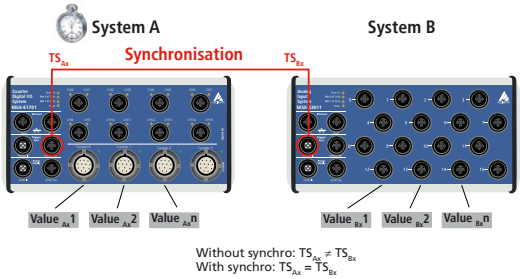
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

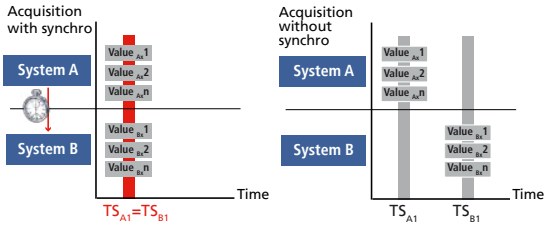
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



NOTE

NPN

While most sensors when activated will output a 24V signal (PNP sensors), a NPN sensor when activated switches to ground.
The swichting to ground of NPN sensors can be read by the MSX-E1516-NPN system.

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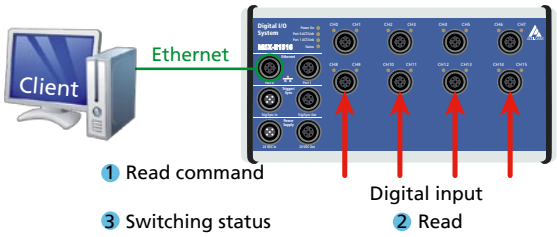
Acquisition modes

Acquisition modes – There are 2 different possibilities for reading the digital inputs.

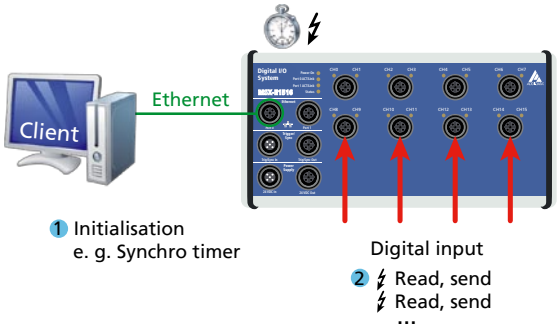
1. Asynchronous acquisition

With the asynchronous acquisition, the digital inputs can be read out via SOAP or Modbus function. For each function call, the values of one channel are transmitted.



2. Synchronous acquisition

With the synchronous acquisition, the inputs are first initialised and then the acquisition is parameterised. The acquisition runs automatically depending from a trigger source.
Either the 24V trigger input or a synchro trigger can be used as trigger source.

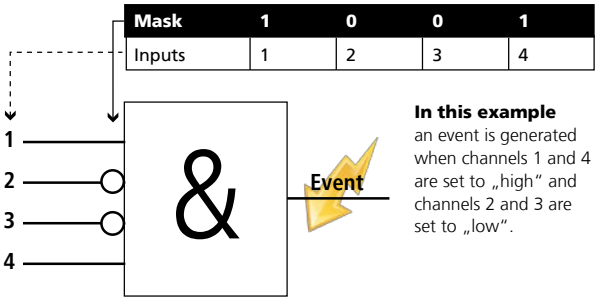


Synchro latch

A periodic acquisition of the digital inputs is possible using the synchro timer (synchro latch). Several MSX-E systems (of same or different types) can be combined through synchro trigger. With the synchronous acquisition, as soon as there are measurement values available, they are sent to the clients via socket connection.

Event logic

The event logic of the MSX-E1516 can be used to detect a change of edge on the digital inputs (e.g. to show that 1 unit has been produced, or that the machine runs or stands still).
This information (time stamp + event mask) is stored on the data server of the MSX-E1516 and can be read through a socket connection.
The information can be read either through an application written for this purpose or by using the DatabaseConnect software. DatabaseConnect writes the information in a database and can then evaluate it.

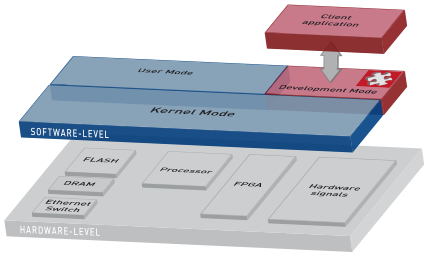


In this example
an event is generated when channels 1 and 4 are set to „high“ and channels 2 and 3 are set to „low“.

Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



Safety

Watchdog

The MSX-E1516 Ethernet system has a 16-bit watchdog which can be programmed in 3 time units (µs, ms, s). The watchdog is used for automatically resetting the digital outputs to 0 V after a defined time in order e. g. to switch off actuators if an error has occurred.

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ConfigTools

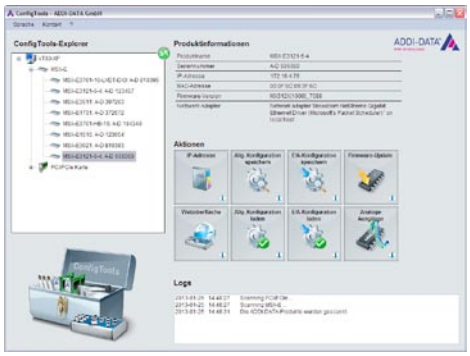
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

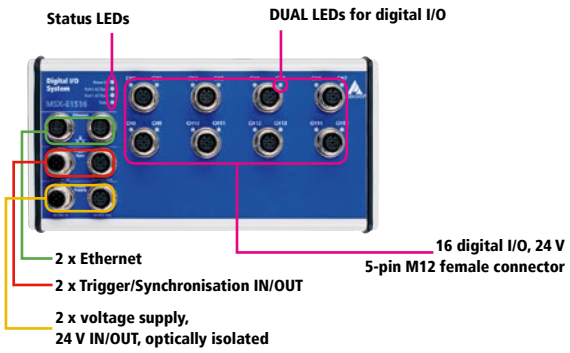
ConfigTools functions for MSX-E1516 / MSX-E1516-NPN:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration

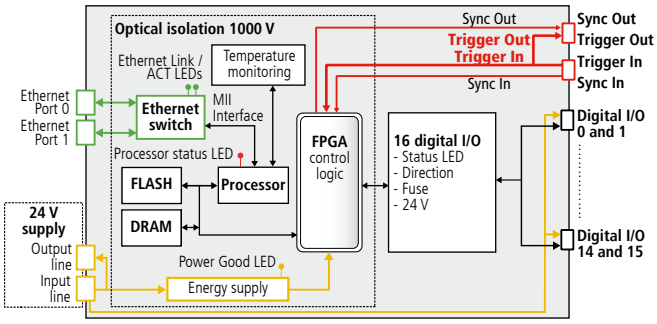
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



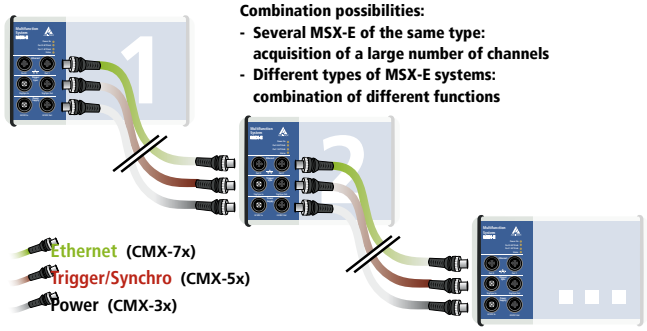
Features



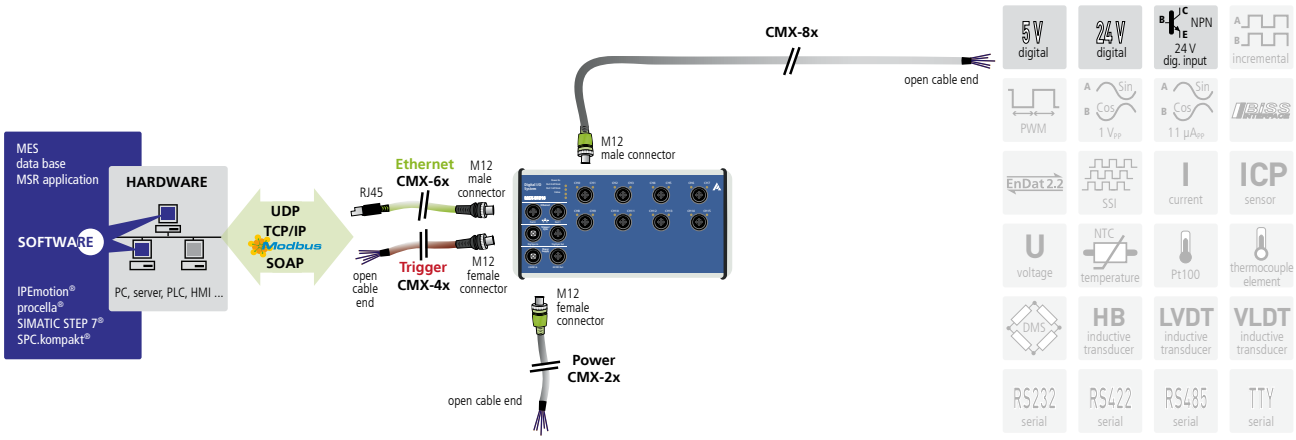
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Digital inputs

Number of inputs:	16, 2 per M12 female connector Common ground acc. to IEC 1131-2
Overvoltage protection:	30 V
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 to 30 V
Input impedance:	> 1 MΩ
Logic input levels:	UH (max) 30 V typ. UH (min) 18 V typ. UL (max) 16 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	16, 2 per M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Current (max.):	1.85 A typ. for 8 channels through PTC at 20°C
Output current per channel:	500 mA max. Short-circuit current per output 1.7 A max Shut-down logic at 24 V, R_{load} = 10 mΩ
RDS ON Resistance:	280 mΩ max.
Switch-on time:	100 µs max RL = 48 Ω of 80 % V_{out}
Switch-off time	150 µs max RL = 48 Ω of 10 % V_{out}
Overtemperature (shutdown):	135°C max. (output driver)
Temperature hysteresis:	15°C typ. (output driver)
Diagnostics:	Common diagnostics bit for all 16 channels at overtemperature of one channel

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	215 mm x 110 mm x 50 mm
Weight:	900 g
Degree of protection:	IP 65
Current consumption at 24 V:	160 mA
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For digital I/O:	8 x 5-pin M12 female connector

Ordering information

MSX-E1516 / MSX-E1516-NPN

Ethernet digital I/O system, 16 digital I/O, 24 V, with event logic. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E1516: 16 digital I/O, 24 V
MSX-E1516-NPN: 16 digital inputs, 24 V (NPN)

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector
Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (please specify when ordering!),
MX-Screw, PCMX-1x

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Ethernet multifunction counter system
4 counter inputs (incremental, sin/cos), 16 digital I/O, 24 V

MSX-E1701 / MSX-E1711 / MSX-E1721

4 incremental counter inputs
or 8 PWM outputs (MSX-E1701)

4 sin/cos counter inputs 1 V_{pp} (MSX-E1711),
11 μA_{pp} (MSX-E1721) with A, B, C (index) signals

16 digital I/O, 24 V, status LEDs

Configurable inputs and outputs

24 V digital trigger input

M12 and M23 connectors

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

Timer function or compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters

Counter

- 4 x 32-bit incremental counter inputs (MSX-E1701), max. 5 MHz, or 8 x PWM outputs, can be configured through firmware
- 4 x 32-bit sin/cos counter inputs with 1V_{pp} (MSX-E1711) or 11 μA_{pp} (MSX-E1721), 250 kHz
- Voltage supply of the sensors through M23 female connector (24 V or 5 V)
- Single, double, quadruple edge analysis (MSX-E1701)
- Compare logic
- Status LEDs for incremental counter inputs

Digital I/O

- 8 x 2 digital lines, 24 V, which can be parameterised as pairs of inputs or outputs
- Shutdown logic
- Watchdog for resetting the outputs to "0"
- At Power-On the outputs are set to "0"
- Electronic fuse
- Dual LED for each 24 V digital I/O with direction indication

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

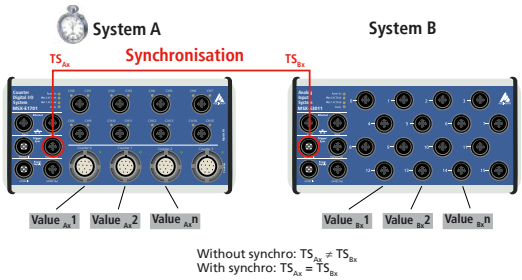
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

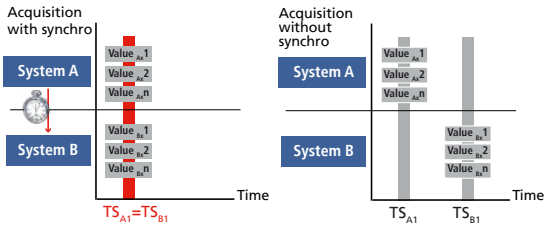
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



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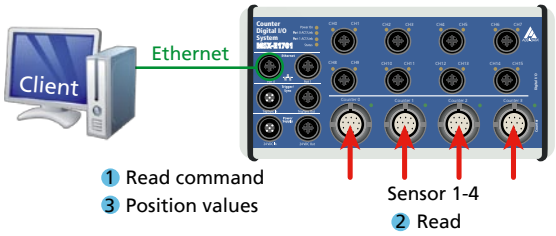
Acquisition modes

Acquisition modes – There are 2 different possibilities for reading the counter inputs.

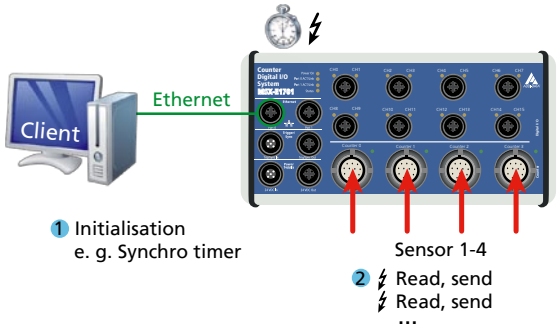
1. Asynchronous acquisition

With the asynchronous acquisition, the counter inputs can be read out via SOAP or Modbus function. For each function call, the values of one channel are transmitted.



2. Synchronous acquisition

With the synchronous acquisition, the inputs are first initialised and then the acquisition is parameterised. The acquisition runs automatically depending from a trigger source.
Either the 24V trigger input or a synchro trigger can be used as trigger source.



Synchro latch

A periodic acquisition of the counter inputs is possible using the synchro timer (synchro latch). Several MSX-E systems (of same or different types) can be combined through synchro trigger. With the synchronous acquisition, as soon as there are measurement values available, they are sent to the clients via socket connection.

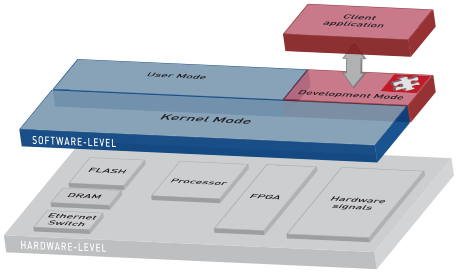
Compare logic

With the compare logic, a synchro-trigger signal can be generated in order to latch the counter value as soon as the counter value is equal to the compare value.
With the additional „Modulo-Mode" (Modulo Compare), a trigger can also be generated at the n value of the compare value.
Thus it is possible, e. g. when using an encoder with 3,600 steps / revolution to obtain each degree of a measurement value (Modulo Compare = 10).
The thus generated synchro-trigger can also be used for data acquisition on further MSX-E systems.

Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



Safety

Watchdog

The MSX-E17x1 Ethernet system has a 16-bit watchdog which can be programmed in 3 time units (µs, ms, s). The watchdog is used for automatically resetting the digital outputs to 0 V after a defined time in order e. g. to switch off actuators if an error has occurred.

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ConfigTools

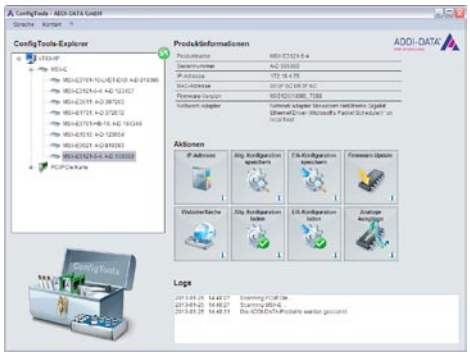
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

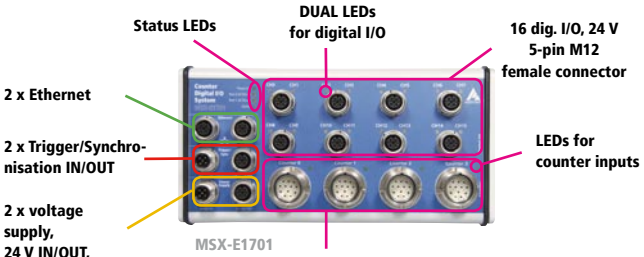
ConfigTools functions for MSX-E1701 / MSX-E1711 / MSX-E1721:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



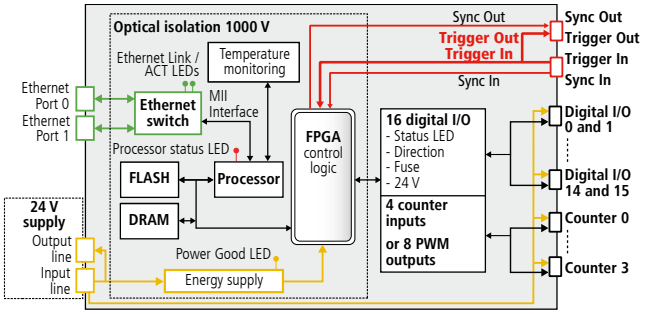
Features



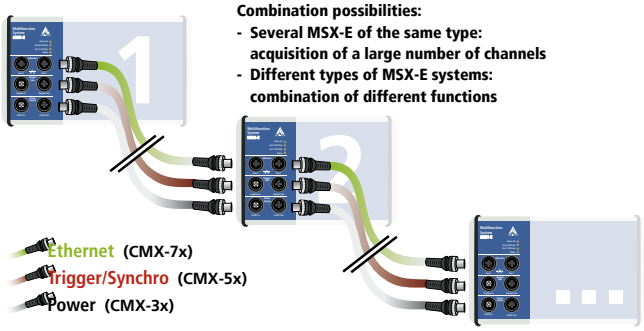
MSX-E1701
4 incremental counter inputs: 12-pin M23 female connector or 4 x 2 PWM outputs

MSX-E1711 / MSX-E1721
4 sin/cos inputs: 1 V_{pp} or 11 μA_{pp}
M23 female connector: 12-pin for MSX-E1711 (1 V_{pp}) or 9-pin for MSX-E1721 (11 μA_{pp})

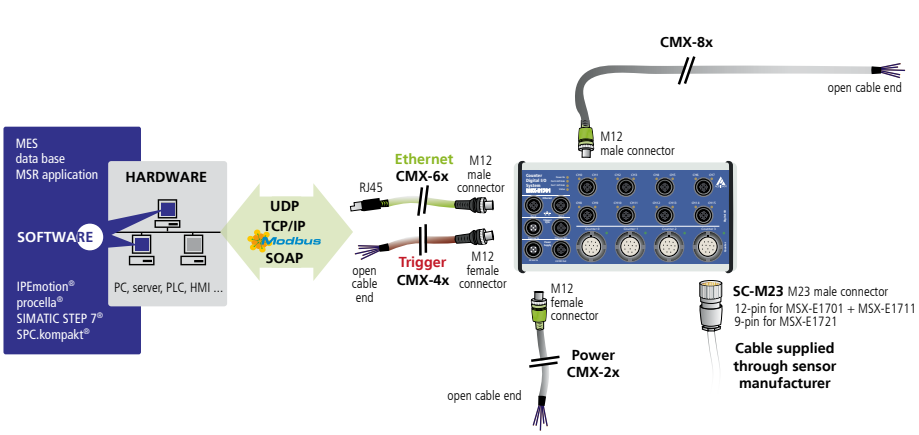
Simplified block diagram

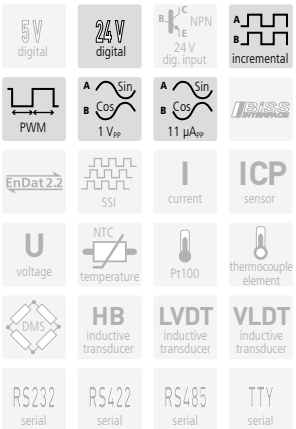


Cascading



ADDI-DATA connection technology





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Specifications*

Incremental counter inputs (MSX-E1701)

Number of inputs:	4 x incremental counters each with A, B, C and D signals
5 V inputs (MSX-E1701 version)	
Differential inputs:	Complies with the EIA standards RS422A
Input type:	Differential or TTL (with reference voltage)
Common mode range:	+12 / -7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Max. input frequency:	5 MHz
„Open Circuit Fail Safe Receiver Design"	
ESD protection:	Up to ±15 kV
24 V inputs (MSX-E1701-24 version)	
	For 24 V encoders. Only 24 V signals can be connected.
Nominal voltage:	24 VDC
Max. input frequency:	1 MHz at nominal voltage
Input impedance:	> 1 MΩ
Logic input levels:	UH (max): 30 V typ. UH (min): 18 V typ. UL (max): 16 V typ. UL (min): 0 V typ.
Voltage supply:	Incremental encoder selectable, 5 V or 24 V, max. 500 mA

PWM outputs (MSX-E1701)

Number of outputs:	8
Differential I/O:	Complies with the EIA standards RS422A
Output type:	Differential
Common mode range:	+12 / -7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Time base:	250 ns, 1 µs, 1 ms, 1 s
Min. pulse duration:	250 ns
Max. output rate:	n: number of pulses (Duty Cycle), n ≥ 2 $f = \frac{1}{n \cdot \text{time base}}$

Examples (time base = 250 ns)**:**

Duty Cycle 50%
1 high pulse, 1 low pulse, n=2
$f = \frac{1}{2 \cdot 250\ ns} = 2\ MHz$

Duty Cycle 66%
2 high pulses, 1 low pulse, n=3
$f = \frac{1}{3 \cdot 250\ ns} = 1.33\ MHz$

Voltage supply:	5 V or 24 V, max. 500 mA

Sin/cos counter inputs (MSX-E1711, MSX-E1721)

Number of inputs:	4 x sin/cos counter inputs each with A, B, C and D signals
Resolution:	32-bit
Differential inputs:	- 1 V_{pp} (MSX-E1711) - 11µA_{pp} (MSX-E1721)
Interpolation factor:	Up to 8192
Max. input frequency:	max. 250 kHz (at min. interpolation), on request
ESD protection:	2 kV

Digital inputs

Number of inputs:	max. 16, 2 per M12 female connector, common ground acc. to IEC 1131-2
Overvoltage protection:	30 V
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 to 30 V
Input impedance:	> 1 MΩ
Logic input levels:	UH (max): 30 V typ. UH (min):18 V typ. UL (max):16 V typ. UL (min):0 V typ.

Digital outputs

Number of outputs:	max. 16, 2 per M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Current (max.):	1.85 A typ. for 8 channels through PTC
Output current / output:	500 mA max.
Short-circuit current / output:	1.7 A max., shut-down logic at 24 V, R_{load}= 10 mΩ
RDS ON resistance:	280 mΩ max.
Switch-on time:	100 µs, max. RL = 48 Ω from 80 % V_{out}
Switch-off time:	150 µs, max. RL=48 Ω from 10 % V_{out}
Overtemperature (shutdown):	135°C max. (output driver)
Temperature hysteresis:	15°C typ. (output driver)
Diagnostics:	Common diagnostics bit for all 16 channels at overtemperature of one channel

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 54
Weight:	900 g
Degree of protection:	IP 65
Current consumption at 24 V:	150 mA without load
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
Digital I/O:	8 x 5-pin M12 female connector
Incremental counter inputs:	4 x 12-pin M23 female connector
Sin/cos counter input 1 V_{ss}:	4 x 12-pin M23 female connector
Sin/cos counter input 11 µA_{ss}:	4 x 9-pin M23 female connector

Ordering information

MSX-E1701 / MSX-E1711 / MSX-E1721

Ethernet multifunction counter system, 4 counter inputs (incremental, sin/cos), 16 digital I/O, 24 V.
Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E1701: 5 V RS422 incremental counter inputs
MSX-E1701-24V: 24 V incremental counter inputs
MSX-E1711: Sin/cos inputs, 1 V_{pp}
MSX-E1721: Sin/cos inputs, 11 µA_{pp}

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7:
Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

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Ethernet multifunction counter system
4 EnDat counter inputs, 16 digital I/O, 24 V

New!*

EnDat 2.2

MSX-E1731

- 4 EnDat 2.2 inputs
- 16 digital I/O, 24 V, with status LEDs
- 24 V digital trigger input
- M12 connectors

Integrated Ethernet switch

+ 85 °C*
- 40 °C
*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
on request

More information at www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V
- Input filters

Sensor inputs

- 8-pin M12 female connectors
- 4 x EnDat counter inputs for the acquisition of EnDat encoders
- Max. clock frequency 4.5 MHz
- Voltage supply of the EnDat encoders via M12 female connectors: 5 V ±10%
- Output of the values as raw value or position value (mm or °)
- Communication LED for each EnDat input

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

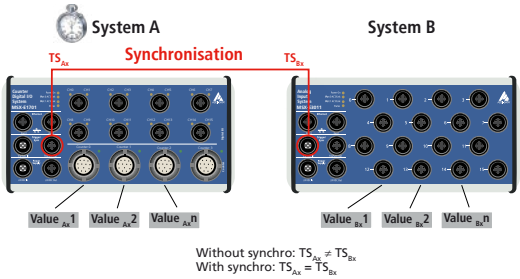
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

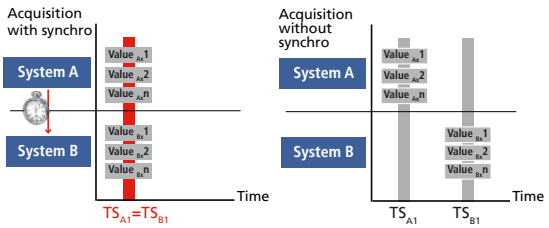
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminary product information

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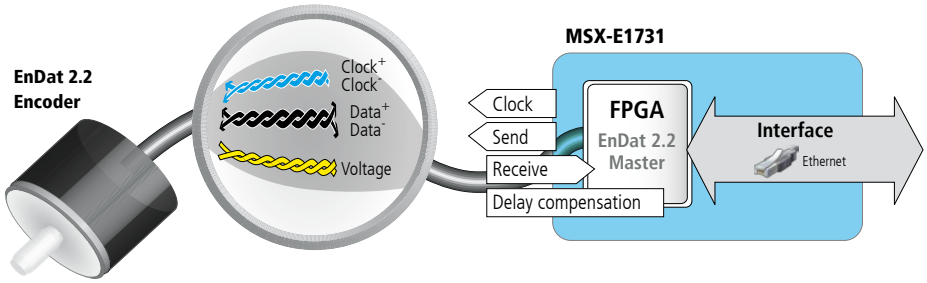
EnDat

EnDat is a bidirectional synchronous-serial interface for position measurement devices. This interface allows to read out absolute position values and parameters, to write status and initialisation registers and to transfer additional information about the position value. In addition, ADDI-DATA EnDat 2.2 solutions support the evaluation of diagnostic values and access to the OEM memory. Data is transferred serially.

- Fast data transfer
- Signal delay time compensation
- High contour accuracy
- High transmission safety
- No need for additional sensors: Evaluation (temperature, limit switch, etc.)
- Serial transmission: only 4 lines necessary (EnDat 2.2)
- Single-line wiring (M12, 8-pin)
- Automatic parameterisation through electronic type plate

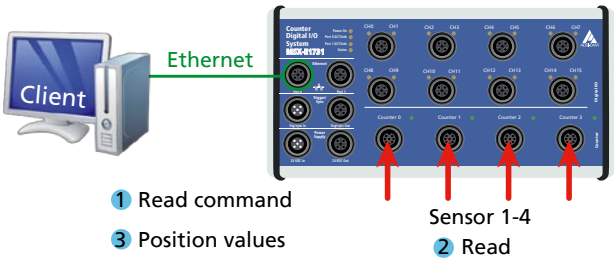


Acquisition modes

There are two different acquisition modes for EnDat sensors:

Asynchronous acquisition

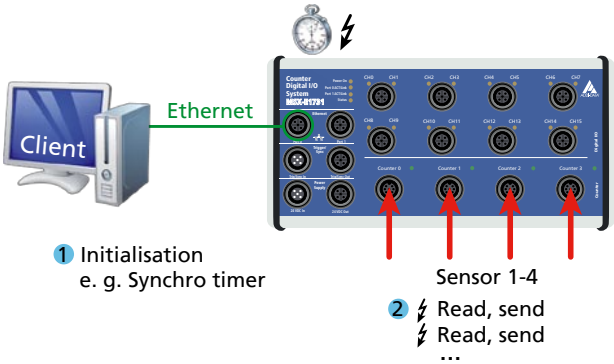
With the asynchronous acquisition, the EnDat sensors can be read out after initialisation via SOAP or Modbus function.
For each function call, one position value is transmitted.
EnDat 2.2 also allows to read out additional sensor-specific values (e. g. temperature,...)



Synchronous acquisition

With the synchronous acquisition, at first the sensors are initialised and then the acquisition is parameterised. The acquisition runs automatically in relation to a trigger source.
Either the 24 V trigger input or a Synchro timer can be used as a trigger source.
When using the Synchro timer, a periodical acquisition of the EnDat inputs is also possible.

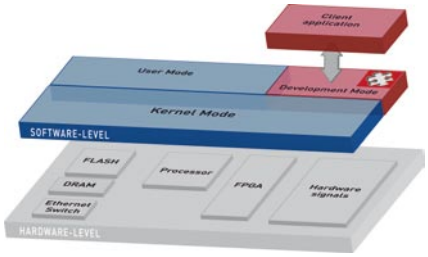
With the synchronous acquisition, it is possible to acquire all 4 sensor inputs of the MSX-E1731 simultaneously.
It is also possible to combine several MSX-E systems (even of different types) through the Synchro trigger. In synchronous acquisition mode, measurement data is sent to the clients as soon as it is available via a socket connection.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



* Preliminary product information

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ConfigTools

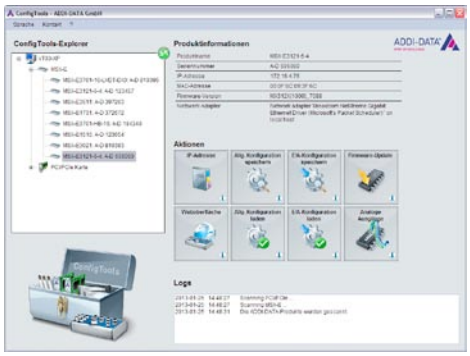
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

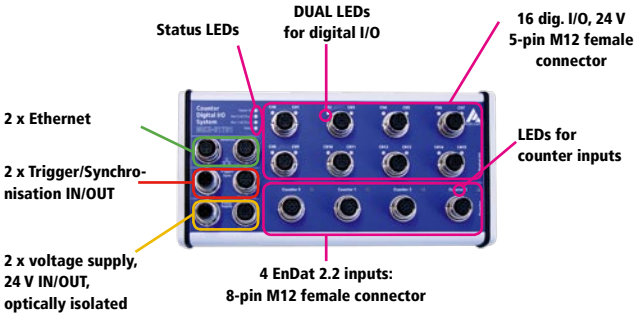
ConfigTools functions for MSX-E1731:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration

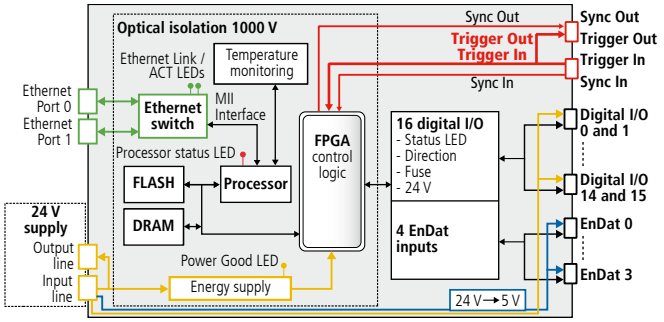
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



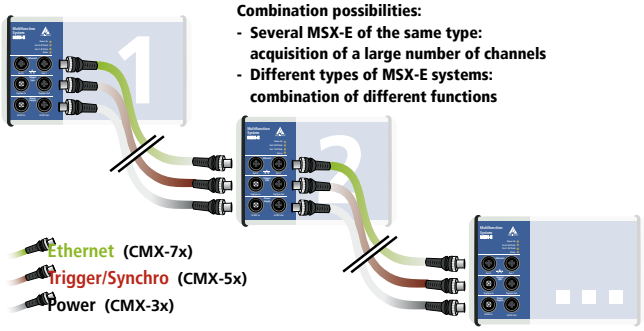
Features



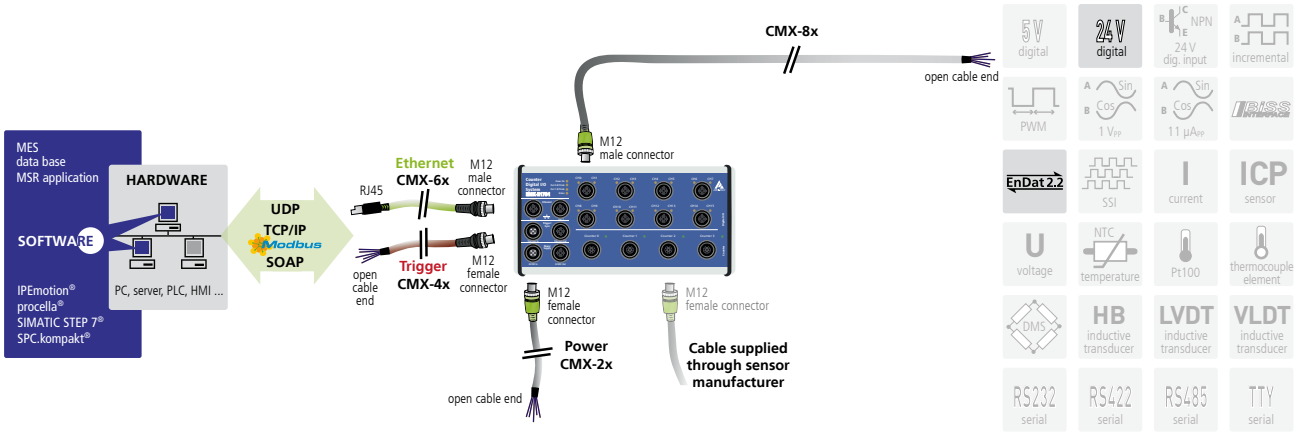
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Counter inputs

Input type:	EnDat 2.2
Differential inputs:	Complies with the EIA standards RS422A
Input type:	Differential
Common mode range:	+12 / -7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Max. input frequency:	5 MHz
ESD protection:	Up to ±15 kV
Clock frequencies:	4500 kHz 2500 kHz 1500 kHz 900 kHz 500 kHz

Digital inputs

Number of inputs:	max. 16, 2 per M12 female connector, common ground acc. to IEC 1131-2
Overvoltage protection:	30 V
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	from 0 to 30 V
Input impedance:	> 1 MΩ
Logic input levels:	UH (max):30 V typ. UH (min): 18 V typ. UL (max): 16 V typ. UL (min): 0 V typ.

Digital outputs

Number of outputs:	max. 16, 2 per M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Current (max.):	1.85 A typical for 8 channels through PTC
Output current / output:	500 mA max.
Short-circuit current / output:	1.7 A max. Shut-down logic at 24 V, Rload=10 mΩ
RDS ON resistance:	280 mΩ max.
Switch-on time:	100 µs max RL=48 Ω from 80 % Vout
Switch-off time:	150 µs max RL=48 Ω from 10 % Vout
Overtemperature (shutdown):	135°C max. (output driver)
Temperature hysteresis:	15°C typ. (output driver)
Diagnostics:	Common diagnostics bits for all 16 channels at overtemperature

Watchdog

Number:	1
Resolution:	16-bit
Time base:	µs, ms, s (programmable)
Time value range:	1 to 65535

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 54 mm
Weight:	approx. 900 g
Degree of protection:	IP 65
Current consumption at 24 V:	150 mA without load
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
Digital I/O:	8 x 5-pin M12 female connector
Counter inputs:	4 x 8-pin M12 female connector

Ordering information

MSX-E1731

Ethernet multifunction counter system, 4 EnDat counter inputs, 16 digital I/O. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector

CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals

CMX-8x: For the digital I/O, shielded cable, M12 5-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V

MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

* Preliminary product information

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ADDI-DATA®
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Ethernet counter system
3 sin/cos counter inputs 1 V_{pp} , 1 analog input, 24-bit

New!*

MSX-E1741-1VPP

- 3 sin/cos counter inputs 1 V_{pp}
- 1 analog input
- 24 V digital trigger input
- M12 and M23 connectors

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

Timer function or compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V
- Input filters

Counter

- 3 x 32 bit sin/cos counter inputs 1 V_{pp}, 250 kHz
- Voltage supply of the sensors via M23 female connectors (5 V)
- Compare logic
- Status LED for counter inputs

Analog input

- 1 diff./SE inputs, 24-bit, 4-pin M12 female connector
- Sampling frequency 100 kHz/channel max.

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

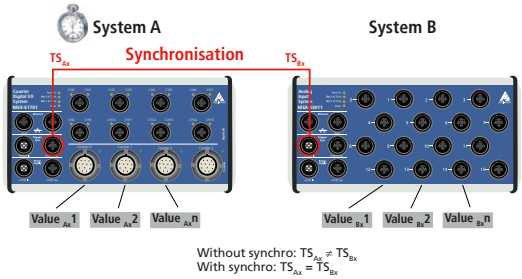
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

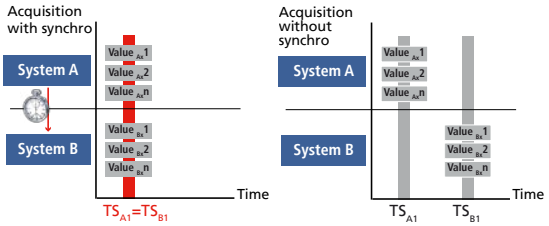
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminay product information

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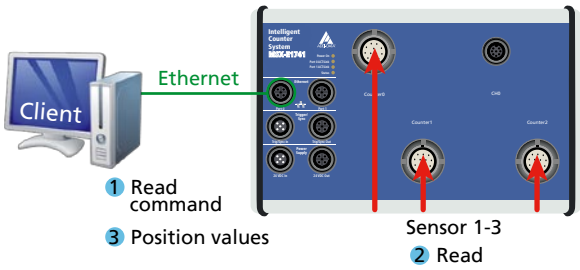
Acquisition modes

Acquisition modes – There are 2 different possibilities for reading the counter inputs.

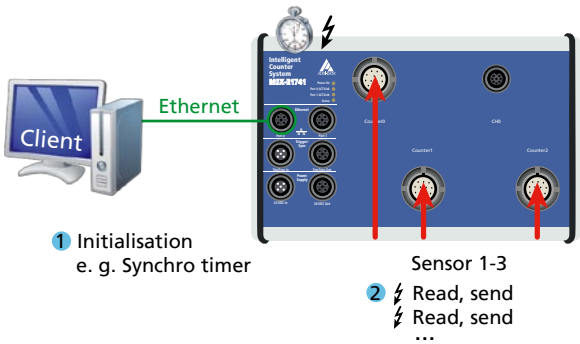
1. Asynchronous acquisition

With the asynchronous acquisition, the counter inputs can be read out via SOAP or Modbus function. For each function call, the values of one channel are transmitted.



2. Synchronous acquisition

With the synchronous acquisition, the inputs are first initialised and then the acquisition is parameterised. The acquisition runs automatically depending from a trigger source.
Either the 24V trigger input or a synchro trigger can be used as trigger source.

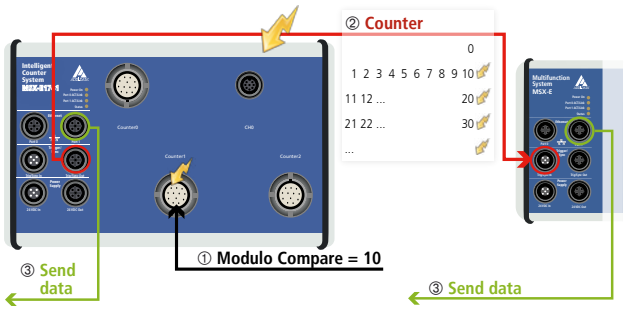


Synchro latch

A periodic acquisition of the counter inputs is possible using the synchro timer (synchro latch). Several MSX-E systems (of same or different types) can be combined through synchro trigger. With the synchronous acquisition, as soon as there are measurement values available, they are sent to the clients via socket connection.

Compare logic

With the compare logic, a synchro-trigger signal can be generated in order to latch the counter value as soon as the counter value is equal to the compare value.
With the additional „Modulo-Mode" (Modulo Compare), a trigger can also be generated at the n value of the compare value.
Thus it is possible, e. g. when using an encoder with 3,600 steps / revolution to obtain each degree of a measurement value (Modulo Compare = 10).
The thus generated synchro-trigger can also be used for data acquisition on further MSX-E systems.



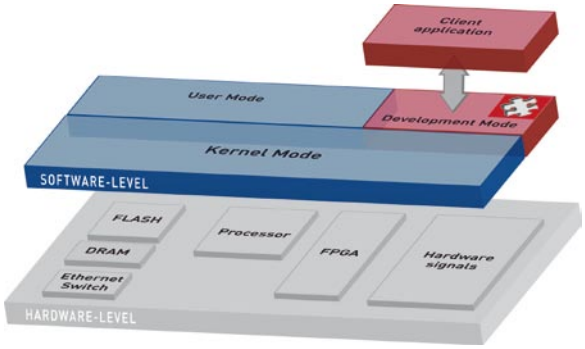
Index logic

The Index track of the encoder can also be used as trigger source. Either the selected edge of the index signal can directly start the acquisition or a synchro-trigger can be generated and then used on further MSX-E systems. Furthermore, the index signal can be used to delete the counter channel.

Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

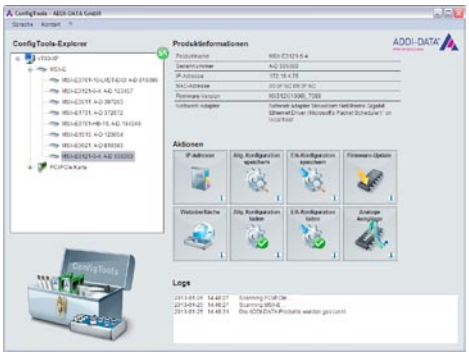
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

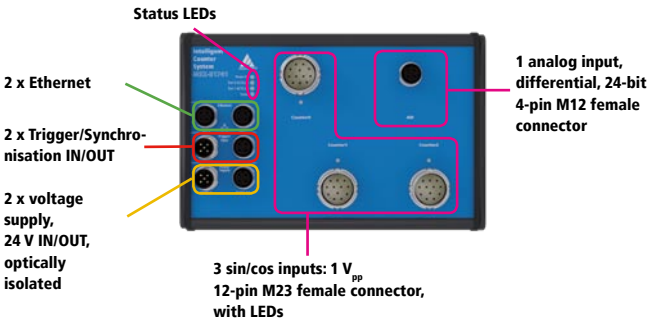
ConfigTools functions for MSX-E1741-1VPP:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration

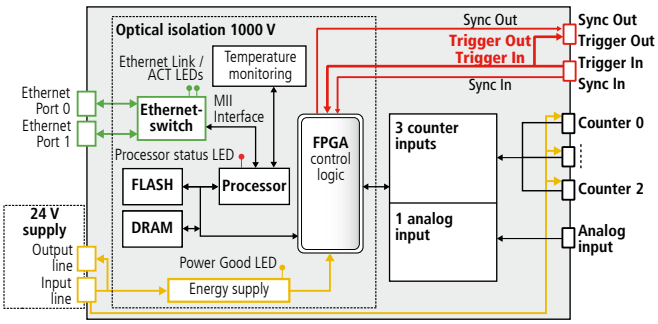
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



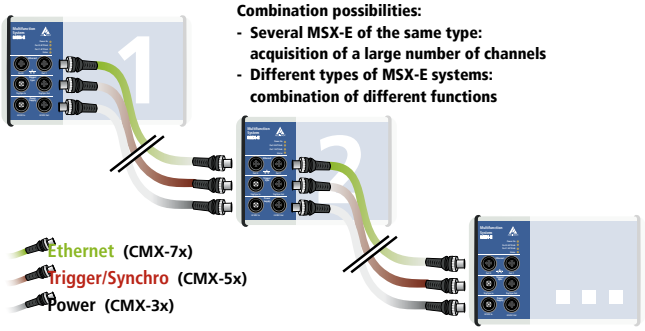
Features



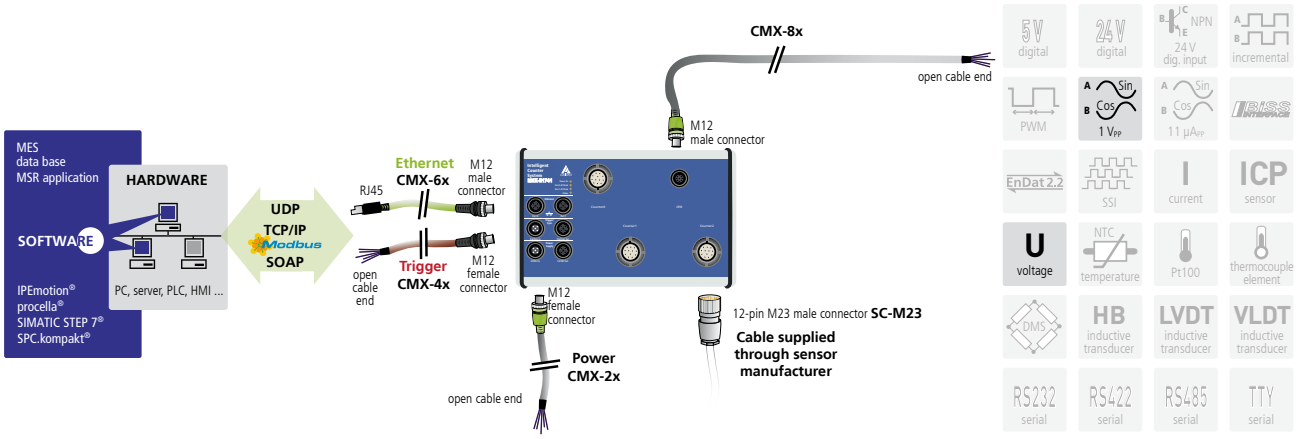
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Sin/cos counter inputs

Number of inputs:	3 x sin/cos counter inputs, each with A, B, C signals
Resolution:	32-bit
Differential inputs:	1 V_{pp}
Interpolation factor:	up to 8192
Max. input frequency:	max. 250 kHz (at min. interpolation)
ESD protection:	2 kV

Analog input

Number/type:	1 differential / single-ended input (software-selectable)
Resolution:	24-bit
Optical isolation:	1000 V
Input ranges:	± 10 V, ± 1 V, ± 100 mV, ± 10 mV (24-bit), 0-10 V, 0-1 V, 0-100 mV, 0-10 mV (23-bit), software-programmable, current input 0(4) – 20 mA optional
Sampling frequency:	100 kHz
Gain:	x1, x10, x100, software-programmable
Trigger:	digital input, synchro, software-programmable

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 54
Weight:	in preparation
Degree of protection:	IP 65
Current consumption at 24 V:	in preparation
Operation temperature:	-40 °C to +85 °C
Connectors for sensors	
Sin/cos counter input 1 V_{pp}:	3 x 12-pin M23 female connector
Analog input:	1 x 4-pin M12 female connector

Ordering information

MSX-E1741-1VPP

Ethernet counter system, 3 sin/cos counter inputs 1 V_{pp}, 1 analog input, 24-bit. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals

CMX-8x: For the analog input, shielded cable, M12 5-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

* Preliminay product information

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Ethernet analog input system
16 analog inputs, diff., 16-bit

MSX-E3011

16 analog inputs, differential, 16-bit

Voltage or current inputs

Simultaneous acquisition of 4 channels with 100 kHz each

M12 connector

24 V trigger input

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 16 diff. inputs, 16-bit, 5-pin M12 female connector
- Sampling frequency max. 100 kHz, up to 4 simultaneous channels
- Input ranges: ± 5 V, ± 10 V (16-bit)
  0-5 V, 0-10 V (15-bit)
- Current inputs optional

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

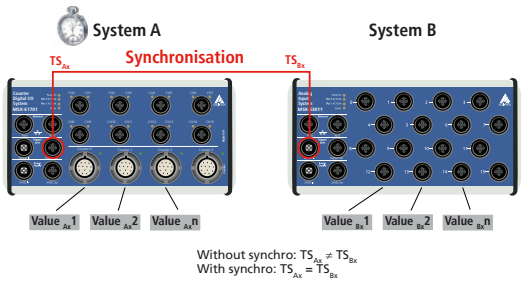
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

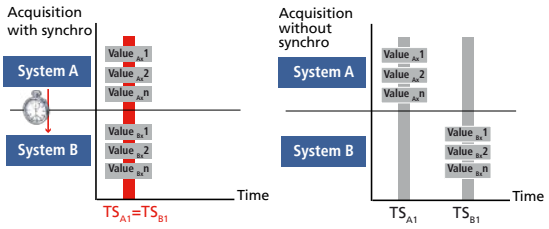
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
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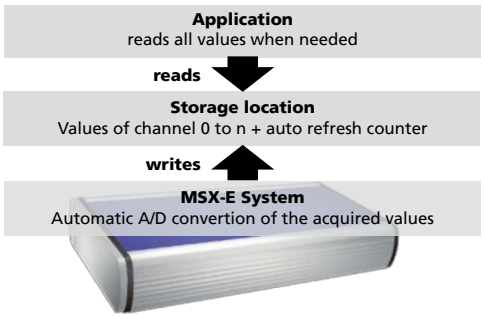
Acquisition modes

Auto-refresh mode

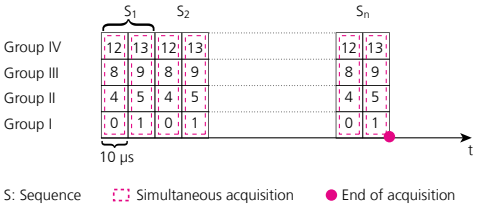
In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.

Example: 8 channels, each with 10 µs



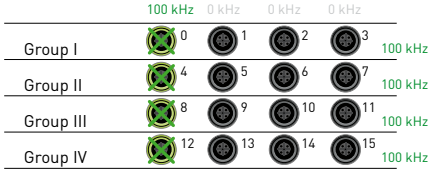
S: Sequence Simultaneous acquisition End of acquisition

Acquisition speed

Different wiring
for 25 kHz/channel and 100 kHz/groups

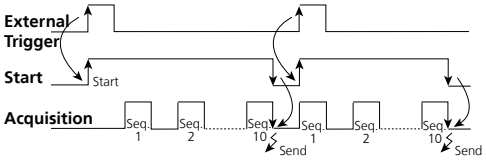
Horizontal wiring (with 4 gauges/sensors)

Vertical wiring (with 4 gauges/sensors)



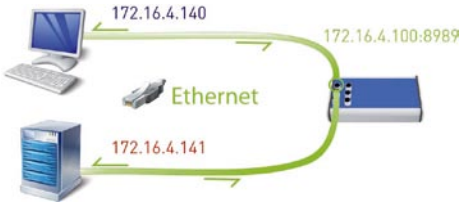
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

Development mode

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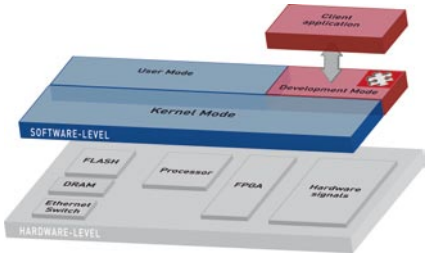

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ConfigTools

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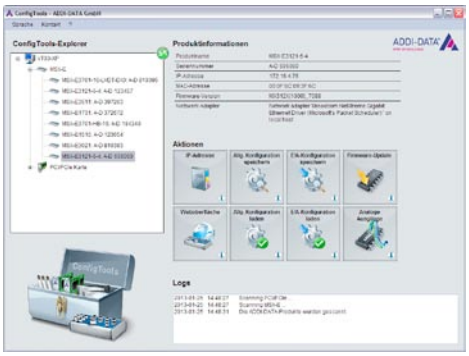
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

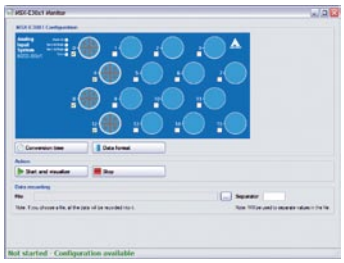
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3011:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for analog inputs

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

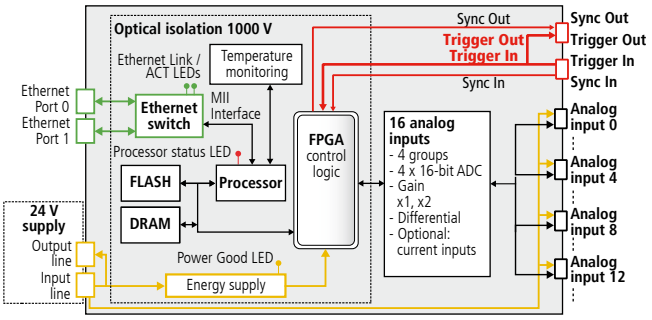




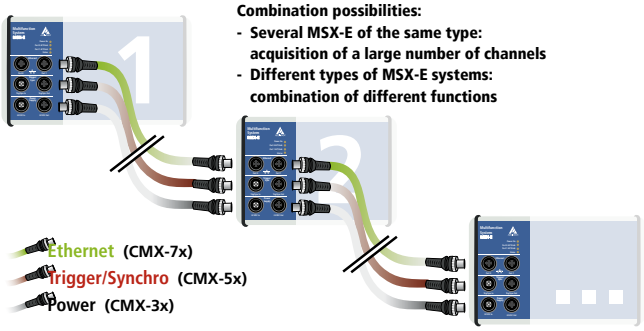
Example of monitor function: Testing the analog inputs.

Features

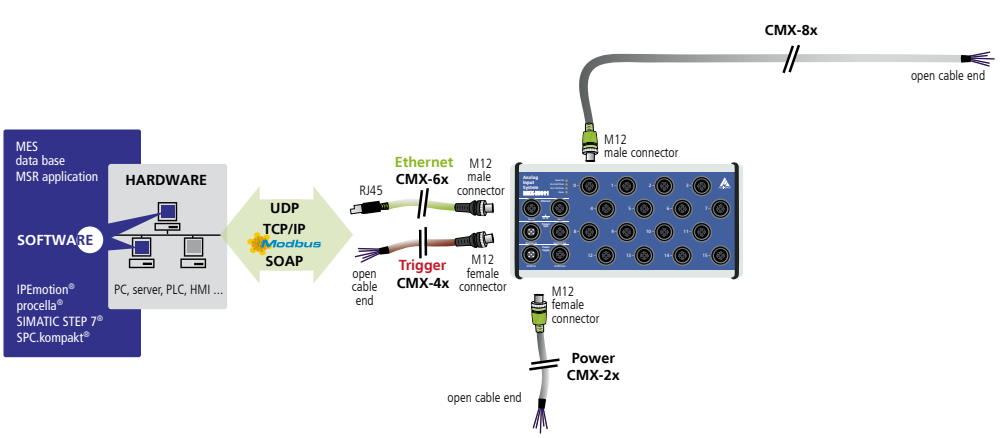
Simplified block diagram

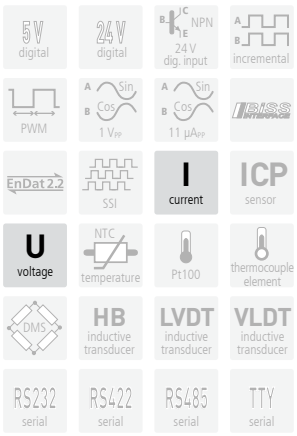


Cascading



ADDI-DATA connection technology





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Specifications

Analog inputs

Number/type:	16 differential inputs
Architecture:	4 groups of 4 channels each 4-port simultaneous converter with one 4-channel multiplexer per converter
Resolution:	16-bit, SAR ADC
Accuracy:	± 1.221 mV typ. (± 4 LSB) ± 2.442 mV max.
Relative Accuracy (INL):	± 3 LSB max (ADC)
Optical isolation:	1000 V
Input ranges:	± 5 V, ± 10 V (16-bit), 0-5 V, 0-10 V (15-bit) software-programmable, current inputs optional
Sampling frequency:	25 kHz per channel / 100 kHz max.
Gain:	x1, x2, software-programmable
Common mode rejection:	80 dB min. DC up to 60 Hz (diff. amplifier)
Input impedance (PGA):	10^9 Ω // 10nF against GND
Bandwidth (-3dB):	160 kHz limited through TP filters 16 Hz version with differential filter
Trigger:	digital input, synchro, software-programmable
Offset error:	± 1 LSB (± 305 µV)
Gain error:	± 2.5 LSB
Temperature drift: V_{in}: input voltage in Volts (-10 V ≤ V_{in} ≤ +10 V) In the temperature range: from -40°C to +85°C	2.3 x V_{in} + 22.5 (µ V/ °C) typ. 4.5 ppm/°C FSR

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	215 x 110 mm x 50 mm
Weight:	850 g
Degree of protection:	IP 65
Current consumption at 24 V:	180 mA
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For analog inputs	16 x 5-pin M12 female connector

Ordering information

MSX-E3011

Ethernet analog input system, 16 analog inputs, diff., 16-bit. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector

CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals

CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V

MX-Clip, **MX-Rail** (please specify when ordering!),

MX-Screw, PCMX-1x

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Ethernet force-distance measurement system, 1 counter input, 4 analog inputs, 24-bit, 2 dig. I/O, 24 V

New!*

MSX-E3017

1 counter input

4 analog inputs, diff, 24-bit

2 digital I/O, 24 V

Easy configuration: Easy mode

Integrated Ethernet switch

On request + 85 °C* - 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
on request, see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters

Counter input

- 1 incremental counter input, 32-bit, (on request: Sin/Cos 1 V_{pp} or Sin/Cos 11 μA_{pp}) 12-pin M23 female connector
- Max. input frequency 5 MHz

Analog inputs

- 4 diff. inputs, 24-bit, 4-pin M12 female connector
- Sampling frequency max. 100 kHz/channel simultaneous on 4 channels

Digital I/O

- 1 x 2 digital lines, 24 V, which can be parameterised as pairs of inputs or outputs
- Shutdown logic
- Watchdog for resetting the outputs to „0“
- At Power-On the outputs are set to „0“
- Electronic fuse
- Dual LED for each 24 V digital I/O with direction indication

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

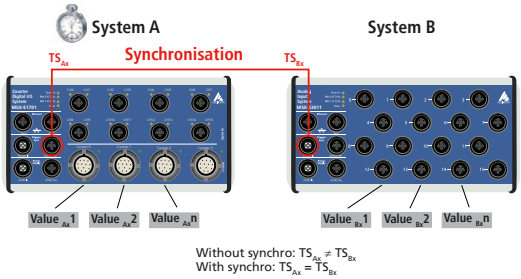
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

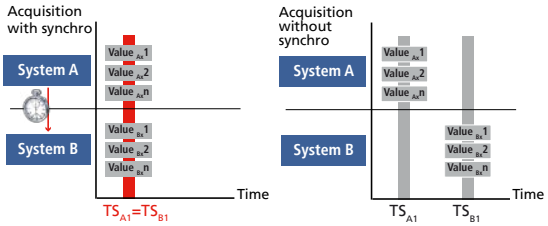
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminary Product information

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Fax: +49 7229 1847-222 www.addi-data.com

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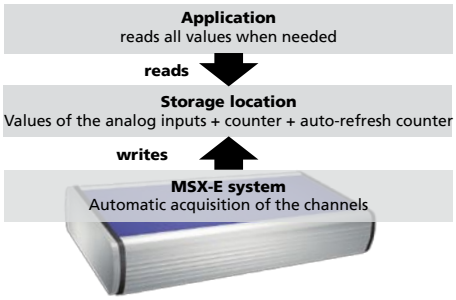
Acquisition modes

With the MSX-E3017 system, you can effect force-distance measurements in 2 different ways: in auto-refresh mode or sequence mode.
The acquisition can be done depending on a position or on time.w

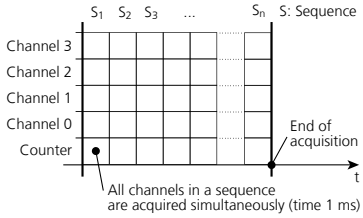
Auto-refresh mode

In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



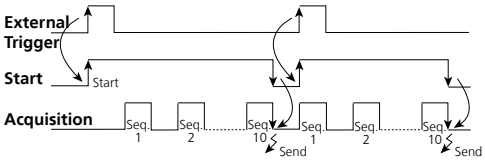
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



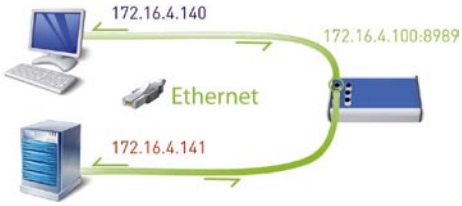
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

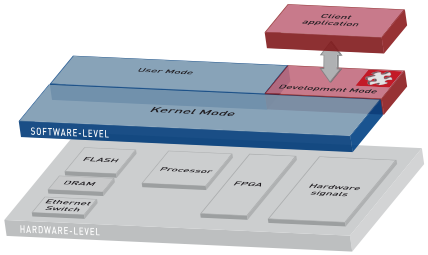
MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

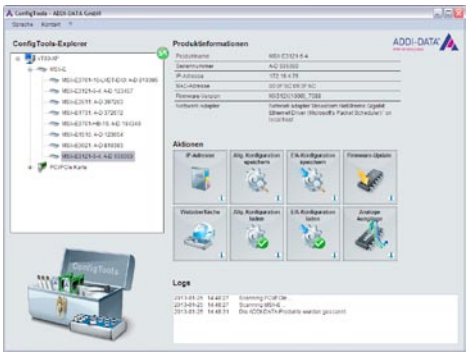
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

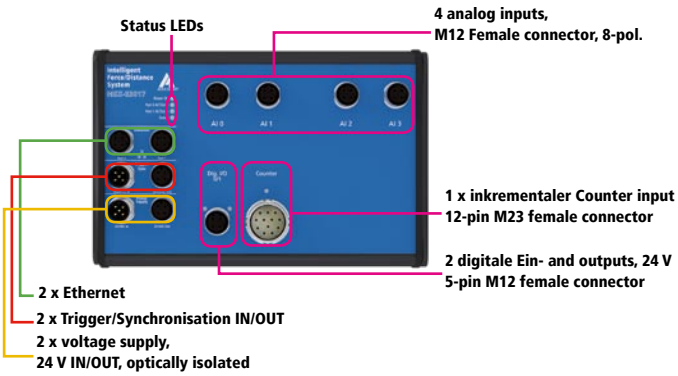
ConfigTools functions for MSX-E3017:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for analog inputs
- Visualisation of the force-distance measurement (Easy mode)

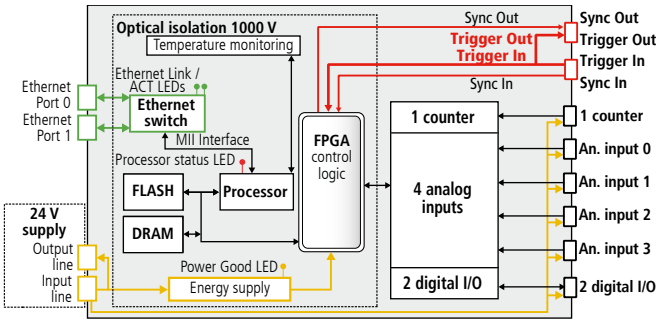
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



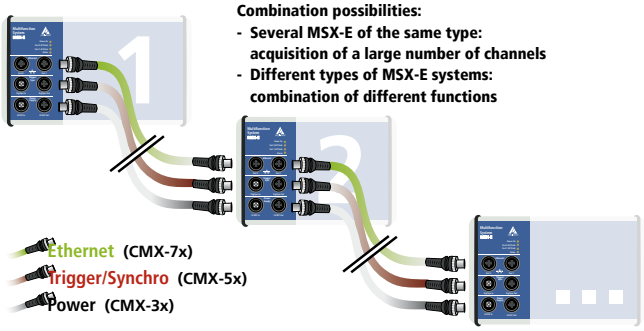
Features



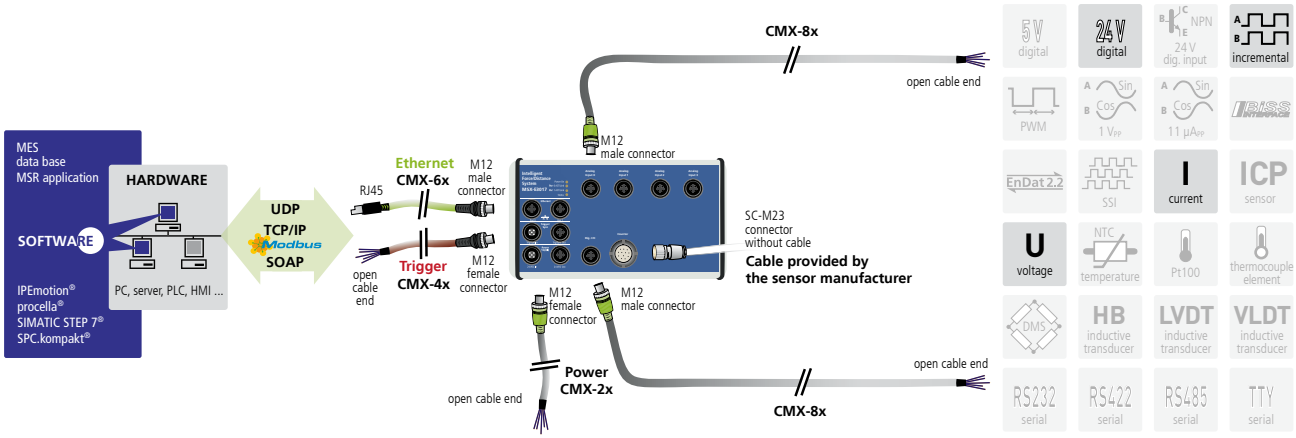
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Incremental counter

Number of counter inputs:	1
Input type:	Differential or TTL inputs
Differential inputs:	Complies with the EIA standards RS422A
Common mode range:	+12 / -7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Max. input frequency:	5 MHz at nominal voltage
„Open Circuit Fail Safe Receiver Design"	„1" = inputs open
ESD protection:	Up to ±15 kV
Voltage supply Incremental encoder:	5 V or 24 V, max. 500 mA

Analog inputs

Number/type:	4 differential inputs, 1 A/D converter per channel
Resolution:	24-bit, SAR ADC
Optical isolation:	1000 V
Input ranges:	± 10 V, ± 5 V (24-bit), 0-10 V, 0-5 V (23-Bit), software-programmable, current inputs optional
Sampling frequency:	100 kHz per channel
Gain:	x1, x10, x100, x1000, software-programmable
Trigger:	digital input, synchro, software-programmable

Digital inputs

Number of inputs:	2, on 1 M12 female connector Common ground acc. to IEC 1131-2
Overvoltage protection:	30 V
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 to 30 V
Input impedance:	> 1 MΩ
Logic input levels:	UH (max) 30 V typ. UH (min) 18 V typ. UL (max) 16 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	2, on 1 M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Current (max.):	1.85 A typical for 2 channels through PTC
Output current / output:	500 mA max.
Short-circuit current / output:	1.7 A max. Shut-down logic at 24 V, R_{load}=10mΩ
RDS ON Resistance:	280 mΩ max.
Switch-on time:	100 µs max RL=48 Ω von 80 % V_{out}
Switch-off time:	150 µs max RL=48 Ω von 10 % V_{out}
Overtemperature (shutdown):	135°C max. (output driver)
Temperature hysteresis:	15°C typ. (output driver)
Diagnostics:	Common diagnostics bit at overtemperature

Watchdog:

Number:	1
Resolution:	16-bit
Time base:	µs, ms, s (programmable)
Time value range:	1 to 65535

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	220 x 140 x 50 mm
Weight:	ca. 900 g
Degree of protection:	IP 65
Current consumption at 24 V:	150 mA without load
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For analog inputs:	4 x 4-pin M12 female connector
For digital I/O:	1 x 5-pin M12 female connector
For the counter input:	1 x 12-pin M23 female connector

Ordering information

MSX-E3017

Ethernet force-distance measurement system, 1 counter input, 4 analog inputs, 24-bit, 2 digital I/O, 24 V.
Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, MX-Rail (please specify when ordering!),
MX-Screw, PCMX-1x

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Ethernet force-distance measurement system, 1 counter input, 4 inputs for strain gauges, 24-bit, 2 digital I/O, 24 V

New!*

MSX-E3317

1 counter input

4 inputs for strain gauges, diff, 24-bit

2 digital I/O, 24 V

Easy configuration: Easy mode

Integrated Ethernet switch

On request + 85 °C* - 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect

on request, see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters

Counter input

- 1 incremental counter input, 32-bit, (on request: Sin/Cos 1 V_{pp} or Sin/Cos 11 μA_{pp}) 12-pin M23 female connector
- Max. input frequency 5 MHz

Inputs for strain gauges

- 4 inputs for strain gauges, 24-bit, M12 female connector, 8-pin
- Sampling frequency max. 788 Hz/channel (max. 2 channels simultaneously)

Digital I/O

- 1 x 2 digital lines, 24 V, which can be parameterised as pairs of inputs or outputs
- Shutdown logic
- At Power-On the outputs are set to „0“
- Electronic fuse
- Dual LED for each 24 V dig. I/O with direction indication

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

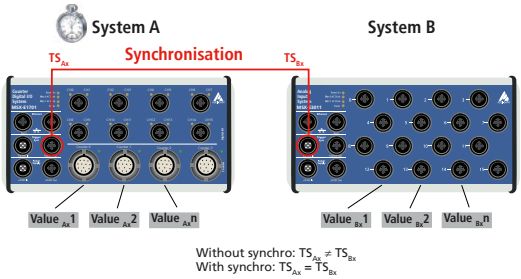
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

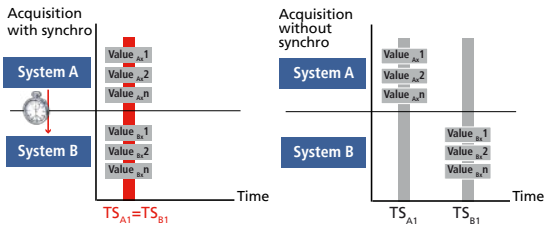
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
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*Preliminary Product information

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Acquisition modes

With the MSX-E3317 system, you can effect force-distance measurements in 2 different ways: in auto-refresh mode or sequence mode.
The acquisition can be done depending on a position or on time.

Auto-refresh mode

In the auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system. The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
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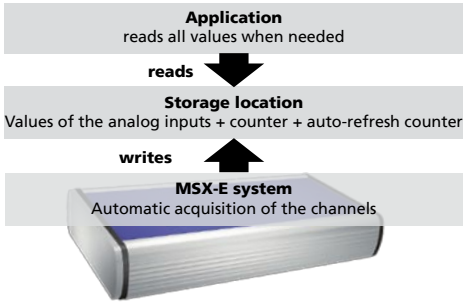
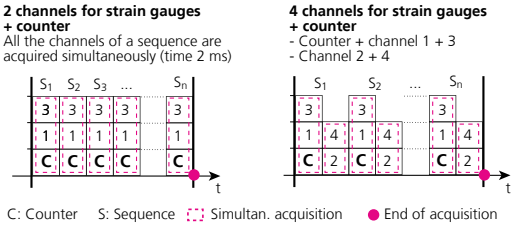


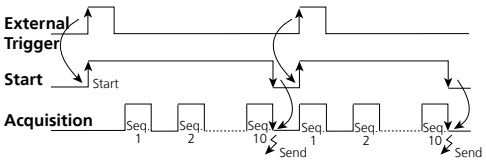
Sequence mode

In the sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



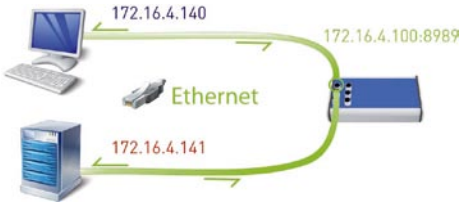
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, ...) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



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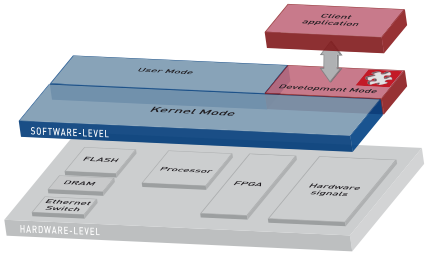

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ConfigTools

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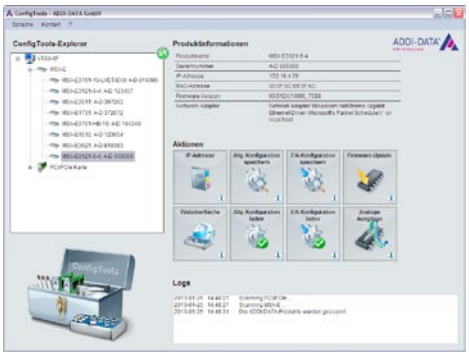
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

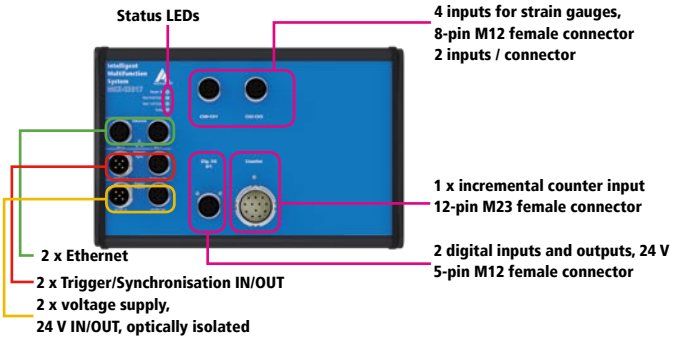
ConfigTools functions for MSX-E3317:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for Inputs for strain gauges
- Visualisation of the force-distance measurement (Easy mode)

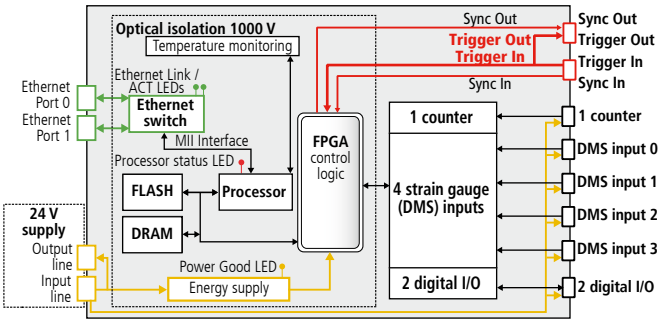
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



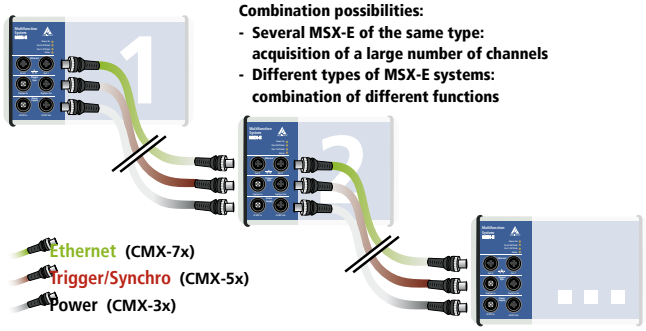
Features



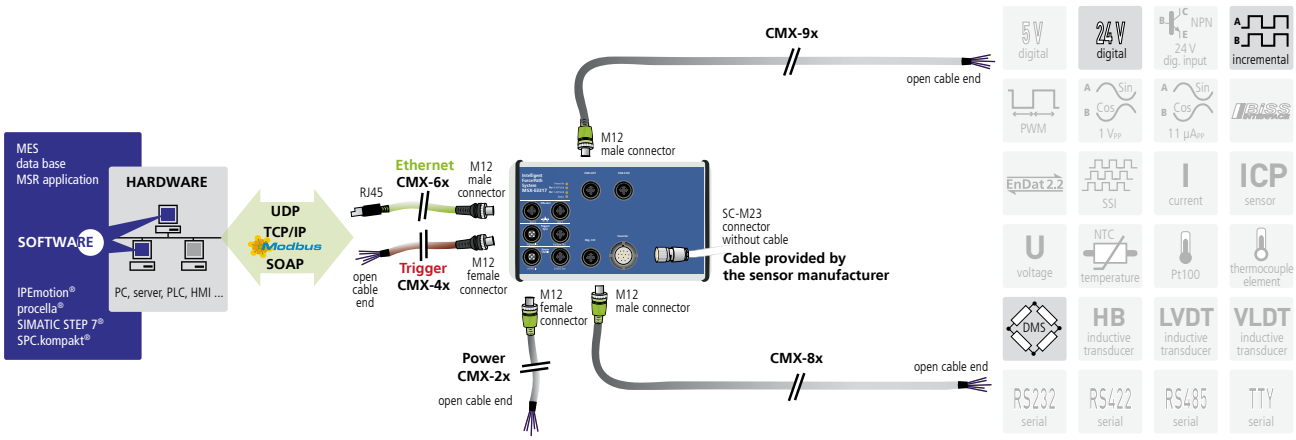
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Incremental counter

Number of counter inputs:	1
Input type:	Differential or TTL inputs
Differential inputs:	Complies with the EIA standards RS422A
Common mode range:	+12 / -7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Max. input frequency:	5 MHz at nominal voltage
„Open Circuit Fail Safe Receiver Design"	„1" = inputs open
ESD protection:	Up to ±15 kV
Voltage supply Incremental encoder:	5 V or 24 V, max. 500 mA

Inputs for strain gauges

Number of inputs:	4 differential inputs for strain gauges 2 inputs per M12 connector
Resolution:	24-bit
Optical isolation:	1000 V
Throughput per M12 connector:	max. 788 Hz for 1 channel, max. 528 Hz for 2 channels
Voltage supply for the sensors:	10 V, 50 mA
Trigger:	Digital input, synchro, software-programmable

Digital inputs

Number of inputs:	2, on 1 M12 female connector, Common ground acc. to IEC 1131-2
Overvoltage protection:	30 V
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 to 30 V
Input impedance:	> 1 MΩ
Logic input levels:	UH (max) 30 V typ. UH (min) 18 V typ. UL (max) 16 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	2, on 1 M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Current (max.):	1.85 A typical for 2 channels through PTC
Output current / output:	500 mA max.
Short-circuit current / output:	1.7 A max. Shut-down logic at 24 V, R_{load}=10mΩ
RDS ON Resistance:	280 mΩ max.
Switch-on time:	100 µs max RL=48 Ω von 80 % V_{out}
Switch-off time:	150 µs max RL=48 Ω von 10 % V_{out}
Overtemperature (shutdown):	135°C max. (output driver)
Temperature hysteresis:	15°C typ. (output driver)
Diagnostics:	Common diagnostics bit at overtemperature

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	220 x 140 x 50 mm
Weight:	ca. 900 g
Degree of protection:	IP 65
Current consumption at 24 V:	150 mA without load
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For inputs for strain gauges:	2 x 8-pin female connector M12
For digital I/O:	1 x 5-pin M12 female connector
For the counter input:	1 x 12-pin M23 female connector

Ordering information

MSX-E3317

Ethernet force-distance measurement system, 1 counter input, 4 inputs for strain gauges, 24-bit, 2 digital I/O, 24 V.
Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65
CMX-9x: Shielded cable, M12 8-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (please specify when ordering!),
MX-Screw, PCMX-1x

* Preliminary product information

Phone: +49 7229 1847-0 info@addi-data.com
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Ethernet analog input system
16 analog inputs, diff., 16-bit

MSX-E3021

16 analog inputs, differential, 16-bit

Voltage or current inputs

Simultaneous acquisition of 4 channels with 100 kHz per channel

4 GB extended memory

Buffered real-time clock

24 V digital trigger input

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 16 diff. inputs, 16-bit, 5-pin M12 female connector
- Sampling frequency max. 100 kHz, up to 4 simultaneous channels
- Input ranges: ±5 V, ±10 V (16-bit), 0-5 V, 0-10 V (15-bit)
- Gain PGA x1, x2, x10, x20, x100, x200, x1000, x2000 software-programmable, signals up to +/-5mV (16-bit) are possible
- Current inputs optional

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

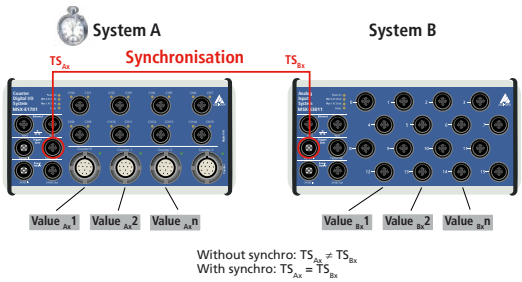
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

Synchronisation/time stamp

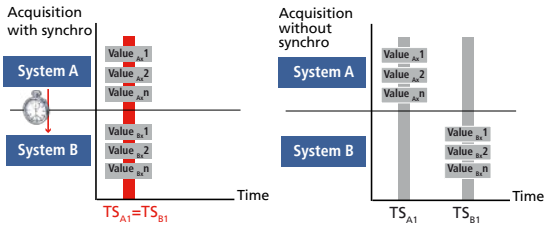
Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



Without synchro: $TS_{Ax} \neq TS_{Bx}$
With synchro: $TS_{Ax} = TS_{Bx}$

The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminary Product information

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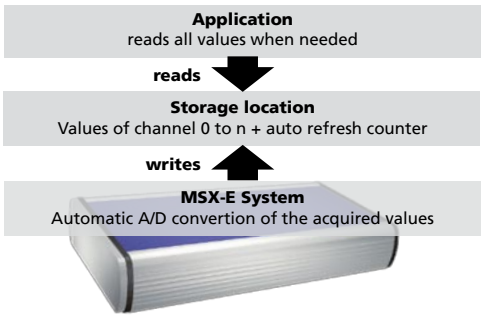
Acquisition modes

Auto-refresh mode

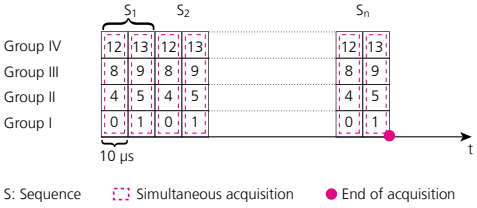
In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.

Example: 8 channels, each with 10 µs

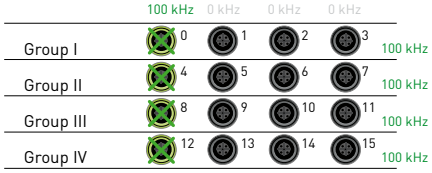


Acquisition speed

Different wiring
for 25 kHz/channel and 100 kHz/groups

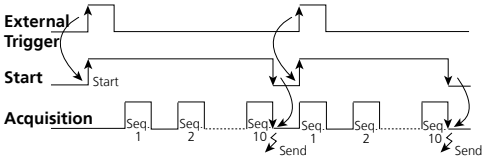
Horizontal wiring (with 4 gauges/sensors)

Vertical wiring (with 4 gauges/sensors)



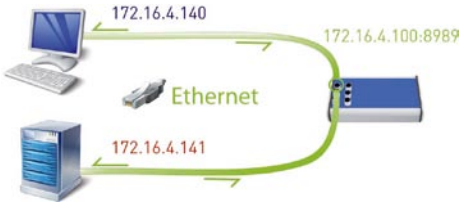
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

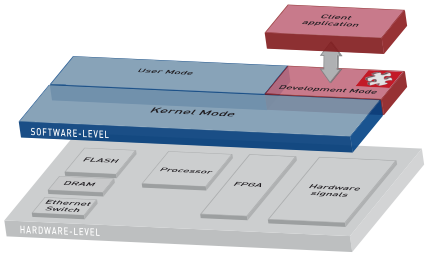
MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

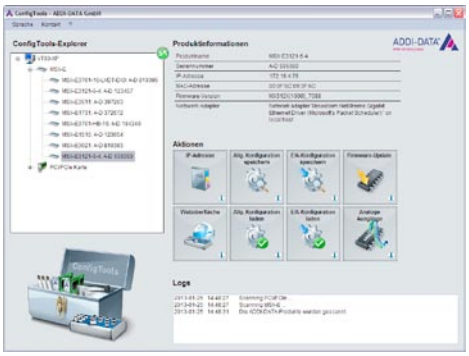
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

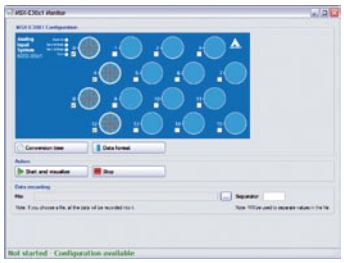
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3021:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for analog inputs

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

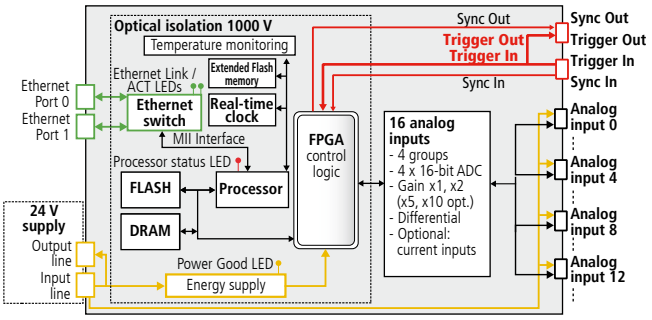




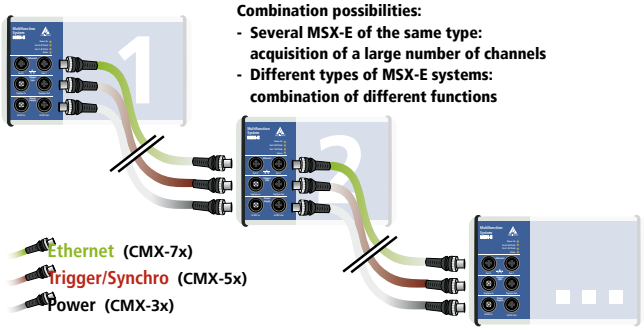
Example of monitor function: Testing the analog inputs.

Features

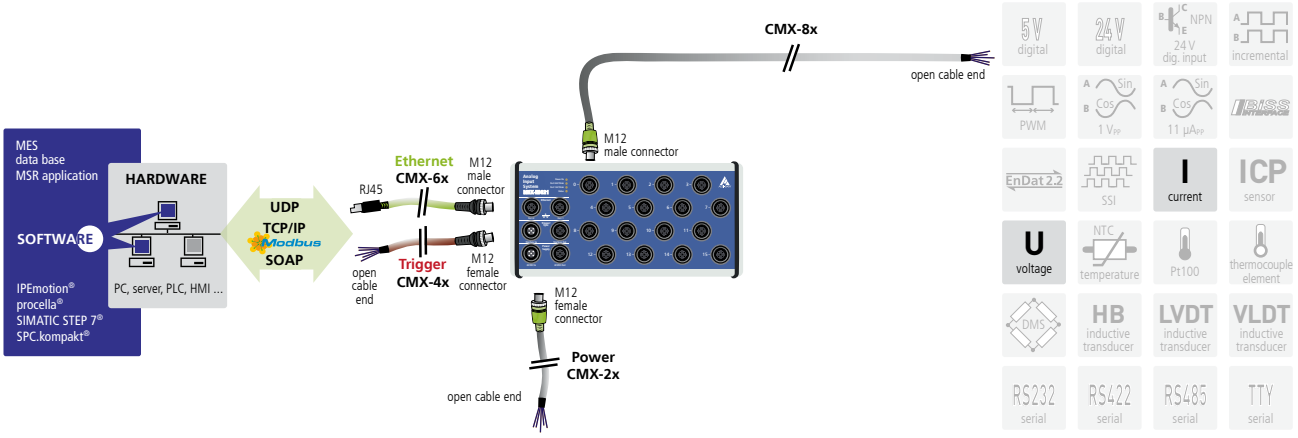
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Analog inputs

Number/type:	16 differential inputs
Architecture:	4 groups of 4 channels each 4-port simultaneous converter with one 4-channel multiplexer per converter
Resolution:	16-bit, SAR ADC
Accuracy:	± 1.221 mV typ. (± 4 LSB) ± 2.442 mV max.
Relative Accuracy (INL):	± 3 LSB max (ADC)
Optical isolation:	1000 V
Input ranges:	± 5 V, ± 10 V (16-bit), 0-5 V, 0-10 V (15-bit) current inputs optional
Sampling frequency:	25 kHz per channel / 100 kHz max.
Gain:	x1, x2, x10, x20, x100, x200, x1000, x2000 software-programmable
Common mode rejection:	80 dB min. DC up to 60 Hz (diff. amplifier)
Input impedance (PGA):	10^9 Ω // 10nF against GND
Bandwidth (-3dB):	160 kHz limited through TP filters 16 Hz version with differential filter
Trigger:	digital input, synchro, software-programmable
Offset error:	± 1 LSB (± 305 µV)
Gain error:	± 2.5 LSB
Temperature drift :	2.3 x V_{in} + 22.5 (µ V/ °C) typ. V_{in}: input voltage in Volts (-10 V ≤ V_{in} ≤ +10 V) In the temperature range from -40°C to +85°C: 4.5 ppm/°C FSR

Data storage

RAM:	64 MB
FLASH:	4 MB for system data
Extended FLASH memory:	4 GB (3.7 GB for measured data)
Buffered real-time clock:	approx. 4 weeks at 20 °C

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	215 x 110 x 50 mm
Weight:	850 g
Degree of protection:	IP 65
Current consumption at 24 V:	180 mA
Operating temperature:	-25 °C to +85 °C -40 °C to +85 °C on request
Connectors for sensors	
For analog inputs:	8 x 5-pin M12 female connector

Ordering information

MSX-E3021

Ethernet analog input system, 16 analog inputs, diff., 16-bit. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)
S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (please specify when ordering!),
MX-Screw, PCMX-1x

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Ethernet analog input system
16 analog inputs, differential, 16-bit

MSX-E3027

16 analog inputs, differential, 16-bit

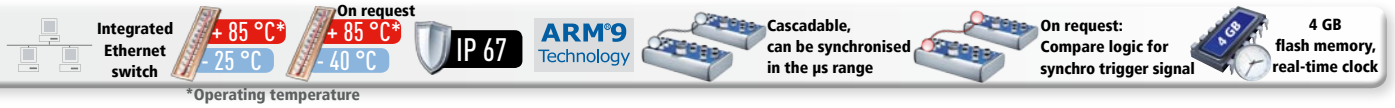
Voltage or current inputs

4 GB extended memory

Buffered real-time clock

Stainless steel housing – IP 67

Fast distributed data acquisition



*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 16 diff. inputs, 16-bit, 5-pin M12 female connector
- Sampling frequency max. 100 kHz, up to 4 simultaneous channels
- Input ranges: ±5 V, ±10 V (16-bit), 0-5 V, 0-10 V (15-bit)
- Gain PGA x1, x2, x10, x20, x100, x200, x1000, x2000 software-programmable, signals up to +/-5mV (16-bit) are possible
- Current inputs 0(4) to 20 mA optional

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

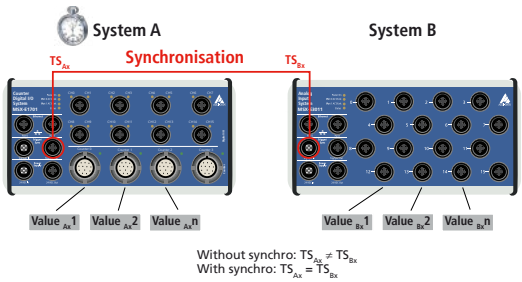
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

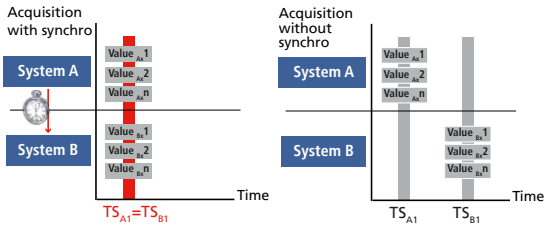
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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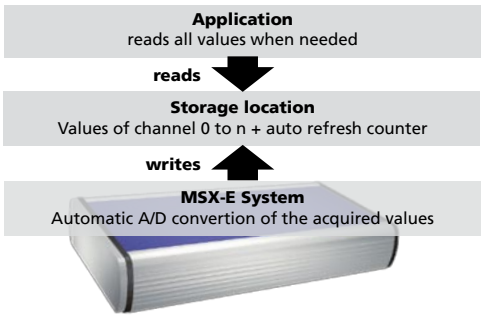
Acquisition modes

Auto-refresh mode

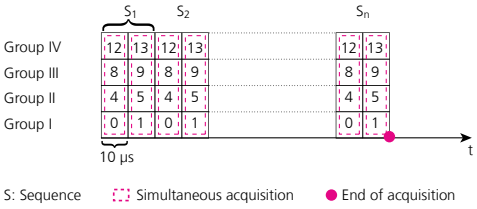
In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.

Example: 8 channels, each with 10 µs

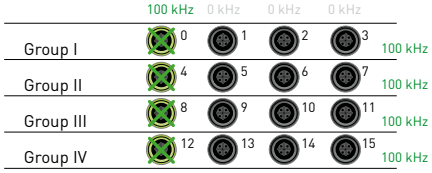


S: Sequence Simultaneous acquisition End of acquisition

Acquisition speed
Different wiring
for 25 kHz/channel and 100 kHz/groups

Horizontal wiring (with 4 gauges/sensors)

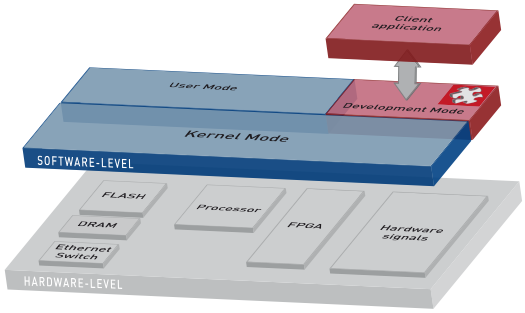
Vertical wiring (with 4 gauges/sensors)



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



Buffered real-time clock

The MSX-E3027 system features a buffered real-time clock (SuperCap). This clock keeps on running 4 weeks after the MSX-E system has been switched off. After a new start, the system time is still the current time.

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ConfigTools

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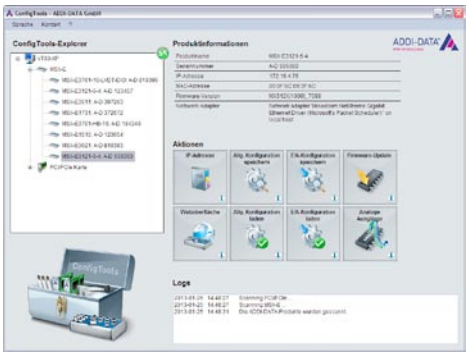
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

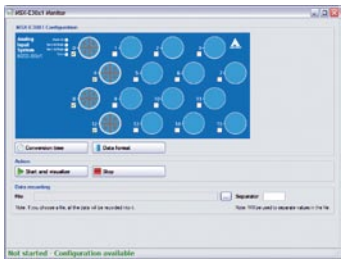
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3027:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for analog inputs

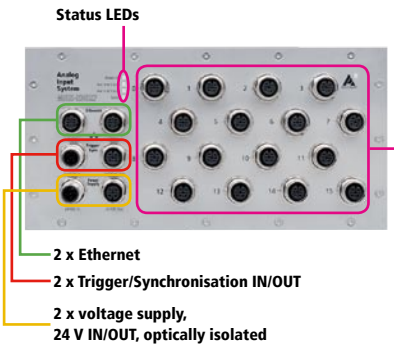
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



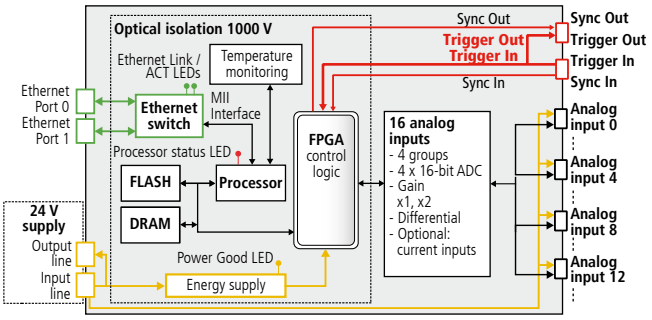


Example of monitor function: Testing the analog inputs.

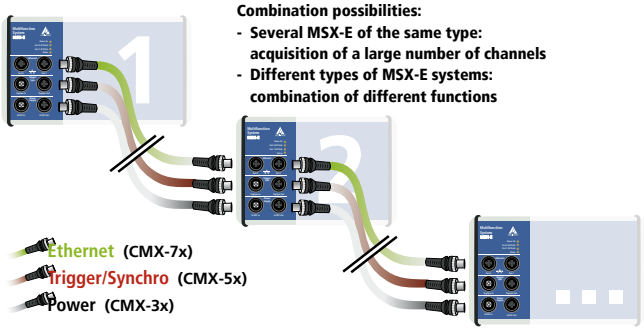
Features



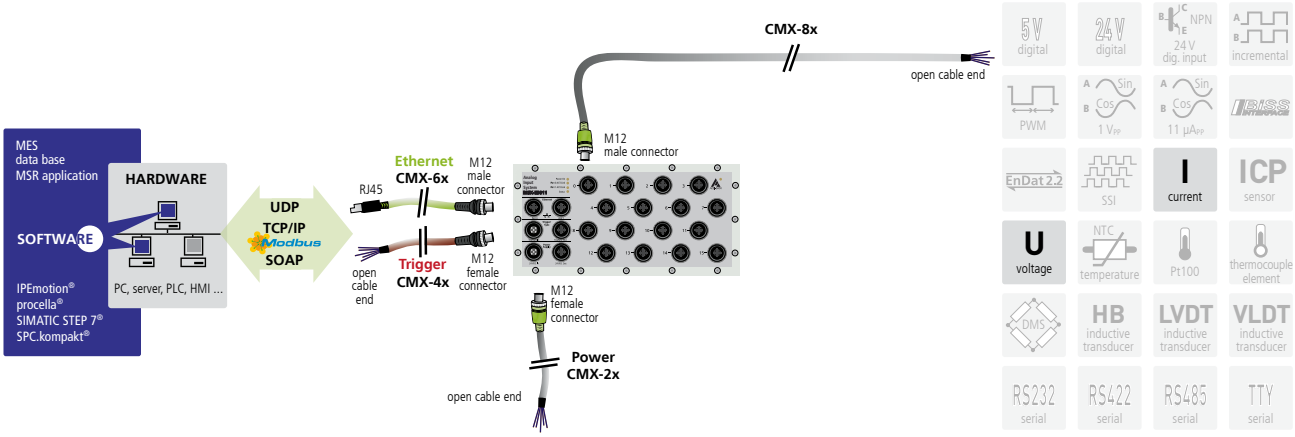
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Analog inputs

Number/type:	16 differential inputs
Architecture:	4 groups of 4 channels each 4-port simultaneous converter with one 4-channel multiplexer per converter
Resolution:	16-bit, SAR ADC
Accuracy:	± 1.221 mV typ. (± 4 LSB) ± 2.442 mV max.
Relative Accuracy (INL):	± 3 LSB max (ADC)
Optical isolation:	1000 V
Input ranges	± 5 V, ± 10 V (16-bit), 0-5 V, 0-10 V (15-bit) current inputs optional
Sampling frequency:	25 kHz per channel / 100 kHz max.
Gain:	x1, x2, x10, x20, x100, x200, x1000, x2000 software-programmable
Common mode rejection:	80 dB min. DC up to 60 Hz (diff. amplifier)
Input impedance (PGA):	10^9 Ω // 10nF against GND
Bandwidth (-3dB):	160 kHz limited through TP filters 16 Hz version with differential filter
Trigger:	digital input, synchro, software-programmable
Offset error:	± 1 LSB (± 305 µV)
Gain error:	± 2.5 LSB
Temperature drift : V_{in}: input voltage in Volts (-10 V ≤ V_{in} ≤ +10 V) In the temperature range from -40°C to +85°C:	2.3 x V_{in} + 22.5 (µ V/ °C) typ. 4.5 ppm/°C FSR

Data storage

RAM:	64 MB
FLASH:	4 MB for system data
Extended FLASH memory:	4 GB (3.7 GB for measured data)
Buffered real-time clock:	approx. 4 weeks at 20 °C

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Degree of protection:	IP 67
Current consumption at 24 V:	160 mA
Operating temperature:	-25 °C to +85 °C -40 °C to +85 °C on request
Connectors for sensors	
For analog inputs:	8 x 5-pin M12 female connector

Ordering information

MSX-E3027

Ethernet analog input system, 16 analog inputs, differential, 16-bit. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 67
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 67
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 67
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 67
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 67

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)
S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Rail (please specify when ordering!), **PCMX-1x**

* Preliminary product information

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Ethernet multifunction system
6 diff./SE inputs, 4 analog outputs, 32 digital I/O

New!*

MSX-E3121

6 analog inputs, differential/single-ended, 24-bit

Voltage or current inputs

4 analog outputs, 16-bit

32 digital I/O

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information at www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V
- Input filters

Analog inputs

- 6 diff./SE inputs, 24-bit, 4-pin M12 female connector
- Sampling frequency max. 100 kHz/channel

Analog outputs

- 4 voltage outputs or
  2 voltage outputs and 2 current outputs

Digital input and output

- 16 digital inputs, 24 V, optically isolated
- 16 digital outputs, 24 V, optically isolated

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

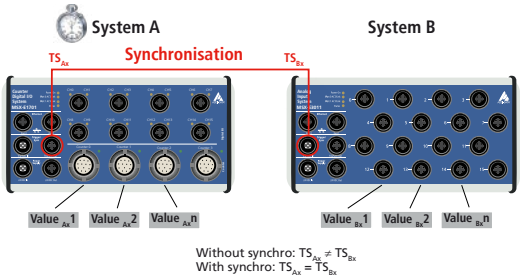
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

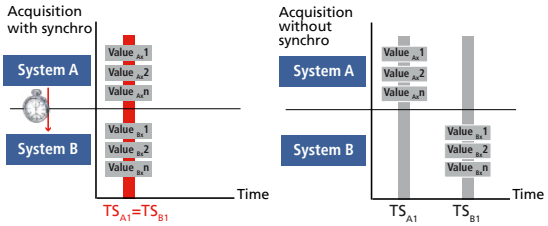
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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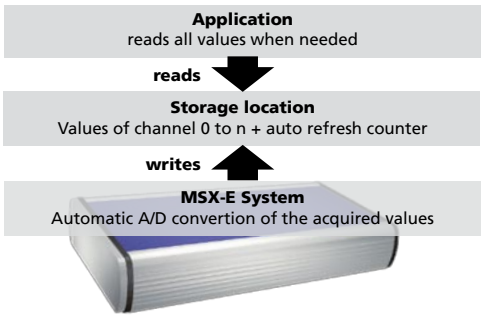
Acquisition modes

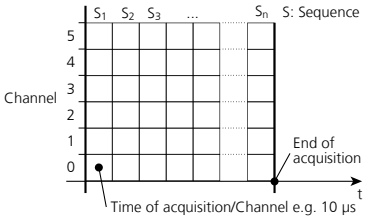
Auto-refresh mode

In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



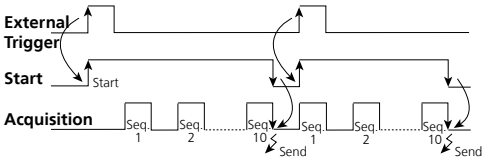
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



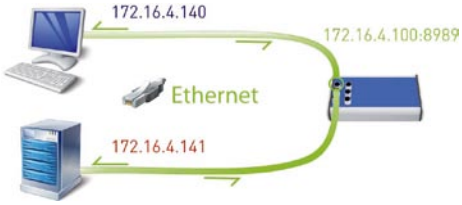
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

New: Cycle mode

MSX-E systems which are used in stand-alone operation can be controlled through the cycle mode. The cycle mode is a cyclic processing of a program written by the user – the inputs are acquired and the values calculated, if required. At the same time a digital or analog output is possible. Measurement values are read in the auto-refresh mode, thus the current value is always available. A selectable clock pulse (1 ms up to 65535 ms) is available. The programming is executed onboard according to IEC 61131-3.

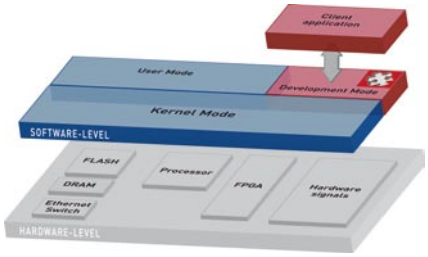
```
GLOBAL
END

(*Task1 with 10ms pulse*)
TASK Task1 10
            HEADER
                  VAR REAL Sensor1Volt 0
                  VAR DWORD Sensor1 16#0
            END

            BODY
                  (* Reading of Sensor1 as digital value *)
                  LD %ID0.0.0
                  ST Sensor1
                  (* Reading of Sensor1 as float value*)
                  LD %IF0.0.0
                  ST Sensor1Volt
            END
END
```

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

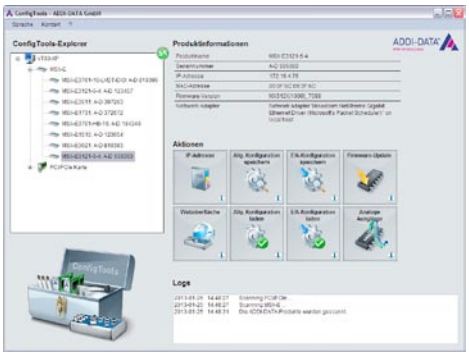
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are recognised automatically in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3121:

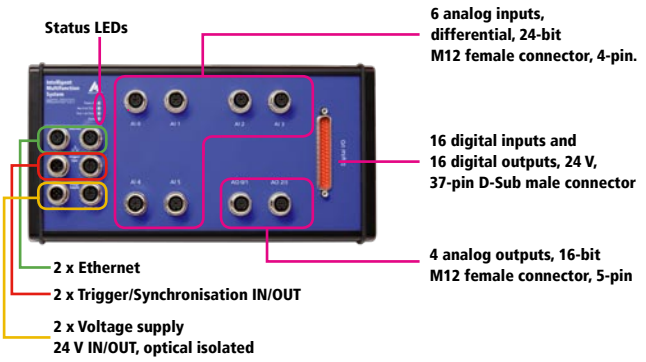
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitoring the analog inputs/outputs

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

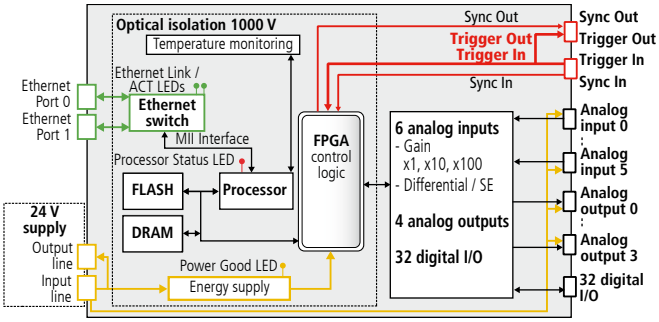


Monitor function example: Check of the analog outputs – value display without programming.

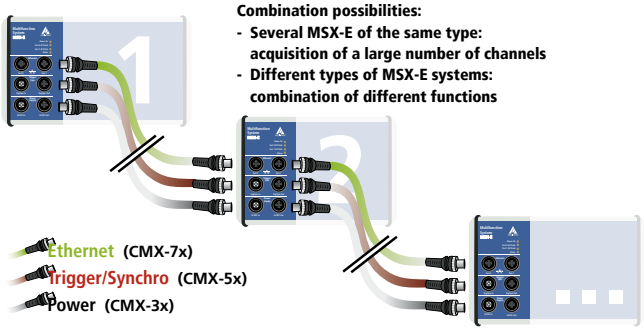
Features



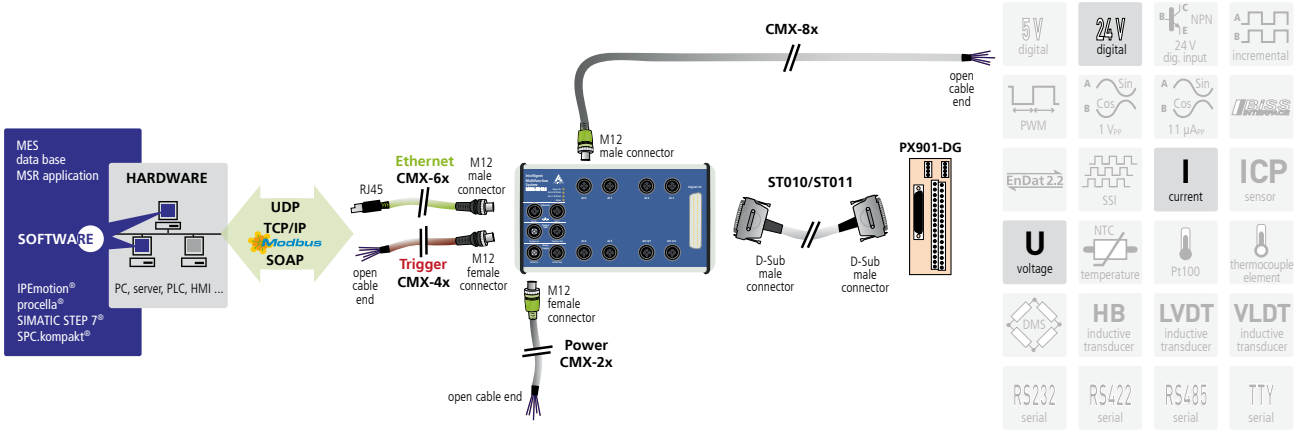
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Analog inputs

Number/type:	6 differential inputs, 1 A/D converter per channel
Resolution:	24-bit
Optical isolation:	1000 V
Input ranges:	± 10 V, ± 1 V, ± 100 mV, ± 10 mV (24-bit), 0-10 V, 0-1 V, 0-100 mV, 0-10 mV (23-bit), software-programmable, current input optional
Input frequency:	100 kHz per channel
Gain:	x1, x10, x100 software-programmable
Trigger:	digital input, synchro, software-programmable

Analog outputs

Number of outputs:	4
Resolution:	16-bit (bipolar) / 15-bit (unipolar)
Optical isolation:	1000 V
Output range:	Voltage output: 0-10 V (±10 V) Current output: 0-20 mA
Output value after reset:	0 V voltage output, not calibrated

Digital inputs

Number of inputs:	16, common ground acc. to IEC 1131-2	
Optical isolation:	1000 V through opto-couplers	
Nominal voltage:	24 VDC	
Input voltage:	0 – 30 V	
Logic input levels:	UH (max) 30 V typ. UL (max) 14 V typ.	UH (min) 19 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	16
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	11 – 36 V
Output current per output:	150 mA max.
Diagnostics:	Common diagnostic bit for 16 channels at overtemperature of one channel

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	270 x 140 x 35
Weight:	approx. 1200 g
Degree of protection:	IP 65
Current consumption at 24 V:	390 mA typ. ± 10 %
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For analog inputs:	6 x 4-pin female connector M12
For analog outputs:	2 x 5-pin female connector M12
For digital I/O:	1 x 37-pin D-Sub male connector

Ordering information

MSX-E3121

Ethernet multifunction system, 6 diff./SE inputs, 4 analog outputs, 32 digital I/O. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3121-6-4: 4 voltage outputs
MSX-E3121-6-4C: 2 voltage outputs, 2 current outputs

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65
ST010: Standard round cable, shielded, twisted pairs, 2m
PX901-DG: Screw terminal panel LED status display for DIN rail

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)
S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!), **MX-Screw, PCMX-1x**

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Ethernet multifunction system
6 diff./SE inputs, 4 analog outputs, 64 dig. I/O

New!*

MSX-E3122

6 analog inputs, differential/Single-Ended, 24-bit

Voltage or current inputs

4 analog outputs, 16-bit, voltage outputs, current outputs

64 digital I/O, 24 V

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters

Analog inputs

- 6 diff./SE inputs, 24-bit, 4-pin M12 female connector
- Sampling frequency max. 100 kHz/channel

Analog outputs

- 4 voltage outputs or 2 voltage and 2 current outputs

Digital I/O

- 32 optically isolated digital inputs, 24 V
- 32 optically isolated digital outputs, 24 V

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

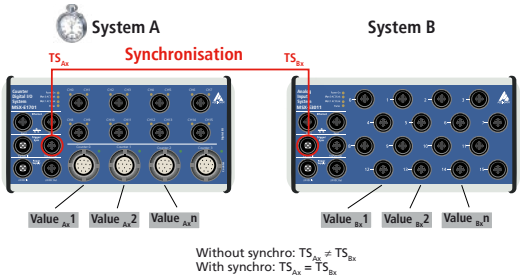
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

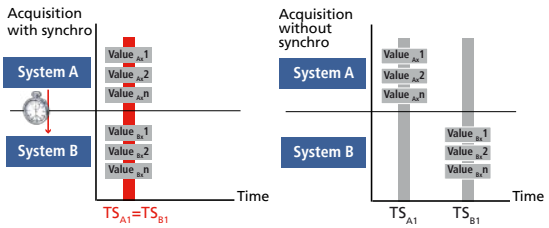
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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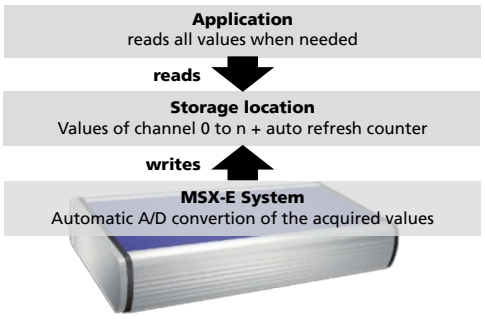
Acquisition modes

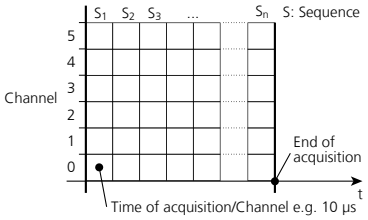
Auto-refresh mode

In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



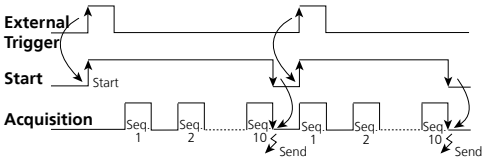
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



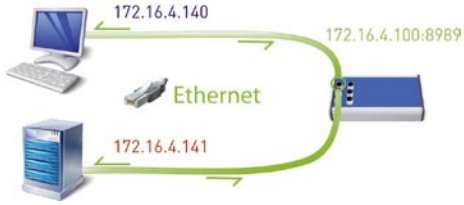
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

New: Cycle mode

MSX-E systems which are used in stand-alone operation can be controlled through the cycle mode. The cycle mode is a cyclic processing of a program written by the user – the inputs are acquired and the values calculated, if required. At the same time a digital or analog output is possible. Measurement values are read in the auto-refresh mode, thus the current value is always available. A selectable clock pulse (1 ms up to 65535 ms) is available. The programming is executed onboard according to IEC 61131-3.

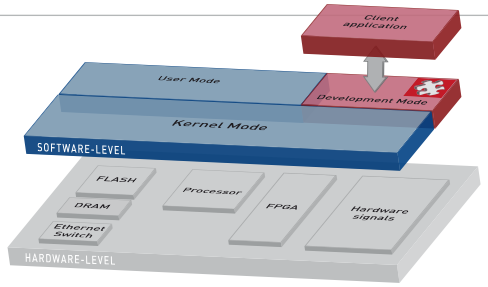
```
GLOBAL
END

(*Task1 with 10ms pulse*)
TASK Task1 10
            HEADER
                        VAR REAL Sensor1Volt 0
                        VAR DWORD Sensor1 16#0
            END

            BODY
                        (* Reading of Sensor1 as digital value *)
                        LD %ID0.0.0
                        ST Sensor1
                        (* Reading of Sensor1 as float value*)
                        LD %IF0.0.0
                        ST Sensor1Volt
            END
END
```

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

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In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

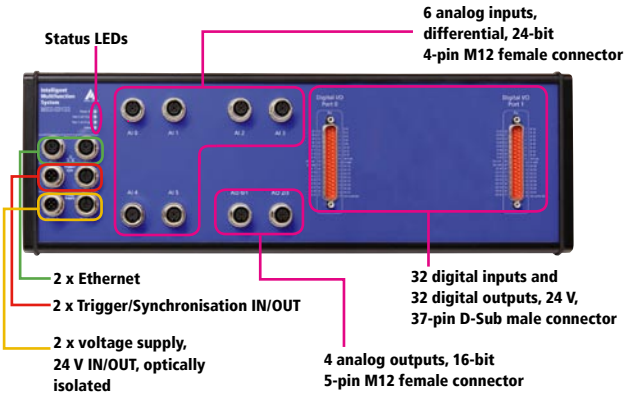
ConfigTools functions for MSX-E3122:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for analog inputs and outputs

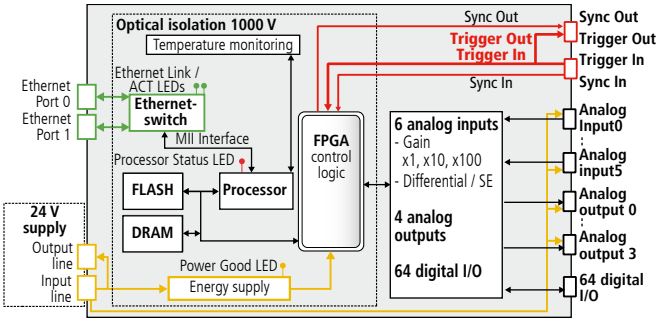
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

Example of monitor function: Testing the analog outputs – Value output without programming.

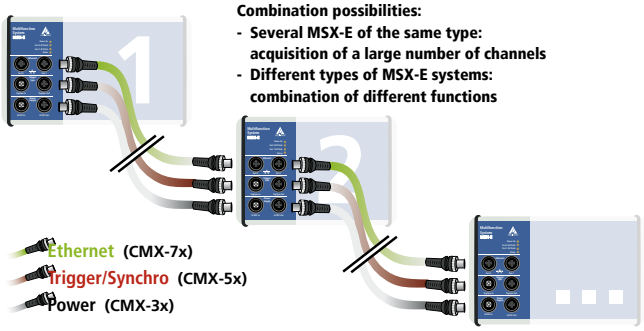
Features



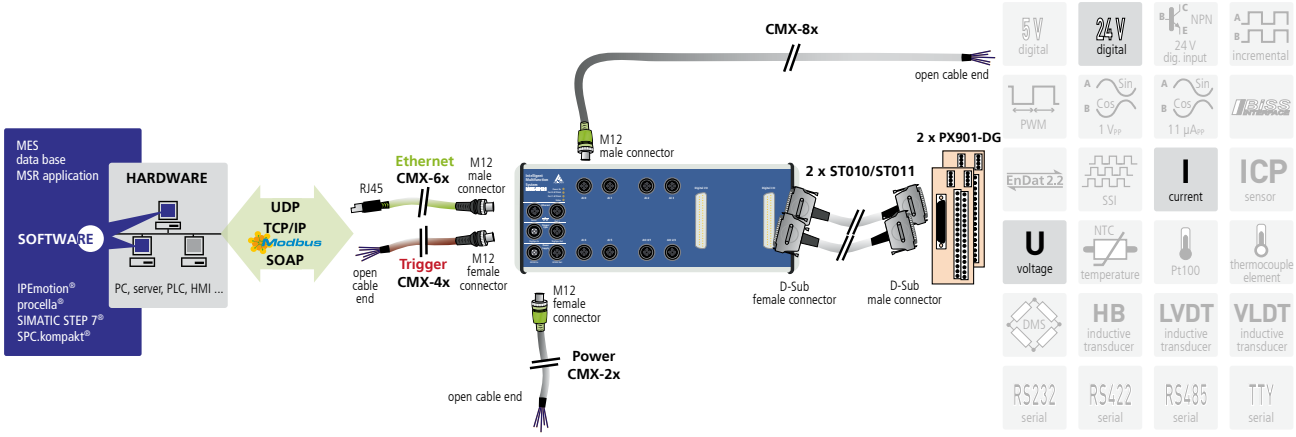
Simplified block diagram



Cascading



ADDI-DATA connection technology



* Preliminary product information

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Specifications*

Analog inputs

Number/type:	6 differential/Single-Ended inputs (software-configurable), 1 A/D converter per channel
Resolution:	24-bit
Optical isolation:	1000 V
Input ranges:	± 10 V, ± 1 V, ± 100 mV, ± 10 mV (24-bit), 0-10 V, 0-1 V, 0-100 mV, 0-10 mV (23-Bit), software-programmable, current inputs 0(4) – 20 mA optional
Sampling frequency:	100 kHz per channel
Gain:	x1, x10, x100, software-programmable
Trigger:	Digital input, synchro, software-programmable

Analog outputs

Number of outputs:	4
Resolution:	16-bit (bipolar) / 15-bit (unipolar)
Optical isolation:	1000 V
Output range:	Voltage output: 0-10 V (±10 V) Current output: 0-20 mA
Output value after reset:	0 V voltage output, not calibrated

Digital inputs

Number of inputs:	32, common ground acc. to IEC 1131-2
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 – 30 V
Logic input levels:	UH (max) 30 V typ. UH (min) 19 V typ. UL (max) 14 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	32
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	11 – 30 V
Output current per channel:	500 mA max.
Max. total current of 16 outputs:	2 A
Diagnostics:	Common diagnostics bit for all 16 channels at Overtemperature of one channel

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	380 x 130 x 50 mm
Weight:	in preparation
Degree of protection:	IP 65
Current consumption at 24 V:	390 mA typ. ± 10 %
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
For analog inputs:	6 x 4-pin M12 female connector
For analog outputs:	2 x 5-pin M12 female connector
For digital I/O:	2 x 37-pin D-Sub male connector

Ordering information

MSX-E3122

Ethernet multifunction system, 6 diff./SE inputs, 4 analog outputs, 64 digital I/O. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3122: 4 voltage outputs
MSX-E3122-C: 2 voltage outputs, 2 current outputs

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals
CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65
ST010: Standard round cable, shielded, twisted pairs, 2 m
PX901-DG: Screw terminal board, LED Status display, for DIN rail

Options

PC-Diff: Current input 0(4)-20 mA for 1 input, diff. (please indicate the number of channels)

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, MX-Rail (please specify when ordering!),
MX-Screw, PCMX-1x

* Preliminary product information

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Ethernet analog output system
8 analog outputs (voltage and/or current), 16-bit

MSX-E3511 / MSX-E3511-C

8 analog outputs, 16-bit

Voltage or current outputs

Function generator for the output of any signal type, e. g. sine curves, sawtooth curves etc. – can be configurated separately for each channel

M12 connector

24 V trigger input

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

*Operating temperature

RoHS 2002/95/EC

on request

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Diagnostics in case of short-circuits (voltage mode) or line break (current mode)
- Internal temperature monitoring

Analog outputs

- 8 analog outputs, 16-bit:
  MSX-E3511: voltage outputs 0-10 V, ± 10 V
  MSX-E3511-C: each output can be configured as voltage or current output 0-20 mA
- Output voltage after reset 0 V
- 5-pin M12 female connector
- Output mode/operation mode: Data output per software function, trigger input or synchro output

Function generator

- Output of any signal type, e. g. sine curves, sawtooth curves etc.
- Maximal 8 channels (each channel independently)
- Can be used without programming skills, e. g. via .csv-file or mathematic functions such as $f(x) = \sin(x)$

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

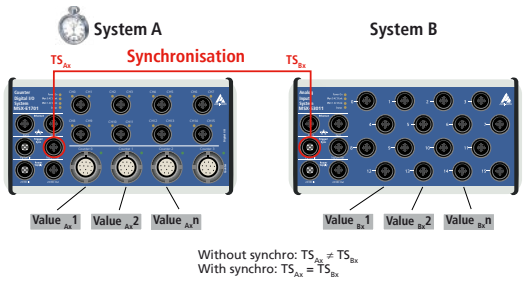
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

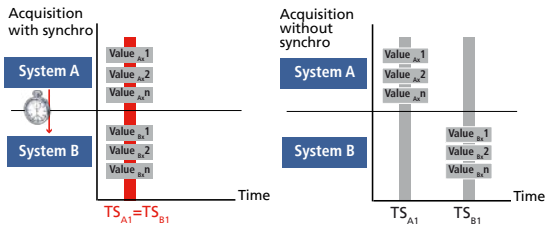
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



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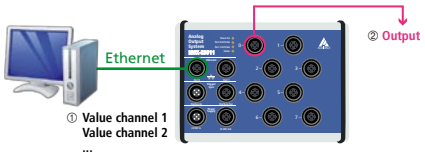
Output modes

Output modes – Analog output values can be generated either via direct access or through function generator:

1. Direct access

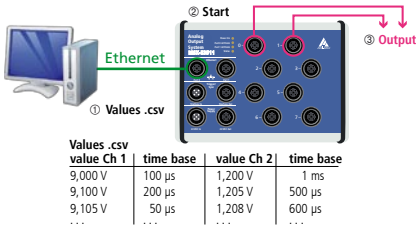
In direct access, the values of the outputs are transmitted via SOAP or Modbus function.
For each function call, 1 value (for one or several outputs) is sent.
The value output is triggered per software, 24V hardware or synchro trigger.



2. Function generator

The MSX-E3511 system features a function generator for each analog output. The values are sent either automatically at a defined rate or using a trigger. The 24V trigger input or the synchro trigger can be used, included those issued by another MSX-E system.

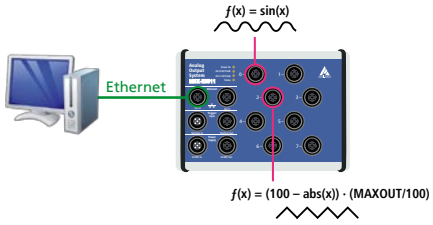
Generator with CSV file
The value are transmitted to the function generator via a CSV file which contains both the values and the number of cycles for each value.



Values .csv

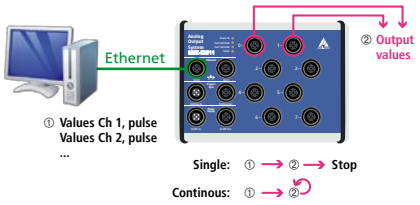
value Ch 1	time base	value Ch 2	time base
9,000 V	100 µs	1,200 V	1 ms
9,100 V	200 µs	1,205 V	500 µs
9,105 V	50 µs	1,208 V	600 µs
...	...	...	...

Generator with mathematical formula
The values are generated through a formula, e.g. $f(x) = \sin(x)$.



„Single Mode" Generator
In „Single Mode", an array with values is sent to the respective generator via SOAP function. After all values have been transmitted, the generator stops automatically (outputs = 0V).

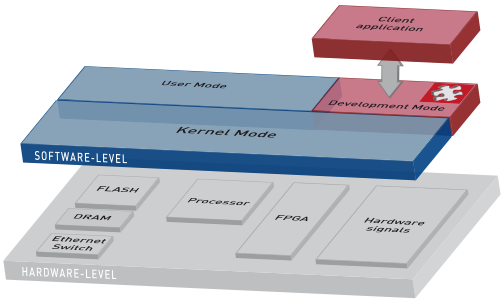
„Continuous Mode" Generator
In „Continuous Mode", an array with values is sent to the respective generator via SOAP function. After all values have been transmitted, the generator automatically starts again at the first value.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



Safety

Watchdog

The MSX-E3511 Ethernet system has a 16-bit watchdog which can be programmed in 3 time units (µs, ms, s). The watchdog is used for automatically resetting the digital outputs to 0 V after a defined time in order e. g. to switch off actuators if an error has occurred.

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ConfigTools

The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

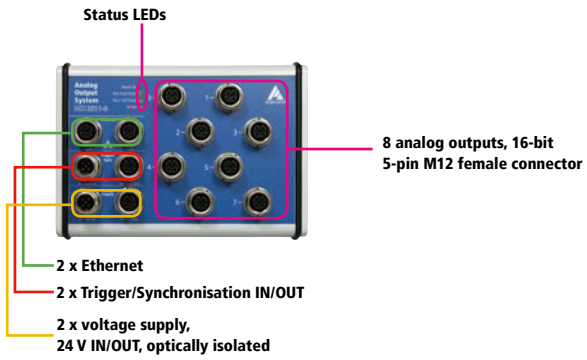
ConfigTools functions for MSX-E3511 / MSX-E3511-C:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration

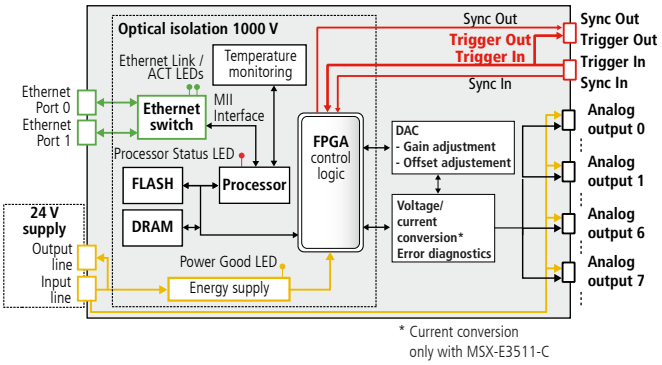
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

Example of monitor function: Testing the analog outputs – Value output without programming.

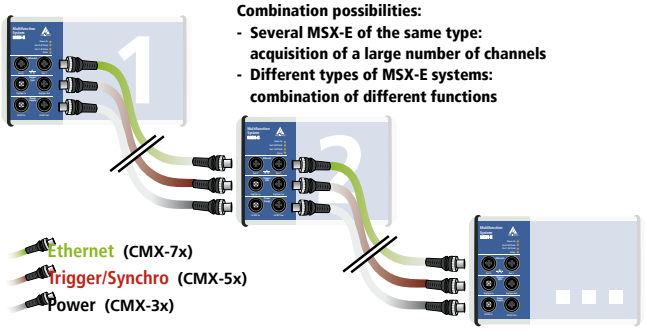
Features



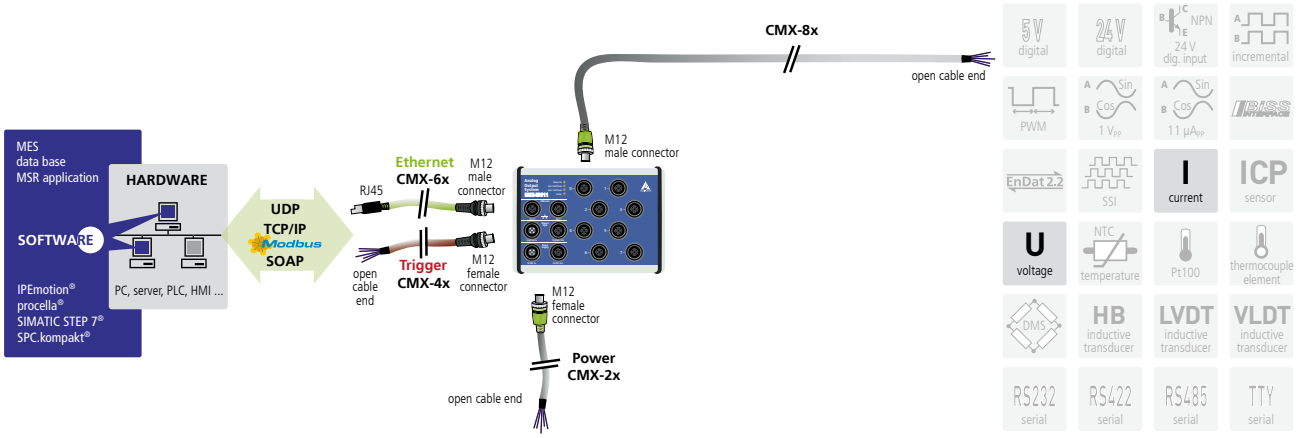
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications

Analog outputs

Number of outputs:	8	
Resolution:	16-bit (bipolar) 15-bit (unipolar)	
Optical isolation:	1000 V	
Output range:	voltage output: current output:	0-10 V (±10 V) 0-20 mA
Output velocity:	Voltage version: max. 40 kHz	
	Voltage version: max. 25 kHz FSR (Full Scale Range) Current version: depending on load	
Overvoltage protection:	±14 V	
Output current/Last:	voltage output: current output:	15 mA, min. 680 Ω 20 mA, max. 550 Ω
Short-circuit current:	Voltage output: Current output:	± 20 mA ± 32 mA
Output value after reset	0 V voltage output, not calibrated	
1 watchdog (programmable):	16-bit, 1 µs to 65535 s	

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3	
Dimensions:	154 mm x 110 mm x 50 mm	
Weight:	620 g	
Degree of protection:	IP 65	
Current consumption at 24 V:	150 mA 310 mA 410 mA	without load current outputs switched on voltage outputs switched on
Operating temperature:	- 40°C to + 85°C	
Connectors for sensors		
Analog outputs	8 x 5-pin M12 female connector	

Ordering information

MSX-E3511 / MSX-E3511-C

Ethernet analog output system, 8 analog outputs (voltage and/or current), 16-bit. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3511-C: Ethernet analog output system, 8 analog outputs (voltage and/or current), 16-bit

MSX-E3511: Ethernet analog output system, 8 analog outputs, only voltage for fast signal output, 16-bit

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector

CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Connection to peripherals

CMX-8x: Shielded cable, M12 5-pin male connector/open end, IP 65

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V

MX-Clip, **MX-Rail** (please specify when ordering!),

MX-Screw, PCMX-1x

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Ethernet system for temperature measurement 16/8/4 channels for thermocouples or RTD, 24-bit

MSX-E3211

16/8/4 differential inputs, 24-bit

For thermocouples or RTD (Pt 100, Pt 1000)

Simultaneous data acquisition up to 8 channels

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect

see page 112

More information at www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters

Temperature inputs

- 16/8/4 differential inputs for thermocouples or RTD, 24-bit
- Sampling frequency max. 788 Hz/channel (max. 8/4/2 channels simultaneously)
- Auto gain: Optimal adjustment of the gain to the measuring range
- Integrated cold junction compensation (CJC) for thermocouples
- NTC sensors optional

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- 24 V supply and cascading

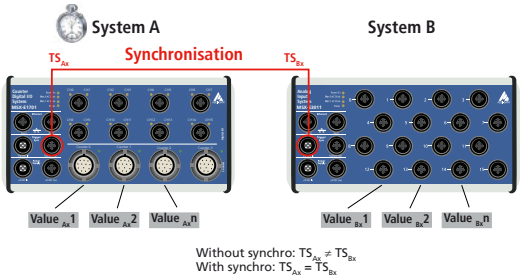
Communication interface

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

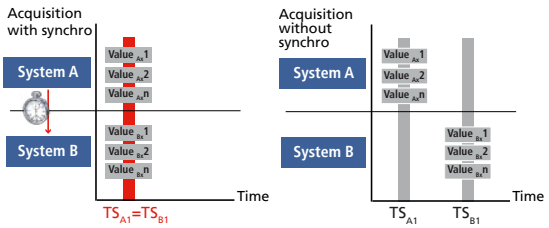
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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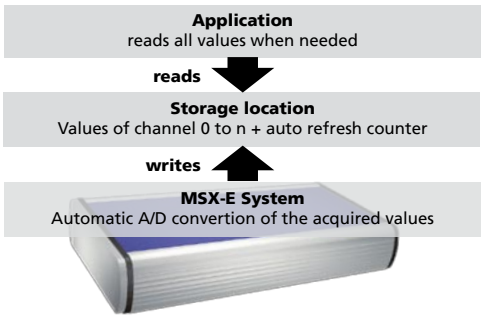
Acquisition modes

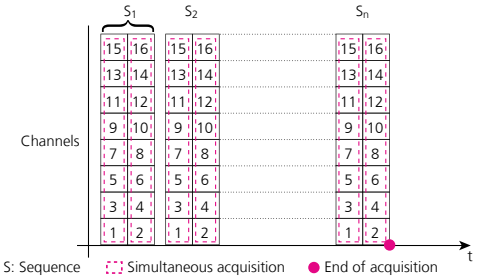
Auto-refresh mode

In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



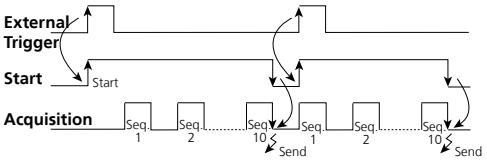
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



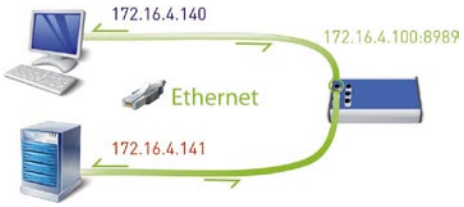
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

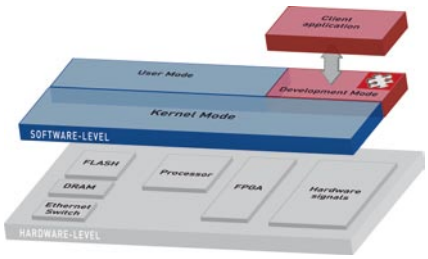
MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, ...) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



NOTE

With thermocouples, it is only possible to capture the relative temperature between the terminal to which the thermocouple is connected and the welding spot. For this reason, in order to calculate the actual temperature at the measuring point, it is necessary to capture an absolute temperature on a second sensor (PTC) . This is called cold junction compensation (CJC) and is included on the MSX-E3211-TC system.

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ConfigTools

The **ConfigTools** program allows an easy administration of the MSX-E systems. These are recognised automatically in the network. **ConfigTools** consists of common and specific functions.

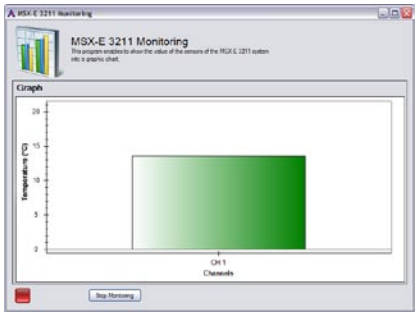
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3211:

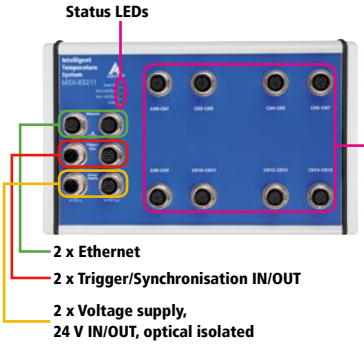
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitoring the temperature inputs

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

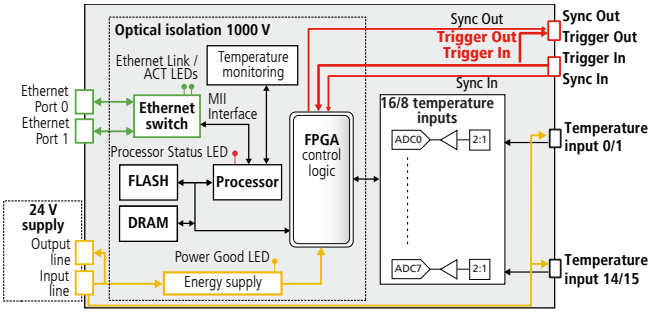


Monitor function example for temperature inputs

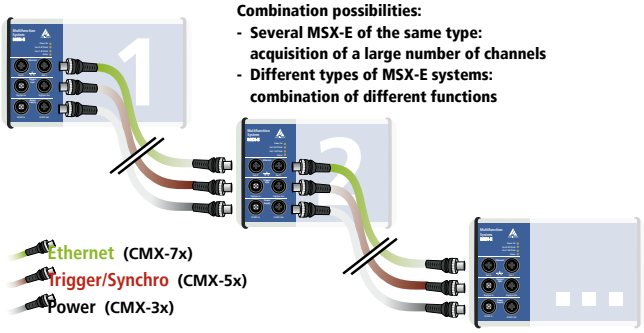
Features



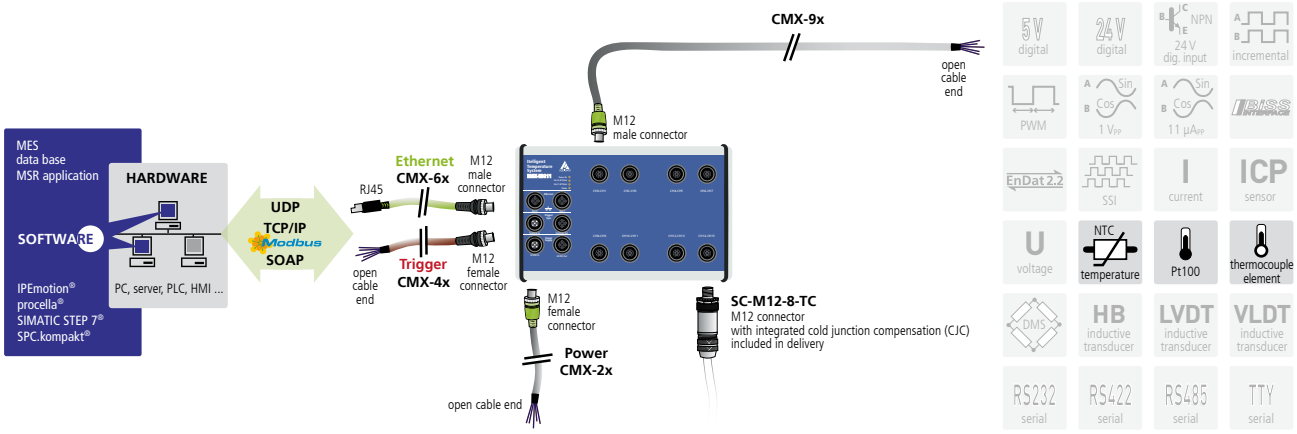
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications

Analog inputs

Number of inputs:	16, 8 or 4 differential inputs for thermocouples or RTD 2 outputs for each M12 connector
Resolution:	24-bit
Optical isolation:	1000 V
Throughput:	max. 788 Hz for 1 channel, max. 528 Hz for 2 channels
Current source:	~200 µA (intern kalibriert)

Real acquisition frequency:

at 1 channel	at 2 channels	Sampling frequency (software programmable)
2.37 Hz	1.585 Hz	5 Hz
4.73 Hz	3.154 Hz	10 Hz
9.37 Hz	6.243 Hz	20 Hz
18.9 Hz	12.6 Hz	40 Hz
37.35 Hz	24.89 Hz	80 Hz
73 Hz	48.65 Hz	160 Hz
145 Hz	96.8 Hz	320 Hz
276.4 Hz	184.26 Hz	640 Hz
407.83 Hz	271.96 Hz	1 kHz
788 Hz	525.48 Hz	2 kHz

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	220 x 140 x 50
Weight:	620 g
Degree of protection:	IP 65
Current consumption:	150 mA ± 10 % typ. in idle/power save
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
Analog inputs:	8, 4 or 2 x 8-pin M12 female connector

Ordering information

MSX-E3211

Ethernet system for temperature measurement, 16/8/4 channels for thermocouples or RTD, 24-bit. Incl. technical description and software drivers.

Versions

MSX-E3211-TC-16: for 16 thermocouples
MSX-E3211-TC-8: for 8 thermocouples
MSX-E3211-TC-16: for 4 thermocouples
MSX-E3211-RTD-16: for 16 RTD
MSX-E3211-RTD-8: for 8 RTD
MSX-E3211-RTD-4: for 4 RTD

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MSX-E-Filter-20Hz: 20 Hz input filter
MSX-E-NTC-100µA: for NTC sensors with 0-20 kΩ
MSX-E-NTC-50µA: for NTC sensors with 0-40 kΩ
MX-Rail (Please specify when ordering!),
MX-Screw, PCMX-1x

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Ethernet system for pressure/force measurement 16/8 channels for strain gauges, 24-bit

MSX-E3311

16/8 differential inputs, 24-bit

For strain gauges

Simultaneous acquisition of up to 8 channels

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters

Inputs for strain gauges

- 16/8 differential inputs for strain gauges, 24-bit
- Sampling frequency max. 788 Hz/channel (max. 8/4 channels simultaneously)
- Autogain: Optimal adjustment of the gain to the measuring range
- Integrated sensor supply: 10 V, 50 mA (5 V optional)

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

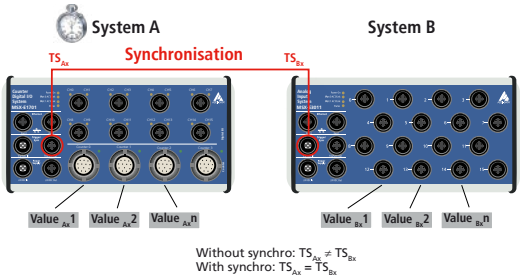
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

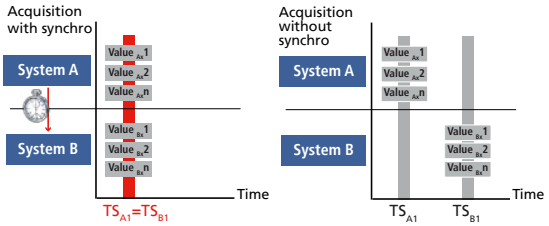
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminary Product information

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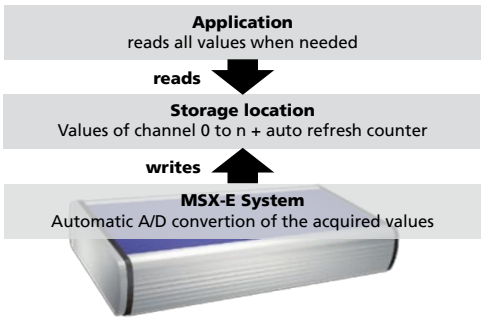
Acquisition modes

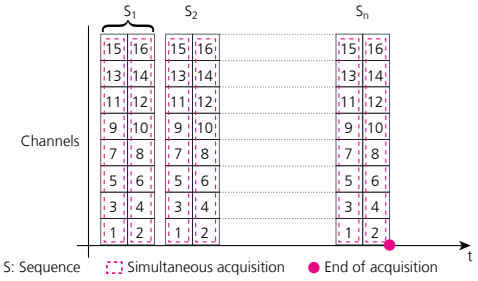
Auto-refresh mode

In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



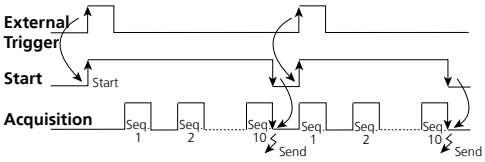
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



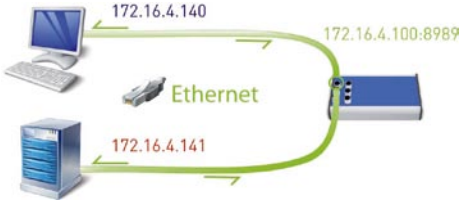
Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

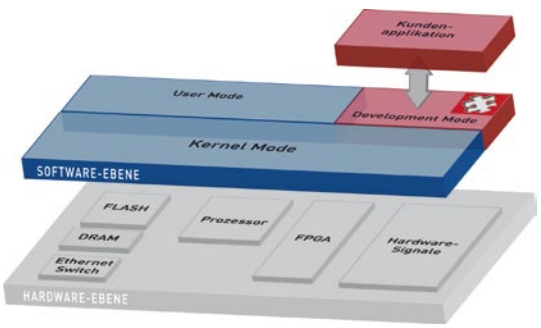
MSX-E systems are multi-client capable, this means several clients (e. g. PC, server, PLC, …) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values are available on the data server, the MSX-E system transfers them to the clients.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

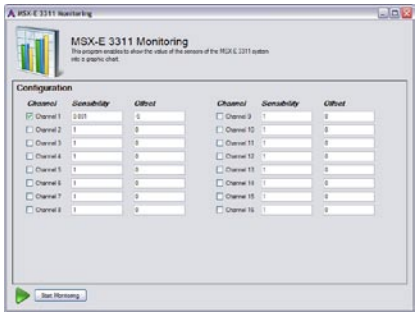
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3311:

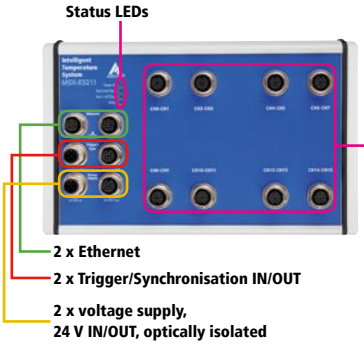
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for Inputs for strain gauges

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

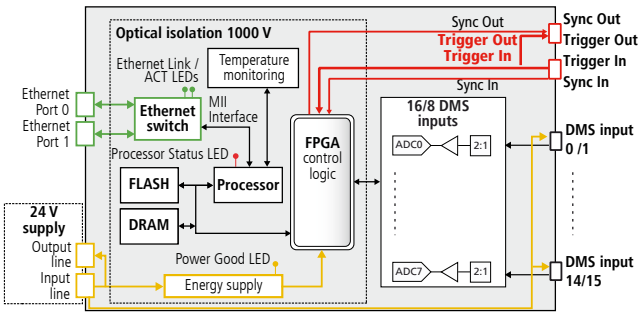


Example of monitor function for Inputs for strain gauges

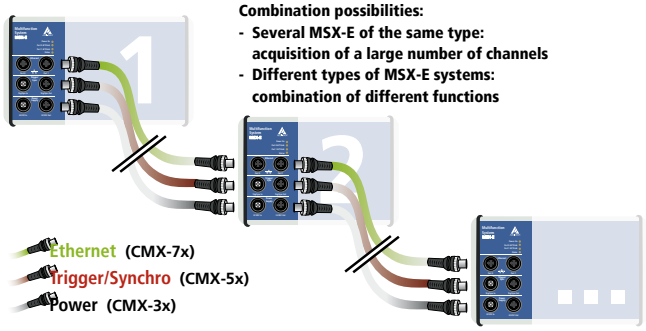
Features



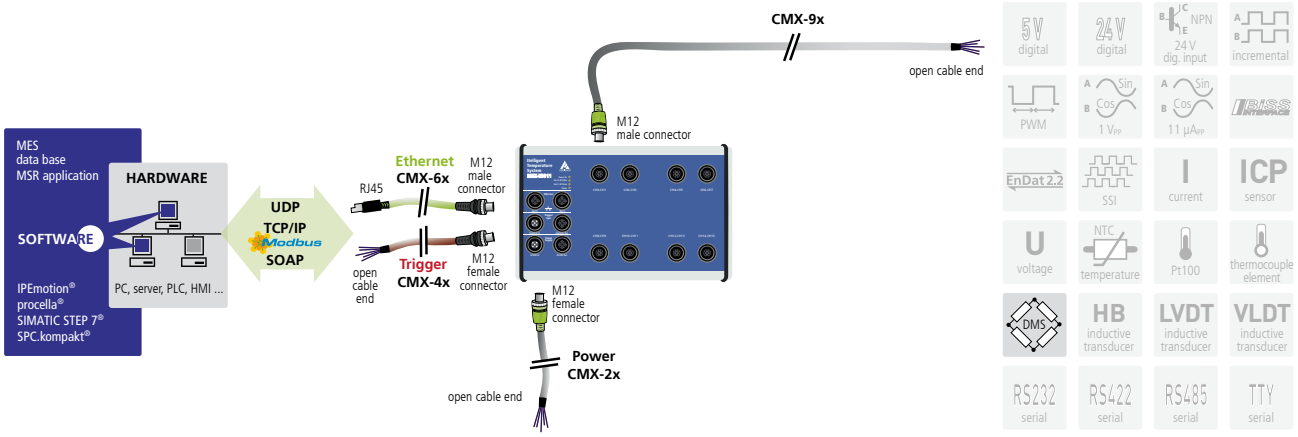
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Inputs for strain gauges

Number of inputs:	16 or 8 differential inputs for strain gauges 2 inputs per M12 connector
Resolution:	24-bit
Optical isolation:	1000 V
Throughput per M12 connector:	max. 788 Hz for 1 channel, max. 528 Hz for 2 channels
Voltage supply for the sensors:	10 V, 50 mA
Voltage supply:	~10 V / optional 5 V (onboard calibration) 100 mA max.

Real Sampling frequency:

on 1 channel	on 2 channels	Sampling frequency (software-configurable)
2.37 Hz	1.585 Hz	5 Hz
4.73 Hz	3.154 Hz	10 Hz
9.37 Hz	6.243 Hz	20 Hz
18.9 Hz	12.6 Hz	40 Hz
37.35 Hz	24.89 Hz	80 Hz
73 Hz	48.65 Hz	160 Hz
145 Hz	96.8 Hz	320 Hz
276.4 Hz	184.26 Hz	640 Hz
407.83 Hz	271.96 Hz	1 kHz
788 Hz	525.48 Hz	2 kHz

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	220 mm x 140 mm x 50 mm
Weight:	620 g
Degree of protection:	IP 65
Current consumption:	150 mA ± 10 % typ. in idle/power save mode
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
Analog inputs:	8 or 4 x 8-pin female connector, M12

Ordering information

MSX-E3311

Ethernet system for pressure/force measurement, 16/8 channels for strain gauges, 24-bit. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3311-16: for 16 strain gauges
MSX-E3311-8: for 8 strain gauges
Opt.MSX-E-5Vss: Bridge supply voltage adjustment to 5 V **(optional)**

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Rail (please specify when ordering!), **MX-Screw, PCMX-1x**

* Preliminary product information

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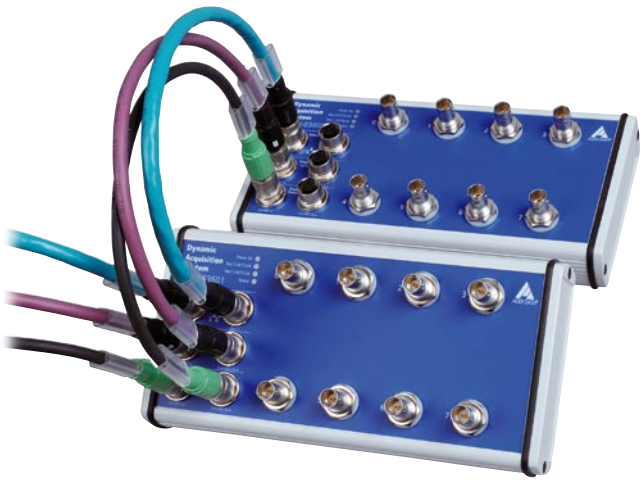
Ethernet system for the acquisition of dynamic signals
8 SE/diff. inputs, 24-bit, simultaneous acquisition



MSX-E3601 / MSX-E3601-2

2 or 8 SE/diff. inputs, 24 V

Simultaneous acquisition

2 or 8 current sources for ICP sensors

Onboard calibration

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C* / - 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- 8 SE or diff. inputs, 24-bit, AC/DC coupling
- One A/D converter per channel: simultaneous acquisition on all analog inputs
- Sampling rate up to 128 kHz
- Antialiasing filter
- BNC female connector:
  - inner conductor for positive input
  - outer conductor for negative input (diff) or GND (SE)
- Gain x1, x10, x100

Current sources

- 8 current sources for the direct connection of ICP™ sensors (integrated circuit piezoelectric)
- 4 mA typ., 24 V max.

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

Communication interfaces

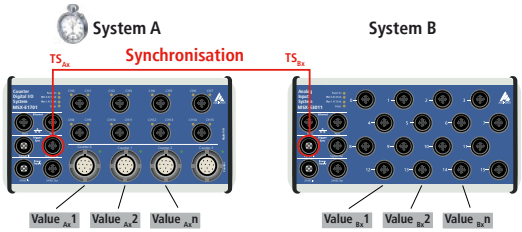
- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

Synchronisation/time stamp

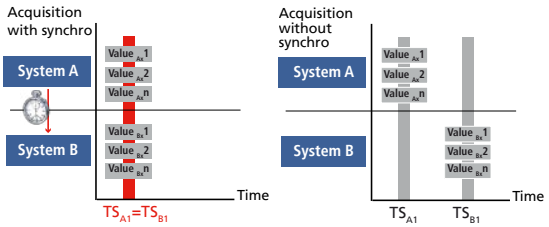
Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



Without synchro: $TS_{Ax} \neq TS_{Bx}$
With synchro: $TS_{Ax} = TS_{Bx}$

The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



MSX-E3601-2

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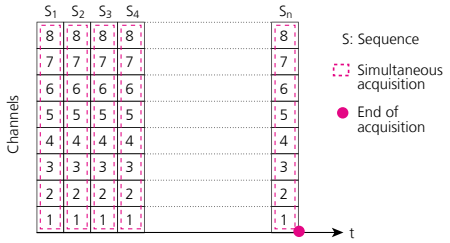
Acquisition modes

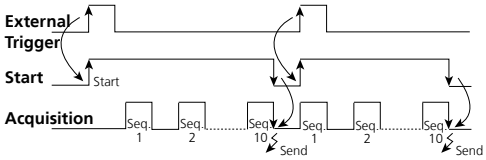
Sequence mode

In sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.



Reading data from a MSX-E system

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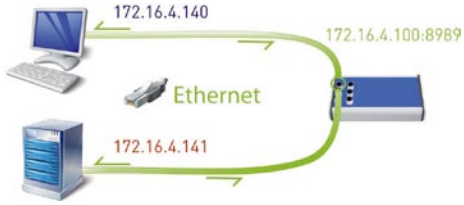

Onboard programming / stand-alone operation

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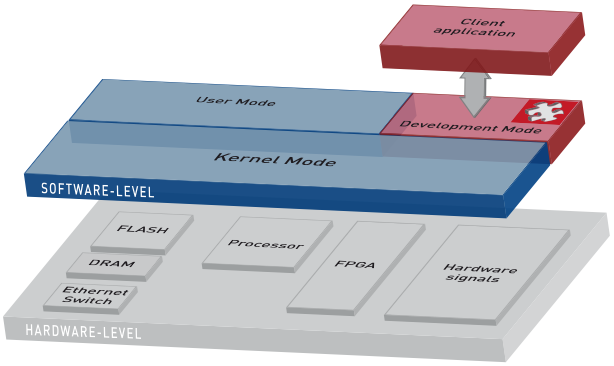
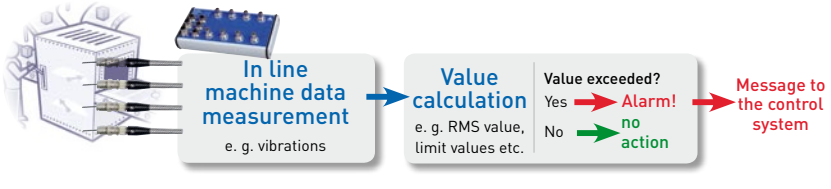


Anti-aliasing filter

Low-pass filters are used before or during digitising in order to remove all frequency components which are higher than the Nyquist frequency. This is to make sure that the digitised value or result does not contain any unwanted frequencies (aliasing frequencies). According to the Nyquist criterion, in order to obtain the full signal information, the sampling rate must be at least 2 x the signal band width.

Firmware and software adaptation

Because MSX-E systems are very flexible, the MSX-E3601 firmware can be easily extended. Thus, calculations such as RMS or limit values etc. can be integrated.
Using the Development Mode, it is possible to create self-sufficient intelligent nodes.



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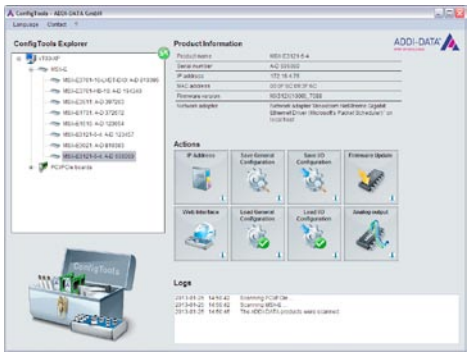
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

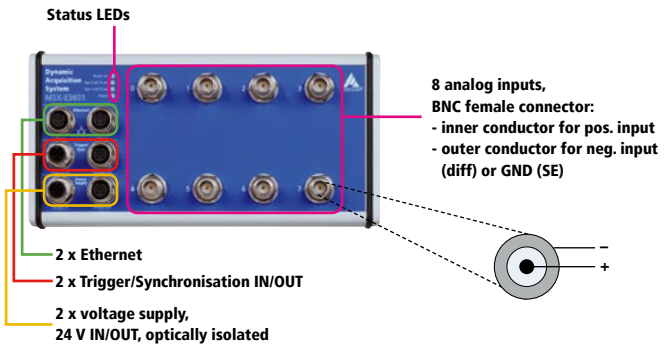
ConfigTools functions for MSX-E3601 / MSX-E3601-2:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration

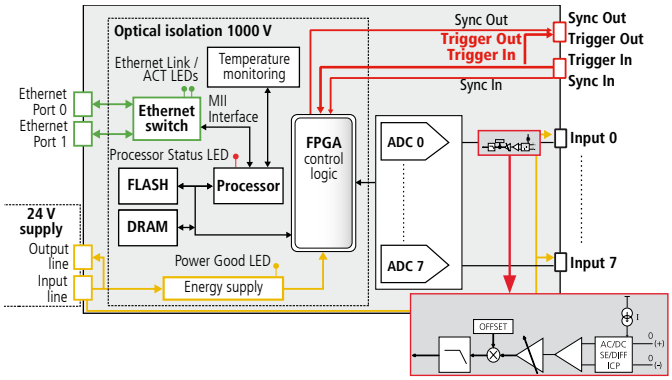
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



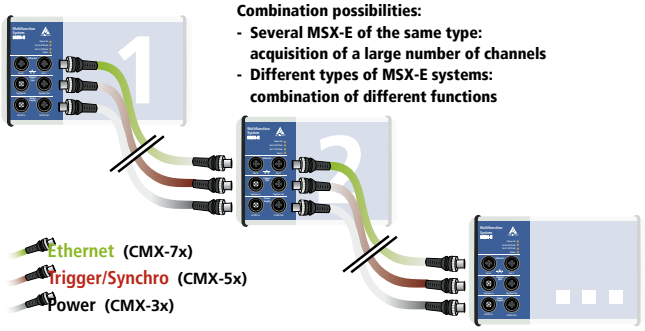
Features



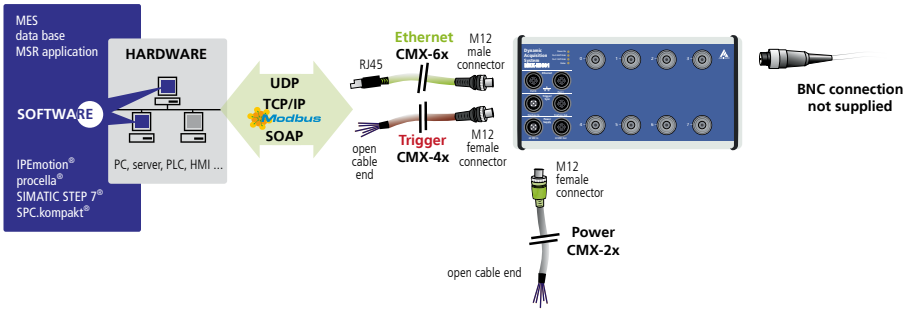
Simplified block diagram

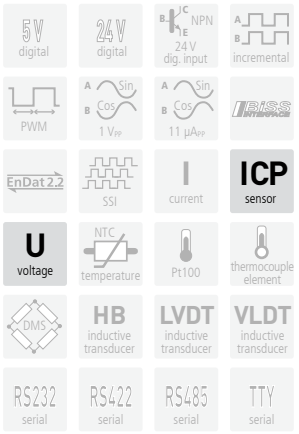


Cascading



ADDI-DATA connection technology





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Specifications

Analog inputs

Number of inputs:	8, simultaneous acquisition (MSX-E3601), 1 AD converter per channel 2, simultaneous acquisition (MSX-E3601-2)			
Coupling:	DC, AC (software-configurable)			
Input type:	single-ended or differential (software-configurable)			
Input ranges	**SE**		**Diff**	
Gain x1:	± 10 V single-ended		± 5 V differential	
Gain x10:	± 1 V single-ended		± 0.5 V differential	
Gain x100:	± 0.1 V single-ended		± 0.05 V differential	
ADC-Typ:	Oversampled SAR with linear phase FIR antialiasing digital filter			
Resolution:	24-bit			
Sampling rate f_s:	up to 128 kHz			
Selectable frequencies f_s:	128000.00	100000.00	80000.00	66666.67
	64000.00	50000.00	40000.00	33333.33
	32000.00	25000.00	20000.00	16666.67
	16000.00	13333.33	12800.00	12500.00
	10000.00	8000.00	6666.67	6400.00
	6250.00	5000.00	4000.00	3333.33
	3200.00	3125.00	2500.00	2000.00
	1666.67	1600.00	1562.50	1280.00
	1000.00			
Oversampling:	8 x f_s			
Frequency accuracy:	± 50 ppm			
Input stage characteristics				
Input impedance:	1 MΩ // 300 pF typ., DC coupled			
AC cutoff frequency (-3dB):	0.48 Hz typ.			
Overvoltage protection:	Positive input	+27 V/-14 V, ± 100mA Max. continuous current		
	Negative input	± 14 V, ± 100mA Max. continuous current		
Filter response				
Passband:	DC up to 0.453 x f_s typ.			
Passband ripple:	+/-0.01 dB max. DC up to 0.453 x f_s			
Bandwidth (-3dB):	0.49 x f_s typ.			
Stop band:	0.547 x f_s typ.			
Stop band attenuation:	100 dB min.			
Group delay:	37/f_s (µs) typ.			
Settling time (latency):	74/f_s (µs) complete settling			
Dynamic characteristics				
Signal-to-noise ration (SNR):	FSR, f_{in}=1kHz			
	≥ 95 dB	Gain x1		
	≥ 94 dB	Gain x10		
	≥ 75 dB	Gain x100		
Total Harmonic Distortion (THD):	FSR, fin=1kHz			
	≥ 100 dB	Gain x1		
	≥ 100 dB	Gain x10		
	≥ 90 dB	Gain x100		
Dynamic range:	Shorted inputs			
	≥ 105 dB	Gain x1		
	≥ 100 dB	Gain x10		
	≥ 85 dB	Gain x100		

Crosstalk:	Between channels 0-1, 2-3, 4-5, 6-7, with gain x1 ≥ 104 dB short input, f_{in} = 100 Hz ≥ 100 dB short input, f_{in} = 1 kHz ≥ 104 dB 50 Ω input, f_{in} = 100 Hz ≥ 100 dB 50 Ω input, f_{in} = 1 kHz
Phase mismatch:	Between channels 1-2, 3-4, 5-6, 7-8, with gain x1 ± 0.001° fin < 100 Hz ± 0.01° f_{in} < 1 kHz ± 0.1° f_{in} < 10 kHz
Amplitude accuracy:	± 0.009 dB max. at f_{in} = 1 kHz sine signal, Gain x1, x10, x100
CMRR:	> 110 dB typ. at DC > 90 dB typ. at f_{in} < 1000 Hz
Offset error:	± 90 µV after calibration at 25 °C
Onboard DC calibration:	Software-configurable
Calibration voltage:	5 V typ. Gain x1 900 mV typ. Gain x10 90 mV typ. Gain x100
Temperature drift:	± 8 ppm/°C typ.
Sensor supply voltage	
Number of channels:	2 (MSXE-3601-2) or 8 (MSX-E3601) positive input
Current source:	4 mA typ. to 24 V max.
Coupling:	AC (positive input) GND (negative input)
Recording duration:	TBD max. at 128 kHz sampling rate on 8 channels

Current sources

Number:	2 or 8 constant current sources for the supply of the ICP™ sensors, 4 mA typ., 24 V max.

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

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.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	215 x 110 x 52 mm
Weight:	860 g
Degree of protection:	IP 65
Current consumption at 24 V:	350 mA typ.
Operating temperature:	-40 °C to +85 °C
Connectors for sensors	
for analog inputs:	8 x BNC female connector (MSX-E3601) 2 x BNC female connector (MSX-E3601-2)

Ordering information

MSX-E3601 / MSX-E3601-2

Ethernet system for the acquisition of dynamic signals, 2 or 8 SE/diff. inputs, 24-bit, simultaneous acquisition. Incl. technical description, software drivers and ConfigTools.

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector

CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V

MX-Clip, **MX-Rail** (please specify when ordering!),

MX-Screw, PCMX-1x

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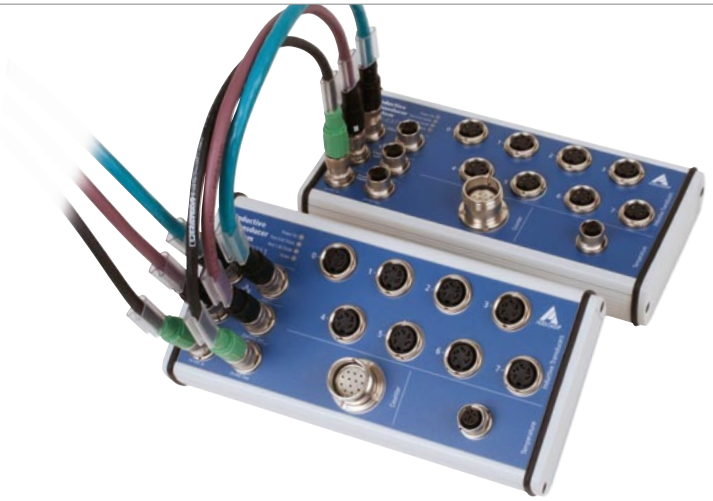
Ethernet system for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature inputs



MSX-E3711

Simultaneous acquisition of
up to 8 inductive displacement transducers

For half-bridge, LVDT, Mahr or Knaebel transducers

1 incremental counter input (32-bit)

1 input for temperature measurement (Pt100)
or for thermocouples (TC)

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C*
- 40 °C

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information at
www.addi-data.com

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

Features

- ARM®9 32-bit processor
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Transducer inputs

- 8 transducer inputs, 24-bit, 5-pin M18 female connector
- Half-bridge (HB), LVDT, Mahr-compatible, Knaebel
- Simultaneous acquisition
- Diagnostic option (short-circuit, line break)

Counter input

- 1 x 32-bit incremental counter input, max. 5 MHz
- Voltage supply of sensors with M23 female connector (24 V or 5 V)
- Single, double, quadruple edge analysis
- Compare logic

Temperature input

- 1 x RTD input, 16-bit, 5-pin M12 female connector
- +/- 0,01 °C resolution
- Thermocouple input, optional (MSX-E3711-TC)

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

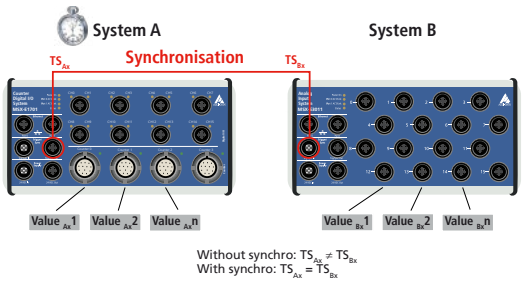
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

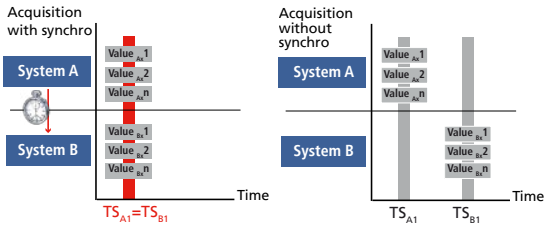
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



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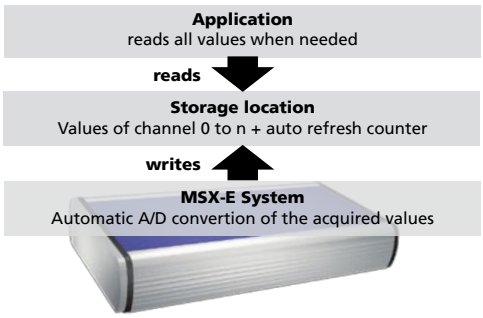
Acquisition modes

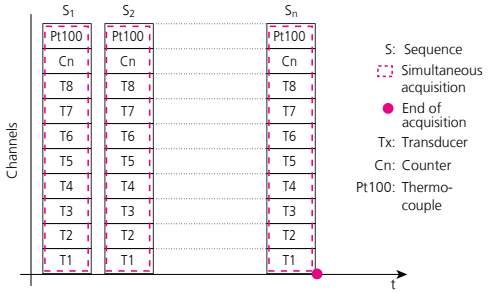
Auto-refresh mode

In the auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system. The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



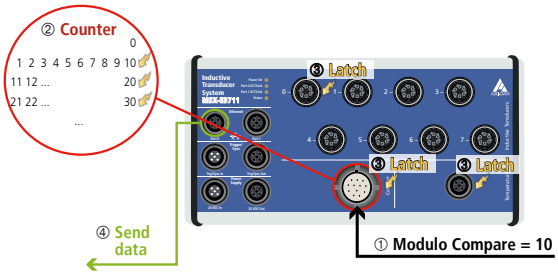
Sequence mode

In the sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



Compare logic

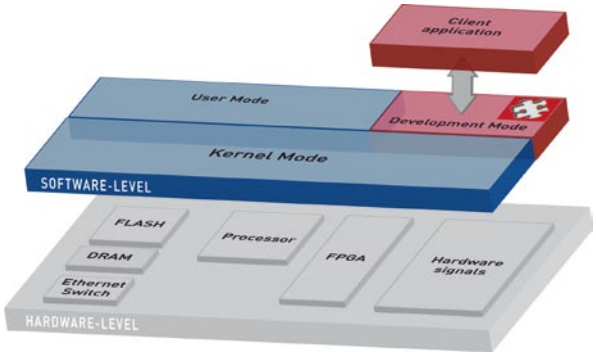
With the compare logic of the incremental counter, a synchro-trigger signal can be generated in order to latch the counter value, the transducers and the temperature input as soon as the counter value is equal to the compare value.
Thus all the inputs of the MSX-E3711 system can be acquired simultaneously.
With the additional „Modulo-Mode" (Modulo Compare), a trigger can also be generated at the n value of the compare value.
Thus it is possible, e. g. when using an encoder with 3,600 steps / revolution to obtain each degree of a measurement value (Modulo Compare = 10).
The thus generated synchro-trigger can also be used for data acquisition on further MSX-E systems.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



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ConfigTools

The **ConfigTools** program allows an easy administration of the MSX-E systems. These are recognised automatically in the network. **ConfigTools** consists of common and specific functions.

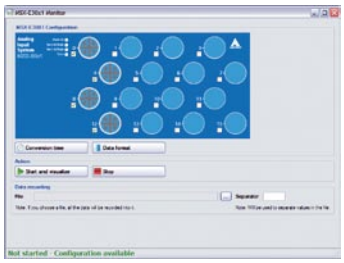
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3711:

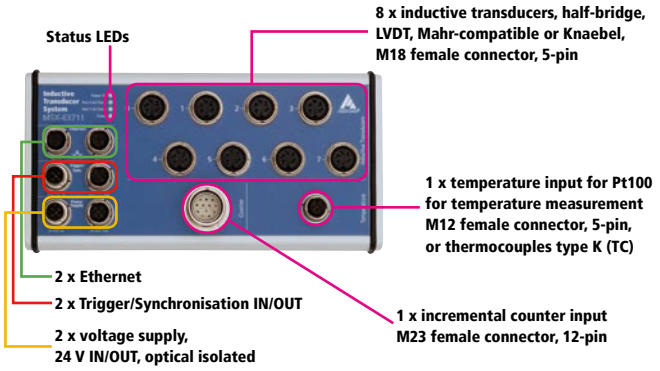
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Calibration of transducers
- Data base of transducers
- Monitoring of transducers
- Diagnostics of transducers

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

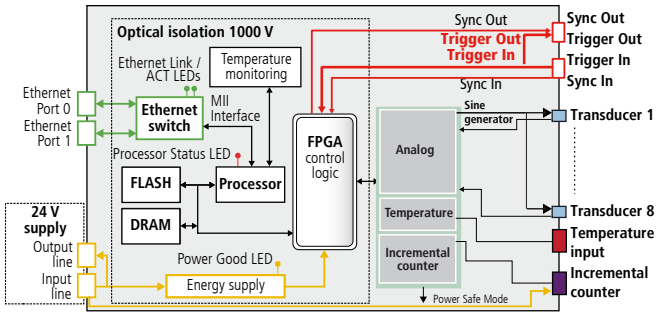


Monitor function example: Check of the analog inputs.

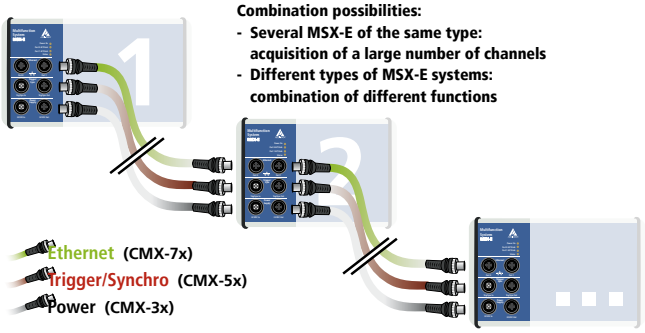
Features



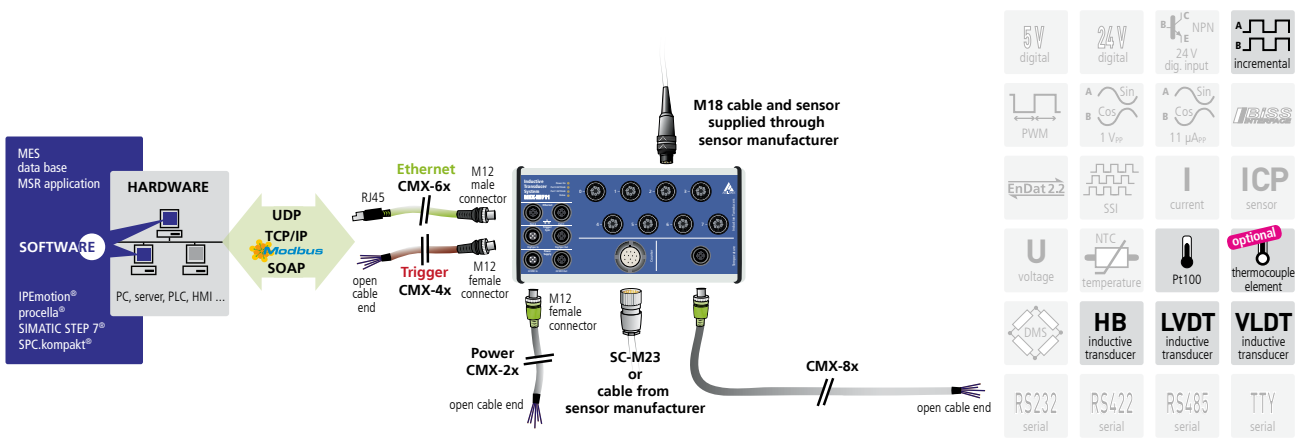
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications

Connection of inductive transducers

Inputs for inductive transducers

Channel features:		
Number:	8 x ADC (not multiplexed)	
Input type:	Single-ended	
Coupling:	DC	
Resolution:	24-bit	
Sampling rate f_s:	On 8 channels	At primary frequency f_P of 5 kHz 7.69 kHz
	$f_s = f_P$	10 kHz 12.5 kHz 20 kHz 50 kHz
Example with TESA GT21:	$f_s = f_P$ = 12.5 kHZ	on all 8 channels
Input level		
Input impedance:	2 kΩ 10 kΩ 100 kΩ 10 MΩ	software-programmable
Transducer accuracy:	± 61 nm (Tesa GT21)	
Sensor supply (Sine generator)		
Type:	Sine differential (180° phase-shift)	
Coupling:	AC	
Programmed signals:		
Output frequency f_P (primary frequency)	2-20 kHz depending on the transducer (50 kHz Knaebel)	
Output impedance:	< 0.1 Ω typ. > 30 kΩ typ. in shutdown mode	
Short-circuit current:	0.7 A typ. at 25 °C with thermal protection	

Counter

Number of counter inputs:	1
Input type:	Differential inputs or TTL
Differential inputs:	Comply with the EIA standards RS422A
Common mode range:	+12 V / - 7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 kΩ min.
Max. input frequency:	5 MHz at nominal voltage
"Open Circuit Fail Safe Receiver Design"	"1" = inputs open
ESD protection:	Up to ± 15 kV
Voltage supply of the encoder:	5 or 24 V/500 mA max.

24 V version

This version is designed for the connection of 24 V encoders.
Only 24 V signals can be connected to the inputs.

Nominal voltage:	24 V_{DC}		
Max. input frequency:	1 MHz at nominal voltage		
Input impedance:	1 MΩ typ.		
Logic input levels:			
UH (max.)	30 V	typ.	
UH (min)	18 V	typical	(on request)
UL (max.)	16 V	typical	(on request)
UL (min)	0 V	typical	

Temperature measurement

Number of inputs:	1
Type:	RTD Pt100 or TC type K (optional)
Connection:	4-wire
Temperature range:	-200 to 850 °C
Resolution:	± 0.01 °C

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 54
Weight:	760 g
Degree of protection:	IP 65
Operating temperature:	- 40 to + 85°C
Current consumption at 24 V:	400 mA
Voltage Supply	
24 VDC IN	1 x 5-pin M12 male connector
24 VDC OUT	1 x 5-pin M12 female connector
Connectors for sensors	
For inductive transducers:	8 x 5-pin M18 female connector
For temperature sensors:	1 x 5-pin M12 female connector 1-, 2-, 4-wire Pt100
For the counter function:	1 x 12-pin M23 female connector

Ordering information

MSX-E3711

Ethernet system for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature input.
Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3711-HB: for 8 HB inductive transducers, 5 V counter input
MSX-E3711-LVDT: for 8 LVDT inductive transducers, 5 V counter input
MSX-E3711-M: for 8 Mahr-comp. transducers, 5 V counter input
MSX-E3711-K: for 8 Knaebel transducers, 5 V counter input
MSX-E3711-HB-24V: for 8 HB inductive transducers, 24 V counter input
MSX-E3711-LVDT-24V: for 8 LVDT inductive transducers, 24 V counter input
MSX-E3711-TC: Type K thermocouple in place of the Pt100 input, other types on request

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!),**MX-Screw, PCMX-1x**

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Ethernet system for length measurement, 24-bit 16/8/4 inductive transducers, LVDT, Half-Bridge, Mahr

New!
32 digital I/O (Option)

MSX-E3701 / MSX-E3701-x / MSX-E3700

Acquisition of 4, 8 or 16 inductive transducers

For Half-Bridge, LVDT, Mahr or Knaebel transducers

Digital output 24 V with compare logic

24 V digital trigger input

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65 IP 40

ARM®9 Technology

Cascadable, can be synchronised in the µs range

Timer function for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

Q-DAS®

procella®

More information on www.addi-data.com

Features

- ARM®9 32-bit processor
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Inputs for transducers

- 4, 8 or 16 inputs for transducers, 24-bit, 5-pin M18 female connector
- Half-bridge (HB), LVDT, Mahr compatible, Knaebel
- Diagnostics (short-circuits, line break)
- 16-bit accuracy, example of a measurement:
  Typ TESA GT21, range ± 2 mm (Δ 4 mm),
  $\frac{4\ mm}{2^{16}}$ = ± 61 nm = 0.061 µm

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

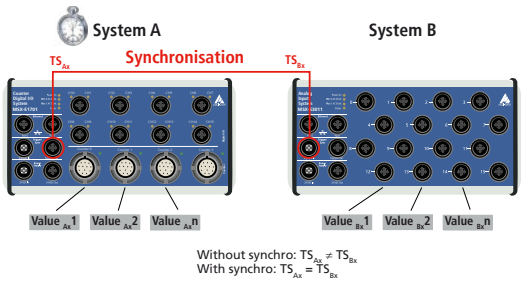
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

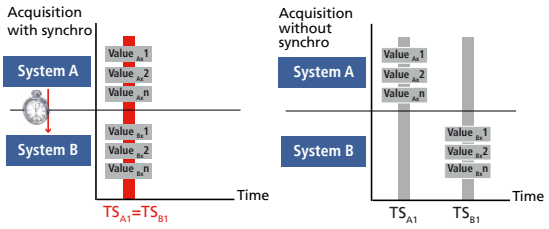
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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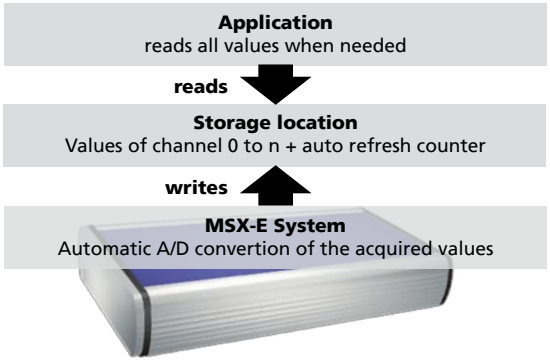
Acquisition modes

Auto-refresh mode

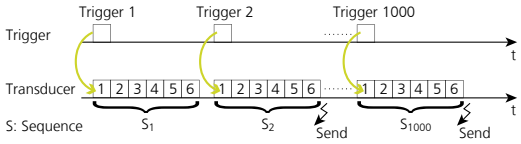
In the auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system. The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence Mode

In the sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first.
The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.

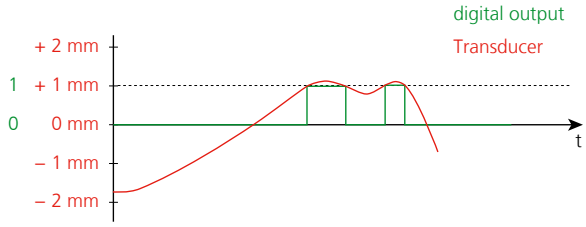
Example: Sequence acquisition of 6 channels, 1 Trigger for each sequence sending data after 2 sequences – a total of 1000 sequences



Digtal output with Compare logic

The MSX-3701-x-4 system can optionally be equipped with a digital 24 V output with Compare logic (OPT. MSX-E Dig. Out). This output can be set either manually or through a transducer.
This allows easy threshold value monitoring, e.g. probing a workpiece and then automatically sending an message to a PLC.

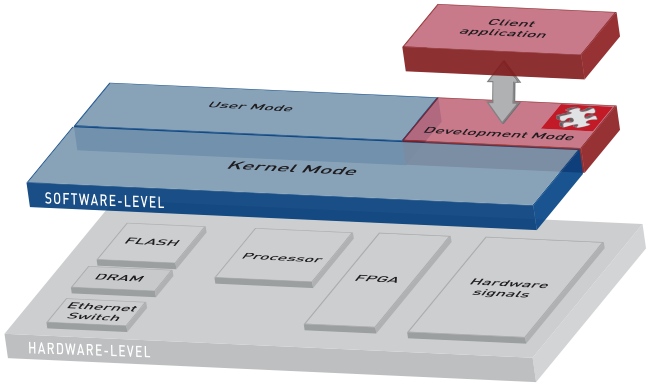
Example: Transducer channel 0, TESA GT21, range ± 2 mm, threshold value: + 1 mm



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



* Preliminary product information

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ConfigTools

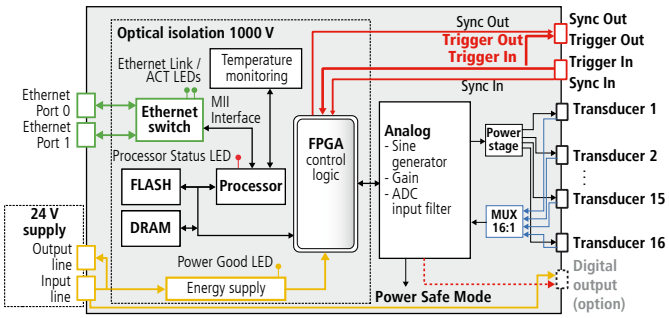
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

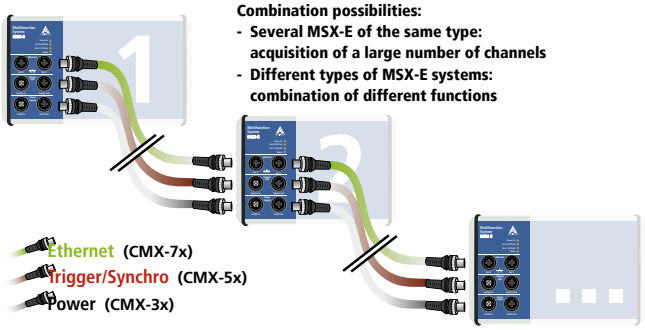
ConfigTools functions for MSX-E3701 / MSX-E3701-x / MSX-E3700:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Transducer calibration
- Transducer database
- Transducer monitoring
- Transducer diagnostics

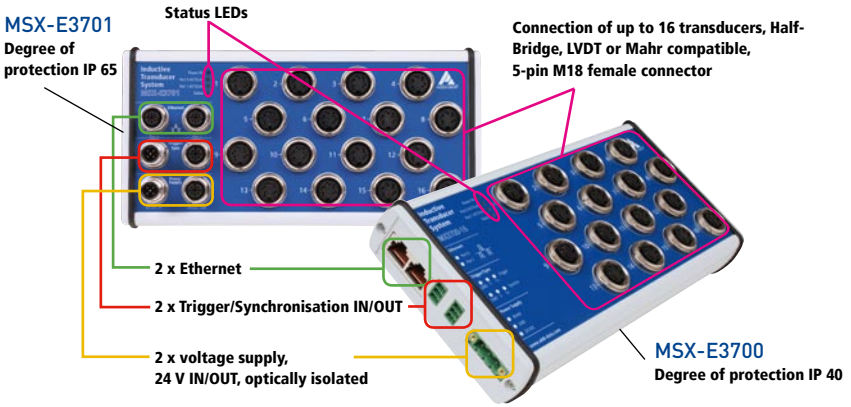
Simplified block diagram



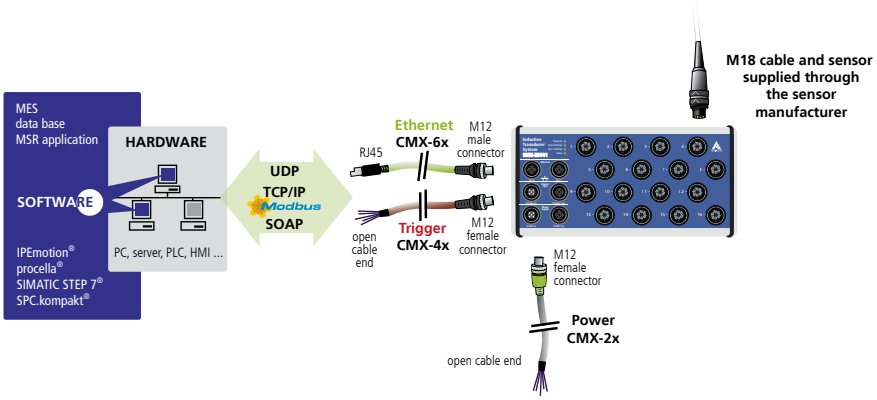
Cascading

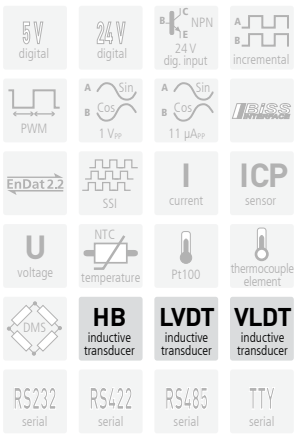


Features



ADDI-DATA connection technology





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Specifications

Inputs for inductive transducers

Channel features

Number:	-4/-8/-16/ multiplexed	
Input type:	single-ended	
Coupling:	DC	
Resolution:	24-bit	
Sampling frequency f_s:	On 1 channel	At primary frequency f_P of 5 kHz, 7.69 kHz, 10 kHz, 12.5 kHz, 20 kHz, 50 kHz
	$f_s = f_P$	
	Ab n ≥ 2 channels	f_P = primary frequency SP . Settling period 5 ≤ SP ≤ 255
	$f_s = \frac{f_P}{SP \times n}$	f_s concerns here all n channels
Example with TESA GT21:	On 1 channel	$f_s = f_P$ = 12.5 kHz
	From n ≥ 2 channels	$f_s = \frac{12.5\ kHz}{5 \times 4}$ = 625 Hz for 4 channels
		$f_s = \frac{12.5\ kHz}{5 \times 8}$ = 312.5 Hz for 8 channels
		$f_s = \frac{12.5\ kHz}{5 \times 16}$ = 156.25 Hz for 16 channels

Input level

Input impedance:	2 kΩ software-programmable 10 kΩ 100 kΩ 10 MΩ

Sensor supply (sine generator)

Type:	Sine differential (180° phase-shift)
Coupling:	AC
Programmed signals:	
output frequency f_P (primary frequency)	2-20 kHz depending on the transducer (50 kHz Knaebel)
Output impedance:	< 0.1 Ω typ. > 30 kΩ typ. in shutdown mode
Short-circuit current:	0.7 A typ. at 25 °C with thermal protection

Voltage supply

Nominal voltage:	24 V	⎓
Voltage supply:	18-30 V	
Optical isolation:	1000 V	
Current consumption at 24 V:	90 mA	typ. in power safe mode / idle
	120 mA	Power on
	150 mA	DAC init, sine on, Buffer off
	200 mA	typ. without load (transducers) at ± 9 V power (Buffer on)
	320 mA	typ. with 16 Solartron AX1S transducers at ± 7 V power, 5 kHz and 3 V_{rms}
	330 mA	typ. with 8 Knaebel IET0200 transducers at 5 V power, 50 kHz and 1 V_{rms}
Reverse voltage protection		

Digital output (option for MSX-E3701-x-4)

Number of outputs:	1, M12 female connector
Optical isolation:	1000 V through opto-couplers
Output type:	High Side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	18 V-30 V
Output current:	0.8 A
Short-circuit current / output:	0.8 A max.
RDS ON resistance:	1 mΩ max.
Switch-on time:	21 µs typ. RL = 270 Ω
Switch-off time:	11 µs typ. RL = 270 Ω
Overtemperature (shutdown):	150°C max. (output driver)
Temperature hysteresis:	10°C typ. (output driver)

Ethernet

Number of ports:	2	
Cable length:	150 m	max. at CAT5E UTP
Bandwidth:	10 Mbps	auto-negotiation
	100 Mbps	auto-negotiation
Protocol:	10Base-T	IEEE802.3 compliant
	100Base-TX	IEEE802.3 compliant
Optical isolation:	1000 V	
MAC address:	00:0F:6C:##:##:##, unique for each device	

Trigger

Number of inputs:	1 trigger input
Number of outputs:	1 trigger output
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 to 30 V
Input current:	11 mA at 24 VDC, typical
Input frequency (max.):	2 MHz at 24 V
Connector, common with Synchro	
Trigger input:	1 x 5-pin male connector M12
Trigger output:	1 x 5-pin female connector M12

Synchro

Number of inputs:	1
Number of outputs:	1
Max. cable length:	20 m
Optical isolation:	1000 V
Signal type:	RS485
Connector, common with Trigger	
Trigger input:	1 x 5-pin male connector M12
Trigger output:	1 x 5-pin female connector M12

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.

System features

Interface:	Ethernet acc. to specification IEEE802.3	
Dimensions:	MSX-E3700-16	215 x 110 x 39 mm
	MSX-E3700-4/8	154 x 110 x 39 mm
	MSX-E3701-16	215 x 110 x 50 mm
	MSX-E3701-4/8	154 x 110 x 50 mm
Weight:	MSX-E370x-16:	760 g
	MSX-E370x-8:	560 g
	MSX-E370x-4:	530 g
Degree of protection:	MSX-E3701-4/-8/-16:	IP 65
	MSX-E3700-4/-8/-16:	IP 40
Operating temperature:	MSX-E370x:	-40 °C to + 85°C

MSX-E3701 interface connectors

Ethernet:	2 x 4-pin M12 female connector, D-coded for port 0 and port 1
Trigger/Synchro IN:	1 x 5-pin male connector M12
Trigger/Synchro OUT:	1 x 5-pin female connector M12
Voltage supply	
24 VDC IN:	1 x 5-pin male connector M12
24 VDC OUT:	1 x 5-pin female connector M12

MSX-E3700 interface connectors

Ethernet:	RJ45 for Port 0 and 1
External trigger:	1 x 3-pin binder, 3.81 mm grid
Synchro signal:	1x 3-pin binder, 3.81 mm grid
Voltage supply	
24 VDC:	3-pin binder, 5.08 mm grid

Connectors for connecting inductive transducers

MSX-E370x-4:	4 x 5-pin M18 female connector
MSX-E370x-8:	8 x 5-pin M18 female connector
MSX-E370x-16:	16 x 5-pin M18 female connector

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Versions	Temperature range - 40 °C to + 85 °C	Number of transducers	Type of transducer	Digital output 24 V (option)	Degrees of protection
MSX-E3701-HB-16	✓	16	Half-Bridge		**MSX-E3701: Degree of protection IP 65** Protection against a water jet directed at the housing from any direction. Protection against the penetration of dust. Total protection against contact (dust-proof).
MSX-E3701-HB-8		8			
MSX-E3701-HB-4		4		✓	
MSX-E3701-LVDT-16	✓	16	LVDT		
MSX-E3701-LVDT-8		8			
MSX-E3701-LVDT-4		4		✓	
MSX-E3701-K-8	✓		Knaebel		
MSX-E3701-M-8	✓	8	Mahr compatible		
MSX-E3701-M-4		4		✓	
MSX-E3700-HB-16	✓	16	Half-Bridge		**MSX-E3700: Degree of protection IP 40** Protection against the penetration of foreign bodies with a diameter greater than 1 mm.
MSX-E3700-HB-8		8			
MSX-E3700-HB-4		4			
MSX-E3700-LVDT-16	✓	16	LVDT		
MSX-E3700-LVDT-8		8			
MSX-E3700-LVDT-4		4			

Ordering information

MSX-E3701 / MSX-E3701-EXT / MSX-E3700

Ethernet system for length measurement, 24-bit, 16/8/4 inductive displacement transducers, LVDT, half-bridge, Mahr-compatible, Knaebel.
Incl. technical description, software drivers and ConfigTools.

MSX-E3701: IP 65, standard system

MSX-E3701-HB-16: For 16 HB inductive displacement transducers
MSX-E3701-LVDT-16: For 16 LVDT inductive displacement transducers
MSX-E3701-HB-8: For 8 HB inductive displacement transducers
MSX-E3701-K-8: For 8 Knaebel induct. displacement transducers
MSX-E3701-LVDT-8: For 8 LVDT inductive displacement transducers
MSX-E3701-HB-4: For 4 HB inductive displacement transducers
MSX-E3701-M-8: for 8 Mahr-compatible displacement transducers
MSX-E3701-LVDT-4: For 4 LVDT inductive displacement transducers
MSX-E3701-M-4: for 4 Mahr-compatible displacement transducers

Options

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
Opt. MSX-E Dig. Out: additional dig. ouptut with compare logic for transducer 0 (only available for MSX-E3701-x-4)

MSX-E3700 (degree of protection IP 40)

Incl. standard binders SMX-10 and SMX-20
MSX-E3700-HB-16: For 16 HB inductive transducers
MSX-E3700-LVDT-16: For 16 LVDT inductive transducers
MSX-E3700-HB-8: For 8 HB inductive transducers
MSX-E3700-LVDT-8: For 8 LVDT inductive transducers
MSX-E3700-HB-4: For 4 HB inductive transducers
MSX-E3700-LVDT-4: For 4 LVDT inductive transducers

Binders for MSX-E3700:

Power Supply
SMX-10: Standard 3-pin binder, 5.08 mm grid, screw connector (included in delivery)
SMX-11: 3-pin binder, 5.08 mm grid, 2-row screw connector
SMX-12: 3-pin binder,5.08 mm grid, 2-row spring-cage connector
Trigger
SMX-20: Standard 3-pin binder, 5.08 mm grid

Options for MSX-E3701 and MSX-E3700

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

Connection cables

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65
Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Clip, **MX-Rail** (Please specify when ordering!),**MX-Screw, PCMX-1x**

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Applications

Practical Examples

Machinery

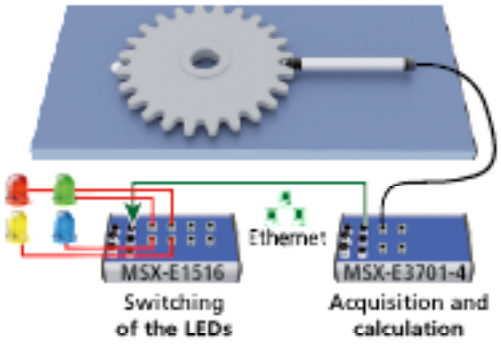
Precise and error-free diameter detection of gear wheels

Challenge

A manual test station shall be replaced by a modern and easy-to-use measuring system. The goal is to improve the accuracy of the measurement and to avoid errors which occur when measurement values are entered manually.

Solution

The diameter between the gear teeth shall be measured. Therefore the gear wheel is put on a measurement table with a ball for stopping. On the opposite side, a spring-loaded ball and an inductive measurement sensor are installed. The diameter between the fixed ball and the sensor is detected by the Ethernet length measurement system MSX- E3701. Then the measured values are calculated through an integrated logic and classified in 4 predefined categories (tolerance range). The measurement result is displayed with an LED on the digital Ethernet system MSX-E1516.



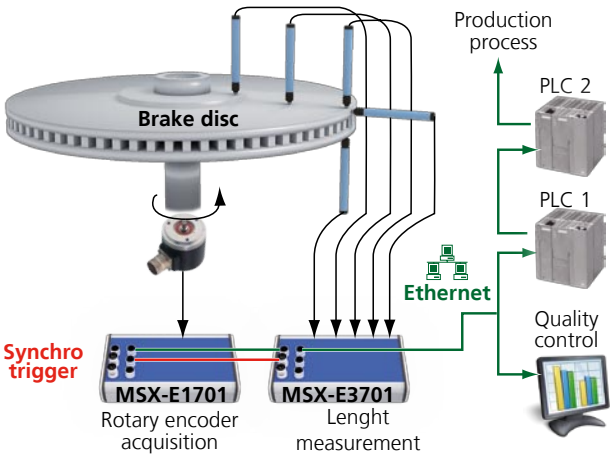
Consistent data for parameter corrections and precise rework of brake discs

Challenge

A manufacturer of car parts wants to test the surface of his produced brake discs as exactly as possible for roundness, radius and surface quality. In order to allow precise rework and corrections of the process parameters, the measurement device must be able to transfer a consistent data set of the position value and the measured value to the control unit.

Solution

For this application, two intelligent Ethernet systems are used: The MSX-E1701 counter system for the position acquisition and the MSX-E3701 length measurement system for the detection of the measurement values through the connected displacement transducers. For each measurement point, the MSX-E1701 system triggers the MSX-E3701 system angle-dependently. For a precise matching of position and measurement values at each measurement point, both systems are synchronised and have a time stamp. The acquired data is then transferred through Ethernet to a PC or a PLC for evaluation and regulation purposes. Exceeded tolerance values are forwarded to the super-ordinate machine in order to adjust process parameters or to effect corrections on the measured brake disc.



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Ethernet system for length measurement, 24-bit 16 inductive transducers, LVDT, half-bridge

New!*

MSX-E3701-DIO

Acquisition of 16 inductive transducers

For half-bridge and LVDT transducers

24 V digital trigger input

32 digital I/O, 24 V

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

Timer function for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 112

More information on www.addi-data.com

Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

*Preliminary Product information

Features

- ARM®9 32-bit processor
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Inputs for transducers

- 16 inputs for transducers, 24-bit, 5-pin M18 female connector
- Half-bridge (HB), LVDT
- Diagnostics at short-circuits or line break
- 16-bit accuracy

Transducer precision: example of a measurement

Typ TESA GT21, range ± 2 mm (Δ 4 mm),
16-bit accuracy

$$\frac{4\ \text{mm}}{2^{16}} = \pm\ 61\ \text{nm} = 0{,}061\ \mu\text{m}$$

Digital I/O

- 16 inputs for transducers, 24-bit, 5-pin M18 female connector
- 32 digital I/O, 24 V:
  16 opt. isolated inputs, 24 V, optional filter
  16 opt. isolated outputs, 11 V to 36 V,
  output current per channel 150 mA

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

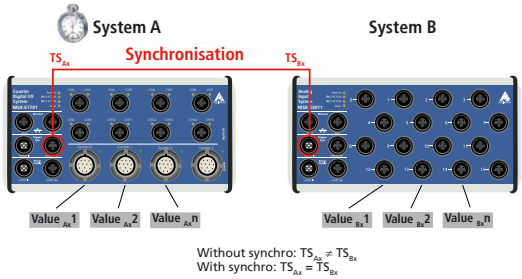
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

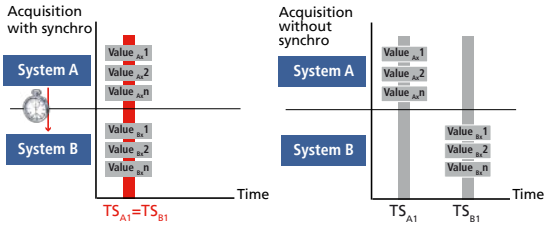
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



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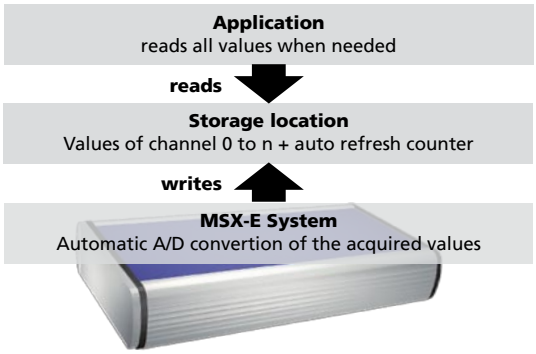
New!*

Acquisition modes

Auto-refresh mode

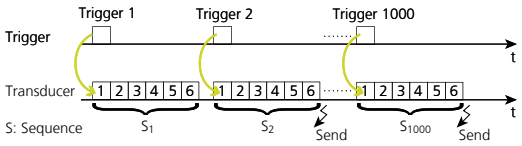
In the auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system. The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten.
In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence Mode

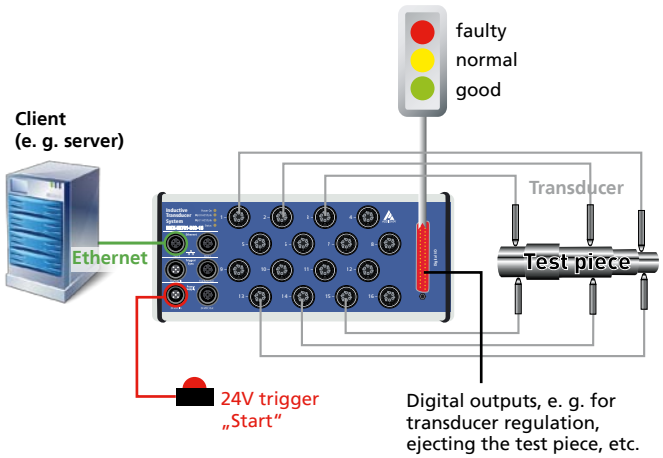
In the sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first.
The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.

Example: Sequence acquisition of 6 channels, 1 trigger per sequence
Send data after 2 sequences – 1000 sequences in total



Digital I/O

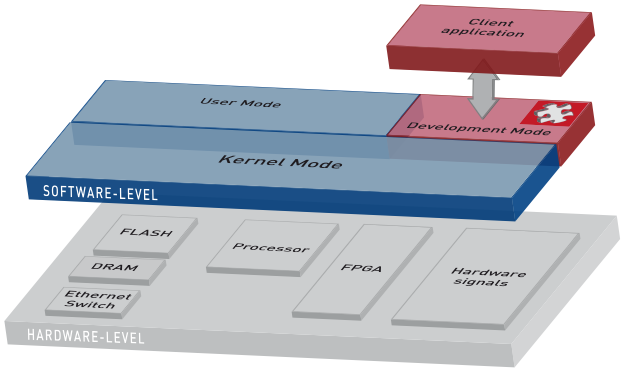
In addition to the transducer channels, the MSX-3701-DIO system has 32 digital 24 V I/O channels (16 inputs, 16 outputs). The system is therefore very flexible and can manage complete measurement and test applications. Example: Test bench for cylindrical parts, probing the workpieces, automatic regulation of the transducers and visualisation of the results via LED trafic light. The measurement data is at the same time stored in a database.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



* Preliminary product information

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New!*

ConfigTools

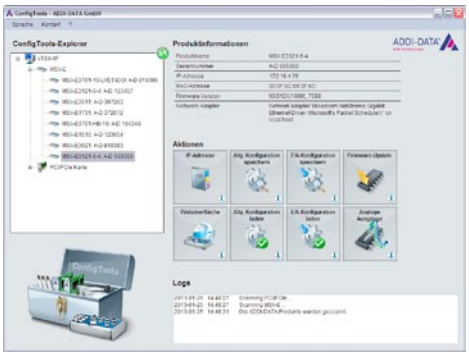
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

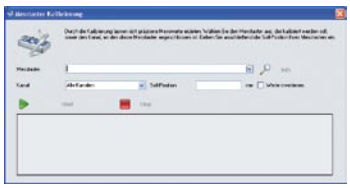
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3701-DIO:

- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Transducer calibration
- Transducer database
- Transducer monitoring
- Transducer diagnostics

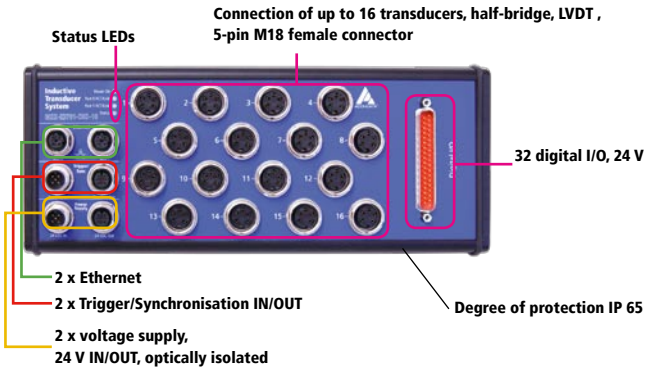
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



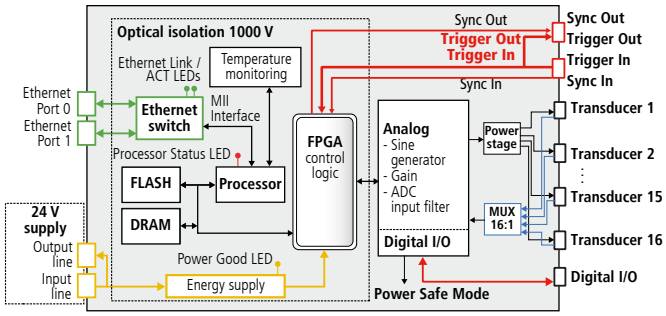


... and can then be calibrated.

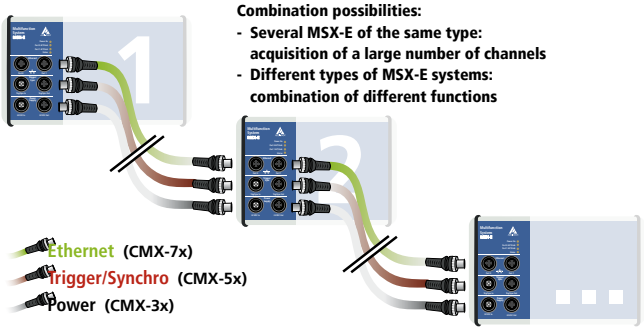
Features



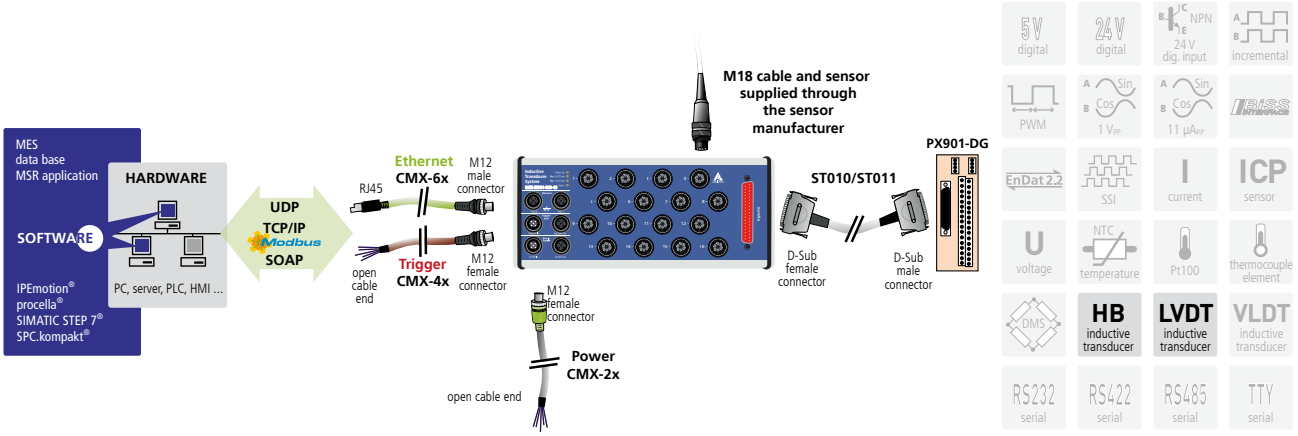
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Inputs for inductive transducers

Channel features

Number:	16 multiplexed	
Input type:	Single-Ended	
Coupling:	DC	
Resolution:	24-bit	
Sampling frequency f_s:	on 1 channel	at primary frequency f_P of 5 kHz, 7.69 kHz, 10 kHz, 12.5 kHz, 20 kHz, 50 kHz
	$f_s = f_P$	
	From n ≥ 2 channels $f_s = \frac{f_P}{SP \times n}$	f_P = primary frequency; SP = settling period (5 ≤ SP ≤ 255); f_s concerns here all n channels
Example with TESA GT21:	On one channel	$f_s = f_P$ = 12.5 kHz
	From n ≥ 2 channels	$f_s = \frac{12.5\ kHz}{5 \times 4}$ = 625 Hz for 4 channels
		$f_s = \frac{12.5\ kHz}{5 \times 8}$ = 312.5 Hz for 8 channels
		$f_s = \frac{12.5\ kHz}{5 \times 16}$ = 156.25 Hz for 16 channels

Input level

Input impedance:	2 kΩ software-configurable 10 kΩ, 100 kΩ, 10 MΩ

Sensor supply (sine generator)

Type:	Differential sine (180° phase shift)
Coupling:	AC
Programmed signals: Output frequency f_P	5 kHz; 7.69 kHz; 10 kHz; 12.5 kHz; 20 kHz, 50 kHz, depending on the transducer
Output impedance:	< 0,1 Ω typ. > 30 kΩ typ. in shutdown mode
Short-circuit current:	0.7 A typ. at 25°C with thermal protection

Power Supply

Nominal voltage:	24 V ⎓	
Voltage supply:	18-30 V	
Optical isolation:	1000 V	
Current consumption at 24 V:	90 mA	typ. in power safe mode / idle
	120 mA	Power on
	150 mA	DAC init, sinus on, buffer off
	200 mA	typ. without load (transducer) at ± 9 V power (buffer on)
	320 mA	typ. with 16 Solartron AX1S transducers at ± 7 V power, 5 kHz and 3 V_{rms}
Reverse voltage protection		

Digital inputs

Number of inputs:	16, common ground acc. to IEC 1131-2
Optical isolation:	1000 V through opto-couplers
Nominal voltage:	24 VDC
Input voltage:	0 to 30 V
Logic input levels:	UH (max) 30 V typ. UH (min) 19 V typ. UL (max) 14 V typ. UL (min) 0 V typ.

Digital outputs

Number of outputs:	16
Optical isolation:	1000 V through opto-couplers
Output type:	High-side, load to ground acc. to IEC 1131-2
Nominal voltage:	24 V
Voltage supply:	11 V-36 V
Output current per channel:	150 mA max.
Diagnostics:	Common diagnostics bit for all 16 channels at overtemperature of one channel

Ethernet

Number of ports:	2	
Cable length:	150 m	max. at CAT5E UTP
Bandwidth:	10 Mbps	auto-negotiation
	100 Mbps	auto-negotiation
Protocol:	10Base-T	IEEE802.3 compliant
	100Base-TX	IEEE802.3 compliant
Optical isolation:	1000 V	
MAC address:	00:0F:6C:##:##:##, unique for each device	

Trigger

Number of inputs:	1 trigger input
Number of outputs:	1 trigger output
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 to 30 V
Input current:	11 mA at 24 VDC, typical
Input frequency (max.):	2 MHz at 24 V
Connector, common with Synchro	
Trigger input:	1 x 5-pin male connector M12
Trigger output:	1 x 5-pin female connector M12

Synchro

Number of inputs:	1
Number of outputs:	1
Max. cable length:	20 m
Optical isolation:	1000 V
Signal type:	RS485
Connector, common with Trigger	
Trigger input:	1 x 5-pin male connector M12
Trigger output:	1 x 5-pin female connector M12

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.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	260 x 110 x 50 mm
Weight:	965 g
Degree of protection:	IP 65
Operating temperature:	-40 °C to + 85°C

Interface connectors

Ethernet:	2 x 4-pin female connector, D-coded M12 for port 0 and port1
Trigger/Synchro input:	1 x 5-pin M12 male connector
Trigger/Synchro output:	1 x 5-pin M12 female connector
Voltage supply	
24 VDC input:	1 x 5-pin M12 male connector
24 VDC output:	1 x 5-pin M12 female connector

Ordering information

MSX-E3701-DIO

Ethernet system for length measurement, 24-bit, 16 inductive transducers, LVDT, half-bridge. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3701-DIO-HB-16: for 16 HB inductive transducers
MSX-E3701-DIO-LVDT-16: for 16 LVDT inductive transducers

Connection cables for 32 dig. I/O, 24 V auf 37-pol. D-Sub-Connector

ST010: Standard round cable, shielded twisted pairs, 2m
PX901-DG: Screw terminal board with Schraubklemmen, LED Status display, for DIN rail

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Options

MX-Clip, **MX-Rail** (please specify when ordering!),
MX-Screw, PCMX-1x

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Ethernet system for serial interfaces
4 ports for RS232, RS422, RS485 or 20 mA CL

MSX-E7511

- 4 serial interfaces
- RS232, RS422, RS485, 20 mA Current Loop
- 128-byte FIFO buffer for each port
- 16C950 compatible UART
- Optical isolation
- Onboard evaluation of user data

Integrated Ethernet switch

+ 85 °C*
- 40 °C

*Operating temperature

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

More information on www.addi-data.com

Features

- 24 V digital trigger input
- ARM®9 32-bit processor
- 64 MB onboard SDRAM for storing data
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation • Input filters

Serial interfaces

- 4 serial interfaces
- RS232, RS422, RS485 and TTY (20 mA Current Loop)
- The port modes can be mixed
- The channels are optically isolated from each other

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

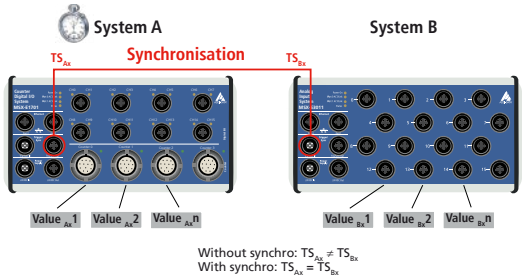
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

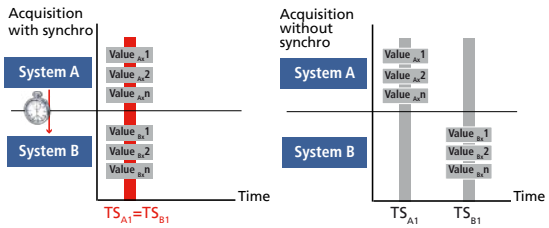
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the µs range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.



Drivers and samples
Find software for the MSX-E systems at:
www.addi-data.com/downloads

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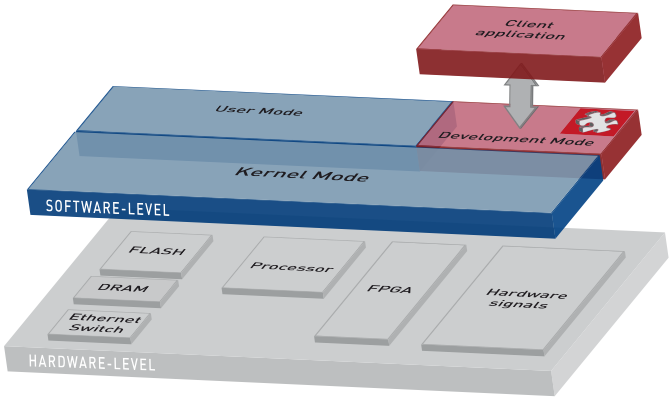
Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.

Flexibility through firmware and software adaptation

Thanks to the flexibility of the MSX-E product range, the MSX-E7511 system can be easily extended via firmware, e. g. to install additional protocols on the serial interfaces.



Fields of application

The MSX-E7511 Ethernet system features 4 serial interfaces.
Depending on the version, the interface standards are RS232, RS422, RS485 and TTY (20 mA Current Loop).
Any application can be programmed either through a firmware adaptation or using the Development mode.

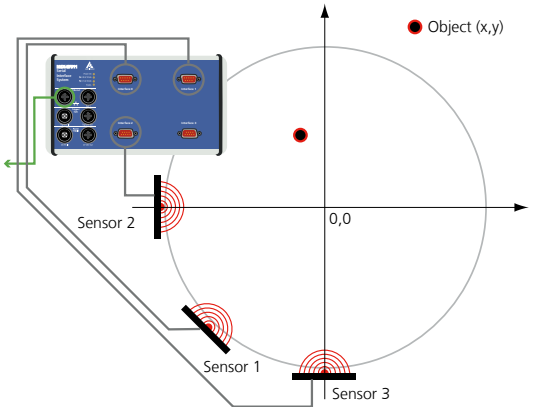
Data collector

Via the RS485 interface, the Modbus RTU protocol can be used. For example, temperature sensors featuring an integrated Modbus RTU interface can be read and the complete protocol interpretation can be made on the MSX-E7511 system.
It is thus possible to filter the actual user data - in this case temperature data - and to transmit only this data or to store it in a database.

Onboard calculation

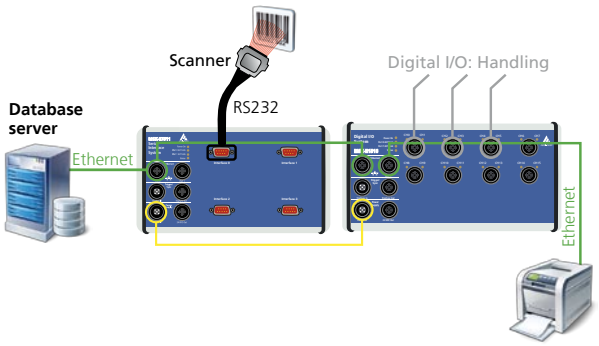
As the system can be programmed, it is possible to effect calculations with the different ports.
Example:
Using a radar sensor, the position of an object is to be displayed.
The sensors indicate the distance via RS422.
Three sensors are used:
- Sensor 1 as a reference to control whether there is an object or not.
- Sensor 2 and 3 for establishing the position of the object.

On the MSX-E7511 system, the interface data is read and interpreted.
The position of the object is obtained through calculation of the values of sensor 2 and 3 (e.g. as x/y value). Sensor 1 is used to validate the result.
The MSX-E7511 system transmits then only the position data to the Client.



Selft-sufficient unit

Using further systems from the MSX-E product range, the MSX-E7511 system can also be used as a self-sufficient unit.
Example:
Components are acquired via a scanner (RS232). The MSX-E7511 system reads the barcode and sends the corresponding commands for the processing of the components to a MSX-E1516 Ethernet digital I/O system (handling) and a printer (marking).
There is thus no need for an additional PLC or PC.



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ConfigTools

The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

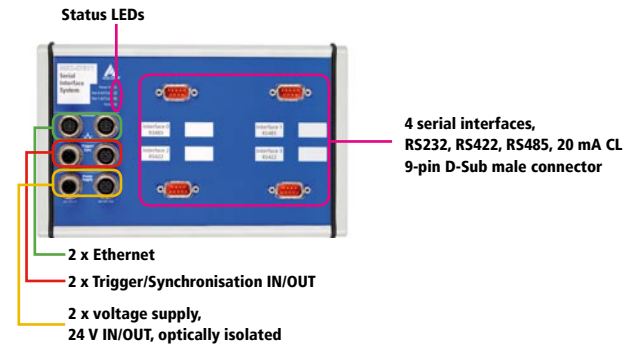
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E7511:

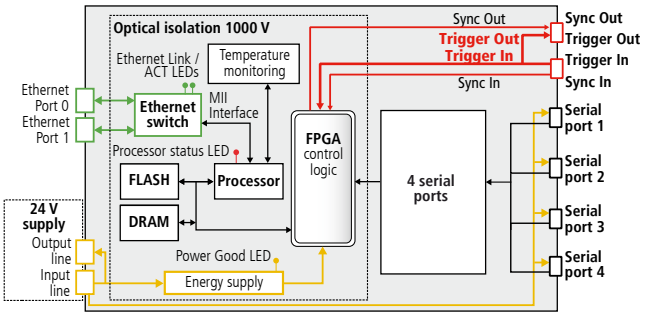
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration

Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.

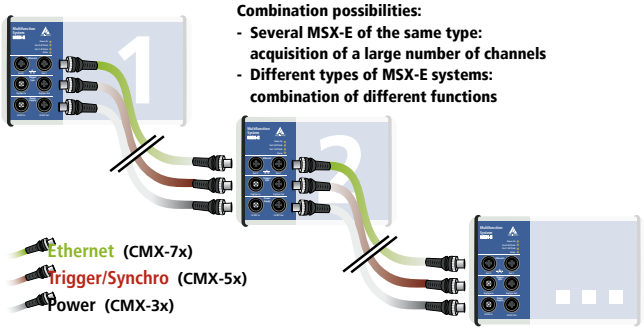
Features



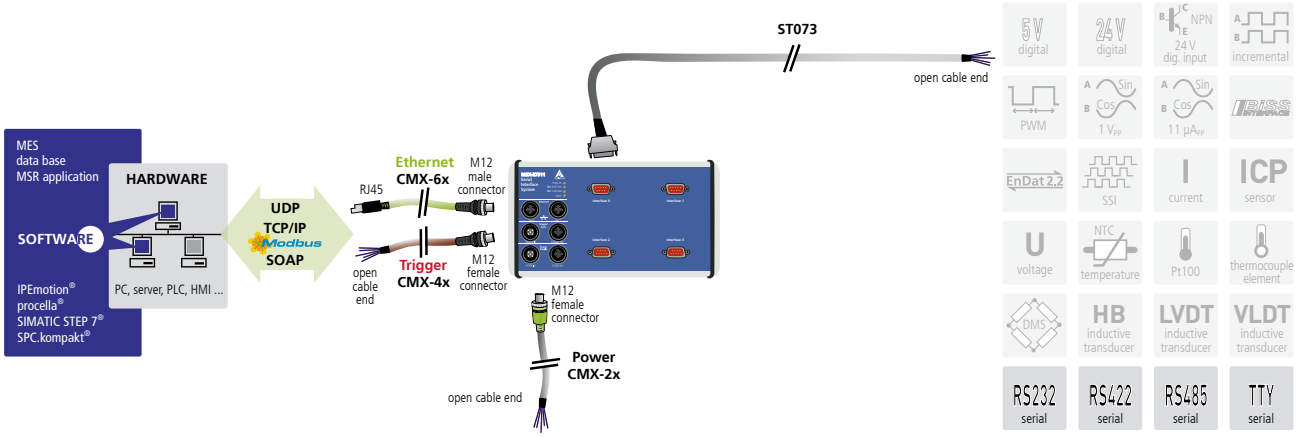
Simplified block diagram



Cascading



ADDI-DATA connection technology



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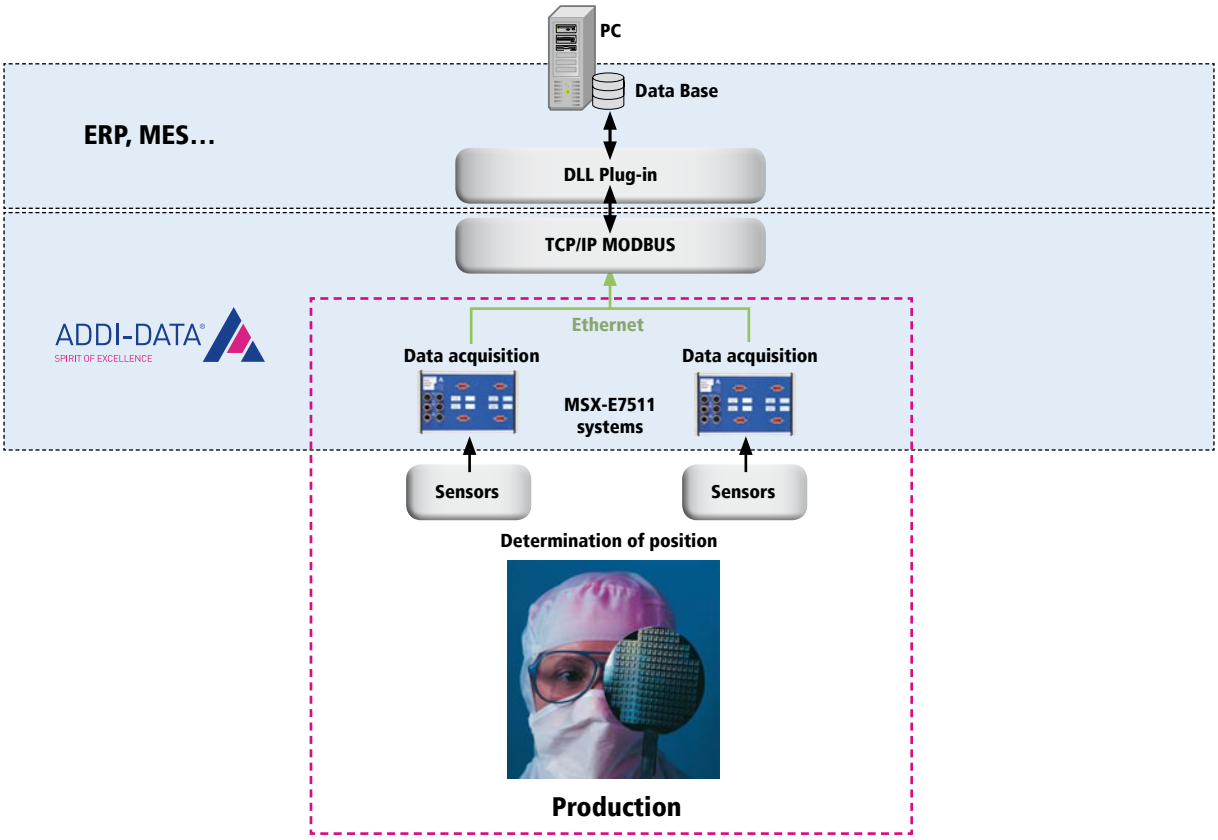

Specifications

Serial interfaces

Number of ports:	4
Mode:	RS232, RS422, RS485, 20 mA Current Loop (active, passive) with optical isolation
Configuration:	at ordering
Optical isolation:	1000 V
Transmission mode:	Asynchronous, full or half duplex
Addressing:	Automatic
Memory:	128-byte FIFO memory for sender and receiver
Transfer rate:	Programmable up to 115.2 kBaud Any Baud rate up to 1 MBaud on request
Protocol:	5-, 6-,7- or 8-bit character 1,1½ or 2 stop bits
Parity:	Even, odd, none, mark, space
Connectors:	4 x 9-pin D-Sub male connector

Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 31.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	220 mm x 140 mm x 50 mm
Weight:	620 g
Degree of protection:	IP 65
Current consumption:	150 mA ± 10 % typ. in idle/power save
Operating temperature:	-40 °C to +85 °C

Ordering information

MSX-E7511

Ethernet system for serial interfaces, 4 ports for RS232, RS422, RS485 or 20 mA CL. Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E7511-XXXX

A: RS232, optically isolated
B: RS422, optically isolated
C: RS485, optically isolated
D: 20mA CL

Example: **MSX-E7511-AACC**
Port 1 = RS232, Port 2 = RS232, Port 3 = RS485, Port 4 = RS485

Connection cables

For serial interfaces
Open cable end, 9-pin D-Sub female connector
ST073-RS232 (A): RS232 cable
ST073-RS422 (B): RS422 cable
ST073-RS485 (C): RS485 cable
ST073-CL (D): 20mA CL cable

Voltage supply
CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro
CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65
CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet
CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector
CMX-7x: For cascading, CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs
MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V
MX-Rail (please specify when ordering!), **MX-Screw**

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Database interface software
Ethernet-based, no programming needed

DatabaseConnect

Measurement data stored in databases

Standard Ethernet for easy integration

Ease of use: No programming needed

Processing of measurement data

Filtering of measurement values

Easy parameterising of MSX-E systems via website

on request

Features

Description

- Program for storing measurement data in databases
- Easy to use
- Based on the latest technology (XML, SOAP, etc.)
- Ideal addition to the MSX-E systems as interface between field and IT levels
- Data transfer via standard Ethernet
- No programming needed
- Raw data is converted into real values
- Optional filtering of values

Functions

- **First Steps**
  DatabaseConnect First Steps are easy-to-follow instructions for creating a project
- **Storage function**
  for storing DatabaseConnect projects
- **Parameterisation function**
  Measurement parameterisation and system configuration via the website of the MSX-E systems
- **Calculation function**
  Measurement data is converted into "real values," e.g. a 0..10 V standardised signal into fill level [%], pressure [bar], etc.
- **Scan function**
  Easy detection and selection of MSX-E systems present in the network
- **Database function**
  for creating and configuring databases
- **Data monitoring** (Live values)
- **Error analysis** (Log files)
- **Export** as .txt, .csv or .xml files
- **Direct connection of databases**:
  MS SQL Server©, mySQL, MS Access©

Licence conditions

- 1 PC
- a maximum of 20 MSX-E systems

Extras

- Language versions on request
- Multi-user/server licence on request

Examples of use

- Acquisition of machine data, e.g. number of produced pieces, downtime, etc.
- Temperature data logger, e.g. in server rooms
- Documentation of production data and quality parameters in databases
- Company-wide availability of measurement data

Scope of delivery

The program is supplied on a CD-ROM including a quick installation manual and an online tutorial.

First Aid Functions

Online help, tutorial, First Steps

Read further information about the current software version on the internet at www.addi-data.com

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Specifications

Program features

DatabaseConnect:	Single-user licence
Data processing:	Measurement data is read, converted, calculated and stored
Language:	English Other languages on request

Database connection

File format:	.txt, .csv, .xml
Databases:	Microsoft SQL-Server, mySQL, MS Access® Other databases on request

System features

Memory space:	min. RAM of 512 MB, 1 GB recommended
Processor:	min. CPU of 700 MHz, 2 GHz recommended
Hard drive:	min. HDD of 350 MB (300 MB for .Net and 50 MB for DatabaseConnect)
Operating system:	Microsoft Windows 2000 Microsoft Windows XP (32-bit) Microsoft Vista (32-bit) Microsoft Windows 7 (32-bit) Linux on request
Monitor screen resolution:	min. 1024 x 768 pixels

MSX-E system compatibility

Ethernet systems		DatabaseConnect compatible
MSX-E1516:	Digital I/O system, 16 digital I/O	yes
MSX-E1516-NPN:	Digital I/O system, 16 digital I/O	on request
MSX-E1516-5V-Input:	Digital I/O system, 16 digital I/O:	
MSX-E1701:	Multifunction counter system, digital I/O	on request
MSX-E1711:	Multifunction counter system, sin/cos, digital I/O	on request
MSX-E1721:	Multifunction counter system, sin/cos, digital I/O	on request
MSX-E1731:	Multifunction counter system, digital	on request
MSX-E1741-1VPP:	Multifunction counter system, digital	on request
MSX-E3121:	Analog input system	yes, max. 1 kHz/channel
MSX-E3122:	Multifunction system, analog I/O	on request
MSX-E3011:	Analog input system	yes, max. 1 kHz/channel
MSX-E3021:	Analog input system	yes, max. 1 kHz/channel
MSX-E3027:	Analog input system	yes, max. 1 kHz/channel
MSX-E3017:	Force distance measurement system	on request
MSX-E3317:	Force distance measurement system	on request
MSX-E3211:	System for temperature acquisition	on request
MSX-E3311:	System for pressure acquisition	on request
MSX-E3601:	System for the acquisition of dynamic signals	on request
MSX-E3601-2:	System for the acquisition of dynamic signals	on request
MSX-E3711:	System for length measurement, 24-bit, simultaneous	on request
MSX-E3701-x:	System for length measurement	on request
MSX-E3700:	System for length measurement	on request
MSX-E7511:	System for length measurement	on request

DatabaseConnect

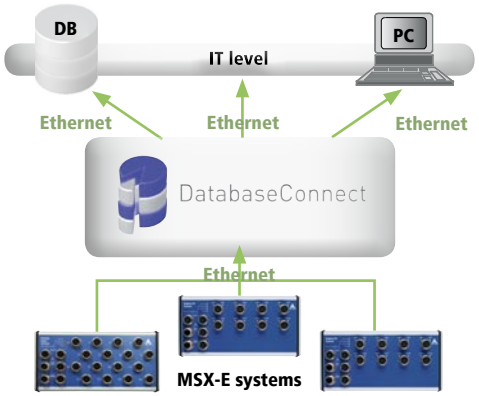
Use cases

Use Case 1: If no database is used and none is to be generated, DatabaseConnect can store the measurement data in files like for example .txt , .csv or .xml format.

Use Case 2: If a database which already exists is to be used (SQL©, mySQL, etc.), DatabaseConnect stores the measurement data directly into it.

Use Case 3: If a database is not yet available, but the data is to be stored in one, DatabaseConnect can generate an (open source) mySQL database and use it.

Data flow with DatabaseConnect



How DatabaseConnect works

Field level MSX-E systems	DatabaseConnect	IT level
Raw data (on data server) for example Channel 1: 0…10 V Channel 2: ± 10 V … Channel 20: off Channel 21: on ... Channel n: 4…20 mA	Parameterisation of the acquisition Monitoring Database management Processing the measurement data Storing the configuration (backup)	Time stamp Channel 1: Fill level in % Channel 2: Pressure in bar … Channel 20: Fan 1 off Channel 21: Door A open ... Channel n: humidity in %

Ordering information

DatabaseConnect

Database interface software, Ethernet-based, no programming needed

Versions

DatabaseConnect

Version 1.1: CD-ROM incl. Quick Installation and online manual

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ADDI-DATA®
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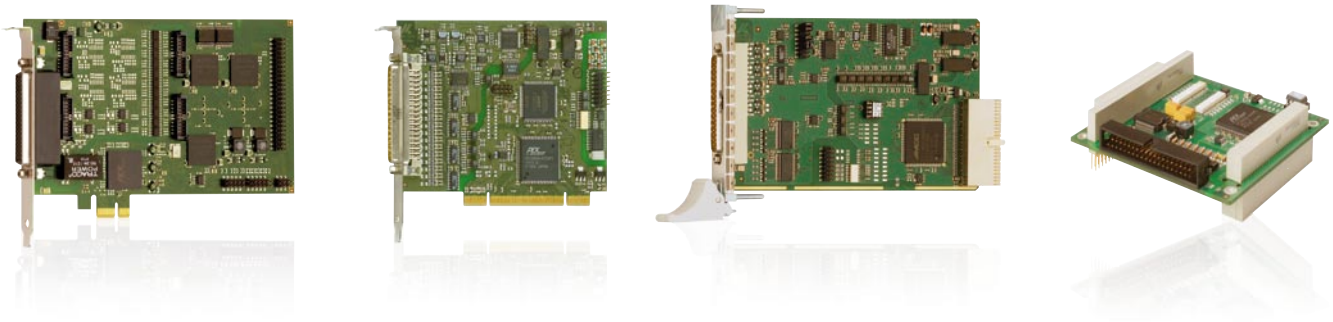
INTERFERENCE FREE PC BOARDS

Performance and reliability in the industrial environment



With the sophisticated and reliable ADDI-DATA PC boards, your measurement and automation tasks will be a success! High quality products, well thought-out design concepts and robust constitution guarantee a reliable function of ADDI-DATA PC boards in a harsh industrial environment.

For more than 25 years ADDI-DATA has been developing interference-free PC boards for industrial measurement and automation and offers a wide range of solutions for PCI-Express, PCI and CompactPCI-bus:

- Digital I/O
- Analog I/O or multifunction boards
- Serial interfaces
- Multifunction counter boards
- Motion control boards

For a safe and reliable use in your application, ADDI-DATA PC boards are protected by numerous protective circuits like optical isolation, filters, protection against short-circuits etc.

Bespoke solutions

Benefit from our know-how and our experience and improve the efficiency of your application with our customised solutions. We will be glad to help you – from a small adaptation of a standard product to the complete development of a new product.

Examples:

- Adaptation of the signal type, for example 12 V instead of 24 V
- Firmware adaptation
- Drivers for specific operating systems

Unique applications due to FPGA technology

A FPGA component has a programmable logic on which you can save your own algorithms in order to adapt the functionality of the PC board to your requirements. This adaptation makes your PC board unique and improves the performance of your applications. The onboard algorithms reduce the cycle time of signal acquisition and of regulation tasks.

Many ADDI-DATA boards come with a FPGA component. Use the full potential of your PC board hardware and software resources and thus accelerate your processes.

MORE PERFORMANCE WITH ADDI-DATA PC BOARDS

- Simplified application design
- Faster processes through FPGA technology
- High-precision measurement results
- Individual customisation
- Safe investments through long-term availability

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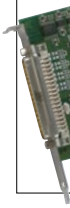


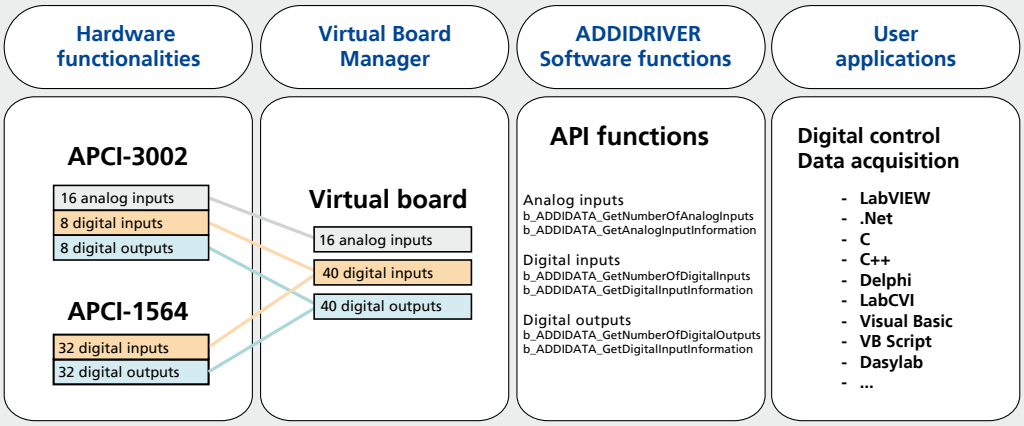
Fast and easy application design

ADDI-DATA PC boards are supplied with an extensive software package for a fast and convenient integration into your application: the clever driver concept ADDIPACK, a wide range of drivers and samples and a configuration tool assist you from the beginning.

ADDIPACK: welcome to the virtual world

For an easy administration of the boards installed in the PC ADDI-DATA has developed a convenient driver system that lists the functionalities of all boards inside your PC on a virtual board. This means that you do not administrate PC boards but functionalities, in principle like a resource.

Thus you can easily exchange or add new boards.
Changes in the functionalities due to exchanges are immediately visible.
An installation of new drivers, for example in case of replacement of PCI boards by PCI-Express boards, is not necessary.



The ADDIPACK concept

The ADDIPACK software is organised in two parts:
ADDIDRIVER (ADDIDATA.DLL): The library contains all API functions for the control of ADDI-DATA boards.
ADDEVICE MAPPER and ADDEVICE MANAGER: With these programs, you can administrate the functionalities of the virtual board. The programs help you by showing a clear visualisation of the virtual board.

These two principles are the interface between ADDI-DATA boards and your application.

Supported functionalities

- Digital inputs and outputs
- Analog inputs and outputs
- Temperature measurement
- Pressure measurement
- Resistance measurement
- Inductive sensors
- Timer/ watchdog/ counter

Numerous drivers and samples

ADDI-DATA boards come with drivers and samples, software packages and compilers for the most common operating systems like Linux, Windows 7/ Vista/XP/2000, LabVIEW, etc.

For time-critical tasks ADDI-DATA offers real-time drivers for Linux and Windows (RTX, VxWorks). They allow an easy integration of our boards into real-time systems.

Linux drivers

In the sector of automation, Linux allows an easy and cost-effective realisation of highly-efficient systems. Depending on the board type, our Linux drivers are available for Kernel 2.4, 2.6 or 3.0.

The driver model is based on 2 levels: the user level and the Kernel level. The source code of all drivers is included, allowing you to adapt the drivers to your personal requirements.

Practical simulation

In order to simplify the initiation of our boards the drivers come with numerous programming examples. They allow you to parameterise the inputs and outputs of your process and to simulate it practically. Complete measurement, control and regulation processes can be developed fast and easily.

Fast integration in LabVIEW

LabVIEW drivers are available for numerous ADDI-DATA PC boards. They enable a fast and convenient parameterisation of your measurement boards with LabVIEW.

Individual driver adaptations

You cannot find the drivers you need on our website? You need a driver adaptation for your application? Our experts will be glad to advise you. Just call us!

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ADDI-DATA®
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Prepared for the future

Realise your future PC-based applications with efficient and robust PCI Express boards by ADDI-DATA.

The boards of the APCIe-xxxx series are intended for use in an industrial environment: They are equipped with numerous protective circuits like filters, optical isolation, protection against overvoltage and short-circuits, etc. Thus they ensure a reliable and smooth operation, particularly in case of dangerous interferences like voltage peaks or high currents.
With the ADDI-DATA PCI Express boards, you secure your investments in the long term.

Simplified application design

ADDI-DATA PCI Express boards come with useful software tools for a fast and convenient integration into your application:
The ingenious driver concept ADDIPACK (see page 75), a wide range of drivers and samples and a configuration tool assist you from the beginning.

Shorter cycle times through FPGA technology

PCI Express boards with FPGA components reduce the cycle time of signal acquisition and regulation tasks. Use the full hardware and software capacity of your board and accelerate your processes. In the product overview, PCI Express boards with FPGA component are indicated.

Upgrade from PCI to PCI Express

Your application is running with ADDI-DATA PCI boards and you would like to upgrade to PCI Express boards? Our PCI Express follow-up models are functionally compatible with our PCI boards. Benefit from the new technologies and the new efficient FPGA components that we have added to our PCI Express boards.
Any questions on compatibility?
Contact us! +49 7229 1847-0 or per e-mail at info@addi-data.com.

YOUR BENEFITS

- Higher data transmission rate
- Shorter cycle times through FPGA technology
- Simplified application design
- Safe operation in an industrial environment
- Long term availability
- Fast upgrade from PCI to PCI Express
- Free loan period.

HIGH LEVEL OF PROTECTION

- Optical isolation from 500 V to 1000 V
- Separation of analog and digital signals
- Protection against short-circuits, overtemperature, overvoltage
- Filters for the inputs and outputs
- Industry-standard D-Sub connectors

READY FOR HARSH INDUSTRIAL ENVIRONMENT

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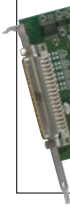

New!

PCI EXPRESS®	Digital								Counter	Analog			Watchdog	Serial Interfaces*
	APCIe-1502	APCIe-1501	APCIe-1532	APCIe-1532-12V	APCIe-1516	APCIe-1564	APCIe-1564-5V / APCIe-1564-5V-HS	APCIe-2200	APCIe-1711	APCIe-3121 / APCIe-3123	APCIe-3021	APCIe-3521	APCIe-040	APCIe-7xxx
PCI Express bus	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FPGA	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Filter and protective circuits	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
Optical isolation	1000 V		1000 V		1000 V	1000 V	1000 V	1000 V	1000 V	500 V	500 V	500 V	1000 V	optional
Digital, 24 V / 12 V / 5 V														
Input channels, *incl. interruptible*	16 *15*		16 *15*		8	32 *16*	32 *16*	16 *15*		4 *1*	4 *1*	4 *1*	8	
24 V / 12 V / 5 V	24 V		24 V	12 V	24 V	24 V	5 V	24 V	24 V	24 V	24 V	24 V	24 V	
Output channels, 24 V / 5 V	16, 24 V		16, 24 V		8, 24 V	32, 24 V	32, 5 V			4, 24 V	4, 24 V	4, 24 V		
Output current per channel	500 mA (typ.)		500 mA (typ.)		500 mA (typ.)	500 mA (typ.)	50 mA	Relays 2A		65 mA (typ.)	65 mA (typ.)	65 mA (typ.)	Relays 2 A	
Relays								16					8	
Watchdog / Timer	1 watchdog/ timer + 1 timer (12-bit)		1 watchdog/ timer + 1 timer (12-bit)		1 watchdog	1 watchdog/ timer + 1 timer (12-bit)	1 watchdog/ timer + 1 timer (12-bit)	1 watchdog	–	1 watchdog/ timer + 1 timer (16-bit)	1 timer (16-bit)	1 watchdog/ timer + 1 timer (16-bit)	7	–
Counter	2 x 16-bit	1 x 16-bit	2 x 16-bit		–	3 x 32-bit	3 x 32-bit	–	–	–	–	–	–	–
Reprogrammable function modules														
– *Incremental counter,* – *SSI synchronous serial interface,* – *Counter/timer,* – *Pulse acquisition,* – *Frequency, pulse width, period duration measurement, PWM* – *dig. in- and outputs* – *BiSS-B, BiSS-C* – *Parallel interface* – **New:** *EnDat 2.2* – **New:** *Sin/Cos ...*									4					
Input frequency									Up to 5 MHz **New:** 10 MHz					
Signals									TTL, RS422, 24 V					
Analog														
Analog inputs, 16-bit										16 / 8 SE or 8 / 4 diff.	16 / 8 SE or 8 / 4 diff.			
Throughput (kHz)										100	100			
Voltage range										0-10 V ± 10 V	0-10 V ± 10 V			
Current inputs (option)										0(4)-20 mA	0(4)-20 mA			
Gain 1, 2, 5, 10										1, 2, 5, 10	1, 2, 5, 10			
Trigger (software / 24 V)										✓	✓			
Analog outputs, 16-bit										8 or 4		8 or 4		
0-10 V / ± 10 V										✓		✓		
Current outputs										0-20 mA		0-20 mA		
Serial interfaces (base boards)														1 / 2 / 4 / 8 ports
Operating mode configuration through SI modules														RS232, RS422, RS485, 20 mA CL
Software	Current driver list on the web: **www.addi-data.com**													
Page	118		118		120	122	124	126	128	134	136	138	140	142

*Base Boards

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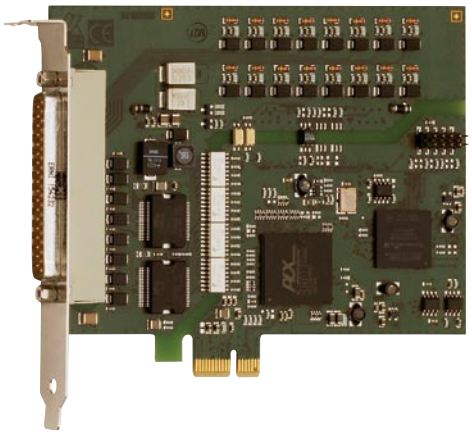
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V, for PCI Express

New!* 12 V version



APCIe-1532 / APCIe-1532-12V / APCIe-1502 / APCIe-1501

PCI Express interface

16 digital inputs, 24 V / 12 V, including 15 interruptible inputs

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry-standard D-Sub connector

RoHS 2002/95/EC

Also for PCI
See APCI-1500, page 154

Also for CompactPCI™
See CPCI-1500, page 232

Also for PC/104-PLUS
see PC104-PLUS1500 page 214

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

*Preliminary product information

Features

Inputs

- 16 optically isolated inputs, 24 V (APCIe-1532 / APCIe-1502 / APCIe-1501) or 12 V (APCIe-1532-12V) incl. 15 interruptible inputs
- Channel 0 can be used as a 16-bit counter input (up to 100 kHz)
- Reverse voltage protection
- All inputs are filtered

Outputs

- 16 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

Timer / Counter

- 2 timers (12-bit resolution)
- 1 timer can be used as watchdog
- 1 counter (APCIe-1502: 2 counters)

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications

- Industrial I/O control
- PLC coupling
- Reading of encoder values for process control
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- Interface to machines

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

ADDIPACK functions:

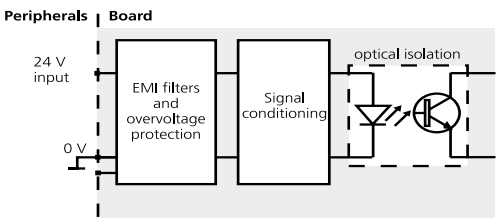
- Digital input • Digital output • Watchdog
- Timer • Counter

On request:

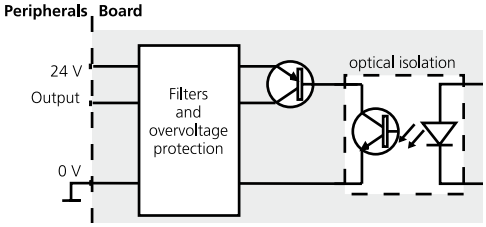
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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Specifications*

Digital inputs

Number of inputs:	16 digital inputs,	
(common ground	channel 0 can be used as a 16-bit counter input	
acc. to IEC 1131-2)	(up to 100 kHz) / APCIe-1502: channel 0 and 1	
Interruptible inputs:	15 channels (channel 1 to 15)	
Optical isolation:	1000 V through opto-couplers, from PC to peripheral	
Nominal voltage:	24 V (APCIe-1532, -1502, -1501 / 12 V (APCIe-1532-12V)	
Input current:	**at 24 V**	**at 12 V (APCIe-1532-12V)**
Channel 0 or 0-1:	6.6 mA typ.	3.2 mA typ.
Channel 1-15 or 2-16:	2 mA typ.	1.5 mA typ.
Input frequency (max.):	**at 24 V**	**at 12 V (APCIe-1532-12V)**
Channel 0 or 0-1:	100 kHz	100 kHz
Channel 1-15 or 2-16:	5 kHz	5 kHz
Logic input levels:	**at 24 V**	**at 12 V (APCIe-1532-12V)**
UH (max.):	30 V	16 V
UH (min.):	19 V	9 V
UL (max.):	14 V	6 V
UL (min.):	0 V	0 V
Filters/protective circuit:	Input filters, transil diode, RC filters, Z diode, opto-couplers	

Digital outputs

Number of outputs:	16 digital outputs
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral
Nominal voltage:	24 V
Supply voltage range:	11 to 36 V
Current limit:	1.5 A per 8 channels (through PTC)
Output current per output:	500 mA (typical)
Short-circuit current per output:	1.5 A (typ.) pulse current shutdown at 24 V, R_{load}<0.1 Ω
RDS ON resistance:	max. 0.2 Ω at 25 °C
Switch-on time:	I_{out}=0.5 A, load = resistance: 50 µs
Switch-off time:	I_{out}=0.5 A, load = resistance: 75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Timer/watchdog

Timer:	2 x 12-bit timers, 1 up to 4095 µs, ms, s 1 timer can be used as watchdog.

Safety

Shutdown logic (V_{CC} diagnostic):	When the ext. 24 V voltage drops below 7 V: The outputs are switched off.
Watchdog:	For resetting the outputs to "0"
Common diagnostics:	For all 16 channels at overtemperature of one channel

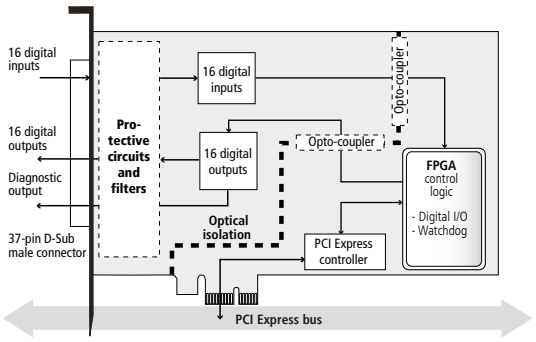
EMC – Electromagnetic compatibility

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.

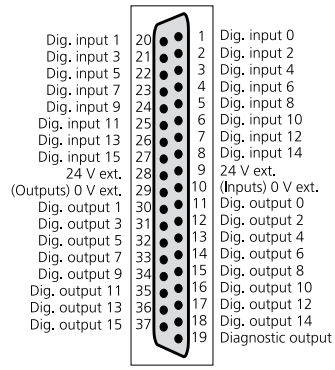
Physical and environmental conditions

Dimensions:	149 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V from PC
Current consumption:	Inputs and outputs inactive 320 mA ± 10 %, typical 8 inputs and outputs active 400 mA ± 10 %, typical 16 inputs and outputs active 470 mA ± 10 %, typical
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

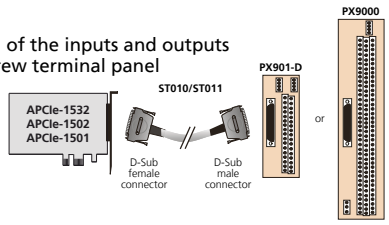


Pin assignment – 37-pin D-Sub male connector



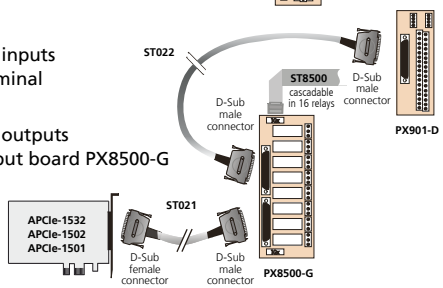
ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panel



Example 2
Connection of the inputs through screw terminal panel PX901-DG

Connection of the outputs through relay output board PX8500-G



Ordering information

APCIe-1532 / APCIe-1532-12V / APCIe-1502 / APCIe-1501

Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V, for PCI Express. Incl. technical description and software drivers.

APCIe-1532: 16 inputs, 24 V, 16 outputs, 11-36 V, 1 counter
APCIe-1532-12V: 16 inputs, 12 V, 16 outputs, 11-36 V, 1 counter
APCIe-1502: 16 inputs, 24 V, 16 outputs, 11-36 V, 2 counters
APCIe-1501: 16 inputs, 24 V, 16 outputs, 11-36 V, 1 counter
(APCI-1501 firmware compatible with APCI-1500, direct replacement possible)

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, with LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents
ST021: Round cable between APCIe-15x2 and PX8500-G, shielded, twisted pairs, 2 m
ST022: Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

* Preliminary product information

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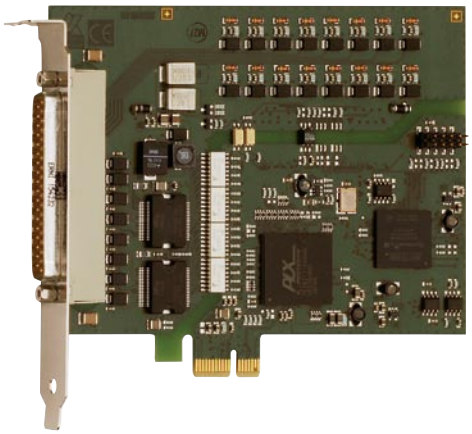
Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V, for PCI Express



APCIe-1516

PCI Express interface

8 digital inputs, 24 V

8 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry standard D-Sub connector

RoHS 2002/95/EC

Also for PCI

See APCI-1516, page 148

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Features

Inputs

- 8 optically isolated inputs, 24 V
- Reverse voltage protection
- All inputs are filtered

Outputs

- 8 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 1.5 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to"0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~ 1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- External 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Separate ground line for inputs and outputs
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Watchdog for the outputs

Applications

- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays

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

ADDIPACK functions:

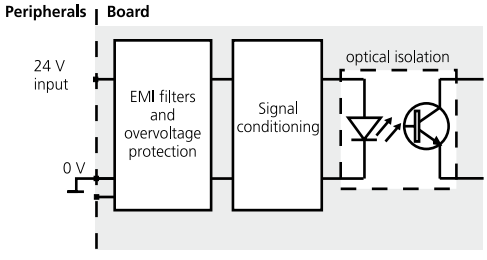
- Digital input • Digital output • Watchdog

On request:

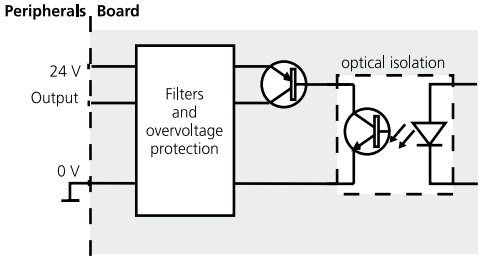
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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Specifications

Digital inputs

Number of inputs: (common ground acc. to IEC 1131-2)	8 digital inputs	
Optical isolation:	1000 V through opto-couplers, from PC to peripheral	
Nominal voltage:	24 V	
Input current:	Channel 0-7:	2 mA at 24 V, typical
Input frequency (max.):	Channel 0-7:	5 kHz at 24 V
Logic input levels:	UH (max.):	30 V
	UH (min.):	19 V
	UL (max.):	14 V
	UL (min.):	0 V
Filters/protective circuit:	Input filters, transil diode, RC filters, Z diode, opto-couplers	

Digital outputs

Number of outputs:	8 digital outputs
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral
Nominal voltage:	24 V
Supply voltage range:	11 to 36 V
Current limit:	1.5 A for all channels (through PTC)
Output current per output:	500 mA (typical)
Short-circuit current per output	1.5 A (typ.) pulse current shutdown at 24 V, R_{load}<0.1 Ω
RDS ON resistance:	max. 0.2 Ω at 25 °C
Switch-on time:	I_{out}=0.5 A, load = resistance: 50 µs
Switch-off time:	I_{out}=0.5 A, load = resistance: 75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Safety

Shutdown logic (V_{CC} diagnostic):	When the ext. 24 V voltage drops below 7 V: The outputs are switched off.
Watchdog:	For resetting the outputs to "0" Time units: 1 up to 4095 µs, ms, s
Diagnostics:	Common Diagnostics for all 8 channels at overtemperature of one channel

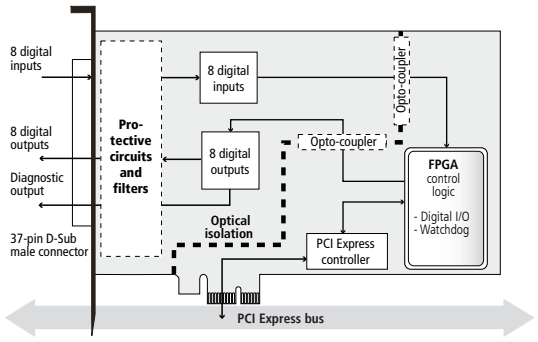
EMC – Electromagnetic compatibility

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.

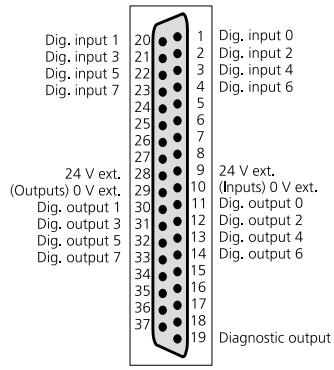
Physical and environmental conditions

Dimensions:	149 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V from PC
Current consumption:	Inputs and outputs inactive 320 mA ± 10 %, typical 8 inputs and outputs active 400 mA ± 10 %, typical
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

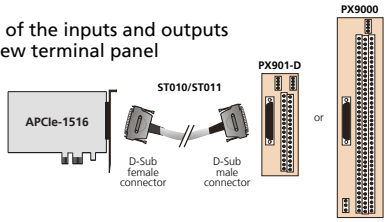


Pin assignment – 37-pin D-Sub male connector



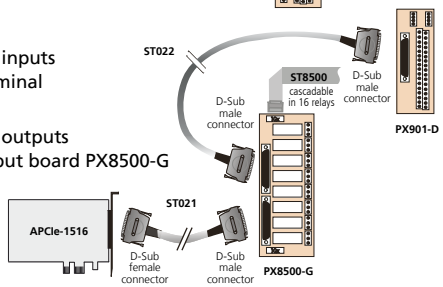
ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panel



Example 2
Connection of the inputs through screw terminal panel PX901-DG

Connection of the outputs through relay output board PX8500-G



Ordering information

APCIe-1516

Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V, for PCI Express. Incl. technical description and software drivers.

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, with LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents
ST021: Round cable between APCIe-1516 and PX8500-G, shielded, twisted pairs, 2 m
ST022: Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

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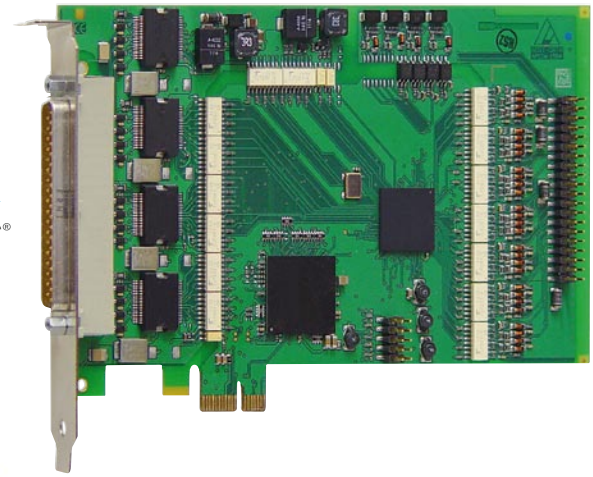
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V, for PCI Express

New!*



APCIe-1564

PCI Express interface

32 digital inputs, 24 V,
including 16 interruptible inputs

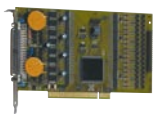
32 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry-standard
D-Sub connector

RoHS 2002/95/EC



Also for PCI
See APCI-1564, page 150

Windows
64/32-bit drivers

on request

LabVIEW™
on request

Features

Inputs
- 32 optically isolated inputs, 24 V, incl. 16 interruptible inputs
- Channels 0–2 can be used as 32-bit counter inputs (up to 500 kHz)
- Reverse voltage protection
- All inputs are filtered

Outputs
- 32 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

Timer / Watchdog / Counter
- 2 timers (12-bit), of which one can be used as a watchdog
- 3 counter (32-bit)

Safety features
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications
- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- ...

Software drivers

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

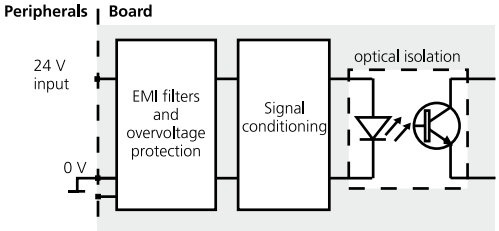
Standard drivers for:
- Linux
- 32-bit drivers for Windows 8 / 7 / Vista / XP / 2000
- Signed 64-bit drivers for Windows 8 / 7 / XP
- Real-time use with Linux and Windows on request

Drivers and samples for the following compilers and software packages:
- C#.NET, C

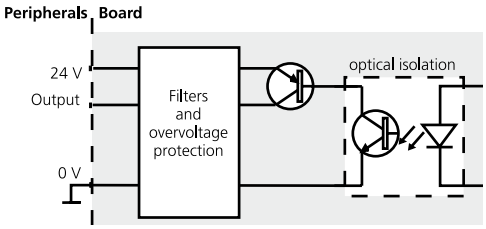
On request:
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



*Preliminary product information

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Specifications*

Digital inputs

Number of inputs:	32 digital inputs,		
(common ground	channel 0-2 can be used as 32-bit counter inputs		
acc. to IEC 1131-2)	(up to 500 kHz)		
Interruptible inputs:	16 channels (channel 4 to 19)		
Optical isolation:	1000 V through opto-couplers, from PC to peripheral		
Nominal voltage:	24 V		
Input current:	Channel 0-3:	6.6 mA	at 24 V, typical
	Channel 4-31:	2 mA	at 24 V, typical
Input frequency (max.):	Channel 0-2:	500 kHz	at 24 V
	Channel 3-31:	5 kHz	at 24 V
Logic input levels:	UH (max.):	30 V / 3.1 mA, typical (channel 4-31)	
	UH (min.):	19 V / 1 mA, typical (channel 4-31)	
	UH (max.):	30 V / 11 mA, typical (channel 0-3)	
	UH (min.):	19 V / 3.4 mA, typical (channel 0-3)	
	UL (max.):	14 V / 0.1 mA, typical	
	UL (min.):	0 V / 0 mA, typical	
Filters/protective circuit:	Input filters, transil diode,		
	RC filters, Z diode, opto-couplers		

Digital outputs

Number of outputs:	32 digital outputs
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral
Nominal voltage:	24 V
Supply voltage range:	11 to 36 V
Current limit:	1.5 A per 8 channels (through PTC)
Output current per output:	500 mA (typical)
Short-circuit current per output:	1.5 A (typ.) pulse current shutdown at 24 V, R_{load}<0.1 Ω
RDS ON resistance:	0.2 Ω at 25 °C
Switch-on time:	I out=0.5 A, load = resistance: 50 µs
Switch-off time:	I out=0.5 A, load = resistance: 75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Timer/watchdog

Watchdog:	12-bit, programmable as timer from 1µs to 4095 s

Safety

Shutdown logic (V_{CC} diagnostic):	When the ext. 24 V voltage drops below 7 V, the outputs are switched off.
Watchdog:	For resetting the outputs to „0"
Common diagnostics:	For all 16 channels at overtemperature of one channel

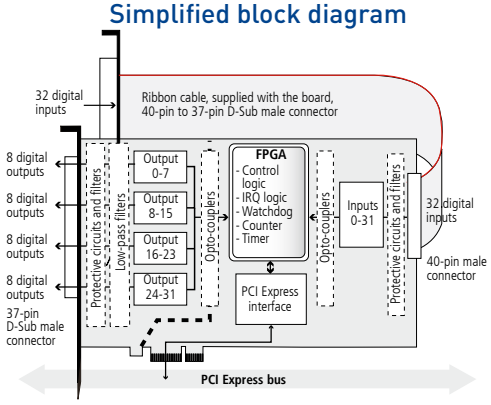
EMC – Electromagnetic compatibility

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.

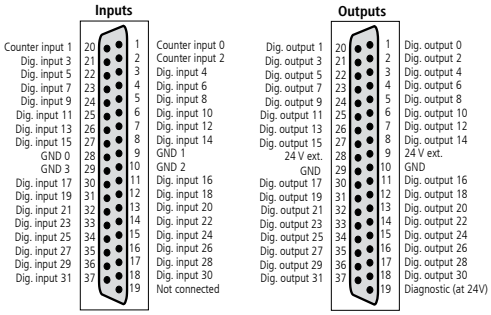
Physical and environmental conditions

Dimensions:	168 x 99 mm	
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)	
Space required:	1-/4-lane PCI Express slot	
Operating voltage:	+ 3.3 V from PC	
Current consumption:	Inputs and outputs inactive	340 mA ± 10 %, typical
	inputs and outputs active	590 mA ± 10 %, typical
Front connector:	37-pin D-Sub male connector	
Temperature range:	0 to 60 °C (with forced cooling)	

Simplified block diagram

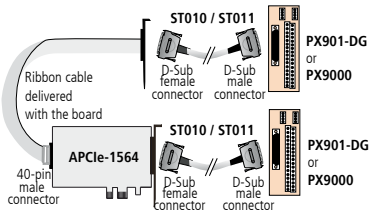


Pin assignment – 37-pin D-Sub male connector

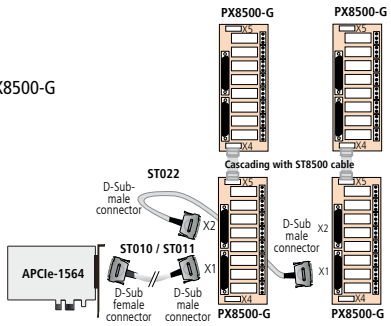


ADDI-DATA connection

Example 1:
- Connection of the inputs (Ribbon cable)
- Connection of the outputs through screw terminal panel PX901-DG or PX9000



Example 2:
Connection of the outputs with relay output board PX8500-G cascaded in 32 relays



Ordering information

APCIe-1564

Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V, for PCI Express.
Incl. technical description and software drivers.

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, with LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents
ST022: Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

* Preliminary product information

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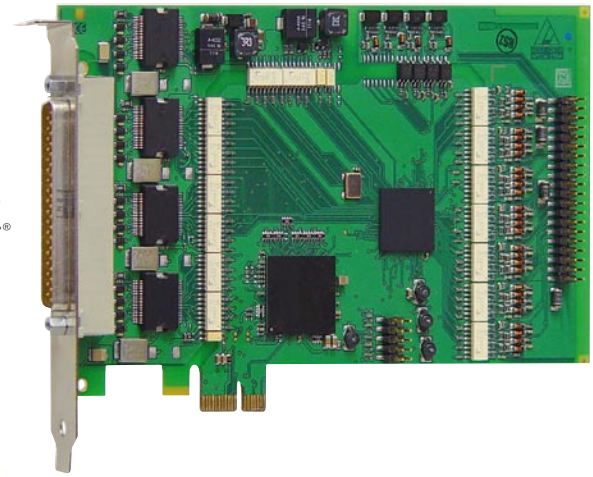
Digital I/O board, optically isolated, 64 digital inputs and outputs, 5 V, for PCI Express

New!*



APCIe-1564-5V / APCIe-1564-5V-HS

PCI Express interface

32 digital inputs, 5 V, including 16 interruptible inputs

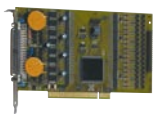
32 digital outputs, 5 V, 50 mA/channel, Open Collector (5V) or High-Side (5V-HS)

Optical isolation 1000 V

Input and output filters

Connection through industry-standard D-Sub connector

RoHS 2002/95/EC



Also for PCI
See APCI-1564, page 152

Windows
64/32-bit drivers

on request

LabVIEW™
on request

Features

Inputs

- 32 optically isolated inputs, 5 V, incl. 16 interruptible inputs
- Channels 0–2 can be used as 32-bit counter inputs (up to 500 kHz)
- Reverse voltage protection
- All inputs are filtered

Outputs

- 32 optically isolated outputs, 5 V
  APCI-e1564-5V: Open Collector outputs
  APCIe-1564-5V-HS: High-Side outputs
- Output current per channel 50 mA
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~0.5 A per 8 channels (through PTC)
- Short-circuit current per output ~0.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- External voltage supply screened and filtered

Timer / Watchdog / Counter

- 2 timers (12-bit), of which one can be used as a watchdog
- 3 counter (32-bit)

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications

- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- ...

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:

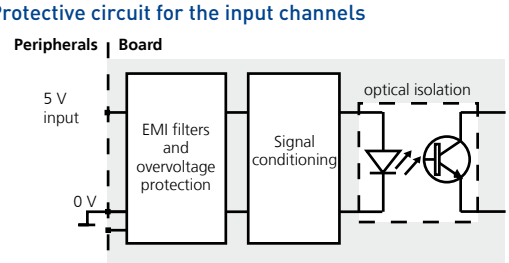
- C#.NET, C

On request:

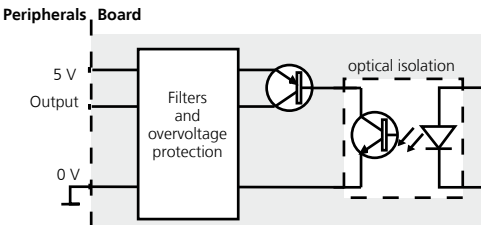
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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ADDI-DATA
SPIRIT OF EXCELLENCE

Specifications*

Digital inputs

Number of inputs: (common ground acc. to IEC 1131-2)	32 digital inputs, channel 0-2 can be used as 32-bit counter inputs (up to 500 kHz)		
Interruptible inputs:	16 channels (channel 4 to 19)		
Optical isolation:	1000 V through opto-couplers, from PC to peripheral		
Nominal voltage:	5 V		
Input current:	Channel 0-3:	8.5 mA	at 5 V, typ.
	Channel 4-31:	5.9 mA	at 5 V, typ.
Input frequency (max.):	Channel 0-3:	500 kHz	at 5 V
	Channel 4-31:	5 kHz	at 5 V
Logic input levels:	UH (max.):	6 V / 7.8 mA	typ. (channel 4-31)
	UH (min.):	4 V / 4.1 mA	typ. (channel 4-31)
	UH (max.):	6 V / 11.5 mA	typ. (channel 0-3)
	UH (min.):	4 V / 5.6 mA	typ. (channel 0-3)
	UL (max.):	2 V / 0.8 mA	typ. (channel 4-31)
	UL (max.):	2 V / 1.1 mA	typ. (channel 0-3)
	UL (min.):	0 V / 0 mA	typ.
Filters/protective circuit:	Input filters, transil diode, RC filters, Z diode, opto-couplers		

Digital outputs

Number of outputs:	32 digital outputs	
Output type:	APCIe-1564-5V:	Open Collector
	APCIe-1564-5V-HS:	High-Side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral	
Nominal voltage:	5 V	
Supply voltage range:	5 to 12 V (5V-Version) 5 to 35 V (5V-HS-Version)	
Current limit:	0.5 A (typ.) per 8 channels (through PTC)	
Output current per output:	50 mA (typical)	
Short-circuit current per output:	0.5 A (typ.)	

Timer/watchdog

Watchdog:	12-bit, programmable as timer from 1 µs to 4095 s

Safety

Watchdog:	For resetting the outputs to „0"
Common diagnostics:	For all 16 channels at overtemperature of one channel

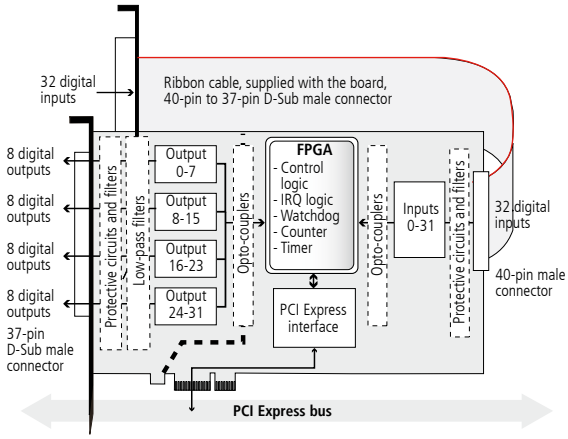
EMC – Electromagnetic compatibility

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.

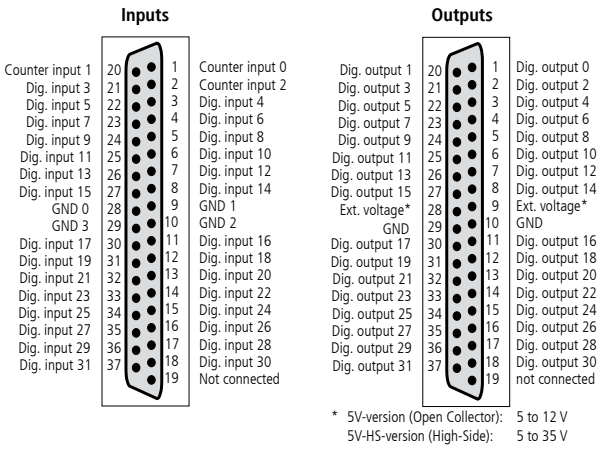
Physical and environmental conditions

Dimensions:	168 x 99 mm	
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)	
Space required:	1-/4-lane PCI Express slot	
Operating voltage:	+ 3.3 V from PC	
Current consumption:	Inputs and outputs inactive	340 mA ± 10 %, typical
	inputs and outputs active	590 mA ± 10 %, typical
Front connector:	37-pin D-Sub male connector	
Temperature range:	0 to 60 °C (with forced cooling)	

Simplified block diagram

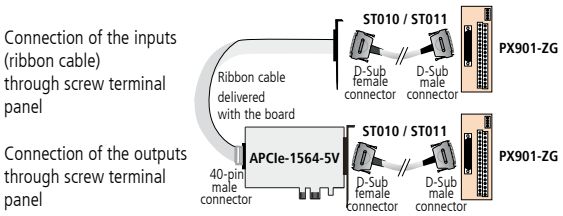


Pin assignment – 37-pin D-Sub male connector



* 5V-version (Open Collector): 5 to 12 V
5V-HS-version (High-Side): 5 to 35 V

ADDI-DATA connection



Ordering information

APCIe-1564-5V / APCIe-1564-5V-HS

Digital I/O board, optically isolated, 64 digital inputs and outputs, 5 V, for PCI Express.
Incl. ribbon cable, technical description and software drivers.

Versions

APCIe-1564-5V: 64 digital I/O, 5 V, Open Collector outputs
APCIe-1564-5V-HS: 64 digital I/O, 5 V, High-Side outputs

Accessories

PX901-ZG: Screw terminal panel for DIN rail
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

* Preliminary product information

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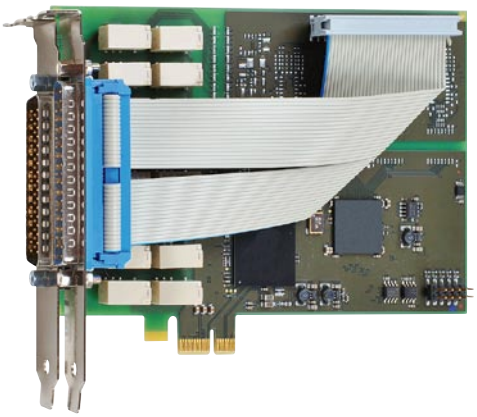
ADDI-DATA® SPIRIT OF EXCELLENCE

Relay board, optically isolated, 8/16 relays, 8/16 digital inputs, 24 V

PCI EXPRESS®



APCIe-2200

8 or 16 relay output channels

Max. switching voltage 200 VDC, 200 VAC
max. switching current 2 A

8/16 digital inputs 24 V,
incl. 7/15 interruptible inputs

Optical isolation 1000 V

RoHS 2002/95/EC

Also for PCI
see APCI-2200, page 162

Windows
64/32-bit drivers

on request

LabVIEW™

LabWindows/CVI™

Features

Relays
- 8 or 16 electromechanical relays with change-over contacts
- Max. switching voltage for the relays: 200 VDC, 200 VAC
- Max. switching capacity: 60 W, max. 2 A
- Short response time
- Watchdog: switched on/off through software

Digital inputs
- 8 or 16 inputs, optically isolated, incl. 7 or 15 interruptible inputs
- Input voltage 24 V

Safety features
- EMC tested
- Watchdog activity can be read back
- Optical isolation of the relays
- Creeping distance IEC 61010-1

Applications

- Industrial digital I/O controlling
- Automatic test equipment
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Alarm monitoring
- Machine interfacing
- ...

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

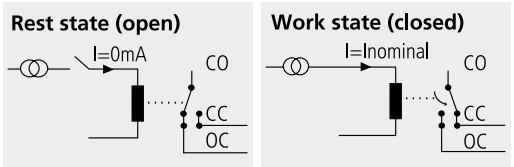
Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:
- Digital input • Digital output
- Watchdog • Timer

On request:
Further operating systems, compilers and samples.

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

Function principle of the relays



CO: Change-over contact
CC: Closing contact
OC: Opening contact

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Specifications

Relays

Type of contacts:	8/16 change-over
Max. switching voltage:	200 VDC, 200 VAC
Max. switching current:	2 A
Max. switching capacity:	60 W
Contact resistance:	< 100 mΩ
Contact material:	Ag and Au plated
Response time:	Max. 4 ms, typ. 2.5 ms
Release time:	Max. 4 ms, typ. 0.9 ms
Mechanical life:	10^8 operations
Electrical life:	10^5 operations at rated load

Digital inputs

Number of inputs:	8/16 incl. 7/15 interruptible inputs
Optical isolation:	Through opto-couplers, 1000 V
Nominal voltage:	24 V
Input current:	5 – 8 mA
Signal delay:	70 µs (at 24 V)
Maximal input frequency:	10 kHz (at 24 V)

Timer

Time settings:	16-bit, programmable, 1 µs to 65535 s

Safety

Test voltage:	1000 V
Watchdog:	For resetting the outputs to "0": 12-bit, programmable, 1 µs to 4095 s

EMC – Electromagnetic compatibility

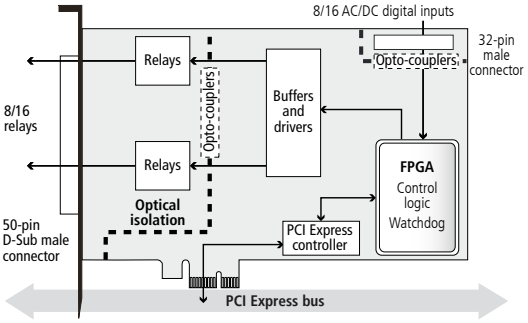
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

Dimensions:	149 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane, 1 PCI Express slot
Operating voltage:	+3.3 V from the PC
Max. current consumption:	1 A ±10 % (typ. APCIe-2200-16-16)
Front connector:	50-pin D-Sub male connector
Additional connector:	32-pin male connector. APCIe-2200-16-8/APCIe-2200-16-16: Connection with delivered ribbon cable. Connects the board to a bracket with a 37-pin D-Sub male connector. For connecting the PX901-ZG.
Temperature range:	0 up to 60 °C (with forced cooling)

Screw terminal panel PX8001
with cable ST370-16

Simplified block diagram



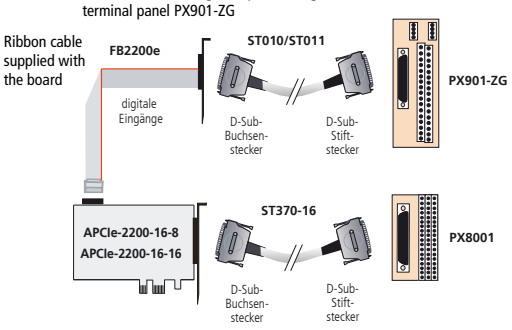
Pin assignment – 50-pin D-Sub connector
APCIe-2200-16-8/APCIe-2200-16-16

Pin		Pin		Pin		Pin
34	OC of relay 0	18	CC of relay 0	34	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	35	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	36	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41	CO of relay 7	8
42	OC of relay 8	26	CC of relay 8	42	CO of relay 8	9
43	OC of relay 9	27	CC of relay 9	43	CO of relay 9	10
44	OC of relay 10	28	CC of relay 10	44	CO of relay 10	11
45	OC of relay 11	29	CC of relay 11	45	CO of relay 11	12
46	OC of relay 12	30	CC of relay 12	46	CO of relay 12	13
47	OC of relay 13	31	CC of relay 13	47	CO of relay 13	14
48	OC of relay 14	32	CC of relay 14	48	CO of relay 14	15
49	OC of relay 15	33	CC of relay 15	49	CO of relay 15	16
50	-			50	-	17

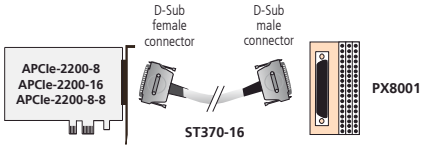
OC: Opening contact CC: Closing contact CO: Change-over contact

ADDI-DATA connection

Example 1: APCIe-2200-16-8/ APCIe-2200-16-16
- Connection of the relay outputs through screw terminal panel PX8001
- Connection of the digital inputs through ribbon cable to the screw terminal panel PX901-ZG



Example 2: APCIe-2200-8/APCIe-2200-8-8/ APCIe-2200-16
Connection of the relay outputs and the digital inputs through front connector to the screw terminal panel



Ordering information

APCIe-2200

Relay board, optically isolated, 8/16 relays, 8/16 digital inputs, 24 V. Incl. technical description and software drivers.

APCIe-2200-16-16:	16 relays, 16 dig. inputs, with ribbon cable for the connection of the digital inputs
APCIe-2200-16-8:	16 relays, 8 dig. inputs, with ribbon cable for the connection of the digital inputs
APCIe-2200-8-8:	8 relays, 8 digital inputs, 24 V
APCIe-2200-16:	16 relays
APCIe-2200-8:	8 relays

Accessories

PX8001:	3-row screw terminal panel for DIN rail
ST370-16:	Shielded round cable, 2 m
PX901-ZG:	Screw terminal panel for DIN rail

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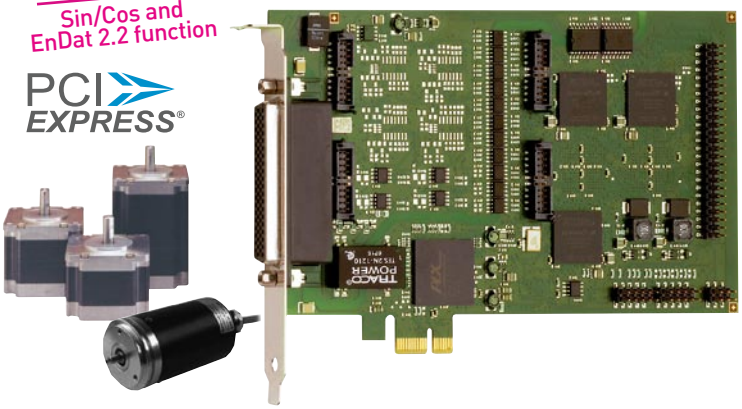
Multifunction counter board, optically isolated, fast counter inputs - programmable functions, for PCI Express

New!*
Sin/Cos and EnDat 2.2 function

PCI EXPRESS®



APCIe-1711

Available functions:
Incremental counter, SSI Synchronous Serial Interface, counter/timer, pulse acquisition, frequency, pulse width, period duration, velocity measurement, PWM, BiSS-Master, digital inputs and outputs, Sin/Cos, EnDat 2.2 ...

Function selection through software

Optical isolation

Inputs and outputs: RS422, TTL, 24 V

Customised functions

RoHS 2002/95/EC

Also for PCI
see APCI-1710
page 166

Also for CompactPCI™
see CPCI-1710
page 234

Windows
64/32-bit drivers

on request

LabVIEW™

The board APCIe-1711 is a fast multifunction and multichannel counter board for the PCI Express bus.
The strengths of this board are its wide range of applications and high precision and reliability in harsh industrial environment.
With this board you can realise many different applications on the same hardware base. The board is supplied with a pool of functions which provides the user with maximum efficiency yet minimum space and parts requirement. The functions are individually configured for each channel through the supplied software. The flexible programming facilities on this board allow many different user applications to be quickly and easily developed and reconfigured as further requirements arise. Thanks to the FPGA board structure, further counting applications can be realised through software adaptation. Contact us!

Features

- 32-bit data access
- RS422 driver with max 5 MHz max.
  (10 MHz for the APCIe-1711-10MHz – without ESD protection)
- With RS422/TTL input/output signals (APCIe-1711) or 24 V input signals (APCIe-1711-24 V)
- Four onboard function modules

Functions

- Incremental counter for the acquisition of incremental encoders (90° phase-shifted signals)
- BiSS-Master (B and C mode)
- SSI Synchronous Serial Interface. The SSI function is an interface for systems which allow an absolute position information via serial data transfer.
- Counter/timer (82C54)
- Pulse acquisition
- Frequency measurement
- Pulse width modulation (PWM)
- Period duration measurement
- Velocity measurement
- Digital inputs and outputs
- Edge time measurement (ETM)
- Parallel interface
- Sin/Cos (1 V_{pp}, 11 A_{pp})
- EnDat 2.2
- Customised functions

Available channels on one function module

- 4 channels, programmable either as digital inputs or outputs, optically isolated, RS422
- 3 channels, digital inputs, optically isolated, 24 V
- 1 digital power output, optically isolated, 24 V

Additional channels

- 28 TTL I/O, without optical isolation

Versions

	RS422/ TTL-I/O	24 V inputs	5 V inputs	24 V outputs	TTL I/O
APCIe-1711	16	12	–	4	28
APCIe-1711-24V	–	28	–	4	28
APCIe-1711-5V-I	16	–	12	4	28
APCIe-1711-10MHz	16	12	–	4	28

Safety features

- Creeping distance IEC 61010-1
- Optical isolation 1000 V
- Noise neutralisation of the PC supply

Applications

- Event counting
- Position acquisition
- Motion control
- Batch counting
- ...

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:

- Microsoft VC++ • Borland C++ 5.01

On request:

Further operating systems, compilers and samples.

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

*Preliminary product information

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Wide range of applications through the free combination of functions

4 function modules quickly and easily programmable with numerous functions

Each of the four modules is programmed with one function. You can program 4 times the same function or freely combine 4 different functions.

Configuration example 1			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
Incremental counter	Incremental counter	Pulse acquisition	Counter/Timer

Configuration example 2			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
SSI	SSI	Incremental counter	digital I/O

Programmable onboard modules

Each module can be programmed with the function of your choice. You can operate simultaneously up to 4 different functions on one board. If your application must be modified, you can load a new function quickly and easily.

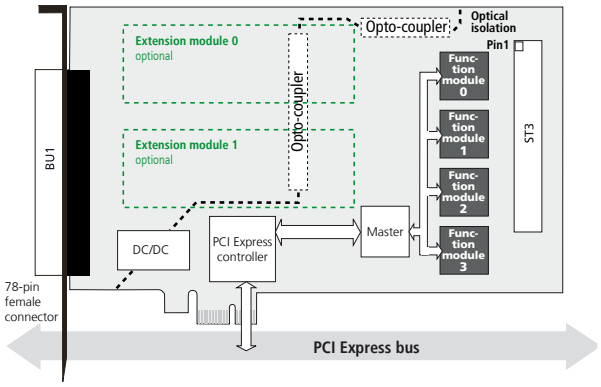
Overview of signal generators resp. functions

Application	Max. number of signal generators or functions for each function module	Max. number of function modules for each APCIe-1711	Max. number of signal generators or functions of each APCIe-1711	Page
Incremental counter	1 (32-bit) or 2 (16-bit)	4	4 or 8	168
SSI	3	4	12	168
Chronos	1	4	4	169
BiSS-Master	6	4	24	130
Counter/Timer	3	4	12	170
TOR	2	4	8	171
Pulse acquisition	4	4	16	172
PWM	2	4	8	172
ETM	2	4	8	173
Digital I/O	8	4	32	173
TTL	24	1	24	–
Parallel Interface	1	4	1	130
Sin/Cos*	2	2	4	132
EnDat 2.2	2	4	8	131

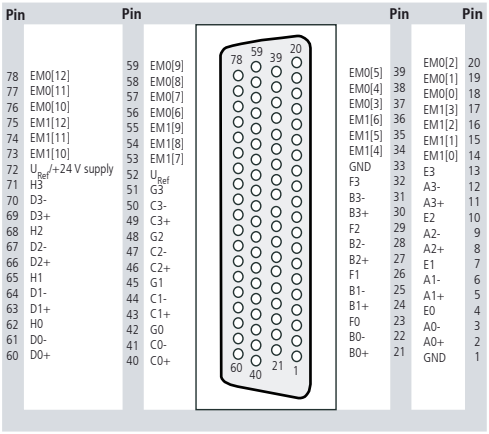
*Extension module (EM) is required

Customer-tailored modifications,
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

Simplified block diagram

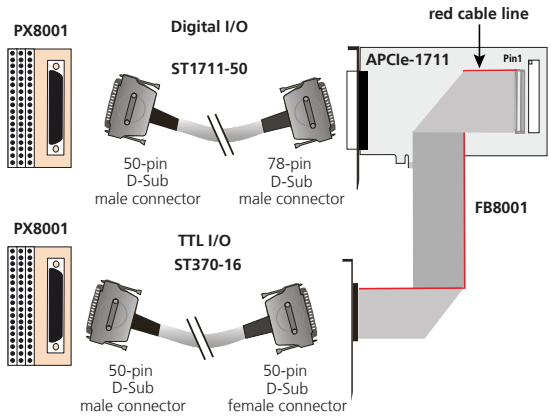


Pin assignment – 78-pin D-Sub female connector



EM = Extension module

ADDI-DATA connection



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Function Parallel Interface

On request

With the **Parallel Interface** function, the digital inputs of the APCIe-1711 are acquired parallelly. Up to 28 digital inputs, 24 V, can be acquired with the APCIe-1711-24 V. Up to 16 RS422 and 12 24 V digital inputs can be acquired with the APCIe-1711.

There are different methods for the acquisition of the inputs:
- Timer controlled (max. resolution 1 µs = 1 MHz)
- Digital input (by masking the digital inputs, rising or falling edge)
- Software

This function can be loaded up to 4 times for each APCIe-1711, i.e. it is possible to acquire 8-bit (7 inputs), 16-bit (14 inputs), 24-bit (21 inputs) or 32-bit (28 inputs) parallelly. If an external trigger signal is used (maskable, rising or falling edge) then there is no need to use one of the inputs for triggering.

The data is transferred directly via DMA in the RAM of the PC.
If the **Parallel Interface** function is loaded on all function modules, then up to 28 digital inputs (RS422 / 24 V) are available.

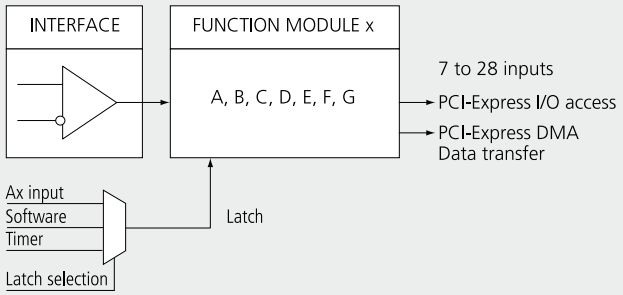
Used signals

Pin name	Signal type	Function
Ax +/-	24 V*/ RS422	Digital input
Bx +/-	24 V*/ RS422	Digital input
Cx +/-	24 V*/ RS422	Digital input
Dx +/-	24 V*/ RS422	Digital input
Ex	24 V	Digital input
Fx	24 V	Digital input
Gx	24 V	Digital input

The 24 V switching level can be adjusted optionally down to 1 V

x: Number of the module (See pin assignment page 129)
* 24 V for the APCIe-1711-24 V

Block diagram Parallel Interface



Function BiSS-Master

The **BiSS-Master** function is a **bi**directional **s**ensor **i**nterface for the communication with up to 6 sensors. BiSS B and C are supported.

Features of the BiSS-Master function:
- 1 function module with a maximum amount of 6 sensors which can be assigned freely to 1 or 2 channels.
- Sensor data transmission
- Register data transmission

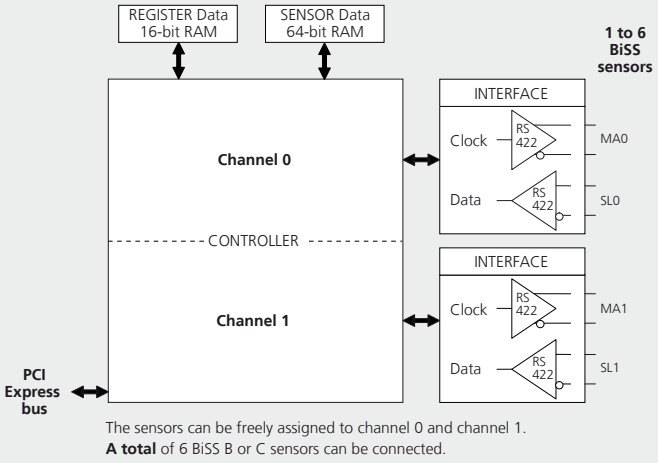
More information about the function range of the BiSS interface on www.biss-interface.com.

Used signals

Signal name	Pin name	Signal type	Function
Output_Ch0_x	Ax +/-	RS422	Dig. output 0 (clock line from master to slave) MA 0
Input_Ch0_x	Bx +/-	RS422	Dig. input 0 (data line from slave to master) SL 0
Output_Ch1_x	Cx +/-	RS422	Dig. output 1 (clock line from master to slave) MA 1
Input_Ch1_x	Dx +/-	RS422	Dig. input 1 (data line from slave to master) SL 1

x: Number of the module (See pin assignment page 129)

Block diagram BiSS-Master



The sensors can be freely assigned to channel 0 and channel 1.
A total of 6 BiSS B or C sensors can be connected.

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Function EnDat 2.2

On request

EnDat 2.2 is a bidirectional synchronous-serial interface for position measurement devices. This interface allows the reading out of absolute position values and parameters, the writing of status and initialisation registers and the transfer of additional information about the position value. Furthermore, the **EnDat 2.2** function modules support the analysis of diagnostic values and access to the OEM memory. Data transfer is effected serially.

On one board you can use up to 8 **EnDat 2.2** sensors (2 sensors per function module). Each function module has its own clock pulse line (B or D) and data line (A or C).

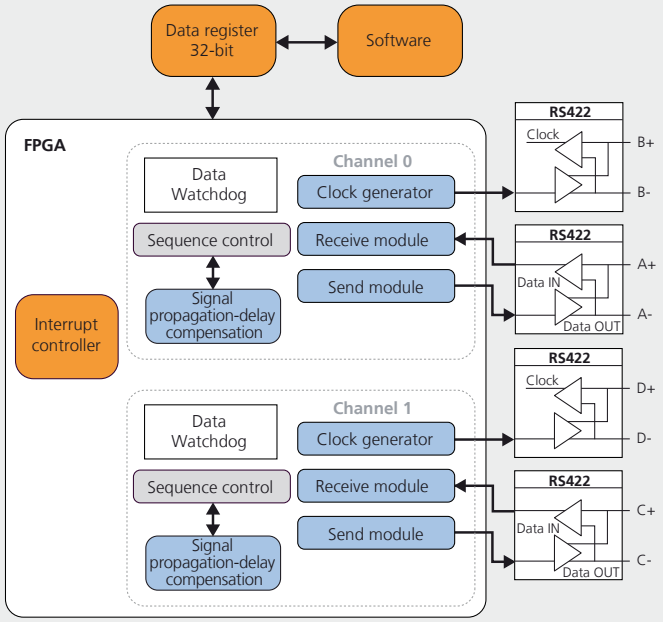
The function EnDat 2.2 is only available for the APCIe-1711!
(not for the APCIe-1711-24V and APCIe-1711-5V-I)

Used signals

Channel	Signal name	I/O	Pin name	Function
0	CLK_0+	O	Bx +	Clock pulse line
0	CLK_0-	O	Bx -	Clock pulse line
0	DATA_0+	I/O	Ax +	Data line
0	DATA_0-	O	Ax -	Data line
1	CLK_1+	O	Dx +	Clock pulse line
1	CLK_1-	O	Dx -	Clock pulse line
1	DATA_1+	I/O	Cx +	Data line
1	DATA_1-	O	Cx -	Data line

x: Number of the module (See pin assignment page 129)

Block diagram EnDat 2.2



Up to 8 EnDat 2.2 sensors can be connected (2 per function module)!

Application example

EnDat 2.2

Exact positioning of axes for the regulation of surface measurement devices for rotationally symmetric parts (e.g. gear wheels)

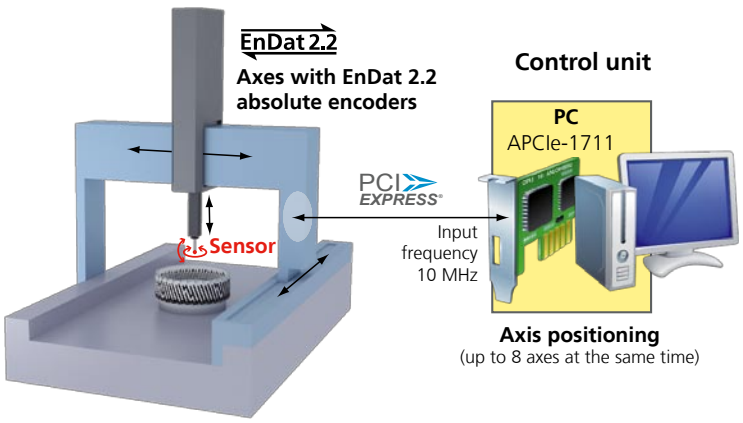
Challenge

For the measurement of the surfaces of rotationally symmetric parts numerous axes must be positioned. Furthermore the signals must be fastly transferred in order to detect the position as exactly as possible. To safe time, absolute encoders are used because they do not need any reference runs when started.

Solution

The measurement device consists of a measurement table with a gate. The rotationally symmetric parts are fixed on the measurement table and their surface is tested with a sensor connected to the gate. To move the sensor around the parts the gate has several axes equipped with EnDat 2.2 absolute encoders. The precision of the axis position is assured by the PCI Express counter board APCIe-1711: Thanks to its high input speed of 10 MHz (optional APCIe-1711-10MHZ version) and its resistance to interferences, the board is able to move the axes precisely even at high speed.

Measurement table with gate



Axis positioning
(up to 8 axes at the same time)

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Function Sin/Cos

New!

With the function **Sin/Cos**, up to 4 Sin/Cos sensors can be used on one board (function module 0 or 1 as well as 2 or 3). The extension module EM-SINCOS-1V_{pp} is meant for the connection of signals with 1 V_{pp}, the EM-SINCOS-11μA_{pp} is able to acquire 11 μA_{pp} signals. A signal period of the Sin/Cos signal is divided in a predefined number of steps, depending on the chosen resolution. The maximum input frequency of the counter input also depends on the chosen resolution.

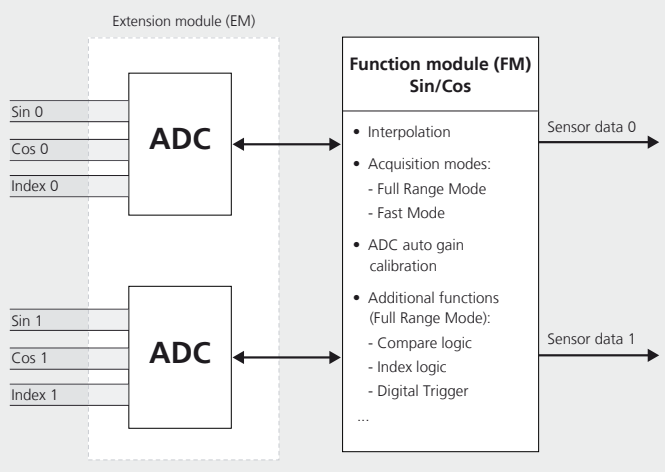
Please note: The function **Sin/Cos** can only be used with the extension module EM-SINCOS.

Used signals

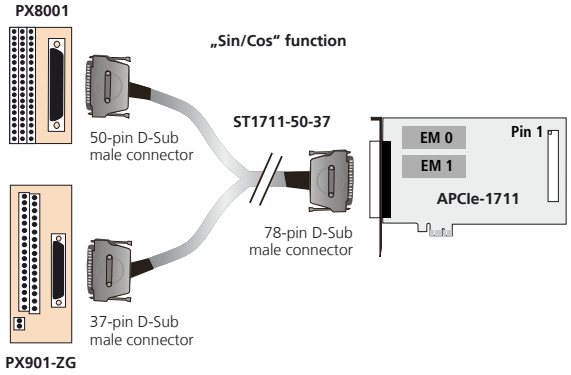
Signal	Sensor 1 Pin no.*	Sensor 2 Pin no.*
Extension module 0		
Sin+	18	57
Sin-	38	76
Cos+	19	58
Cos-	39	77
Index+	20	59
Index-	56	78
24 V Digital Input	37	37
Extension module 1		
Sin+	14	53
Sin-	34	73
Cos+	15	54
Cos-	35	74
Index+	16	55
Index-	36	75
24 V Digital Input	17	17

* 78-pin D-Sub female connector (pin assignment see page 129)

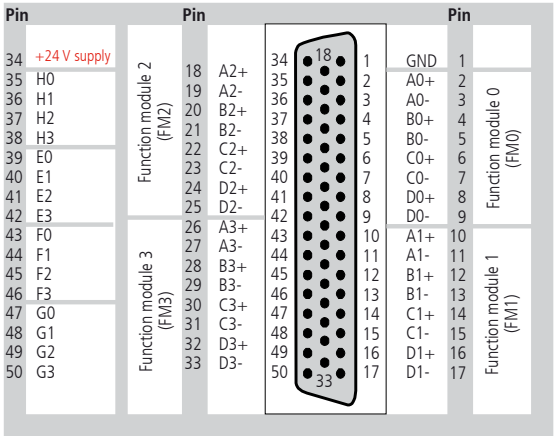
Block diagram Sin/Cos



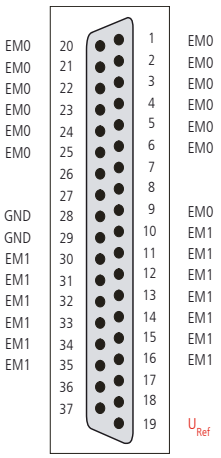
ADDI-DATA connection



Pin assignment – 50-pin D-Sub male connector



Pin assignment – 37-pin D-Sub male connector



EM = Extension Module

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Specifications*

Free programming of the functions

- Acquisition of incremental encoders (1 x 32-bit or 2 x 16-bit)
- SSI (max. 3 encoders per module)
- Counter/Timer (3 counters similar to 82C54)
- Pulse counter (4 x 32-bit counters per module)
- Chronos (chronometer)
- TOR (pulse counter with time slices, ...)
- Digital I/O (8 I/O, 24 V, TTL, RS422)
- PWM (pulse width modulation, 2 x per module)
- BiSS-Master (B and C mode)
- ETM (Timer interface for period duration measurement, edge time, ...)
- TTL (TTL I/O without isolation)
- Parallel Interface
- EnDat 2.2
- Sin/Cos
- Customised functions

Signals

Digital I/O signals, TTL or RS422, 24 V

Inputs

Differential inputs or outputs (A, B, C, D)		
Differential inputs, RS422:	16 (can be used as inputs or outputs)	
Nominal voltage:	3.3 VDC	
Common mode range:	+12 / -7 V	
Input sensitivity:	200 mV	
Input hysteresis:	50 mV	
Input impedance:	12 kΩ	
Terminal resistor:	120 Ω (not supplied)	
Max. input frequency:	APCIe-1711: 5 MHz (at nominal voltage) APCIe-1711-10MHz: 10 MHz (at nominal voltage)	
Mass-related inputs, 24 V (E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	14 V
	UL min.:	0 V
Maximal input frequency:	1 MHz (at nominal voltage) depending on the function	

Outputs

Nominal voltage:	3.3 VDC
Maximum output frequency:	5 MHz (diff. outputs)
Max. number of outputs:	16 (if they are not used as diff. inputs)
Digital outputs, 24 V (H)	
Output type:	High-side (load to ground)
Number of outputs:	4
Nominal voltage:	24 VDC
Supply voltage range.	4.75 V to 35 VDC (via 24 V ext. pin)
Maximum current:	90 mA per output / 270 mA for all outputs (PTC)
Overtemperature:	165 °C (all outputs switch off)

Technical data APCIe-1711-24 V version

	24 V inputs (Channels A, B, C, D). This board version is intended for the connection of 24 V encoders. Only 24 V signals can be connected to the inputs.	
Nominal voltage:	24 VDC	
Max. input frequency:	1 MHz (at nominal voltage) depending on the function	
Logic input levels :	Unominal:	24 V
(Standard)	UH max.:	30 V
	UH min.:	18 V
	UL max.:	16 V
	UL min.:	0 V

Functions

On the board APCIe-1711-24V Ax, Bx, Cx and Dx are only available as 24V inputs and not as outputs. Therefore not any function can be used on any version of the board.

Available functions:	- Incremental counter
	- Sin/Cos
Partially available:	- PWM

Please find more detailed information in the respective function manual.

Safety

Optical isolation:	1000 V

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:	168 x 98 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V / + 12 V from the PC +24 V ext.
Current consumption APCIe-1711:	3.3 V / 341 mA 12 V / 76 mA typ.
Front connector:	78-pin D-Sub female connector
Additional connector:	50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Ordering information

APCIe-1711

Multifunction counter board, optically isolated, fast counter inputs – programmable functionality, for PCI Express.
Incl. technical description and software drivers.

APCIe-1711:	Isolated counter board with programmable functionality
APCIe-1711-24V:	24 V instead of RS422 (A, B, C, D).
APCIe-1711-5V-I:	5 V inputs (E, F, G) instead of 24 V
APCIe-1711-10MHz:	Input frequency 10 MHz, Inputs (A, B, C, D)

Option

Opt. 5V:	5 V outputs (H1, H2, H3, H4) instead of 24 V

Accessories

PX8001:	3-row screw terminal panel with housing for DIN rail
ST1711-50:	Standard round cable, shielded, twisted pairs, 2 m, 78-pin male connector to 50-pin male connector

For the TTL I/O function

ST370-16:	Standard round cable, shielded, twisted pairs, 2 m
FB8001:	Ribbon cable

For the Sin/Cos function

EM-SINCOS-11µAPP:	Extension module, 2 x 11 μA_{pp} inputs, 1 dig. output, 24 V
EM-SINCOS-1VPP:	Extension module, 2 x 1 V_{pp} inputs, 1 dig. output, 24 V
ST1711-50-37:	Y-cable, round, shielded, twisted pairs, 78-pin D-Sub male connector to 50-pin D-Sub male connector and 37-pin D-Sub male connector

* Preliminary product information

Phone: +49 7229 1847-0 info@addi-data.com
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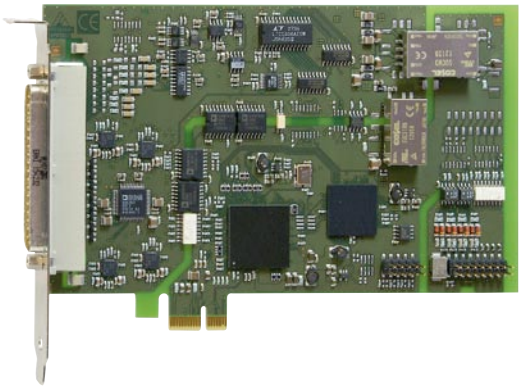
Multifunction board, optically isolated, 16 SE/8 differential inputs, 4/8 analog outputs, 16-bit

New!
APCIe-3123



APCIe-3121 / APCIe-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

RoHS 2002/95/EC

Also for PCI
see APCI-3120, page 180
Also for CompactPCI™
see CPCI-3120, page 238

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

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
- 4 or 8 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
- 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

ADDIPACK 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

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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 PC 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(4)-20 mA (optional), software-programmable for each channel
Throughput:	100 kHz
Gain:	Software programmable (1, 2, 5, 10)
Relative precision (INL):	± 2 LSB max. (A/D converter)
Diff. non-linearity (DNL):	± 1 LSB max. (A/D converter)
Bandwidth (- 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:	8 or 4
Resolution:	16-bit
Optical isolation:	500 V through opto-couplers
Output range:	0-10 V, ±10 V switchable through software (0-20 mA optional)
Overvoltage protection:	±15 V
Max. output current / load:	±5 mA, 2 kΩ
Short-circuit current:	±35 mA (short time)
Output voltage after reset:	0 V
Current outputs	
Resolution:	15-bit
Output range:	0-20 mA
LSB:	610.35 nA
Load (at 20 mA):	10 Ω min., 560 Ω max.
Output current after reset:	0 mA

Digital I/O

Number of I/O channels:	4 dig. inputs, 4 dig. high-side outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	10 mA typ.
Input range:	0-30 V
Supply voltage:	8-32 V
Max. switching current:	65 mA typ.

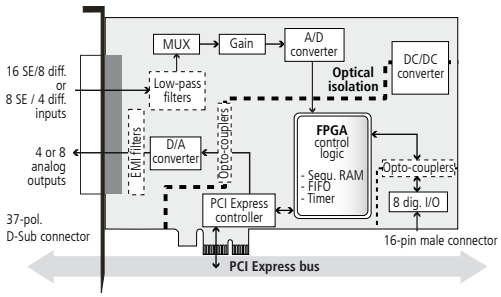
EMC – Electromagnetic compatibility

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.

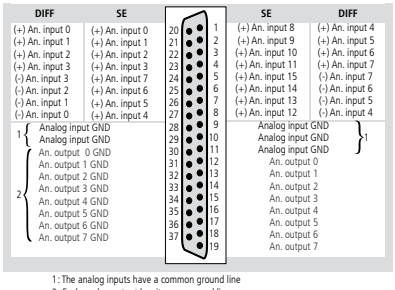
Physical and environmental conditions

Dimensions:	168 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V, + 12 V from PC
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

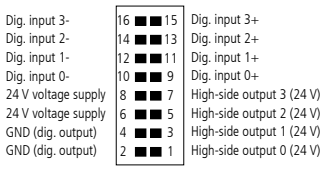


Pin assignment – 37-pin D-Sub male connector

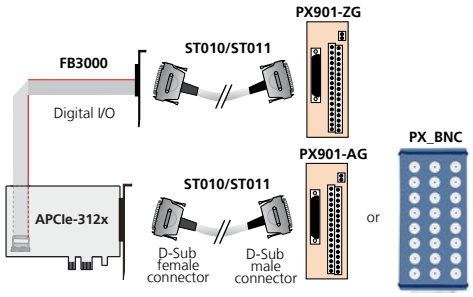


1: The analog inputs have a common ground line
2: Each analog output has its own ground line

Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

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

Voltage

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

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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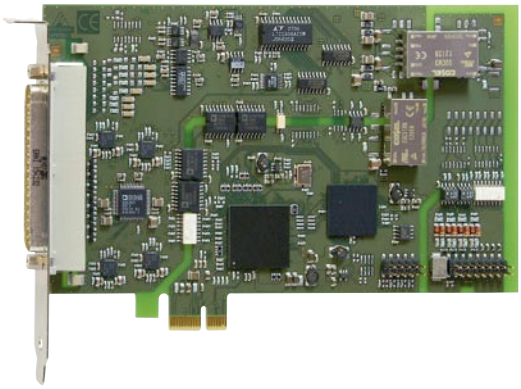
Analog input board, optically isolated, 16 SE/8 differential inputs, 16-bit



APCIe-3021

PCI Express interface

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

Optical isolation 500 V

PCI Express DMA, programmable gain

Trigger functions

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

RoHS 2002/95/EC

Also for PCI
see APCI-3001, page 190
and APCI-3010 / APCI-3016, page 184

Also for CompactPCI™
see CPCI-3001, page 240

Windows
64/32-bit drivers

on request

LabVIEW™

LabWindows/CVI™

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

Digital

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

Timer

- 1 timer

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

ADDIPACK functions

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

On request:

Further operating systems, compilers and samples.

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

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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 PC 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(4)-20 mA (optional) software-programmable for each channel
Throughput:	100 kHz
Gain:	Software programmable (1, 2, 5, 10)
Relative precision (INL):	± 2 LSB max. (A/D converter)
Diff. non-linearity (DNL):	± 1 LSB max. (A/D converter)
Bandwidth (- 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

Digital I/O

Number of I/O channels:	4 dig. inputs, 4 dig. high-side outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	10 mA typ.
Input range:	0-30 V
Supply voltage:	8-32 V
Max. switching current:	65 mA typ.

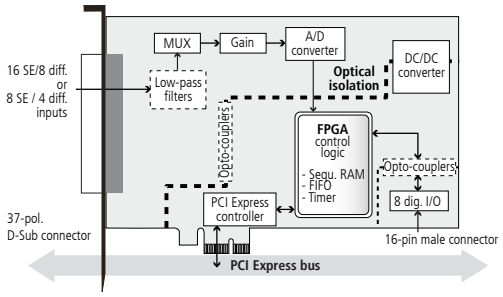
EMC – Electromagnetic compatibility

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.

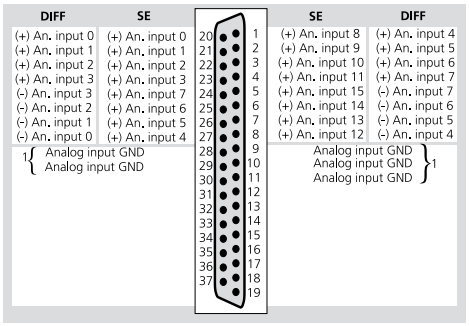
Physical and environmental conditions

Dimensions:	168 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V, + 12 V from PC
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

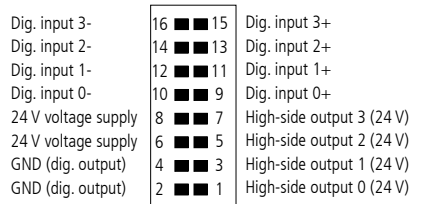


Pin assignment – 37-pin D-Sub male connector

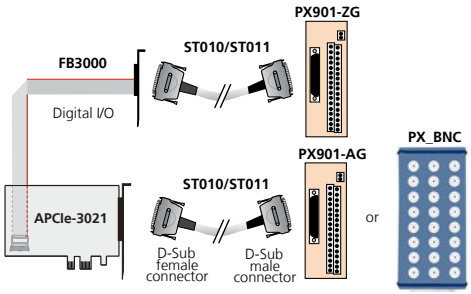


1: The analog inputs have a common ground line

Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

APCIe-3021

Analog input board, optically isolated, 16 SE/8 differential inputs, 16-bit. Incl. technical description and software drivers.

Versions

APCIe-3021-16 Version with 16 SE/8 diff. inputs
APCIe-3021-8 Version with 8 SE/4 diff. inputs
APCIe-3021-4 Version with 4 SE/2 diff. inputs

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

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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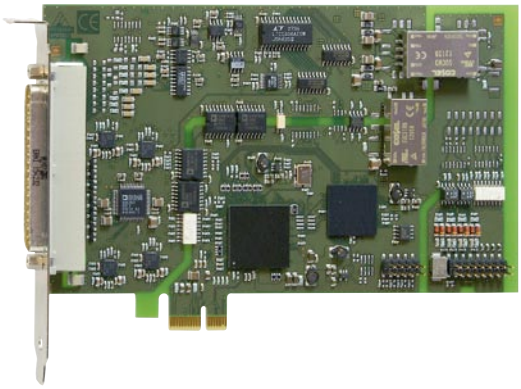
Fax: +49 7229 1847-222 www.addi-data.com

Analog output board, optically isolated, 8/4 differential outputs, 16-bit



APCIe-3521

PCI Express interface

8/4 analog outputs, 16-bit

Optical isolation 500 V

8 digital I/O, 24 V, optically isolated, timer, watchdog

RoHS 2002/95/EC

Also for PCI and APCI-3501, page 192

Windows 64/32-bit drivers

on request

LabVIEW™

LabWindows/CVI™

Features

Analog outputs

- 4 or 8 analog outputs, optically isolated 500 V
- Voltage or current outputs
- 16-bit resolution (15-bit for 0-10 V)
- Output ranges: ±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

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

Safety features

- Optical isolation 500 V min.
- Creeping distance IEC 61010-1
- Protection against high-frequency EMI
- Noise neutralisation of the PC supply

Applications

- Industrial process control
- Industrial measurement and monitoring
- Control of chemical processes
- Factory automation
- Laboratory equipment, instrumentation

Software drivers

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

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- LabVIEW • LabWindows/CVI

ADDIPACK 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

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Fax: +49 7229 1847-222 www.addi-data.com

Specifications

Analog outputs

Number of outputs:	8 or 4
Resolution:	16-bit resolution
Optical isolation:	500 V through opto-couplers
Output range:	0-10 V, ±10 V switchable through software (0-20 mA optional)
Overvoltage protection:	±15 V
Max. output current / load:	±5 mA, 2 kΩ
Short-circuit current:	±35 mA (short time)
Output voltage after reset:	0 V
Current outputs	
Resolution:	15-bit
Output range:	0-20 mA
LSB:	610.35 nA
Load (at 20 mA):	10 Ω min., 560 Ω max.
Output current after reset:	0 mA

Digital I/O

Number of I/O channels:	4 dig. inputs, 4 dig. high-side outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	10 mA typ.
Input range:	0-30 V
Supply voltage:	8-32 V
Max. switching current:	65 mA typ.

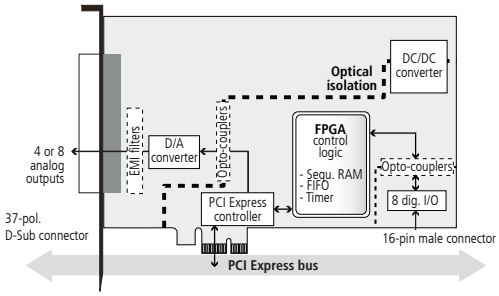
EMC – Electromagnetic compatibility

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.

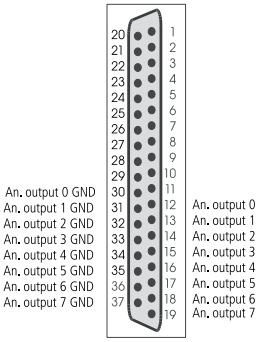
Physical and environmental conditions

Dimensions:	168 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane PCI Express slot
Operating voltage:	+ 3.3 V, + 12 V from PC
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

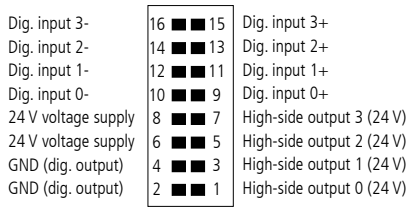
Simplified block diagram



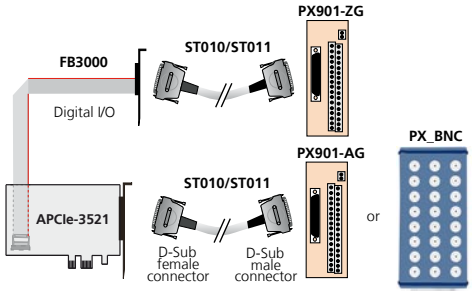
Pin assignment – 37-pin D-Sub male connector



Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

APCIe-3521

Analog output board, optically isolated, 8/4 differential outputs, 16-bit, for PCI Express.
Incl. technical description and software drivers.

Versions

Voltage

APCIe-3521-8	Version with 8 analog voltage outputs
APCIe-3521-4	Version with 4 analog voltage outputs

Current

APCIe-3521-8C	Version with 8 analog current outputs
APCIe-3521-4C	Version with 4 analog current outputs

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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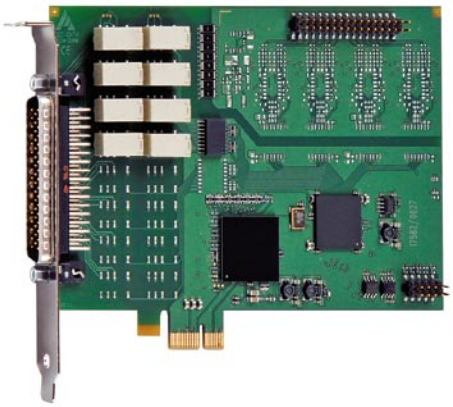
Watchdog board, optically isolated, 7 watchdogs/timer

New!*



APCIe-040

7 watchdogs/timer

8 electromechanical relays with change-over contacts

7 digital inputs 24 V

2 alarm levels

Temperature monitoring from -35 °C to + 85 °C

Optical isolation 1000 V

RoHS 2002/95/EC

Windows 64/32-bit drivers

on request

LabVIEW™ on request

Features

Maximise the reliability of your telecom, ISP, Voice Mail, File Server or industrial systems under Windows operating systems with the APCIe-040 PCI Express watchdog board. The board is equipped with 7 watchdogs for simultaneous software and hardware monitoring. External devices can thus be monitored (e. g. alarm systems, PLCs) and controlled (e. g. modems, dialing devices).
In addition, the PCI Express watchdog board APCIe-040 has a two-level alarm system and can initiate a hardware reset in case of emergency. The principle is based on the computer software having to send signals to the board at regular intervals.
If the board does not receive an expected signal within a certain period of time, the first alarm level is activated. The emergency program is started which determines the cause and tries to remove the error. If this fails, the operating system and, if necessary, external devices are prepared for the hardware reset. The second alarm level is automatically triggered after a defined timeout.
The internal PC temperature can be monitored through the onboard temperature sensor.

Watchdog

- 7 watchdogs/timers
- 7 trigger channels/Gate inputs (24 V)
- Activation through software
- Configuration through software, readable
- Can be triggered through software or digital input
- Time base for the watchdog/timer: µs, ms, s, min
- Several alarm levels are possible for each watchdog
- Level 1 generates an interrupt or switches the warning relay, level 2 switches the reset relay (only watchdog 0 has 2 relays)
- With the two-level alarm, the operating system can be warned through an interrupt that a hardware reset is going to take place. There is then enough time to close the active tasks or to reset the warning relay.
- The alarm time can be read back at any time, so that the time remaining for further tasks can be established.
- Switching time of the reset relay: 2 s

Defined state after booting

- The watchdogs are switched off through the system reset

Diagnostic

- The status of the 7 watchdogs is readable
- 7 digital inputs (watchdog trigger or timer gate)

Safety

- Optical isolation 1000 V

Temperature measurement

- 1 temperature onboard sensor
- Alarm function when a programmable limit value is exceeded

Digital inputs

- 7 inputs, optically isolated
- Input voltage 24 V

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:

- C#.NET, C

On request:

Further operating systems, compilers and samples.

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

*Preliminary product information

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ADDI-DATA SPIRIT OF EXCELLENCE

Specifications*

Relays

Type of contacts:	8 change-over
Max. switching voltage:	200 VDC, 200 VAC
Max. switching current:	2 A
Max. switching capacity:	60 W
Contact resistance:	< 100 mΩ
Contact material:	Ag and Au plated
Response time:	Max. 4 ms, typ. 2.5 ms
Release time:	Max. 4 ms, typ. 0.9 ms
Mechanical life:	5 x 10^8 operations
Electrical life:	10^5 operations at rated load

Watchdogs/timers

Depth:	8-bit
Switching time of the reset relay:	2 s
Programmable time of the 7 watchdogs/timers:	Can be set from 2 µs to 255 min.
Time units:	µs, ms, s, min

Digital inputs

Number of inputs:	7
Optical isolation:	Through opto-couplers, 1000 V
Nominal voltage:	24 V
Input current:	5 – 8 mA
Signal delay:	70 µs (at 24 V)
Maximal input frequency:	10 kHz (at 24 V)

Temperature monitoring

Accuracy:	± 1 °C
Measurement range:	-35 °C to 85 °C (real range of application 0-60 °C)
Resolution:	8-bit

Safety

Test voltage:	1000 V

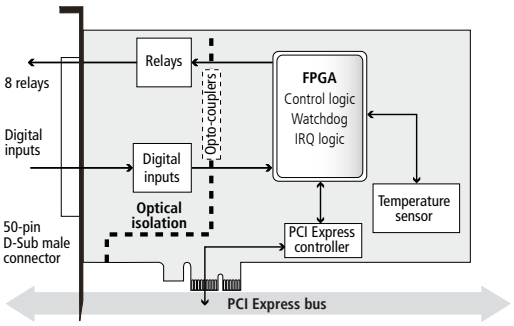
EMC – Electromagnetic compatibility

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:	149 x 99 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-lane, 1 PCI Express slot
Operating voltage:	+3.3 V from the PC
Max. current consumption:	0,67 A ±10 %
Front connector:	50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

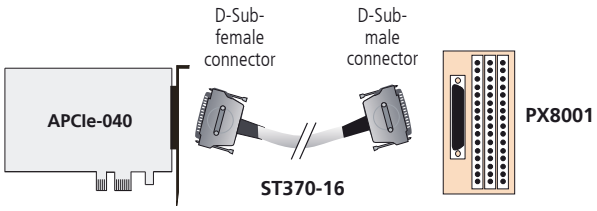


Pin assignment

Pin		Pin				Pin	
34	OC of relay 0	18	CC of relay 0	34	18 1	CO of relay 0	1
35	OC of relay 1*	19	CC of relay 1*	35	2	CO of relay 1*	2
36	OC of relay 2	20	CC of relay 2	36	3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37	4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38	5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39	6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40	7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41	8	CO of relay 7	8
42	Digital input 0 (+)	26	-	42	9	Digital input 0 (-)	9
43	Digital input 1 (+)	27	-	43	10	Digital input 0 (-)	10
44	Digital input 2 (+)	28	-	44	11	Digital input 0 (-)	11
45	Digital input 3 (+)	29	-	45	12	Digital input 0 (-)	12
46	Digital input 4 (+)	30	-	46	13	Digital input 0 (-)	13
47	Digital input 5 (+)	31	-	47	14	Digital input 0 (-)	14
48	Digital input 6 (+)	32	-	48	15	Digital input 0 (-)	15
49	-	33	-	49	16 33	-	16
50	-			50	17	-	17

OC: opening contact CC: closing contact CO: change-over contact * = reset relay

ADDI-DATA connection



Screw terminal panel PX8001 with cable ST370-16

Ordering information

APCIe-040

Watchdog board, optically isolated, 7 watchdogs/timer. Incl. technical description and software drivers.

APCIe-040: 7 watchdogs, 8 relays, 7 digital inputs, 24 V

Accessories

PX8001: 3-row screw terminal panel, 50-pin, for DIN-rail mounting

ST370-16: Shielded round cable, 2 m

* Preliminary product information

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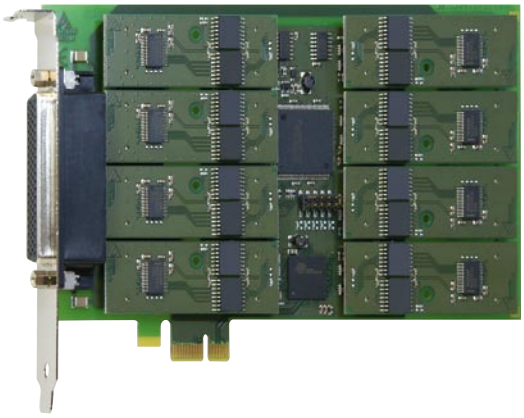
1 to 8-port serial interface, RS232, RS422, RS485, 20 mA CL, modular mounting through modules



APCIe-7300 – 1-port serial interface
APCIe-7420 – 2-port serial interface
APCIe-7500 – 4-port serial interface
APCIe-7800 – 8-port serial interface

RS232, RS422, RS485, 20 mA Current Loop

Free mode configuration for each port through SI modules

With/without optical isolation 1000 V

128-byte FIFO buffer for each port

16C950-compatible UART

RoHS 2002/95/EC

Also for PCI
see APCI-7xxx-3, page 210

Also for CompactPCI™
see CPCI-7500, page 242

Windows
64/32-bit drivers

The APCIe-7xxx communication boards are configured by inserting SI modules which the board identifies automatically. The serial interfaces can be configured through modules in the following modes: RS232, RS422, RS485 (with or without optical isolation) and current loop (with optical isolation).
The SI modules with optical isolation allow a protection of up to 1000 V for the use in noisy environments where earth loops can occur.
The I/O lines are protected against short-circuits, fast transients, electrostatic discharge and high-frequency EMI.
The interface is supported through a 128-byte FIFO buffer for sending and receiving data and guarantees reliable operation at high transfer rates.

Features

- Asynchronous communication adapter
- Modular mounting through SI modules
  1 socket for 1-port serial interface (APCIe-7300)
  2 sockets for 2-port serial interface (APCIe-7420)
  4 sockets for 4-port serial interface (APCIe-7500, APCIe-7500/4C)
  8 sockets for 8-port serial interface (APCIe-7800)
- Can be configured as RS232, RS422, RS485 with/without optical isolation, 20 mA Current Loop (active, passive), with optical isolation through separate SI modules
- Automatic addressing through BIOS
- Automatic module identification
- UART 16C950, downwards compatible until 16C450
- 128-byte FIFO buffer for sending and receiving data
- Programmable transfer rate
- 5, 6, 7 or 8-bit character
- 1, 1½ or 2 stop bits
- Parity: even, odd or none
- Automatic transmitter control for RS485 and transmitter control through FIFO level
- Common interrupt

Safety features

- SI modules available with optical isolation 1000 V
- Creeping distance IEC 61010-1 (VDE411-1)
- Protection against fast transients (Burst)
- Short-circuit protection for RS422 and RS485
- Internal diagnostic possibility, break, parity, overrun and framing error

Applications

- Industrial serial communication
- Data acquisition
- Multi-user systems
- PLC interface
- Multidrop applications
- Modem and printer control, etc.

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:

- Microsoft VC++
- Visual Basic • Delphi

On request:

Further operating systems, compilers and samples.

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

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SI modules

Operating mode	RS232		RS422		RS485		20 mA CL
							
	SI232-G	SI232	SI422-G	SI422	SI485-G	SI485	SITTY
Optical isolation 1000 V	✓		✓		✓		✓
Creeping distance 3.2 mm	✓		✓		✓		✓
Short-circuit protection			✓	✓	✓	✓	
ESD protection	✓	✓	✓		✓		
Burst protection	✓	✓	✓	✓	✓	✓	✓
Duplex	Full	Full	Full	Full	Half	Half	Full
Max. Baud rate	1 MBaud	1 MBaud	1 MBaud	1 MBaud	1 MBaud	1 MBaud	19.2 kBaud
Modem control signals	✓	✓	Optional RTS/CTS (SI-422-PEP)				
Autom. transmitter control					✓	✓	
Current consumption	16 mA	1 mA	15 mA	5 mA	15 mA	5 mA	82 mA

Specifications

APCIe-7300 / APCIe-7420 / APCIe-7500 / APCIe-7800

Serial interface – 1-port, 2-port, 4-port, 8-port

Mode:	RS232, RS422, RS485, 20 mA Current Loop (active, passive) with or without optical isolation through separate SI modules
Transmission mode:	Asynchronous, full or half duplex (SI modules)
Addressing:	Automatic through BIOS
Memory:	128-byte FIFO buffer for transmitter and receiver
Transfer rate:	Programmable up to 1 MBaud
Protocol:	5-, 6-,7- or 8-bit character 1,1½ or 2 stop bits
Parity:	Even, odd, none, mark, space
Interrupt lines:	Automatic configuration through BIOS

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.

Safety features

Optical isolation:	1000 V (SI modules)

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 PCI Express slot
Operating voltage:	+ 3,3 V from the PC
Front connector:	9-pin D-Sub male connector (APCIe-7300) 2 x 9-pin D-Sub male connector (APCIe-7420) 37-pin D-Sub male connector (APCIe-7500) 78-pin D-Sub female connector (APCIe-7800)
Temperature range:	0 to 60 °C (with forced cooling)

Ordering information

APCIe-7300 / APCIe-7420 / APCIe-7500 / APCIe-7800

APCIe-7300: 1-port serial interface (1 x 9-pin D-Sub)
APCIe-7420: 2-port serial interface (2 x 9-pin D-Sub)
APCIe-7500: 4-port serial interface (1 x 37-pin D-Sub)
APCIe-7500/4C: 4-port serial interface (4 x 9-pin D-Sub)
APCIe-7800: 8-port serial interface (1 x 78-pin D-Sub
Each incl. technical description and software drivers.

SI modules: Please order the modules separately!

SI232-G: RS232 mode, isolated
SI232: RS232 mode
SI422-G: RS422 mode, isolated
SI422-PEP: RS422 mode, isolated, with RTS/CTS
SI422: RS422 mode
SI485-G: RS485 mode, isolated
SI485: RS485 mode
SITTY: 20 mA Current Loop mode (active, passive), isolated

Accessories

ST075: Shielded round cable, 37 to 4 x 9-pin (for APCIe-7500)
ST074: Shielded round cable, 37 to 4 x 25-pin (for APCIe-7500)
ST7809: Shielded round cable, 78 to 8 x 9-pin (for APCIe-7800)
ST7825: Shielded round cable, 78 to 8 x 25-pin (for APCIe-7800)

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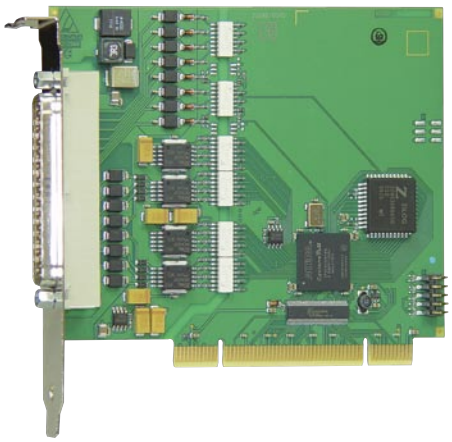

Correct state identification

With the digital boards by ADDI-DATA, you can reliably find out the state (0 or 1) of the connected devices or sensors. There is thus no undefined range that could lead to switching errors.

Digital boards are used for industrial I/O regulation, signal switching, as interface to automatic test devices, for the on/off monitoring of electrical consumers or as interfaces to machines. They can activate e.g. ventilation, valves, pumps and electromechanical relays.

A large product range

Our product range of digital input and output boards for the PCI bus is as varied as their possibilities of use. In our product range you will find:

- Digital input boards, 5 V, 24 V
- Digital I/O boards, 5 V, 12 V, 24 V, TTL
- Digital output boards, 24 V
- Relay boards, 8 to 16 relays

All PCI boards can be used in 5 V systems.
Some of the boards have been developed for use in 5 V systems as well as in 3.3 V systems.

More performance through CPU relief

The interruptible inputs of the digital I/O boards make continuous cyclic scan processes (polling) for routine monitoring and analysis tasks unnecessary, which relieves the processor and the software. At a status change of the digital inputs, a corresponding interrupt is generated, enabling the system to react to the event through the interrupt routine and thus meet the defined real-time criteria.

Safe machine start

Until the current supply provides its nominal voltage in the initialisation phase, the logic components on electronic devices run through different undefined intermediate states.
Without special measures the state of the digital outputs cannot be ascertained. Thus the I/O and output boards reset all outputs to „0" at power-on or reset. This allows straight solutions for machine starts or the start of measurement processes.

Real-time complete system MSX-Box

Combination of the MSX-Box PAC system and PCI boards

- Compact and flexible
- Stand-alone system (own CPU)
- Long-term availability

MSX-Box product information see page 20

HIGH DEGREE OF PROTECTION

- Optical isolation from 500 V to 1000 V
- Protection against short-circuits, overtemperature, overvoltage
- Filters for the inputs and outputs
- Industry-standard D-Sub connectors

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Product overview

	Digital I/O, 24 V					Digital input, 24 V		Digital output, 24 V		Relay board	Digital I/O, TTL
	APCI-1500 APCI-1500-12V	APCI-1516	APCI-1564	APCI-1564_3,3V	APCI-1564-5V APCI-1564-5V-HS	APCI-1032 APCI-1032-5	APCI-1016	APCI-2032 APCI-2032-5	APCI-2016	APCI-2200_3,3V APCI-2200	APCI-1648 APCI-1696
32-bit PCI bus	PCI 5 V	5 V	5 V	3.3 V	5 V	5 V	5 V	5 V	5 V	3.3 V / 5 V	3.3 V / 5 V
FPGA			✓		✓					✓	
Filters and protective circuits	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Input channels	16	8	32		32	32	16				48 TTL (APCI-1648) 96 TTL (APCI-1696)
Optical isolation 1000 V	✓	✓	✓		✓	✓	✓				
Interruptible input channels	14		16		16	16					
Nominal voltage (V) DC (V)	24 V (19-30) 12 V (APCI-1500-12V)	24 V (19-30)	24 V (19-26)		5 V	24 V (19-30) 5 V (APCI-1032-5)	24 V (19-30)				TTL
Input current at 24 VDC	6 mA	6 mA	5 mA			5 mA	6 mA				
Output channels (24 V high-side drivers)	16	8	32					32	16		48 TTL (APCI-1648) 96 TTL (APCI-1696)
Output channels (5 V high-side drivers)					32 (APCI-1564-5V-HS)						
Output channels Open Collector					32 (APCI-1564-5V)						
Relays										8/16 relays	
Optical isolation 1000 V	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Nominal voltage (V)	24 V DC (10-36)	24 V DC (10-36)	24 V DC (10-36) 5 V (APCI-1564-5V)		5 V			24 V DC (10-36) 5 V (APCI-2032-5)	24 V DC (10-36)	60 V DC 48 V AC	TTL
Output current (A) for one channel	0.5[1]	0.5[1]	0.5[1]		50 mA			0.5[2]	0.5[2]	1	12 LS TTL Loads
Watchdog (depth)	✓ (16-bit)	✓ (8-bit)	✓ (8-bit)		✓ (8-bit)			✓ (8-bit)	✓ (8-bit)	✓ (8-bit)	
Timer / Counter (depth)	3/- (16-bit)		1/3 (32-bit)		1/3 (32-bit)						
Page	146	148	150		152	154	156	158	160	162	164
Software	Driver download: www.addi-data.com/downloads										

(1) Limited to 3 A for all outputs, self-resetting fuse against short-circuits
(2) Limited to 2x3 A for all outputs, self-resetting fuse against short-circuits

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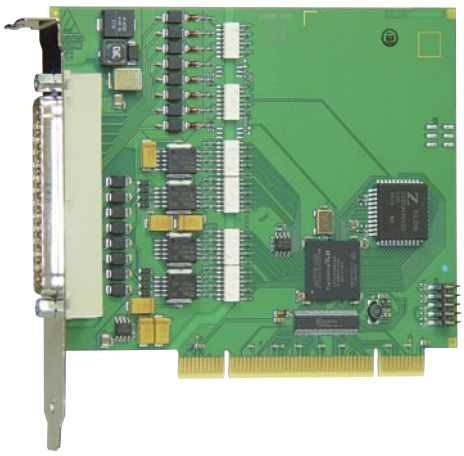
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V



APCI-1500 / APCI-1500-12V

16 digital inputs, 24 V or 12 V, including 14 interruptible inputs

16 digital outputs, 10-36 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Watchdog, timer

At Power-On the outputs are reset to "0"

RoHS 2002/95/EC

PCI 32-bit

Also for CompactPCI™
See CPCI-1500, page 176

Also for PC/104-PLUS
See page 172

Also for PCI EXPRESS®
see page 78

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DASYLab10 Data Acquisition System Laboratory

DIAdem

Features

- 3 programmable timers
- Connector compatible to the ISA board PA 1500. Connector and software compatible to the digital I/O boards APCIe-1532 for the PCI Express bus and CPCI-1500 for the CompactPCI bus.
- Monitoring program for testing and setting the board functions

Inputs

- 16 optically isolated digital inputs, 24 V or 12 V (APCI-1500-12V), including 14 interruptible inputs
- Reverse voltage protection
- All inputs are filtered

Outputs

- 16 optically isolated digital outputs, 10 V to 36 V
- Output current per channel 500 mA
- Timer programmable watchdog for resetting the outputs to „0"
- Diagnostic report through status register at short-circuits, overtemperature, voltage drop or watchdog
- Interrupt triggered through watchdog, timer, error
- At Power-On, reset of the outputs to „0"
- Short-circuit current for 16 outputs ~ 3 A typ.
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- External 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground lines for inputs and outputs

Applications

- Industrial I/O control
- PLC coupling
- Reading of encoder values for process control
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Watchdog / Timer
- Machine interfacing, ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

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

On request:

Further operating systems, compilers and samples.

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

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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Digital inputs

Number of inputs:	16 (common ground acc. to IEC 1131-2)
Including interruptible inputs:	14, IRQ line selected through BIOS
Optical isolation:	Through opto-couplers, 1000 V from PC to peripheral
Compare logic:	AND and OR mode; OR priority
24 V version (APCI-1500)	
Nominal voltage:	24 V
Input current at 24 V:	6 mA typ.
Logic input levels:	U nominal: 24 V
UH max.:	30 V/current 9 mA typ.
UH min.:	19 V/current 2 mA typ.
UL max.:	14 V/current 0.7 mA typ.
UL min.:	0 V/current 0 mA typ.
Signal delay:	70 µs (at nominal voltage)
Maximum input frequency:	5 kHz (at nominal voltage)
12 V version (APCI-1500-12V)	
Nominal voltage:	12 V
Input current at 12 V:	4.2 mA typ.
Logic input levels:	U nominal: 12 V
UH max.:	16 V/current 6.3 mA typ.
UH min.:	9 V/current 2.7 mA typ.
UL max.:	6 V/current 1.2 mA typ.
UL min.:	0 V/current 0 mA typ.
Signal delay:	70 µs (at nominal voltage)
Maximum input frequency:	5 kHz (at nominal voltage)

Digital outputs

Number of outputs:	16, optically isolated up to 1000 V through opto-couplers
Output type:	High-side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V / 12 V (APCI-1500-12V)
Supply voltage:	10 V to 36 V, min. 5 V (via front connector)
Max. current for 16 outputs:	3 A typ.
Output current/output:	500 mA max.
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1 Ω:	1.5 A
RDS ON resistance:	0.4 Ω max.
Switch-on time:	I out=0.5 A, load = resistance: 100 µs
Switch-off time:	I out=0.5 A, load = resistance: 60 µs
Overtemperature (shutdown):	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Diagnostics:	Status bit or interrupt to the PC
Timer:	3
Watchdog:	Timer-programmable, 10 µs to 37 s

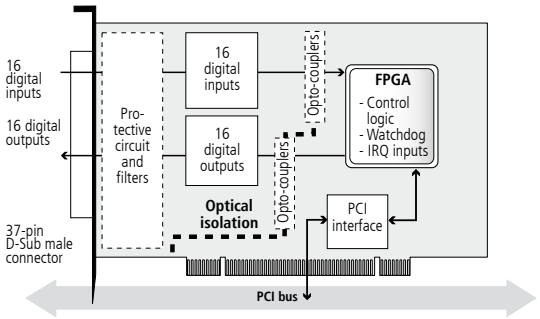
EMC – Electromagnetic compatibility

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.

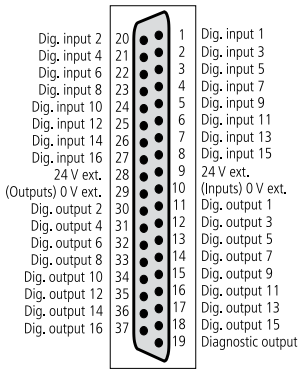
Physical and environmental conditions

Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	400 mA typ. ± 10 %
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

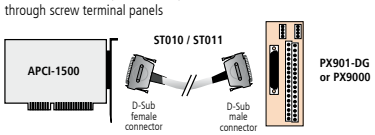


Pin assignment – 37-pin D-Sub male connector

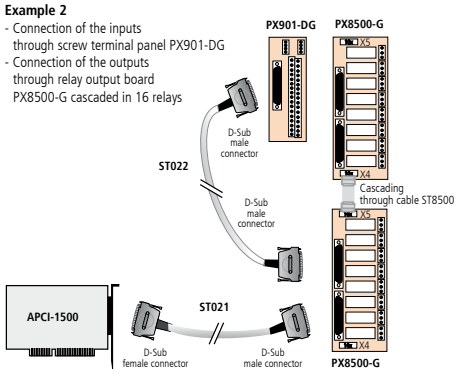


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panels



Example 2
- Connection of the inputs through screw terminal panel PX901-DG
- Connection of the outputs through relay output board PX8500-G cascaded in 16 relays



Ordering information

APCI-1500 / APCI-1500-12V

Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V. Incl. technical description, software drivers and monitoring program.

Versions

APCI-1500: Digital I/O board, opt. isolated, 32 dig. I/O, 24 V inputs, outputs 10 to 36 V
APCI-1500-12V: Digital I/O board, opt. isolated, 32 dig. I/O, 12 V inputs, outputs 10 to 36 V

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, LED status display
PX8500-G: Relay output board for DIN rail, cascadable
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (separate 24 V supply)
ST021: Round cable between APCI-1500 and PX8500-G, shielded, twisted pairs, 2 m
ST022: Cable between PX8500-G and PX901-DG, shielded, 2 m
ST8500: Ribbon cable for cascading two PX 8500

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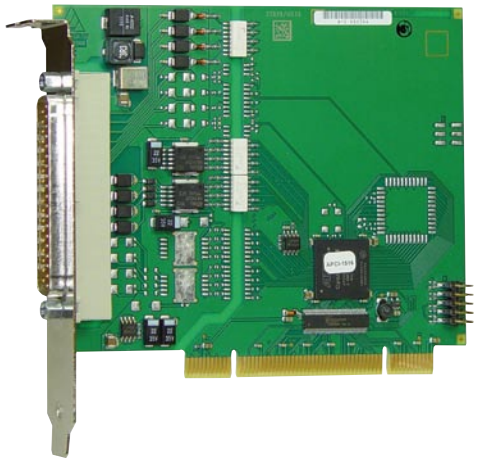
Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V



APCI-1516

8 digital inputs, 24 V

8 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Watchdog

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS see page 80

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

Inputs
- 8 optically isolated inputs, 24 V
- Reverse voltage protection
- All inputs are filtered

Outputs
- 8 optically isolated outputs, 10 V to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Short-circuit current for 8 outputs ~ 3 A typ.
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- External 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V
- Diagnostic function for detecting short-circuits and overtemperature

Safety features
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Separate ground lines for inputs and outputs
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI

Applications
- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog
- Machine interfacing

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

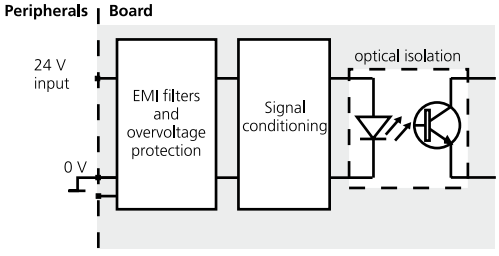
Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:
- Digital input • Digital output • Watchdog

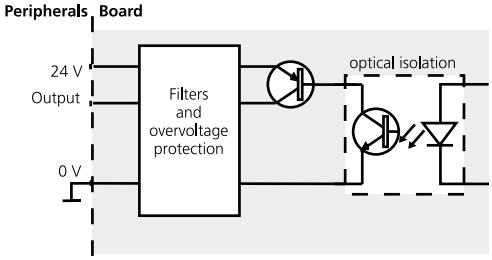
On request:
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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ADDI-DATA SPIRIT OF EXCELLENCE

PCI

Specifications

Digital inputs

Number of inputs:	8 (common ground acc. to IEC 1131-2)
Nominal voltage:	24 V
Input current at 24 V:	6 mA typ.
Logic input levels:	
U nominal:	24 V
UH max.:	30 V/current 9 mA typ.
UH min.:	19 V/current 2 mA typ.
UL max.:	14 V/current 0.6 mA typ.
UL min.:	0 V/current 0 mA typ.
Optical isolation:	Through opto-couplers, 1000 V from PC to peripheral
Signal delay:	70 µs (at 24 V)
Maximal input frequency:	5 kHz (at 24 V)

Digital outputs

Number of outputs:	8, optically isolated up to 1000 V through opto-couplers
Output type:	High side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	10 V to 36 V, min. 5 V (via front connector)
Max. current for 8 outputs:	3 A typ.
Output current/output:	500 mA max.
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1 Ω:	1.5 A
RDS ON resistance:	0.4 Ω max.
Switch-on time:	I out=0.5 A, load = resistance: 100 µs
Switch-off time:	I out=0.5 A, load = resistance: 60 µs
Overtemperature (shutdown):	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Diagnostics (pin 19)	Diagnostics at output overload and overtemperature
Watchdog:	Timer-programmable 20 ms to 5 s in steps of 20 ms

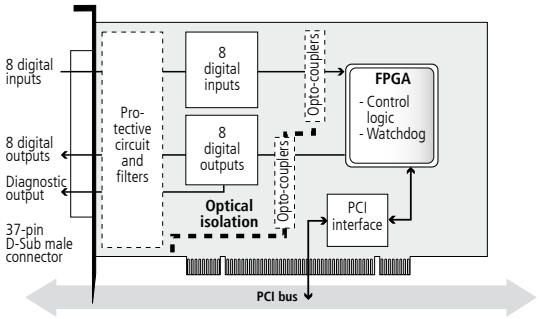
EMC – Electromagnetic compatibility

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.

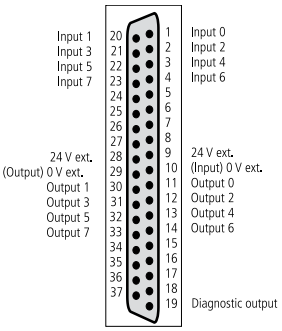
Physical and environmental conditions

Dimensions:	131x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	210 mA ±10 % typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

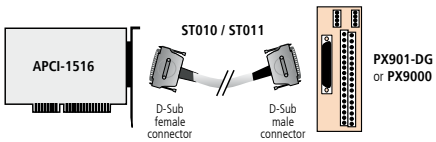


Pin assignment – 37-pin D-Sub male connector

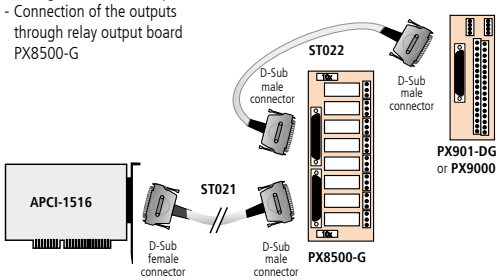


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panels



Example 2
- Connection of the inputs through screw terminal panel PX901-DG
- Connection of the outputs through relay output board PX8500-G



Ordering information

APCI-1516

Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V. Incl. technical description, software drivers

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, with LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents
ST021: Round cable between APCI-1516 and PX8500-G, shielded, twisted pairs, 2 m
ST022: Round cable between PX8500-G and PX 901 or PX9000, shielded, 2 m
ST8500: Ribbon cable for cascading two PX 8500

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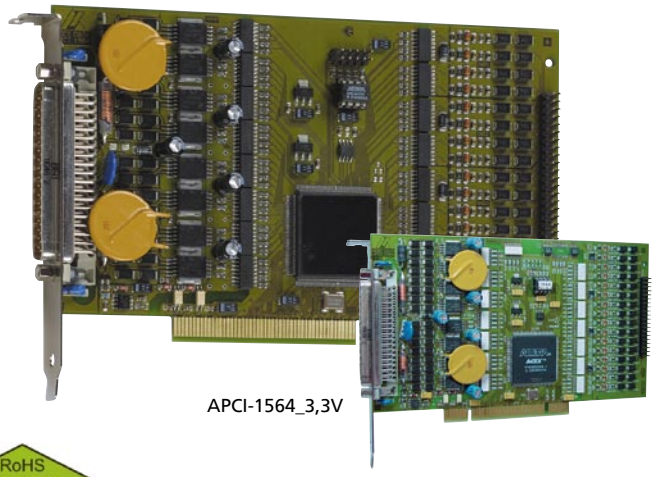
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V



APCI-1564_3,3V

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS see page 122

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

APCI-1564 / APCI-1564_3,3V

PCI 5 V (APCI-1564)
PCI 3.3 V (APCI-1564_3,3V)

32 digital inputs, 24 V, including 16 interruptible, filtered

32 digital outputs, 24 V, 500 mA/channel, filtered

Optical isolation 1000 V

Watchdog, timer, 3 x 32-bit counters up to 500 kHz

The outputs are reset to "0" at Power-On

Features

- 32-bit, 33 MHz, PCI interface
- PCI 5 V (APCI-1564)
- PCI 3.3 V (APCI-1564_3,3V)

Inputs

- 32 optically isolated digital inputs, 24 V, including 16 interruptible and 3 counter inputs
- Inputs organised in 4 groups of 8 channels, each group has its own ground line
- Reverse voltage protection
- All inputs are filtered

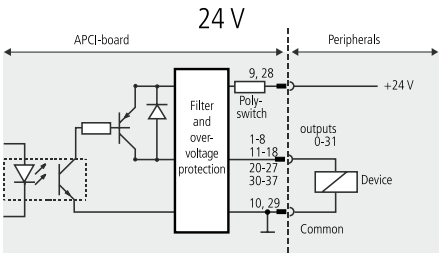
Outputs

- 32 optically isolated digital outputs, 10 V to 36 V
- Output current per channel 500 mA
- Watchdog for resetting the outputs to "0"
- At Power-On, the outputs are reset to "0"
- Total current for 16 outputs ~ 3 A
- Total current for 32 outputs ~ 6 A
- Electronic fuse
- Short-circuit current per output ~1.5 A
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI

Connection principle of the 24 V outputs



- Interrupt started through counter, timer
- Separate ground lines for inputs and outputs

Applications

- Industrial I/O control • PLC coupling • Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog • Machine interfacing
- ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:

Digital input • Digital output
Watchdog • Timer • Counter

On request:

Further operating systems, compilers and samples.

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

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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Digital inputs

Number of inputs:	32; 4 groups of channels with common ground: Input: 0-7, 8-15, 16-23, 24-31 - 0-2: fast counter inputs, 500 kHz - 4-19: interruptible inputs	
Optical isolation:	Through opto-couplers, 1000 V	
	Channel 0-3	**Channel 4-31**
Input current at 24 V:	10.5 mA typ.	5 mA typ.
Logic input levels:		
U nominal	24 V	24 V
UH max.	26 V / 12.3 mA typ.	26 V / 5 mA typ.
UH min.	19 V / 5.5 mA typ.	19 V / 3.2 mA typ.
UL max.	14 V / 0.7 mA typ.	14 V / 1.3 mA typ.
UL min.	0 V / 0 mA typ.	0 V / 0 mA typ.
Signal delay:	1 µs	70 µs
Maximal input frequency:	500 kHz	5 kHz

Digital outputs

Number of outputs:	32, optically isolated up to 1000 V
Output type:	High side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	10 V to 36 V)
Max. current for 16 / 32 outputs:	3 A typ./6 A typ.
Output current/output:	500 mA max.
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1 Ω:	1.5 A
RDS ON resistance:	0.4 Ω max.
Switch-on time:	I out=0.5 A, load = resistance: 94 µs typ.
Switch-off time:	I out=0.5 A, load = resistance: 8 µs typ.
Overtemperature (shutdown):	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Diagnostics:	Pin 19: status bit or interrupt to the PC
Timer:	12-bit
Watchdog:	8-bit, timer-programmable from 20 ms to 5 s in steps of 20 ms

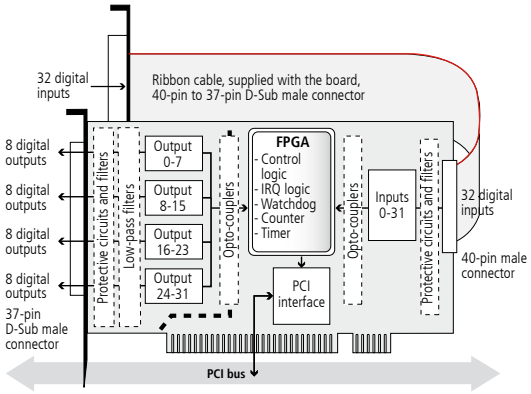
EMC – Electromagnetic compatibility

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.

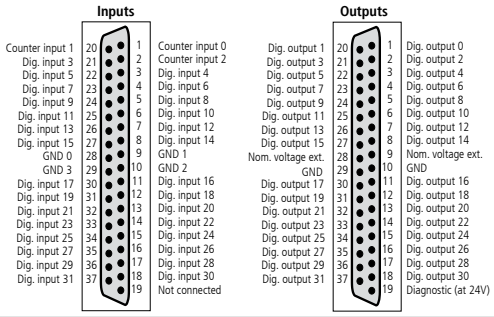
Physical and environmental conditions

Dimensions:	171 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG) or 3.3 V
Space required:	1 PCI slot + 1 additional slot opening
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	410 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector for 32 digital outputs
Additional connector:	37-pin D-Sub male connector on separate bracket for 32 digital inputs
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

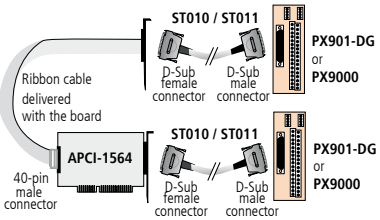


Pin assignment – 37-pin D-Sub male connector

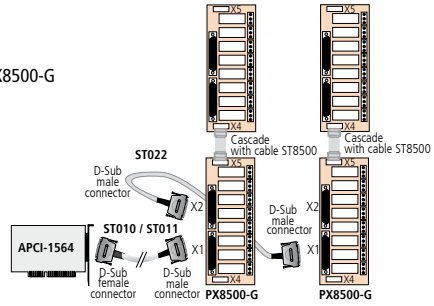


ADDI-DATA connection

Example 1:
- Connection of the inputs (Ribbon cable)
- Connection of the outputs through screw terminal panel PX901-DG or PX9000



Example 2:
Connection of the outputs with relay output board PX8500-G cascaded in 32 relays



Ordering information

APCI-1564/APCI-1564_3,3V

APCI-1564: Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V. Incl. ribbon cable, technical description, software drivers
APCI-1564_3,3V: Same as APCI-1564, for PCI 3.3 V

Accessories

PX901-D: Screw terminal panel
PX901-DG: Screw terminal panel for DIN rail
PX9000: 3-row screw terminal panel
PX8500-G: Relay output board for DIN rail, cascadable
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (24 V supply separate)
ST022: Between 2 relay output boards PX8500-G
ST8500: Ribbon cable for cascading two PX8500-G

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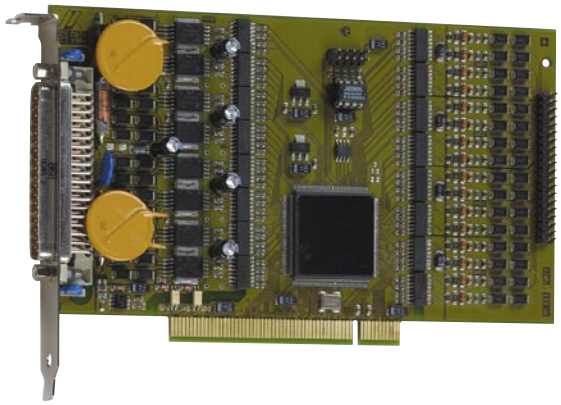
Digital I/O board, optically isolated, 64 digital inputs and outputs, 5 V



APCI-1564-5V / APCI-1564-5V-HS

32 digital inputs, 5 V,
including 16 interruptible, filtered

32 digital outputs, 5 V, 500 mA/channel, filtered
open collector (5V) or high side (5V-HS)

Optical isolation 1000 V

Watchdog, timer, 3 x 32-bit counters
up to 500 kHz

The outputs are reset to "0" at Power-On

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS® see page 122

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- 32-bit, 33 MHz, PCI interface
- PCI 5 V

Inputs

- 32 optically isolated digital inputs, 5 V, including 16 interruptible and 3 counter inputs
- Inputs organised in 4 groups of 8 channels, each group has its own ground line
- Reverse voltage protection
- All inputs are filtered

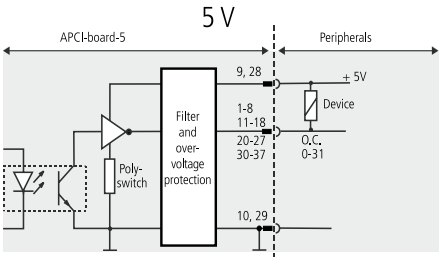
Outputs

- 32 optically isolated digital outputs, 5 V
  APCI-1564-5V: Open Collector outputs
  APCI-1564-5V-HS: High-side outputs
- Output current per channel 50 mA
- Watchdog for resetting the outputs to "0"
- At Power-On, the outputs are reset to "0"
- Total current for 8 outputs ~ 0.5 A (via PTC)
- Electronic fuse
- Short-circuit current per output ~1.5 A
- Overtemperature and overvoltage protection
- Output capacitors against electromagnetic emissions
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI

Connection principle of the 5 V outputs



- Interrupt started through counter, timer
- Separate ground lines for inputs and outputs

Applications

- Industrial I/O control • PLC coupling • Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog • Machine interfacing
- ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:

Digital input • Digital output
Watchdog • Timer • Counter

On request:

Further operating systems, compilers and samples.

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

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Specifications

Digital inputs

Number of inputs:	32; 4 groups of channels with common ground: Input: 0-7, 8-15, 16-23, 24-31 - 0-2: fast counter inputs, 500 kHz - 4-19: interruptible inputs	
Optical isolation:	Through opto-couplers, 1000 V	
	Channel 0-3	**Channel 4-31**
Input current at 5 V:	8,5 mA typ.	6 mA typ.
Logic input levels:		
U nominal	5 V	5 V
UH max.	6 V / 11.3 mA typ.	6 V / 8.4 mA typ.
UH min.	4 V / 5.5 mA typ.	4 V / 4 mA typ.
UL max.	2 V / 1 mA typ.	2 V / 0.8 mA typ.
UL min.	0 V / 0 mA typ.	0 V / 0 mA typ.
Signal delay:	1 µs	70 µs
Maximal input frequency:	500 kHz	5 kHz

Digital outputs

Number of outputs:	32, optically isolated up to 1000 V	
Output type:	High side (load to ground) acc. to IEC 1131-2 Open collector (only APCI-1564-5V)	
Nominal voltage:	5 V	
Supply voltage:	5 V to 35 V (APCI-1564-5V-HS) 5 V to 12 V (APCI-1564-5V)	
Max. current for 16 / 32 outputs:	0.8 A typ./1.6 A typ.	
Output current/output:	50 mA max.	
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1 Ω:	1.5 A	
RDS ON resistance:	0.4 Ω max.	
Switch-on time:	I out=50 mA,	load = resistance: 250 µs typ.
Switch-off time:	I out=50 mA,	load = resistance: 3 µs typ.
Overtemperature (shutdown):	170 °C (output driver)	
Temperature hysteresis:	20 °C (output driver)	

Safety

Diagnostics:	Pin 19: status bit or interrupt to the PC
Timer:	12-bit
Watchdog:	8-bit, timer-programmable from 20 ms to 5 s in steps of 20 ms

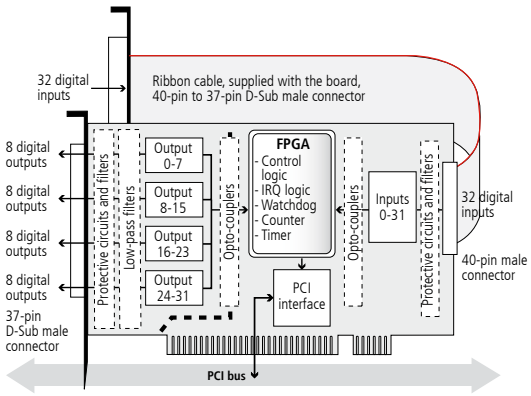
EMC – Electromagnetic compatibility

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.

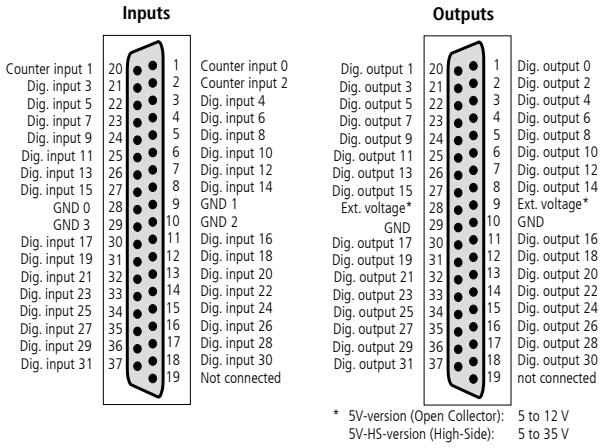
Physical and environmental conditions

Dimensions:	171 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG) or 3.3 V
Space required:	1 PCI slot + 1 additional slot opening
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	410 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector for 32 digital outputs
Additional connector:	37-pin D-Sub male connector on separate bracket for 32 digital inputs
Temperature range:	0 to 60 °C (with forced cooling)

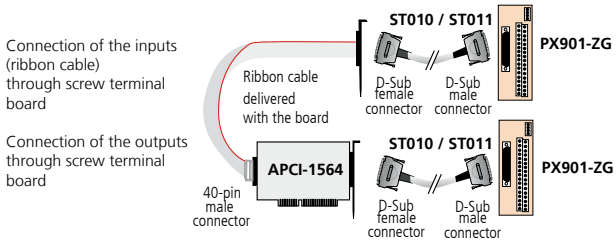
Simplified block diagram



Pin assignment – 37-pin D-Sub male connector



ADDI-DATA connection



Ordering information

APCI-1564-5V/APCI-1564-5V-HS

Digital I/O board, optically isolated, 64 digital inputs and outputs, 5 V. Incl. ribbon cable, technical description, software drivers

APCI-1564-5V: open collector outputs
APCI-1564-5V-HS: high-side outputs

Accessories

PX 901-ZG: Screw terminal panel (only for APCI-1564-5V)
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

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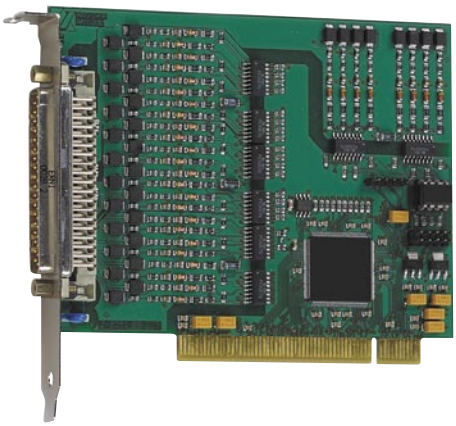
Digital input board, optically isolated, 32 digital inputs, 24 V / 5 V



APCI-1032 / APCI-1032-5

32 digital inputs, 24 V or 5 V, including 16 interruptible inputs

Optical isolation 1000 V

Input filters

Reverse voltage protection

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- 32 optically isolated digital inputs, 24 V (APCI-1032) or as 5 V version (APCI-1032-5) including 16 interruptible inputs

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Reverse voltage protection
- All inputs are filtered
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Additional noise suppression on the interrupt lines

Applications

- Industrial I/O control
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Machine interfacing
- ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:

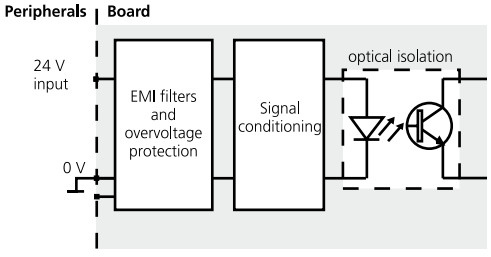
Digital input

On request:

Further operating systems, compilers and samples.

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

Protective circuit for the input channels



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Specifications

Digital inputs

Number of inputs:	32	
Optical isolation:	through opto-couplers, 1000 V from PC to peripherals	
Interruptible inputs:	16 (input 0 to 15)	
Interrupt compare logic:	AND and OR mode	
Nominal voltage:	24 V (APCI-1032);	5 V (APCI-1032-5)
Input current at U nominal:	5 mA (24 V),	6 mA typ. (5 V)
Logic input levels:	U nominal: 24 V	U nominal: 5 V
UH max.:	30 V/current 7.3 mA typ.	6 V/8.4 mA typ
UH min.:	19 V/current 3.2 mA typ.	4 V/4 mA typ.
UL max.:	14 V/current 1.3 mA typ.	2 V/0.7 mA typ.
UL min. at nominal voltage:	0 V/current 0 mA typ.	
Signal delay:	70 µs	
Maximal input frequency:	5 kHz at nominal voltage	

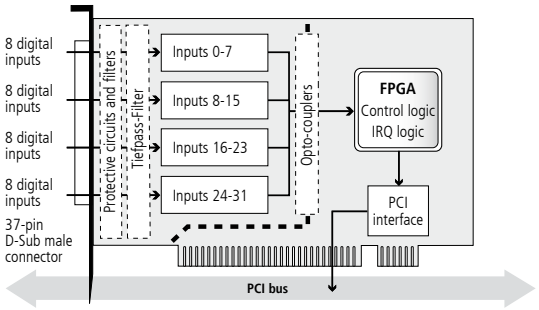
EMC – Electromagnetic compatibility

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.

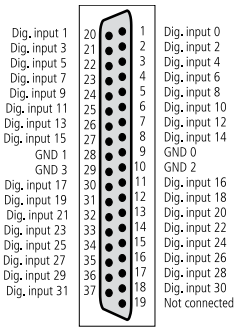
Physical and environmental conditions

Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Max. current consumption:	(+5 V from the PC) 140 mA ± 10 %
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

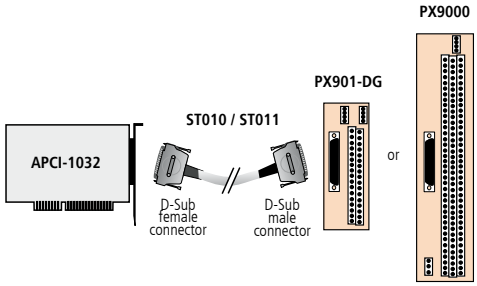


Pin assignment – 37-pin D-Sub male connector



APCI-1032
Screw terminal panels PX9000 and PX901-DG with cable ST010

ADDI-DATA connection for the APCI-1032



(without illustration: The APCI-1032-5 can only be connected to the PX901-ZG)

Ordering information

APCI-1032 / APCI-1032-5

APCI-1032: Digital input board, optically isolated, 32 digital inputs, 24 V. Incl. technical description and software drivers
APCI-1032-5: Digital input board, optically isolated, 32 digital inputs, 5 V. Incl. technical description and software drivers

Accessories for the APCI-1032

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, LED status display
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

Accessories for the APCI-1032-5

PX 901-ZG: Screw terminal panel, for DIN rail
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

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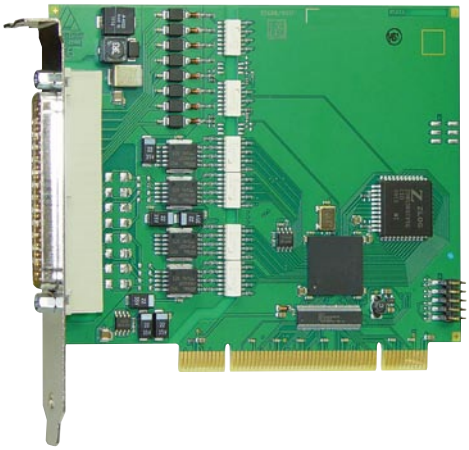
Digital input board, optically isolated, 16 digital inputs, 24 V



APCI-1016

16 digital inputs, 24 V

Optical isolation 1000 V

Input filters

Reverse voltage protection

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- 16 optically isolated digital inputs, 24 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Reverse voltage protection
- All inputs are filtered
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI

Applications

- Industrial I/O control
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Machine interfacing
- ...

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 • DIAdem

ADDIPACK functions:

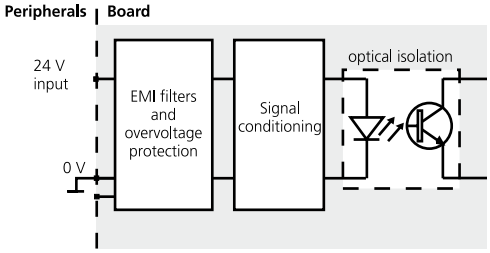
Digital input

On request:

Further operating systems, compilers and samples.

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

Protective circuit for the input channels



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ADDI-DATA® SPIRIT OF EXCELLENCE

PCI

Specifications

Digital inputs

Number of inputs:	16
Optical isolation:	Through opto-couplers, 1000 V from PC to peripheral
Nominal voltage:	24 V
Input current at U nominal:	6 mA typ.
Logic input levels:	U nominal: 24 V
UH max.:	30 V/current 9 mA typ.
UH min.:	19 V/current 2 mA typ.
UL max.:	14 V/current 0.7 mA typ.
UL min. at nominal voltage:	0 V/current 0 mA typ.
Signal delay:	70 µs
Maximal input frequency:	5 kHz at nominal voltage

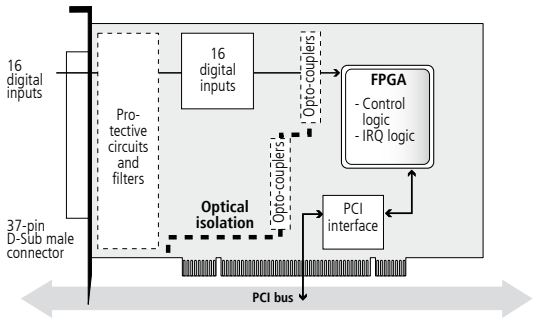
EMC – Electromagnetic compatibility

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.

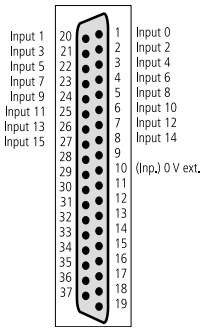
Physical and environmental conditions

Dimensions:	131 x 99 mm (PCI short)
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Max. current consumption:	(+5 V from the PC) 190 mA ± 10 mA typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

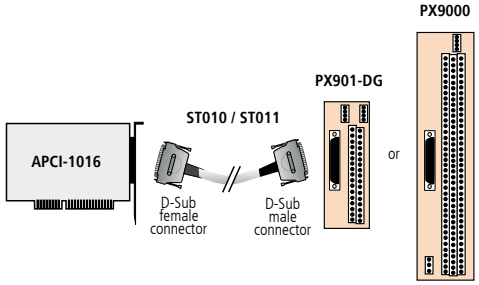
Simplified block diagram



Pin assignment – 37-pin D-Sub male connector



ADDI-DATA connection



APCI-1016
Screw terminal panels PX9000 and PX901-DG with cable ST010

Ordering information

APCI-1016
Digital input board, optically isolated, 16 digital inputs, 24 V. Incl. technical description and software drivers

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, LED status display
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

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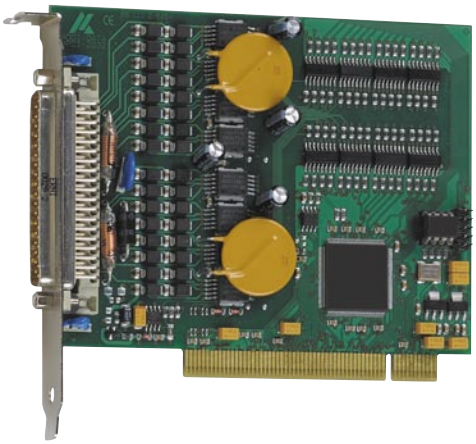
Digital output board, optically isolated, 32 digital outputs, 24 V / 5 V



APCI-2032 /APCI-2032-5

32 digital outputs, 24 V or 5 V, 500 mA/channel

Optical isolation 1000 V

Output filters, short-circuit protection

Watchdog

The outputs are reset to "0" at Power-On

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- 32 digital outputs, 24 V (APCI-2032) or as 5 V version (APCI-2032-5), optically isolated
- Output current per channel: 500 mA
- Voltage range: 10 V to 36 V
- Diagnostic report, through status register at short-circuits, overtemperature, voltage drop or watchdog
- Programmable watchdog for resetting the outputs to "0", function release through software
- Interrupt triggered through error
- At Power-On the outputs are reset to „0"

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Maximum output current for 32 outputs 6 A typ. (2 x 3 A)
- 24 V power outputs with protection diodes and filters
- Self-resetting fuse (electronic fuse)
- Short-circuit current per output 1.5 A typ.
- Output capacitors against electromagnetic emissions
- Fast demagnetisation in case of inductive loads
- External 24 V voltage supply screened and filtered

Applications

- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog timer • Machine interfacing

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 • DIAdem

ADDIPACK functions:

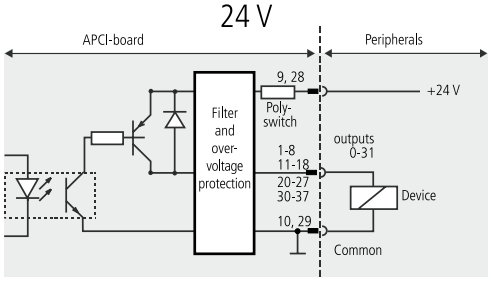
Digital output • Watchdog

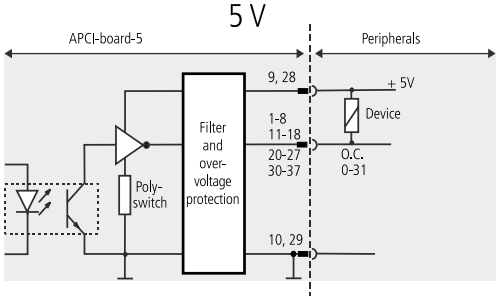
On request:

Further operating systems, compilers and samples.

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

Connection principle of the outputs at 24 V (APCI-2032) and 5 V (APCI-2032-5)





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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Digital outputs

Outputs:	32
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	through opto-couplers, 1000 V from PC to peripheral
Nominal voltage:	24 V (APCI-2032); or 5 V (APCI-2032-5)
Supply voltage:	for 24 V version: 10 V to 36 V for 5 V version: 5 V to 12 V via front connector
Max. current for 32 outputs:	6 A typ. (2x3 A)
Output current:	500 mA max./channel
Short-circuit current/output shutdown at 24 V, $R_{load} < 0.1\ \Omega$:	1.5 A
RDS ON resistance:	0.4 Ω max.
Switch-on time:	I out=0.5 A, load = resistance: 94 µs typ. (APCI-2032) I out=50 mA, load = resistance: 250 µs typ. (APCI-2032-5V)
Switch-off time:	I out=0.5 A, load = resistance: 8 µs typ. (APCI-2032) I out=50 mA, load = resistance: 3 µs typ. (APCI-2032-5V)
Overtemperature (shutdown):	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shut-down logic (V_{CC} diagnostic):	If the ext. 24 V voltage drops below 5 V, then the outputs are switched off.
CC-Diagnostics:	Pin 19: status bit or interrupt to the PC
Watchdog:	8-bit, programmable, 20 ms up to 5 s in steps of 20 ms

EMC – Electromagnetic compatibility

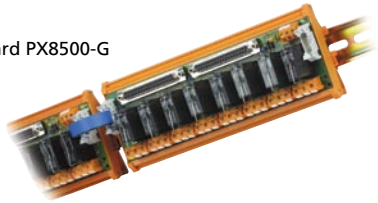
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

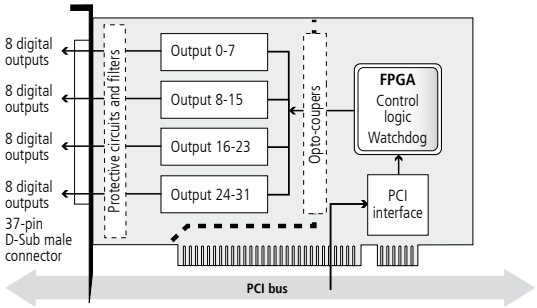
Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	230 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-DG with cable ST010

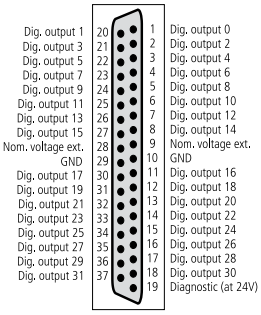
Relay output board PX8500-G



Simplified block diagram

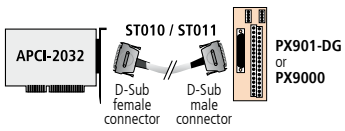


Pin assignment – 37-pin D-Sub male connector

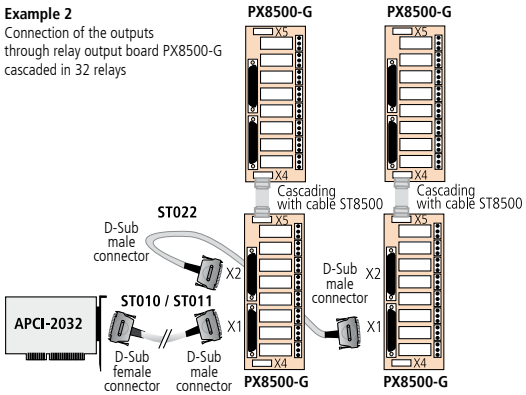


ADDI-DATA connection

Example 1
Connection of the outputs through screw terminal panels



Example 2
Connection of the outputs through relay output board PX8500-G cascaded in 32 relays



Ordering information

APCI-2032 /APCI-2032-5

APCI-2032: Digital output board, optically isolated, 32 digital outputs, 24 V. Incl. technical description and software drivers
APCI-2032-5: Digital output board, optically isolated, 32 digital outputs, 5 V. Incl. technical description and software drivers

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Same as PX901-D, for DIN rail
PX 901-ZG: Screw terminal panel (only APCI-2032-5)
PX9000: 3-row screw terminal panel for DIN rail, LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (24 V supply separate)
ST022: Round cable between two PX8500-G, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

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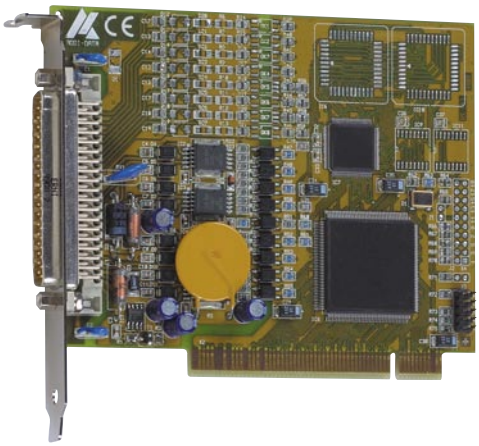
Digital output board, optically isolated, 16 digital outputs, 24 V



APCI-2016

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Output filter, short-circuit protection

Watchdog

The outputs are reset to "0" at Power-On

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- 16 optically isolated digital outputs, 10 V to 36 V
- Output current per channel 500 mA
- Watchdog for resetting the outputs to "0"
- One ground line for all outputs
- At Power-On, the outputs are reset to "0"

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Short-circuit current for 16 outputs ~ 3 A typ.
- Short-circuit current per output ~ 1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- External 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V
- Diagnostic function for detecting short-circuits and overtemperature

Applications

- Control of industrial PC-based processes
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- Machine interfacing, ...

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 • DIAdem

ADDIPACK functions:

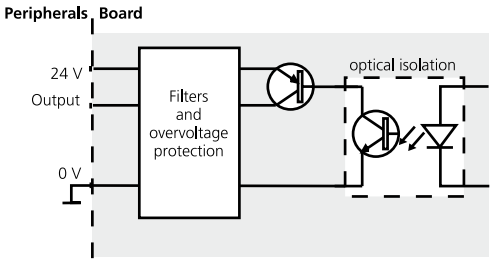
Digital output • Watchdog

On request:

Further operating systems, compilers and samples.

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

Protective circuit for the output channels



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PCI

Specifications

Digital outputs

Number of outputs:	16
Optical isolation:	Through opto-couplers, 1000 V from PC to peripheral
Output type:	High-side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	10 V to 36 V, min. 5 V (via front connector)
Max. current for 16 outputs:	3 A typ.
Output current/output:	500 mA max.
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1Ω:	1.5 A
RDS ON resistance:	0.4 Ω max.
Switch-on time:	I out=0.5 A, load = resistance: 100 µs
Switch-off time:	I out=0.5 A, load = resistance: 60 µs
Overtemperature (shutdown):	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Watchdog:	8-bit, programmable, 20 ms up to 5 s in steps of 20 ms

EMC – Electromagnetic compatibility

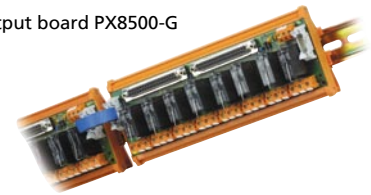
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

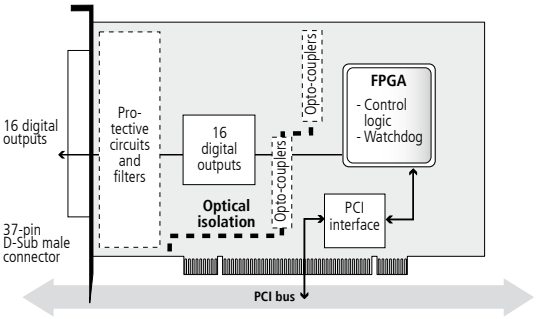
Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	233 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-DG with cable ST010

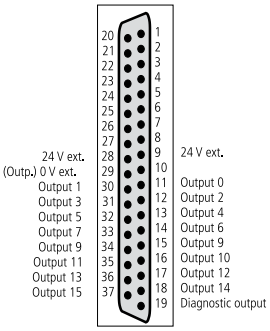
Relay output board PX8500-G



Simplified block diagram

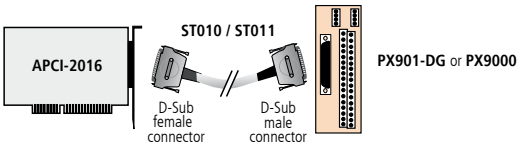


Pin assignment – 37-pin D-Sub male connector

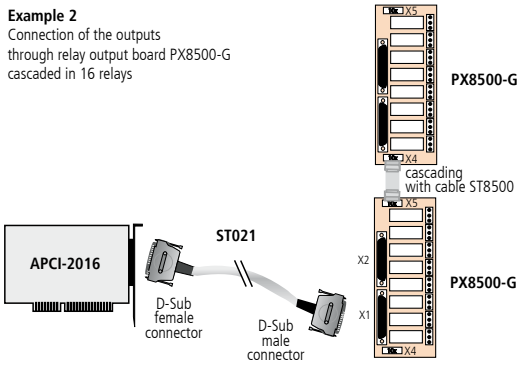


ADDI-DATA connection

Example 1
Connection of the outputs through screw terminal panels



Example 2
Connection of the outputs through relay output board PX8500-G cascaded in 16 relays



Ordering information

APCI-2016

Digital output board, optically isolated, 16 digital outputs, 24 V. Incl. technical description and software drivers

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (separate 24 V supply)
ST021: Round cable between APCI-2016 and PX8500-G, shielded, twisted pairs, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

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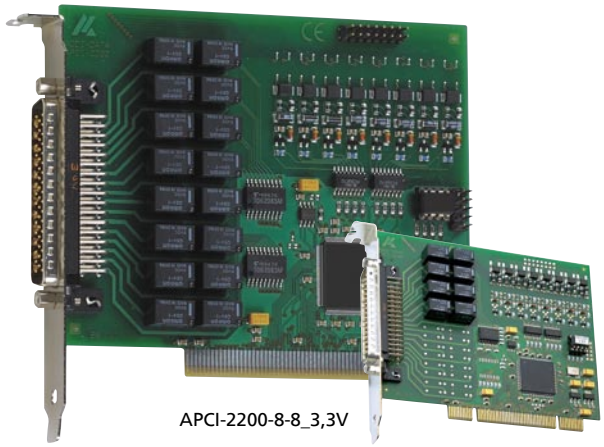
Relay board, optically isolated, 8/16 relays, 8 digital inputs, 24 V



APCI-2200-8-8_3,3V

APCI-2200 /APCI-2200-8-8_3,3V

PCI 5 V (APCI-2200)

PCI 3.3 V (APCI-2200-8-8_3,3V)

8 or 16 relay output channels

Max. switching voltage 60 VDC, 48 VAC

max. switching current 1 A

8 digital inputs 24 V

Optical isolation 1000 V

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS
see APCIe-2200 page 126

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

Features

- PCI 5 V (APCI-2200)
- PCI 3.3 V (APCI-2200-8-8_3,3V)

Relays

- 8 or 16 electromechanical relays with change-over contacts
- Max. switching voltage for the relays: 60 VDC, 48 VAC
- Max. switching capacity: 30 W, max. 1 A
- Short response time
- Watchdog: switched on/off through software

Digital inputs

- 8 inputs, optically isolated
- Input voltage: 12-24 V (DC)

Safety features

- EMC tested
- Watchdog activity can be read back
- Optical isolation of the relays
- Creeping distance IEC 61010-1

Applications

- Industrial digital I/O controlling
- Automatic test equipment
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Alarm monitoring
- Machine interfacing
- ...

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 • DIAdem

ADDIPACK functions:

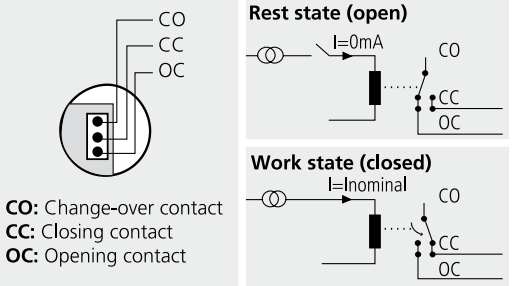
Digital output • Watchdog

On request:

Further operating systems, compilers and samples.

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

Function principle of the relays



CO: Change-over contact
CC: Closing contact
OC: Opening contact

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Specifications

Relays

Type of contacts:	8/16 change-over
Max. switching voltage:	60 VDC, 48 VAC
Max. switching current:	1 A
Max. switching capacity:	30 W
Contact resistance:	< 100 mΩ
Contact material:	Ag and Au plated
Response time:	Max. 5 ms, typ. 2.5 ms
Release time:	Max. 5 ms, typ. 0.9 ms
Mechanical life:	5 x 10^6 operations
Electrical life:	10^5 operations at rated load

Digital inputs

Number of inputs:	8
Optical isolation:	Through opto-couplers, 1000 V
Nominal voltage:	12 - 24 V (DC)
Nominal input current at 12 - 24 V (DC):	5 - 8 mA
Signal delay:	70 µs (at 24 V)
Maximal input frequency:	5 kHz (at 24 V)

Watchdog

Watchdog time:	20 ms to 5 s in steps of 20 ms

Safety

Test voltage:	1000 V
Watchdog:	8-bit, programmable, 20 ms to 5 s in steps of 20 ms

EMC – Electromagnetic compatibility

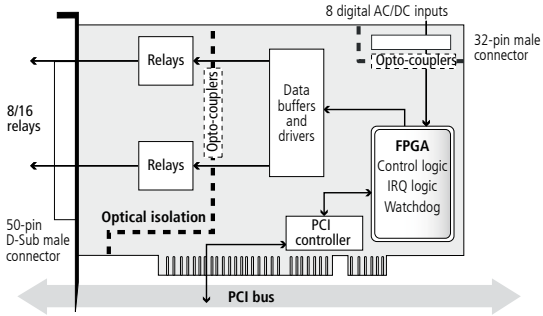
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG) or 3.3 V
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	550 mA ± 10 % typ. (APCI-2200-16-8)
Front connector:	50-pin D-Sub male connector
Additional connector:	16-pin male connector. APCI-2200-16-8: Connection with delivered ribbon cable FB2200-3. Connects the board to a bracket with a 37-pin D-Sub male connector. For connecting the PX 901-ZG.
Temperature range:	0 up to 60 °C (with forced cooling)

Screw terminal panel PX8001
with cable ST370-16

Simplified block diagram



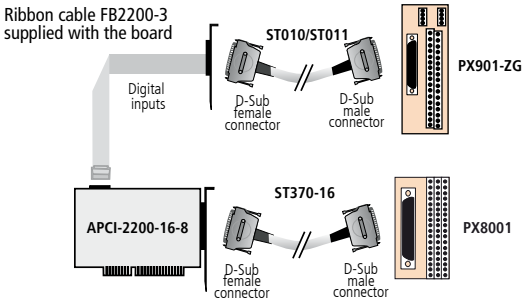
Pin assignment – 50-pin D-Sub connector APCI-2200-16-8

Pin		Pin			Pin		Pin
34	OC of relay 0	18	CC of relay 0	34 ● 18	1	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	35	2	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	36	3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37	4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38	5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39	6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40	7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41	8	CO of relay 7	8
42	OC of relay 8	26	CC of relay 8	42	9	CO of relay 8	9
43	OC of relay 9	27	CC of relay 9	43	10	CO of relay 9	10
44	OC of relay 10	28	CC of relay 10	44	11	CO of relay 10	11
45	OC of relay 11	29	CC of relay 11	45	12	CO of relay 11	12
46	OC of relay 12	30	CC of relay 12	46	13	CO of relay 12	13
47	OC of relay 13	31	CC of relay 13	47	14	CO of relay 13	14
48	OC of relay 14	32	CC of relay 14	48	15	CO of relay 14	15
49	OC of relay 15	33	CC of relay 15	49	16	CO of relay 15	16
50	-			50 ● 33	17	-	17

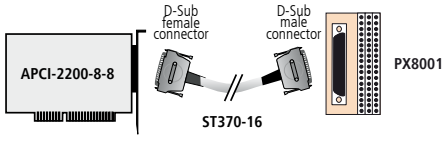
OC: Opening contact CC: Closing contact CO: Change-over contact

ADDI-DATA connection

Example 1: APCI-2200-16-8
- Connection of the relay outputs through screw terminal panel PX8001
- Connection of the digital inputs through ribbon cable to the screw terminal panel PX901-ZG



Example 2: APCI-2200-8-8, APCI-2200-8, APCI-2200-16
Connection of the relay outputs and the digital inputs through the front connector to the screw terminal panel



Ordering information

APCI-2200 /APCI-2200-8-8_3,3V

Relay board, optically isolated, 8/16 relays output channels, 8 digital inputs, 24 V. Incl. technical description and software drivers.

APCI-2200-16-8:	16 relays, 8 dig. inputs, with ribbon cable for the connection of the dig. inputs, PCI 5 V
APCI-2200-8-8:	8 relays, 8 digital inputs, 24 V, PCI 5 V
APCI-2200-8-8_3,3V:	8 relays, 8 digital inputs, 24 V, PCI 3.3 V
APCI-2200-16:	16 relays, PCI 5 V
APCI-2200-8:	8 relays, PCI 5 V

Accessories

PX8001:	3-row screw terminal panel, 50-pin, for DIN-rail mounting
ST370-16:	Shielded round cable, 2 m
PX 901-ZG:	Screw terminal panel for DIN rail

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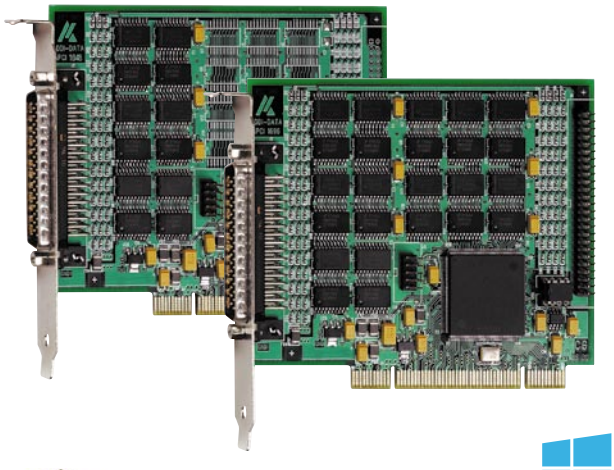
TTL I/O board,
48 or 96 digital TTL inputs and outputs



RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

APCI-1696 – 96 digital TTL I/O

APCI-1648 – 48 digital TTL I/O

Driver capacity up to 15 TTL loads

Can be configured as inputs or outputs in groups of 8 channels

Filters on each I/O line

LabVIEW™ LabWindows/CVI™

Features

- PCI 3.3 V or 5 V
- 48 digital TTL inputs/outputs (APCI-1648)
- 96 digital TTL inputs/outputs (APCI-1696)
- Each group of 8 lines (1 port) can be configured as input or output.
- All I/Os are driven through pull-up resistors to 5 V
- Easy programming through I/O read/write commands

Connection

- APCI-1648: 50-pin D-Sub male connector
- APCI-1696: 50-pin D-Sub male connector and
  I/O 49 - 96 to 50-pin male connector

Software drivers

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

ADDIPACK functions:

Digital input • Digital output

On request:

Further operating systems, compilers and samples.
Driver download: www.addi-data.com/downloads

Specifications

48 TTL I/O channels - 96 TTL I/O channels

Inputs and outputs:	48 digital TTL I/O (APCI-1648) 96 digital TTL I/O (APCI-1696)
I/O address range:	128 byte
Addressing:	32-bit
Programming:	Through write/read commands
Driver type:	74 HC 574
Max. input and output voltage:	TTL Level
Output current:	DC ± 35 mA

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:	131 x 99 mm
System bus:	universal PCI 32-bit 3.3/5V acc. to spec. 2.2 (PCISIG)
Space required:	1 PCI slot + 1 slot opening for bracket (APCI-1696)
Operating voltage:	+5 V ± 5 % from the PC
Current consumption:	124 mA ± 10 % (APCI-1696, all channels as output without load)
Connectors:	APCI-1648: 50-pin D-Sub male connector APCI-1696: 50-pin D-Sub male connector 50-pin D-Sub male connector and I/O 49 - 96 to 50-pin male connector
Temperature range:	0 to 60 °C (with forced cooling)

Ordering information

APCI-1648: TTL I/O board, 48 digital TTL inputs and outputs. Incl. technical description and software drivers.
APCI-1696: TTL I/O board, 96 digital TTL inputs and outputs.
Incl. ribbon cable FB1696, technical description and software drivers.

Accessories

PX8001: 3-row screw terminal panel, 50-pin, for DIN-rail mounting
ST370-16: Shielded round cable, 2 m
Accessories for the APCI-1696: Please order 2 x PX8001 and 2 x ST370-16

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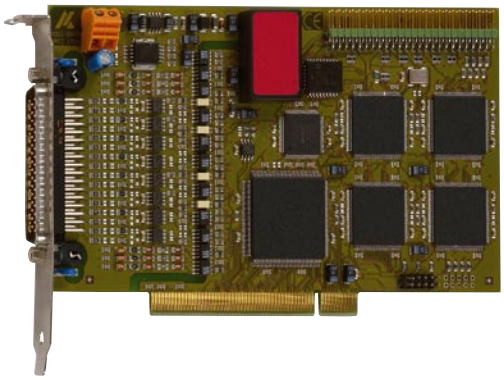
Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM, ...



APCI-1710

Available functions:
incremental counter, SSI synchronous serial interface, counter/timer, pulse acquisition, frequency/pulse width/period duration/velocity measurement, PWM, BiSS-Master, digital inputs and outputs, ...

Function selection through software

Optical isolation

TTL, RS422, 24 V

RoHS 2002/95/EC

Also for *CompactPCI™*
See CPCI-1710, page 234

Also for PCI EXPRESS
see APCIe-1711 page 128

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

DIAdem

DASYLab10 Data Acquisition System Laboratory

for SSI, incremental counter, digital I/O

The board APCI-1710 is a fast multifunction and multi-channel counter board for the PCI bus. The strengths of this board are its wide range of applications and high precision and reliability for rough industrial applications. With this board you can realise many different applications on the same hardware base. The board is supplied with a pool of functions which provides the user with maximum efficiency yet minimum space and parts requirement. The functions are individually configured for each channel through the supplied software. The flexible programming facilities on this board allow many different user applications to be quickly and easily developed and reconfigured as further requirements arise.
Thanks to the FPGA board structure, further counting applications can be realised through software adaptation. Contact us!

Features

- 32-bit data access
- Up to 5 MHz input frequency
- Signals in TTL or RS422 mode (APCI-1710), 24 V signals (APCI-1710-24V)
- Four onboard function modules
- Reprogrammable functions

Functions

- Incremental counter for the acquisition of incremental encoders (90° phase-shifted signals)
- SSI synchronous serial interface. The SSI function is an interface for systems which allow an absolute position information via serial data transfer.
- Counter/timer (82C54)
- Pulse acquisition
- Frequency measurement
- Pulse width modulation (PWM)
- Period duration measurement
- Velocity measurement
- BiSS-Master
- Digital inputs and outputs
- Edge time measurement (ETM)
- Customised functions

Available channels for all four function modules

- 20 channels for digital inputs, optically isolated
- 8 channels, programmable either as digital inputs or outputs, optically isolated
- 4 digital power outputs, optically isolated

Available lines for each function module

8 lines are available for each function module

- Input lines:
  - 2 x TTL and RS422 (APCI-1710)
    or 2 x 24 V (APCI-1710-24V)
  - 3 x 24 V, optional 5 V for channels E, F, G
- Output lines:
  - 1 x 24 V, optional 5 V (power output)
- 2 channels, programmable either as digital inputs or outputs, optically isolated: 2 x TTL, RS422

Safety features

- Creeping distance IEC 61010-1
- Optical isolation 1000 V
- Noise neutralisation of the PC supply

Applications

- Event counting • Position acquisition
- Motion control • Batch counting
- ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Microsoft C
- Borland C++ • Borland C
- Visual Basic • Delphi
- LabVIEW

On request:

Further operating systems, compilers and samples.

Driver download: www.addi-data.com/downloads menu
The software functions can be adapted to your applications on request. The board can also be implemented for other software applications.

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ADDI-DATA® SPIRIT OF EXCELLENCE

Wide range of applications through free combination of function modules

4 function modules quickly and easily programmable with numerous functions

Each of the four modules is programmed with one function. You can program 4 times the same function or freely combine 4 different functions.

Configuration example 1			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
1 x 32-bit Incremental counter	1 x 32-bit Incremental counter	4 x Pulse counter	3 x Counter/Timer

Configuration example 2			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
3 x SSI	3 x SSI	1 x 32-bit Incremental counter	8 x Digital I/O, 24 V

Programmable onboard modules

Each onboard module can be programmed with the function of your choice. You can simultaneously operate up to 4 different functions on one board. If your application must be modified, you can load a new function quickly and easily per mouse click in the SET1710 configuration program which is delivered with the board.

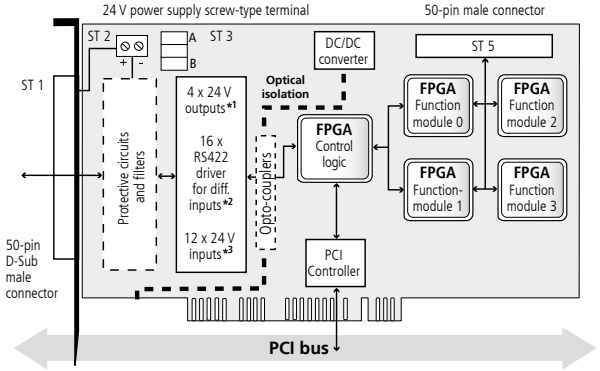
Overview of signal generators resp. functions

Application	Max. number of signal generators or functions for each function module	Max. number of function modules for each APCI-1710	Max. number of signal generators or functions of each APCI-1710	Page
Incremental counter	1 (32-bit) or 2 (16-bit)	4	4 or 8	168
SSI*	3	4	12	168
Chronos	1	4	4	169
BiSS-Master	1	4	4	169
Counter/Timer*	3	4	12	170
TOR	2	4	8	171
Pulse acquisition	4	4	16	172
PWM*	2	4	8	172
ETM	2	4	8	173
Digital I/O	8	4	32	173
TTL	24	1	24	–

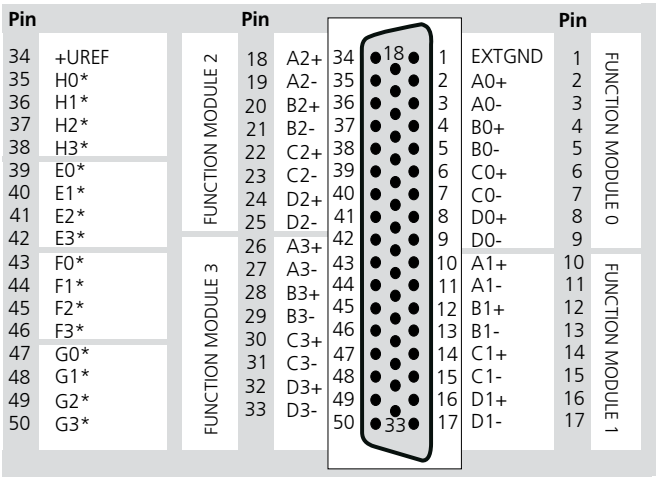
*** Function not available for APCI-1710-24V**

Customer-tailored modifications,
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

Simplified block diagram

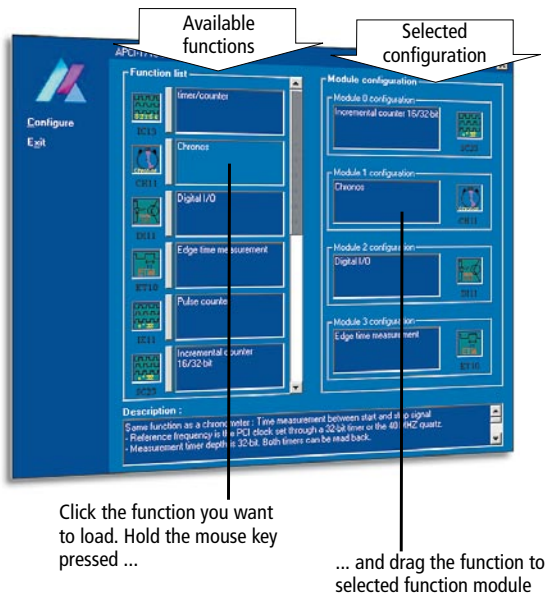


Pin assignment



*Each number corresponds to the number of the function module

Program SET1710



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Function Incremental encoder

Up to 2 incremental encoders can be connected to a module programmed with the function **Incremental encoder**.

- 90° phase-shifted input signals (displacement measurement systems)
- Motion control
- Pulse width and frequency measurement
- Incremental encoder acquisition
- Tolerance measurement
- Velocity measurement
- Rotation measurement
- Electronic "mouse"

Function range of the counter component

- Simple, double, quadruple analysis of 2 phase-shifted clock pulses (A, B)
- Direction recognition for upwards or downwards counting
- Hysteresis circuit for the absorption of the first pulse after a change in rotation; switchable
- 2 x 32-bit data latches, indiv. programmable for internal / external strobe, latch strobe synchronised with an internal clock pulse
- Operating mode is defined by an internal mode register, loadable and readable through the data bus
- Strobe inputs which can be triggered either through 2 external pins (24 V input) or by writing in a register
- Interrupt indication triggered through the external strobe inputs
- Compare logic, interrupt and reference point logic

Used signals

Signal name	Pin name	Signal type	Function
A_x	Ax +/-	Diff./TTL/24 V*	A signal of the incremental encoder (32-bit) resp. A signal of the incremental encoder 0 (16-bit)
B_x	Bx +/-	Diff./TTL/24 V*	B signal of the incremental encoder (32-bit) resp. B signal of the incremental encoder 0 (16-bit)
INDEX_x	Cx +/-	Diff./TTL/24 V*	Index signal of the incremental encoder (32-bit)
C_x	Cx +/-	Diff./TTL/24 V*	A signal of the incremental encoder 1 (2x16-bit)
UAS_x	Dx +/-	Diff./TTL/24 V*	Error signal input (32-bit)
D_x	Dx +/-	Diff./TTL/24 V*	B signal of the incremental encoder 1 (2x16-bit)
REF_x	Ex	24 V / 5 V optional	Digital input (can also control the reference point logic)
ExtStrb_a_x	Fx	24 V / 5 V optional Active High	Digital input (can be used for latch logic, respectively generate an interrupt)
ExtStrb_b_x	Gx	24 V / 5 V optional Active High	Digital input (can be used for latch logic, respectively generate an interrupt)
DIG_OUT_x	Hx	24 V / optional 5 V	Digital output

x: Number of the function module (See pin assignment page 167)
* 24 V for the APCI-1710-24 V

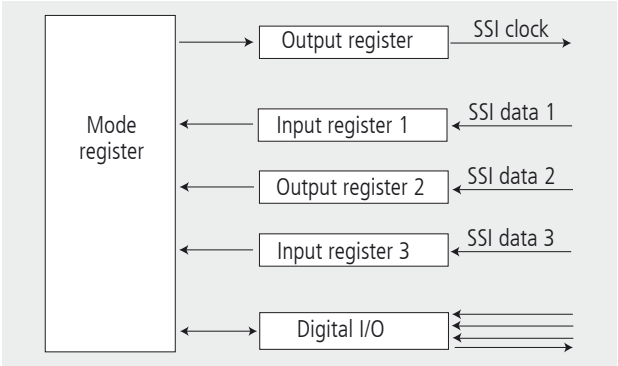
Function Synchronous serial interface (SSI)

The function module is programmed as a synchronous serial interface. The **SSI** function is an interface for systems which allow an absolute position information through serial data transfer.

Typical application examples:

- Acquisition of displacement measurement systems
- Axis control (X, Y and Z)
- Tolerance measurement ...

Block diagram SSI



Properties

- 4 function modules for each board, up to 3 SSI encoders per function module (depends on encoder)
- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Serial data transfer
- Common clock pulse for the 3 interfaces per function module
- Clock frequency and number of data bits are software-programmable
- GRAY to BINARY conversion possible
- For each function module there are 3 digital inputs and 1 digital output for an additional function (no effect on SSI function)

The interface includes:

- Three independent 32-bit SHIFT registers, which can be read through the data bus
- Clock and pulse generator
- Function and control logic

Used signals

Signal name	Pin name	Signal type	Function
Clock_x	Ax +/-	RS422	Clock output signal for the SSI encoders
DATA1_x	Bx +/-	RS422/TTL	Data input 1 for the first encoder
DATA2_x	Cx +/-	RS422/TTL	Data input 2 for the second encoder
DATA3_x	Dx +/-	RS422/TTL	Data input 3 for the third encoder
Input1_x	Ex	24 V / 5 V optional	Digital input 1
Input2_x	Fx	24 V / 5 V optional	Digital input 2
Input3_x	Gx	24 V / 5 V optional	Digital input 3
Output_x	Hx	24 V / 5 V optional	Digital output

x: Number of the function module (See pin assignment page 167)
The SSI function cannot be programmed on the APCI-1710-24 V.

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Function Chronos

The function **Chronos** is a timer interface which allows to measure the time between two "events" like a chronometer.
3 functions are available:
- a 32-bit timer to create a time reference,
- a 32-bit measuring timer to determinate and measure the time between start and stop pulse.
- 3 digital inputs and 3 digital outputs

Properties
- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Interrupt status at the end of the measuring time
- Timer readable
- Input and output channels can be inverted through software, Software GATE possible

Function description
The pulse signals from Timer 0 are counted between the start pulse signal and the stop pulse signal. The number of pulses is then stored in the measuring timer and can be read through I/O read commands. The timer 0 is used as a time reference generator. The divider factor is written in timer 0 and determines the output frequency.
The input frequency is set according to the PCI clock pulse or to the 10 MHz onboard clock generator. Timer 0 is synchronised with the start event or with the 40 MHz quartz of the board.
Timer 0 can be read at any time. The **Chronos** function can be used in 8 different modes.

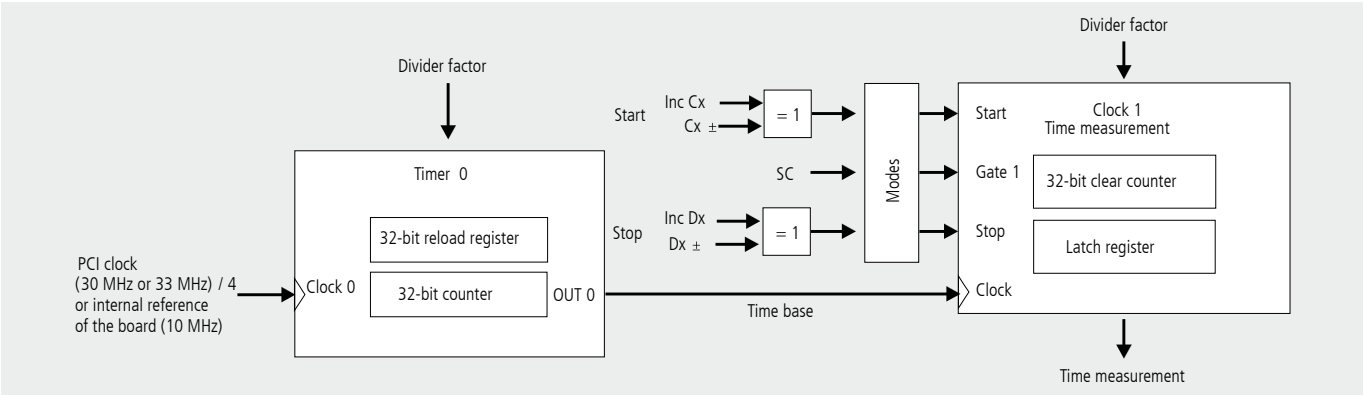
Used signals

Pin name	Signal type	Function
Ax +/-	Diff./TTL, 24 V*	Digital output 1; set to "0" after reset
Bx +/-	Diff./TTL, 24 V*	Digital output 2; set to "0" after reset
Cx +/-	Diff/TTL/24 V*	Start pulse for measuring
Dx +/-	Diff/TTL/24 V*	Stop pulse for measuring
Ex	24 V / 5 V optional	Digital input 0, inverting
Fx	24 V / 5 V optional	Digital input 1, inverting
Gx	24 V / 5 V optional	Digital input 2, inverting
Hx	24 V / 5 V optional	Digital output 0; set to "0" after reset

x: Number of the function module (See pin assignment page 167)

*24 V for the APCI-1710-24 V

Block diagram Chronos



Function BiSS-Master

The function **BiSS-Master** is a bidirectional sensor interface for the communication with positioning encoders. The following types of communications are supported:

Functions of the BiSS-Master:
- Sensor data transmission
- Register data transmission
- Multicycle data transmission

More information about the function range of the BiSS interface on www.biss-interface.com.

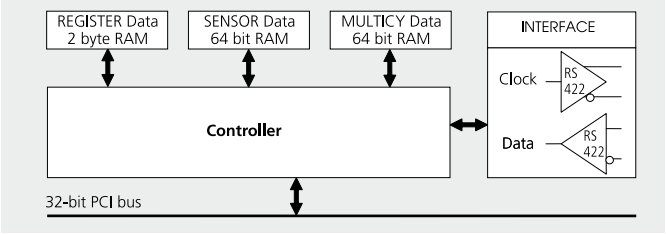
Limits and differences with respect to the BiSS specification:
- One channel available, to which a BiSS slave can be connected
- The functionality "automatic sensor data request" is not available
- Data buffer for two sensor registers available
- The board APCI-1710-10K20 is required

Used signals

Signal name	Pin name	Signal type	Function
Input_Ch1_x	Cx +/-	Diff.	Digital input 1 (data line from slave to master)
Output Ch1_x	Ax +/-	Diff.	Digital output 1 (clock line from master to slave)

x: Number of the function module (See pin assignment page 167)

Block diagram BiSS-Master



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Function Counter/Timer

Function equivalent to Intel 82C54

The module **Counter/Timer** can be used as a programmable interval counter/timer (similar to Intel 82C54) with 3 x 32-bit per module.
It generates time delays through software control. Instead of setting up timing loops in software, the user programs the module for the desired delays. After this delay, the module will interrupt the PC.

- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- 3 x 32-bit counters/timers, binary counting only
- 6 programmable modes
- Status readback and latch command
- Inputs and outputs can be inverted through software
- Hardware and software gate possible, readable
- Simple interface: no multiple assignment of the addresses
- Interrupt enabled with an individual release bit per counter/timer and interrupt status register
- Available clock: PCI clock divided by four (APCI-1710 only) or 10 MHz of the onboard quartz oscillator, selectable through software

Typical applications:

- Event counter
- Programmable rate generator
- Binary rate multiplier
- Square-wave generator
- Complex motor controller / signal generator

Programmable modes

For each counter/timer (3 x 32-bit) there are 6 modes available: mode 0 to mode 5, which can be programmed independently.

Mode 0: Interrupt on terminal count

Mode 0 is particularly suitable for event counting. The output is initially set to "Low" and remains "Low" until the counter reaches 0.
The output then goes "High" and holds this state until a new count or a new counter value is written into the counter.

Mode 1: Hardware retriggerable one-shot

This mode is identical to mode 0 except for the GATE input. The GATE input is not used to activate or deactivate the timer, but to trigger it.

Mode 2: Pulse generator

In this mode the counter is dividing the choosed input clock through the start value "ul_ReloadValue". Mode 2 is used for generating a real-time clock interrupt.
After initialization the output is set to "High". When the initial count has decremented to 1, the output goes "Low". For only one clock pulse the output is setted on "Low" then it goes back to"High". The counter reloads the start value ("ul_ReloadValue") and the counter sequence is repeated.
The number of sequences is unlimited. An interrupt can be generated at the end of the cycle. Calculation of time: (ul_ReloadValue +2) x input clock

Mode 3: Square wave mode

Mode 3 is used for baud rate generation. It is similar to mode 2 except for the duty cycle of the output. The output is initially set to "High". When half the initial count has expired, the output is set to "Low" for the remainder of the count. Mode 3 is periodic; the same sequence is repeated indefinitely.
Calculation of time: (ul_ReloadValue +2) x input clock

Mode 4: Software-triggered strobe

The output is initially set to "High". When the initial count expires, the output goes "Low" for one clock pulse and then goes "High" again. The counting sequence is triggered by writing the initial count.
If a new count is written during counting, it will be loaded on the next clock pulse and counting will continue from the new count.

Mode 5: Hardware-triggered strobe (retriggerable)

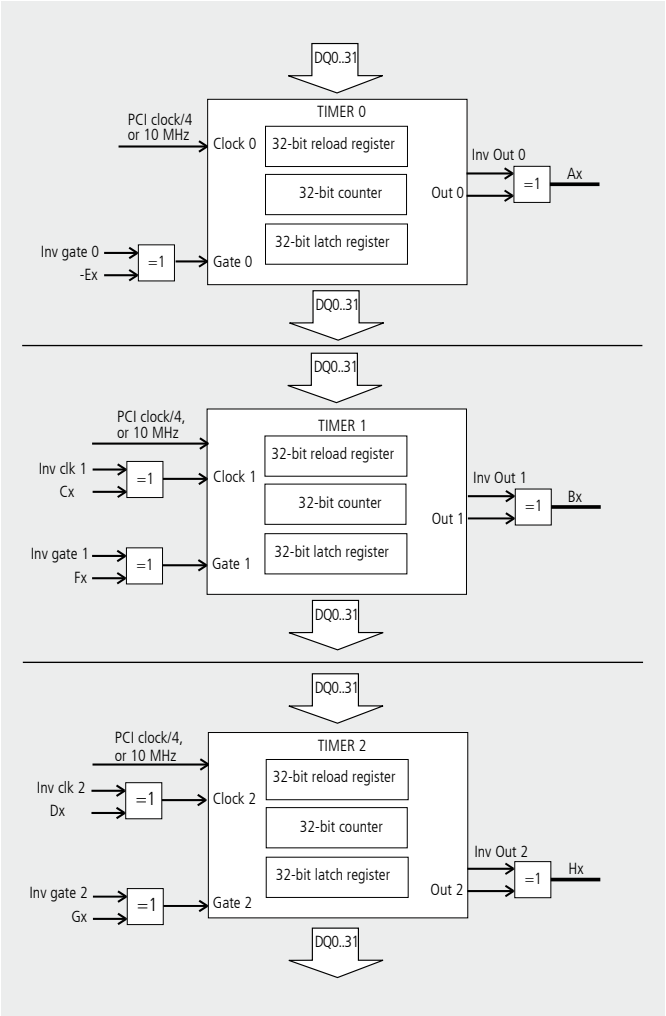
This mode is identical to mode 4 except for the GATE input. The GATE input is not used to activate or deactivate the timer, but to trigger it.

Used signals

Signal name	Pin name	Signal type	Function
OUT1_x	Ax +/-	Diff./TTL	Output of counter/timer 0
OUT2_x	Bx +/-	Diff./TTL	Output of counter/timer 1
OUT3_x	Hx	24 V / 5 V opt.	Output of counter/timer 2
GATE1_x	Ex	24 V / 5 V opt.	GATE Input of counter/timer 0
GATE2_x	Fx	24 V / 5 V opt.	GATE Input of counter/timer 1
GATE3_x	Gx	24 V / 5 V opt.	GATE Input of counter/timer 2
CLK1_x	-	-	Internal clock
CLK2_x	Cx +/-	Diff./TTL/ 24 V opt.	Clock counter input of counter/timer 1
CLK3_x	Dx +/-	Diff./ TTL/ 24 V opt.	Clock counter input of counter/timer 2

x: Number of the function module (See pin assignment page 167)
The Counter/Timer function cannot be programmed on the APCI-1710-24 V.

Block diagram Counter/Timer



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Function TOR

The **TOR** function is a counter interface which allows counting input signals in a defined time interval.
2 TOR counters are available on each function module. Each TOR counter includes 2 x 32-bit timers.
The TOR function is a scaled-down version of the Counter/Timer function. The pulse signal of Timer 1 gives the start and stop pulse signal to Timer 0. Timer 0 counts the input signals. After the stop signal from Timer 0 the number of pulses is stored and can be read through I/O read commands.
The timer 1 is used as a time reference generator.
The divider factor is written in timer 1 and determines the output frequency. The input frequency is set according to the PCI clock pulse or the 40 MHz on-board quartz clock. Timer 0 is synchronised with the start event.

Pulse measurement

As soon as a start signal occurs from Timer 1, the Timer 0 is reset.
It counts the pulse signals of the channel Ax(Bx).
During the process the status bit "Counter in Progress" is set.
As soon as a stop signal occurs from Timer 1, the Timer 0 is stopped and the status bit "Counter in Progress" is reset.
An interrupt can also be generated. The value can then be read. The latest measured value is read in the counter measurement register.

Properties

- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Interrupt status at the end of the measuring period
- Inputs and output can be inverted through software
- Software GATE

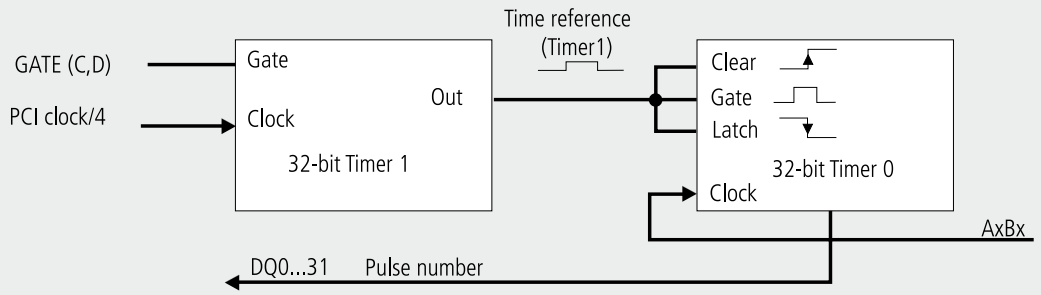
The function **TOR** occupies 4 inputs (A to D) of the corresponding function module of the APCI-1710 or CPCI-1710.

Used signals

Pin name	Signal type	Function
Ax +/-	Diff./TTL/24 V*	Digital input 1 (TOR1)
Bx +/-	Diff./TTL/24 V*	Digital input 2 (TOR2)
Cx +/-	Diff./TTL/24 V*	External Gate (TOR1)
Dx +/-	Diff./TTL/24 V*	External Gate (TOR2)

x: Number of the function module (see pin assignment page 167)
*24 V for the APCI-1710-24 V

Block diagram TOR



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Function Pulse counter

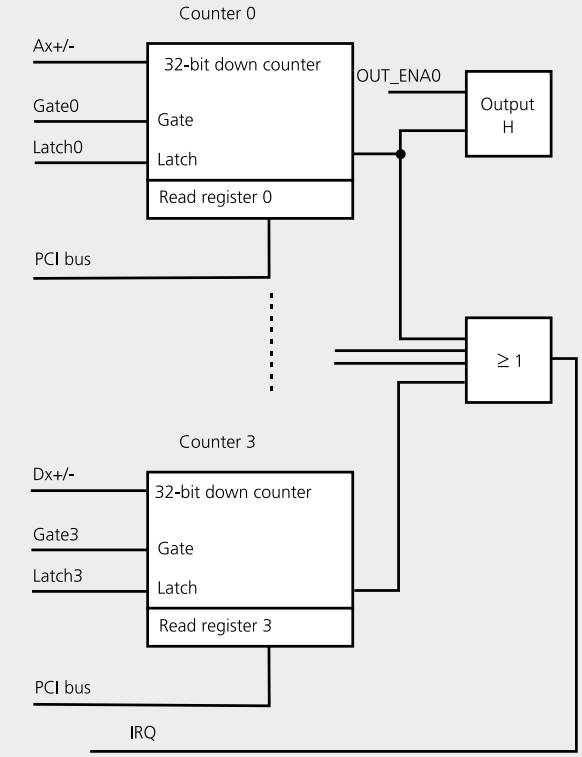
The **Pulse counter** is an interface for the acquisition of external digital pulses. Each rising or falling edge on the counter input starts decrementing from the initially set counter value. An interrupt is generated at logical "0", i.e. the digital output is set or reset.

- 4 x 32-bit downward counters
- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Each counter can be loaded with a predefined counter value
- Interrupt at overflow
- Output can be set or reset at overflow
- Polarity of the inputs selectable through software

The interface includes:

- 4 x 32-bit counters
- 4 independent 32-bit registers, readable through the data bus
- a function and control logic.

Block diagram Pulse counter



Used signals

Pin name	Signal type	Function
Ax +/-	Diff./TTL/24 V*	Input of the 1st counter
Bx +/-	Diff./TTL/24 V*	Input of the 2nd counter
Cx +/-	Diff./TTL/24 V*	Input of the 3rd counter
Dx +/-	Diff./TTL/24 V*	Input of the 4th counter
H	24 V/5 V optional	Common digital output of the counter

x: Number of the function module (see pin assignment page 167)
* 24 V for the APCI-1710-24V

Function PWM (Pulse width modulation)

The function **PWM** is an interface for pulse width modulation.
It generates a frequency and defines the time duration (pulse width) of the "Low" and "High" level. The function generates rectangle signals.
The output pulses from the timer generate the pulse width modulation.

PWM generator

The "Low/High" time-divider factor is written in the timer and determines the output frequency. The input frequency is set according to the PCI clock or the 40 MHz quartz of the board.
The function includes:

- a 32-bit frequency generator for setting the "Low" and "High" levels
- 2 digital inputs as start or stop trigger
- 2 digital frequency outputs

Properties

- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Interrupt status at the end of a period
- Selection of the start level
- Selection of the stop level
- Hardware gate
- Software gate

Typical applications

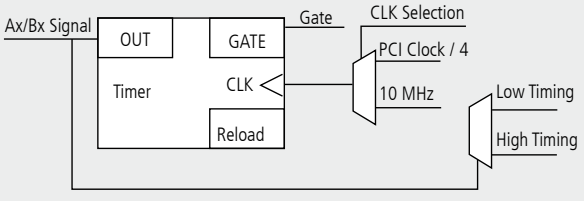
- Frequency generation
- Pulse width modulation
- Drive technology

Used signals

Signal name	Pin name	Signal type	Function
PWM_OUT_Ch0_x	Ax +/-	Diff./TTL output	digital output PWM 0
PWM_OUT_Ch1_x	Bx +/-	Diff./TTL output	digital output PWM 1
GATE_Ch0_x	Cx +/-	Diff./TTL input	Gate input PWM 0
GATE_Ch1_x	Dx+/-	Diff./TTL input	Gate input PWM 1
DIG_IN_E_x	Ex	24 V input	digital input
DIG_IN_F_x	Fx	24 V input	digital input
DIG_IN_G_x	Gx	24 V input	digital input
DIG_OUT_H_x	Hx	24 V output	digital output PWM 0 or freely controllable

x: Number of the function module (See pin assignment page 167)
The PWM function only can be used restricted to the 24 V version. Only PWM0 is available for the DIG_OUT_H_x 24 V output.

Block diagram PWM



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Function ETM (Edge Time Measurement)

The **ETM** function is a timer interface which allows measuring the duration of a period, and simultaneously, the "High" or "Low" level time of this period. A function module with the ETM function has

- 1 timer to create a time base
- 2 counters to measure the period duration
- 2 counters to measure the "High" or "Low" level time
- 2 gate inputs

The ETM function uses 4 inputs (A to D) with each function module of the APCI-1710 or CPCI-1710. Up to 8 ETM (2 per module) can be operated on one board.

Properties

- Optical isolation of the inputs and outputs through opto-couplers to prevent ground loops
- Interrupt status at the end of a period
- Timer can be read back
- Inputs and outputs can be inverted through software
- Software gate

Typical applications

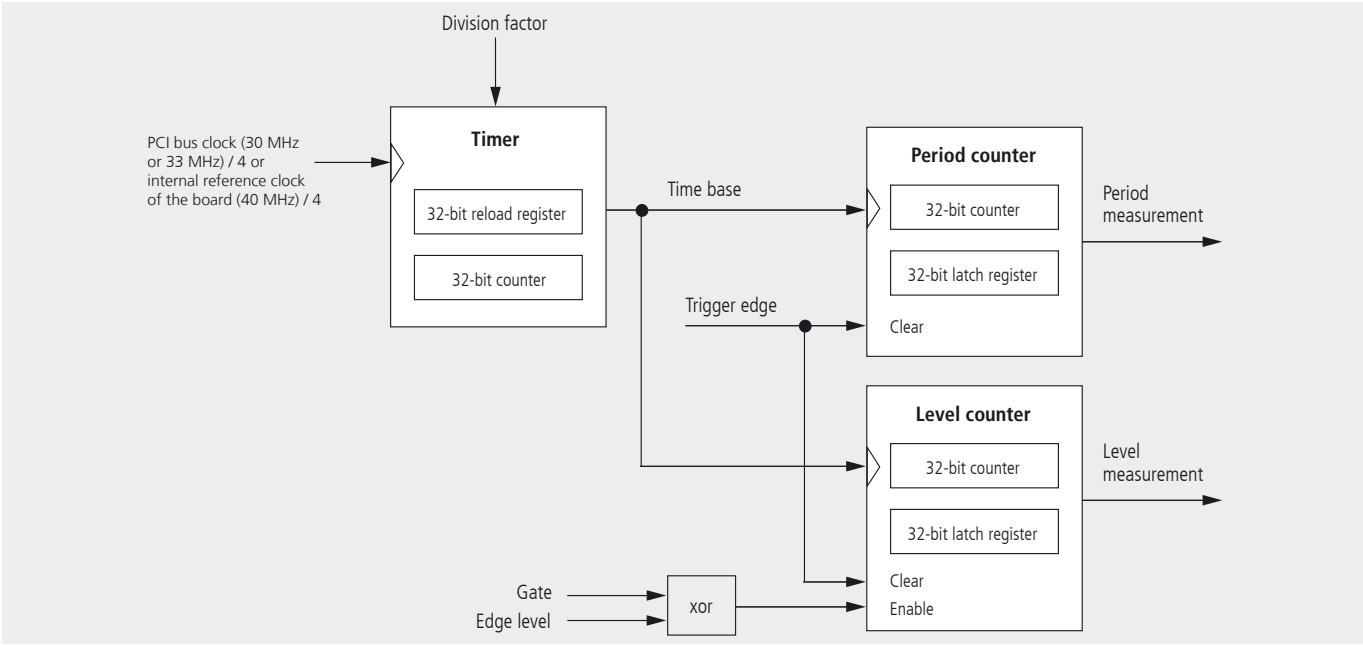
- Period duration measurement
- Level duration measurement

Used signals

Signal name	Pin name	Signal type	Function
Gate0_x	Ax +/-	Diff./TTL/opt. 24 V*	Gate input of ETM counter 0
Input0_x	Bx +/-	Diff./TTL/opt. 24 V*	Input of ETM counter 0
Gate1_x	Cx +/-	Diff./TTL/opt. 24 V*	Gate input of ETM counter 1
Input1_x	Dx +/-	Diff./TTL/opt. 24 V*	Input of ETM counter 1

x: Number of the function module (see pin assignment page 167)
*24 V for the APCI-1710-24V

Block diagram ETM



Function Digital input and output

The **Digital input and output** function allows an easy access to the digital I/O available on the function modules. The I/O level of the input and output channels are read and set or reset through read/write commands. The digital I/O have no logical connection to each other. The connection can only be made through software. The complete isolation through opto-couplers avoids earth circuits.

Available channels

- 3 x 24 V mass-related input channels, optional 5 V
- 2 x differential input channels (RS422/485), can also be used as TTL input channels
- 1 digital output, 24 V, load to ground (10 to 36 V / 500mA)
- 2 differential inputs or outputs (RS485), can also be used as TTL input or output channels. Software configuration.

When the digital I/O function is programmed on all function modules, up to 28 digital input and 12 digital output channels are available

Used signals

Pin name	Signal type	Function
Ax +/-	Diff/TTL/24 V*	Dig. input and output (with 24 V* only input)
Bx +/-	Diff/TTL/24 V*	Dig. input and output (with 24 V* only input)
Cx +/-	Diff./TTL/24 V*	Digital input
Dx +/-	Diff./TTL/24 V*	Digital input
Ex	24 V / 5 V optional	Digital input
Fx	24 V / 5 V optional	Digital input
Gx	24 V / 5 V optional	Digital input
Hx	24 V / 500 mA (10 – 36 V)	Digital output

x: Number of the function module (see pin assignment page 167)
*with the APCI-1710-24V

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Specifications

Counter components

Counting depth: 32-bit, Counting frequency: up to 5 MHz

Free programming of the functions

	32-bit or 16-bit acquisition of incremental encoders
	Acquisition of absolute encoders/SSI
	Counter/timer
	Chronos/TOR for frequency measurement
	Pulse acquisition
	Chronos for pulse width modulation
	Chronos for period duration measurement
	TOR for velocity measurement
	BiSS-Master
	Digital I/O, 24 V, TTL, RS422
	PWM
	ETM
	Customised functions

Signals

Digital I/O signals, TTL or RS422

Inputs

Number of inputs:	20	
Differential inputs or outputs		
5 V inputs:	8/16 (8 can be used as inputs or outputs)	
Nominal voltage:	5 VDC	
Common mode range:	+12 / -7 V	
Max. differential voltage	±12 V	
Input sensitivity:	200 mV	
Input hysteresis:	50 mV	
Input impedance:	12 kΩ	
Terminal resistor:	150 Ω serial with 10 nF (typ.)	
Signal delay:	120 nS (at nominal voltage)	
Max. input frequency:	5 MHz (at nominal voltage)	
Mass-related inputs, 24 V (channels E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Input current:	11 mA (typical) at nominal voltage	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	15 V
	UL min.:	0 V
Signal delay:	120 ns (at nominal voltage)	
Maximal input frequency:	2.5 MHz (at nominal voltage)	

Outputs

Nominal voltage:	5 VDC
Maximum output frequency:	5 MHz (diff. outputs)
Max. number of outputs:	8 (if they are not used as diff. inputs)
Digital outputs, 24 V:	
Output type:	High-side (load to ground)
Number of outputs:	4
Nominal voltage:	24 VDC
Range of the supply voltage:	10 V to 36 VDC (via 24 V ext. pin)
Maximum current for 4 outputs:	2 A typ. (limited to the voltage supply)
Maximum output current: output at 24 V, R_{load} < 0.1 Ω:	500 mA short-circuit current/ 1.5 A max. (output switches off)
ON-resistance of the output (RDS ON resistance):	0.4 Ω max.
Overtemperature:	170 °C (all outputs switch off)
Overtemperature protection (24 V outputs)	
Activated:	From approx. 150-170 °C (chip temperature)
Deactivated (automatically):	From approx. 125-140 °C (chip temperature)
Outputs (at overtemperature):	Outputs switch off
Protection against undervoltage (effective at V ext.<5 V)**:**	
Outputs (at undervoltage):	All outputs switch off
Switching characteristics of the 24 V outputs	
(V ext. = 24 V, T=25 °C, ohmic load: 500 mA)**:**	
Switch ON time:	200 µs
Switch OFF time:	15 µs
Digital outputs, 5 V (option):	
Output type:	TTL
Number of outputs:	4
Nominal voltage:	5 VDC
Switching characteristics of the 5 V outputs (T=25 °C, TTL load)**:**	
Switch ON time:	0.06 µs
Switch OFF time:	0.02 µs

Technical data for the APCI-1710-24 V board version

24 V inputs (channels A to G). This board version is exclusively used for connecting 24 V encoders. Only 24 V signals can be connected to the input channels.

Nominal voltage:	24 VDC / 10 mA	
Max. input frequency:	1 MHz (at nominal voltage)	
Logic input levels : (Standard)	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	15 V
	UL min.:	0 V

Safety

Optical isolation: 1000 V

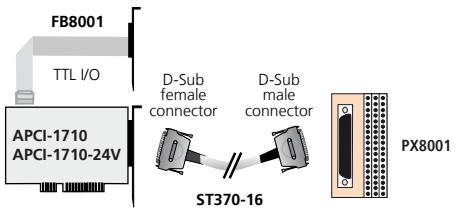
EMC – Electromagnetic compatibility

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:	179 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	1 slot
Operating voltage:	+5 V, ± 5 % from the PC +24 V ext. /10 mA
Current consumption:	APCI-1710-x: 1.15 A typ. ± 10 %
Front connector:	50-pin D-Sub male connector
Additional connector:	Male connector for the TTL I/O function
Temperature range:	0 to 60 °C (with forced cooling)

ADDI-DATA connection



Ordering information

APCI-1710

Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM,...
Incl. technical description and software drivers.

APCI-1710: Multifunction counter board, optically isolated.
APCI-1710-24V: 24 V for differential input signals (A and B for counter, I (Index) and UAS (error) signals).
APCI-1710-5V-I: 5 V inputs (E, F, G) instead of 24 V
APCI-1710-5V-I-0: 5 V inputs (E, F, G) instead of 24 V, outputs (H1, H2, H3, H4) 5 V instead of 24 V
APCI-1710-10K20: Same as APCI-1710, with additional function for connecting a **BiSS** interface

Option

Opt. 5V: 5 V outputs (H1, H2, H3, H4) instead of 24 V

Accessories

ST370-16: Shielded round cable, 2 m
PX8001: 3-row terminal panel for DIN rail
FB8001: Ribbon cable for connecting the TTL I/O function

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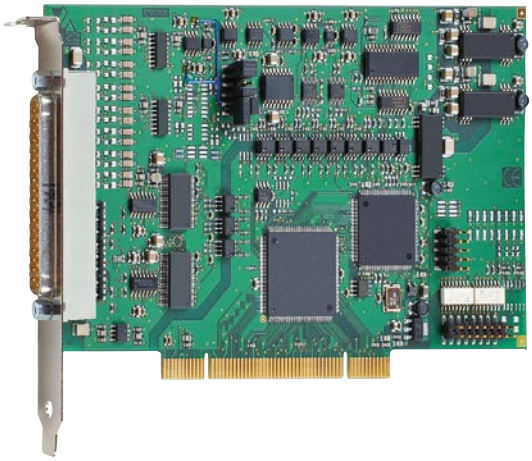
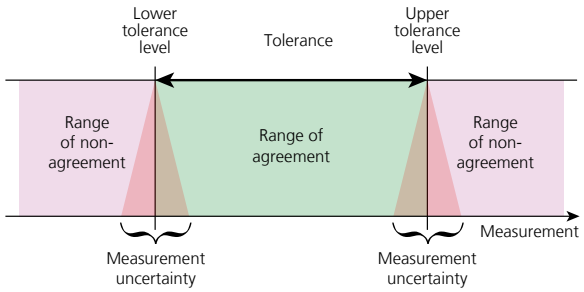


High-precision measurement

Measurement technology is the basis of every automation process. Therefore the accuracy of the sensor acquisition is highly important. The environment of a production line with a lot of interference requires peak performance from the measurement technology. For more than 25 years, ADDI-DATA has been developing analog boards for data acquisition intended for an industrial environment: they are robust, precise and fast.

High-precision measurement in the field

There are numerous measurement systems that provide precise data under laboratory conditions. This is different in the production or in outdoor areas, where the conditions are considerably more demanding. There the measurement results play a central role. Rework and defective goods can only be effectively reduced if the tolerance testing during the production process is precise enough to sort products reliably as being within or without the tolerance range. The importance of accuracy appears even clearer in cases where the measurement is used for regulation.



Precise even in case of temperature drift

Temperature drift can be caused by the surrounding temperature as well as by the board itself. To ensure the accuracy of the measurement, on the one hand we are careful to use only high-quality components with little drift. On the other hand we pay a lot of attention to the board layout. For example, components that generate heat are placed where they will not heat up the other components unnecessarily.

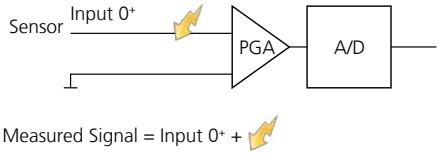
Precision through interference resistance

Not only the quality of the A/D converter is important but the interference resistance of the whole chain of acquisition has to be analysed, from the sensors to the acquisition board. Therefore in addition to our PC boards we offer robust cables and screw terminal panels that are intended for the use in a harsh industrial environment.

Single-ended or differential inputs

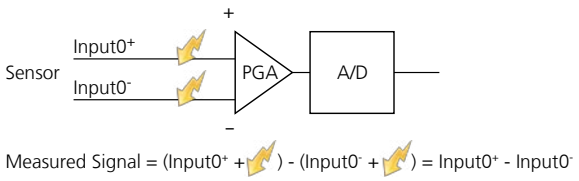
When measuring input voltage you can choose between 2 modes with important differences:

Single-ended mode – One-wire inputs connected to the system ground.



When acquiring analog signals in the single-ended mode, interfering signals are acquired with the signal. Therefore this mode is only advisable in case of high voltage levels and short lines.

Differential mode – Two-wire inputs



Interference signals affecting both lines are not included in the measurement because of the difference on the input. This is the optimal mode for measurement lines with a lot of interferences and long lines.

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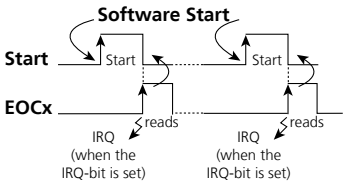
Acquisition modes of the analog inputs

There are four modes available for analog inputs.
The following is a short overview of the settings available for data acquisition:

A. Simple mode

The software initiates and starts the A/D conversion and reads out the digital values of one or more channels after the end of conversion.

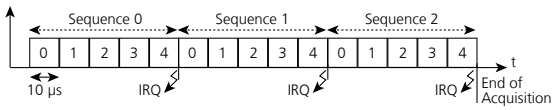


B. Sequence modes

With the DMA function (Direct Memory Access) for a direct data exchange with the PC memory
There are 2 available sequence modes:

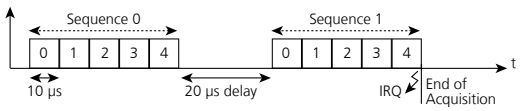
1. Simple sequence mode

In this example the interrupt is generated at the end of each sequence after 5 acquisitions.
The complete acquisition process ends after 3 sequences.



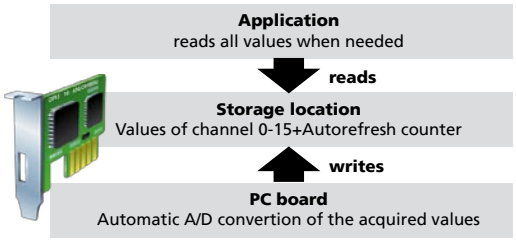
2. Sequence mode with delay

In this example the delay time between the end of one sequence and the start of the next sequence is 20 µs.



C. Auto refresh mode

The analog acquisition is initialised and the values of the channels are written in a buffer on an analog board. The PC reads the data asynchronously to the acquisition.

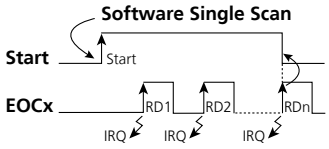


D. Scan mode

There are 6 different scan modes:

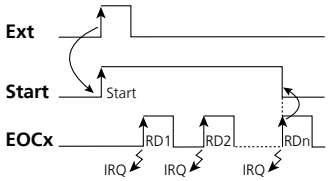
1. Software single scan

The interrupt routine of the user is called up after the last IRQ.

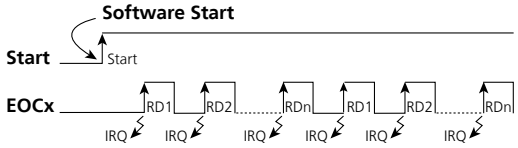


2. Hardware triggered single scan

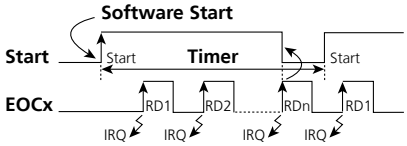
This scan can be triggered with increasing or decreasing edge. The hardware trigger allows to start the acquisition independently from the software or to start the acquisition of more than one board at the same time.



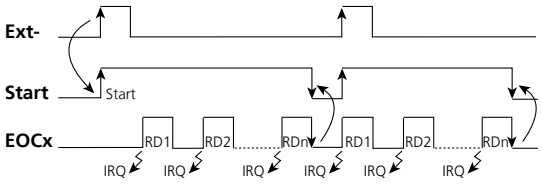
3. Continuous scan (software)



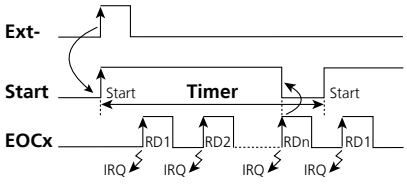
4. Continuous scan with timer delay (software)



5. Continuous scan (hardware)



6. Continuous scan with timer delay (hardware)



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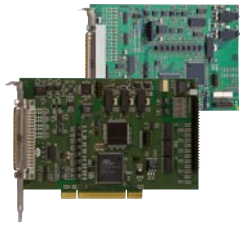
PCI BOARDS: ANALOG I/O

Multifunction, analog input and analog output boards for 3.3 V or 5 V PCI



	Multifunction boards			Analog input boards					Analog output boards
	APCI-3120	APCI-3110	APCI-3116	APCI-3010	APCI-3016	APCI-3002	APCI-3003	APCI-3001	APCI-3501
32-bit PCI bus	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**	**3.3/5 V**
FPGA	✓	✓	✓	✓	✓	✓	✓	✓	✓
Simultaneous acquisition							✓		
Analog inputs									
Single Ended	16/8	16/8	16/8	16/8/4	16/8/4			16/8/4	
Differential	8/4	8/4	8/4	8/4/2	8/4/2	16		8/4	
Diff. separated from each other							4		
Resolution (-bit)	16	12	16	12	16	16	16	12	
Optical isolation	500 V	✓	✓	✓	✓	✓	✓	✓	
Throughput (kHz)	100	200	200	200	200	200	400/ channel	100	
Voltage range									
0-10 V; ± 10 V / 0-5 V; ± 5 V 0-2 V; ± 2 V / 0-1 V; ± 1 V	✓	✓	✓	✓	✓	✓	✓	✓	
Other ranges (optional)	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	
Gain 1, 2, 5, 10	✓	✓	✓	✓	✓	✓	✓	✓	
FIFO (value)	256	512	512	512	512	512	512	256	
Functions of the analog inputs									
DMA (scatter gather, single, continuous, Sequence)		✓	✓	✓	✓	✓	✓		
DMA (single, continuous, Sequence)	✓							✓	
Auto Refresh		✓	✓	✓	✓	✓	✓		
Interrupt	✓	✓	✓	✓	✓	✓	✓	✓	
Programmed I/O	✓	✓	✓	✓	✓	✓	✓	✓	
Trigger: Software TTL input 24 V input	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	 ✓ – ✓	
Sequence RAM	✓	✓	✓	✓	✓	✓	✓	✓	
Analog outputs	4 or 8	4	4						4 or 8
Resolution (-bit)	14	12	12						14
Optical isolation	✓	✓	✓						✓
0-10 V ± 10 V	✓	✓	✓						✓
Current outputs									
Setup time	30 µs	15 µs	15 µs						30 µs
Digital I/O 24 V inputs, optically isolated 24 V outputs, optically isolated	4 4 (OpenC)	4 4 (50mA)	4 4 (50mA)	4 4 (50mA)	4 4 (50mA)	4 4 (50mA)	4 4 (50mA)	4 4 (OpenC)	2 2 (OpenC)
TTL I/O		24	24	24	24				
Timer/Counter/Watchdog (depth) and/or	1 /– / 1 24-bit	3 / 3 / 2 16-bit	3 / 3 / 2 16-bit	3 / 3 / 1 16-bit	3 / 3 / 1 16-bit	1 / – / – 16-bit	1 / – / – 16-bit	1 / – / – 16-bit	1 / – / – 12-bit
Page	180	182	182	184	184	186	188	190	192
Software	Current driver list on the web: **www.addi-data.com**								

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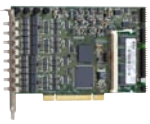
Temperature, pressure, noise, vibration and length measurement

New!

	Temperature measurement	Pressure measurement	Noise and vibration measurement	Length measurement	
					
	APCI-3200	APCI-3300	APCI-3600	**APCI-3702**	APCI-3701
64-bit or 32-bit PCI-Bus	**3.3 V / 5 V**	**3.3 V / 5 V**	**3,3 V / 5 V**	**3.3 V / 5 V**	**3.3 V / 5 V**
FPGA			✓		
Noise and vibration			✓		
Thermocouples J,K,T,E,R,S,B,N Pt100, Pt1000	✓				
Strain gauges		✓			
Inductive transducers				Half Bridge, LVDT	Half Bridge, LVDT
Signal conditioning			8 current sources for connecting ICP™ sensors		
Analog inputs	4 groups 4 channels	4 groups 4 channels			
Single Ended (SE)/ differential (diff.)	16 thermo/8 RTDs 8 thermo/4 RTDs 4 thermo/2 RTDs	8/4 inputs for strain gauges	8/8	5 channels *simultaneous* acquisition for induct. displacement transducers	16/8/1 channels for inductive displacement transducers
Resolution (-bit)	18	18	24	16	16
Optical isolation	✓	✓			
Throughput	20-160 Hz	20-160 Hz	2-200 kHz (through software)	depends on transducer type	depends on transducer type 2-20 kHz (50 kHz opt.)
Voltage ranges	+ 1.25 V	+ 1.25 V	± 10 V		
Gain	1, 2, 4, 8, 16, 32, 64, 128	1, 2, 4, 8, 16, 32, 64, 128		depends on transducer type	depends on transducer type
FIFO (Values)			128 DWORD		
Functions of the analog inputs					
DMA (scatter gather; single; continuous; Sequence)			scatter gather free run, ring buffer	✓	✓
Auto Refresh				✓	✓
Interrupt	✓	✓	✓	✓	✓
Programmed I/O	✓	✓	✓	✓	✓
Trigger: Software 24 V input	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
Sequence RAM				✓	✓
Analog outputs			2		
Resolution (-bit)			16		
Optical isolation					
0-10 V ± 10 V			± 10 V		
Chronometer inputs Gate inputs			4 2		
Timer/Watchdog (depth) in combination, and/or	– / –	– / –	– / –	1 / – 16-bit	1 / – 16-bit
Digital I/O Inputs 24 V, optically isolated Outputs 24 V, optically isolated	4 3 (Open Collector)	4 3 (Open Collector)	8 8 (50 mA)	8 8 (125 mA)	8 8 (125 mA)
Page	194	198	200	204	206
Software	Current driver list on the web: **www.addi-data.com**				

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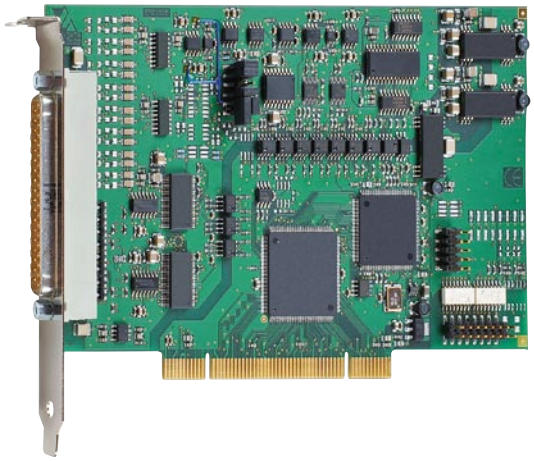
Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4/8 analog outputs,16-bit



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

RoHS 2002/95/EC

PCI 32-bit

Also for CompactPCI™
See CPCI-3121, page 238

Also for PCI EXPRESS®
see APCIe-3121, page 134

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DASYLab10 Data Acquisition System Laboratory

DIAdem

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
- RTX drivers (real-time)

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

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PCI

Specifications

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 opto-couplers from PC to peripheral
Input ranges:	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
Throughput:	100 kHz
Gain:	Software programmable (1, 2, 5, 10)
Common mode rejection:	DC at 10 Hz, 90 dB minimum
Relative precision (INL):	± 1 LSB (ADC)
Diff. non-linearity (DNL):	± 0.5 LSB (ADC)
Input impedance (PGA):	10^{12} Ω / 10 nF single-ended, 10^{12} Ω / 20 nF differential against GND
Bandwidth (- 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 opto-couplers
Output range:	0-10 V, ±10 V switchable through software
Setup time at 2 kΩ, 1000 pF:	10 µs at 10 V step
Overvoltage protection:	±12 V
Max. output current / load:	±5 mA / 500 pF, 2 kΩ
Short-circuit current:	±25 mA
Output voltage after reset:	0 V

Digital I/O

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

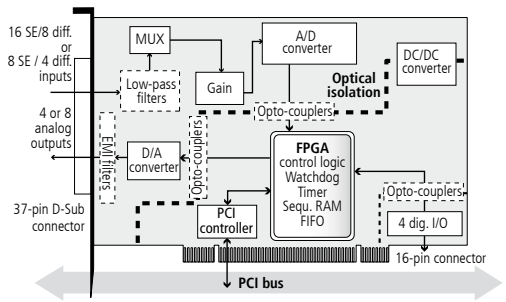
EMC – Electromagnetic compatibility

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.

PC system requirements and environmental conditions

Dimensions:	169 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot for analog I/O, 1 slot opening for digital I/O with FB3000
Operating voltage:	+5 V, ±5 % 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)

Simplified block diagram



Pin assignment – 37-pin D-Sub male connector

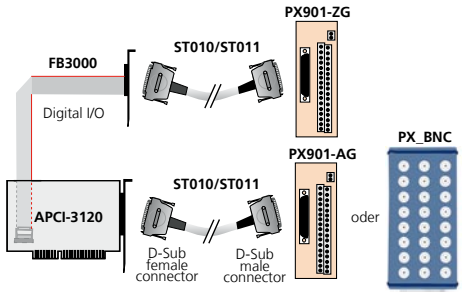
DIFF	SE		SE	DIFF
(+) An. input 0	(+) An. input 0	20 / 1	(+) An. input 8	(+) An. input 4
(+) An. input 1	(+) An. input 1	21 / 2	(+) An. input 9	(+) An. input 5
(+) An. input 2	(+) An. input 2	22 / 3	(+) An. input 10	(+) An. input 6
(+) An. input 3	(+) An. input 3	23 / 4	(+) An. input 11	(+) An. input 7
(-) An. input 3	(+) An. input 7	24 / 5	(+) An. input 15	(-) An. input 7
(-) An. input 2	(+) An. input 6	25 / 6	(+) An. input 14	(-) An. input 6
(-) An. input 1	(+) An. input 5	26 / 7	(+) An. input 13	(-) An. input 5
(-) An. input 0	(+) An. input 4	27 / 8	(+) An. input 12	(-) An. input 4
1 Analog input GND		28 / 9	Analog input GND	1
1 Analog input GND		29 / 10	Analog input GND	1
2 An. output 0 GND		30 / 11	Analog input GND	1
2 An. output 1 GND		31 / 12	An. output 0	
2 An. output 2 GND		32 / 13	An. output 1	
2 An. output 3 GND		33 / 14	An. output 2	
2 An. output 4 GND		34 / 15	An. output 3	
2 An. output 5 GND		35 / 16	An. output 4	
2 An. output 6 GND		36 / 17	An. output 5	
2 An. output 7 GND		37 / 18	An. output 6	
		19	An. output 7	

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

Pin assignment – 16-pin male connector

Dig. output 0 (+)	1 ■ ■ 2	Dig. output 0 (-)
Dig. output 1 (+)	3 ■ ■ 4	Dig. output 1 (-)
Dig. output 2 (+)	5 ■ ■ 6	Dig. output 2 (-)
Dig. output 3 (+)	7 ■ ■ 8	Dig. output 3 (-)
Trigger/dig. input 0 (+)	9 ■ ■ 10	Trigger/dig. input 0 (-)
Dig. input 1 (+)	11 ■ ■ 12	Dig. input 1 (-)
Dig. input 2 (+)	13 ■ ■ 14	Dig. input 2 (-)
Dig. input 3 (+)	15 ■ ■ 16	Dig. input 3 (-)

ADDI-DATA connection



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/8 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(4)-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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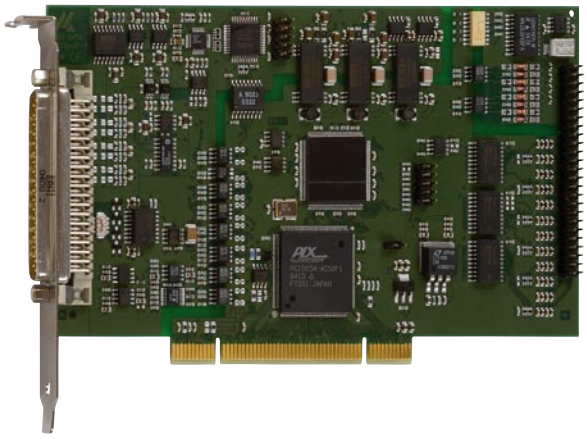
Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4 analog outputs, 12-/16-bit



APCI-3110 / APCI-3116

PCI 3.3 V or 5 V

Optical isolation 1000 V

16/8 SE or 8/4 diff. inputs

12-bit or 16-bit resolution, 200 kHz

PCI DMA, programmable gain

4 analog outputs, 12-bit

Timer/counter/watchdog

8 optically isolated dig. I/O, 24 V, 24 TTL I/O

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

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designed
to suit your needs.
Hardware and software,
firmware, PLDs, ...
Contact us!

Features

- PCI 3.3 V or 5 V

Analog inputs

- 16/8 SE or 8/4 diff. inputs, optically isolated
- Resolution: 12-bit (APCI-3110) or 16-bit (APCI-3116)
- Throughput: 200 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
- Current inputs: 0-20 mA (Option)
  can be combined freely with voltage inputs
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel

Analog acquisition

- Different input modes:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Onboard FIFO (for 512 analog values)
- PCI-DMA for analog data acquisition

Analog outputs

- 4 analog outputs, optically isolated
- 12-bit resolution
- Setup time 15 µs typ
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation)
- Output voltage range: -10 V up to + 10 V
- Output current: ± 5 mA
- Short-circuit current: ± 20 mA

24 V digital I/O

- 24 V digital I/O enable a high interference distance and a long distance between signal transmitter and data acquisition
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

TTL I/O

- 24 digital TTL inputs/outputs
- Port0: outputs / Port1: inputs / Port2: I/O
- All I/O are at 5 V through pull-up resistors
- Easy programming through I/O read and write commands

Timer/counter

- 3 / 3, 16-bit

Watchdog

- 2, 16-bit

Safety features

- Optical isolation 1000 V min.
- Creeping distance IEC 61010-1
- Circuit part of the analog acquisition is separated from the circuit part of the digital function
- Overvoltage protection ± 40 V
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O signals through robust industry-standard D-Sub connector

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

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

ADDIPACK functions:

Analog input • Analog output • Digital input
Digital output • Watchdog • Timer • Counter

On request:

Further operating systems, compilers and samples.

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

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PCI

Specifications

Analog inputs

Number of inputs:	16/8 SE or 8/4 differential inputs
Resolution:	12-bit (APCI-3110) or 16-bit (APCI-3116)
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Input ranges:	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
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	200 kHz
Trigger:	through software, timer, external event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of scan

Analog outputs

Number of outputs:	4
Optical isolation:	1000 V through opto-couplers
Resolution:	12-bit
Voltage outputs	
Output range:	-10 V to +10 V (-1 LSB)
LSB:	4.8828 mV
Accuracy:	11-bit
Time to Ready:	typ. 4.5 µs
Setup time:	typ 15 µs (at 10 V step)
Max. output current:	± 5 mA
Short-circuit current:	± 20 mA
Output voltage after reset:	0 V

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V 4 digital outputs, 24 V
Logical "0" level:	0-14 V
Logical "1" level:	19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral

TTL I/O

Number of TTL I/O channels:	24
I/O Address range:	128 Byte, addressing : 32-bit
Programming:	Through write/read commands

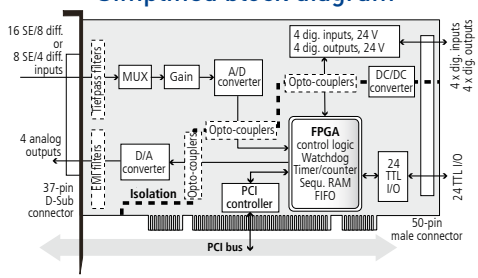
EMC – Electromagnetic compatibility

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.

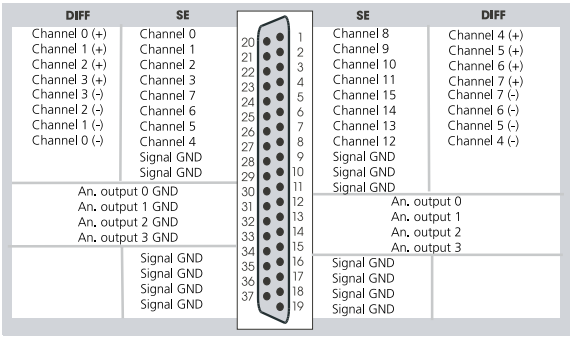
Physical and environmental conditions

Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for analog I/O, 1 slot opening for digital I/O with FB8001
Operating voltage:	+5 V, ±5 % from the PC
Front connector:	37-pin D-Sub male connector
Additional connector :	50-pin male connector for connecting the dig. I/O
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram



Pin assignment – 37-pin D-Sub male connector

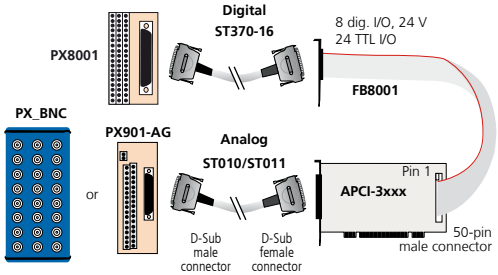


Pin assignment – 50-pin male connector

Assignment	Pin		Assignment
Output 3	1	2	Input 3+
Input 3-	3	4	Output 2
Input 2+	5	6	Input 2-
Output 1	7	8	Input 1 +
Input 1-	9	10	Output 0
Input 0+	11	12	Input 0-
GND 0	13	14	+24 V
Not connected	15 bis 24		Not connected
GND	25	26	GND
TTL 15	27	28	TTL 23
TTL 7	29	30	TTL 14

Assignment	Pin		Assignment
TTL 22	31	32	TTL 6
TTL 13	33	34	TTL 21
TTL 5	35	36	TTL 12
TTL 20	37	38	TTL 4
TTL 11	39	40	TTL 19
TTL 3	41	42	TTL 10
TTL 18	43	44	TTL 2
TTL 9	45	46	TTL 17
TTL 1	47	48	TTL 8
TTL 16	49	50	TTL 0

ADDI-DATA connection



Ordering information

APCI-3110 / APCI-3116

Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4 analog outputs, 12-/16-bit.
Incl. technical description and software drivers.

Versions

APCI-3110-16: 16 SE/8 diff. inputs, 4 analog outputs, 12-bit
APCI-3110-8: 8 SE/4 diff. inputs, 4 analog outputs, 12-bit
APCI-3116-16: 16 SE/8 diff. inputs, 4 analog outputs, 16-bit
APCI-3116-8: 8 SE/4 diff. inputs, 4 analog outputs, 16-bit

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

PX901-A: Screw terminal panel with transorb diodes 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
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
PX8001: 3-row screw terminal panel, 50-pin, for DIN-rail mounting
FB8001: Ribbon cable for digital I/O
ST370-16: Standard round cable, shielded, twisted pairs, 2 m

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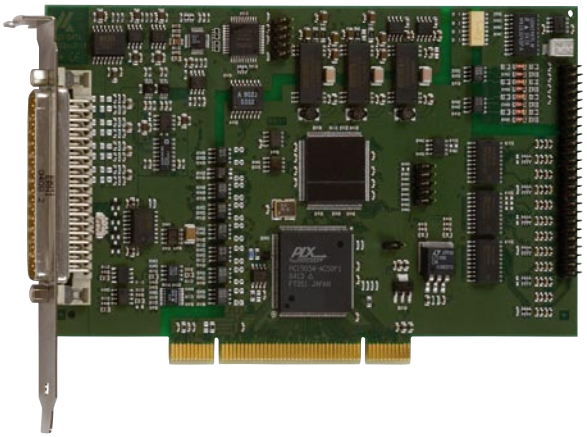
Analog input board, optically isolated, 16/8/4 SE or 8/4/2 diff. inputs, 12-/16-bit



APCI-3010 / APCI-3016

PCI 3.3 V or 5 V

Optical isolation 1000 V

16/8/4 SE or 8/4/2 diff. inputs

12- or 16-bit resolution, 200 kHz

PCI DMA, programmable gain

Trigger functions

Timer/counter/watchdog

8 optically isolated dig. I/O, 24 V, 24 TTL I/O

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Customer-tailored modifications designed to suit your needs. Hardware and software, firmware, PLDs, ... Contact us!

Features

- PCI 3.3 V or 5 V

Analog inputs

- 16/8/4 SE or 8/4/2 diff. inputs, optically isolated
- Resolution: 12-bit (APCI-3010) or 16-bit (APCI-3016)
- Throughput: 200 kHz
- Voltage inputs: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V, freely programmable through software for each channel
- Current inputs: 0-20 mA (option) can be combined freely with voltage inputs
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel

Analog acquisition

- Different input modes:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Trigger functions:
  - Software trigger or
  - external trigger: the analog acquisition (single or sequence) is started through the signal on digital input 0 from 0 V to 24 V
- Onboard FIFO (for 512 Analog values)
- PCI-DMA for analog data acquisition

24 V digital I/O

- 24 V digital I/O enable a high interference distance and a long distance between signal transmitter and data acquisition
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

TTL I/O

- 24 digital TTL inputs/outputs
- Port1: inputs / Port2: outputs / Port3: I/O
- All I/O are at 5 V through pull-up resistors
- Easy programming through I/O read and write commands

Timer/Counter

- 3 / 3, 16-bit

Watchdog

- 1, 16-bit

Safety features

- For more protection in noisy industrial environment
- Optical isolation 1000 V min.
- Creeping distance IEC 61010-1
- Circuit part of the analog acquisition is separated from the circuit part of the digital function
- Overvoltage protection ± 40 V (analog inputs)
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O-signals through robust industry-standard 37-pin D-Sub connector

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

A CD-ROM with the following software and programming examples 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

ADDIPACK functions:

Analog input • Digital input • Digital output
Watchdog • Timer • Counter

On request:

Further operating systems, compilers and samples.

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

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ADDI-DATA® SPIRIT OF EXCELLENCE

PCI

Specifications

Analog inputs

Number of inputs:	16/8/4 SE or 8/4/2 differential inputs
Resolution:	12-bit (APCI-3010) or 16-bit (APCI-3016)
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Input ranges:	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
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	200 kHz
Trigger:	Through software, timer, external event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of scan

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V 4 digital outputs, 24 V
Logical "0" Level:	0-14 V
Logical "1" Level:	19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Outputs	High Side, 50 mA

TTL I/O

Number of TTL I/O channels:	24
Programming:	Through write/read commands

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.

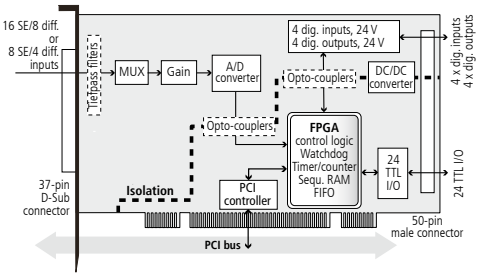
Physical and environmental conditions

Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O with FB8001
Operating voltage:	+5 V, ±5 % from the PC
Front connector:	37-pin D-Sub male connector
Additional connector:	50-pin male connector for connecting the dig. I/O
Temperature range:	0 to 60 °C (with forced cooling)

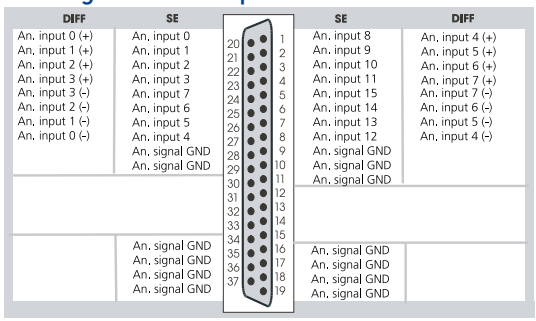
Screw terminal panel PX901-AG with cable ST010

Connection box PX_BNC with cable ST010

Simplified block diagram



Pin assignment – 37-pin D-Sub male connector

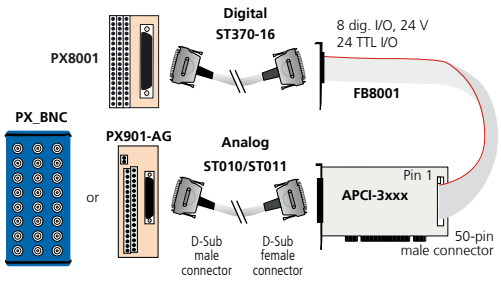


Pin assignment – 50-pin male connector

Assignment	Pin		Assignment
Output 3	1	2	Input 3+
Input 3-	3	4	Output 2
Input 2+	5	6	Input 2-
Output 1	7	8	Input 1 +
Input 1-	9	10	Output 0
Input 0+	11	12	Input 0-
GND 0	13	14	+24 V
Not connected	15 to 24		Not connected
GND	25	26	GND
TTL 15	27	28	TTL 23
TTL 7	29	30	TTL 14

Assignment	Pin		Assignment
TTL 22	31	32	TTL 6
TTL 13	33	34	TTL 21
TTL 5	35	36	TTL 12
TTL 20	37	38	TTL 4
TTL 11	39	40	TTL 19
TTL 3	41	42	TTL 10
TTL 18	43	44	TTL 2
TTL 9	45	46	TTL 17
TTL 1	47	48	TTL 8
TTL 16	49	50	TTL 0

ADDI-DATA connection



Ordering information

APCI-3010 / APCI-3016

Analog input board, optically isolated, 16/8/4 SE or 8/4/2 diff. inputs, 12-/16-bit. Incl. technical description and software drivers.

Versions

APCI-3010-16: 16 SE/8 diff. inputs, 12-bit
APCI-3010-8: 8 SE/4 diff. inputs, 12-bit
APCI-3010-4: 4 SE/2 diff. inputs, 12-bit
APCI-3016-16: 16 SE/8 diff. inputs, 16-bit
APCI-3016-8: 8 SE/4 diff. inputs, 16-bit
APCI-3016-4: 4 SE/2 diff. inputs, 16-bit

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

PX901-A: Screw terminal panel with transorb diodes, for connecting the analog inputs
PX901-AG: Same as PX901-A with housing for DIN rail
PX_BNC: BNC connection box for connecting the analog inputs
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
PX8001: Screw terminal panel for connecting the digital I/O, for DIN rail
FB8001: Ribbon cable for digital I/O
ST370-16: Standard round cable, shielded, twisted pairs, 2 m

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ADDI-DATA®
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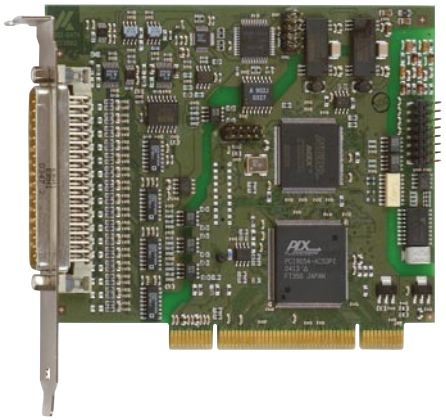
Analog input board, optically isolated, 16 differential inputs, 16-bit



APCI-3002

PCI 3.3 V or 5 V

Optical isolation 1000 V

16 differential inputs,
200 kHz throughput

16-bit resolution

PCI DMA, programmable gain

Trigger functions, timer

8 optically isolated digital I/O, 24 V

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Customer-tailored modifications
designed
to suit your needs.
Hardware and software,
firmware, PLDs, ...
Contact us!

Features

- PCI 3.3 V or 5 V

Analog inputs

- 16 differential inputs
- 16-bit resolution
- Throughput: 200 kHz
- Voltage inputs: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V, freely programmable through software for each channel
- Current inputs: 0-20 mA (option)
  can be combined freely with voltage inputs
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel

Analog acquisition

- Different input modes for the analog acquisition:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Trigger functions:
  - software trigger or
  - external trigger: the analog acquisition (single or sequence) is started through the signal on digital input 0 from 0 V to 24 V
- Onboard FIFO
- PCI-DMA

24 V digital

- 24 V digital I/O enable a high interference distance and a long distance between signal transmitter and data acquisition
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Timer

- 1, 12-bit

Safety features

- For more protection in noisy industrial environment
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Overvoltage protection ±40 V
- Protection against high-frequency EMI
- Input filters
- 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 sensors
- 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
- 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

ADDIPACK functions:

Analog input • Digital input • Digital output • Timer

On request:

Further operating systems, compilers and samples.

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

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Fax: +49 7229 1847-222 www.addi-data.com

ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Analog inputs

Number of inputs:	16 differential inputs
Resolution:	16-bit
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Input ranges:	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
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	200 kHz
Trigger:	Through software, timer, external event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of scan

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V, 4 digital outputs, 24 V, 50 mA typ., Open Collector
Logical "0" Level:	0-14 V
Logical "1" Level:	19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral

EMC – Electromagnetic compatibility

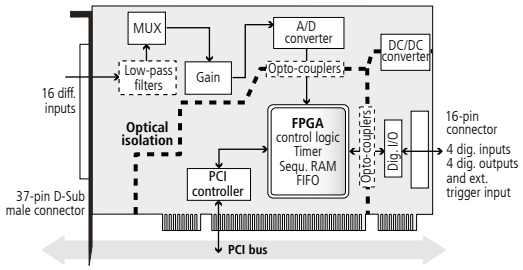
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

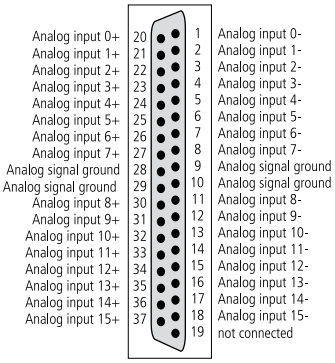
Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to specification 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O
Operating voltage:	+ 5 V, ± 5 % from the PC
Current consumption:	814 mA ± 10 mA
Front connector:	37-pin D-Sub male connector
Additional connector:	16-pin male connector for ribbon cable for connecting the digital inputs and outputs
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-AG
with cable ST010

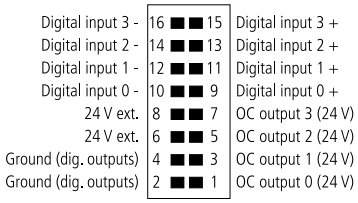
Simplified block diagram



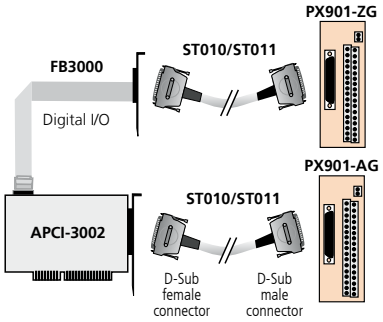
Pin assignment – 37-pin D-Sub male connector



Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

APCI-3002

Analog input board, optically isolated, 16 diff. inputs, 8 digital I/O, 16-bit.
Incl. technical description and software drivers.

Options

Please indicate the number of channels

Option PC-diff: Current input for 1 differential channel 0(4)-20 mA
Option DF: Precision filter for 1 channel

Accessories

PX901-AG: Screw terminal panel with transorb diodes, with housing for DIN rail for connecting the analog inputs
PX901-ZG: Screw terminal panel for connecting the digital I/O, for DIN rail
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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ADDI-DATA®
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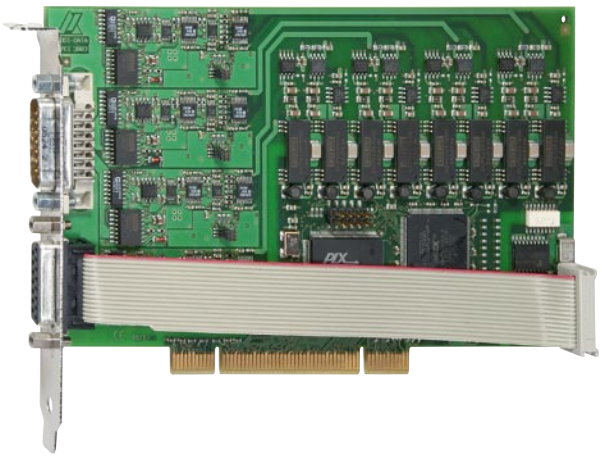
Analog input board, optically isolated, 4 differential inputs, 16-bit



APCI-3003

PCI 3.3 V or 5 V

Optical isolation between all channels

4 differential inputs, 16-bit resolution

Simultaneous acquisition on all channels

400 kHz throughput per channel

PCI DMA, programmable gain

Trigger functions

8 optically isolated digital I/O, 24 V

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Customer-tailored modifications
designed
to suit your needs.
Hardware and software,
firmware, PLDs, ...
Contact us!

With the fast analog input board APCI-3003 you can achieve high transfer rates with a simultaneous conversion of 4 channels.
The board has 4 differential inputs, each channel has its own A/D converter.
All 4 inputs are optically isolated from each other up to 1000 V.

Features

- PCI 3.3 V or 5 V
- Data acquisition independent from PCI clock

Analog inputs

- 4 differential inputs
- 16-bit resolution
- Throughput: 400 kHz per input
- Simultaneous conversion of 4 channels
- Input voltage: 0-10 V, ± 10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V, freely programmable through software for each channel
- Current inputs: 0-20 mA (option) can be combined freely with voltage inputs
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel

Analog acquisition

- Different input modes for the analog acquisition:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Trigger functions:
  - software trigger or
  - external trigger: the analog acquisition (single or sequence) is started through the signal on digital input 0 from 0 V to 24 V
- Onboard FIFO (for 512 analog values)
- PCI-DMA

Digital

- 24 V digital I/O enable a high interference distance and a long distance between signal transmitter and data acquisition
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Timer

- 1, 12-bit
- Timer as cyclic time counter

Safety features

- For more protection in noisy industrial environment
- Optical isolation 1000 V min.
- Creeping distance IEC 61010-1
- Overvoltage protection ± 40 V
- Protection against high-frequency EMI
- Input filters
- 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 sensors
- 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
- 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

ADDIPACK functions:

Analog input • Digital input • Digital output • Timer

On request:

Further operating systems, compilers and samples.

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

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Specifications

Analog inputs

Number of inputs:	4 differential inputs
resolution:	16-bit
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Input ranges:	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
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	400 kHz per input
Trigger:	Through software, timer, external event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of scan

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V, 4 digital outputs, 24 V, 50 mA typ., Open Collector
Logical "0" level:	0-13 V
Logical "1" level:	16-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral

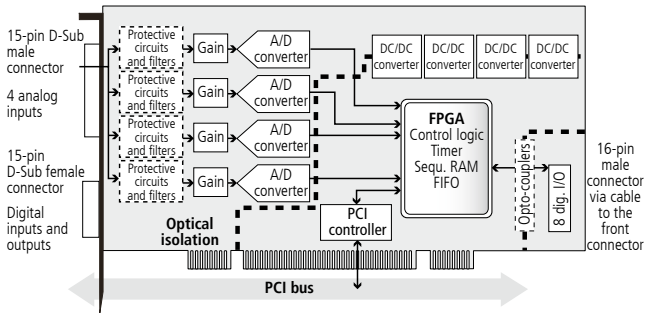
EMC – Electromagnetic compatibility

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.

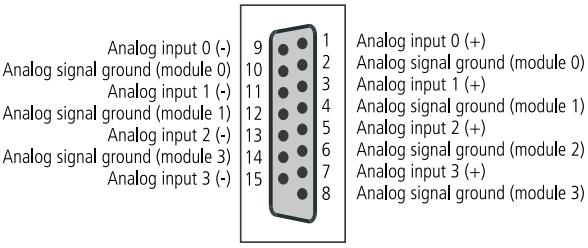
Physical and environmental conditions

Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to specification 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O
Operating voltage:	+5 V, ±5 % from the PC
Current consumption:	1.55 A typ.
Front connector:	15-pin D-Sub male connector for analog inputs 15-pin female connector for digital I/O
Temperature range:	0 to 60 °C (with forced cooling)

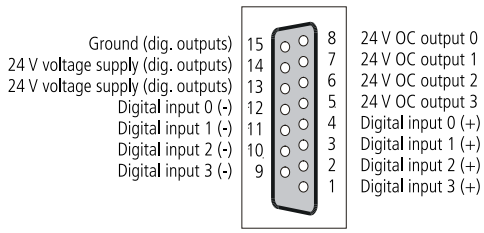
Simplified block diagram



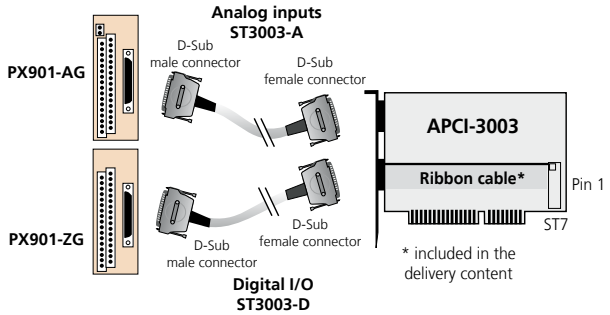
Pin assignment analog – 15-pin D-Sub male connector



Pin assignment digital – 15-pin D-Sub female connector



ADDI-DATA connection



Ordering information

APCI-3003

Analog input board, optically isolated, 4 differential inputs, 16-bit.
Incl. technical description and software drivers

Versions

APCI-3003: 4 differential inputs, simultaneous acquisition,
8 digital inputs and outputs, 24 V

Options

Please indicate the number of channels
Option PC-Diff: Current input for 1 differential channel 0(4)-20 mA
Option DF: Precision filter for 1 channel

Accessories

PX901-AG: Screw terminal panel with transorb diodes,
with housing for DIN rail
for connecting the analog inputs
ST3003-A: Shielded round cable, connection to PX-901-AG
PX901-ZG: Screw terminal panel for connecting
the digital I/O, for DIN rail
ST3003-D: Shielded round cable, connection to PX-901-ZG

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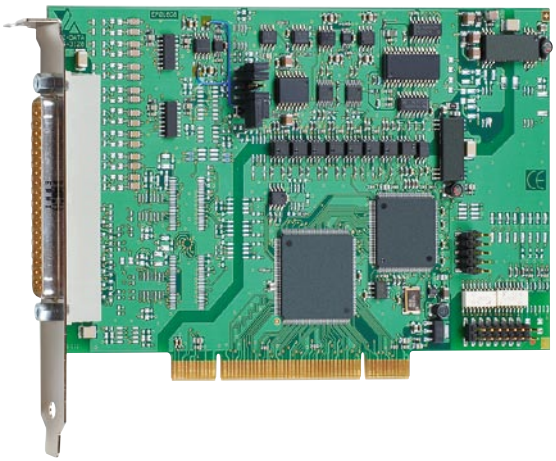
Analog input board, optically isolated, 16/8/4 SE or 8/4 differential inputs, 12-bit



APCI-3001

16/8/4 single-ended or
8/4 differential inputs

12-bit resolution

Optical isolation 500 V

100 kHz throughput

PCI DMA, programmable gain

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

Trigger functions

RoHS 2002/95/EC

Also for
PCI EXPRESS
see APCIe-3121, page 136

Compatible version for *CompactPCI™*
See CPCI-3001, page 240

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

DASYLab10
Data Acquisition System Laboratory

Features

Analog inputs
- 16 single-ended / 8 differential inputs or 8 single-ended / 4 differential inputs or 4 single-ended inputs
- 12-bit resolution
- 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

Analog acquisition
- 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 scan) 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

Digital
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Timer
- 24-bit, can be used as cyclic time counter

Safety features
- Optical isolation 500 V min.
- Creeping distance IEC 61010-1
- Overvoltage protection ± 40 V
- 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 sensors
- 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
- 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:
- Visual C++ • Microsoft C
- Borland C++ • Borland C
- Visual Basic • Delphi
- LabVIEW • DASYLab • DIAdem

On request:
Further operating systems, compilers and samples.

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

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PCI

Specifications

Analog inputs

Number of inputs:	16 single-ended/8 differential inputs 8 single-ended/4 differential inputs or 4 single-ended inputs
Resolution:	12-bit
Optical isolation:	500 V through opto-couplers from PC to peripheral
Input ranges:	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
Throughput:	100 kHz
Gain:	Software programmable (x1, x2, x5, x10)
Common mode rejection:	DC at 10 Hz, 90 dB minimum
Relative precision (INL):	± 1 LSB (ADC)
Diff. non-linearity (DNL):	± 0.5 LSB (ADC)
Input impedance (PGA):	10^{12} Ω // 10 nF single-ended, 10^{12} Ω // 20 nF differential against GND
Bandwidth (- 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

Timer

Time base timer 2:	50 µs; smallest programmable value: 100 µs

Digital I/O

Number of I/O channels:	4 digital inputs, 4 digital outputs, 24 V
Optical isolation:	500 V through opto-couplers from PC to peripheral
Input range:	0-30 V - Logical "0": 0-5 V - Logical "1": 10-30 V
Input current at 24 V:	3 mA typ.
Output range:	5-30 V
Max. switching current:	10 mA typ.
Output type:	Open Collector

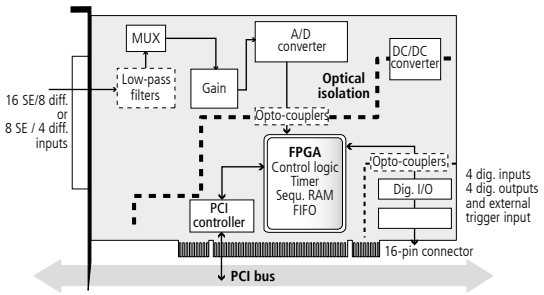
EMC – Electromagnetic compatibility

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.

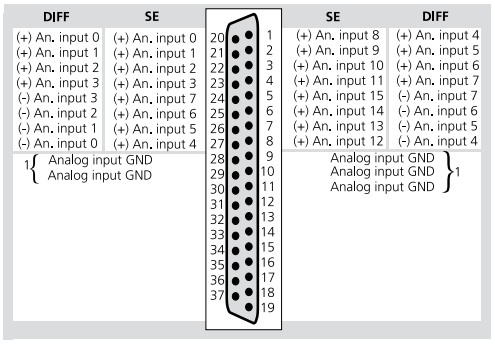
Physical and environmental conditions

Dimensions:	169 x 99 mm
System bus:	PCI 32-bit 3.3 / 5 V acc. to specification 2.1 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O
Operating voltage:	+5 V, ±5 % from the PC
Current consumption:	496 mA typ. ± 10 %
Front connector:	37-pin D-Sub male connector
Additional connector:	16-pin male connector for ribbon cable for connecting the digital inputs and outputs
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

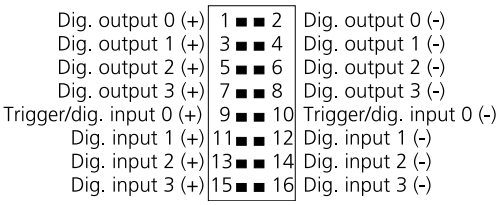


Pin assignment – 37-pin D-Sub male connector

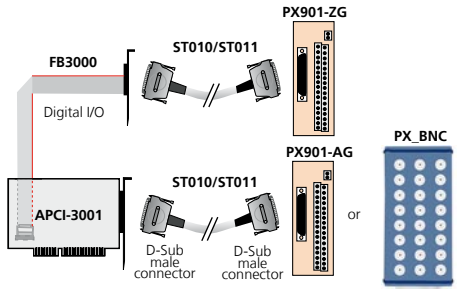


1: The analog inputs have a common ground line

Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

APCI-3001

Analog input board, optically isolated, 16/8/4 SE or 8/4 diff. inputs, 12-bit. Incl. technical description and software drivers.

Versions

APCI-3001-16: 16 SE/8 diff. inputs, 8 dig. I/O
APCI-3001-8: 8 SE/4 diff. inputs, 8 dig. I/O
APCI-3001-4: 4 SE inputs, 8 dig. I/O

Options

Please indicate the number of channels
Option SF: Precision filter for 1 single-ended channel
Option DF: Precision filter for 1 differential channel
Option SC: Current input for 1 single-ended channel 0(4)-20 mA
Option DC: Current input for 1 diff. channel, 0(4)-20 mA

Accessories

PX901-A: Screw terminal panel with transorb diodes, for connecting the analog inputs
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 digital I/O, for DIN rail
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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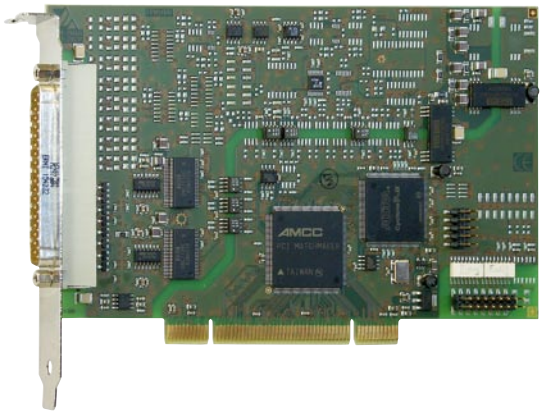
Analog output board, optically isolated, 8 analog outputs, 14-bit



APCI-3501

8/4 analog outputs, 14-bit

Optical isolation 500 V

4 digital I/O, 24 V, optically isolated

Watchdog, timer

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS
see APCIe-3521, page 138

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Features

- 8 or 4 analog outputs
- Optical isolation 500 V
- Setup time 30 µs typ.
- 14-bit resolution (13-bit for 0-10 V)
- Output voltage: ±10 V, 0-10 V (switchable through software)
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation from each other)
- Driver capacity: 5 mA/500 pF
- Short-circuit protection, EMI filters
- Noise neutralisation of the PC supply
- Creeping distance IEC 61010-1
- Watchdog for resetting the analog outputs (4 different time bases: µs, ms, s, min) or as 12-bit timer (with interrupt possibility), when the watchdog function is not necessary.

Digital

- 2 digital inputs, 24 V, optically isolated
- 2 digital outputs, 24 V, optically isolated

Applications

- Industrial process control
- Industrial measurement and monitoring
- Control of chemical processes
- Factory automation
- Laboratory equipment
- Programmable voltage source
- Instrumentation
- ...

Software drivers

A CD-ROM with the following software and programming examples 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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions

• Analog output • Digital input • Digital output • Timer • Watchdog

On request:

Further operating systems, compilers and samples.

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

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ADDI-DATA®
SPIRIT OF EXCELLENCE

Specifications

Analog outputs

Number of outputs:	8 or 4
Resolution:	14-bit resolution, 12-bit accuracy
Monotony:	12-bit
Optical isolation:	500 V through opto-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:	±25 mA
Output voltage after reset:	0 V
Watchdog:	software-programmable 4 different time bases: µs, ms, s, min.

Digital I/O

Number of I/O channels:	2 digital inputs, 2 digital outputs, 24 V
Optical isolation:	500 V through opto-couplers from PC to peripheral
Input current at 24 V:	3 mA typ.
Input range:	0-30 V - Logical "0": 0-5 V - Logical "1": 10-30 V
Max. switching current:	10 mA typ.
Output range:	5-30 V
Output type:	Open Collector

EMC – Electromagnetic compatibility

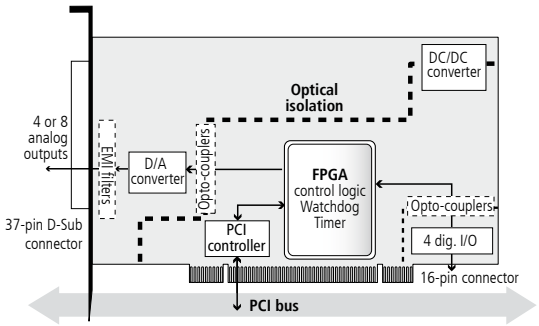
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

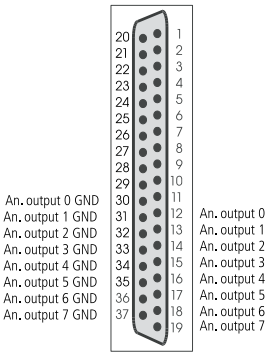
Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot for analog outputs, 1 slot opening for digital I/O with FB3000
Operating voltage:	+5 V, ±5 % from the PC
Current consumption:	440 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
Additional connector :	16-pin male connector for ribbon cable for connecting the digital inputs and outputs
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-AG
with cable ST010

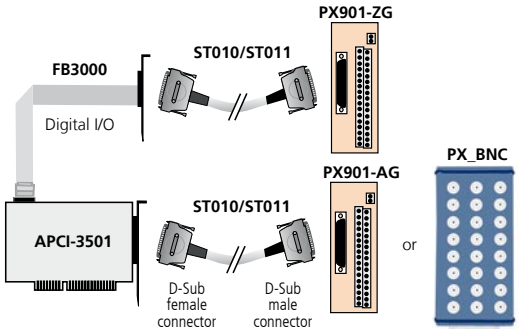
Simplified block diagram



Pin assignment – 37-pin D-Sub male connector



ADDI-DATA connection



Ordering information

APCI-3501

Analog output board, optically isolated, 8/4 analog outputs, 14-bit. Incl. technical description and software drivers.

Versions

APCI-3501-8 Version with 8 analog voltage outputs
APCI-3501-4 Version with 4 analog voltage outputs

Accessories

PX901-A: Screw terminal panel with transorb diodes, for connecting the analog outputs
PX901-AG: Same as PX901-A with housing for DIN rail
PX_BNC: BNC connection box for connecting the analog I/O
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
PX901-ZG: Screw terminal panel for connecting the digital I/O, for DIN rail
FB3000: Ribbon cable for digital I/O

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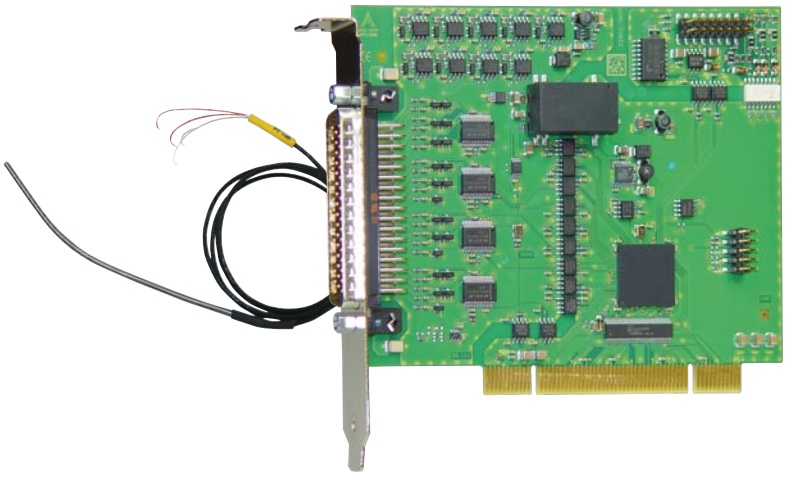
Temperature measurement board, optically isolated, 16/8/4 channels for thermocouples, Pt100, RTD, 18-bit



APCI-3200

Up to 16 channels for thermocouples or 8 inputs for resistance temperature detectors (RTD)

Mixed configuration of the channels

18-bit resolution

Optical isolation 1000 V

Cold junction compensation on PX3200-G

Software linearisation

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

DASYLab10 Data Acquisition System Laboratory

Features

- PCI 3.3 V or 5 V
- 18-bit resolution, 16-bit accuracy
- Each channel can be configured either to thermocouples, RTD or as an analog voltage input channel
  - 16 analog inputs for thermocouple types J, K, T, E, R, S, B, N
  - or 8 diff. analog inputs for the acquisition of the resistance temperature detectors (Pt100)
  - or 16 SE/8 differential analog voltage inputs, ± 1.25 V
- 8 independent current sources for resistance temperature detectors (RTD) and one current source for the cold junction compensation
- Cold junction compensation (on separate screw terminal board PX3200-G)
- Gain and offset calibration
- Linearisation through table and calculation for thermocouple types J, K, T, E, R, S, B, N and RTDs
- Programmable gain
- 16-bit accuracy with converter sample rate of 20, 40, 80 or 160 Hz (higher sample rate on request)
- 4 digital inputs, 24 V and 3 digital outputs, open collector, optically isolated
- Base address and IRQ channels set through BIOS
- The board is supplied with a monitoring program for testing and setting the board functions

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Diagnostic: Short-circuits- and line break detection, depending on the type of sensor used
- Protection against overvoltage (±30 V) and high-frequency EMI

Software drivers

A CD-ROM with the following software and programming examples 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 • DIAdem

ADDIPACK functions

• Analog input • Temperature • Resistance • Digital input • Digital output

On request:

Further operating systems, compilers and samples.

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

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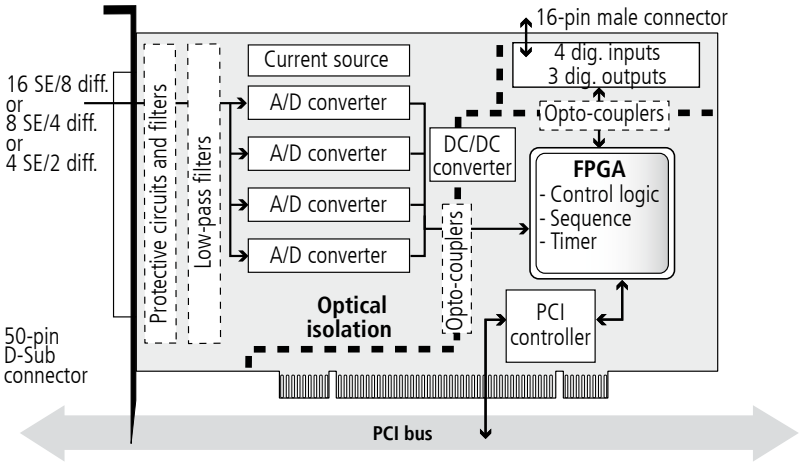
Simplified block diagram



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Specifications

Analog inputs

Analog inputs:	- 16 x thermocouples or - 8 x RTD with 2 or 4 wire connection or - 4 x RTD with 3 wire connection or 16 SE/8 diff. inputs, ± 2.5 V
Resolution:	18-bit
Accuracy:	16-bit
Input amplifier:	1, 2, 4, 8, 16, 32, 64, 128
Conversion start:	Through software or external trigger

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V, 3 digital outputs, 24 V, 125 mA typ., open collector
Logical "0" level:	0-5 V
Logical "1" level:	12-30 V
Optical isolation:	1000 V through opto-couplers for analog and digital channels

Sampling frequencies

Selectable
Sampling frequencies f_{ADC} — f_{ADC} = 160 Hz, 80 Hz, 40 Hz or 20 Hz

Various sampling rates F_S — in „Read 1" and in „Scan" mode depending on the type of transducer RTD or thermocouple (TC)

Sensor	Selectable sampling frequencies f_{ADC}	Sampling frequencies im „Read 1" Mode	Sampling frequencies in „Scan" Mode	
RTD (Pt100…)	160 Hz 80 Hz 40 Hz 20 Hz	53 Hz / channel 26 Hz / channel 13 Hz / channel 6 Hz / channel	32 Hz 16 Hz 8 Hz 4 Hz	for 2, 4, 6 and/or 8 channels
Thermo-couples	160 Hz 80 Hz 40 Hz 20 Hz	26 Hz / channel 16 Hz / channel 6 Hz / channel 3 Hz / channel	23 Hz 11 Hz 6 Hz 3 Hz	for 4, 8, 12 and/or 16 channels

Four cases are possible:

1. „Read 1" mode with RTD

$$F_s = \frac{f_{ADC}}{3}$$

With RTD (Pt100…) 3 values are acquired at each measurement:
- the measured value,
- the offset,
- the reference voltage.

F_S = 53 Hz, 26 Hz, 13 Hz, 6 Hz

2. „Read 1" mode with thermocouples (TC)

$$F_s = \frac{f_{ADC}}{6}$$

With TC 2 x 3 values are acquired at each measurement:
- the measured value,
- the offset,
- the reference voltage.

One time for the acquisition value and one time for the cold junction compensation.
F_S = 26 Hz, 13 Hz, 6 Hz, 3 Hz

3. „Scan" Mode with RTD

$$F_s = \frac{f_{ADC}}{5}$$

With RTD (Pt100…) 5 values (unipolar, diff.) are acquired per scan measurement to sample 2 channels: for 2 values for 1, 2, 3 and/or 4 modules
F_S = 32Hz, 16Hz, 8Hz, 4Hz

4. „Scan" Mode with thermocouples (TC)

$$F_s = \frac{f_{ADC}}{7}$$

With TC 7 values (bipolar, SE) are acquired, per scan measurement to sample 4 channels: for 4 values for 1, 2, 3 and/or 4 modules
F_S = 23 Hz, 11 Hz, 6 Hz, 3 Hz

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:	131 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot and 1 slot opening for the digital I/O
Operating voltage:	+5 V, ±5 % from the PC
Current consumption (typ.):	550 to 600 mA depending on the version
Front connector (analog channels):	50-pin D-Sub male connector
Additional connector :	16-pin male connector for connecting the digital I/O via ribbon cable with 37-pin D-Sub connector
Operating temperature:	0 to 60 °C (with forced cooling)

Thermocouples accuracy

Type DIN EN 60584	Range		Accuracy (+/-)
Type J	-200.0 °C	-0.1 °C	±0.6 °C
	0.0 °C	+599.9 °C	±0.2 °C
	+600.0 °C	+1200.0 °C	±0.6 °C
Type T	-200.0 °C	-80.0 °C	±0.7 °C
	-79.9 °C	+400.0 °C	±0.3 °C
Type K	-200.0 °C	-0.1 °C	±0.8 °C
	0.0 °C	+999.9 °C	±0.4 °C
	+1000.0 °C	+1300.0 °C	±0.6 °C
Type E	-200.0 °C	+1000.0 °C	±0.5 °C
Type N	-200.0 °C	-0.1 °C	±1.0 °C
	0.0 °C	+799.9 °C	±0.2 °C
	+800.0 °C	+1300.0 °C	±0.5 °C
Type S	0.0 °C	+399.9 °C	±1.6 °C
	+400.0 °C	+1768.0 °C	±0.7 °C
Type R	0.0 °C	+399.9 °C	±1.6 °C
	+400.0 °C	+1768.0 °C	±0.6 °C
Type B	+400.0 °C	+799.9 °C	±2.0 °C
	+800.0 °C	+1820.0 °C	±1.0 °C

Accuracy of the reference cold junction temperature

Type	Range	Accuracy (+/-)
Pt1000	0° C+60° C	± (0.30 °C + 0.0050 x |T|) (T: Temperature in °C)

Accuracy of the resistance thermometer (RTD)

Type DIN EN 60751	Range		Accuracy (+/-) Worst Case (Gain=1 unipolar)
Pt100	-200.0 °C	+850.0 °C	±0.4 °C
Pt200	-200.0 °C	+850.0 °C	±0.4 °C
Pt500	-200.0 °C	+850.0 °C	±0.3 °C
Pt1000	-200.0 °C	+499.9 °C	±0.2 °C
	+500.0 °C	+850.0 °C	±1.0 °C
Ni100	-60.0 °C	+250.0 °C	±0.3 °C

Accuracy in the temperature range of -20 °C to +40 °C with Pt100

Gain	Accuracy
1	± 0.40 °C
2	± 0.20 °C
4	± 0.15 °C
8	± 0.10 °C
16	± 0.08 °C
32	± 0.08 °C
64	± 0.08 °C

Sensor short-circuit / line break detection

Type	short-circuits	line break
Thermocouple (SE)	no detection	no detection
Resistance thermometer (diff.)	detection	detection
Potentiometer (diff.)	detection	detection

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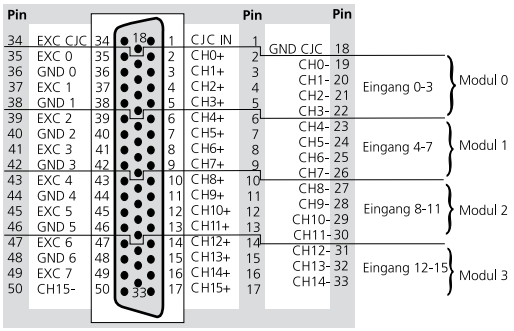
Screw terminal panel with cold junction compensation PX3200-G

Screw terminal panel PX3200-G with cable ST3200

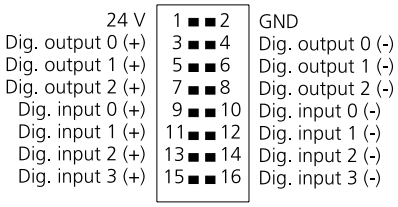
The PX3200-G screw terminal panel is used for connecting thermocouples/ RTDs. It is connected to the APCI-3200 through the ST3200 cable.
The housing of the female connector is connected to two ground terminals so that the board is additionally earthed for more security. All components of the board are enclosed in an earthing strip also connected to the ground terminals.
Each terminal is directly connected to one pin of the 50-pin D-Sub female connector. The designations on the terminals indicate the respective connections for the 50-pin D-Sub female connector.
The PX3200-G features an integrated cold junction compensation.
The voltage (V_{CJC}[1]) is measured through an RTD (Pt1000) at the cold junction and used as reference voltage for the temperature measurement of the thermocouples connected to the panel.
After each acquisition, a new measurement of the cold junction compensation is made for each channel and processed through software.

1 CJC: Cold Junction Compensation

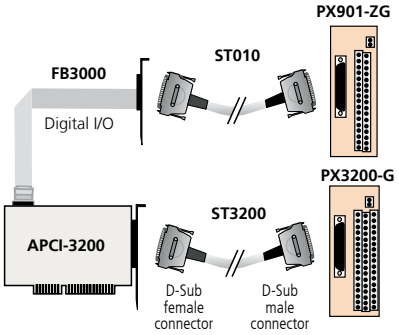
Pin assignment – 50-pin D-Sub male connector



Pin assignment – 16-pin male connector



ADDI-DATA connection



Specifications

Possible connections

Versions	Number of thermocouples (SE inputs)	Number of RTDs (diff. inputs)		
		2-wire connection	3-wire connection	4-wire connection
APCI-3200-4	4	2	1	2
APCI-3200-8	8	4	2	4
APCI-3200-16	16	8	4	8

Safety features:	Ground terminals
Connector:	50-pin D-Sub female connector
Dimensions of the board:	(L x W x H) 110 x 70 x 45 mm
Dimensions with housing:	(L x W x H) 113 x 87 x 80 mm
Temperature range:	0-70 °C

Ordering information

APCI-3200

Temperature measurement board, optically isolated, 16/8/4 channels for thermocouples, Pt100, RTD, 18-bit.
Incl. technical description, software drivers and monitoring program.

Versions

APCI-3200-16: 16 analog inputs:
16 thermocouples
or 8 RTDs or 16 single-ended
or 8 diff. voltage inputs

APCI-3200-8: 8 analog inputs: 8 thermocouples
or 4 RTDs or 8 single-ended
or 4 diff. voltage inputs

APCI-3200-4: 4 analog inputs: 4 thermocouples
or 2 RTDs or 4 single-ended
or 2 diff. voltage inputs

Accessories

PX3200-G: Screw terminal panel with cold junction compensation and housing for DIN rail.

PX3200: Screw terminal panel with cold junction compensation and 4 mounting holes for wall mounting.

ST3200: Standard round cable, shielded, twisted pairs, 2 m

FB3000: Ribbon cable for digital I/O on separate bracket

PX901-ZG: Screw terminal panel for connecting the digital I/O, for DIN rail

ST010: Standard round cable, shielded, twisted pairs, 2 m

ST011: Standard round cable, shielded, twisted pairs, 5 m

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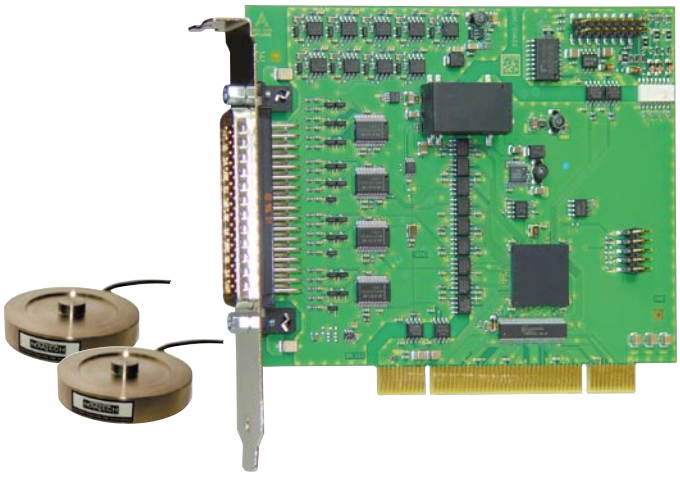
Pressure measurement board, optically isolated, up to 8 channels for strain gauges, 18-bit



APCI-3300

Up to 8 channels for strain gauges

Up to 8 onboard voltage sources

18-bit resolution

Optical isolation 1000 V

Software linearisation

Direct connection of the pressure sensors to the screw terminal panel PX3200-G

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™ *

LabWindows/CVI™ *

*** On request**

Features

- PCI 3.3 V or 5 V

Analog inputs

- 18-bit resolution, unipolar, 16-bit accuracy
- 8 or 4 differential inputs for strain gauges
- Voltage range from 0 to + 1.25 V
- 4 or 8 voltage sources for the connected pressure sensors
- Output voltage for the voltage sources 5 V, 30 mA
- Gain and offset calibration
- Calculation of the pressure value through software
- Programmable gain
- 16-bit accuracy with a sample rate of 20, 40, 80 or 160 Hz

Analog acquisition

- 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.
- Connection of linear sensors (Wheatstone Bridge)

Digital

- 4 digital inputs, 24 V and 3 digital outputs, open collector, optically isolated

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against overvoltage (±30 V) and high-frequency EMI

Software

A CD-ROM with the following software and programming examples 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

ADDIPACK functions

Pressure • Digital input • Digital output

On request:

Further operating systems, compilers and samples.

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

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PCI

Specifications

Analog inputs

Resolution:	18-bit, unipolar
Number of inputs:	8 or 4 analog inputs for strain gauges, one voltage source per channel
Input type:	Differential channels
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Accuracy:	16-bit
Overvoltage protection:	± 30 V
Input voltage range:	0 to 1.25 V / PGA
Input amplifier (PGA):	1, 2, 4, 8, 16, 32, 64, 128
Conversion start:	Through software or external trigger, with or without timer
Voltage sources:	4 or 8
Output voltage for the voltage sources:	5 V, 30 mA (other values on request)

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V, 3 digital outputs, 24 V, 125 mA typ., open collector
Logical "0" level:	0-5 V
Logical "1" level:	12-30 V
Input current at 24 V:	2 mA
Max. switching current of the outputs:	125 mA
Optical isolation:	1000 V through opto-couplers for analog and digital channels

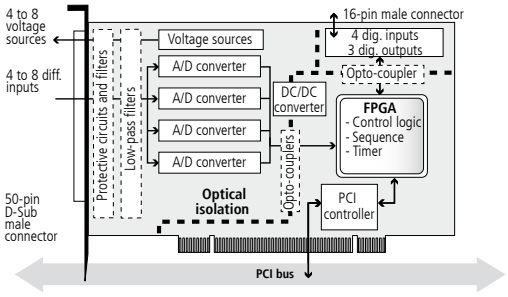
EMC – Electromagnetic compatibility

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.

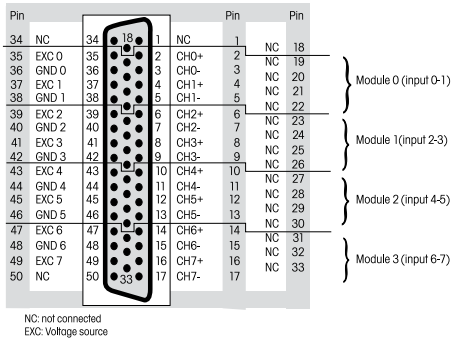
Physical and environmental conditions

Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 3.3 / 5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot and 1 slot opening for the digital I/O
Operating voltage:	+5 V, ±5 % from the PC, +3.3 V
Current consumption (typ.):	570 to 600 mA depending on the version
Front connector (analog channels):	50-pin D-Sub male connector
Additional connector:	16-pin male connector for connecting of the digital I/O via ribbon cable with 37-pin D-Sub connector
Operating temperature:	0 to 60 °C (with forced cooling)

Simplified block diagram



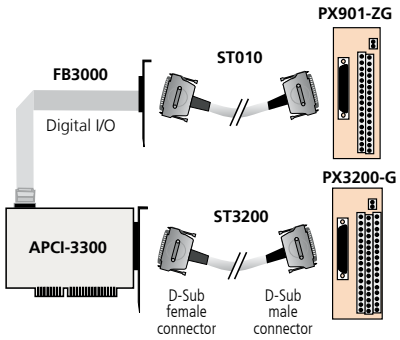
Pin assignment – 50-pin D-Sub male connector



Pin assignment – 16-pin male connector

24 V	1 ■ ■ 2	GND
Dig. output 0 (+)	3 ■ ■ 4	Dig. output 0 (-)
Dig. output 1 (+)	5 ■ ■ 6	Dig. output 1 (-)
Dig. output 2 (+)	7 ■ ■ 8	Dig. output 2 (-)
Dig. input 0 (+)	9 ■ ■ 10	Dig. input 0 (-)
Dig. input 1 (+)	11 ■ ■ 12	Dig. input 1 (-)
Dig. input 2 (+)	13 ■ ■ 14	Dig. input 2 (-)
Dig. input 3 (+)	15 ■ ■ 16	Dig. input 3 (-)

ADDI-DATA connection



Ordering information

APCI-3300

Pressure measurement board, optically isolated, up to 8 channels for strain gauges, 18-bit. Incl. technical description and software drivers.

Versions

APCI-3300-4: 4 analog inputs for pressure signals
APCI-3300-8: 8 analog inputs for pressure signals

Accessories

PX3200-G: Screw terminal panel with housing for DIN rail
PX3200: Screw terminal panel with 4 mounting holes
ST3200: Standard round cable, shielded, twisted pairs, 2 m
FB3000: Ribbon cable for dig. I/O on separate bracket
PX901-ZG: Screw terminal panel for digital I/O for DIN rail
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

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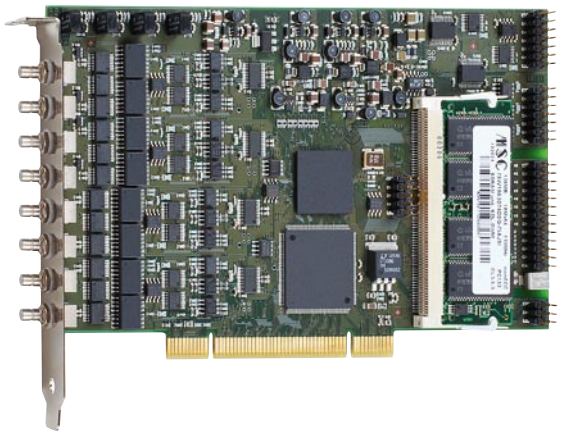
Noise and vibration measurement board, optically isolated, multifunction board, 8 analog inputs, 24-bit



APCI-3600, APCI-3600-L

8 SE/diff. (+/-) inputs, simultaneous sampling

Connection through SMB co-axial connectors

Onboard power supply for ICP™ sensors

4 chronometer inputs (RS485)

2 analog outputs

8 digital inputs, 8 digital outputs

Onboard SDRAM module

PCI 32-bit

Windows 64/32-bit drivers

On request

Customer-tailored modifications
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

Acoustic processes in test applications are not limited to simple noise and vibration measurements.
The multifunction PCI board APCI-3600 by ADDI-DATA offers a PC-based solution to almost all additional measuring tasks which may arise thanks to its many functions.

- 8 analog input channels through SMB co-axial connectors
- Counter function: 4 chronometer inputs (up to 1 MHz 32-bit depth) allow applications in which precise coordinates must be determined.
- Current supply of the ICP™ sensors
- Synchronous mode (cascading) of several APCI-3600 through Master/Trigger
- Digital I/O
- SDRAM memory module allows transfer rates up to 24 MByte/s.

For a fast integration of the board in special test devices, the board is supplied with drivers and samples.

Features

Analog inputs (for all versions)

- 8 SE or diff. (+/-) inputs
- Sampling rate can be set between 2 and 200 kHz
- SNR (signal/noise ration) > 105 dB
- 24-bit resolution
- One A/D converter per channel: simultaneous acquisition on all analog inputs
- Gain 1 to 10, software-programmable
- Input coupling AC, DC, GND, software-programmable for each channel
- Antialiasing filter to avoid sampling errors
- Overvoltage protection

Current sources

- 8 current sources for the direct connection of ICP™ sensors (integrated circuit piezoelectric)
- 4 mA typ., 24 V max.

Chronometer inputs (only for version APCI-3600)

- 4 chronometer inputs, RS485, 32-bit for revolution counting
- 2 gate inputs

Analog outputs (only for version APCI-3600)

- 2 analog outputs: both outputs are started synchronously with the A/D converter. Arbitrary function generators can be programmed.
- Settling time: 5 µs
- 16-bit resolution
- Simultaneous sampling on both channels
- 13-bit accuracy
- DAC type: R-2R
- Output range: ± 10 V

Digital (only for version APCI-3600)

- 8 digital inputs, 24 V, optically isolated
- 8 digital outputs, 24 V, optically isolated

Onboard SDRAM module

- 128 MB (256 MB or 512 MB on request)

Applications

The following applications can be realised with the **APCI-3600**:

- Noise measurement with fault diagnosis on gear and drive over FFT:
  Encoders are connected to the chronometer inputs and microphones are connected to the analog inputs. Encoders measure the position of the drive and the analog inputs measure the noise of the system at a specific position. For this purpose the analog inputs and the chronometer inputs are controlled synchronously. To each analog sample belongs a position of the chronometer. The synchronisation results from a FFT.
- Measurement of the transfer function of a DUT ("Device Under Test").
- Noise analysis: Evaluation of a washing maschine, measurements in the automotive field, etc.

Software

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

Samples for the following compilers:

Visual C++ • Borland C

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

*Preliminary product information

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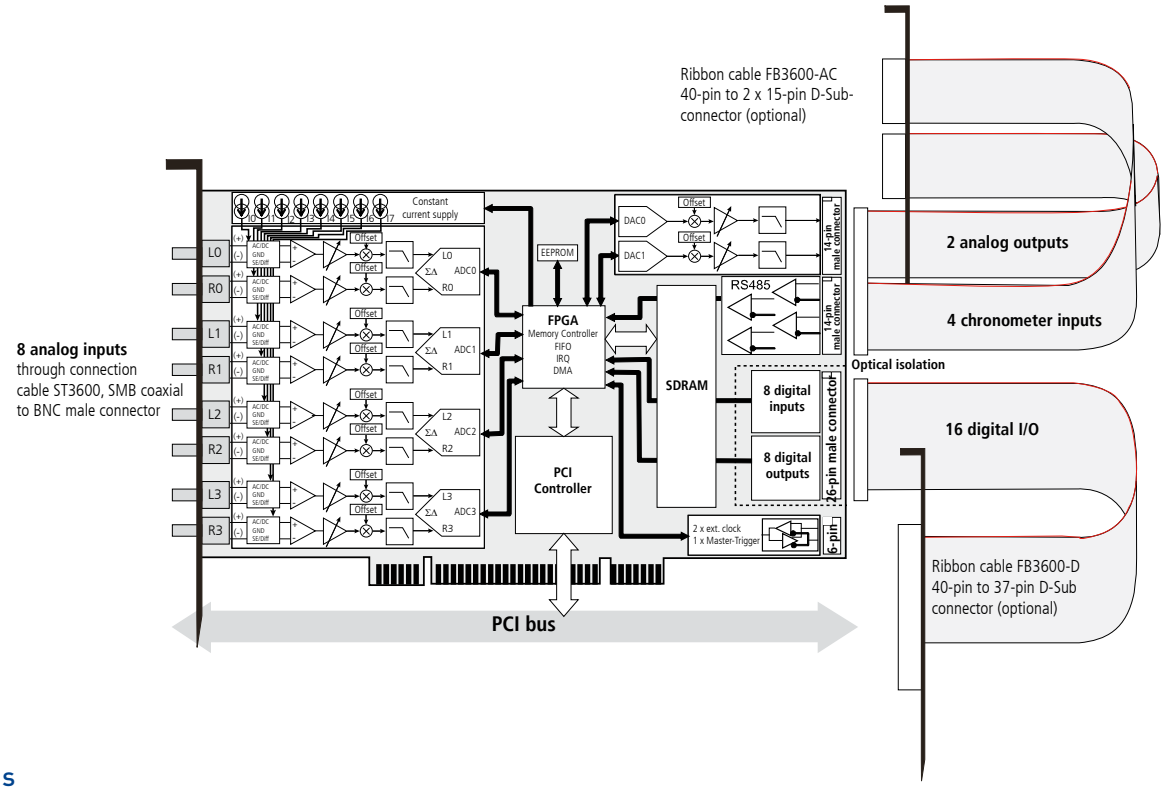
Simplified block diagram



Versions

	8 analog inputs	8 ICP power supply (current sources)	4 chronometer inputs	2 analog outputs	8 digital inputs, 24 V, optically isolated	8 digital outputs, 24 V, optically isolated	Onboard SD RAM
APCI-3600	✓	✓	✓	✓	✓	✓	✓
APCI-3600-L	✓	✓					✓

Specifications*

Analog inputs

Number:	8		
Input type:	Single-ended or differential through software		
resolution:	24-bit		
A/D Converter:	Delta-Sigma, 5th order, multibit Delta-Sigma modulator		
Gain:	x1, x10 software programmable		
Input ranges:	Gain x1	± 10 V single-ended	
	Gain x1	± 5 V differential	
	Gain x10	± 1 V single-ended	
	Gain x10	± 0.5 V differential	
Sampling rate f_s:	2 kHz ≤ f_s ≤ 200 kHz selectable through software		

Selectable frequencies:	2 kHz ≤ f_s ≤ 50 kHz	50 kHz ≤ f_s ≤ 100 kHz	100 kHz ≤ f_s ≤ 200 kHz
	50000 Hz	100000 Hz	200000 Hz
	40000 Hz	80000 Hz	160000 Hz
	33333 Hz	66667 Hz	133333 Hz
	25000 Hz	50000 Hz	100000 Hz
	20000 Hz		
	16667 Hz		
	12500 Hz		
	10000 Hz		
	8000 Hz		
	5000 Hz		
	4000 Hz		
	3333 Hz		
	2500 Hz		
	2000 Hz		

Oversampling:	64 x f_s (for sampling rate f_s)
Frequency precision:	± 50 ppm
FIFO depth:	128 DWORD, for the rigth and the left channel of the same ADC
Data transfer:	DMA, I/O, IRQ
Transmission ripple (rel. to 1 kHz), max., DC-coupled:	
2 kHz ≤ f_s ≤ 50 kHz:	-0.1dB, DC to 0.47 x f_s
50 kHz ≤ f_s ≤ 100 kHz:	-0.1dB, DC to 0.45 x f_s
100 kHz ≤ f_s ≤ 200 kHz:	-0.1dB, DC to 0.24 x f_s
-3 dB bandwidth:	
2 kHz ≤ f_s ≤ 50 kHz:	0.5 x f_s
50 kHz ≤ f_s ≤ 100 kHz:	0.5 x f_s
100 kHz ≤ f_s ≤ 200 kHz:	0.358 x f_s
Input coupling:	AC, DC, GND, selectable through software
AC -3dB limit frequency:	1.6 Hz
Overvoltage protection:	

R1-, L1-, R2-, L2-, L/R3+-, L/R4+-

Max. direct current:	± 12 V, ± 200 mA
Max. peak current (Impuls at 1 ms, 10% duty cycle):	± 12 V, ± 300 mA

R1+, L1+, R2+, L2+

Max. direct current:	± 36 V, ± 30 mA
Max. peak current (pulse at 1 ms, 10% duty cycle):	± 36 V, ± 70 mA
ESD protection:	> 2 kV, ESD protection through method 3015.17

* Preliminary product information

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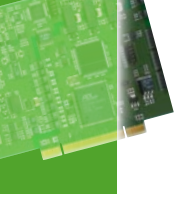


Specifications*

Analog inputs (continued)

Dynamic properties

2 kHz ≤ f_S ≤ 50 kHz:

Passband:	DC (0Hz) up to 0.47 x f_S, min. to max.
Stopband:	0.58 x f_S min
Stopband attenuation:	-95 dB min
Total group delay:	12/f_S s typical

50 kHz ≤ f_S ≤ 100 kHz:

Passband:	DC (0Hz) up to 0.45 x f_S, min. to max.
Stopband:	0,68 x f_S min
Stopband attenuation:	-92 dB min
Total group delay:	9/f_S s typical

100 kHz ≤ f_S ≤ 200 kHz:

Passband:	DC (0Hz) up to 0.24 x f_S, min. to max.
Stopband:	0.78 x f_S min
Stopband attenuation:	-97 dB min
Total group delay:	5/f_S s typical

Dynamic range SNR

2 kHz	≤ f_S ≤	50 kHz:	< -105 dB (short input gain x1)
			< -100 dB (short input gain x10)
			< -80 dB (open input gain x1)
			< -60 dB (open input gain x10)
50 kHz	≤ f_S ≤	100 kHz:	< -105 dB (short input gain x1)
			< -100 dB (short input gain x10)
			< -80 dB (open input gain x1)
			< -60 dB (open input gain x10)
100 kHz	≤ f_S ≤	200 kHz:	< -75 dB (short input gain x1)
			< -75 dB (short input gain x10)
			< -75 dB (open input gain x1)
			< -60 dB (open input gain x10)

Crosstalk

Between channel R0 and L0, R1 and L1, R2 and L2, R3 and L3, Gain x1:

Short input at f_{in} = 100 Hz

2 kHz	≤ f_S ≤	50 kHz:	< -95 dB
50 kHz	≤ f_S ≤	100 kHz:	< -95 dB
100 kHz	≤ f_S ≤	200 kHz:	< -70 dB

Short input at f_{in} = 1 kHz

2 kHz	≤ f_S ≤	50 kHz:	< -95 dB
50 kHz	≤ f_S ≤	100 kHz:	< -95 dB
100 kHz	≤ f_S ≤	200 kHz:	< -70 dB

1 kΩ load at f_{in} = 100 Hz

2 kHz	≤ f_S ≤	50 kHz:	< -95 dB
50 kHz	≤ f_S ≤	100 kHz:	< -95 dB
100 kHz	≤ f_S ≤	200 kHz:	< -70 dB

1 kΩ load at f_{in} = 1 kHz

2 kHz	≤ f_S ≤	50 kHz:	< -95 dB
50 kHz	≤ f_S ≤	100 kHz:	< -95 dB
100 kHz	≤ f_S ≤	200 kHz:	< -70 dB

Phase error

between channel R0 and L0, R1 and L1, R2 and L2, R3 and L3

At f_S = 200 kHz	0.3° max.
	0.2° at f_{in} = 10 kHz sinus signal
	0.02° at f_{in} = 1 kHz sinus signal

Amplitude error ± 0,02 dB max., at f_{in} = 1 kHz sinus signal (Gain x1 and x10)

Offset error ± 200 µV, max. at f_S = 2 kHz

Analog outputs

Number of outputs:	2
Resolution / accuracy:	16-bit / 13-bit
DAC type:	R-2R
Output range:	± 10 V
Settling time: 10 V step, RL = 2 k , CL = 1500 pF	
± 0.1%:	5 µs typical
± 0.01%:	5.6 µs typical
Overvoltage protection:	± 12 V, 100 mA max. direct current
Short-circuit current:	± 45 mA typical
Output voltage after reset:	0 V
FIFO depth:	256 Word
Data transfer:	DMA, I/O, IRQ

Digital inputs

Number of inputs:	8
Filters/protective circuit:	Low-pass/transorb diode
Optical isolation:	1000 V
Nominal voltage:	24 V external
Input voltage:	0 up to 30 V
Input current:	7 mA at 24 VDC, typical
Logic input levels:	UH (max.): 30 V
	UH (min): 19 V
	UL (max.): 14 V
	UL (min): 0V
Input frequency (max.):	5 kHz at 24 V
Trigger input:	Digital input 0

Digital outputs

Number outputs:	8, open collector
Optical isolation:	1000 V
Nominal voltage:	24 V
Supply voltage:	5-30 V
Output current per output:	50 mA max.
Total current:	300 mA limited through PTC
Switch-on time:	0.25 µs typical
Switch-off time:	0.25 µs typical

Current sources

Number:	8 constant current sources for the power supply of the ICP™ sensors, 4 mA typical, 24 V max.

Chronometer

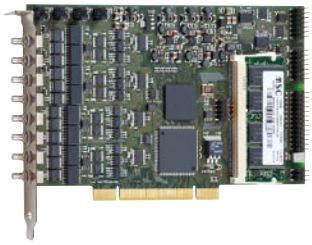
Number:	4 x chronometer, 2 x gate on chronos 1+2
Input type:	RS485
Max. speed:	1 MHz max.
Counting depth:	32-bit
Divisor:	From 2^0 to 2^{15} per chronometer
FIFO depth:	256 DWORD
Data transfer:	DMA, I/O, IRQ
Differential threshold voltage:	-200 mV min -50 mV max.
Input resistance:	120 differential
ESD protection:	±15 kV Human Body Model

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:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for the analog inputs 1 slot opening for digital inputs and outputs 1 slot opening for chronometer and analog outputs
Operating voltage:	+5 V, ±5 % from the PC
Front connector:	8 SMB co-axial connector on bracket
Additional connector:	• 37-pin D-Sub connector for digital I/O • 15-pin D-Sub connector for chronometer inputs • 15-pin D-Sub connector for analog outputs
Temperature range:	0 to 60 °C (with forced cooling)



* Preliminary product information

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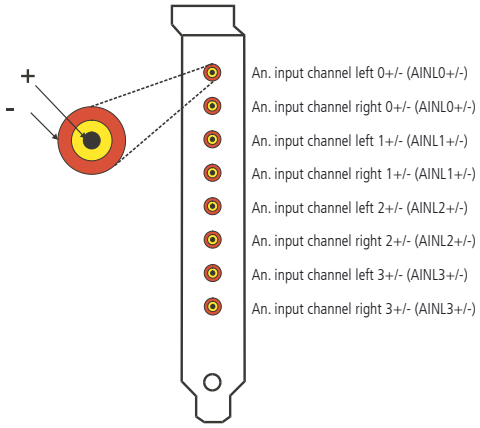
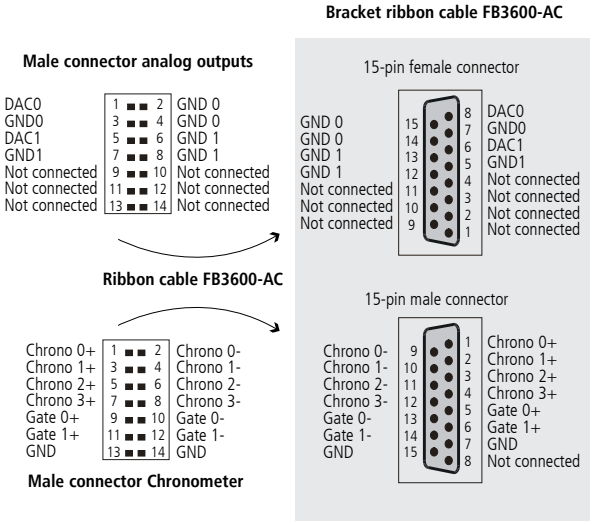
Connection of 8 analog inputs on front connector

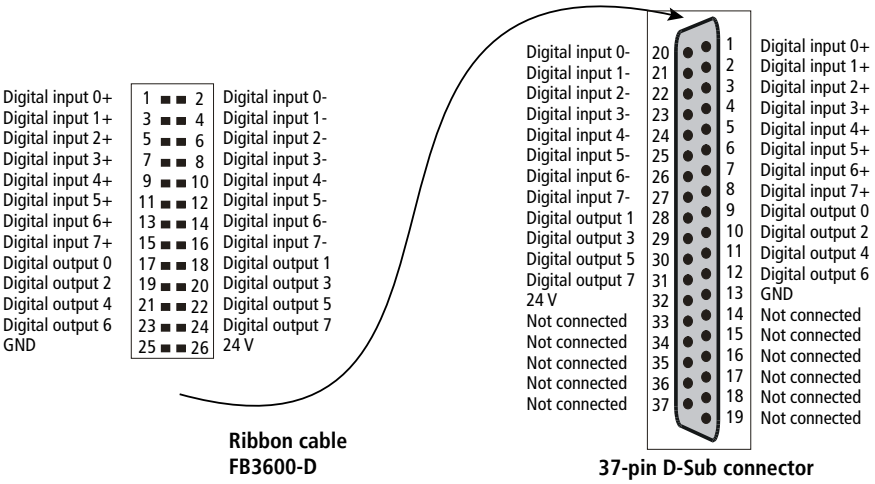


Pin assignment of the chronometer and analog outputs (ribbon cable FB3600-AC)



Pin assignment of the digital inputs and outputs

26-pin male connector on separate 37-pin D-Sub-male connector (ribbon cable FB3600-D)



Ordering information

APCI-3600, APCI-3600-L

Noise and vibration measurement board, optically isolated, 24-bit, multifunction board, 8 analog inputs, 8 current sources..., antialiasing filter. Incl. technical description and software drivers.

Versions

APCI-3600: 8 analog inputs, 8 current sources for connecting ICP™ sensors, 2 analog outputs, 4 chronometer inputs, 8 digital inputs, 8 digital outputs, 128 MBytes SDRAM

APCI-3600-L: 8 analog inputs, 8 current sources for connecting ICP™ sensors, 128 MBytes SDRAM

Accessories

ST3601: Connection cable, 2 m SMB co-axial female connector on BNC male connector

ST3600: Connection cable, 2 m (ST3600 = 8 x ST3601)

FB3600-D: Ribbon cable for connecting the digital I/O on separate bracket, 30 cm

FB3600-AC: Ribbon cable for connecting the chronometer and analog outputs on separate bracket, 30 cm

* Preliminary product information

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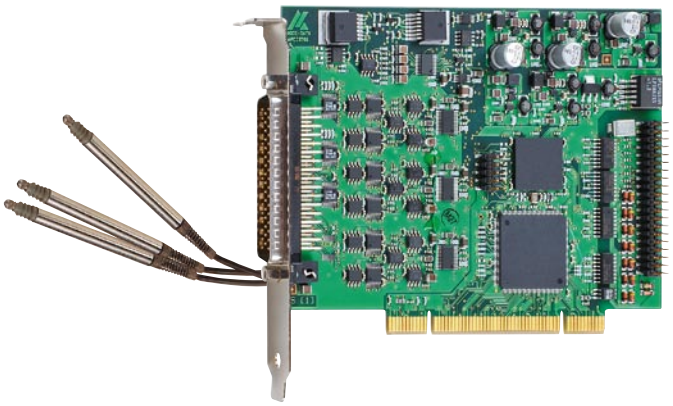
Length measurement board, 16-bit, simultaneous acquisition of 5 inductive transducers, LVDT, half-bridge



APCI-3702

Simultaneous acquisition of 5 inductive transducers

Half-bridge, LVDT

16-bit resolution

16 digital inputs and outputs, optically isolated

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

The PCI length measurement board APCI-3702 is designed for the simultaneous acquisition of 5 half-bridge or LVDT transducers.
It operates with a 16-bit resolution.
It is suited for dynamic measurement, e.g. for measuring moving parts or applications with time-critical measurement cycles – especially in test equipment with several sensors.
The calibration tool SET3701 includes a data base with pre-calibrated transducers. It guides you through each step of the installation beginning with the selection of a transducer up to testing the channels.

Features

- PCI interface to the 32-bit data bus, 3.3 V or 5 V
- Acquisition of 5 inductive transducers (half-bridge, LVDT)
- 16-bit resolution
- Sampling rate depending on the transducer: 2-20 kHz
- Example for TESA transducers GT21:
  13.951 kHz per channel,
  0.072 ms for one sequence of up to 5 channels
- Measuring frequency through software programmable: 2-20 kHz
- Conversion triggered through software, digital input or timer
- End of conversion through software and/or interrupt
- PCI-DMA access
- Onboard FIFO
- Sequence RAM
- 16 digital inputs and outputs, optically isolated, 24 V
- Connection of the transducer through external box PX3701-8. The box type depends on the transducers used.
  Please order separately.
- Software operation
- Automatic setting of the input levels (gain and offset) according to the transducer sensitivity
- Tool for individual database-managed calibration of the transducers
- Database for connecting/calibrating a large range of industry-standard transducers:
  • Solartron • Tesa • Marposs • Schlumberger
  • Peter & Hirt • Mahr • RDP • Schaevitz
  • SMPR Controle
  Further transducers like for example Horst Knäbel can be calibrated on request.

Safety features

- Input filters
- Diagnostic function in case of short-circuits or line break

Applications

- Gear wheel control
- Gauge block
- Acquisition of sensor data
- Quality control
- Industrial process control
- Automatic parts control
- R&D instrumentation

Software

Calibration tool SET3701 (supplied with the board)
- Easy transducer calibration
- Step by step from the transducer selection up to testing each single channel.
- Database with more than 50 pre-calibrated transducers
- Update of the APCI-3702 firmware

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

ADDIPACK functions:
Transducer • Timer • Digital input • Digital output

On request:
Further operating systems, compilers and samples.

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

Connection box for transducers

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PCI

Specifications

Connection of inductive transducers

Inputs for inductive transducers		
Number	5 (simultaneous)	
Input type	Single ended	
Coupling	DC	
Resolution / Accuracy:	16-bit / 13-bit	
Sampling rate f_s on 5 channels selectable per software:	Depending on the transducer 4.883 kHz (typ.) 6.975 kHz (typ.) 9.768 kHz (typ.) 13.951 kHz (typ.) 19.531 kHz (typ.)	
Example with TESA GT21	13.951kHz (on 5 channels)	
Input level		
Input impedance	2 kΩ 10 kΩ 100 kΩ 10 MΩ	software-programmable
Sensor supply (sinus generator)		
Type	Sinus differential (180° phase-shift)	
Number of outputs:	2	
Coupling	AC	
Programmed signals:		
output frequency f_P (primary frequency)	2-20 kHz depending on the transducer (50 kHz Knäbel)	
Output level		
Output impedance	< 0.1 Ω typ. > 30 kΩ typ. in shutdown mode	
Short-circuit current	0.7 A typ. at 25°C with thermal protection	

Digital I/O

Number of I/O channels:	8 dig. inputs, 8 dig. outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	11 mA typ.
Max. input frequency:	5 kHz (inputs 1 to 7)
Max. switching current at 24 V:	50 mA typ.
Input voltage:	0-30 V
Output voltage:	5-30 V

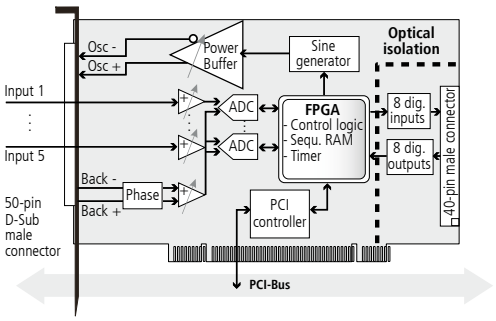
EMC – Electromagnetic compatibility

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.

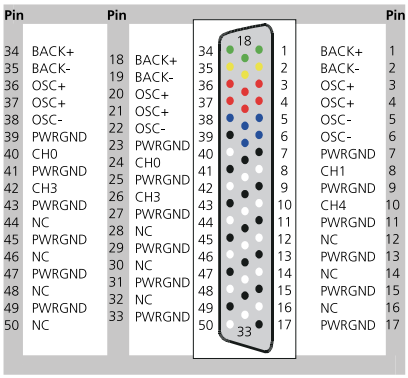
Physical and environmental conditions

Dimensions:	109 x 138 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O with FB3702
Operating voltage:	+5 V, ± 5 % from the PC; 24 V external
Current consumption (+ 5 V from the PC):	990 mA typ. without load
Front connector:	50-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)

Simplified block diagram

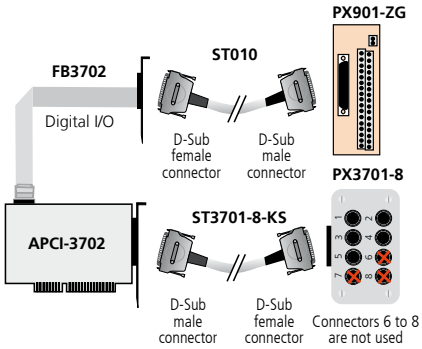


Pin assignment
50-pin D-Sub male connector



Osc+/-:	Phase-shifted supply signal of the inductive transducers
Back+/-:	Return lines of the supply voltage for measuring the amplitude. Actual value signal of the oscillator for the supply voltage.
CHx:	Transducer input and input number
PWRGND:	Ground

ADDI-DATA connection



Ordering information

APCI-3702

Length measurement board, 16-bit, simultaneous acquisition 5 inductive transducers, LVDT, half-bridge.
Incl. technical description and software drivers.

Accessories for HB and LVDT transducer:

PX3701HB-8: Connection box of the APCI-3702
PX3701LVDT-8: Connection box of the APCI-3702
ST3701-8-KS: Shielded coaxial cable between APCI-3702 and connection box PX3701-8

Accessories:

FB3702: Ribbon cable for digital I/O
PX901-ZG: Screw terminal panel for digital I/O, for DIN rail
ST010: Standard round cable, shielded, twisted pairs, 2 m

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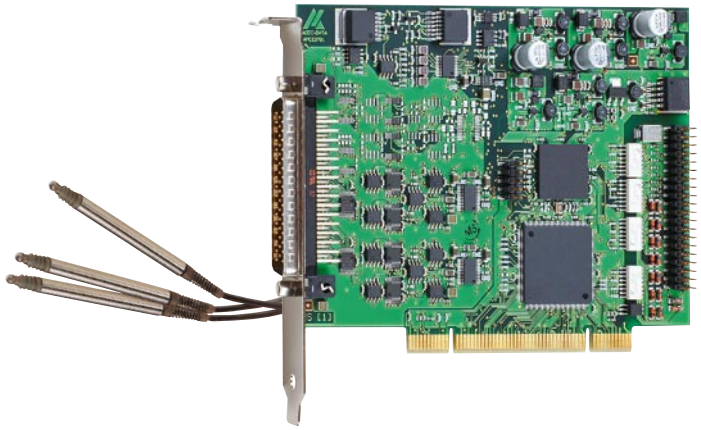
Length measurement board, 16-bit, 16 or 8 inductive transducers, LVDT, half-bridge



APCI-3701

Acquisition of 16 or 8 inductive transducers

Half-bridge, LVDT, Knäbel

16-bit resolution

16 digital inputs and outputs, optically isolated

Measurement of different transducer types with the same board!

RoHS 2002/95/EC

PCI 32-bit

Windows 64/32-bit drivers

LabVIEW™

With the length measurement board APCI-3701, you can connect directly and acquire up to 16 half-bridge or LVDT transducers. The calibration software "ConfigTools" guides you through each step of the installation, beginning with the selection of a transducer from a database including more than 50 pre-calibrated transducers up to testing each single channel.

Features

- PCI interface to the 32-bit data bus, 3.3 V or 5 V
- Acquisition of 8 or 16 inductive transducers (half-bridge, LVDT, Knäbel)
- 16-bit resolution
- Sampling rate depending on the transducer: APCI-3701-8/-16: from 2 to 20 kHz
- Measuring frequency programmable through software: Standard version APCI-3701-8/-16: from 2 to 20 kHz (50 kHz on request)
- Conversion triggered through software, digital input or timer
- End of conversion through software and/or interrupt
- PCI-DMA access
- Onboard FIFO
- Sequence RAM
- 16 digital inputs and outputs, optically isolated, 24 V
- Connection of the transducer through an external box PX3701-8 or -16. The box type depends on the transducer, please order separately.
- Software operation
- Automatic setting of the input levels (gain and offset) acc. to the transducer sensitivity
- Tool for the individual calibration of the transducers with transducer database
- Database for connecting/calibrating a large range of industry-standard transducers (APCI-3701-8, or -16):
  • Solartron • Tesa • Marposs • Schlumberger
  • Peter & Hirt • Mahr • RDP • Schaevitz
  • SMPR Controle • Knäbel

Safety features

- Input filters
- Diagnostic function in case of short-circuits or line break

Applications

- Gear wheel control
- Gauge block
- Acquisition of sensor data
- Quality control
- Industrial process control
- Automatic parts control
- R&D Instrumentation

Software

ConfigTools (supplied with the board)

- Easy transducer calibration
- Step by step from the transducer selection up to testing each single channel.
- Database with more than 50 pre-calibrated transducers
- Update of the APCI-3701 firmware

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 for the following compilers and software packages:

- Microsoft VC++ • Borland C++ • Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:

Transducer • Timer • Digital input • Digital output

On request:

Further operating systems, compilers and samples

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

Connection box for transducers

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Specifications

Inputs for inductive transducers

Channel features		
Number	-4/-8/-16/ multiplexed	
Input type	Single ended	
Coupling	DC	
Resolution	24-bit	
Sampling rate f_s	On 1 channel	At primary frequency f_P of 4.883 kHz 6.975 kHz 9.768 kHz 13.951 kHz 19.531 kHz
	$f_s = f_P$	
	Ab n ≥ 2 channels $f_s = \frac{f_P}{SP \times n}$	f_P = primary frequency SP . Settling period 5 ≤ SP ≤ 255 f_s here concerns all n channels
Example with TESA GT21	On one channel	$f_s = f_P$ = 13.951 kHz
	Ab n ≥ 2 channels	$f_s = \frac{13.951\ kHz}{5 \times 4}$ = 697.5 Hz for 4 channels
		$f_s = \frac{13.951\ kHz}{5 \times 8}$ = 348.7 Hz for 8 channels
		$f_s = \frac{13.951\ kHz}{5 \times 16}$ = 174.4 Hz for 16 channels
Input level		
Input impedance	2 kΩ software-programmable 10 kΩ, 100 kΩ, 10 MΩ	
Input ranges	± 3 V single ended	
Sensor supply (sinus generator)		
Type	Sinus differential (180° phase-shift)	
Coupling	AC	
Programmed signals:		
Output frequency f_P (primary frequency)	2-20 kHz depending on the transducer (50 kHz Knäbel)	
Output impedance	< 0.1 Ω typ., > 30 kΩ typ. in shutdown mode	
Short-circuit current	0.7 A typ. at 25°C with thermal protection	

Digital I/O

Number of I/O channels:	8 dig. inputs, 8 dig. outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	3 mA typ.
Max. input frequency:	5 kHz
Max. switching current:	50 mA typ.
Input range:	0-30 V
Output range:	5-30 V

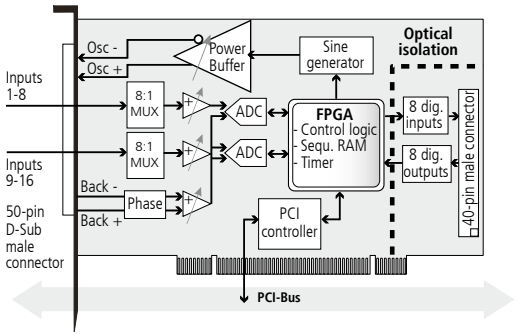
EMC – Electromagnetic compatibility

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.

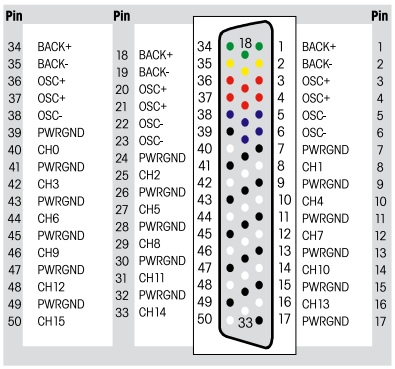
Physical and environmental conditions

Dimensions:	140 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O with FB3701
Operating voltage:	+5 V, ± 5 % from the PC; 24 V external
Current consumption (+ 5 V from the PC):	APCI-3701-8: typ. 630 mA APCI-3701-16: typ. 800 mA
Front connector:	50-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)

Simplified block diagram

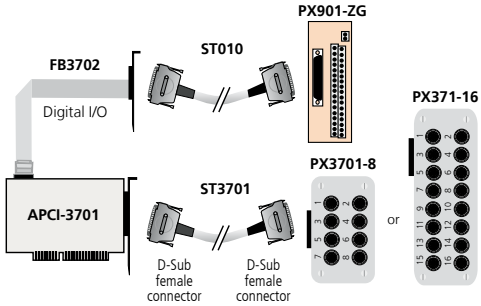


Pin assignment
50-pin D-Sub male connector (APCI-3701-16)



Osc+/-:	Phase-shifted supply signal of the inductive transducers
Back+/-:	Return lines of the supply voltage for measuring the amplitude. Actual value signal of the oscillator for the supply voltage.
CHx:	Transducer input and input number
PWRGND:	Ground

ADDI-DATA connection



Ordering information

APCI-3701

Length measurement board, 16-bit, 16 or 8 inductive transducers, LVDT, half-bridge, Knäbel.
Incl. technical description and software drivers.

APCI-3701-8:	For 8 inductive transducers
APCI-3701-16:	For 16 inductive transducers
APCI-3701-8-K:	For 8 Knäbel inductive transducers
APCI-3701-16-K:	For 16 Knäbel inductive transducers

Accessories:

FB3702:	Ribbon cable for digital I/O
PX901-ZG:	Screw terminal panel for digital I/O, for DIN rail
ST010:	Standard round cable, shielded, twisted pairs, 2 m

Accessories for half-bridge and LVDT transducer:

PX3701HB-8:	Connection box of the APCI-3701-8, 8 x half-bridge
PX3701HB-16:	Connection box of the APCI-3701-16, 16 x half-bridge
PX3701LVDT-8:	Connection box of the APCI-3701-8, 8 x LVDT
PX3701LVDT-16:	Connection box of the APCI-3701-16, 16 x LVDT
ST3701:	Connection cable between APCI-3701 and Connection box PX3701

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Modular serial interfaces

Large field of application
Serial products are still very popular and thus widespread in measurement technology. They are mainly used for the parameterising of machines or for data acquisition of measurement instruments or sensors. Examples are barcode scanners, magnetic card readers, various types of sensors, counter modules, speedometer modules, weighting devices, displays, CNC machines, robots, PLC systems etc.

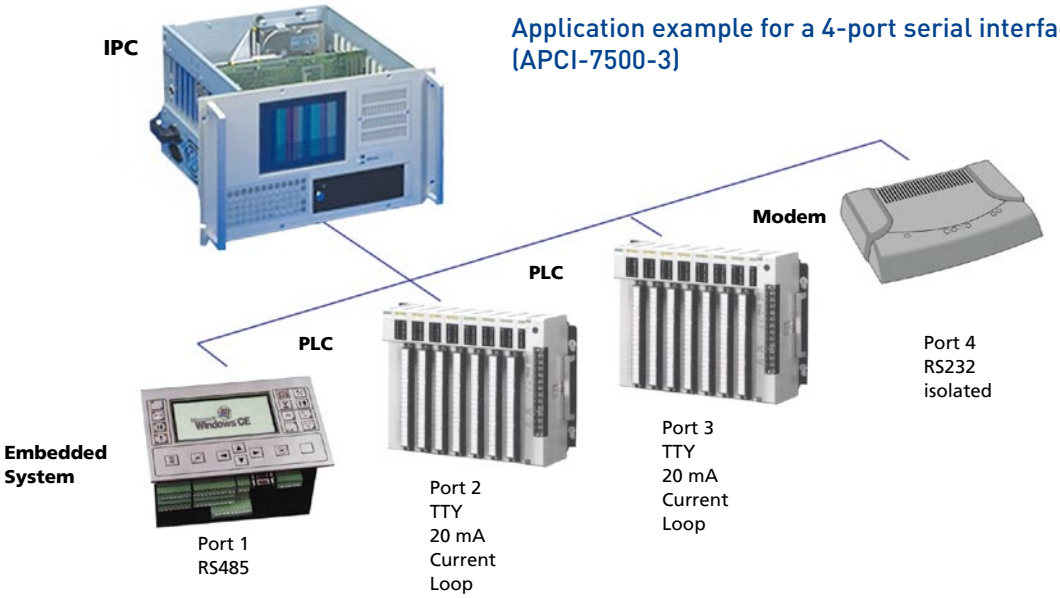
Flexible mode configuration
ADDI-DATA serial interfaces are based on a concept of a basic circuit board and modules. For the 1-port, 2-port, 4-port or 8-port interfaces, the following modules are available in standard or 20 mA current loop (TTY) version: RS323, RS422 and RS485. The modules can be freely combined. Due to the modular structure, each interface can be configured as required. Thus the hardware can be adapted optimally to your requirements.

No data loss
To guarantee a reliable data transfer, the baud rate (max. 1 MBaud) can be adapted to the required frequency and, for higher transfer rates, a 128-byte FIFO buffer is available.

Robust for a safe data transfer
In the industrial environment, potential differences can occur. Therefore, each port of the ADDI-DATA serial interfaces is optically isolated from the other ports. There is also an optical isolation on the PC side. For a reliable data transfer, further protective measures have been implemented: EMC protection such as ESD, burst and short-circuit protection.

Saving money with serial interfaces through retrofit
The serial interfaces of the APCI-7xxx-3 series are available over years in order to secure your investment. They are suitable for retrofit projects with sensors or devices with serial interfaces. You can thus keep on using your sensors for a long time which means huge cost savings.

Application example for a 4-port serial interface (APCI-7500-3)



YOUR ADVANTAGES

- Flexible through modular set-up
- Identified as COM port
- Optical isolation between the ports
- Long-term availability

PRECISE ADJUSTMENT OF THE BAUD RATE – NO DATA LOSS

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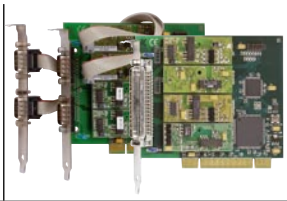
Serial interfaces (base boards)

				
Serial interfaces	**1-port**	**2-port**	**4-port**	**8-port**
Boards	**APCI-7300-3**	**APCI-7420-3**	**APCI-7500-3, APCI-7500-3/4C**	**APCI-7800-3**
32-bit data bus	PCI 5 V / 3.3 V	PCI 5 V / 3.3 V	PCI 5 V / 3.3 V	PCI 5 V / 3.3 V
Operating mode, configurable through MX modules	RS232, RS485, RS422, 20 mA CL	RS232, RS485, RS422, 20 mA CL	RS232, RS485, RS422, 20 mA CL	RS232, RS485, RS422, 20 mA CL
Optical isolation	1000 V , optional	1000 V , optional	1000 V , optional	1000 V , optional
Can be configured as standard interface	✓	✓	✓	✓
Interrupts	BIOS	BIOS	BIOS	BIOS
FIFO memory	128-byte	128-byte	128-byte	128-byte
Remarks		Common interrupt	Common interrupt	Common interrupt
Addressing				
Through software	BIOS	BIOS	BIOS	BIOS
COM	Free configuration	Free configuration	Free configuration	Free configuration
Connection cable			For APCI-7500-3 ST075: 4 x 9 pin ,ST074: 4 x 25 pin	ST7809: 8 x 9 pin ST7825: 8 x 25 pin
Page	210	210	210	210

Mode selectable through modules

For each interface, modules are available in the RS232, RS422, RS485 or 20 mA CL mode.
Please order the modules additionally to the selected base boards.

Modules for APCI-7300-3, APCI-7420-3, APCI-7500-3, APCI-7800-3 and CPCI-7500

Operating mode	**RS232**		**RS422**		**RS485**		**20 mA CL**
							
	MX232-G	MX232	MX422-G	MX422	MX485-G	MX485	MXTTY
Optical isolation 1000 V	✓		✓		✓		✓
Creeping distance 3.2 mm	✓		✓		✓		✓
Short-circuit protection			✓	✓	✓	✓	
ESD protection	✓	✓	✓		✓		
Burst protection	✓	✓	✓	✓	✓	✓	✓
Duplex	Full	Full	Full	Full	Half	Half	Full
Max. Baud rate*	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	19.2 kBaud
Modem control signals	✓	✓	Optional RTS/CTS (MX-422-PEP)				
Autom. transmitter control					✓	✓	
Current consumption	16 mA	1 mA	15 mA	5 mA	15 mA	5 mA	82 mA

* max 115.2 kBaud, optional up to 1 MBaud with crystal quartz adjustment (Quarz option)

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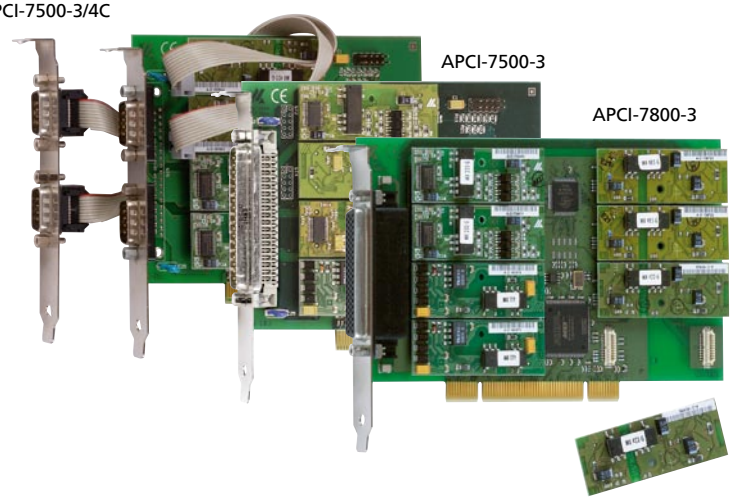
1 to 8-port serial interface, RS232, RS422, RS485, 20 mA CL, modular mounting through modules

APCI-7500-3/4C



APCI-7300-3 – 1-port serial interface
APCI-7420-3 – 2-port serial interface
APCI-7500-3 – 4-port serial interface
APCI-7800-3 – 8-port serial interface

RS232, RS422, RS485, 20 mA Current Loop

Free mode configuration for each port through MX modules

With/without optical isolation 1000 V

128-byte FIFO buffer for each port

16C950 UART downward compatible

PCI 3.3 V or 5 V

RoHS 2002/95/EC

PCI 32-bit

Also for PCI EXPRESS®

see APCIe-7xxx, page 142

Also for *CompactPCI™*

See CPCI-7500, page 242

Windows
64/32-bit drivers

The APCI-7xxx-3 communication boards are configured by inserting MX modules which the board identifies automatically. The 1- to 8-port serial interfaces APCI-7xxx-3 can be used as universal PCI boards in 3.3 V or in 5 V systems, and in PCI or PCI-X systems. The serial interfaces can be configured through modules in the following modes: RS232, RS422, RS485 (with or without optical isolation) and 20 mA current loop (with optical isolation).
The MX modules with optical isolation allow a protection up to 1000 V for the use in noisy environments where earth loops can occur. The I/O lines are protected against short-circuits, fast transients, electrostatic discharge and high-frequency EMI. The interface is supported through a 128-byte FIFO buffer for sending and receiving data and guarantees reliable operation at high transfer rates.

Features

- Asynchronous serial interfaces
- PCI 3.3 V or 5 V
- Modular mounting through MX modules
  1 socket for 1-port serial interface (APCI-7300-3)
  2 sockets for 2-port serial interface (APCI-7420-3)
  4 sockets for 4-port serial interface
  (APCI-7500-3 and APCI-7500-3/4C)
  8 sockets for 8-port serial interface (APCI-7800-3)
- Can be configured as RS232, RS422, RS485 with/without optical isolation, 20 mA Current Loop (active, passive), with optical isolation through separate MX modules
- Automatic addressing through BIOS
- Automatic module identification
- 128-byte FIFO buffer for sending and receiving data
- Programmable transfer rate
- 5, 6, 7 or 8-bit character
- 1, 1½ or 2 stop bits
- Parity: even, odd or none
- Automatic transmitter control for RS485 and transmitter control through FIFO level
- Common interrupt

Safety features

- MX modules available with optical isolation 1000 V
- Creeping distance IEC 61010-1 (VDE411-1)
- Protection against fast transients (Burst)
- Short-circuit protection for RS422 and RS485
- Detection of false start bits
- Internal diagnostic possibility, break, parity, overrun and framing error

Applications

- Data acquisition • Industrial process control
- Direct connection to sensors
- Multi-user systems
- PLC interface
- Multidrop applications
- Weighting devices, modem and printer control, etc.

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:

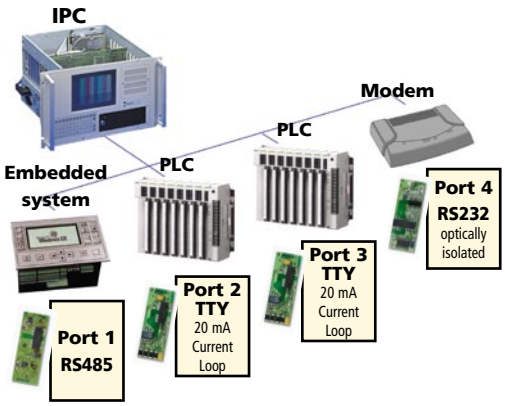
- Microsoft VC++
- Visual Basic • Delphi

On request:

Further operating systems, compilers and samples.

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

Application example for APCI-7500-3



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MX modules

Operating mode	RS232		RS422		RS485		20 mA CL
							
	MX232-G	MX232	MX422-G	MX422	MX485-G	MX485	MXTTY
Optical isolation 1000 V	✓		✓		✓		✓
Creeping distance 3.2 mm	✓		✓		✓		✓
Short-circuit protection			✓	✓	✓	✓	
ESD protection	✓	✓	✓		✓		
Burst protection	✓	✓	✓	✓	✓	✓	✓
Duplex	Full	Full	Full	Full	Half	Half	Full
Max. Baud rate	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	19.2 kBaud
Modem control signals	✓	✓	Optional RTS/CTS (MX-422-PEP)				
Autom. transmitter control					✓	✓	
Current consumption	16 mA	1 mA	15 mA	5 mA	15 mA	5 mA	82 mA

Specifications

APCI-7300-3 / APCI-7420-3 / APCI-7500-3/4C / APCI-7500-3 / APCI-7800-3

Serial interface – 1-port, 2-port, 4-port, 8-port

Mode:	RS232, RS422, RS485, 20 mA Current Loop (active, passive) with or without optical isolation through separate MX modules
Transmission mode:	Asynchronous, full or half duplex (MX modules)
Addressing:	Automatic through BIOS
Memory:	128-byte FIFO buffer for transmitter and receiver
Transfer rate:	Programmable up to 115.2 kBaud Baud rate up to 1 MBaud on request
Protocol:	5-, 6-, 7- or 8-bit character 1,1½ or 2 stop bits
Parity:	Even, odd, none, mark, space
Interrupt lines:	Automatic configuration through BIOS

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.

Safety features

Optical isolation:	1000 V (MX modules)

Physical and environmental conditions

Dimensions:	151 x 99 mm / APCI-7800-3: 175 x 99 mm
System bus:	PCI 32-bit, 3.3 V/5V acc. to spec. 2.2 (PCISIG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption (without modules):	160 mA typ. / APCI-7800: 220 mA
Front connector:	9-pin D-Sub male connector (APCI-7300-3) 2 x 9-pin D-Sub male connector (APCI-7420-3) 4 x 9-pin D-Sub male connector on separate bracket (APCI-7500-3/4C) 37-pin D-Sub male connector (APCI-7500-3) 78-pin D-Sub female connector (APCI-7800-3)
Temperature range:	0 to 60 °C (with forced cooling)

Ordering information

APCI-7300-3 / APCI-7420-3 / APCI-7500-3 / APCI-7800-3

APCI-7300-3: 1-port serial interface (1 x 9-pin D-Sub)
APCI-7420-3: 2-port serial interface (2 x 9-pin D-Sub)
APCI-7500-3: 4-port serial interface (1 x 37-pin D-Sub)
APCI-7500-3/4C: 4-port serial interface incl. 4 x 9-pin D-Sub male connector on separate bracket (incl. ribbon cable)
APCI-7800-3: 8-port serial interface (1 x 78-pin D-Sub)
Each incl. technical description and software drivers.

MX modules: Please order the modules separately!

MX232-G: RS232 mode, optically isolated
MX232: RS232 mode
MX422-G: RS422 mode, optically isolated
MX422-PEP: RS422 mode, optically isolated, with RTS/CTS
MX422: RS422 mode
MX485-G: RS485 mode, optically isolated
MX485: RS485 mode
MXTTY: 20 mA Current Loop mode (active, passive), optically isolated
Option
Quarz: <1 MBaud transfer rate for RS232, RS422, RS485, TTY

Accessories

ST075: Shielded round cable, 37 to 4 x 9-pin (for APCI-7500-3)
ST074: Shielded round cable, 37 to 4 x 25-pin (for APCI-7500-3)
ST7809: Shielded round cable, 78 to 8 x 9-pin (for APCI-7800-3)
ST7825: Shielded round cable, 78 to 8 x 25-pin (for APCI-7800-3)

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Motion control
for servo or stepper motors

New!*

APCI-8008

For 3 servo or stepper motors

Onboard 64-bit RISC processor

Ethernet/EtherCAT interfaces

Incremental encoder, SSI or EnDat 2.2

16-bit analog output channels

Can be extended to a total of 8 axes

RoHS 2002/95/EG

PCI 32-bit

Windows
64/32-bit drivers

The board APCI-8008 for the PCI bus is used for the control of up to 8 servo or stepper motor axes through a PC. With this intelligent and flexible board, many control tasks from simple to complicated can be realised.
The board has three stepping/direction output channels (D/A channels, 16-bit). They are optically isolated from the digital current supply and are used for the control of commercially available power amplifiers connected as speed controlling devices or current regulators.
Incremental encoders, SSI encoders and EnDat encoders as well as end and reference switches can be connected to each axis channel.
Digital PID filters with forward compensation and optional Notch filters are also involved in the axis control.
The "open" controlling concept of the APCI-8008 is intended in the first place for manufacturers of special-purpose machines and users who need a flexible integration as well as a CNC solution.

Features

Hardware/properties

- Intelligent board based on a 64-bit RISC processor
- Positioning of up to 3 axes either with servo or stepper motors. Mixed operating of servo and stepper motors possible. Up to 8 axes with slave board
- Interface for commercially available power amplifiers
- All input and output channels are optically isolated
- A multiple-axis system can be realised by inserting several APCI-8008 in the same PC.
- 2 Ethernet interfaces incl. one which can be used as an EtherCAT interface.

Software

- Linear, circular, helical, spline and CAD interpolation
- Point-to-point movement with independent control of each axis
- Function library for .NET, Pascal, C-Basic, Borland Delphi, Borland C++, Visual Basic, Visual C++, LabVIEW
- Programming through a PC application software or stand-alone (a compiler similar to pascal is supplied with the board)
- The operating program can be easily adapted to specific requirements using program modules supplied with the board (e.g. GEAR, SCANNER, ELCAM)
- User programs created with the compiler can be processed automatically
- Multitasking: the board can simultaneously process up to 4 user programs.

Applications

- Motion control and position measurement (e.g. optical component measurement)
- Laser processing machines
- Bonding robots
- Water-jet cutting machines
- Tube bending machines
- Tube welding machines
- Component mounting machines (SMD)
- Fibreglass wrapping devices
- Handling systems for analysis technology
- Machines for contact lens production
- Stud welding machines
- Machines for processing dental prostheses
- Production quality control
- Cutting-to-length devices with flying saw

Software

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:

- Microsoft C Lib. • Borland C Lib.
- Visual Basic • Visual C++ • Delphi
- LabVIEW

Supplied with the board: McuWIN user interface

On request:

Other operating systems, compilers and samples

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

Customer-tailored modifications
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

*Preliminary product information

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Specifications*

APCI-8008

CPU system:	64-bit-RISC processor 333 MHz
RAM:	64 MB / Flash 32 MB (1 GB optional)
Data exchange with the PC:	Through PCI bus
Controller software:	PIDF (PID filters with forward compensation)
Interpolation:	2D .. 3D linear, 2D circular, 3D circular, 3D helix, spline, asynchronous and synchronous interpolation with secondary axes. With OPMF-8008 all interpolations 2D .. 8D depending on the number of axes
Inputs for incremental encoders:	Diff. or TTL max. 16 MHz Word length: 32-bit with sign Short-circuit and line break protection
Inputs for SSI encoders:	Up to 32-bit, Gray / binary code, variable frequency 30 kHz to 2 MHz
Inputs for EnDat:	EnDat 2.2 up to 4 MHz
Setpoint value outputs (servo):	4 D/A converters, 16-bit resolution, ± 10 V
Pulse outputs (stepper motors):	1 stepper signal (RS422) and 1 directional signal (RS422) for each channel, pulse frequency up to 2 MHz
Isolated digital inputs:	16 inputs, 24 V, as end, reference switch or freely programmable
Isolated digital outputs:	8 channels, 24 V / 500 mA, for releasing the power amplifiers or freely programmable
Ethernet (option):	2 x Ethernet, 10/100 MBit
Interrupts:	Through PCI BIOS
DMA:	Bus master
Auxiliary voltage:	24 V external for digital I/O, 5 V, 1.1 A

Safety

Optical isolation:	1000 V

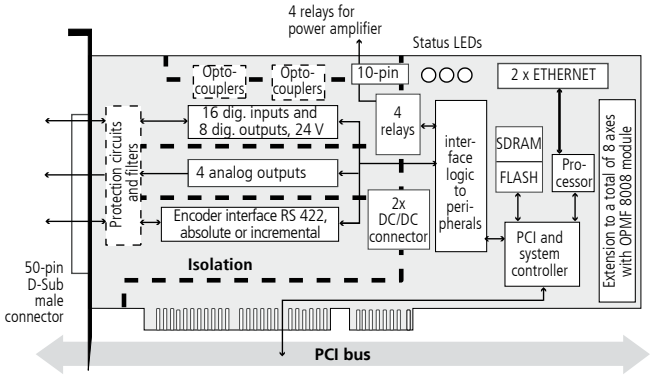
EMC – Electromagnetic compatibility

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.

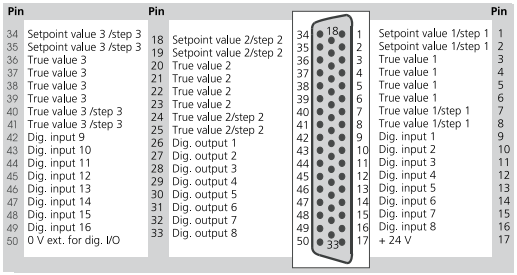
Physical and environmental conditions

Dimensions:	175 x 106 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	Board APCI-8008: 1 PCI slot Slave board OPMF: 1 PCI slot Cable FB8008: 1 slot opening
Operating voltage:	+ 5 V ± 5 % from the PC
Front connector APCI-8008:	Axis 1, 2, 3: 50-pin D-Sub male connector
Front connector OPMF-8008:	Axis 4, 5, 6: 50-pin D-Sub male connector
Ribbon cable FB8008:	Axis 7, 8: 50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

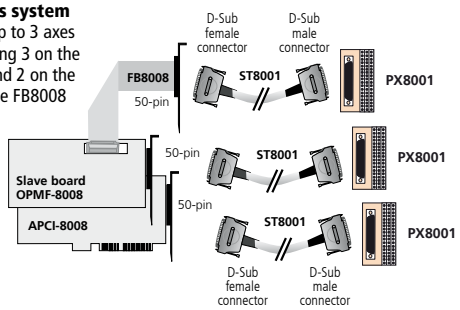


Pin assignment – 50-pin D-Sub male connector



ADDI-DATA connection

Example for an 8-axes system
APCI-8008: Standard 1 up to 3 axes
OPMF/8A: 5 axes, including 3 on the 50-pin front connector and 2 on the connector for ribbon cable FB8008



Ordering information

APCI-8008: Motion control board for servo or stepper motors. 16 dig. inputs and 8 dig. outputs, 24 V, optically isolated. Incl. technical description, software drivers.
APCI-8008-STP: same as APCI-8008, only for stepper motors

Options: All options begin with OPMF-8008. Please complete with the following option name:

-Basis: Mezzanine board for the extension with -AI16-4, -AO and -DIO (only up to 3 axes)
-4A-SRV/-4A-STP: 4th axis – 8 inputs and 4 dig. outputs in addition
-5A-SRV/-5A-STP: 5th axis – 16 inputs and 8 dig. outputs in addition
-6A-SRV/-6A-STP: 6th axis – 16 inputs and 8 dig. outputs in addition
For the option -7A and more the FB8008 cable is required
-7A-SRV/-7A-STP: 7th axis – 24 inputs and 12 dig. outputs in addition
-8A-SRV/-8A-STP: 8th axis – 24 inputs and 12 dig. outputs in addition
-AI16-4: 4 analog inputs (option available in single or double, max. 8 analog inputs), 16-bit resolution.
-ETH: Mezzanine board for the connection of 2 Ethernet interfaces (Standard Ethernet / EtherCAT)
-DIO: 8 digital inputs and 4 dig. outputs, opt. isolated (option available up to 3 times, max. 24 inputs and 12 outputs)
-AO: 1 analog output, option available up to 5 times (max. 8 analog outputs) (output is only free when the axis is not used)
OPT.CAN-8008: CAN bus connection of the APCI-8008 (not CAN Open).

Accessories:

FB-CAN: Ribbon cable between OPMF and 9-pin D-Sub male connector with bracket for connecting the CAN bus.
FB-INTERBUS: Ribbon cable between OPMF and 9-pin D-Sub male connector with bracket for connecting the INTERBUS.
FB8008: From the 1rst axis on for connecting the analog inputs (option OPMF-8008-AI-16-4). Ribbon cable between OPMF and a 50-pin D-Sub male connector with bracket. On request with female connector.
FB8008_50_25: From the 4th axis on for connecting the analog inputs (OPMF-8008-AI16-4) or from the 7th axis on (OPMF/7; OPMF/8) for connecting additional axes. Ribbon cable between OPMF and D-Sub male connector on bracket and the 25-pin D-Sub for the connecting the relays.
FBRELAY: For releasing the relays
FBRELAY_9: Standard, 9-pin cable with bracket
FBRELAY_25: more than 3 axes: 25-pin cable.
PX8001: 3-row terminal panel for DIN rail
ST8001: Cable for connecting APCI-8008 and OPMF, 50-pin.

* Preliminary product information

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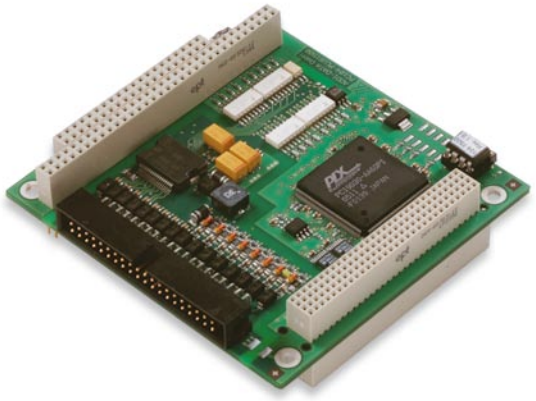
SPIRIT OF EXCELLENCE

Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for PC/104-Plus



+ 85 °C*
- 40 °C
*PC104-PLUS1500-EXT

PC104-PLUS1500

16 digital inputs, 24 V, including 2 interruptible inputs

16 digital outputs, 24 V, 150 mA/channel

Optical isolation 1000 V

Input and output filters

Watchdog, timer, counter

The outputs are reset to "0"at Power-On

RoHS 2002/95/EC

EMBEDDED-PC PC/104-PLUS MODULES

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

Features

- 2 programmable timers

Inputs

- 16 optically isolated digital inputs, 24 V, including 2 interruptible inputs
- Reverse voltage protection
- All inputs are filtered

Outputs

- 16 optically isolated digital outputs, 11 V to 36 V
- Output current per channel 150 mA
- Timer-programmable watchdog for resetting the outputs to "0"
- Diagnostic report through status register at short-circuits, overtemperature, voltage drop or watchdog
- Interrupt triggered through watchdog, timer, error
- At Power-On, the outputs are reset to "0"
- Short-circuit current for 16 outputs ~ 2 A typ.
- Short-circuit current per output ~1.1 A peak
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops under 7 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications

- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- ...

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:

- Microsoft CVC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions

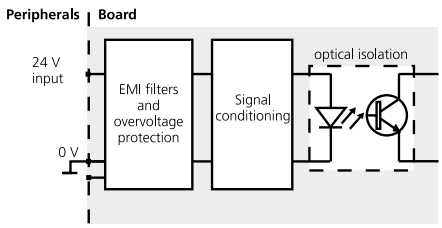
- Digital input • Digital output
- Watchdog • Timer • Counter

On request:

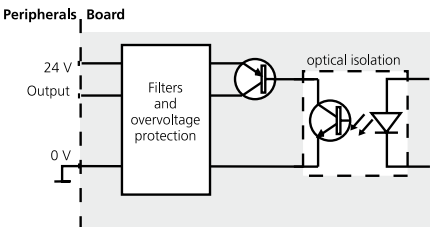
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Digital inputs

Number of inputs:	16 (common ground acc. to IEC 1131-2) including one input used as a counter input (channel 0)
Interruptible inputs:	2 (channel 2 and 3)
Optical isolation:	through opto-couplers, 1000 V, from PC to peripheral
Interrupt compare logic:	OR mode (with fixed filter times)
Filters for interruptible inputs:	40 µs
Nominal voltage:	24 V
Input current at 24 V:	Channel 0: 6 mA typ. Channel 1-15: 3.9 mA typ.
Logic input levels:	U nominal: 24 V
UH max.:	30 V/current 6 mA typ.
UH min.:	19 V/current 2 mA typ.
UL max.:	14 V/current 0.7 mA typ.
UL min.:	0 V/current 0 mA typ.
Maximal input frequency:	Channel 0: 100 kHz (at 24 V) Channel 1-15: 5 kHz (at 24 V)

Digital outputs

Number of outputs:	16, optically isolated up to 1000 V through opto-couplers
Output type:	High-side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	11 V up to 36 V
Current limit:	1.5 A typ. per 8 channels
Output current/output:	150 mA typ.
Short-circuit current/output shutdown at 24 V, R_{load} < 0.1Ω:	1.1 A (typ.) pulse current
RDS ON resistance:	0.2 Ω at 25 °C max.
Switch-on time (typ.):	50 µs
Switch-off time (typ.):	75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	10 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 7 V: The outputs are switched off.
Diagnostics:	Status bit or interrupt to the PC
Timer1/Watchdog:	1, 12-bit, time bases µs, ms, s
Timer2:	1, 12-bit, time bases µs, ms, s
Counter:	1, 16-bit, signal channel 0, Limit frequency 100 kHz

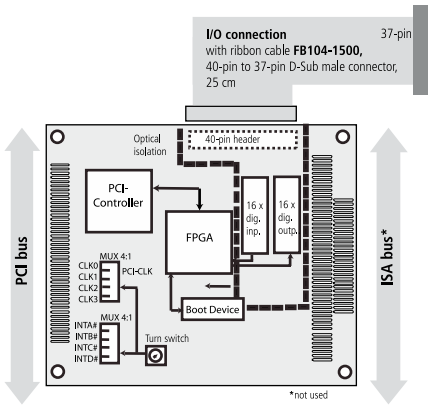
EMC – Electromagnetic compatibility

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.

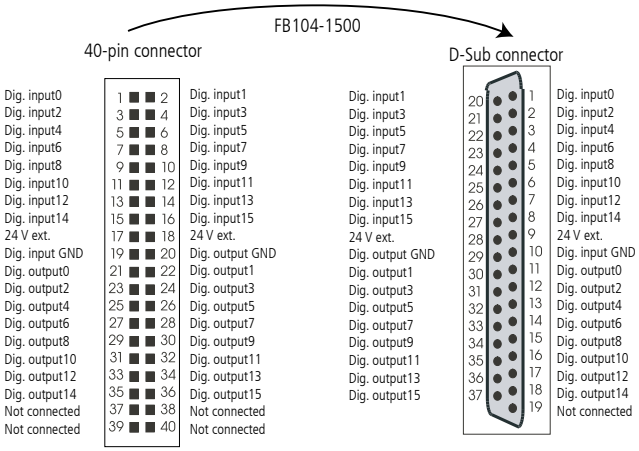
Physical and environmental conditions

Dimensions:	90 x 96 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Mounting in:	PC/104-Plus system
Operating voltage:	+5 V or +3.3 V, ± 5 % from the PC
Current consumption:	
+ 3.3 V from PC	95 mA
+ 5 V from the PC	45 mA
I/O-connector:	40-pin male connector (2-row, 2.54 mm grid)
Temperature range:	0 to 60 °C (with forced cooling) -40 to +85 °C (with forced cooling), PC104-PLUS1500-EXT

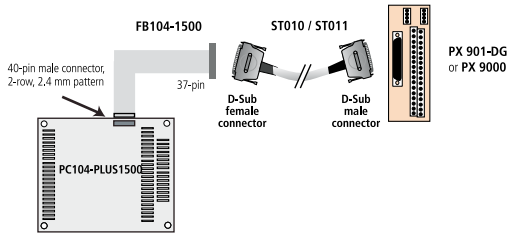
Simplified block diagram



Pin assignment – 40-pin to 37-pin male connector



ADDI-DATA connection



Ordering information

PC104-PLUS1500

PC104-PLUS1500: Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V. Incl. technical description and software drivers.

PC104-PLUS1500-EXT: Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, extended temperature range. Incl. technical description and software drivers.

Accessories

FB104-1500: Ribbon cable, 40-pin to 37-pin D-Sub male connector, 25 cm

PX901-D: Screw terminal panel, LED status display

PX901-DG: Screw terminal panel, LED status display, for DIN rail

PX9000: 3-row screw terminal panel, for DIN rail, LED status display

PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m

ST011: Standard round cable, shielded, twisted pairs, 5 m

ST010-S: Same as ST010, for high currents (24 V supply separate)

ST021: Round cable between FB104-1500 and PX 8500-G, shielded, twisted pairs, 2 m

ST022: Round cable between PX 8500-G and PX 901-DG, shielded, 2m

ST8500: Ribbon cable for cascading two PX 8500-G

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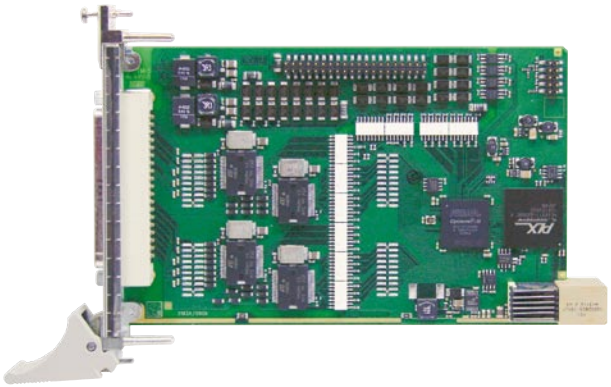

CompactPCI® Serial

YOUR BENEFITS

- Fast data transmission rate: up to 12 GB/s
- Star topology
- Standardized 19" technology (IEEE 1101)
- All protocols available on the connector
- Hybrid systems

More data – simply faster!

With its new serial data transfer, the new CompactPCI Serial bus is especially interesting for developing new high-performance systems in industrial environment. It also opens up new fields of application.
ADDI-DATA now offers digital, analog and counter boards for the new CompactPCI Serial bus technology, the Bus-Technologie, in the tried-and-tested quality we always deliver.

Multiple data transfer options

What was not possible with the CompactPCI bus is now possible: the extension boards can now be accessed via Ethernet, PCI Express, SATA or USB. All protocols are available on the connector with equal priority.

High immunity to interferences

The well-though concept of design and protective circuitry is the key for the high immunity to interferences featured by the CompactPCI Serial boards by ADDI-DATA. These boards are thus especially suited for use in extreme industrial environment. They are resistant to vibration, acceleration and dirt while supplying reliable data.

Faster through FPGA

A FPGA component has a programmable logic on which you can save your own algorithms in order to adapt the functionality of the PC board to your requirements. This adaptation makes your PC board unique and improves the performance of your applications. The onboard algorithms reduce the cycle time of signal acquisition and regulation tasks.

Most ADDI-DATA CompactPCI Serial boards are equipped with a FPGA component. Use the full potential of your PC board hardware and software resources and thus accelerate your processes.

Hybrid systems

Some housing manufacturers offer hybrid systems in which existing applications can run with CompactPCI while new functions can be added using CompactPCI serial . This saves time and money and allows for a smooth transition between these two technologies.

READY FOR HARSH INDUSTRIAL ENVIRONMENT

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ADDI-DATA® SPIRIT OF EXCELLENCE

	Digital		Counter	Analog	
	CPCIs-1532	CPCIs-1564	CPCIs-1711	CPCIs-3121	CPCIs-3131
CompactPCI Serial bus	✓	✓	✓	✓	✓
FPGA	✓	✓	✓	✓	✓
Filter and protective circuits	✓	✓	✓	✓	✓
Optical isolation	1000 V	1000 V	1000 V	500 V	1000 V
Digital, 24 V					
Input channels, 24 V	16	32	12 (dependent on function)	4	4
Output channels, 24 V	16	32	4	4	4
Output current per channel	500 mA (typ.)	500 mA (typ.)	500 mA (typ.)		
Timer / Counter / Watchdog	2 x 12 bit timer, 1 can be used as a watchdog.	2 x 12 bit timer, 1 can be used as a watchdog. 3 x 32 bit counter		1 x 24 bit timer can be used as a watchdog.	3 x 16 bit timer, 3 x 16 bit counter, 2 x 16 bit watchdog
Counter					
Function modules			4		
Functions Incremental counter, SSI synchronous serial interface, Counter/timer, Pulse acquisition, Frequency, Pulse width, Period duration measurement, velocity measurement, PWM, BiSS-Master, digital inputs and outputs, ...			Reprogrammable		
Input frequency			up to 5 MHz		
Signals			TTL, RS422, 24 V		
Analog					
Analog inputs, 16 bit				16 SE or 8 diff.	8 SE or 8 diff.
Throughput (kHz)				100	100
Voltage range				0-10 V ± 10 V	0-10 V ± 10 V
Gain PGA				x1, x2, x5, x10	x1, x10, x100, x1000
Trigger (software or 24 V)				✓	✓
Sequence RAM				✓	
Analog outputs				8 or 4, 16 bit	4, 16 bit
0-10 V ± 10 V				✓	✓
Software	Current driver list on the web: **www.addi-data.com**				
Page	218	220	222	224	226

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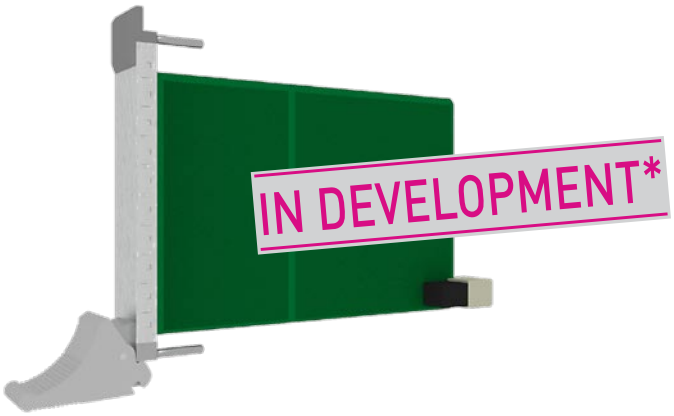
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for CompactPCI Serial



CPCIs-1532

CompactPCI Serial interface

16 digital inputs, 24 V, including 15 interruptible inputs

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry-standard D-Sub connector

Extended temperature range – 40 °C to + 85 °C

RoHS 2002/95/EC

Also for PCI EXPRESS
See APCIe-1532, page 118

Also for PCI
See APCI-1500, page 146

Also for CompactPCI™
See CPCI-1500, page 230

Also for PC/104-PLUS
see PC104-PLUS1500 page 214

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

*Preliminary product information

Features

Inputs
- 16 optically isolated inputs, 24 V incl. 15 interruptible inputs
- Channel 0 can be used as a 16-bit counter input (up to 100 kHz)
- Reverse voltage protection
- All inputs are filtered

Outputs
- 16 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

Timer / Counter
- 2 timers (12-bit resolution)
- 1 timer can be used as watchdog

Safety features
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications
- Industrial I/O control
- PLC coupling
- Reading of encoder values for process control
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Watchdog / timer
- Interface to machines

Software drivers

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

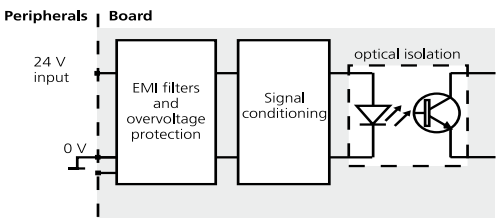
Standard drivers for:
- Linux
- 32-bit drivers for Windows 8 / 7 / Vista / XP / 2000
- Signed 64-bit drivers for Windows 8 / 7 / XP
- Real-time use with Linux and Windows on request

Drivers and samples for the following compilers and software packages:
- MC .NET, C

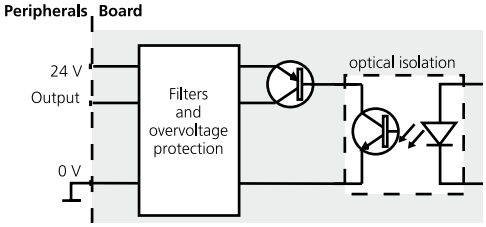
On request:
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications*

Digital inputs

Number of inputs:	16 digital inputs,	
(common ground	channel 0 can be used as a 16-bit counter input	
acc. to IEC 1131-2)	(up to 100 kHz)	
Interruptible inputs:	15 channels (channel 1 to 15)	
Optical isolation:	1000 V through opto-couplers, from PC to peripheral	
Nominal voltage:	24 V (CPCIs-1532), 12 V (CPCIs-1532-12V)	
Input current:	**at 24 V**	**at 12 V (CPCIs-1532-12V)**
Channel 0 or 0-1:	6.6 mA typ.	3.2 mA typ.
Channel 1-15 or 2-16:	2 mA typ.	1.5 mA typ.
Input frequency (max.):	**at 24 V**	**at 12 V (CPCIs-1532-12V)**
Channel 0 or 0-1:	100 kHz	100 kHz
Channel 1-15 or 2-16:	5 kHz	5 kHz
Logic input levels:	**at 24 V**	**at 12 V (CPCIs-1532-12V)**
UH (max.):	30 V	16 V
UH (min.):	19 V	9 V
UL (max.):	14 V	6 V
UL (min.):	0 V	0 V
Filters/protective circuit:	Input filters, transil diode, RC filters, Z diode, opto-couplers	

Digital outputs

Number of outputs:	16 digital outputs
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral
Nominal voltage:	24 V
Supply voltage range:	11 to 36 V
Current limit:	1.5 A per 8 channels (through PTC)
Output current per output:	500 mA (typical)
Short-circuit current per output:	1.5 A (typ.) pulse current shutdown at 24 V, R_{load}<0.1 Ω
RDS ON resistance:	max. 0.2 Ω at 25 °C
Switch-on time:	I_{out}=0.5 A, load = resistance: 50 µs
Switch-off time:	I_{out}=0.5 A, load = resistance: 75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Timer/watchdog

Timer:	2 x 12-bit timers, 1 up to 4095 µs, ms, s 1 timer can be used as watchdog.

Safety

Shutdown logic (V_{CC} diagnostic):	When the ext. 24 V voltage drops below 7 V: The outputs are switched off.
Watchdog:	For resetting the outputs to "0"
Common diagnostics:	For all 16 channels at overtemperature of one channel

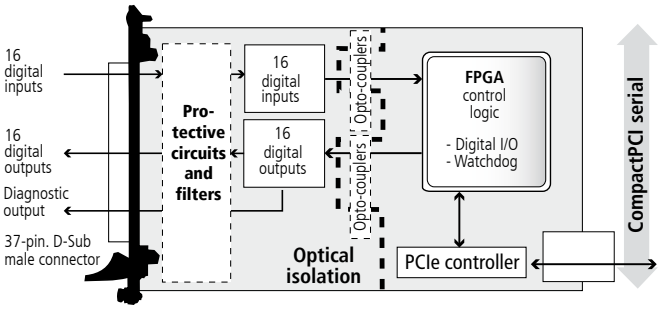
EMC – Electromagnetic compatibility

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.

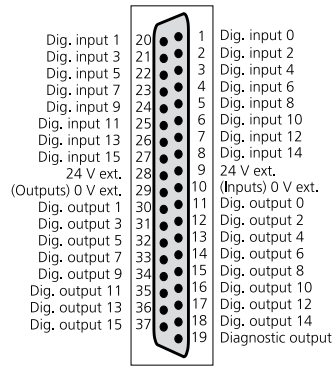
Physical and environmental conditions

Dimensions:	149 x 99 mm	
System bus:	PCI Express according CompactPCI Serial specification PICMG CPCI-S.0 R1.0	
Space required:	1 x CompactPCI Serial slot	
Operating voltage:	+ 3.3 V from PC	
Current consumption:	Inputs/outputs inactive	320 mA ± 10 %, typ.
	8 inputs/outputs active	400 mA ± 10 %, typ.
	16 inputs/outputs active	470 mA ± 10 %, typ.
Front connector:	37-pin D-Sub male connector	
Temperature range:	from – 40°C to + 85 °C	

Simplified block diagram

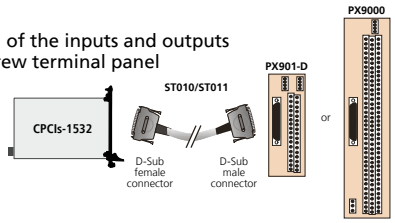


Pin assignment – 37-pin D-Sub male connector



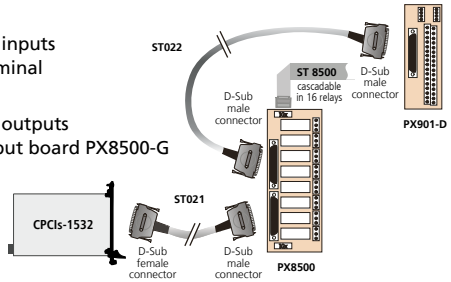
ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panel



Example 2
Connection of the inputs through screw terminal panel PX901-DG

Connection of the outputs through relay output board PX8500-G



Ordering information

CPCIs-1532

Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for CompactPCI Serial. Incl. technical description and software drivers.

CPCIs-1532: 16 inputs, 24 V, 16 outputs, 11-36 V, 1 counter

Accessories

PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel for DIN rail, with LED status display
PX8500-G: Relay output board for DIN rail, cascadable

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents
ST021: Round cable between APCIe-15x2 and PX8500-G, shielded, twisted pairs, 2 m
ST022: Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500-G

* Preliminary product information

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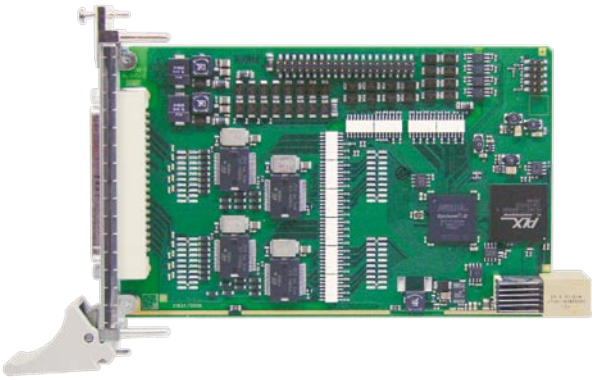
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V, for CompactPCI Serial

NEW*



CPCIs-1564

CompactPCI Serial interface

32 digital inputs, 24 V, including 16 interruptible inputs

32 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry-standard D-Sub connector

Extended temperature range –40 °C to +85 °C

RoHS 2002/95/EC

Also for PCI EXPRESS
See APCIe-1564, page 124

Also for PCI
See APCI-1564, page 150

Also for CompactPCI™
See CPCI-1564, page 232

Windows
64/32-bit drivers

on request

LabVIEW™
on request

Features

Inputs
- 32 optically isolated inputs, 24 V, incl. 16 interruptible inputs
- Channels 0–2 can be used as 32-bit counter inputs (up to 500 kHz)
- Reverse voltage protection
- All inputs are filtered

Outputs
- 32 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

Timer / Watchdog / Counter
- 2 timers (12-bit), of which one can be used as a watchdog
- 3 counter (32-bit)

Safety features
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications
- Industrial I/O control
- PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog/timer
- ...

Software drivers

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

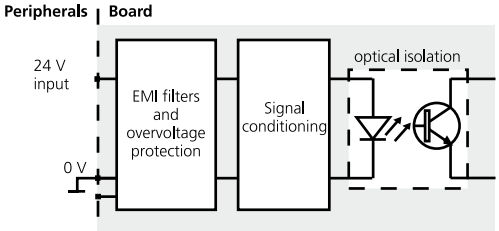
Standard drivers for:
- Linux
- 32-bit drivers for Windows 8 / 7 / Vista / XP / 2000
- Signed 64-bit drivers for Windows 8 / 7 / XP
- Real-time use with Linux and Windows on request

Drivers and samples for the following compilers and software packages:
- C#.NET, C

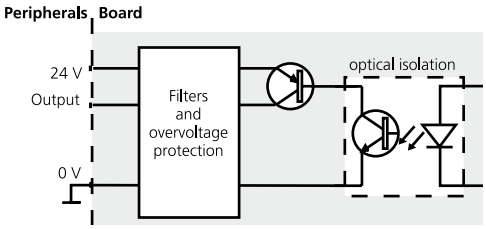
On request:
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



*Preliminary product information

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Specifications*

Digital inputs

Number of inputs: (common ground acc. to IEC 1131-2)	32 digital inputs, channel 0-2 can be used as 32-bit counter inputs (up to 500 kHz)		
Interruptible inputs:	16 channels (channel 4 to 19)		
Optical isolation:	1000 V through opto-couplers, from PC to peripheral		
Nominal voltage:	24 V		
Input current:	Channel 0-3:	6.6 mA	at 24 V, typical
	Channel 4-31:	2 mA	at 24 V, typical
Input frequency (max.):	Channel 0-2:	500 kHz	at 24 V
	Channel 3-31:	5 kHz	at 24 V
Logic input levels:	UH (max.):	30 V / 3.1 mA, typical (channel 4-31)	
	UH (min.):	19 V / 1 mA, typical (channel 4-31)	
	UH (max.):	30 V / 11 mA, typical (channel 0-3)	
	UH (min.):	19 V / 3.4 mA, typical (channel 0-3)	
	UL (max.):	14 V / 0.1 mA, typical	
	UL (min.):	0 V / 0 mA, typical	
Filters/protective circuit:	Input filters, transil diode, RC filters, Z diode, opto-couplers		

Digital outputs

Number of outputs:	32 digital outputs
Output type:	High-side (load to ground) acc. to IEC 1131-2
Optical isolation:	1000 V (through opto-couplers), from PC to peripheral
Nominal voltage:	24 V
Supply voltage range:	11 to 36 V
Current limit:	1.5 A per 8 channels (through PTC)
Output current per output:	500 mA (typical)
Short-circuit current per output:	1.5 A (typ.) pulse current shutdown at 24 V, R_{load}<0.1 Ω
RDS ON resistance:	0.2 Ω at 25 °C
Switch-on time:	I out=0.5 A, load = resistance: 50 µs
Switch-off time:	I out=0.5 A, load = resistance: 75 µs
Overtemperature (shutdown):	135 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Timer/watchdog

Watchdog:	12-bit, programmable as timer from 1µs to 4095 s

Safety

Shutdown logic (V_{CC} diagnostic):	When the ext. 24 V voltage drops below 7 V, the outputs are switched off.
Watchdog:	For resetting the outputs to "0"
Common diagnostics:	For all 16 channels at overtemperature of one channel

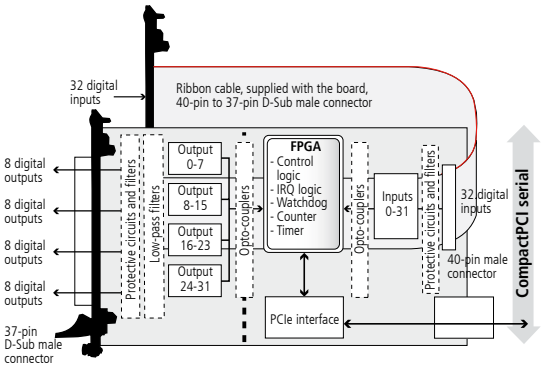
EMC – Electromagnetic compatibility

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.

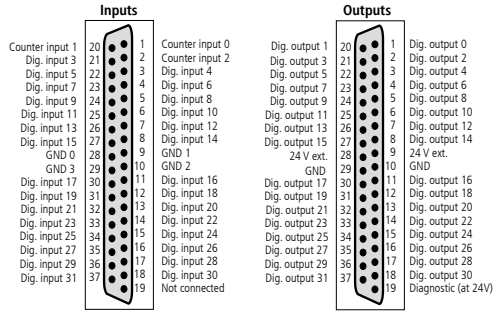
Physical and environmental conditions

Dimensions:	3U/4TE
System bus:	PCI Express according CompactPCI Serial specification PICMG CPCI-S.0 R1.0
Space required:	1 x CompactPCI Serial slot
Operating voltage:	+12 V, ±5 %
Current consumption:	in preparation
Front connector:	37-pin D-Sub male connector
Temperature range:	from – 40°C to + 85 °C
MTBF	in preparation

Simplified block diagram

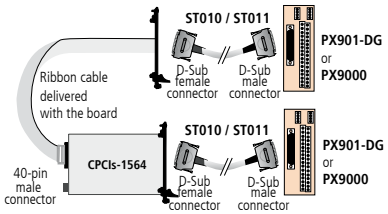


Pin assignment – 37-pin D-Sub male connector

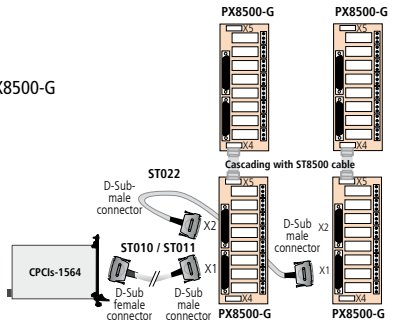


ADDI-DATA connection

Example 1:
- Connection of the inputs (Ribbon cable)
- Connection of the outputs through screw terminal panel PX901-DG or PX9000



Example 2:
Connection of the outputs with relay output board PX8500-G cascaded in 32 relays



Ordering information

CPCIs-1564

Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V, for CompactPCI Serial.
Incl. technical description and software drivers.

Accessories

PX901-D:	Screw terminal panel, LED status display
PX901-DG:	Screw terminal panel, LED status display, for DIN rail
PX9000:	3-row screw terminal panel for DIN rail, with LED status display
PX8500-G:	Relay output board for DIN rail, cascadable
ST010:	Standard round cable, shielded, twisted pairs, 2 m
ST011:	Standard round cable, shielded, twisted pairs, 5 m
ST010-S:	Same as ST010, for high currents
ST022:	Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m
ST8500:	Ribbon cable for cascading two PX8500-G

* Preliminary product information

Phone: +49 7229 1847-0 info@addi-data.com
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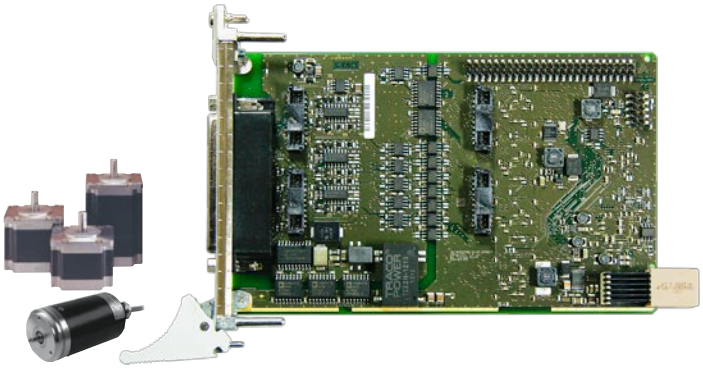
Multifunction counter board, optically isolated,

fast counter inputs – programmable functions, for CompactPCI Serial

NEW*



CPCIs-1711

Available functions: incremental counter, SSI Synchronous Serial Interface, counter/timer, pulse acquisition, frequency, pulse width, period duration, velocity measurement, PWM, BiSS-Master, digital I/O, Sin/Cos, EnDat 2.2 ...

Function selection through software

Optical isolation

Inputs and outputs: RS422, TTL, 24 V

Customised functions

Extended temperature range – 40 °C to + 85 °C

RoHS 2002/95/EC

Also for PCI EXPRESS
See APCIe-1711, page 128

Also for PCI
see APCI-1710
page 166

Also for CompactPCI™
see CPCI-1710
page 234

The board CPCIs-1711 is a fast multifunction and multichannel counter board for CompactPCI Serial.
The strengths of this board are its wide range of applications and high precision and reliability in harsh industrial environment.
With this board you can realise many different applications on the same hardware base. The board is supplied with a pool of functions which provides the user with maximum efficiency yet minimum space and parts requirement. The functions are individually configured for each channel through the supplied software. The flexible programming facilities on this board allow many different user applications to be quickly and easily developed and reconfigured as further requirements arise. Thanks to the FPGA board structure, further counting applications can be realised through software adaptation. Contact us!

Features

- 32-bit data access
- RS422 driver 5 MHz (up to 20 MHz on request)
- With RS422/TTL input/output signals (CPCIs-1711) or 24 V input signals (CPCIs-1711-24 V)
- Four onboard function modules

Functions

- Incremental counter for the acquisition of incremental encoders (90° phase-shifted signals)
- BiSS-Master (B and C mode)
- SSI Synchronous Serial Interface. The SSI function is an interface for systems which allow an absolute position information via serial data transfer.
- Counter/timer (82C54)
- Pulse acquisition
- Frequency measurement
- Pulse width modulation (PWM)
- Period duration measurement
- Velocity measurement
- Digital inputs and outputs
- Edge time measurement (ETM)
- Parallel interface
- Sin/Cos (1 V_{SS}, 11 A_{SS})
- EnDat 2.2
- Customised functions

Available channels on one function module

- 4 channels, programmable either as digital inputs or outputs, optically isolated, RS422
- 3 channels, digital inputs, optically isolated, 24 V
- 1 digital power outputs, optically isolated, 24 V

Additional channels

- 28 TTL I/O, without optical isolation

Versions

	RS422/ TTL-I/O	24 V inputs	5 V inputs	24 V outputs	TTL I/O
CPCIs-1711	16	12	–	4	28
CPCIs-1711-24V	–	28	–	4	28
CPCIs-1711-5V-I	16		12	4	28

Safety features

- Creeping distance IEC 61010-1
- Optical isolation 1000 V
- Noise neutralisation of the PC supply

Applications

- Event counting
- Position acquisition
- Motion control
- Batch counting
- ...

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:

- Microsoft VC++ • Borland C++ 5.01

On request:

Further operating systems, compilers and samples.

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

Windows
64/32-bit drivers

on request

LabVIEW™

* Preliminary product information

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Specifications*

Free programming of the functions

- Acquisition of incremental encoders (1 x 32-bit or 2 x 16-bit)
- SSI (max. 3 encoders per module)
- Counter/Timer (3 counters similar to 82C54)
- Pulse counter (4 x 32-bit counters per module)
- Chronos (chronometer)
- TOR (pulse counter with time slices, ...)
- Digital I/O (8 I/O, 24 V, TTL, RS422)
- PWM (pulse width modulation, 2 x per module)
- BiSS-Master (B and C mode)
- ETM (Timer interface for period duration measurement, edge time, ...)
- TTL (TTL I/O without isolation)
- Parallel Interface
- EnDat 2.2
- Sin/Cos
- Customised functions

Signals

Digital I/O signals, TTL or RS422, 24 V

Inputs

Differential inputs or outputs (A, B, C, D)		
Differential inputs, RS422:	16 (can be used as inputs or outputs)	
Nominal voltage:	3.3 VDC	
Common mode range:	+12 / -7 V	
Input sensitivity:	200 mV	
Input hysteresis:	50 mV	
Input impedance:	12 kΩ	
Terminal resistor:	120 Ω (not supplied)	
Max. input frequency:	CPCIs-1711: 5 MHz (at nominal voltage) up to 20 MHz on request!	
Mass-related inputs, 24 V (E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	14 V
	UL min.:	0 V
Maximal input frequency:	1 MHz (at nominal voltage) depending on the function	

Outputs

Nominal voltage:	3.3 VDC
Maximum output frequency:	5 MHz (diff. outputs)
Max. number of outputs:	16 (if they are not used as diff. inputs)
Digital outputs, 24 V (H)	
Output type:	High-side (load to ground)
Number of outputs:	4
Nominal voltage:	24 VDC
Supply voltage range:	4.75 V to 35 VDC (via 24 V ext. pin)
Maximum current:	90 mA per output / 270 mA total current limit (PTC)
Overtemperature:	165 °C (all outputs switch off)

Technical data CPCIs-1711-24 V version

	24 V inputs (Channels A, B, C, D). This board version is intended for the connection of 24 V encoders. Only 24 V signals can be connected to the inputs.	
Nominal voltage:	24 VDC	
Max. input frequency:	1 MHz (at nominal voltage) depending on the function	
Logic input levels :	Unominal:	24 V
(Standard)	UH max.:	30 V
	UH min.:	18 V
	UL max.:	16 V
	UL min.:	0 V

All functions using port A, B, C, D as outputs cannot be used.
See the manuals of the functions!

Safety

Optical isolation:	1000 V

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:	3U/4TE
System bus:	PCI Express according CompactPCI Serial specification PICMG CPCI-S.0 R1.0
Space required:	1 x CompactPCI Serial slot for digital I/O 1 x slot opening for TTL I/O with FB1711
Operating voltage:	+12 V, ±5 %
Current consumption:	in preparation
Front connector:	78-pin D-Sub female connector
Additional connector:	50-pin D-Sub male connector
Temperature range:	from – 40 °C to + 85 °C
MTBF	in preparation

Ordering information

CPCIs-1711

Multifunction counter board, optically isolated, fast counter inputs – programmable functionality, for CompactPCI Serial.
Incl. technical description and software drivers.

CPCIs-1711: Multifunction counter board, optical isolated, RS422
CPCIs-1711-24V: 24 V instead of RS422 (A, B, C, D).
CPCIs-1711-5V-I: 5 V inputs (E, F, G) instead of 24 V

Option

Opt. 5V: Outputs (H1, H2, H3, H4) 5 V instead of 24 V

Accessories

PX8001: 3-row screw terminal panel with housing for DIN rail
ST1711-50: Standard round cable, shielded, twisted pairs, 2 m, 78-pin male connector to 50-pin male connector

For the TTL I/O function
ST370-16: Standard round cable, shielded, twisted pairs, 2 m
FB1711: Ribbon cable

* Preliminary product information

Phone: +49 7229 1847-0 info@addi-data.com
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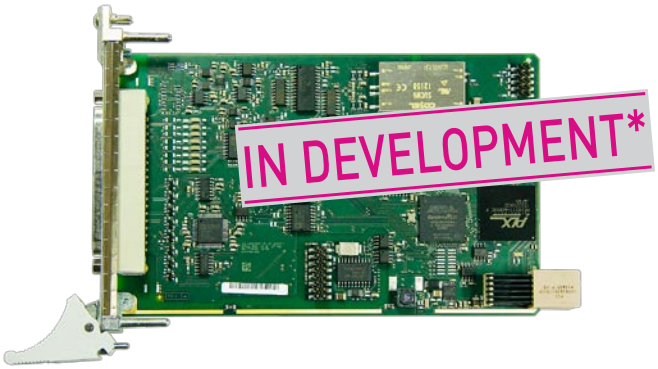
Multifunction board, optically isolated, 16 SE/8 differential inputs, 4/8 analog outputs, 16-bit



CPCIs-3121

CompactPCI Serial 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, isolated, timer, watchdog

Extended temperature range –40 °C to +85 °C

RoHS 2002/95/EC

Also for PCI EXPRESS
See APCIe-3121, page 134

Also for PCI
see APCI-3120, page 180

Also for CompactPCI™
see CPCI-3120, page 238

Windows
64/32-bit drivers

on request

LabVIEW™

LabWindows/CVI™

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
- 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
- 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

- 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

ADDIPACK 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

*Preliminary product information

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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 PC to peripheral
Input ranges:	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), freely programmable through software for each channel
Throughput:	100 kHz
Gain:	Software programmable (1, 2, 5, 10)
Relative precision (INL):	± 2 LSB max. (A/D converter)
Diff. non-linearity (DNL):	± 1 LSB max. (A/D converter)
Bandwidth (- 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 Sequence), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of sequence

Analog outputs

Number of outputs:	8 or 4
Resolution:	16-bit
Optical isolation:	500 V through opto-couplers
Output range:	0-10 V, ±10 V switchable through software (0-20 mA optional)
Overvoltage protection:	±15 V
Max. output current / load:	±5 mA, 2 kΩ
Short-circuit current:	±35 mA (short time)
Output voltage after reset:	0 V

Digital I/O

Number of I/O channels:	4 dig. inputs, 4 dig. high-side outputs, 24 V
Optical isolation:	1000 V through opto-couplers
Input current at 24 V:	10 mA typ.
Input range:	0-30 V
Supply voltage:	8-32 V
Max. switching current:	65 mA typ.

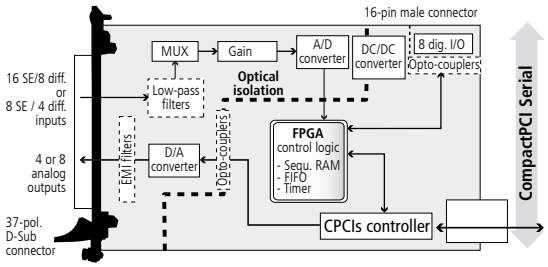
EMC – Electromagnetic compatibility

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.

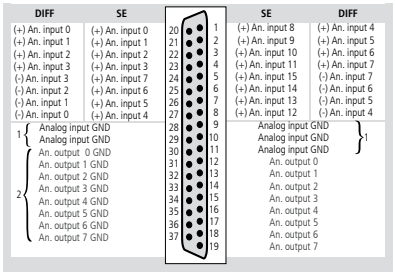
Physical and environmental conditions

Dimensions:	3U/4TE
System bus:	PICMG CPCI-S.0 R1.0
Space required:	1 x CompactPCI slot for analog I/O 1 x slot opening for digital I/O with FB3001
Operating voltage:	+12 V, ±5 %
Current consumption:	in preparation
Front connector:	37-pin D-Sub male connector
Temperature range:	-20°C to +70 °C
MTBF	in preparation

Simplified block diagram

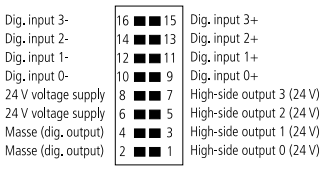


Pin assignment – 37-pin D-Sub male connector

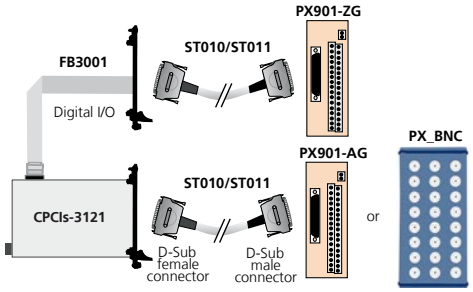


1: The analog inputs have a common ground line
2: Each analog output has its own ground line

Pin assignment – 16-pin male connector



ADDI-DATA connection



Ordering information

CPCIs-3121

Multifunction board, opt.isolated, 16 SE/8 diff. inputs, 4/8 analog outputs, 16-bit, for CompactPCI Serial. Incl. techn. description and software drivers.

Versions

CPCIs-3121-16-8	Version with 16 SE/8 diff. inputs, 8 analog outputs
CPCIs-3121-16-4	Version with 16 SE/8 diff. inputs, 4 analog outputs
CPCIs-3121-8-8	Version with 8 SE/4 diff. inputs, 8 analog outputs
CPCIs-3121-8-4	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(4)-20 mA for 1 channel
	PC-SE: for single-ended **PC-Diff:** for differential

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
FB3001:	Ribbon cable for digital I/O with 3U bracket

* Preliminary product information

Phone: +49 7229 1847-0 info@addi-data.com
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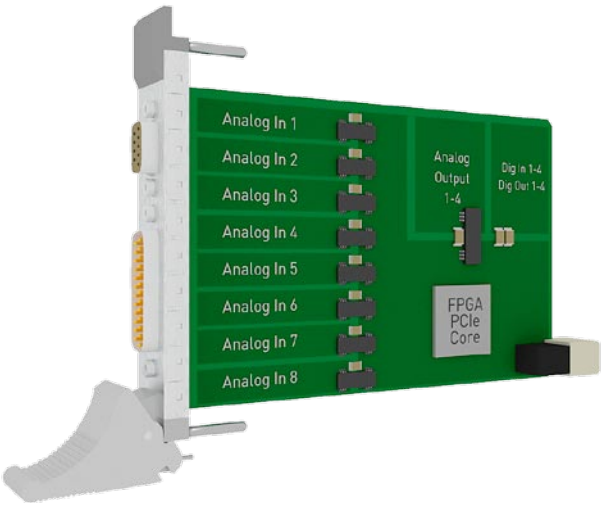
Multifunction board, optically isolated, 8 SE or 8 diff. inputs, 4 analog outputs, 24-bit

IN DEVELOPMENT*



CPCIs-3131-8-4

CompactPCI Serial interface

8 SE or 8 differential inputs

24-bit resolution, 250 kHz

4 analog outputs, 16-bit

8 digital I/O, optically isolated, 24 V

Extended temperature range

RoHS 2002/95/EC

Windows
64/32-bit drivers

The CompactPCI Serial board CPCIs-3131 is a fast and highly-precise multifunction board. Each of the 8 inputs has an own A/D converter, the resolution is 24-bit. On the CPCIs-3131, not only the analog and digital part are optically isolated but also all analog channels are separated from each other.
Further protective circuits complete the interference resistance of the board and offer an excellent protection for your application in the harsh industrial environment. Please contact us for further information!

Features

- CompactPCI Serial (PICMG CPCI-S.0 R1.0)

Analog inputs

- 8 SE/diff. inputs, optically isolated 1000 V
- Optical isolation between channels 500 V
- 24-bit resolution
- Throughput: max. 100 kHz, programmable for each channel
- Input voltage:

PGA	unipolar	bipolar
1	0-10 V	±10 V
10	0-1 V	±1 V
100	0-0.1 V	±0.1 V
1000	0-0.01 V	±0.01 V

- Current inputs: 0–20 mA, software-programmable for each channel
- Gain PGA x1, x10, x100, x1000 software-programmable for each channel

Analog acquisition

- Different acquisition modes are available:
  1) Simple Mode, 2) Scan Mode
  3) Sequence Mode 4) Auto Refresh Mode
- Onboard FIFO
- PCI-Express DMA for analog data acquisition
- MSI interrupt

Analog outputs

- Simultaneous output through DMA
- 4 analog outputs, optically isolated
- 16-bit resolution, setup time 18 µs max. (voltage in 10 V steps)
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation)
- Output voltage range:
  0-10 V, ±10 V,
  0-5 V, ±5 V
  0-20 mA, 4-20 mA, 0-24 mA
- Output current: ±20 mA
- Short-circuit current: in preparation

24 V digital I/O

- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Timer / Counter / Watchdog

- 3 / 3 / 2, 16-bit

Safety features

- Optical isolation 1000 V min.
- Optical isolation between analog inputs: 500 V
- Creeping distance IEC 61010-1
- Circuit part of the analog acquisition is separated from the circuit part of the digital function
- Overvoltage protection
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O signals via robust industry-standard D-Sub connector

Software

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

On request:

Further operating systems, compilers and samples

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

* Preliminary product information

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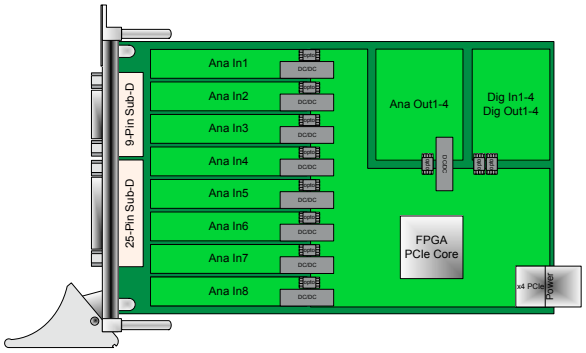
Simplified block diagram



Specifications*

Analog inputs

Number of inputs:	8 differential inputs
Resolution:	24-bit
Optical isolation:	1000 V through opto-couplers from PC to peripheral 500 V between channels
Voltage inputs:	Each channel is freely programmable through software

PGA	unipolar	bipolar
1	0-10 V	±10 V
10	0-1 V	±1 V
100	0-0,1 V	±0.1 V
1000	0-0.01 V	±0.01 V

Current inputs:	0–20 mA (option)
Throughput:	max. 250 kHz, software-programmable for each channel
Trigger:	through software, timer, ext. event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion) DMA transfer at EOC
Interrupts:	End of conversion, end of timer, end of sequence

Analog outputs

Number of outputs:	4
Resolution:	16-bit
Optical isolation:	1000 V through opto-couplers
Voltage and current outputs	
Output range:	0-10 V, ±10 V, 0-5 V, ±5 V, Option: 0-20 mA, 4-20 mA, 0-24 mA
LSB:	in preparation
Accuracy:	13,6-bit for voltage outputs 14-bit for current outputs
Read time:	in preparation
Setup time:	Output voltage, max.18 µs (in 10 V steps) Output current, typ. 15 µs (0 mA - 24 mA)
Max. output current:	in preparation
Short-circuit current:	in preparation
Output-voltage after reset:	0 V

Digital I/O

Number of inputs:	4 digital inputs, 24 V 1 input is programmable as counter input
Number of outputs:	4 digital outputs (50 mA), 24 V
Input range:	0-30 V – logic „0“: 0-14 V; logic „1“: 19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral

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:	3U/4TE
System bus:	PCI Express nach CompactPCI Serial Specification PICMG CPCI-S.0 R1.0
Space required:	1 CompactPCI Serial slot for analog inputs, 1 slot opening for digital I/O with FB300x
Operating voltage:	+ 12 V, ± 5 %
Current consumption:	in preparation
Front connector:	25-pin D-Sub male connector (analog input) 9-pin D-Sub male connector (analog output)
Additional connector:	50-pin D-Sub male connector for 8 digital I/O through ribbon cable FB300x
Temperature range:	from - 40 °C to 85 °C
MTBF:	in preparation

Ordering information

CPCIs-3131-8-4

Multifunction board, optically isolated, 8 SE or 8 diff. inputs, 4 analog outputs, 24-bit. Technical description, software drivers and monitoring program included.

Accessories

FB300x: Ribbon cable for digital I/O

* Preliminary product information

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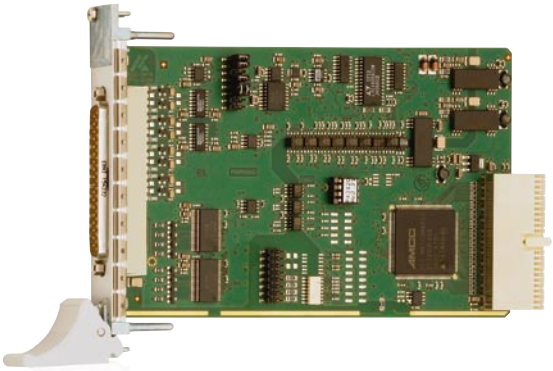

CompactPCI™

READY FOR
HARSH INDUSTRIAL
ENVIRONMENT

HIGH PROTECTION

- Optical isolation from 500 V to 1000 V
- Separation of analog and digital signals
- Protection against short-circuits, overtemperature, overvoltage
- Filters for the inputs and outputs
- Industry-standard D-Sub connectors

Reliable and available in the long term!

The CompactPCI bus is used particularly in applications with vibrations and shocks. To assure the reliability and longevity of a CompactPCI system it is important to use interference-free CompactPCI boards which are available in the long term – like the CompactPCI boards by ADDI-DATA.

High interference resistance

The key to the high interference resistance of the ADDI-DATA CompactPCI boards is the well thought-out concept of design and protective circuits. Therefore our boards are predestined for tasks in harsh industrial environments. They are resistant to vibrations, accelerations or dirt and provide reliable and accurate data.

3 U version

ADDI-DATA CompactPCI boards are available in 3 U version. 6 U brackets enable an installation in a 6 U rack. The 3 U version has been chosen because it is much more stable than longer boards. Thus the CompactPCI boards are more resistant to shocks and vibrations.

Faster through FPGA

A FPGA component has a programmable logic on which you can save your own algorithms in order to adapt the functionality of the PC board to your requirements. This adaptation makes your PC board unique and improves the performance of your applications. The on-board algorithms reduce the cycle time of signal acquisition and regulation tasks. Most ADDI-DATA CompactPCI boards are equipped with a FPGA component. Use the full potential of your PC board hardware and software resources and thus accelerate your processes.

Complete real-time system

- Combination of the PAC-system MSX-Box-CPCI and CompactPCI boards
- Compact and flexible
- Stand-alone system (own CPU)
- Long-term availability

Information about the MSX-Box-CPCI on page 20

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New!

	Digital		Counter	Analog			Serial interfaces (base board)	Motion control
	CPCI-1500	CPCI-1564	CPCI-1710	CPCI-3009	CPCI-3120	CPCI-3001	CPCI-7500	CPCI-8004
32-bit CompactPCI bus	5 V	3,3 V / 5 V	5 V	3.3 V / 5 V	3.3 V / 5 V	3.3 V / 5 V	5 V	3.3 V / 5 V
FPGA		✓	✓	✓	✓	✓		
Filters and protective circuits	✓	✓	✓	✓	✓	✓	✓	✓
Optical isolation 1000 V	✓	✓	✓	✓	✓	✓	optional	✓
Digital, 24 V								
Input channels, 24 V	16	32	12 (depending on function)	4	4	4		24
Output channels, 24 V	16	32	4	4	4	4		12
Output current per output	500 mA (typ.)	500 mA (typ.)	500 mA (typ.)					
Watchdog / Timer / Counter	2 x 12-bit timer, incl. 1 which can be used as a watchdog	Timer (12-Bit)/ Watchdog (8-Bit)		16-bit 3/3/2	1 x 24-bit timer which can be used as a watchdog	1 x 24-bit timer which can be used as a watchdog		
Counter								
Function modules			4	1				
Functions Incremental counter, SSI synchronous serial interface, counter/timer, pulse acquisition, frequency, pulse width, Period duration, velocity measurement, PWM, BiSS master, digital inputs and outputs, ...			reprogramm-able	reprogramm-able				4 incremental counters or SSI
Input frequency			up to 5 MHz	up to 5 MHz				
Signals			TTL, RS422, 24 V	TTL, RS422, 24 V				
Analog								
Analog inputs, 16-bit				16 SE / 8 diff.	16/8 SE or 8/4 diff.	16/8 SE or 8/4 diff.		
Throughput (kHz)				100	100	100		
Voltage range				0-10 V ± 10 V	0-10 V ± 10 V	0-10 V ± 10 V		
Gain 1, 2, 5, 10				✓	✓	✓		
FIFO (value)								
Trigger (software or 24 V)				✓	✓	✓		
Sequence RAM				✓	✓	✓		
Analog outputs				4, 12-bit	8 or 4, 14-bit			4, 16-bit
0-10 V ± 10 V				✓	✓			
Settling time				15 µs	30 µs			
Serial interfaces (base board)							4-port	
Configuration of the operation mode through MX modules							RS232, RS422, RS485, RS485, 20 mA CL	
Motion Control								1 to 4 servo or stepper motors
Software	Current driver list on the web: **www.addi-data.com**							
Page	230	232	234	236	238	240	242	244

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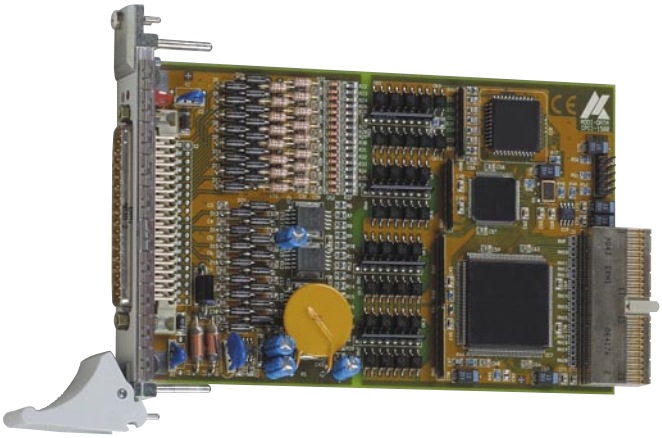
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V



CPCI-1500

16 digital inputs, 24 V, including 14 interruptible

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

The outputs are reset to "0" at Power-On

MTBF: 85 150 hours at 45 °C

Timer, watchdog

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI EXPRESS® see APCIe-1532 page 118

Also for PCI See APCI-1500 page 146

URS-1500-6U
6U bracket

Windows
64/32-bit drivers

LabVIEW™ LabWindows/CVI™

DIAdem

DASYLab10
Data Acquisition System Laboratory

Features

- Can be inserted in PXI systems, with restricted functionality
- 3 software-programmable timers
- Connector and software compatible to digital I/O boards APCI-1500/PA 1500
- Monitoring program for testing and setting the board functions

Inputs

- 16 optically isolated digital inputs, 24 V, including 14 interruptible inputs
- Reverse voltage protection
- All inputs are filtered

Outputs

- 16 optically isolated digital outputs, 10 V to 36 V
- Output current per channel 500 mA
- Timer programmable watchdog for resetting the outputs to "0"
- Diagnostic report through status register at short-circuits, overtemperature, voltage drop or watchdog
- Interrupt triggered through watchdog, timer, error
- At Power-On, the outputs are reset to "0"
- Short-circuit current for 16 outputs ~ 3 A typ.
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V
- Programmable watchdog for resetting the outputs in case of error

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

Applications

- Industrial I/O control
- PLC coupling
- Acquisition of encoder data for process control
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- Machine interfacing
- ...

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- 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/downloads

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Specifications

Digital inputs

Number of inputs:	16 (common ground acc. to IEC 1131-2)
Interruptible inputs:	14 out of 16 digital inputs IRQ line selected through BIOS
Optical isolation:	Through opto-couplers, 1000 V from PC to peripheral
Interrupt compare logic:	AND and OR mode; OR priority
Nominal voltage:	24 V
Input current at 24 V:	6 mA typ.
Logic input levels:	
U nominal:	24 V
UH max.:	30 V/current 9 mA typ.
UH min.:	19 V/current 2 mA typ.
UL max.:	14 V/current 0.7 mA typ.
UL min.:	0 V/current 0 mA typ.
Signal delay:	70 µs (at 24 V)
Maximal input frequency:	5 kHz (at 24 V)

Digital outputs

Number of outputs:	16
Optical isolation:	Through opto-couplers, 1000 V
Output type.:	High-side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	10 V to 36 V, min. 5 V (via front connector)
Max. current for 16 outputs:	3 A typ.
Output current/output:	500 mA typ.
Short-circuit current/output shutdown at 24 V, R_{load} <0.1 Ω:	1.5 A
RDS ON resistance:	0.4 Ω m1ax.
Switch-on time:	I out=0.5 A, load = resistance: 120 µs
Switch-off time:	I out=0.5 A, load = resistance: 60 µs
Overtemperature:	170 °C (output driver)
Temperature hysteresis:	20 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Diagnostics:	Short-circuits, overtemperature, status bit or interrupt to the PC.
Timer:	3 (max. 10 kHz, 24 V)
Watchdog:	Timer programmable, 17 µs up to 36 s for switching off the outputs

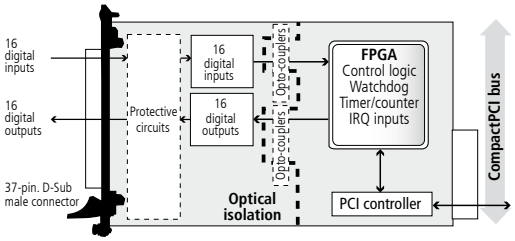
EMC – Electromagnetic compatibility

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.

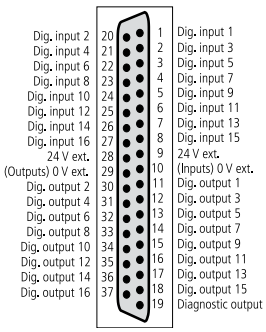
Physical and environmental conditions

Dimensions:	3U/4TE
System bus:	CPCI 32-bit acc. to specification CompactPCI 2.1
Space required:	1 CPCI slot 3U
Operating voltage:	+5 V, ± 5 %, from the PC
Current consumption:	220 mA typ. ± 10 %
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)
MTBF:	85 150 hours at 45 °C

Simplified block diagram

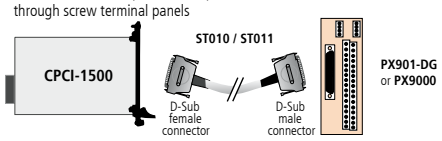


Pin assignment – 37-pin D-Sub male connector

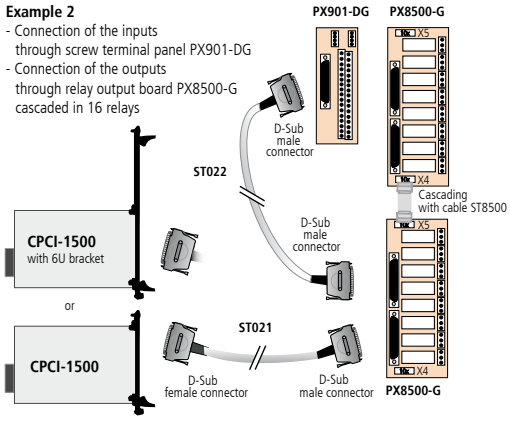


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminal panels



Example 2
- Connection of the inputs through screw terminal panel PX901-DG
- Connection of the outputs through relay output board PX8500-G cascaded in 16 relays



Ordering information

CPCI-1500
Digital I/O board, 32 digital inputs and outputs, optically isolated, 24 V. Incl. technical description, software drivers and monitoring program.

Option
URS-1500-6U: 6U bracket for mounting in 6U housing

Accessories
PX901-D: Screw terminal panel, LED status display
PX901-DG: Screw terminal panel, LED status display, for DIN rail
PX9000: 3-row screw terminal panel, for DIN rail, LED status display
PX8500-G: Relay output board for DIN rail, cascadable
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (24 V supply separate)
ST021: Round cable between CPCI-1500 and PX8500, shielded, twisted pairs, 2 m
ST022: Round cable between PX8500 and PX901, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500

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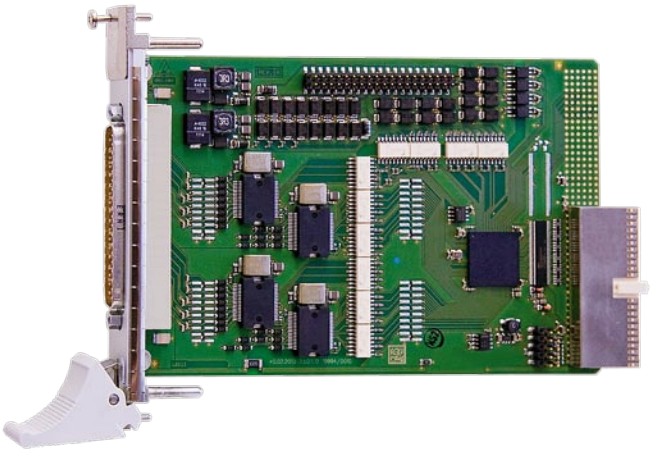
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V

New!*



CPCI-1564

32 digital inputs, 24 V,
including 16 interruptible inputs, filtered

32 digital outputs, 24 V, 500 mA/channel, filtered

Optical isolation 1000 V

Watchdog, timer, 3 x 32-bit counter up to 500 kHz

The outputs are reset to "0" at Power-On

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI EXPRESS® see page 122

Also for PCI See page 150

URS-1500-6U
6U bracket

Windows
64/32-bit drivers

LabVIEW™
on request

Features

- CompactPCI 3,3 V or 5V

Inputs

- 32 optically isolated digital inputs, 24 V , including 16 interruptible and 3 counter inputs
- Inputs organised in 4 groups of 8 channels, each group has its own ground line
- Reverse voltage protection
- All inputs are filtered

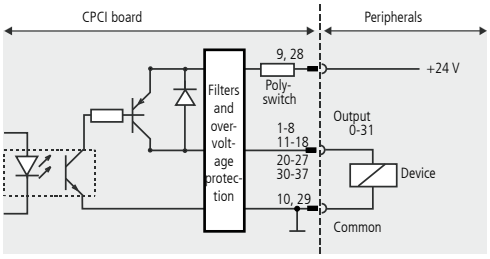
Outputs

- 32 optically isolated digital outputs, 11 V to 36 V Output current per channel 500 mA
- Watchdog for resetting the outputs to "0"
- At Power-On, the outputs are reset to "0"
- Total current for 8 outputs 1.85 A
- Electronic fuse
- Short-circuit current per output max. 1.7 A
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Output capacitors against electromagnetic emissions
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 5 V

Safety features

- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Interrupt started through counter, timer
- Separate ground lines for inputs and outputs

Connection principle of the outputs



Applications

- Industrial I/O control • PLC coupling
- Signal switching
- Interface to electromechanical relays
- Automatic test equipment
- ON/OFF monitoring of motors, lights...
- Watchdog • Machine interfacing
- ...

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:

- C#.NET, C

On request:

Further operating systems, compilers and samples.

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

*Preliminary product information

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Specifications*

Digital inputs

Number of inputs:	32; 4 groups of channels with common ground: Input: 0-7, 8-15, 16-23, 24-31 - 0-3: fast counter input, 500 kHz - 4-19: interruptible inputs	
Optical isolation:	Through opto-couplers, 1000 V	
Nominal voltage 24 V (CPCI-1564):	Digital inputs	Counter inputs
Input current at 24 V:	4 mA typ.	10,5 mA typ.
Logic input levels:		
UH max.:	30 V	
UH min.:	19 V	
UL max.:	14 V	
UL min.:	0 V	

Digital outputs

Number of outputs:	32, optically isolated up to 1000 V
Output type:	High side (load to ground) acc. to IEC 1131-2
Nominal voltage:	24 V (CPCI-1564); or 5 V (CPCI-1564-5V)
Supply voltage:	11 V to 36 V, min. 5 V (via front connector)
Max. current for 8 outputs:	1.85 A typ.
Output current/output:	500 mA max.
Short-circuit current/output shutdown at 24 V, R_{load} = 10 mΩ:	max. 1.7 A
RDS ON resistance:	150 mΩ typ.
Switch-on time:	40 µs typ.
Switch-off time:	470 µs typ.
Overtemperature (shutdown):	130 °C (output driver)
Temperature hysteresis:	15 °C (output driver)

Safety

Shutdown logic:	When the ext. 24 V voltage drops below 5 V: The outputs are switched off.
Diagnostics:	Pin 19: status bit or interrupt to the PC
Timer:	12-bit
Watchdog:	8-bit, timer-programmable from 20 ms to 5 s in steps of 20 ms

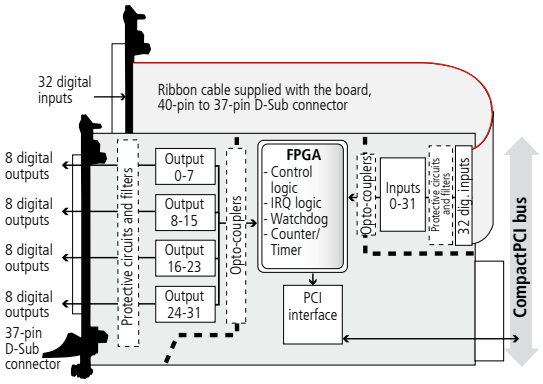
EMC – Electromagnetic compatibility

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.

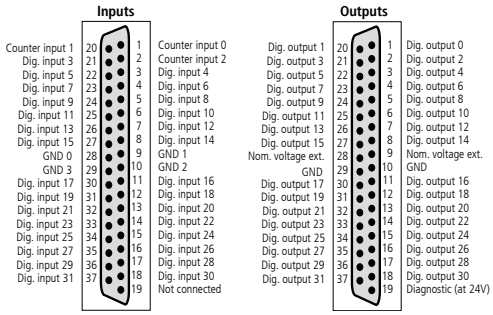
Physical and environmental conditions

Dimensions:	160 x 100 mm
System bus:	CPCI 32-bit 5 V acc. to specification CompactPCI 2.1
Space required:	1 CPCI slot 3U (only at 3HE)
Operating voltage:	+5 V, ± 5 % from CPCI system
Current consumption:	395 mA ± 15 mA typ.
Front connector:	37-pin D-Sub male connector for 32 dig. outputs 37-pin D-Sub male connector for 32 dig. inputs (only 6HE)
Additional connector:	37-pin D-Sub male connector on separate bracket for 32 digital inputs (only 3HE)
Temperature range:	-40 °C to +85 °C (with forced cooling)

Simplified block diagram

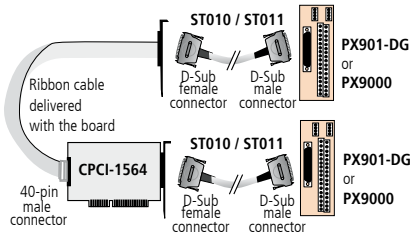


Pin assignment – 37-pin D-Sub male connector

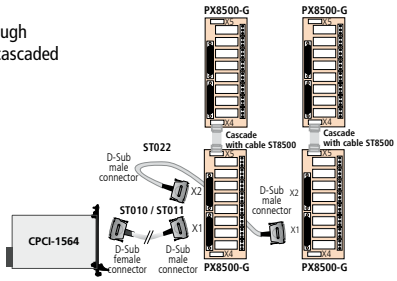


ADDI-DATA connection

Example 1:
- Connection of the inputs (ribbon cable)
- Connection of the outputs through screw terminal panel PX901-DG or PX9000



Example 2:
Connection of the outputs through relay output board PX8500-G cascaded in 32 relays



Ordering information

CPCI-1564

Digital I/O board, 64 digital I/O, optically isolated, 24 V. Incl. technical description, software drivers

Accessories

URS-1564-6U: 6U bracket for mounting in 6U housing
PX901-D: Screw terminal panel
PX901-DG: Screw terminal panel for DIN rail
PX9000: 3-row screw terminal panel
PX8500-G: Relay output board for DIN rail, cascadable
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
ST010-S: Same as ST010, for high currents (24 V supply separate)
ST022: Standard round cable between PX8500 and PX901, shielded, 2 m
ST8500: Ribbon cable for cascading two PX8500

* Preliminary product information

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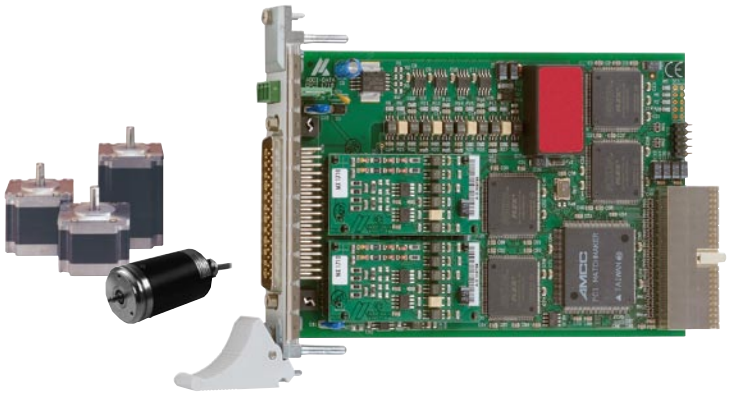
SPIRIT OF EXCELLENCE

Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM, ...



CPCI-1710

Incremental counter, SSI synchronous serial interfaces, counter/timer, pulse acquisition, frequency , pulse width , period duration , velocity measurement, PWM, BiSS-Master, digital inputs and outputs, ...

Function selection through software

Optical isolation, MTBF: 54 287 hours at 45 °C

TTL, RS422, 24 V

Customised functions

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI EXPRESS® see page 128

Also for PCI see page 166

URS-1710-6U
6U bracket

Description of the **functions** see datasheet of the **APCI-1710** page 166

Windows 64/32-bit drivers

LabVIEW™

DASYLab10 Data Acquisition System Laboratory

DIAdem

The board CPCI-1710 is a fast multifunction and multi-channel counter board for the CompactPCI bus.
The strengths of this board are its wide range of applications and high precision, speed and reliability for though industrial applications. With this board you can realise many different applications on the same hardware base.
The board is supplied with a pool of functions which are individually configured for each channel through the supplied software. The flexible programming facilities on this board allow many different user applications to be quickly and easily developed or reconfigured as further requirements arise. Thanks to the FPGA board structure, further counting applications can be realised through software adaptation. Contact us!

Features

- Can be inserted in PXI systems, with restricted functionality
- 32-bit data access
- Counter component with 32-bit counting depth and 5 MHz counting frequency
- Signals in TTL or RS422 mode, 24 V signals optional
- Four onboard function modules
- Reprogrammable functions

Functions (detailed description see APCI-1710)

- Acquisition of incremental encoders (90° phase-shifted signals)
- Synchronous serial interface for systems allowing an absolute position information through serial data transfer
- Counter/timer (82C54)
- Pulse acquisition
- Frequency measurement
- Pulse width modulation / PWM
- Period duration measurement
- Velocity measurement
- BiSS-Master
- Digital inputs and outputs
- Customised functions

Available channels for all four function modules

- 20 channels for digital inputs, optically isolated
- 8 channels, programmable either as digital inputs or outputs, optically isolated
- 4 digital power outputs, optically isolated

Available lines for each function module

8 lines are available for each function module

- Input lines:
  – 2 x TTL and RS422 (CPCI-1710)
    or 2 x 24 V (option)
  – 3 x 24 V, optional 5 V for channels E, F, G
- Output lines:
  – 1 x 24 V, optional 5 V (power output)
- 2 channels, programmable either as digital inputs or outputs, optically isolated: 2 x TTL, RS422

Safety features

- Creeping distance IEC 61010-1
- Optical isolation 1000 V
- Noise neutralisation of the PC supply

Applications

- Event counting • Position acquisition
- Motion control • Batch counting • ...

Software

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
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Microsoft C
- Borland C++ • Borland C
- Visual Basic • Delphi
- LabVIEW • DIAdem

On request:

Further operating systems, compilers and samples.

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

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ADDI-DATA® SPIRIT OF EXCELLENCE

Specifications

Free programming of the functions

	32-bit or 16-bit acquisition of incremental encoders
	Acquisition of absolute encoders/SSI
	Counter/timer
	Chronos/TOR for frequency measurement
	Pulse acquisition
	Chronos for pulse width modulation
	Chronos for period duration measurement
	TOR for velocity measurement
	BiSS-Master
	Digital I/O, 24 V, TTL, RS422
	PWM
	Customised functions

Signals

Digital I/O signals, TTL or RS422

Inputs

Number of inputs:	20	
Differential inputs or outputs		
Differential inputs, 5 V	8/16 (8 can be used as inputs or outputs)	
Nominal voltage:	5 VDC	
Common mode range:	+12 / -7 V	
Max. differential voltage	±12 V	
Input sensitivity:	200 mV	
Input hysteresis:	50 mV	
Input impedance:	12 kΩ	
Terminal resistor:	150 Ω serial with 10 nF (typ.)	
Signal delay:	120 nS (at nominal voltage)	
Max. input frequency:	5 MHz (at nominal voltage)	
Mass-related inputs, 24 V (channels E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Input current at nominal voltage:	11 mA	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	15 V
	UL min.:	0 V
Signal delay:	120 ns (at nominal voltage)	
Maximal input frequency:	2.5 MHz (at nominal voltage)	

Outputs

Nominal voltage:	5 VDC
Maximum output frequency:	2.5 MHz (diff. outputs)
Max. number of outputs:	8 (if they are not used as diff. inputs)
Digital outputs, 24 V:	
Output type:	High-side (load to ground)
Number of outputs:	4
Nominal voltage:	24 VDC
Range of the supply voltage:	10 V up to 36 VDC (via 24 V ext. pin)
Maximum current for 4 outputs:	2 A typ. (limited to the voltage supply)
Maximum output current:	500 mA
Short-circuit current/ output at 24 V, R_{last} < 0.1 Ω:	1.5 A max. (output switched off)
ON-resistance of the output (RDS ON-resistance):	0.4 Ω max.
Overtemperature:	170 °C (all outputs switch off)

Overtemperature protection (24 V outputs)		
Activated:	From approx. 150-170 °C (chip temperature)	
Deactivated (automatically).:	From approx. 125-140 °C (chip temperature)	
Outputs (at overtemperature):	Outputs switch off	
Protection against undervoltage	(effective at Vext <5 V):	
Outputs (at undervoltage):	All outputs switch off	
Switching characteristics of the outputs (Vext = 24 V, T=25 °C, ohmic load: 500 mA)**:**		
Switch ON time:	200 µs	
Switch OFF time:	15 µs	
Digital outputs, 5 V (option):		
Output type:	TTL	
Number of outputs:	4	
Nominal voltage:	5 VDC	
Switching characteristics of the outputs (T=25 °C, TTL load)**:**		
Switch ON time:	0.06 µs	
Switch OFF time:	0.02 µs	
Technical data for the option 24 V		
	24 V inputs (channels A up to D). This board version is intended for the connection of 24 V encoders. Only 24 V signals can be connected to the input channels.	
Nominal voltage:	24 VDC / 10 mA	
Max. input frequency:	1 MHz (at nominal voltage)	
Logic input levels : (Standard)	Unominal:	24 V
	UH max.:	25 V
	UH min.:	15 V
	UL max.:	11 V
	UL min.:	0 V

Safety

Optical isolation: 1000 V

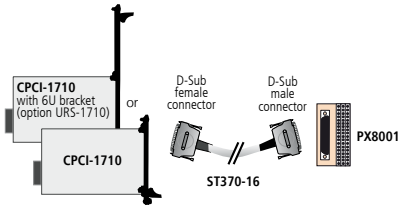
EMC – Electromagnetic compatibility

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:	3U/4TE
System bus:	CompactPCI 32-bit 5 V acc. to spec. 2.1 (PCISIG)
Space required:	1 slot
Operating voltage:	+5 V, ± 5 % from the PC +24 V ext. /10 mA
Current consumption:	CPCI-1710: 877 mA typ. ± 10 %
Front connector:	50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)
MTBF:	54 287 hours at 45 °C

ADDI-DATA connection



Ordering information

CPCI-1710: Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM. Incl. technical description and software drivers.

CPCI-1710-10K20: Same as CPCI-1710, with additional function for connecting a **BiSS** interface.

MX1710: Peripheral module for the board CPCI-1710. 2 modules are necessary for each CPCI-1710 board. **Please order with the board!**

Options

URS-1710-6U: 6U bracket for mounting in 6U housing

Option 24 V: 24 V for differential inputs (channels A up to G, A and B for Counter), I (Index) and UAS (error) signals

Option 5 V 24 V inputs are supplied with 5 V (channels E, F, G)

Accessories

ST370-16: Shielded round cable, 2 m

PX8001: 3-row screw terminal panel, 50-pin, for DIN-rail mounting

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

CPCI-3009

16 SE or 8 diff. inputs

16-bit resolution, 100 kHz

Voltage and current inputs (optional)

4 analog outputs, 12-bit

Reprogrammable counter function module

8 optically isolated digital I/O, 24 V

RoHS 2002/95/EC

CompactPCI™ 32-bit

Windows 64/32-bit drivers

The board CPCI-3009 is a fast multifunction and counter board for the CompactPCI bus. It is characterised by flexible applications, high accuracy, speed and reliability in severe industrial environments.
With this board you can put into practice a large range of applications on the same hardware basis thanks to FPGA technology. The board is supplied with a pool of functions allowing a high efficiency on just one board. The functions are programmed using the supplied software. You can adapt the functions of the board to the requirements of your application and change them as required. On request, further counter applications can be adapted per software thanks to the the FPGA. Contact us!

Features

- CompactPCI 3.3 V or 5 V
- Can be inserted in PXI systems, with restricted functionalities

Analog inputs

- 16 diff. inputs, optically isolated 1000 V
- Resolution: 16-bit
- Throughput: 100 kHz
- Voltage inputs: 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
- Version with input range 0-30 V (only SE inputs)

Analog acquisition

- Different input modes for the analog acquisition:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Onboard FIFO
- PCI-DMA for analog data acquisition

Analog outputs

- 4 analog outputs, optically isolated
- 12-bit resolution, setup time 15 µs typ
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation)
- Output voltage range: - 10 V to + 10 V
- Output current: ± 5 mA
- Short-circuit current: ± 20 mA

24 V digital I/O

- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Reprogrammable counter function module

- 32-bit data access
- Counter component with 32-bit width and 5 MHz counting frequency, signals in RS422 mode

Functions:

- Incremental counter for the acquisition of incremental encoders (90° phase-shifted signals)
- Chronos for frequency , pulse width and period duration measurement
- Digital inputs and outputs, 24 V, TTL, RS422

Further functions on request:

- SSI synchronous serial interfaces. The SSI function is an interface for systems which allow an absolute position information via serial data transfer.
- Counter/timer (82C54)
- Pulse acquisition
- Velocity measurement
- PWM (Pulse Width Modulation)
- Customised functions

Timer/Counter/Watchdog

- 3 / 3 / 2, 16-bit

Safety features

- Optical isolation 1000 V min.
- Creeping distance IEC 61010-1
- Circuit part of the analog acquisition is separated from the circuit part of the digital function
- Overvoltage protection ± 40 V
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O-signals via robust industry-standard D-Sub connector

Software

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

On request:

Further operating systems, compilers and samples.
Driver download: www.addi-data.com/downloads

*Preliminary product information

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Specifications

Analog inputs

Number of inputs:	16 differential inputs, 16-bit resolution
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Voltage inputs:	software-programmable for each channel CPCI-3009: 0-10 V, ±10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V, 0-20 mA optional CPCI-3009_30V: 0-30V
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	100 kHz
Trigger:	Through software, timer, ext. event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, End of timer, End of scan

Analog outputs

Number of outputs:	4, 12-bit resolution
Optical isolation:	1000 V through opto-couplers
Voltage outputs	
Output range:	- 10 V to + 10 V (- 1 LSB)
LSB:	4.8828 mV
Accuracy:	11-bit
Time to read:	typ. 5 µs
Setup time:	typ. 15 µs (at 10 V step)
Max. output current:	± 5 mA (each output)
Short-circuit current:	max. ± 20 mA (temporary)
Output voltage after reset:	0 V

Counter components

Counting depth:	32-bit, counting frequency up to 5 MHz
Optical isolation	1000 V
Free programming of the functions	
	For programming your function module select one function from the list on the right.
Signals	Digital I/O, 24 V signals, TTL or RS422

Digital I/O

Number of I/O channels:	4 dig. inputs, 4 dig. outputs (50 mA), 24 V
Logical "0" level:	0-14 V
Logical "1" level:	19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral

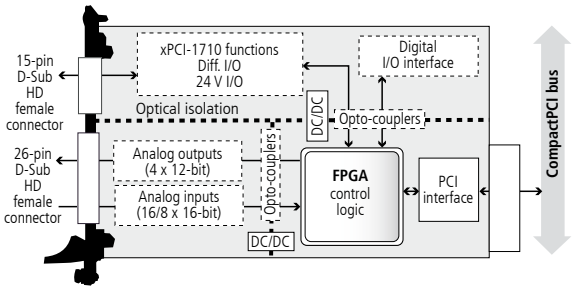
EMC – Electromagnetic compatibility

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:	3U/4TE
System bus:	PCI 32-bit acc. to CompactPCI specification 2.1
Space required:	1 x CompactPCI slot for analog I/O, counter 1 x slot opening for digital I/O with FB3001
Operating voltage:	+5 V, ±5 %
Current consumption:	790 mA, ±10 %
Front connector:	26-pin D-Sub female connector (analog I/O) 15-pin D-Sub female connector (counter module) Separ. 37-pin D-Sub connector for 8 dig. I/O via FB3001
Temperature range:	0 to 60 °C (with forced cooling) -30° up to +70° in preparation

Simplified block diagram



Reprogrammable function module allows many different applications

The function module has numerous functions which can be programmed quickly and easily. For the programming of your function module, choose one of the following functions. If your application changes, just reprogram the function module and use another function from the list below.

Select one of the following functions:

- 1 x 32-bit acquisition of incremental encoders
- 2 x 16-bit acquisition of incremental encoders
- 1 x Chronos/TOR for frequency measurement
- 1 x Chronos for pulse width modulation
- 1 x Chronos for period duration measurement
- 8 digital I/O, 24 V, TTL, RS422

Further functions on request:

- 3 x acquisition of absolute encoders/SSI
- 3 x counter/timer
- 4 x pulse acquisition
- 2 x TOR for velocity measurement
- 2 x PWM
- 2 x ETM
- 1 x SSI monitor

For a detailed description of the functions, please see the data sheet of the board APCI-1710 on page 166

Ordering information

CPCI-3009

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

Versions

CPCI-3009_30V: Same as CPCI-3009, only SE inputs, unipolar, 0-30 V input range

Options

Please specify the number of channels when ordering

URS-3009-6U: 6U bracket for mounting in 6U housing
Option SF: Precision filter for 1 single-ended channel
Option DF: Precision filter for 1 diff. channel (30Hz)
Option PC: Current input 0(4)-20 mA for 1 channel
PC-SE: For 1 single-ended channel
PC-Diff: For 1 diff. channel (30 Hz)
Option CAL3009: Only for 32-bit operation system. On-site calibration of the CPCI-3009. Do the fine adjustment fast and reliably and then save the calibration report file.

Accessories

PX901-A: Screw terminal panel with transorb diodes for connecting the analog I/O
PX901-AG: Same as PX901-A with housing for DIN rail
PX901-ZG: Screw terminal panel for connecting the digital I/O, for DIN rail
ST3009-DZ: 15-pin HD D-Sub female to 37-pin D-Sub male connector
ST3009-A: 26-pin HD D-Sub female to 37-pin D-Sub male connector
FB3001: Ribbon cable for dig. I/O, with 37-pin D-Sub male connector on 3U bracket
ST010: Standard round cable, shielded, twisted pairs, 2 m

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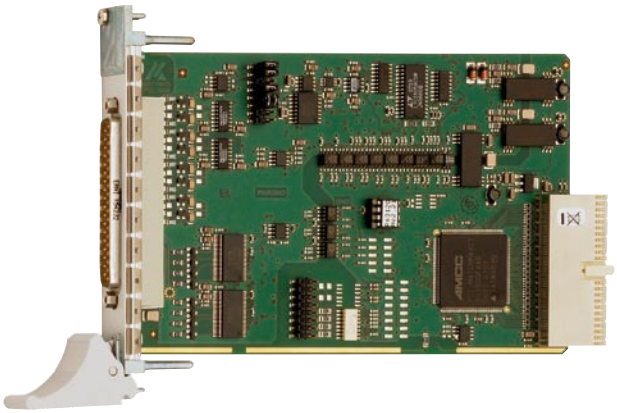
Multifunction board, optically isolated, 16 SE or 8 diff. inputs, 8 analog outputs, 16-bit



CPCI-3120

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

8/4 analog outputs, 14-bit

Optical isolation of the inputs and outputs, 500 V

Automatic analog acquisition

Output voltage after reset 0 V

MTBF: 75 867 hours at 45 °C

Timer, watchdog

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI-Express
See APCIe-3121, page 134

Also for PCI
See APCI-3120, page 180

URS-3120-6U
6U bracket with FB3001

Windows 64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DASYLab10 Data Acquisition System Laboratory

DIAdem

Features

- Can be inserted in PXI systems, with restricted functionality

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

- Single channel, several channels, several channels through scan list
- Autom. 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, End of multichannel, End of scan list

Analog outputs

- 4 or 8 analog outputs, optically isolated 500 V
- Setup time 30 µs
- 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

- 24-bit; as cyclic time counter or 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, pressure data
- 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).

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:

- 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/downloads

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Specifications

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 opto-couplers from PC to peripheral
Input ranges:	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
Throughput:	100 kHz
Gain:	Software programmable (1, 2, 5, 10)
Common mode rejection:	DC at 10 Hz, 90 dB minimum
Relative precision (INL):	± 1 LSB (ADC)
Diff. Non-linearity (DNL):	± 0.5 LSB (ADC)
Input impedance (PDA):	10^{12} Ω//10 nF single-ended, 10^{12} Ω//20 nF differential against GND
Bandwidth (- 3 dB):	Limited to 159 kHz with low-pass filter
Trigger:	Through software, timer, ext. 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, End of timer, End of scan

Timer

Time base of timer 2:	24-bit; 50 µs

Analog outputs

Number of outputs:	4 or 8
Resolution:	14-bit resolution
Optical isolation:	500 V through opto-couplers
Output range:	0-10 V, ±10 V switchable through software
Setup time at 2 kΩ, 1000pF:	10 µs (10 V step)
Overvoltage protection:	±12 V
Max. output current / load:	±5 mA / 500 pF, 2 kΩ
Short-circuit current:	±25 mA
Output voltage after reset:	0 V

Digital I/O

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

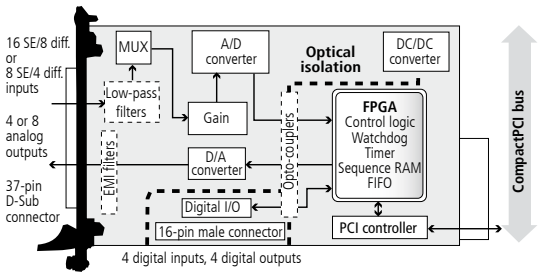
EMC – Electromagnetic compatibility

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.

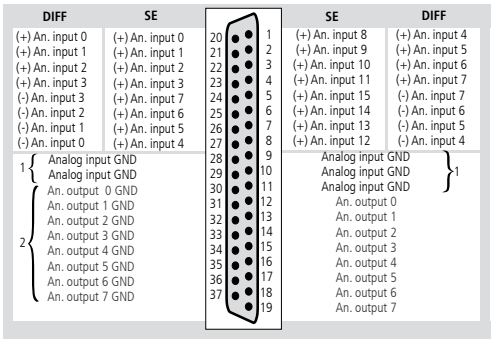
Physical and environmental conditions

Dimensions:	160 x 100 mm
System bus:	PCI 32-bit acc. to CompactPCI specification 2.1
Space required:	1 PCI slot for analog I/O, 1 slot opening for digital I/O with FB3001
Operating voltage:	+ 5 V, ± 5 % , 3.3 V from CPCI system
Current consumption:	800 mA
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)
MTBF:	75867 hours at 45 °C

Simplified block diagram

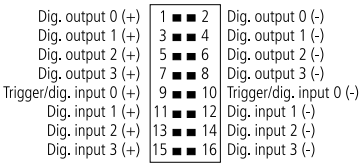


Pin assignment – 37-pin D-Sub male connector

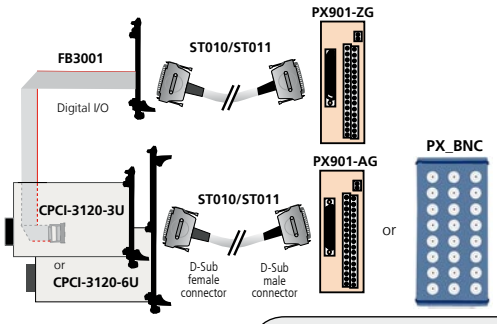


1: The analog inputs have a common ground line
2: Each analog output has its own ground line

Pin assignment – 16-pin connector



ADDI-DATA connection



Ordering information

CPCI-3120

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

Versions

CPCI-3120-16-4 16 SE/8 diff. inputs, 4 analog outputs
CPCI-3120-16-8 16 SE/8 diff. inputs, 8 analog outputs
CPCI-3120-8-4 8 SE/4 diff. inputs, 4 analog outputs
CPCI-3120-8-8 8 SE/4 diff. inputs, 8 analog outputs

Options: **Please specify the number of channels when ordering**

URS-3120-6U: 6U bracket for mounting in 6U housing
Option SF: Precision filter for 1 single-ended channel
Option DF: Precision filter for 1 diff. channel (30 Hz)
Option PC: Current input 0(4)-20 mA for 1 channel
PC-SE: For 1 single-ended channel
PC-Diff: For 1 diff. channel (30 Hz)
Option CAL3120: Only for 32-bit operation system. On-site calibration of the CPCI-3120. Do the fine adjustment fast and reliably and then save the calibration report file.

Accessories

PX901-A: Screw terminal panel with transorb diodes, for connecting the analog I/O
PX901-AG: Same as PX901-A with housing for DIN rail
PX901-ZG: Screw terminal panel for connecting the digital I/O, for DIN rail
PX_BNC: BNC connection box for connecting the analog I/O
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
FB3001: Ribbon cable for digital I/O, with 37-pin D-Sub male connector on 3U bracket

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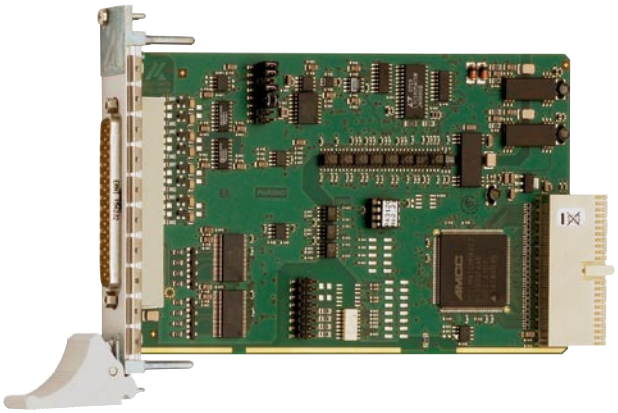
Analog input board, optically isolated, 16 SE or 8 diff. inputs, 12-bit



CPCI-3001

16/8/4 single-ended or
8/4 differential inputs

12-bit resolution

Optical isolation 500 V

100 kHz throughput

Automatic analog acquisition

Trigger functions

MTBF: 75867 hours at 45 °C

Graphical display of the measured data

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI-Express
See APCIe-3021, page 134

Also for PCI
See APCI-3001, page 190

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

DIAdem

DASYLab10
Data Acquisition System Laboratory

Features

- Can be inserted in PXI systems, with restricted functionality
- Monitoring program for testing and setting the board functions

Analog inputs

- 16 single-ended/8 differential inputs or 8 single-ended/4 differential inputs or 4 single-ended inputs
- 12-bit resolution
- 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

Analog acquisition

- Single channel, several channels, several channels through scan list
- Autom. 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

Digital

- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

Timer

- 24-bit
- Timer 2 as cyclic time counter

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 sensors
- Laboratory equipment
- Current measurement
- Instrumentation

Software

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:

- Microsoft VC++ • Microsoft C
- Borland C++ • Borland C
- Visual Basic • Delphi • Turbo Pascal
- LabVIEW • DASYLab • DIAdem

On request:

Further operating systems, compilers and samples.

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Specifications

Analog inputs

Number of inputs:	16 single-ended/8 differential inputs 8 single-ended/4 differential inputs or 4 single-ended inputs
Resolution:	12-bit
Optical isolation:	500 V through opto-couplers from PC to peripheral
Input ranges:	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
Throughput:	100 kHz
Gain:	Software programmable (x1, x2, x5, x10)
Common mode rejection:	DC at 10 Hz, 90 dB minimum
Relative precision (INL):	± 1 LSB (ADC)
Diff. Non-linearity (DNL):	± 0.5 LSB (ADC)
Input impedance (PGA):	10^{12} Ω//10 nF Single-ended, 10^{12} Ω//20 nF Differential against GND
Bandwidth (- 3 dB):	Limited to 159 kHz with low-pass filter
Trigger:	Through software, timer, ext. 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, End of timer, End of scan

Timer

Time base Timer 2:	24-bit; 50 µs; smallest programmable value: 100 µs

Digital I/O

Number of I/O channels:	4 digital inputs, 4 digital outputs, 24 V
Optical isolation:	500 V through opto-couplers from PC to peripheral
Input range:	0-30 V - Logical „0": 0-5 V - Logical „1": 10-30 V
Input current at 24 V:	3 mA typ.
Output range:	5-30 V
Max. switching current:	10 mA typ.
Output type:	Open collector

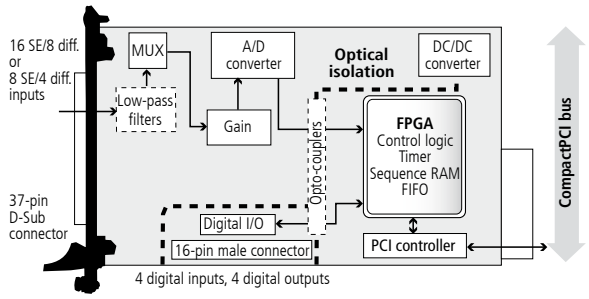
EMC – Electromagnetic compatibility

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.

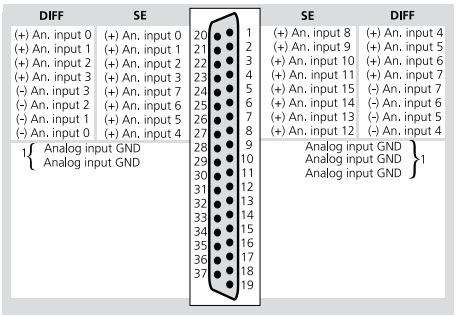
Physical and environmental conditions

Dimensions:	160 x 100 mm
System bus:	PCI 32-bit acc. to CompactPCI specification 2.1
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O
Operating voltage:	+ 5 V, ± 5 % , 3.3 V from CPCI system
Current consumption:	550 mA typ.
Front connector:	37-pin D-Sub male connector
Additional connector:	16-pin male connector for ribbon cable for connecting the digital inputs and outputs
Temperature range:	0 to 60 °C (with forced cooling)
MTBF:	75867 Hours at 45 °C

Simplified block diagram



Pin assignment – 37-pin D-Sub male connector

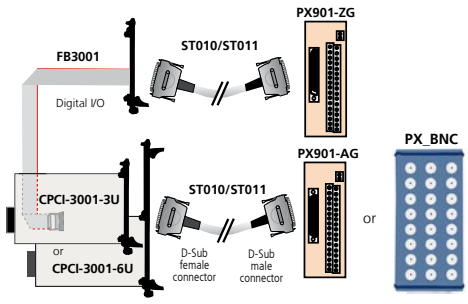


1: The analog inputs have a common ground line

16-pin male connector

Dig. output 0 (+)	1 ■ ■ 2	Dig. output 0 (-)
Dig. output 1 (+)	3 ■ ■ 4	Dig. output 1 (-)
Dig. output 2 (+)	5 ■ ■ 6	Dig. output 2 (-)
Dig. output 3 (+)	7 ■ ■ 8	Dig. output 3 (-)
Trigger/dig. input 0 (+)	9 ■ ■ 10	Trigger/dig. input 0 (-)
Dig. input 1 (+)	11 ■ ■ 12	Dig. input 1 (-)
Dig. input 2 (+)	13 ■ ■ 14	Dig. input 2 (-)
Dig. input 3 (+)	15 ■ ■ 16	Dig. input 3 (-)

ADDI-DATA connection



Ordering information

CPCI-3001

Analog input board, optically isolated, 16 SE or 8 diff. inputs, 12-bit. Incl. technical description, software drivers and monitoring program.

CPCI-3001-16	16 SE/8 diff. inputs, 8 digital I/O
CPCI-3001-8	8 SE/4 diff. inputs, 8 digital I/O
CPCI-3001-4	4 SE inputs, 8 digital I/O

Options: Please specify the number of channels when ordering

URS-3001-6U:	6U bracket for mounting in 6U housing
Option SF:	Precision filter for 1 single-ended channel
Option DF:	Precision filter for 1 diff. channel (30Hz)
Option SC:	Current input 0(4)-20 mA for 1 single-ended channel
Option DC:	Current input 0(4)-20 mA for 1 diff. channel

Accessories

PX901-A:	Screw terminal panel with transorb diodes for connecting the analog inputs
PX901-AG:	Same as PX901-A with housing for DIN rail
PX901-ZG:	Screw terminal panel for connecting the dig. I/O, for DIN rail
PX_BNC:	BNC connection box for connecting the analog I/O
ST010:	Standard round cable, shielded, twisted pairs, 2 m
ST011:	Standard round cable, shielded, twisted pairs, 5 m
FB3001:	Ribbon cable with 37-pin D-Sub male connector on 3U bracket for the digital I/O

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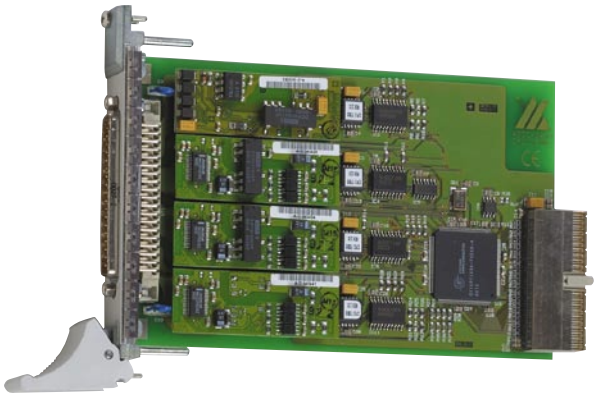
4-port serial interface, RS232, RS422, RS485, 20 mA CL



CPCI-7500

4-port, RS232, RS422, RS485, 20 mA Current Loop

Mode selection through MX modules

With/without optical isolation

Free mode configuration for each port

128-byte FIFO buffer per port

MTBF: 98 551 hours at 45 °C

RoHS 2002/95/EC

CompactPCI™ 32-bit

Also for PCI-Express
See APCIe-7xxx, page 142

Also for PCI
See APCI-7500, page 210

URS-7500-6U
6U bracket

Windows
64/32-bit drivers

The board CPCI-7500 is a 4-port serial interface for industrial applications. It is configured by inserting MX modules which the board identifies automatically. Each serial port can be configured individually through modules in the following modes: RS232, RS422, RS485 (with or without optical isolation) and Current Loop (optically isolated). The optically isolated modules allow a protection up to 1000 V for the use in noisy environments where earth loops can occur. Interrupts, addressing and transfer rate are controlled through the BIOS.
The I/O lines are protected against short-circuits, fast transients, electrostatic discharge and high-frequency EMI. Each port is supported through a 128-byte FIFO buffer for sending and receiving data which guarantees reliable operation with high data volumes.

Features

- Asynchronous 4-port serial interface
- 4 socket for MX modules
- Modular mounting through MX modules
- Can be configured as RS232, RS422, RS485 with or without optical isolation, 20 mA Current Loop (active, passive), with optical isolation
- Addressing through software
- No jumpers: software configuration
- Automatic module recognition
- 128-byte FIFO memory for each interface
- Common interrupts
- Programmable transfer rate
- 5-, 6- or 8-bit character
- 1, 1½ or 2 stop bits
- Parity: even, odd or none
- Automatic transmitter control for RS485

Safety features

- MX modules with optical isolation available
- Protection against fast transients (burst)
- Short-circuits protection for RS422 and RS485
- Internal diagnostic, break, parity, overrun and framing error
- Creeping distance IEC 61010-1 (MX modules)

Applications

- Data acquisition
- Industrial process control
- Industrial communication
- Multi-user systems
- Modem and printer monitoring
- Multidrop applications

Software

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:

- Microsoft VC++
- Visual Basic • Delphi

On request:

Further operating systems, compilers and samples.

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MX modules

Operating mode	RS232		RS422		RS485		20 mA CL
							
	MX232-G	MX232	MX422-G	MX422	MX485-G	MX485	MXTTY
Optical isolation 1000 V	✓		✓		✓		✓
creeping distance 3.2 mm	✓		✓		✓		✓
short-circuit protection			✓	✓	✓	✓	
ESD protection	✓	✓	✓		✓		
Burst-protection	✓	✓	✓	✓	✓	✓	✓
Duplex	Full	Full	Full	Full	Half	Half	Full
Max. Baud rate	1 MBaud	1 MBaud	1 MBaud	1 MBaud	1 MBaud	1 MBaud	19,2 kBaud
Modem control signals	✓	✓	Optional RTS/CTS (MX-422-PEP)				
Autom. transmitter control					✓	✓	
Current consumption	16 mA	1 mA	15 mA	5 mA	15 mA	5 mA	82 mA

4-port serial interface

Modes:	RS232, RS422, RS485, 20 mA Current Loop (active, passive) with or without optically isolated via separate MX modules
Transmission mode:	Asynchronous, full /half duplex (MX modules)
Addressing:	Automatic through BIOS
Memory:	128-byte FIFO buffer for each interface
Transfer rate:	Programmable up to 1 MBaud (optional)
Protocol:	5-, 6-, or 8-bit Character 1, 1½ or 2 Stop bits
Parity:	Even, odd, none, mark, space
Interrupt:	Interrupt configuration through BIOS

Safety

Optical isolation:	1000 V (MX modules)

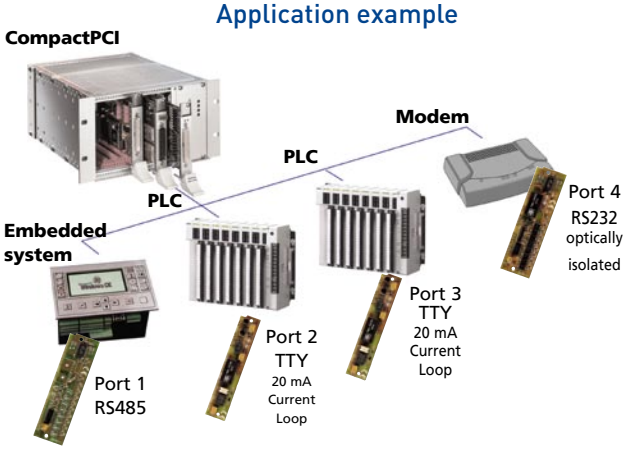
EMC – Electromagnetic compatibility

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:	3U/4TE
System bus:	CPCI 32-bit acc. to specification CompactPCI 2.2
Space required:	CPCI-slot, 3U
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	192 mA typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)
MTBF:	98 551 Hours at 45 °C

Application example



Connection cables

Ordering information

CPCI-7500

4-port serial interface, RS232, RS422, RS485, 20 mA CL. Incl. technical description and software drivers.

MX modules: Please order separately!

MX232-G: RS232 mode optically isolated
MX232: RS232 mode
MX422-G: RS422 mode optically isolated
MX422-PEP: RS422 mode optically isolated, with RTS/CTS
MX422: RS422 mode
MX485-G: RS485 mode optically isolated
MX485: RS485 mode
MXTTY: 20 mA Current Loop (active, passive), optically isolated

Option:

URS-7500-6U: 6U bracket for mounting in 6U housing
Quarz: Up to 1 MBaud transfer rate

Connection cables:

ST075: Shielded round cable, 37-pin to 4 x 9-pin
ST074: Shielded round cable, 37-pin to 4 x 25-pin.

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Motion control for 4 servo or stepper motors

CPCI-8004

For 1 to 4 servo or stepper motors

Onboard 64-bit RISC processor

Optical isolation

16-bit analog output channels

24 digital inputs and 12 digital outputs, optically isolated

CompactPCI™ 32-bit

Also for PCI

See page 212

Windows
64/32-bit drivers

The board CPCI-8004 for the CompactPCI bus is used for the control of up to four servo or stepper motor axes through a PC. With this intelligent and flexible board, many control tasks from simple to complicated can be realised.
The board has four stepping/direction output channels (D/A channels, 16-bit). They are isolated from the digital current supply and are used for the control of commercially available power amplifiers connected as speed controlling devices or current regulators.
Incremental encoders, SSI encoders and EnDat encoders as well as end and reference switches can be connected to each axis channel.
Digital PID filters with forward compensation and optional Notch filters are also involved in the axis control.
The "open" controlling concept of the CPCI-8004 is intended in the first place for manufacturers of special-purpose machines and users which need a flexible integration as well as a CNC solution.

Features

Hardware/Properties

- Intelligent board based on a 64-bit RISC processor
- Positioning of up to 4 axes either with servo or stepper motors. Mixed operating of servo and stepper motors possible.
- Interface for all commercially available power amplifiers
- All input and output channels are optically isolated
- A multiple-axis system can be realised by inserting several CPCI-8004 in the same PC.

Software

- Linear, circular, helical, spline and CAD interpolation
- Point-to-point movement with independent control of each axis
- Function library for Pascal, C-Basic, Borland Delphi, Borland C++, Visual Basic, Visual C++
- Programming through a PC application software or stand-alone
- The operating program can be easily adapted to specific requirements using program modules supplied with the board
- User programs created with the compiler can be processed automatically
- Multitasking: the board can simultaneously process up to 4 user programs.

Applications

- Precision positioning
- CNC control
- Semi-conductor manufacturing
- Event counting
- Motion control
- Robots
- X-Y-Z position control
- Stepper motor control
- Machine monitoring
- Research and development

Software

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:

- Visual C++ • Microsoft C Lib. • Borland C Lib.
- Visual Basic • Delphi

On request:

Further operating systems, compilers and samples.

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

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Specifications

CPCI-8004

CPU system:	64-bit RISC processor 150 MHz
RAM:	16 MB
Data exchange with the PC:	Through CompactPCI bus
Controller software:	PIDF (PID filters with forward compensation)
Interpolation:	2D .. 4D linear, 2D circular, 3D circular, 4D helix, Interpolation with secondary axes.
Inputs for incremental encoders:	Diff. or TTL max. 2 MHz. Word length: 32-bit with sign
Inputs for SSI encoders:	Up to 32-bit, gray / binary code variable frequency 30 kHz to 1.5 MHz
Setpoint value outputs (servo):	1 per channel, D/A converter, 16-bit resolution, ± 10 V
Pulse outputs: (stepper motors)	1 stepper signal (RS422) and 1 directional signal (RS422) for each channel, pulse frequency up to 2 MHz
Isolated digital inputs:	24 inputs, 24 V, as end or reference switch or freely programmable
Isolated digital outputs:	12 channels, 24 V / 500 mA, for releasing the power amplifiers or freely programmable
Interrupts:	Through PCI BIOS
DMA:	Bus master
Auxiliary voltage:	24 V external for dig. I/O
Options:	Interbus or CAN-Bus

Safety

Optical isolation:	1000 V

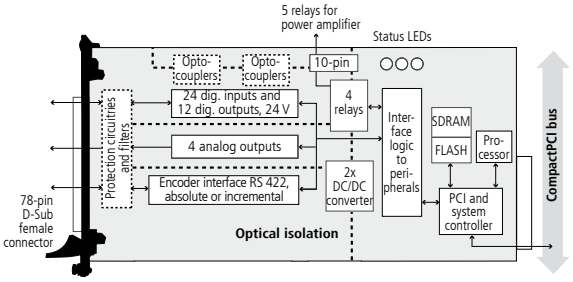
EMC – Electromagnetic compatibility

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.

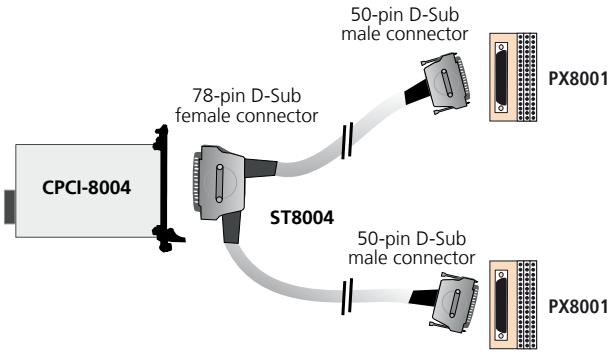
Physical and environmental conditions

Dimensions:	160 x 100 mm
System bus:	CompactPCI - universal
Space required:	1 Compact-PCI slot
Operating voltage:	+ 5 V and 3.3 V, ± 5 % from the PC
Front connector for CPCI-8004:	Axis 1, 2, 3, 4: 78-pin D-Sub female connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram



ADDI-DATA connection



Ordering information

CPCI-8004

Motion control board for 4 servo or stepper motors. Incl. technical description and software drivers.

Accessories

PX8001: 3-row screw terminal panel, 50-pin, for DIN-rail mounting
ST8004: Shielded round cable, 2 m, 78-pin female connector to 2 x 50-pin male connector

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Screw terminal panels, Relay output boards, connection cables

How important are cables and terminal panels?

When the PC runs important controlling and regulating tasks in a processing system, then data transfer must be reliable in order to ensure the reliability of the whole system. This is why ADDI-DATA cables and terminal panels have the same high safety and EMC standards as the PC boards and MSX-E systems.

Robust industry-standard D-Sub connector

Protection against electromagnetic fields

High noise immunity

What makes the difference between cables?

The connection cable as a mechanical device is not submitted to the EMC specifications, though it can affect the emission immunity of the devices to which it is connected.
The use of cables with industry-standard D-Sub connectors has many advantages:

- Robustness
- Protection against EM fields
- Earthing on both connector ends
- High noise immunity

Application

Suitable for use as control or signal cables in noisy environment, for indoor or outdoor applications. The tight braid reduces the emissions.
The copper braid is used as "ground". Twisted pairs provide protection against crosstalk and external interference. The cables are suited for dry or damp environments.

Indispensable terminal panels

Terminal panels are essential in most industrial applications. They dispatch to the sensors, tracers or control modules the numerous signals which are to be processed.

Prevent connection errors

- The terminal panels are pin-compatible with the PC boards
- The terminal panels lead the control signals in increasing order from the PC to the screw terminal which also corresponds to the bit set in the board

Helpful LEDs

- Indicate the status of each digital signal

Integrated 24 V supply

- Separate 24 V supply terminal for the easy connection of digital 24 V PC boards
- Varistors and diodes for overvoltage protection are connected to the screw terminals to prevent emissions from the external supply voltage.

High noise immunity

- The connection between housing and shield through the ground connection terminal creates an earthing on both sides

	PX901	PX9000	PX8001	PX8500	PX_BNC
Description	Panel for connecting up to 32 signal lines	Panel for connecting up to 32 signal lines	Panel for connecting 50 signal lines	Relay output board with 8 relays, cascadable in 16, 24 and 32 relays	Connection of up to 8 diff. or 16 SE inputs through BNC connector, 8 outputs
Function indication with LEDs	**PX901-D**: yes	For 24 V and sensor supply		For relay and sensor supply	
Overvoltage protection of the 24 V supply voltage	Through varistors and transil diodes	Through varistors and transil diodes		Through varistors and transil diodes	
Available versions	**PX901-D**: For digital boards, with 32 LEDs for status indication of the data lines . **PX901-DG**: Same as PX901-D with housing **PX901-A**: For analog boards with transil diodes for the overvoltage protection of the analog I/O **PX901-AG**: Same as PX901-A with housing for DIN rail **PX901-ZG**: For digital I/O boards, analog boards APCI-3120/3001, APCIe-3121/3021/3521 and counter boards PA1700-2, with housing for DIN rail			**PX8500-G**: With housing for DIN rail **PX8500-Vt+G**: With varistors and housing for DIN rail	
Connection to	ADDI-DATA digital, analog or counter boards	All ADDI-DATA digital boards	APCI-1710, CPCI-1710 APCI-8008, CPCI-8004 APCI-2200, APCIe-2200 APCI-311x/301x,	ADDI-DATA digital boards with digital outputs	ADDI-DATA analog boards
Page	247	250	250	248	251

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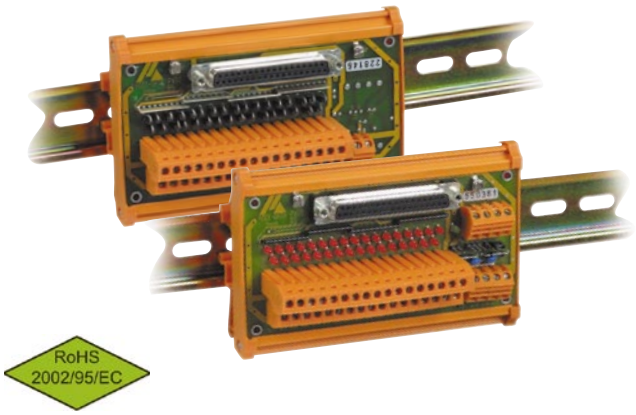
Screw terminal panel for DIN rail



PX901

32 terminals for signal lines

LED status indication for digital signals

Transil diodes for analog signals

DIN-rail mounting

Direct connection to ADDI-DATA boards

The screw terminal panel PX901-xx is used for the connection of maximum 32 signal or signal-reference lines.
ADDI-DATA boards can be connected through 37-pin D-Sub female connector with our standard cables of STxxx series.
The housing of the female connector is connected with two ground terminals so that the board is additionally earthed for more security. All components of the board are enclosed in an earthing strip also connected to the ground terminals.
Each terminal is directly connected to one pin of the 37-pin D-Sub female connector. Designations on terminals indicate respective connections for the 37-pin D-Sub female connector.

The PX901-D version is equipped with LEDs which are ideal for status display when working with ADDI-DATA digital 24 V I/O boards.
The PX901-A version is fitted with transil diodes for analog signals, but without LEDs.
An additional 4-pin terminal is available in order to be able to connect more than one 24 V operating voltage and ground line.
The 24 V or the ground terminal can be connected very easily through wire wrap to the 4-pin terminal.
The 24 V operating voltage lines are additionally protected against overvoltage through varistors and transil diodes.

Features

- Connection of up to 32 signal lines
- Separate ground connections
- Connection through screw terminals
- 2 rows of terminals
- Terminals can be labelled
- Additional 4-pin terminal for connecting the ground or the supply voltage
- With housing for mounting on a standard DIN rail
- All terminals intended for large conductor cross sections: up to 2.5 mm²

Safety features

- Overvoltage protection of the 24 V supply terminals through varistors and transil diodes

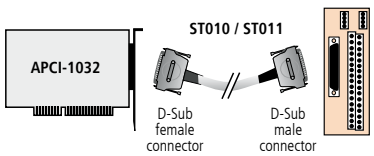
Applications

- Process control
- Industrial measuring
- Acquisition of sensor data
- Signal analysis

Specifications

Signal line terminals:	32 for the connection of peripherals
Additional terminals:	– 4 for feeding the external operating voltage (digital I/O) – 2 for the connection of ground lines
status indication:	32 LEDs for status indication, 1 LED for status display of the operating voltage (version D)
Safety features:	Varistors and transil diodes
Connector:	37-pin D-Sub female connector
Dimensions of the board:	(L x W x H) 130 x 70 x 35 mm
Dimensions with housing:	(L x W x H) 132 x 87 x 70 mm
Temperature range:	0-60 °C

Example:
Connection of a digital input board to the screw terminal panel PX901-DG



Ordering information

PX901
Screw terminal panel. Incl. technical description.

Versions

PX901-D: For digital boards, with status indication through LEDs and the Ethernet systems MSX-E312x and MSX-E3701-DIO
PX901-DG: Same as PX901-D, with housing for mounting on DIN rail
PX901-A: For analog boards, with transil diodes
PX901-AG: Same as PX901-A, with housing for mounting on DIN rail

PX901-ZG: - For the counter boards PA 1700-2 and APCIe-1711 (function Sin/Cos)
- for connection to digital I/O
- for connecting digital I/O to analog PC boards
- for the relay boards (digital inputs) APCIe-2200 and APCI-2200

With housing for DIN-rail mounting

Accessories **please order separately!**

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m

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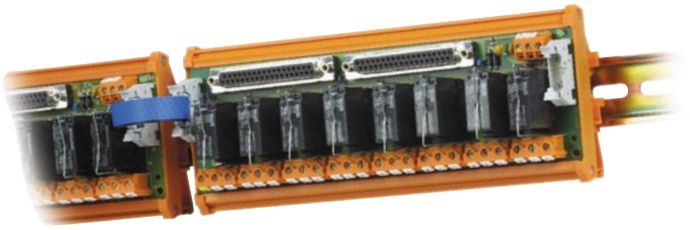
8-port relay output board



PX8500

For the connection of digital output boards

Cascadable in 16/24/32 relays

8 relays on socket

DIN-rail mounting

30 VDC / 277 VAC

300 W / 2500 VA

10 A

RoHS 2002/95/EC

The PX8500 is an external 8-channel relay board for the connection of digital output boards. It can be cascaded in 16, 24 and 32 relays and is intended for mounting on DIN supporting rails. The board provides a convenient interface between an industrial process and the D-Sub connectors on ADDI-DATA boards.
The change-over contacts of the relay are controlled through 24 V signals. The 24 V voltage supply is protected through varistors and transil diodes.
The board is intended for the use with 220 V supply. The creeping distance (acc. to DIN VDE0110) and the connector cross sections allows high-power switching (up to 2,500 VA). The board has a female D-Sub connector for connecting an ADDI-DATA digital 24 V output board through a standard I/O cable ST010. The red LEDs display the state of the relays (open/closed). A green LED displays the ON/OFF of the operating voltage.
The 37-pin cable shielded can be grounded on both sides for the protection against high-frequency EMI

Features

- Relay output board with 8 relays, cascadable in 16, 24 and 32 relays
- Max. switching voltage: 30 VDC / 277 VAC
- Max. switching current: 10 A
- All terminals intended for large conductor cross sections up to 2.5 mm²
- Operating voltage display through green LED
- Relay state display through red LED
- Relays mounted on sockets
- High switching capacity
- Long-lasting life

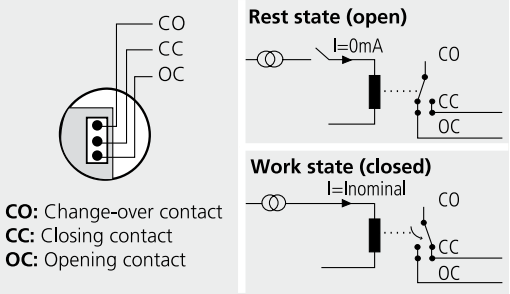
Safety features

- Overvoltage protection of the 24 V supply voltage through varistors and transil diodes
- Contact protection of the relays through varistors (option Vt)
- 4 mm creeping distance between change-over, closer and opening contact
- 6 mm creeping distance between change-over contact and closer of adjoining relay
- Free-wheeling diode in the coil circuit
- With housing for mounting on a standard DIN rail, (option G)
- Operating safety tested according to the low-voltage directive: 73/23/EEC

Applications

- Industrial digital I/O control
- Automatic test equipment
- External high power relay control
- Alarm monitoring
- Test automation
- Alarm monitoring
- Digital monitoring
- ON/OFF monitoring of motors, lights ...
- ...

Function principle of the relays



CO: Change-over contact
CC: Closing contact
OC: Opening contact

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Specifications

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.

Contact side

Type of contacts:	8 change-over
Max. switching voltage:	30 VDC / 277 VAC
Max. switching capacity:	300 W / 2500 VA
Max. switching current:	10 A
Contact resistance:	<100 mΩ
Response time:	15 ms
Release time:	5 ms
Mechanical life:	5.000.000 operations
Life at max. switching capacity:	100.000 operations

Control side

Switching behaviour:	Monostable
Operating voltage:	24 VAC
Operating efficiency:	533 mW
Switch. frequency at max. load:	20 switchings/minute
Threshold voltage at +20 °C:	16.8 V
Release voltage at +20 °C:	2.4 V

Physical and environmental conditions

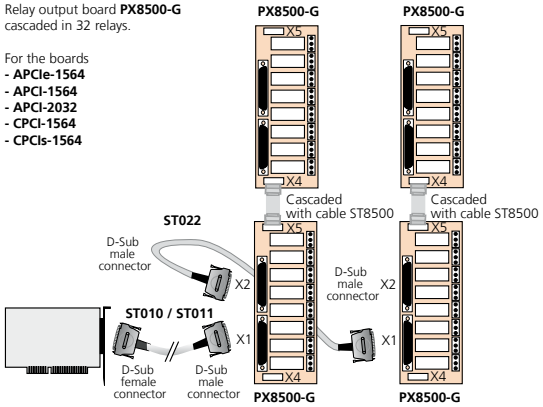
Operating voltage:	+ 24 V
Current consumption:	210 mA typ.
Dimensions (L x W x H):	with housing 212 x 87 x 72 mm
Connector:	2 x 37-pin D-Sub female connector
X1:	For the connection to the PC
X2:	For cascading the PX8500 in max. 32 relays, for example the digital output board APCI-2032. In this case the digital output signal 1 corresponds to the 24 V control signal of the relays 1, output 2 to relays 2, etc.
Temperature range:	0-60 °C
Humidity:	30-95 %

Standard round cable **ST010**

PX8500 cascaded in 32 relays

Relay output board **PX8500-G** cascaded in 32 relays.

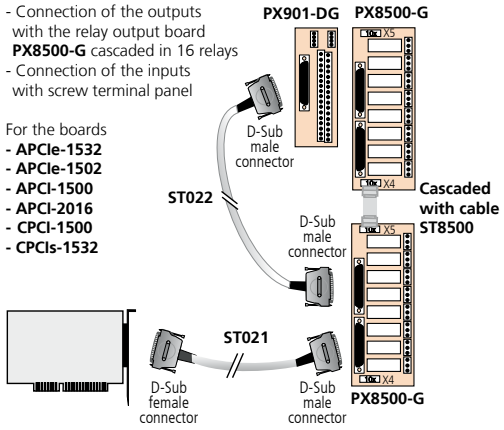
For the boards
- **APCIe-1564**
- **APCI-1564**
- **APCI-2032**
- **CPCI-1564**
- **CPCIs-1564**



PX8500 cascaded in 16 relays

- Connection of the outputs with the relay output board **PX8500-G** cascaded in 16 relays
- Connection of the inputs with screw terminal panel

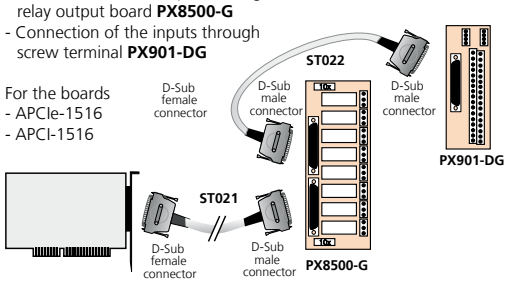
For the boards
- **APCIe-1532**
- **APCIe-1502**
- **APCI-1500**
- **APCI-2016**
- **CPCI-1500**
- **CPCIs-1532**



Connection example for the digital I/O board APCI-1516

- Connection of the outputs through relay output board **PX8500-G**
- Connection of the inputs through screw terminal **PX901-DG**

For the boards
- APCIe-1516
- APCI-1516



Ordering information

PX8500

8-port relay output board. Incl. technical description.

PX8500-G:	With housing for mounting on DIN rail
PX8500-VtG:	PX8500 with varistors and housing for mounting on DIN rail

Accessories

ST8500:	Ribbon cable for cascading the board in 16, 24 or 32 relays
ST021:	Standard round cable, shielded, for connecting to APCI-1500 or APCI-1516
ST022:	Standard round cable, shielded, for cascading two PX8500
ST010:	Standard round cable, shielded, twisted pairs, 2 m, for connecting to APCI-2032, APCI-1564
ST011:	Same as ST010, 5 m

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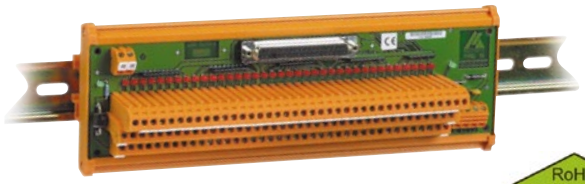
Screw terminal panels for DIN rail



RoHS 2002/95/EC

PX9000

3-row screw terminal panel

LED status indication

DIN rail mounting

For digital or analog boards

The screw terminal panel PX9000 is intended for the connection of maximum 32 signal lines and the voltage supply for the external sensors/actuators. All components of the board are enclosed in an earthing strip which is also connected to the ground terminals.
On the 3x39-pin terminal block, all 37 contacts of the 37-pin female connector are assigned a contact on a row of terminals. Each signal line (terminal 1-32) is assigned a status LED.
Both other rows of terminals are intended for connecting the voltage supply for the sensors/actuators. These rows are protected against unintentional voltage reversal through a diode. A LED indicates when a voltage is applied.
These rows of terminals are equipped with 2 additional terminals, one on the right and one on the left side, for the easy connection of the voltage supply to a further terminal panel.
4 further screw terminals are at disposal for the supply voltage of ADDI-DATA digital I/O boards: two for the connection of the 24 V operating voltage and two for the operating ground.
Both terminals for the operating voltage 24V are in addition protected against overvoltages through varistors and transorb diodes.

Features

- 3 rows of terminals, terminals can be labelled
- LED indicator status
- Additional 4-pin terminal for the direct connection of the ground and the 24 V supply voltage to ADDI-DATA boards
- With housing for DIN-rail mounting
- All terminals intended for large conductor cross sections: up to 2.5 mm²
- 2 x 39 screw terminals to the distribution of the voltage supply e.g. on sensors and for cascading several PX9000

Specifications

Signal line terminals:	32 for the connection of peripherals
Supply voltage terminals:	2 rows of 39 terminals
Additional terminals:	– 4 terminals for the external voltage power supply (digital I/O) – 2 for connecting the ground lines
Status indication:	37 LEDs for status indication, LEDs for operating and supply voltage
Safety features:	Varistors and transil diodes, ground lines
Connector:	37-pin D-Sub female connector
Dimensions of the board:	(L x W x H) 244 x 68 x 35 mm
Dimensions with housing:	(L x W x H) 248 x 87 x 78 mm
Temperature range:	0-60 °C

RoHS 2002/95/EC

PX8001

3-row screw terminal panel, 50-pin, for DIN rail

Connection of 50 signal lines

With numbered screw terminals)

Features

- Screw terminal panel for 50 signal line terminals
- Ground connection of the connector is lead directly to the connecting terminal
- With 50-pin female connector
- For free mounting

Specifications

Cross conductor section up to:	4 mm²	0.2 – 2.5 mm² (flexible)
Input/output test voltage:	2.5 kV, 50 Hz, 60 s	
Operating temperature:	-20 °C to +50 °C	
Dimensions in mm (L x W x H):	69 x 98 x 62	
Current/Voltage:	2 A / 125 V	

Ordering information

PX9000
3-row screw terminal panel, 37-pin, with housing for DIN-rail mounting. Incl. technical description.

PX8001
3-row screw terminal panel, 50-pin, with housing for DIN-rail mounting. Incl. technical description.

Accessory
please order separately!

ST010:	Shielded round cable, twisted pairs, 2 m, 37-pin
ST011:	Shielded round cable, twisted pairs, 5 m, 37-pin
ST370-16:	Shielded round cable, twisted pairs, 2 m, 50-pin
ST8001:	Cable for connecting the APCI-8001 and APCI-8008 to the screw terminal panel PX8001

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BNC connection box for DIN rail

PX_BNC

BNC connection box

For analog I/O boards

DIN-rail mounting

Features

The connection box PX_BNC allows the direct connection of analog voltage and current signals through BNC connectors. Many ADDI-DATA analog boards can be connected (see table on the right). With the PX-BNC, you can connect up to 8 differential or 16 single-ended analog inputs as well as 8 analog output channels through BNC connectors.

Housing

The compact housing consists of black painted aluminium, profile IP65 with good impact resistance.

Accessories

The standard delivery contains 2 clamps for DIN rail mounting.

Connection to the board

The connection to the board is made through the 37-pin D-Sub female connector, the pin assignment depends on the type of board connected.
The connection between PX_BNC and the ADDI-DATA analog board is made through the standard round cable ST010 (shielded cable, 2 m).
Please order the cable separately.

16 BNC connectors for analog inputs

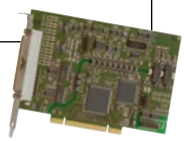
The connection box has 16 BNC connectors In 0 to In 15 for the connection of the analog input channels (Channel 0-15) of many ADDI-DATA input and multifunction boards (see table on the right).
The BNC ground is connected to the ground of the analog signals.
The connection of the differential channels (DIFF) is only possible through a special BNC cable.

8 BNC connectors for analog outputs

The connection box has 8 BNC connectors Out 0 to Out 7 for the connection of the analog output channels (channel 0-7) of many ADDI-DATA multifunction and output boards (see table on the right).
The BNC ground is connected to the ground of the respective analog output channel.

The PX-BNC can be connected to the following ADDI-DATA analog boards:

Analog input boards	Multifunction boards	Analog output board
APCI-3001 / CPCI-3001 APCI-3010 / APCI-3016 APCIe-3021	APCI-3110 / APCI-3116 APCI-3120 / CPCI-3120 APCIe-3121 / APCIe-3123 CPCIs-3121	APCI-3501 APCIe-3521



Specifications

BNC connector:	For the connection of peripherals
BNC connector:	In 0-15 for analog inputs Out 0-7 for analog outputs
D-Sub connector	37-pin D-Sub female connector
Dimensions:	(L x W x H) 210 x 105 x 50 mm
Weight:	727 g
Temperature range:	0-60 °C

Ordering information

PX_BNC

BNC connection box for DIN rail. Incl. technical description.

Accessories

Please order separately!

ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Same as ST010, 5 m
Other cable version on request

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Shielded cables for industrial applications

CABLES

RoHS 2002/95/EC

- Dedicated cables
- Special versions on request
- Standard cables for industrial applications
- More safety for your application

What makes the difference between cables?

The connection cable as a mechanical device is not submitted to the EMC specifications, though it can affect the emission immunity of the devices to which it is connected.
The use of cables with industrial standards has many advantages:

- Protection against EM fields: The shield of the cable is connected to the metallised hood of the D-sub connector. The connection between housing and shield creates an earthing on both sides.
- High noise immunity: More protection through adapted pin assignment of the cables. The way the cable leads are twisted in pairs corresponds to the pin assignment of the boards.

Industry-standard D-sub connectors versus SCSI-connector

D-sub connectors fit the high requirements of industrial measurement and control. They are robust and have a high noise immunity.
This is why we equip all our boards with D-sub connectors.

Application

Suitable for use as control or signal cables in noisy environment, for indoor or outdoor applications. The tight braid reduces the emissions. The copper braid is used as "ground". Twisted pairs provide protection against crosstalk and external interference. The cables are suited for dry or damp environments.

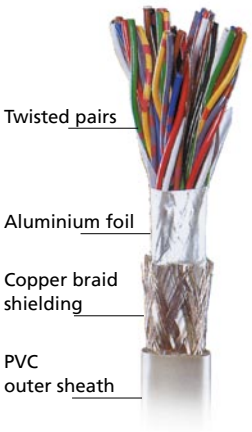
Design of the cables

- Plain copper conductor, fine-strand according to IEC 60228
- Special PVC conductor insulation
- Twisted-pair conductors
- Core identification according to DIN 47100
- Conductors laid up in layers
- Aluminium foil
- Tinned copper braid shielding
- Covering grade approx. 85%
- Special outer sheath, grey PVC
- Oil and petrol resistant according to VDE 0250 and 04772
- Self-extinguishing (SE) and flame-retardant, according to IEC 60332-1

Special versions on request

- Other lengths
- Open cable end, on one or on both ends
- Bent connectors on one or on both ends

Specifications of the cables (STxxxx type)



Specifications:	Special PVC data line for electronic control tasks according to VDE 0812 and 0814
Temperature range:	-30 °C to +80 °C laid permanently
Operating voltage:	Max. 350 V
Test voltage:	1200 V (0.14 mm²)
Insulation resistance:	± 20 MΩ / km
Inductance:	Approx. 0.65 mH / km
Impedance:	Approx. 78 Ω
Capacitive coupling:	Approx. 300 pF/100m
Connector cross section:	0.14 mm² (ST010-S and ST011-S with a connector cross section of 0.25 mm²)
Attenuation factor:	> 40 dB between 300 and 900 MHz
Construction:	The cable screen is screwed with low impedance over the strain relief on both sides of the housing hood with locking screws, the connections are crimped.
Minimum bending radius:	Laid flexibly 15 x cable diameter Laid permanently 6 x cable diameter

Ribbon cables

Cable designation	Description
FB MSX-DIG-IO	For the MSX-Box option MSX-DIG-IO, 9-pin ribbon cable with D-Sub male connector.
FB-INTERBUS	For the APCI-8008, for connecting the Interbus. Ribbon cable, 9-pin D-Sub female connector with bracket.
FB-PROFIBUS	For the MSX Box, for connecting the Profibus. Ribbon cable, 9-pin D-Sub female connector with bracket.
FB104-1500	For the digital I/O port of the PC104-PLUS1500. Ribbon cable, 37-pin D-Sub male connector.
FB3000	Ribbon cable for the digital I/O port, 37-pin D-Sub male connector with bracket.
FB3001	Ribbon cable for the digital I/O port of the CompactPCI boards. 37-pin D-Sub male connector with 3U bracket.
FB3003	Ribbon cable for the digital I/O port, 37-pin D-Sub male connector with bracket.
FB3600-AC	For the analog and counter functions of the APCI-3600. Ribbon cable, 2x15-pin D-Sub male connector with bracket.
FB3600-D	For the digital I/O port of the APCI-3600. Ribbon cable, 37-pin D-Sub male connector with bracket.
FB3702	For the digital I/O port of the APCI-3701 and APCI-3702. Ribbon cable, 37-pin D-Sub male connector with bracket
FB8001/FB8008	For APCI-800x, APCI-30xx and APCI-31xx. Ribbon cable, 50-pin D-Sub male connector with bracket.
FB-CAN	For APCI-800x, between OPMF and 9-pin D-Sub male connector with bracket for external CAN connection.

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Shielded standard cables with metallised hoods

Cable designation	Description	Twisted pairs	Shielded round cable	Length
Round cable, 1 to 20 m, 2 x 37-pin D-Sub connector				
ST010_1	Female connector / male connector	✓	✓	1 m
ST010	Female connector / male connector	✓	✓	2 m
ST010_3	Female connector / male connector	✓	✓	3 m
ST011	Female connector / male connector	✓	✓	5 m
ST011_10	Female connector / male connector	✓	✓	10 m
ST011_15	Female connector / male connector	✓	✓	15 m
ST011_20	Female connector / male connector	✓	✓	20 m
Round cable with one 90° bent female connector, 2 x 37-pin D-Sub connector				
ST010_1_ABGW	90° bent female connector / male connector	✓	✓	1 m
ST010_ABGW	90° bent female connector / male connector	✓	✓	2 m
ST010_3_ABGW	90° bent female connector / male connector	✓	✓	3 m
ST011_ABGW	90° bent female connector / male connectorr	✓	✓	5 m
Round cable with two 90° bent connectors, 2 x 37-pin D-Sub connectors				
ST010_1_2XABGW	Female connector / male connector	✓	✓	1 m
ST010_2XABGW	Female connector / male connector	✓	✓	2 m
Round cable, 2 m and 5 m, or high currents (for 24 V digital outputs), 2 x 37-pin D-Sub connector				
ST010_S	Female connector / male connector, with separate connection for 24 V voltage supply	✓	✓	2 m
ST011_S	Female connector / male connector, with separate connection for 24 V voltage supply	✓	✓	5 m
Round cable with one open end, 1 x 37-pin D-Sub connector				
ST010_1_O	Female connector / other side open and bared, incl. colour table according to DIN 47100	✓	✓	1 m
ST010_O	Female connector / other side open and bared, incl. colour table according to DIN 47100	✓	✓	2 m
ST010_3_O	Female connector / other side open and bared, incl. colour table according to DIN 47100	✓	✓	3 m
ST011_O	Female connector / other side open and bared, incl. colour table according to DIN 47100	✓	✓	5 m
Round cable between digital I/O boards and relay output board PX8500, 2 x 37-pin D-Sub connectors				
ST021	Between digital I/O boards (APCI-1500/-1516/-1532/-2016, CPCI-1500) and PX8500 female connector / male connector	✓	✓	2 m
ST022	Between two PX8500 or PX90x male connector / male connector	✓	✓	2 m
ST8500	Ribbon cable between two PX8500-x			5 cm
Miscellaneous cables				
ST1711-50	Connection cable for the APCIe-1711, for connecting the PX8001, 78-pin D-Sub male connector / 50-pin D-Sub male connector Enables the compatibility with the APCI-1710	✓	✓	2 m
ST3003-A	Connection cable for the APCI-3003, for the analog input signals, 15-pin male connector / 37-pin male connector	✓	✓	2 m
ST3003-D	Cable for the APCI-3003, for the digital signals,15-pin male connector / 37-pin male connector	✓	✓	2 m
ST3200	50-pin female connector / 50-pin male connector	✓	✓	2 m
ST3601	Coaxial cable for the APCI-3600			2 m
Round cables, 2 x 50-pin D-Sub connector				
ST370-16_1	Female connector / male connector	✓	✓	1 m
ST370-16	Female connector / male connector	✓	✓	2 m
ST370-16_5	Female connector / male connector	✓	✓	5 m
ST370-16_1_ABGW	90° bent female connector / male connector	✓	✓	1 m
ST370-16_ABGW	Female connector / 90° bent male connector	✓	✓	2 m
ST370-16_5_ABGW	90° bent female connector / male connector	✓	✓	5 m
ST3701	Round cable for the APCI-3701 female connector / male connector	✓	✓	2 m
Round cables for the APCI-8001 and CPCI-8004, 2 x 50-pin D-Sub connector				
ST8001	Female connector / male connector	✓	✓	2 m
ST8001_5	Female connector / male connector	✓	✓	5 m
Round cables for the connection of serial interfaces				
ST074	4-port serial interfaces, 37-pin D-Sub female connector / 4 x 25-pin D-Sub male connector		✓	35 cm
ST075	4-port serial Interfaces, 37-pin D-Sub female connector / 4 x 9-pin D-Sub male connector		✓	35 cm
ST075_ABGW	4-port serial interfaces, 37-pin D-Sub female connector / 4 x 9-pin D-Sub male connector 90° bent female connector		✓	35 cm
ST7809	8-port serial interfaces, 78-pin male connector / 8 x 9-pin D-Sub male connector		✓	35 cm
ST7825	8-port serial interfaces, 78-pin D-Sub male connector / 8 x 25-pin D-Sub male connector		✓	35 cm

RoHS 2002/95/EC

Bent connector

ST01x-S
for high currents

Open
cable end

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