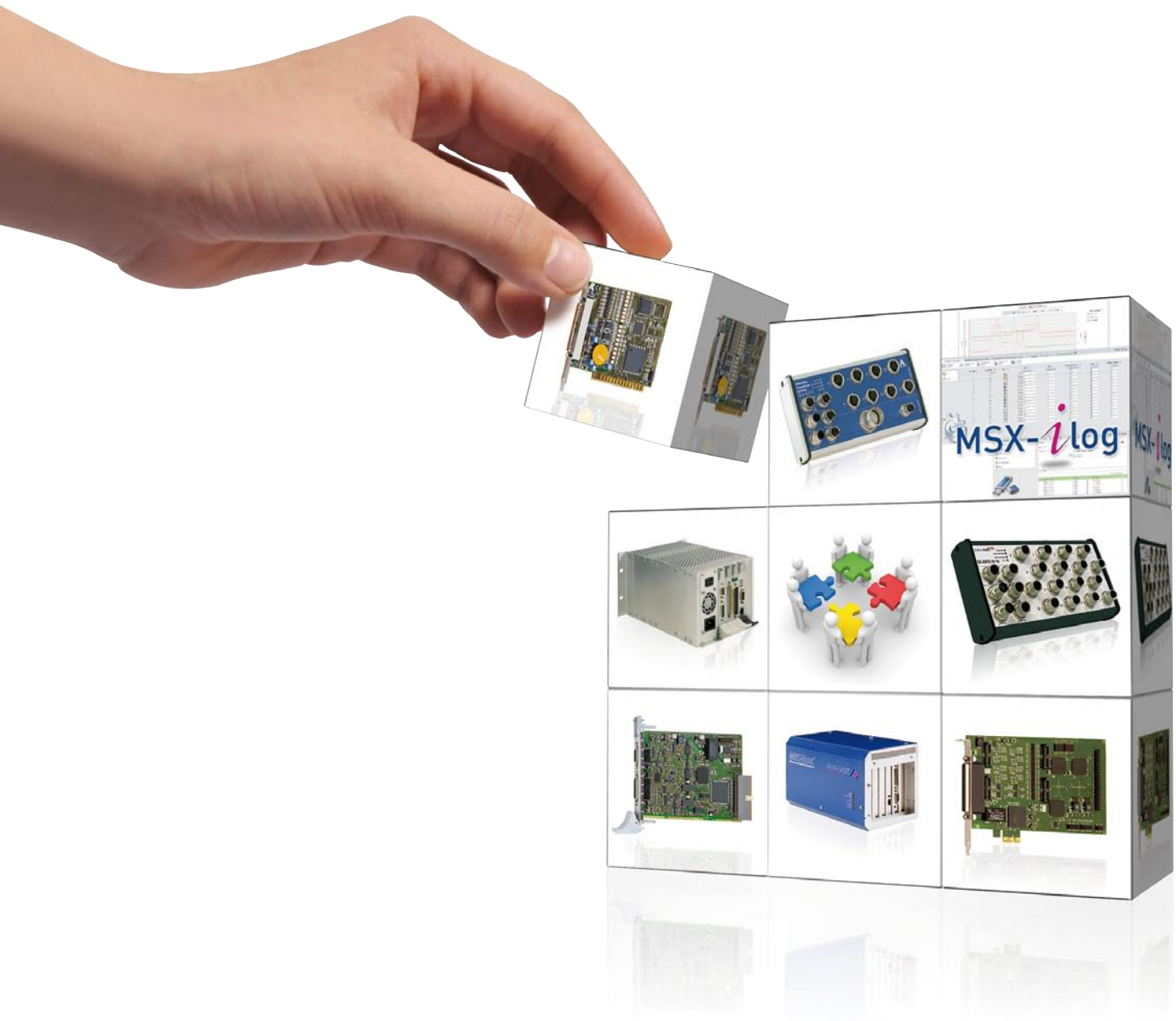
CATALOG 2012

Solutions for industrial Measurement and Automation



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Mechatrology®

A new word in the foreword

Behind this neologism

lies a fund of experience and know-how in the field of industrial measuring equipment. We are known in the industry for our high-precision measurement boards and measuring systems, because they are specifically designed for use in harsh industrial environments. Our solutions enable you to make your day-to-day processes more efficient and conserve resources in the longer term. The expectations people place in measuring equipment to deliver precise measurements at all times despite interference are very high. With tried and tested technology and compliance with standards, we keep our word: Mechatrology – the incorporation of high-precision measuring equipment into the manufacturing process itself. Have I roused your curiosity? Then I invite you to take a look at the thrilling world of Mechatrology on page 11.

Best regards,

René Ohlmann
Managing Director, ADDI-DATA GmbH

CATALOG

Solutions for
industrial Measurement and Automation

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PC/104-PLUS

ISA

CompactPCI

New Products

Product development 2012

Fast distributed acquisition, IP 67: MSX-E3027

The intelligent Ethernet system MSX-E3027 features 16 differential analog inputs, 16-bit, with a throughput of 25 kHz/channel (resp. 100 kHz / channel if 4 channels are used). The IP 67 stainless steel housing allows a temporary immersion of the system and protects it against dust. In addition to a buffered real-time clock that keeps the system time even at power loss the system contains an extended memory of 4 GB for the measured values. It is therefore ideal for long-term measurement. It has voltage and current inputs for connecting sensors.

See MSX-E3027 page 50

Length measurement, IP 65: MSX-E3701 with 24 V digital I/O

The range of intelligent Ethernet length measurement systems MSX-E37xx has been extended with digital I/O. in addition to the inputs for inductive transducers (HB/LVDT/Mahr/Knaebel), the MSX-E3701-DIO system now features additional 16 digital inputs and outputs, for example for status reports or for connecting a PLC. The digital I/O are available for all versions of the MSX-E3701 system: Half-Bridge, LVDT, Knaebel and Mahr.

See MSX-E3701 page 70

Fast distributed signal acquisition and signal output, IP 65: MSX-E3121

The intelligent Ethernet system MSX-E3121 combines analog and digital I/O: 6 differential analog inputs (16 bit, 100kHz/channel) and 4 analog outputs (16-bit) as well as 16 digital inputs and 16 digital outputs, 24 V (for example for status reports or connection to a PLC).

See MSX-E3121 page 52

MSX-ilog-AI-DIO

The new industrial Ethernet data logger MSX-ilog-AI16-DIO40 comes with 16 differential analog inputs, 16-bit, with a sampling frequency of 200 kHz as well as 36 digital inputs, 24 V. 4 additional digital outputs, 24 V, allow the connection of actuators or the transfer of signals. The setting of parameters and the visualisation of the measured values are made through an integrated website. Thus it is not necessary to install additional software. The acquisition of the channels, the visualisation and the storing of the measured values run automatically.

See MSX-ilog-AI16-DIO40 page 24

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Simplified product administration with ConfigTools & MSX-E Quick App

ConfigTools is a new program that enables a consistent administration of the following products with one user interface: All MSX-E systems and the PCI-Express counter board APCIe-1711. With this software you can create back-ups, load images, update the firmware or visualise measured values. With the small program MSX-E QuickApp (2 MB) you can change the IP addresses of the MSX-E systems and update the firmware. Due to its small volume it can be easily sent by e-mail. Both programs run under Windows (32 and 64-bit) and Linux.

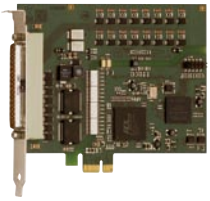
See ConfigTools page 76

New analog multifunction board for PCI-Express: APCIe-3123

The analog PCI-Express multifunction board APCIe-3123 is the successor product of the PCI board APCI-3120. It is interesting for users that use the PCI version via direct access or via the driver of the APCI-3120. At the moment, the APCIe-3123 is available without DMA.

See APCIe-3123 page 94

Digital I/O board PCI-Express with two counters: APCIe-1502

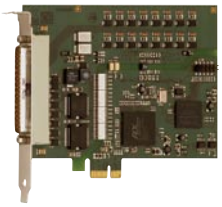


The APCIe-1502 has 32 digital inputs and outputs including two fast counter inputs (100 kHz). They work independently from each other and can be used for pulse counting or velocity measurement. 15 inputs are interruptible. The board is optically isolated up to 1000 V and offers various protective circuits for use in harsh environments. The field of application of the digital inputs lies in sectors where 12 V and 24 V levels are used, e.g. the IT sector, for security and alarm technologies, in the car electronics or in the mining sector.

See APCIe-1502 page 82

64 digital I/O board, 24 V, PCI-Express: APCIe-1564

16 of the 32 digital inputs of the digital I/O board APCIe-1564 are interruptible. The channels 0-2 can be used as 32-bit counter inputs. The 32 digital inputs have an output current of 500 mA per channel. With the watchdog function the outputs can be reset to „0“.



See APCIe-1564 page 86

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Digital I/O board, CompactPCI bus

The CompactPCI board CPCI-1564 has 64 digital inputs and outputs, 24 V. 16 of the 32 inputs are interruptible. The inputs are organised in 4 groups of 8 channels, each with a separated ground line. The 32 outputs have a current output of 500 mA per channel. With the watchdog function the outputs can be reset to „0“. A timer and 3 32-bit counters up to 500 kHz are available. The CPCI-1564 is protected against burst, overvoltage, ESD and high-frequency interferences. The board can be used in an extended temperature range from -40 to +85 °C.

See CPCI-1564 page 186

Intelligent motion control board: APCI-8008

The intelligent PCI board APCI-8008 is used for the control and regulation of axes of up to eight servo motors or stepper motors. The advantage of this board is the highly efficient combination of hardware and software. The APCI-8008 features a PCI bus master which enables a direct access to PC boards without using the CPU of the PC. It has amongst others a stand-alone motion control application with a compiler for programming. Using this, the user can adjust the speed and flexibility of the axes to his requirements. The APCI-8008 can process incremental encoders, SSI encoders and EnDat 2.2 encoders. The signal output can be effected either through the analog interfaces (+/-10V) or through EtherCAT. The control can be accessed to via PC (PCI bus) or Ethernet.

See APCI-8008 page 174

New real-time systems: PN-ARTS-DIO-16, EC-ARTS-AI-16

ADDI-DATA offers two new real-time systems: the digital input and output system PN-ARTS-DIO-16 for ProfiNET with 16 inputs and outputs, 24 V, and an analog input system for EtherCAT with 16 differential inputs, 16-bit. The main advantages of the second system are its highly precise inputs.

See x-ARTS from page 26

Fast and precise temperature measurement directly at the sensor, IP 65: MSX-E3211

The intelligent Ethernet system MSX-E3211 has 16 or 8 differential inputs for the connection of thermocouples or RTD (for example Pt100, Pt1000) and a 24-bit resolution. Data can be measured, processed and stored directly at the sensor. The system has an excellent drift rate and is tested according to the IEC 60068-2-6 and 60068-2-27 norm standards (vibrations and shock).

See MSX-E3211 page 58

Intelligent Ethernet system for force / pressure measurement, IP 65: MSX-E3311

The intelligent Ethernet-System MSX-E3311 has 8 or 16 differential inputs, 24-bit, for the connection of strain gauges. The system has an excellent drift rate and comes with an ARM®9 processor and 64 MB SDRAM. Additional functions: Automatic gain control (Autogain), LED status indication for fast error diagnostics.

See MSX-E3311 page 60

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Preview

Products in focus 2013

NEW IN 2013

Data loggers

MSX-ilog-CMS-8
Ethernet data logger for noise and vibration measurement

MSX-ilog-DMS-16/-8
Ethernet data logger for pressure / force

Real-time system, ProfiNet

PN-ARTS-AI-16
16 differential analog inputs, 16-bit

Analog multifunction board, PCI

APCI-3xxx
16 analog inputs, 8 analog outputs, 8 digital I/O

Sin/Cos inputs for the counter board, PCI Express

APCIe-1711
Up to 4 inputs for Sin/Cos generator and 1 digital input, 24 V

Real-time PAC systems MSX-Box

Function Precision Time Protocol
Time setting synchronization of several devices within a network

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Spirit of excellence

Your success is what drives us

For more than 25 years, ADDI-DATA has been a by-word for top-quality industrial measurement and automation systems. Our passion is to develop products that meet your expectations and to act as a reliable partner from the outset. Quality, adaptability, security of investment, reliability and a spirit of innovation are the ideas that drive us forward, so you can bring your projects to a successful conclusion.

Quality
The quality of our products is essential to the smooth running of your measurement and automation projects. That is why our products are designed and manufactured in Germany, and every one of them undergoes thorough functional testing before delivery. The idea of quality is also reflected in our internal processes, with continuous improvement integrated into our day-to-day operations. The drive for constant improvement is what inspires our slogan: 'Spirit of excellence'.

Adaptability
By doing our own development in-house, we can react faster and more flexibly to customer wishes and requirements. Whether the request is for a minor modification to a product or a customer-specific solution – even for small quantities – our fast and efficient processes ensure that it will be implemented on time.

Security of investment
Along with quality and reliability, our customers set great store by our philosophy of long-term availability, because the installations that you build often have to remain in use for many years. As part of our measurement and automation process, we take this responsibility seriously. That is why you should not be surprised to find ISA cards still in this catalogue.

Reliability
Reliability is the foundation of any successful partnership. It creates trust and brings people closer together. From this comes sustained open dialogue, which takes us to our desired goal. For our customers, we literally move mountains: project-based consulting, fast response times, on-site project meetings and commissioning and workshops are our bread and butter; and not

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only in Germany – our customer service covers the world. With a direct line to our engineers, our customers receive professional and expert advice and support.

Spirit of innovation
Innovation is the gift of creating something special out of tried and tested technologies, so you the user can deploy powerful solutions. You can find out more about the spirit of innovation at ADDI-DATA on pages 10 and 11.

In brief

ADDI-DATA GmbH is an expanding international company based near Baden-Baden in Germany.
The company has been developing high-tech solutions for industrial measurement and automation systems since 1984.

ADDI-DATA solutions can be found all over the world in many areas of industry: the automotive and metalworking sectors, mechanical engineering, special-purpose machinery, aerospace, chemicals, etc. The products are used for things like quality assurance, process control, signal routing, data capture, axis control and position acquisition.

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ADDI-DATA

Spirit of innovation

What is innovation?

It is often the small things that count. That is true of innovations too; because innovation does not necessarily mean revolution. Rather, it is about creating something special out of existing solutions. Evolution driven by the inventiveness of passionate people – that is what we understand by innovation at ADDI-DATA.

We define innovation as the gift of creating something special out of tried and tested technologies.

That is why you will find products in our catalogue that are based on technologies that have proved themselves in the industry: various types of PC boards, and distributed systems with standard interfaces like Ethernet, EtherCAT and ProfiNET. Nothing revolutionary, and yet ...

And yet the spirit of innovation is there in every one of our products, showing up again and again in details like the clever combination of technologies or the inconspicuous extra features that add up to something special.

Efficiency right down the line
It is often the small things that make a big difference: saving resources, safeguarding investments and optimising processes. Enhance the efficiency of your own installation with innovative technologies from ADDI-DATA.

The spirit of innovation
René Ohlmann: "Our customers go on using our products for years. That is why, when we enhance our products and expand our range, we are careful to take customer needs and wishes into account, especially when it comes to migration costs. The market knowledge that comes from close dialogue with our customers enables us to create a mix of requested technologies and our own up-to-the-minute recommendations, in order to increase the performance of our products."

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The world of mechatrology

Under laboratory conditions, spot-checks can be carried out with high-precision measuring instruments to test adherence to tolerances in manufactured parts. The aim of these measurements is to generate less waste. That is one purpose of metrology.

In order to optimise and speed up manufacturing processes, it makes increasing sense to integrate the testing procedures directly into the production process. The challenge lies in the precision: numerous environmental influences such as temperature, shock and dust, as well as process speed and operational behaviour, are factors that can adversely affect accuracy. This is where mechatronic aspects are needed if we are to guarantee precision with mechanical robustness, high-performance electronics and the necessary intelligence.

We call this combination of mechatronics and metrology MECHATROLOGY®. This term emphasises our expertise as electronics specialists in measurement systems when it comes to moving metrology tasks out of the lab and directly into the production process.

MECHATROLOGY® also comes into play outside the production process: wherever the environmental conditions are difficult, the accuracy of our systems is in demand: wind turbines, trains and bridges are just a few examples to show that our products are also suitable for use outdoors.

> *Mechatrology® is the incorporation of high-precision measuring equipment into the manufacturing process itself.*
>
> *René Ohlmann*

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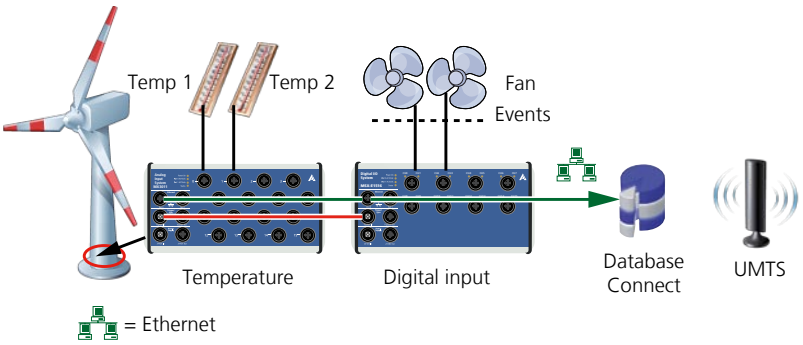
Applications

Practical examples

Energy

Long-term temperature measurement in wind power plants

Challenge:
A manufacturer of wind power plants is looking for the reason of repeated breakdowns of wind turbines. He assumes that the reason is an overheating of the PCs in the switch cabinet located inside the tower. One possible reason could be that the ventilation system is not activated at the right time. A data logger is to make a long-term measurement of the temperature and record when the ventilation system is switched on and off. The measurement system is to be portable because the long-term measurement is to be made in all towers of the plant. Furthermore, it must be resistant against harsh environment and interferences. To simplify data evaluation, the acquired data is to be imported from the system directly into Excel.



Solution:
With three cascadable intelligent MSX-E systems a measurement over weeks can be realised and logged. Therefore two MSX-E3211 are used for capturing the temperature and one MSX-E1516 for registering the switching on and off of the ventilation. For this application, the MSX-E systems are the ideal solution as they are compact and portable systems which can work in stand-alone mode and be easily transported from one tower to the next. The cascadable systems can be synchronised in the µs range and thus provide highly-precise measured values. To resist strains such as current peaks, vibrations, dirt or extreme temperatures from -40°C to +85°C the MSX-E systems are built in robust IP65-compliant metal housings. The software DatabaseConnect which is used with the application allows to import data directly into Excel without programming.

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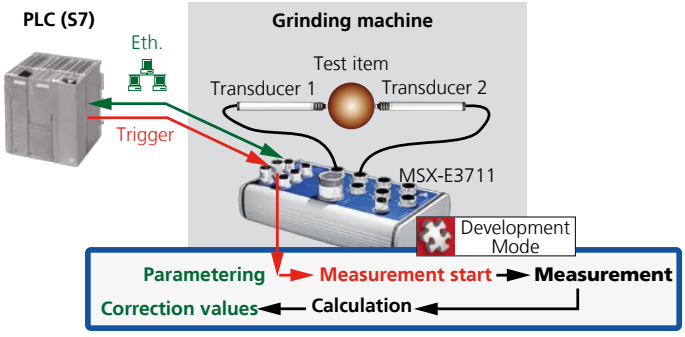
Machinery

Quality control of balls for ball-bearings

Challenge:
On a grinding machine balls for ball-bearings are ground. After the grinding process the balls are to be measured directly on site and evaluated. Possible correction values for the production process are to be transferred directly to the PLC which controls the grinding machine. For this purpose a very robust measurement technology is required as the measurement is effected on the production site. The application controls whether the dimensions of the balls lie within predefined parameters or not. If not, the PLC is to initiate the necessary corrections.

Solution:
For this task the robust MSX-E3701 system is used with a development mode application, in which two sensors acquire and measure the balls. The measured values are calculated and compared to the predefined parameters of the PLC. With this predefined values it is possible to check if the balls have the correct size or if it is necessary to regrind them. The result of the calculation and the measured values are transferred to the PLC which controls the grinding machine. The PLC can then readjust the grinding process. The capacity to calculate values onboard relieves the PLC, accelerates production cycles and achieves significant improvements in quality.



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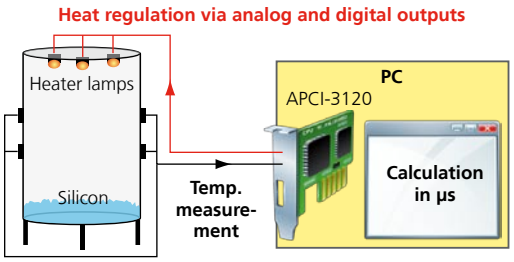
Machinery

Temperature regulation for the production of wafers

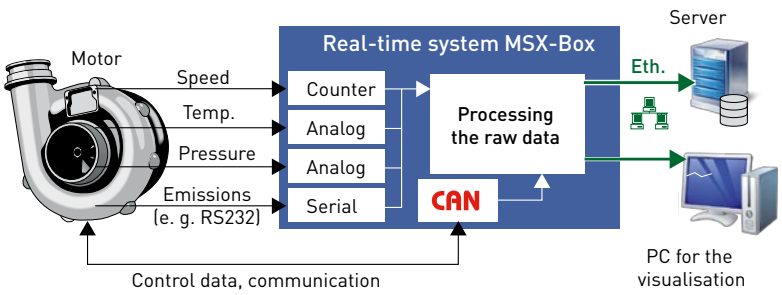


Challenge:
During the production process, a wafer has to go through several temperature stages, which must be regulated in order to avoid wasting the expensive material.
This involves much data and complex calculations, and therefore a PC-based solution is chosen. With an analog PC board the values of 32 pyrometers (0 to 10 V) are to be acquired with an acquisition cycle of 1 ms. For regulating the heater lamps, an algorithm is executed on the FPGA of the PC board. Analog and digital outputs are used for controlling and regulating the heater lamps.

Solution:
For the measurement and regulation of the temperature the analog I/O board APCI-3120 for the PCI-bus was chosen. It satisfies all requirements: speed, precision, FPGA technology and long-term availability. Due to its various protective circuits it is suitable for the use in an environment with interferences.

Automotive

Measurement of emission values, boost pressure and temperature for engine test benches



Challenge:
An automotive manufacturer wants to build test benches for engines to measure, among other data, the temperature inside the engines, the emission values and the boost pressure. The data is to be acquired simultaneously and the measured raw values to be calculated and stored in a self-consistent data set. The data is stored on a centralised server and the visualisation is effected via a central control station.

Solution:
For this task the MSX-Box, our real-time stand-alone system, was chosen as the engine test benches are located at different places of the factory and a high amount of raw data is gathered. At each test bench there are 4 MSX boxes with analog and digital inputs, connected to each other as well as to the main server through Ethernet.
The calculation is done onboard in order to discharge the central server and to take full advantage of the MSX-Box capacity. The CAN messages and the data from the serial interfaces are combined with the other measurement values (temperature, boost pressure, etc.) using an interrupt routine and provided with a time stamp.
On the centralised server, all the measurement data is collected. The data is visualised on a Netbook. Meanwhile, this manufacturer has build many of these test benches.

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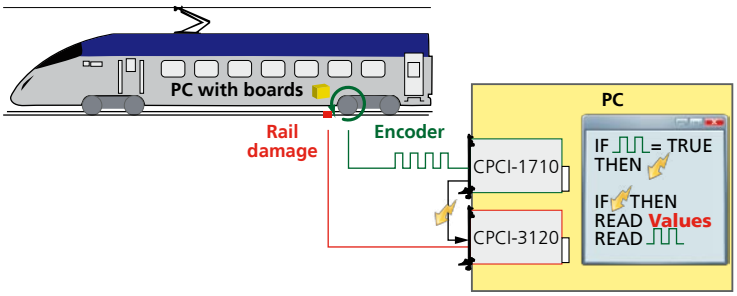
Transportation

Measurement of railway tracks in order to reduce the wear and to optimise the travelling speed

Challenge:
A railway company wants a system for the measurement of railway tracks (elevations, depressions etc.) and of the contact or force between pantograph and overhead traction line in order to reduce the wear and to optimise the travelling speed. The system is to be used in test trains as well as in standard trains and is to be installed inside the power car or in wagons. Railway standards (compatibility in order to avoid disturbing existing frequency uses) and EN50155 norm are to be complied with. Furthermore an extended temperature range is required (from -15°C to +70°C). The system should be a complete solution from one source



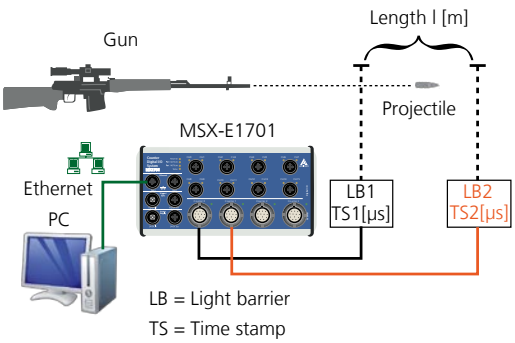
Solution:
For this application a PC with Windows is used with a CPCI-1710 and a CPCI-3120 board. The CPCI-1710 is connected to rotary encoders, which acquire data and trigger the acquisition of the analog board through an hardware signal. The analog values are acquired simultaneously to the counter values.

Defense

Muzzle velocity measurement

Challenge:
An arms manufacturer wants to modernise a shooting tunnel in order to measure the muzzle velocity of machine guns. During the test single shots and salvoes are fired off. The bullets pass 2 light barriers which measure their velocity. The time the bullet needs between the two light barriers is counted and the speed is calculated. The system has to be precise enough to be able to measure times from 500 µs to 10 ms.

Solution:
In order to measure the time that one bullet needs to get from the first light barrier to the second light barrier the intelligent multifunction counter system MSX-E1710 is used. Two counter inputs are used for the light barriers. The time is calculated using the difference between the time stamps of the two inputs. As the system is IP65 compliant, it is resistant against gun powder dust that arises in the shooting tunnel. A PC is not necessary because the system calculates and evaluates the acquired values in stand-alone mode.
The Ethernet connection allows the data transfer to a display screen in another room.



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Our "Applications" area gives you an insight into various aspects of measurement and control technology, with examples of how you can use our products to implement your projects.

You will also find detailed product information, the latest drivers, technical descriptions and data, and details of your contacts around the world.

Look under "FAQs" for initial assistance with your technical queries.

www.msx-box.com

Find out more about our MSX-Box real-time PAC system at www.msx-box.com.

You will find detailed example of applications, in-depth technical information and news about the system. These will help you to explore the diverse uses of the MSX-Box and – specially for our MSX-Box customers – to optimise your system.

Visit the website and give us your feedback on the entries – or put your questions to us directly.

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Product overview

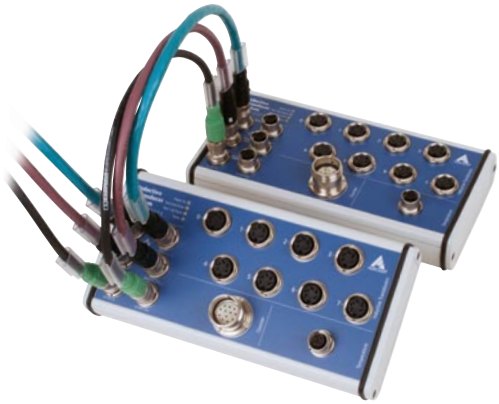
The distributed systems by ADDI-DATA have been developed especially for the harsh industrial environment and can be used directly in the field. They have high-precision inputs as an outstanding feature, save space and reduce the wiring significantly. All systems are available in the long term in order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

The market offers varied distributed solutions. 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 spare 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 spares 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 spare licence costs.

4. Real-time Ethernet systems

ADDI-DATA offers I/O slave systems for EtherCAT, ProfiNET and VARAN. They are characterised by highly precise inputs. While the bus is clocking time, they are able to measure more quickly and to buffer these values. 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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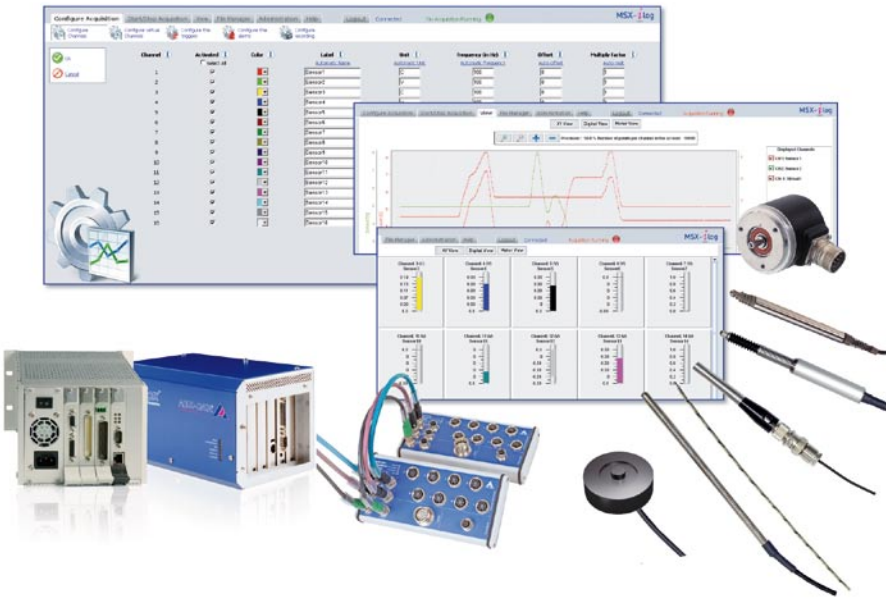
ETHERNET DATA LOGGERS

New!

*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 Channel Configuration

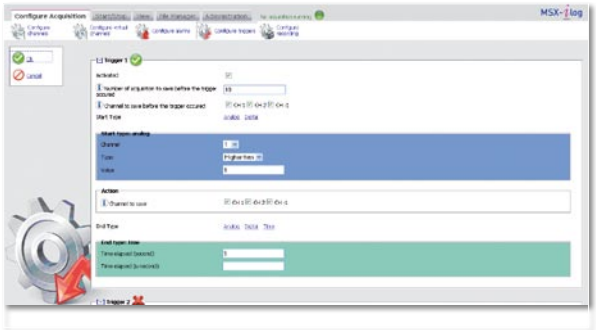
• Activate channel • Colour • Name • Unit • Frequency • Offset • Multiplication factor
• Polarity • Gain

Virtual Channel Configuration

• Activate virtual channel • Colour • Name • Unit • Operation • Frequency

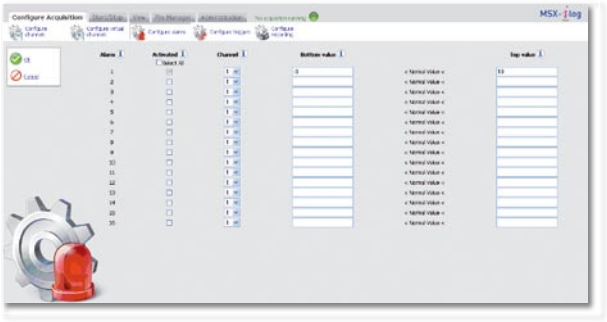
Trigger

• Activate trigger • Pre-trigger number • Pre-trigger channels
• Start/Stop type (software, digital, analog, manual, stop time)
• Action (execute script, start acquisition) • Unit • Operation • Frequency



Alarm

• Channel • Type • Value



Recording

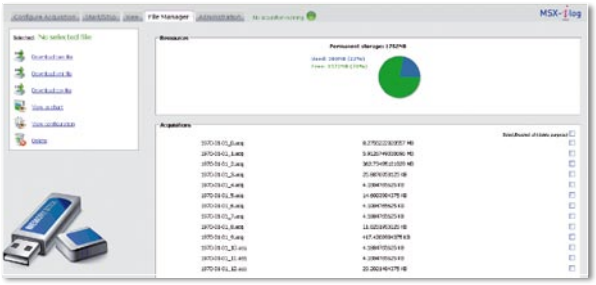
• Start/stop recording • View only • Record all the time • Trigger mode

Real-time view

• XY view • Digital view • Meter view

Exporting

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



Administration

• User administration • Acquisition parameters • System configuration / information • Logs

Bespoke solutions

In order to make the data recording as efficient as possible, it is important to adapt the measurement system as closely as possible 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
Tel.: +49 7229 1847-0 or send an e-mail to: info@addi-data.com.

Ethernet data logger
16 differential analog inputs, 16-bit

New!*

MSX-ilog

MSX-ilog-AI-16

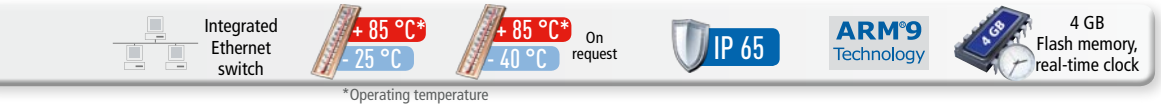
16 analog inputs, differential, 16-bit

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

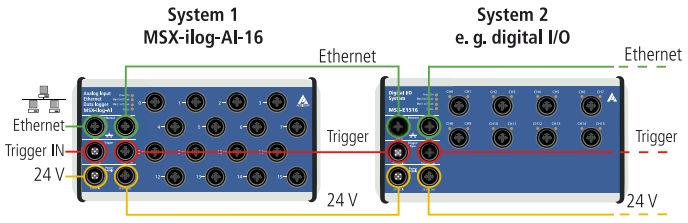
- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Trigger In/Out
- 24 V supply and cascading

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 (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.

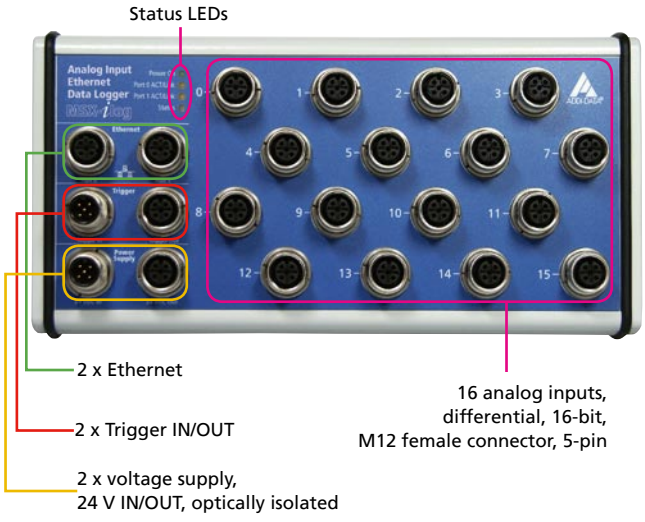
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions:	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 female 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

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

New!*

MSX-ilog-RTD / MSX-ilog-TC

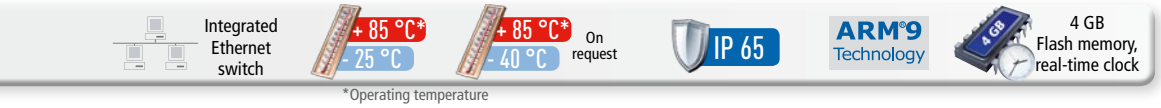
16/8 differential inputs

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

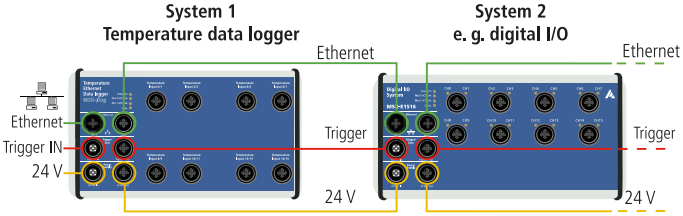
- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Trigger In/Out
- 24 V supply and cascading

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.

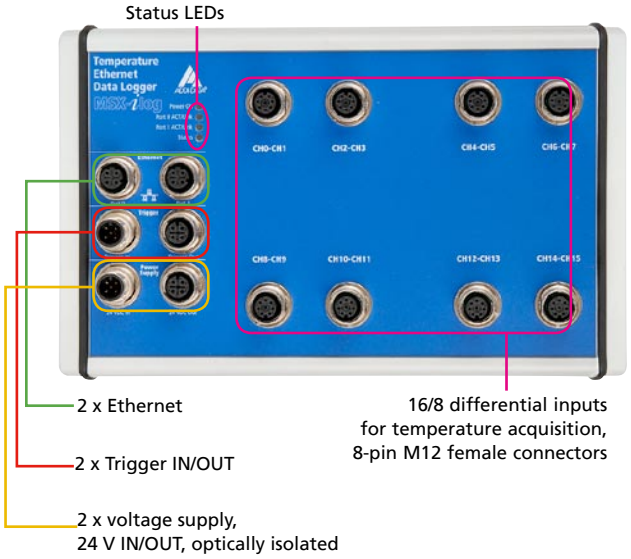
System features

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

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 optoisolated digital inputs, 24 V
- 4 optoisolated 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 optocoupler, 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 optocoupler, 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 progammable 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

New!*

EtherCAT® VARAN PROFINET®

YOUR BENEFITS

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

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.

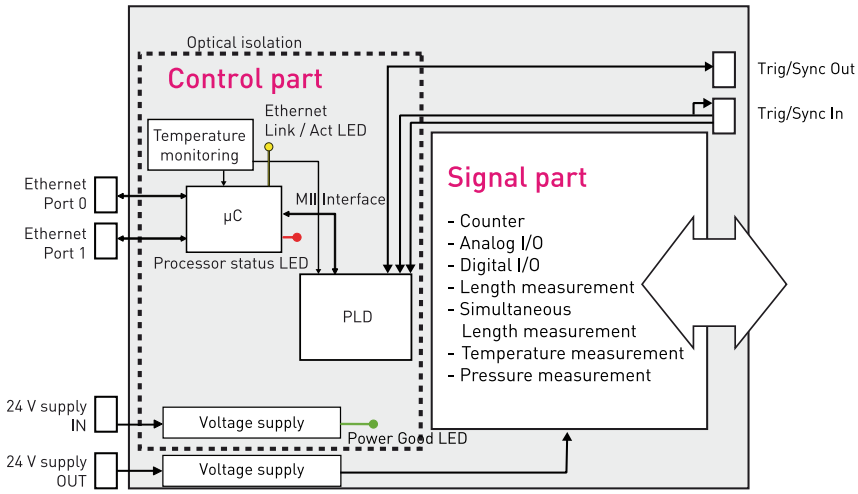
- Protective circuits such as optical isolation, etc.
- Robust metal housing
- IP 65 degree of protection
- Extended temperature range from -40 °C to +85 °C (oper. temperature)

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.

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. While the bus is clocking time, they are able to measure more quickly and to buffer these values. Moreover, the measurement can be started independent of the bus, since by the use of 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-AI-16: Analog inputs (16-bit),
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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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

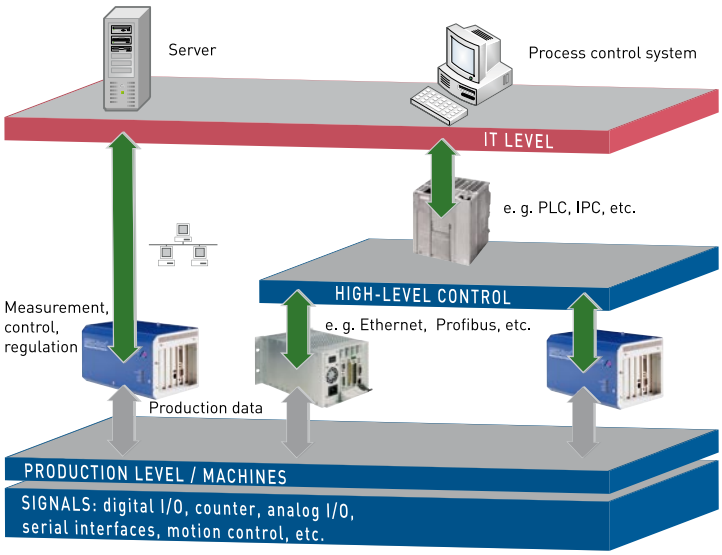
Programmable Automation Controller

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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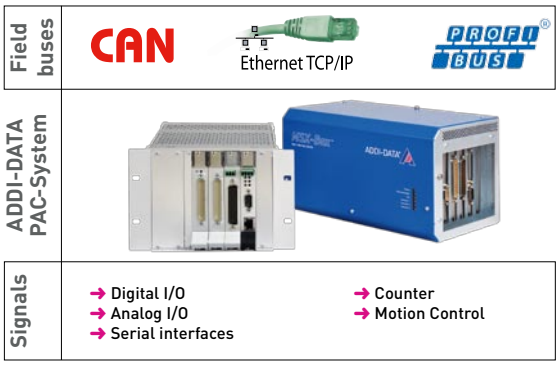
Integrated into the field level

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.

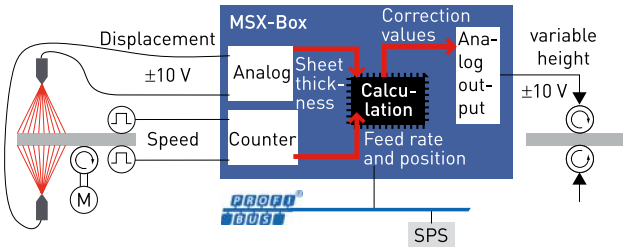
Good for retrofits, too

➜ 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

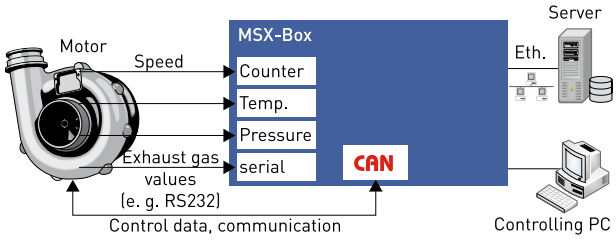
Example 1

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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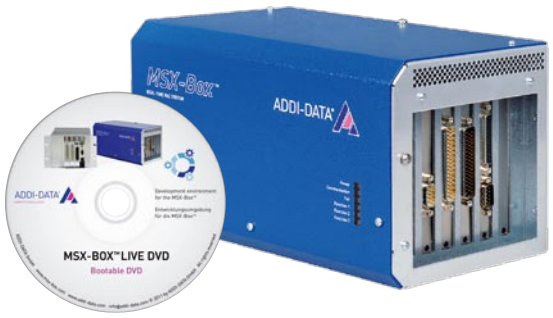
PAC system MSX-Box for the PCI bus



- 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.

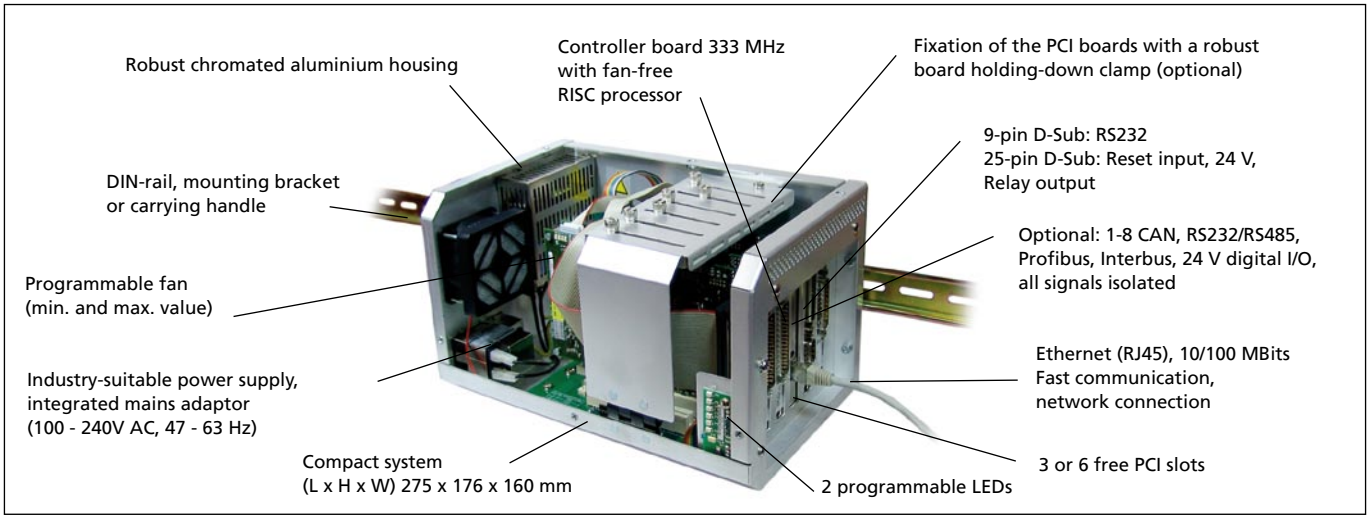
Boost your applications

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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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
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

RoHS 2002/95/EC

- 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.

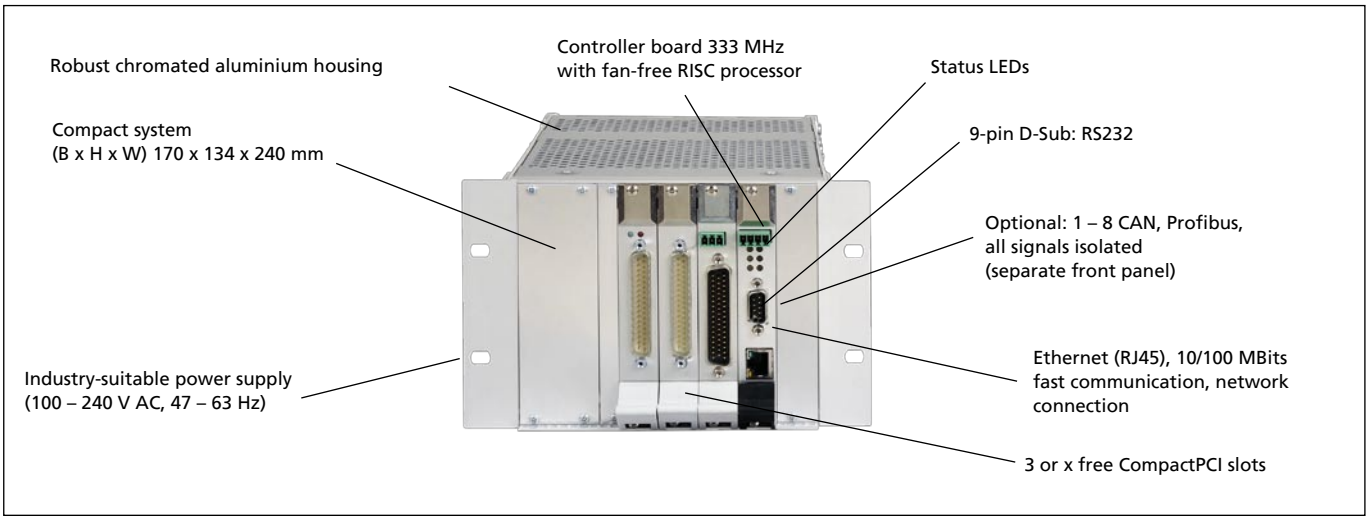
Boost your applications

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 182

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, incl. FB-CPCI-Profi
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 and French.

Characteristics

- 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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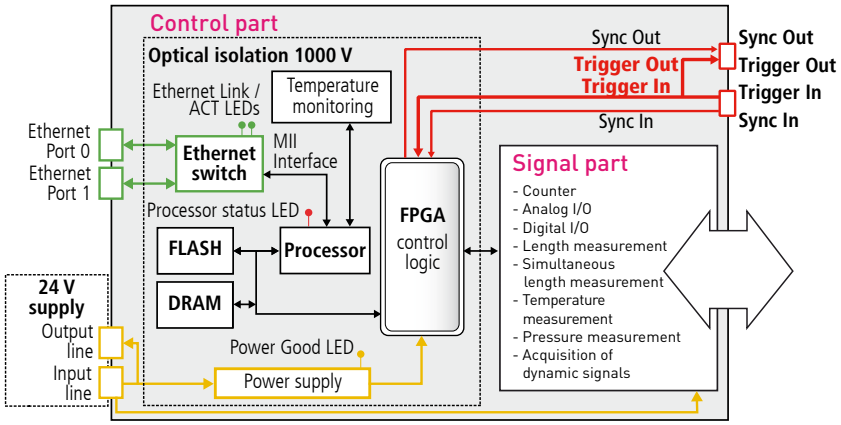
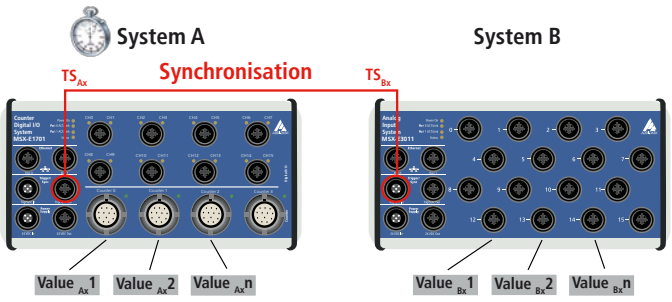
Measurement and control directly in the field

The 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.

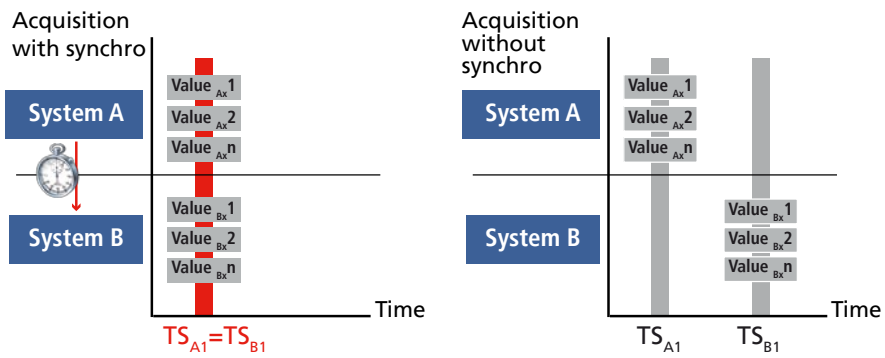


Time stamp

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.



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



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

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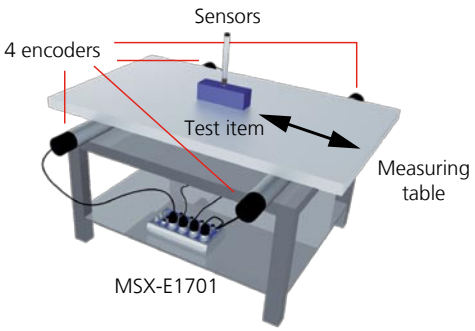
Intelligent Ethernet systems: Special functions

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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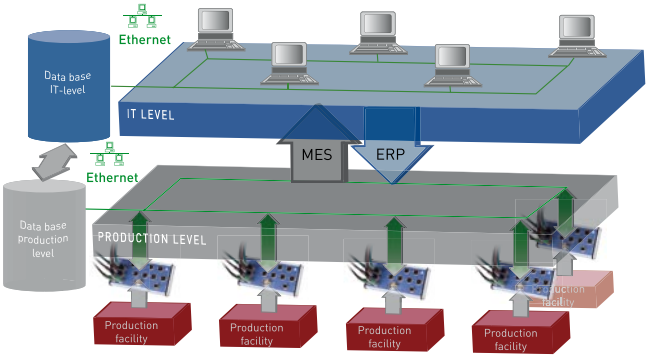
Measurement Control Regulation. Discover the wide range of applications of the intelligent Ethernet systems

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.

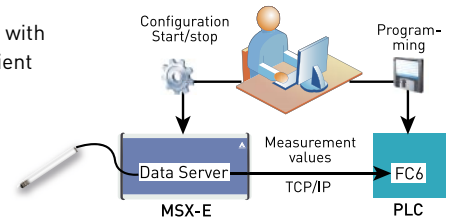


Extend the functionality range of PLCs with MSX-E systems

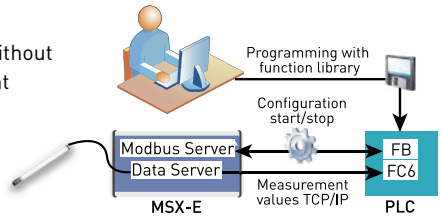
The MSX-E systems can be connected via Ethernet directly to a PLC and thus significantly extend its functionality. The actual measurement task is parameterised and stored on the systems via the website. With the autostart function, the systems load the measurement settings after booting and execute them 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

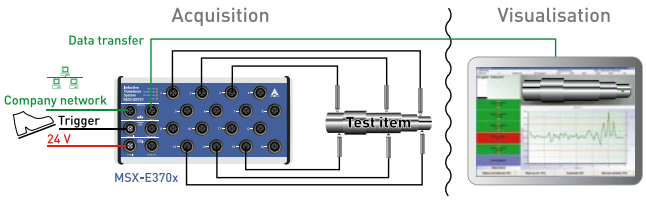


New!
PLC connection without Modbus TCP Client Library (option)



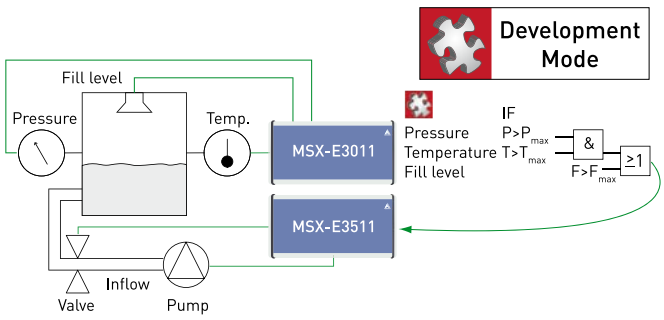
Data measurement and visualisation

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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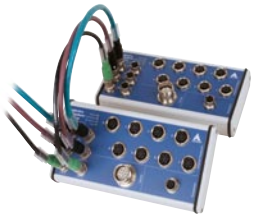
Overview of the Ethernet systems

New! New!



	Digital I/O, 24 V	Multifunction counter			Analog I/O	Analog input			Analog output	Temperature measurement	Pressure measurement
	MSX-E1516	MSX-E1711	MSX-E1721	MSX-E1701	MSX-E3121	MSX-E3011	MSX-E3021	MSX-E3027	MSX-E3511	MSX-E3211	MSX-E3311
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
Timer function generates synchro trigger signal	✓	✓		✓							
Cascading	✓	✓		✓	✓	✓			✓	✓	✓
Degree of protection	IP 65	IP 65		IP 65	IP65	IP 65		IP 67	IP 65	IP 65	IP 65
Temperature range from – 40°C to + 85°C	✓	✓		✓	✓	✓			✓	✓	✓
Dimensions (mm)	215 x 110 x 50	215 x 110 x 54		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	215 x 138 x 50
Digital I/O, 24 V, status LEDs	16	16		16	32						
Event logic	✓										
Input filter configuration through software	✓										
M12 female connector, 5-pin (for 2 inputs or outputs)	8	8		8	1 x 37-pin connector						
Multifunction counter		✓		✓							
Incremental counter inputs (A, B, C, D signals)				4							
Sin/Cos counter inputs (A, B, C signals) 1 V_{pp} (MSX-E1711) or 11µA_{pp} (MSX-E1721)		4									
M23 female connector, 12-pin for incremental counter and Sin/Cos counter 1 V_{ss} (MSX-E1711), or 9-pin for Sin/Cos counter 11µA_{ss} (MSX-E1721)		4		4							
5 V inputs, RS422, 24 V inputs optional				✓							
Max. input frequency		250 kHz (depending on the resolution)		5 MHz							
Analog input					6 diff. channels	4x4 channels, diff.				16/8 diff. channels	16/8 diff. channels
Resolution					24-bit	16-bit				24-bit	24-bit
Type					V / A	V / A				Thermocouples/ RTD	Strain gauges
Connector					6 x M12 5-pin female connector	16 x M12 5-pin female connector				8 x M12 8-pin female connector	8 x M12 8-pin female connector
Simultaneous acquisition						up to 4 channels				8 channels	8 channels
Throughput					up to 100 kHz	up to 100 kHz				up to 1 kHz	up to 1 kHz
Input ranges					± 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	0(4)-20 mA					
Analog output, 16-bit					4				8		
M12 female connector, 5-pin					2				8		
Output ranges					0-10 V, ± 10 V				0-10 V, ± 10 V		
Current outputs					0-20 mA				0-20 mA		
Lengths measurement											
Number of transducers (half-bridge, LVDT, Mahr)											
5-pin M18 female connector											
Simultaneous acquisition											
Temperature input for Pt100											
Page	42	44		44	46	50-55			56	58	60
Software	Current driver list on the web: **www.addi-data.com**										

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New!

Acquisition of dynamic signals	Length measurement			Serial interfaces
MSX-E3601	MSX-E3711	MSX-E3701	MSX-E3700	MSX-E7511
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
	✓			on request
	✓	✓	✓	
✓	✓	✓	✓	✓
IP 65	IP 65	IP 65	IP 40	IP 65
✓	✓	0°C to + 60°C/ –40°C to +85°C	0°C to + 60°C	✓
215 x 110 x 50	215 x 110 x 54	215 x 110 x 50	215 x 110 x 39	215 x 138 x 50
				Serial interfaces RS232, RS422, RS485, 20mA CL
	1			
	1			
	✓			
	5 MHz			
8 SE, diff., ICP				
24-bit				
V / A / ICP				
8 x BNC				
up to 8 channels				
up to 128 kHz				
± 5 V, ± 10 V				
0(4)-20 mA				
	24-bit	24-bit	24-bit	
	8	4 / 8 / 16	4 / 8 / 16	
	8	4 / 8 / 16	4 / 8 / 16	
	✓			
	✓			
62	66	70	70	74

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 Port1 (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:	RS485
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 76

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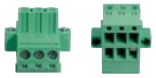
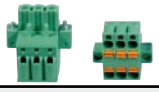
Accessories for the Ethernet systems

		Digital I/O, 24 V	Multifunction-counter
		MSX-E1516	MSX-E1711 MSX-E1721 MSX-E1701
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** (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** (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** (length on request)		✓	✓
Connecting peripheral equipment: Shielded cable, M12 5-pin male connector/open end, IP65 **CMX-81** (3 m), **CMX-89** (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 input	Analog output	Temp. measurem.	Pressure measurem.	Acquisition of dynamic signals	Length measurement			Serial interfaces
New! MSX-E3121	MSX-E3011 MSX-E3021	New! MSX-E3027	MSX-E3511	MSX-E3211	MSX-E3311	MSX-E3601	MSX-E3711	MSX-E3701	MSX-E3700	MSX-E7511
✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
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✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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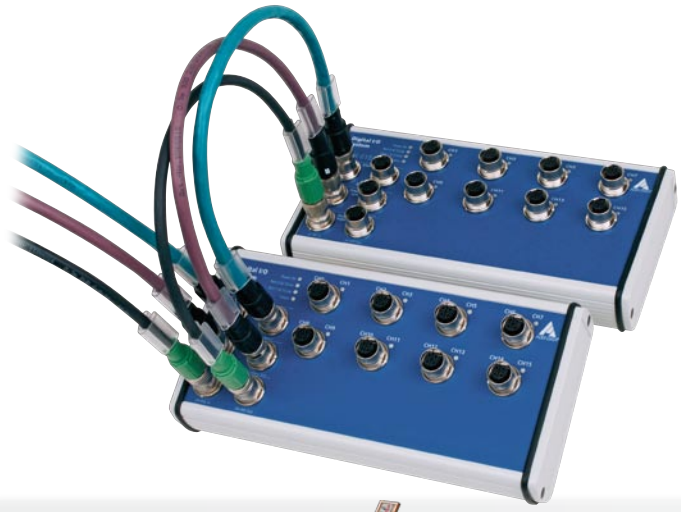
Ethernet digital I/O system
16 digital inputs/outputs, 24 V, with event logic



MSX-E1516

16 digital I/O, 24 V, status LEDs

Event logic for inputs and outputs

24 V digital trigger input

M12 connector

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 76

SPC.kompakt

More information at www.addi-data.com

The intelligent Ethernet digital I/O system MSX-E1516 has 8 x 2 digital lines, 24 V, which can be parameterised as pairs of inputs or outputs. The function is displayed through DUAL LEDs. The system has an event logic for the inputs and the output: a datagram can be generated at status change. The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.
The ARM®9 processor allows the system to perform calculations. The timer function can generate a synchro trigger signal in order to start the acquisition, e.g. of analog measurement values on another system.

Features

- Watchdog for resetting the outputs to "0"
- At Power-On the outputs are set to "0"
- 64 MB onboard SDRAM for storing data
- Robust normed 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
- All inputs are filtered (software configuration)
- Short-circuit protection
- Overvoltage protection 30 V
- Electronic fuse

Applications

- PLC coupling
- Signal switching
- Acquisition and monitoring of machine operating time

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/Trigger In/Out
- 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

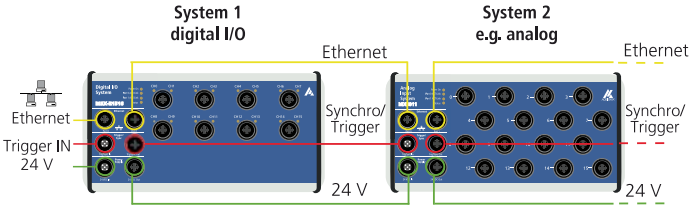
Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0 on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.
The timer function can generate a synchro trigger signal in order to start the acquisition, e.g. of analog measurement values on another MSX-E system.



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Specifications

Digital inputs

Number of inputs:	16, 2 per 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 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	
Supply voltage:	18-30 V	
Current (max.):	1.85 A typical for 8 channels through PTC at 20 °C	
Output current per output:	500 mA max.	
Short-circuit current per 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 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	

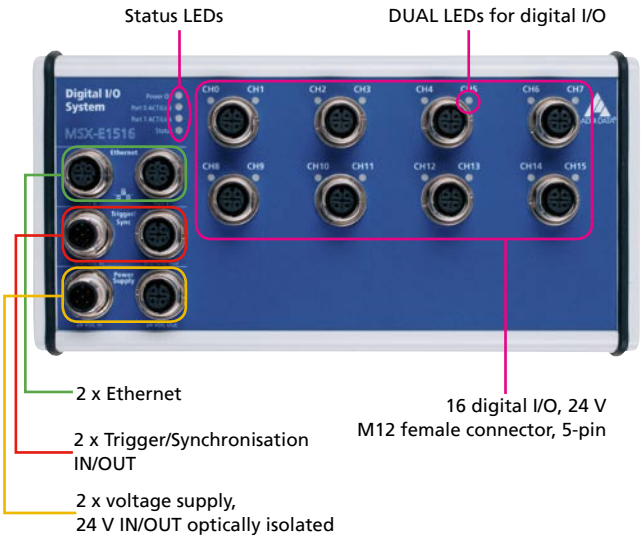
Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

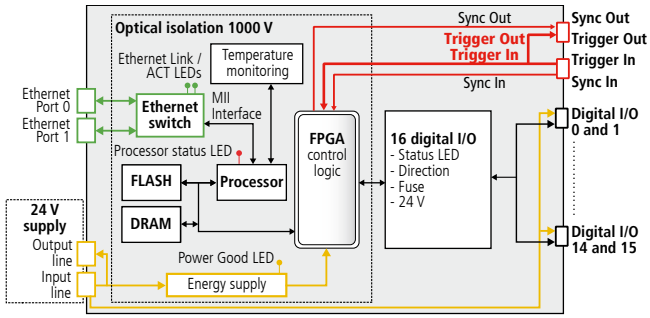
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 50
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 the digital I/O:	8 x 5-pin M12 female connector

Features



Simplified block diagram



Ordering information

MSX-E1516

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

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 female 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 4 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

24 V digital trigger input

M12 and M23 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
see page 76

SPC.kompakt

More information at
www.addi-data.com

The intelligent Ethernet multifunction counter systems MSX-E1701, MSX-E1711 and MSX-E1721 have 4 counter inputs for incremental or sin/cos encoders (1 V_{pp} or 11 μA_{pp}) as well as 16 digital inputs and outputs, 24 V.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations.
The compare logic of the counter or the timer function can generate a synchro trigger signal in order to start the acquisition, e.g. of analog measurement values on another system.

Features

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

Counter

- M23 female connector, 12-pin (incremental, sin/cos 1 V_{pp}) or 9-pin (sin/cos 11 μA_{pp})
- Optical isolation 1000 V
- 4 x 32-bit incremental counter inputs for the acquisition of incremental encoders (MSX-E1701), inputs in RS422 or 24 V available
- 4 x 32-bit sin/cos counter inputs for the acquisition of encoders with 1 V_{pp} (MSX-E1711) or 11 μA_{pp} (MSX-E1721) signals
- Counting frequency 5 MHz (MSX-E1701), 250 kHz (MSX-E1711 and MSX-E1721)
- Supply voltage of the incremental encoders through the M23 connector: 24 V or 5 V, protective filters
- Single, double, quadruple edge analysis, direct mode up/down counter
- A, B (incremental signal inputs), C (index signal input) and D (ref.) signals
- Compare logic
- Status LEDs for incremental counter input A/B

Digital

- 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

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V
- Overtemperature and reverse voltage protection
- Internal temperature monitoring
- Input filter • Short-circuit protection
- Overvoltage protection 30 V

Applications

- Event counting • Position acquisition • Signal switching
- PLC coupling • Output of PWM signals
- Process monitoring
- Position-related acquisition of sensors signals

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/Trigger In/Out
- 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

Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0 on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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Specifications

Incremental counter inputs (MSX-E1701)

Number of inputs:	4 incremental counter inputs each with A, B, C and D signals
5 V inputs (Version MSX-E1701)	
Differential inputs:	Complies with the EIA standards RS422A
Input type:	Differential inputs or TTL
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" „1" = inputs open	
ESD protection:	Up to ±15 kV
24 V inputs: (Version MSX-E1701-24)	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 encoders select-able, 5 V or 24 V, 500 mA max.

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) - 11 μA_{pp} (MSX-E1721)
Interpolation factor:	up to 8192
Max. input frequency:	250 kHz max. (min. interpolation), on request
ESD protection:	2 kV

Digital inputs

Number of inputs:	16, 2 per 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 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
Supply voltage:	18 V-30 V
Current (max.):	1.85 A typical for 8 channels through PTC
Output current per output:	500 mA max.
Short-circuit current /output:	1.7 A max. Shut-down logic at 24V, 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 over-temperature of one channel

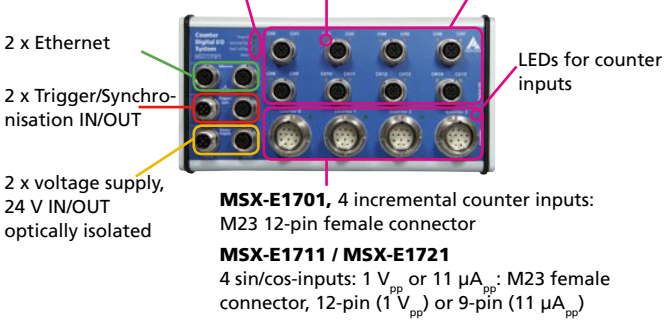
Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

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	
For the digital I/O:	8 x 5-pin female connector M12
For the increm. counter inputs:	4 x 12-pin female connector M23
For the sin/cos counters 1 V_{pp}:	4 x 12-pin female connector M23
For the sin/cos counters 11μA_{pp}:	4 x 9-pin female connector M23

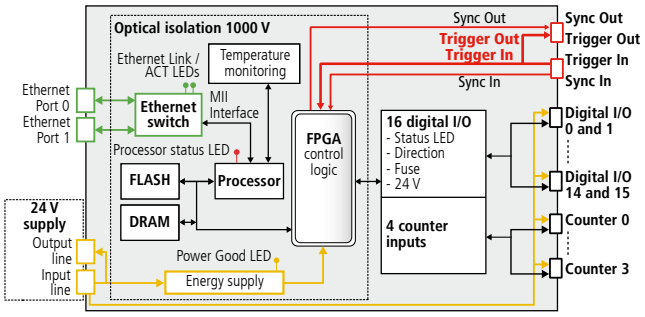
Features



MSX-E1701, 4 incremental counter inputs: M23 12-pin female connector

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

Simplified block diagram



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 and software drivers.

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 female 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 system
6 diff. inputs, 4 analog outputs, 32 digital I/O

New!*

MSX-E3121

6 analog inputs, differential, 24-bit

Voltage or current inputs

4 analog outputs, 16-bit

32 digital I/O

24 V digital trigger input

Integrated Ethernet switch

on request
+ 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 76

More information at www.addi-data.com

The intelligent Ethernet analog input system MSX-E3121 has 6 differential analog inputs, 24-bit, with a sampling frequency of 100 kHz/channel as well as 4 analog outputs, 16-bit.
In addition, the system has 32 digital I/O (24 V). The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations.

Features

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

Analog inputs

- 6 diff. inputs, 24-bit, 4-pin M12 female connector
- Sampling frequency max. 100 kHz/channel
- Input ranges:
  bipolar: ± 10 V, ± 1 V, ± 100 mV, ± 10 mV
  (Gain 1, 10, 100, 1000) - 24-bit
  unipolar: 0-10 V, 0-1 V, 0-100 mV, 0-10 mV
  (Gain 1, 10, 100, 1000) - 23-bit
- Current inputs optional

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- Acquisition triggered through trigger or synchro input

Analog outputs

- 4 analog outputs, 16-bit, configurable as voltage or current outputs (voltage: max 4 outputs, current: max 2 outputs)
- Output voltage ± 10 V (16-bit), 0-10 V (15-bit)
- Current outputs 0-20 mA
- Output voltage after reset 0 V
- M12 female connector, 5-pin
- Output mode/operating mode: data output via software function, trigger input or synchro output

Safety features

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

Digital input and output

- 16 digital inputs, 24 V, optically isolated
- Reverse voltage protection
- All inputs are filtered
- 16 digital outputs, 11 V to 36 V, optically isolated
- Output current per channel 150 mA

Applications

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

Interfaces

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

Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
  on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

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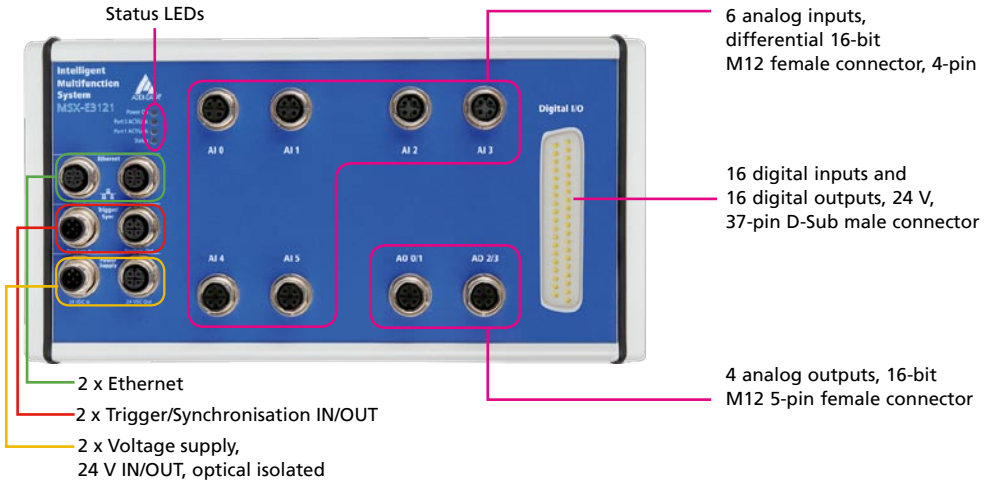
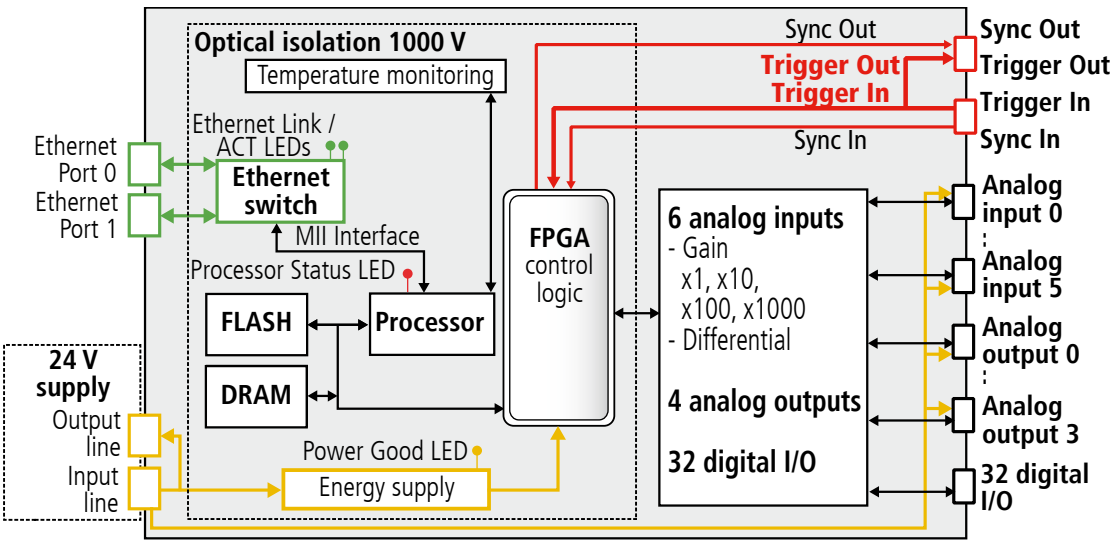
Features

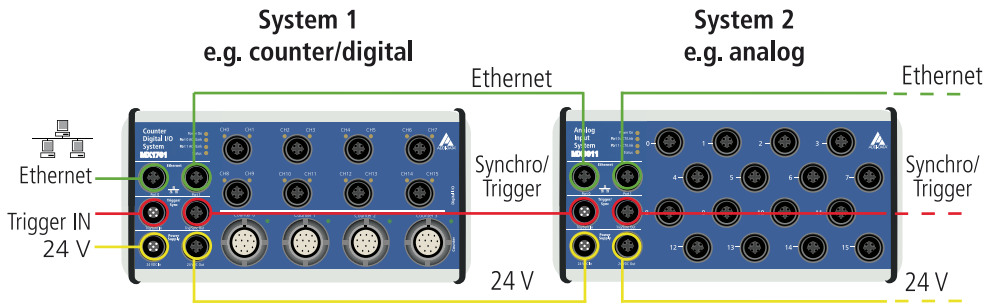


Simplified block diagram



Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



* Preliminary product information

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Specifications

Analog inputs

Number/type:	6 differential inputs, 1 A/D converter per channel
Resolution:	24-bit, SAR ADC
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, x1000, software-programmable
Trigger:	digital input, synchro, software-programmable
In the temperature range:	from -40°C to +85°C

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
Current output:	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
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) 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. IEC 1131-2
Nominal voltage:	24 V
Supply voltage:	18 V-30 V
Output current per output:	150 mA max.
Diagnostics:	Common diagnostic bit for 16 channels at overtemperature of one channel

Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	260 x 140 x 50
Weight:	ca. 850 g
Degree of protection:	IP 65
Current consumption at 24 V:	-
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:	1x 37-pin D-Sub male connector

Ordering information

MSX-E3121

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

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 female 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, diff., 16-bit

MSX-E3011

16 analog inputs, differential, 16-bit

Voltage or current inputs

Simultaneous acquisition of 4 channels with each 100 kHz

24 V digital trigger input

Fast distributed data acquisition

M12 connector

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 76

SPC.kompakt

More information at www.addi-data.com

The intelligent Ethernet analog input system MSX-E3011 has 16 differential analog inputs, 16-bit, with a sampling frequency of 25 kHz/channel.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations.

Features

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

Analog inputs

- 16 differential 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:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- Acquisition triggered through trigger or synchro input

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation 1000 V • Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Applications

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

Interfaces

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

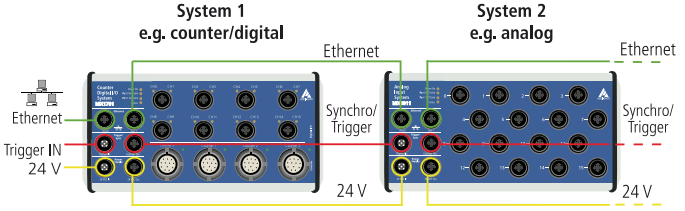
Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0 on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



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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, current input 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
Bandwidth (-3 dB):	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 (µV / °C) typ. 4.5 ppm/°C FSR

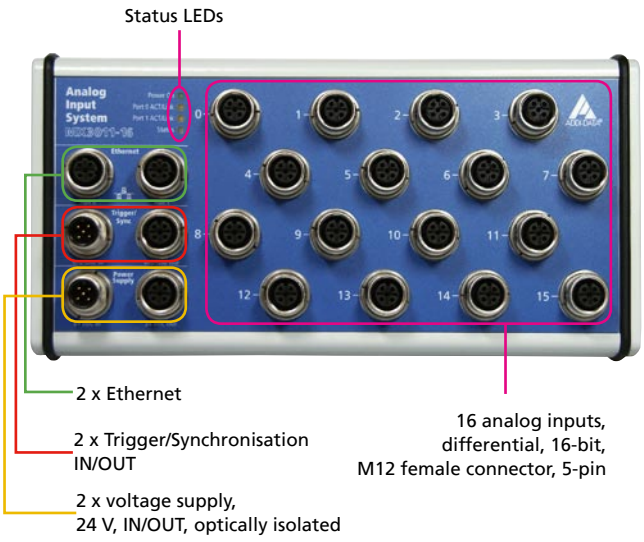
Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

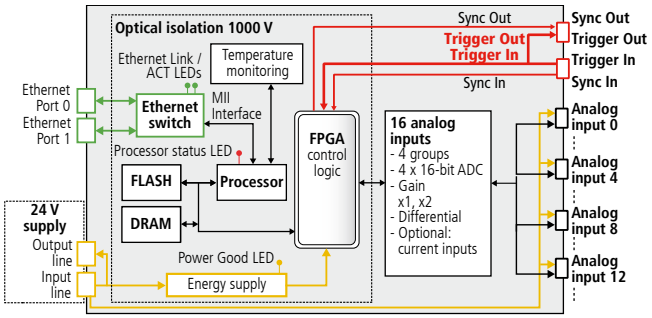
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 51
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

Features



Simplified block diagram



Ordering information

MSX-E3011

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

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 female 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, diff., 16-bit

New!*

MSX-E3021

16 analog inputs, differential, 16-bit

Voltage or current inputs

Simultaneous acquisition of 4 channels with each 100 kHz

4 GB extended memory

Buffered real-time clock

24 V digital trigger input

*Operating temperature On request

RoHS 2002/95/EC

on request

DatabaseConnect
see page 76

More information at www.addi-data.com

The intelligent Ethernet analog input system MSX-E3021 has 16 differential analog inputs, 16-bit, with a sampling frequency of 25 kHz/channel.
In addition to a buffered real-time clock which keeps the system time even at power loss, the MSX-E3021 has an extended 4 GB memory for storing the measured values. It is therefore ideal for long-term measurement.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations.

Features

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

Analog inputs

- 16 diff. inputs, 16-bit, 5-pin M12 female connectors
- 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
- Current inputs optional

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- Acquisition triggered through trigger or synchro input

Safety features

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

Applications

- Industrial process control and measurement
- Multichannel data acquisition • Factory automation
- Long-term measurement • Remote diagnosis

Interfaces

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

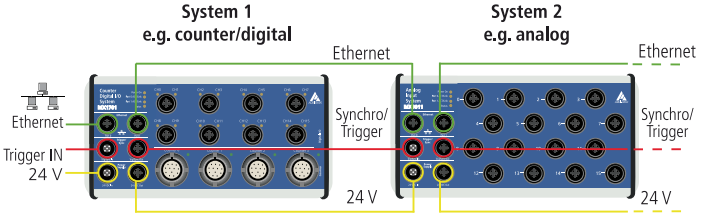
Software:

- Software drivers for Windows 7 (32-bit)/Vista™(32-bit)/ XP/2000.
  On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
  on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



*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 (16-bit), 0-5 V, 0-10 V (15-bit) Current inputs optional
Input 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 (-3 dB):	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 (µV / °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

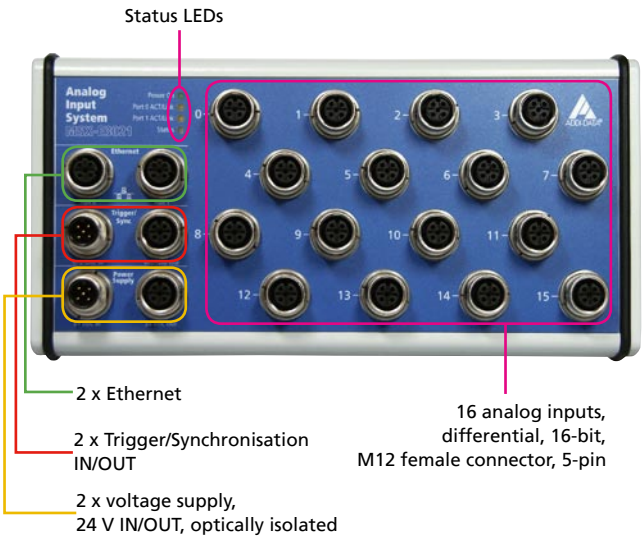
Supply voltage, Ethernet, Trigger, Synchro

TThe specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

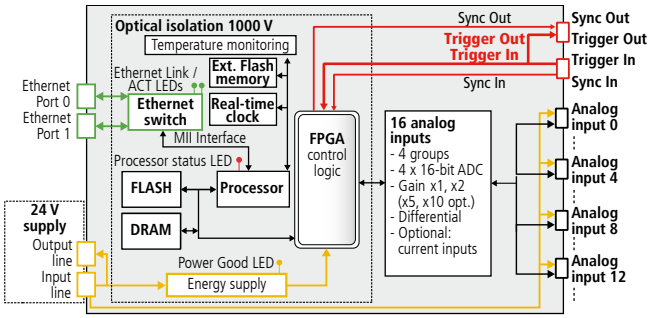
System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 50
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

Features



Simplified block diagram



Ordering information

MSX-E3021

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

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 female 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**

* Preliminary product information

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ADDI-DATA® SPIRIT OF EXCELLENCE

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

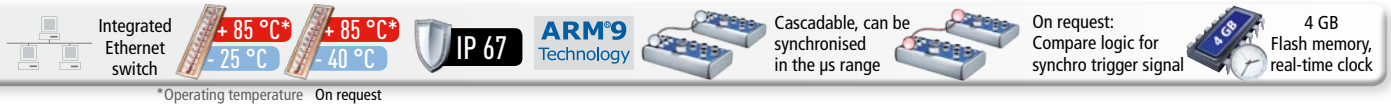
Preliminary!

New!

IP 67

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 On request

RoHS 2002/95/EG

on request

DatabaseConnect

More information at www.addi-data.com

The intelligent Ethernet analog input system MSX-E3027 has 16 differential analog inputs, 16-bit, with a sampling frequency of 25 kHz/channel.
In addition to a buffered real-time clock which keeps the system time even at power loss, the MSX-E3027 has an extended 4 GB memory for storing the measured values. It is therefore ideal for long-term measurement.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations. The high degree of protection (IP 67) combined with the extended operating temperature and the stainless steel housing allow to use this system in very harsh conditions.

Features

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

Analog inputs

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

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- Acquisition triggered through trigger or synchro input

Safety features

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

Applications

- Industrial process control and measurement
- Factory automation
- Long-term measurement • Remote diagnosis

Interfaces

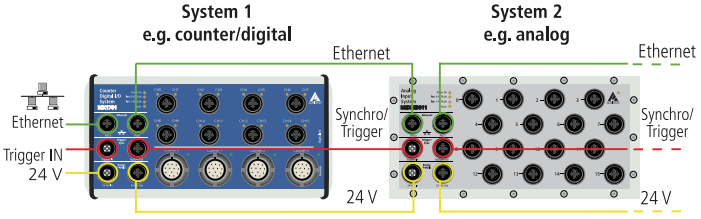
- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- 24 V supply and cascading

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

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



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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 (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, 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 (-3 dB):	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 (µV / °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

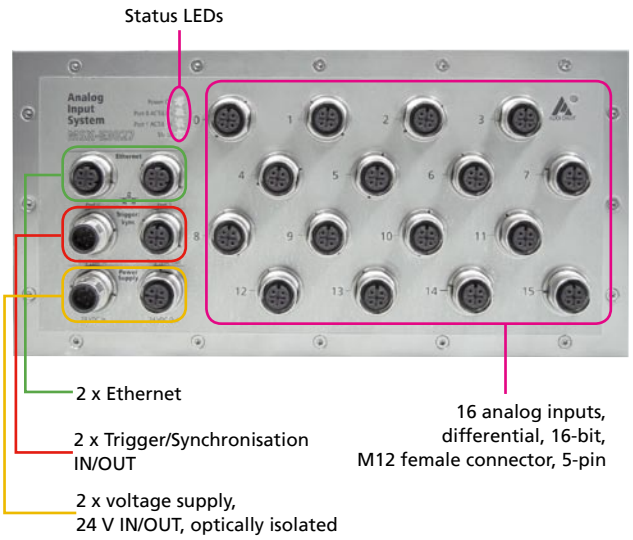
Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

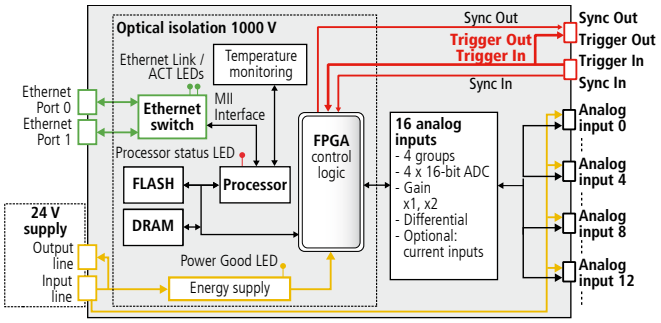
System features

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

Features



Simplified block diagram



Ordering information

MSX-E3027

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

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

* Preliminary product information

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

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 display of various signal curves such as sine curves, sawtooth curves, etc - selectable for each channel

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 at www.addi-data.com

The intelligent Ethernet analog output system MSX-E3511 has 8 analog outputs with a 16-bit resolution.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations.

Features

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

Analog outputs

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

Function generator

- Display of various signal curves such as sine curves, sawtooth curves, …
- Maximum of 8 channels (independent of one another)
- Applicable without programming knowledge, e.g. via CSV files or mathematic functions such as f(x) = sin(x)

Safety features

- LED status display for fast error diagnostics
- Optical isolation
- Diagnostic possible at short-circuits (voltage mode) or line break (current mode)
- Internal temperature monitoring

Applications

- Industrial process control and regulation
- Output of different geometrical signals

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

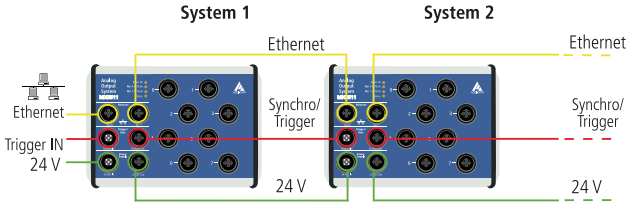
Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000.
  On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
  on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



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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:	0-10 V (±10 V)
	Current output:	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/load:	Voltage output:	15 mA, min. 680 Ω
	Current output:	20 mA, max. 550 Ω
Short-circuit current:	Voltage output:	± 20 mA
	Current output:	± 32 mA
Output value after reset:	0 V voltage output, without calibration	
1 watchdog (programmable):	16-bit, 1 µs up to 65535 µs	

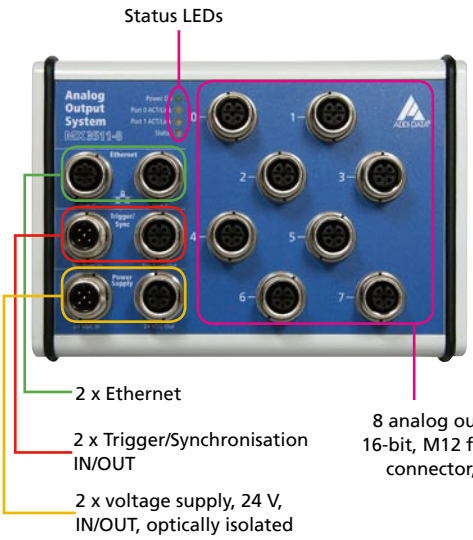
Supply voltage, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

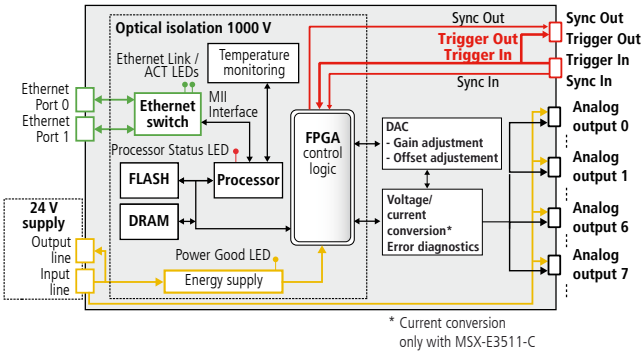
System features

Interface:	Ethernet acc. to specification IEEE802.3	
Dimensions (mm):	154 x 110 x 50	
Weight:	620 g	
Degree of protection:	IP 65	
Current consumption:	150 mA ± 10 % typical in idle / power save	
Operating temperature:	-40 °C to +85 °C	
Current consumption at 24 V:	150 mA	without load
	310 mA	current outputs switched on
	410 mA	voltage outputs switched on
Connectors for sensors		
Analog outputs:	8 x 5-pin M12 female connector	

Features



Simplified block diagram



Ordering information

MSX-E3511

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

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 female 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 channels for thermocouples or RTD, 24-bit

MSX-E3211

16/8 differential inputs

For thermocouples or RTD (Pt 100, Pt 1000)

Distributed data acquisition

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 76

More information at www.addi-data.com

The intelligent Ethernet system MSX-E3211 has 8 or 16 differential inputs for thermocouples or resistance temperature detectors (RTD, Pt100/Pt1000).
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.
The ARM®9 processor allows the system to perform calculations.

Features

- 64 MB onboard SDRAM for storing data
- Onboard ARM®9 32-bit processor
- Robust normed metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Analog inputs

- M12 8-pin female connector
- 16/8 differential inputs for thermocouples or RTD, 24-bit
- Sampling frequency max. 788 Hz/Kanal (max. 8/4 channels simultaneously)
- Auto gain: Optimal adjustment of the gain to the measuring range

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in „packages"
- Acquisition triggered through trigger or synchro input

Safety features

- LED status display for fast error diagnostics
- Optical isolation 1000 V
- Internal temperature monitoring

Norms

- Vibrations (sinusoidal): IEC 60068-2-6
- Shock: IEC 60068-2-27

Applications

- Industrial temperature monitoring in the steel industry
- Remote diagnosis

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In
- 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

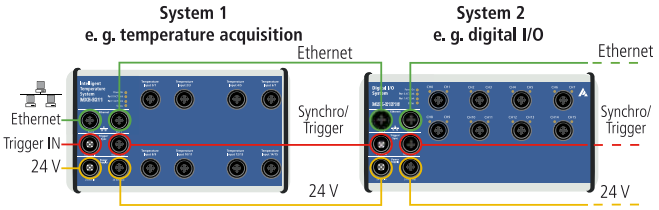
Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000.
  On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
  on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



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Specifications

Analog inputs

Number of inputs:	16 or 8 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

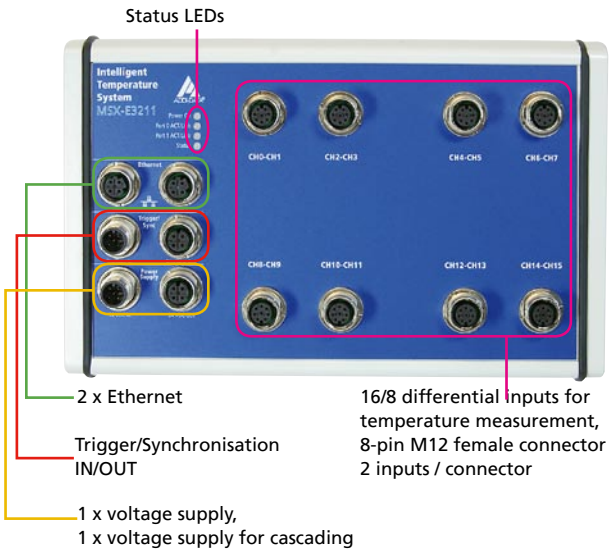
Supply voltage, Ethernet, Trigger, Synchro

TThe specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

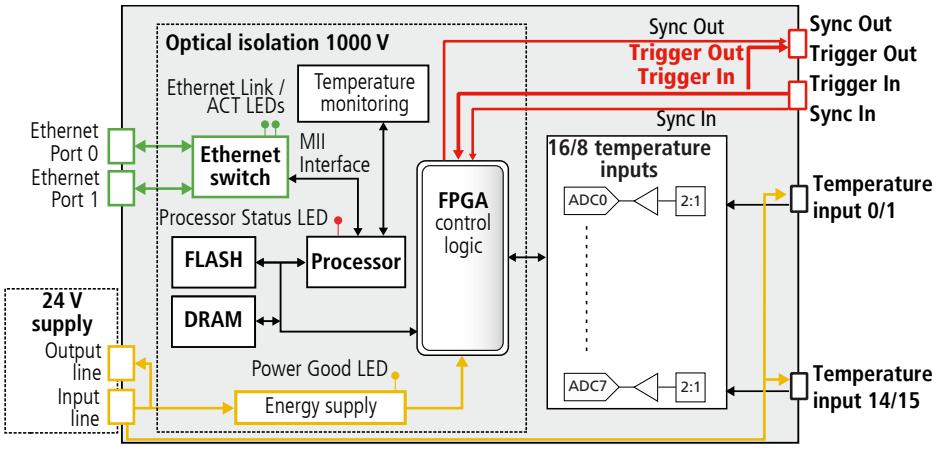
System features

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 or 4 x 8-pin M12 female connector

Features



Simplified block diagram



Ordering information

MSX-E3211

Ethernet system for temperature measurement, 16/8 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-RTD-16: for 16 RTD
MSX-E3211-RTD-8: for 8 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
MX-Rail (Please specify when ordering!),
MX-Screw, PCMX-1x

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

New!*

MSX-E3311

16/8 differential inputs

For strain gauges

Distributed data acquisition

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 76

More information at www.addi-data.com

The intelligent Ethernet system MSX-E3311 has 8 or 16 differential inputs for strain gauges.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.
The ARM®9 processor allows the system to perform calculations.

Features

- 64 MB onboard SDRAM for storing data
- Onboard ARM®9 32-bit processor
- Robust normed metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Strain gauges inputs

- M12 8-pin female connector
- 16/8 differential inputs, 24-bit
- Sampling frequency max. 788 Hz/Kanal (max. 8/4 channels simultaneously)
- Auto gain: Optimal adjustment of the gain to the measuring range
- Voltage supply for the sensors 10 V, 50 mA

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in „packages"
- Acquisition triggered through trigger or synchro input

Safety features

- LED status display for fast error diagnostics
- Optical isolation 1000 V
- Internal temperature monitoring

Applications

- Industrial pressure and lengths measurement
- Weighing cells evaluation
- Industrial process control
- Industrial measurement and monitoring
- Remote diagnosis

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In
- 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

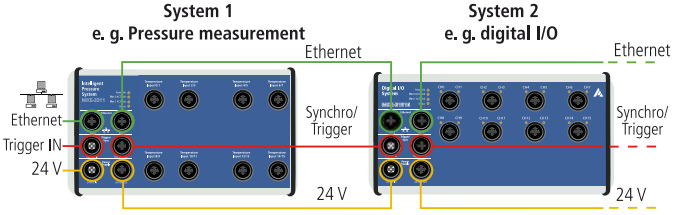
Software:

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0, on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



*Preliminary product information

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Specifications*

Inputs for strain gauges

Number of inputs:	16 or 8 differential inputs for strain gauges 2 inputs for each M12 connector
Resolution:	24-bit
Optical isolation:	1000 V
Throughput:	max. 788 Hz for 1 channel, max. 528 Hz for 2 channels
Voltage supply for the sensors:	10 V, 50 mA

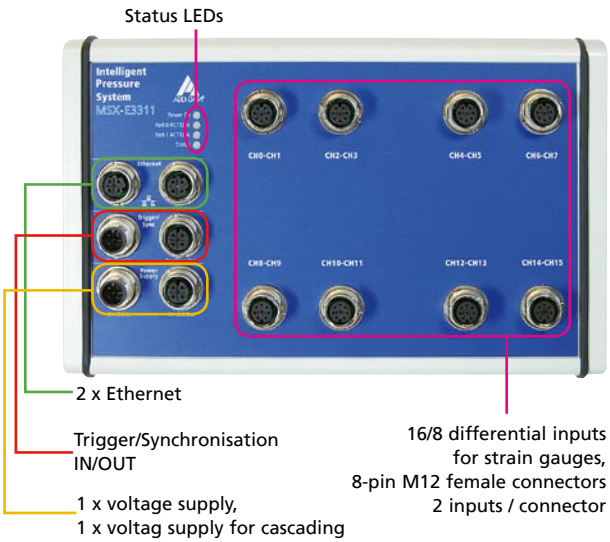
Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

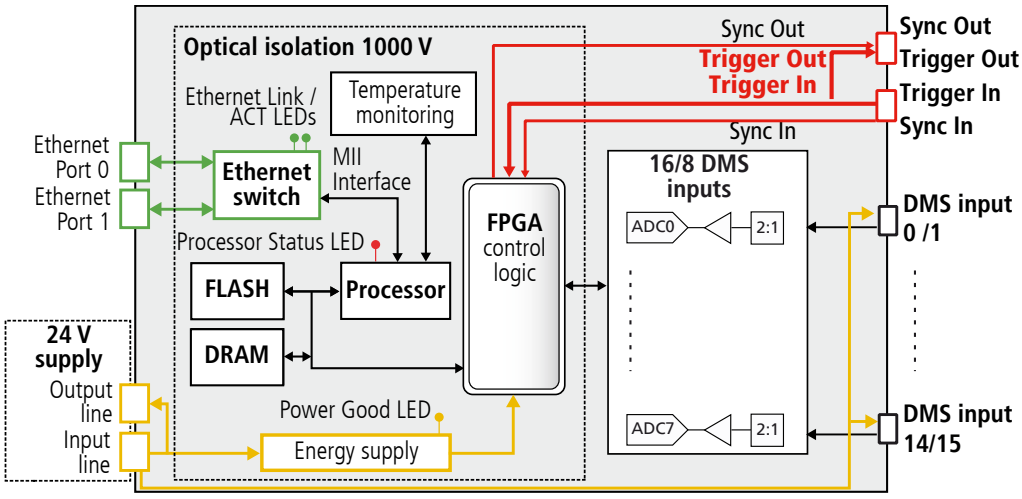
System features

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 x 8-pin M12 female connector

Features



Simplified block diagram



Ordering information

MSX-E3311

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

Versions

MSX-E3311-16: for 16 strain gauges
MSX-E3311-8: for 8 strain gauges

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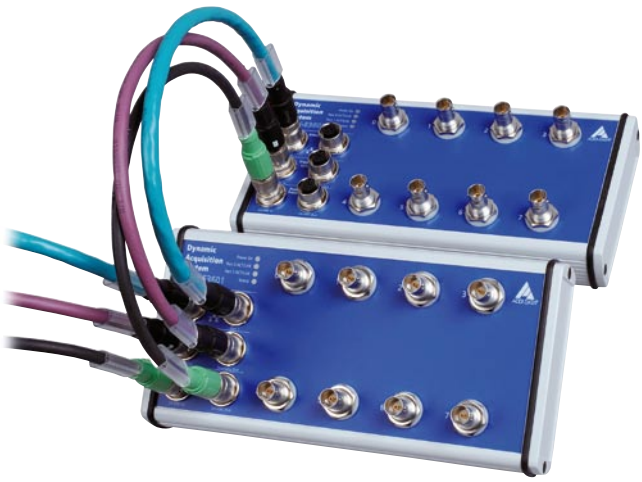
Ethernet system for the acquisition of dynamic signals
8 SE/diff. inputs, 24-bit, simultaneous acquisition



MSX-E3601

8 SE/diff. inputs, simultaneous acquisition

8 current sources for ICP sensors

Fast distributed data acquisition

24 V digital trigger input

Onboard calibration

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 76

SPC.kompakt

More information at www.addi-data.com

The intelligent Ethernet system MSX-E3601 for the acquisition of dynamic signals has 8 SE/diff. 24-bit analog inputs, and 8 integrated current sources for ICP sensors.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.
The ARM®9 processor allows the system to perform calculations.
The system is used in noise and vibration measurement applications.

Features

- Synchronisation of several systems
- 64 MB onboard SDRAM for storing data
- Onboard ARM®9 32-bit processor
- Robust normed metal housing

Analog inputs

- BNC connectors
  - Inner conductor for positive input
  - Outer conductor for negative input (diff.) or GND (SE)
- 8 SE or diff. inputs
- AC/DC coupling
- Sampling frequency up to 128 kHz
- Gain x1, x10, x100
- Anti-aliasing filter
- One A/D converter per channel: simultaneous sampling on all analog inputs
- 24-bit resolution
- DC and AC specification
- Input ranges:

SE	Diff.	Gain
± 10 V	± 5 V	x1
± 1 V	± 0,5 V	x10
± 0.1 V	± 0.05 V	x100

Current sources

- 8 current sources for the direct connection of ICP™ sensors (Integrated Circuit Piezoelectric)
- 4 mA typ., 24 V max.

Acquisition modes

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in „packages"
- Acquisition triggered through trigger or synchro input

Safety features

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

Interfaces

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

Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
- Programming examples LabVIEW from 8.5 and for Linux on request
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

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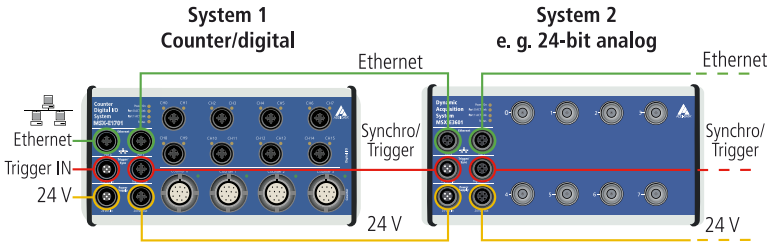
ADDI-DATA® SPIRIT OF EXCELLENCE

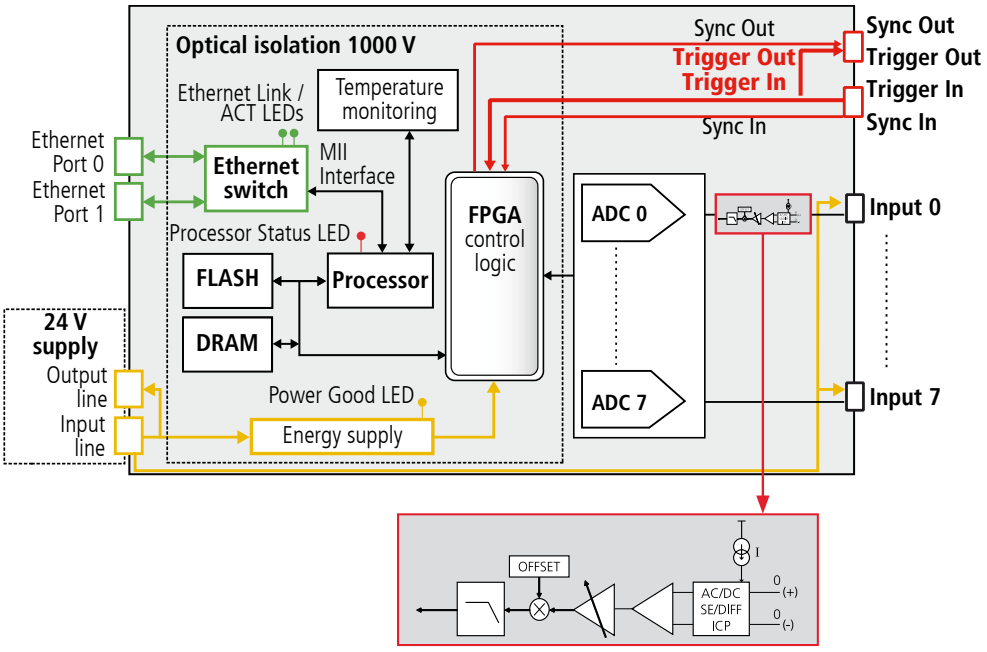
Features

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.
With these features, the MSX-E systems are suited both for simple distributed applications and for complex applications, in which multiple devices with physically widely separated signals have to operate together.



Simplified block diagram



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Specifications

Analog inputs

Number of inputs:	8, simultaneous acquisition			
Coupling:	DC, AC (software-programmable)			
Input type:	Single-ended or differential (software-programmable)			
Input voltage range:				
Gain x1:	± 10 V single-ended			
Gain x10:	± 1 V single-ended			
Gain x100:	± 0,1 V single-ended			
Gain x1:	± 5 V differential			
Gain x10:	± 0,5 V differential			
Gain x100:	± 0.05 V differential			
ADC type:	Oversampled SAR with linear phase FIR anti-aliasing digital filter			
Resolution:	24-bit			
Sampling frequency f_s:	up to 128 kHz:			
Selectable frequencies:	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 sampling frequency f_s			
Frequency accuracy:	± 50 ppm			
Input stage characteristic				
Input impedance:	1 MΩ // 300 pF typ., DC coupled			
AC -3 dB cut-off frequency:	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.			
Pass band ripple:	± 0.1 dB max. DC up to 0.453 x f_s			
-3 dB bandwidth:	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 Ratio (SNR):	FSR, f_{in} = 1 kHz			
	≥ 95 dB	Gain x1		
	≥ 94 dB	Gain x10		
	≥ 75 dB	Gain x100		
Total Harmonic Distortion (THD):	FSR, f_{in}=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°	f_{in} < 100 Hz
	± 0.01°	f_{in} < 2 kHz
	± 0.1°	f_{in} < 10 kHz
Amplitude accuracy:	± 0.009 dB max. with f_{in} = 1 kHz sine signal, Gain x1, x10, x100	
CMRR:	> 110 dB typ. for DC > 90 dB typ. for f_{in} < 1000 Hz	
Offset error:	± 90 µV after calibration for f_{in} < 1000 Hz	
Onboard DC calibration	software-programmable	
Calibration voltage:	5 V typ. gain x1 900 mV typ. gain x10 90 mV typ. gain x100	
Temperature drift:	± 8 ppm/°C typ.	
Signal conditioning		
Channel number:	8 on the positive input	
Current source:	4 mA up to 24 V	
Coupling:	AC on the positive input GND on the negative input	
Recording duration	TBD, max. at 128 kHz sampling rate on 8 channels	

Current sources

Number:	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 35.

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 50
Weight:	850 g
Degree of protection:	IP 65
Operating temperature:	- 40 to + 85°C
Current consumption at 24 V:	350 mA
Connectors for sensors	
For analog inputs:	8 x BNC connectors

Ordering information

MSX-E3601

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

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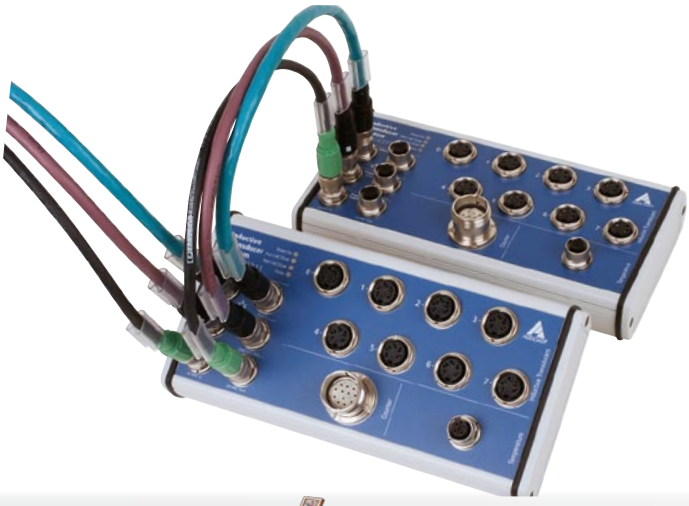
Ethernet system for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature inputs



MSX-E3711

Simultaneous acquisition of up to 8 inductive displacement transducers

For half-bridge, LVDT, Mahr or Knäbel transducers

1 incremental counter input (32-bit)

1 input for temperature measurement (Pt100)

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 76

SPC.kompakt

More information at www.addi-data.com

With the intelligent Ethernet system MSX-E3711 you can acquire up to 8 half-bridge, LVDT, Mahr or Knäbel displacement transducers simultaneously with 24-bit resolution. An incremental counter input and an input for temperature measurement (Pt100) supplement the measurement data with temperature and position references. The transducers can be connected directly through the 5-pin M18 connectors.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.
The ARM®9 processor allows the system to perform calculations.
The compare logic of the counter or the timer function can generate a synchro trigger signal in order to start acquisitions. The system can trigger its own inputs as well as inputs on another MSX-E system.

Features

- Connection of all commercially available transducers (half-bridge, LVDT, Mahr or Knäbel)
- 8 channels for length measurement, cascadable
- 24-bit resolution
- 1 incremental counter input
- 1 input for Pt100 for temperature measurement
- Fast distributed data acquisition
- Example for TESA transducers GT21:
  Sampling frequency: 12.5 kHz per channel,
  sampling period for one sequence,
  of 1 to 8 channels: 0.080 ms
- Synchronisation of several systems
- 64 MB onboard SDRAM for storing data
- ARM®9 32-bit processor for data processing
- Diagnostics possibility at short-circuits or line break of the transducers
- Robust metal housing, degree of protection IP 65
- Power Save Mode: reduction of the power consumption when no acquisition runs

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- With trigger or synchro input

Safety features

- LED status display for fast error diagnostics
- Optical isolation 1000 V for inductive transducers, counter and temperature measurement
- Input filters
- Diagnostics at short-circuits or line break of the inductive transducers
- Internal temperature monitoring

Interfaces

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

Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit) and Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
- Programming examples LabVIEW from 8.5 and for Linux on request
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

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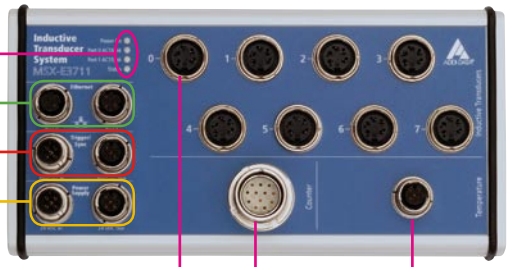
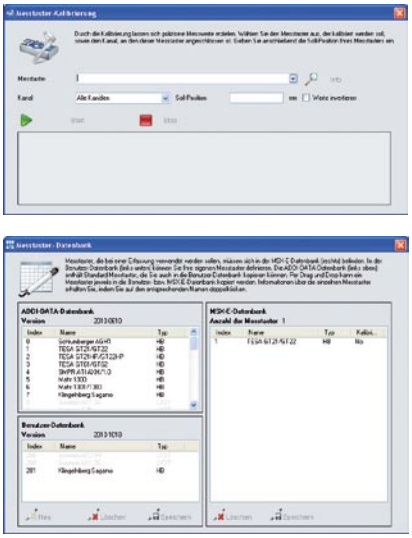
Features



Calibration tool



Synchronisation

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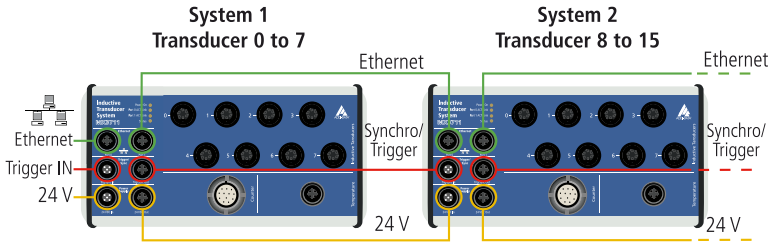
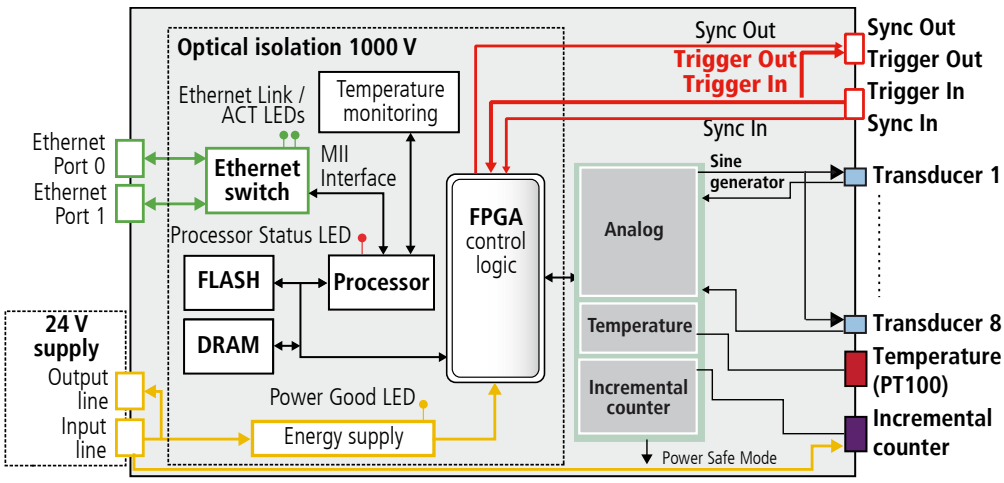
With these features, the MSX-E systems are suited both for simple distributed applications and for complex applications, in which multiple devices with physically widely separated signals have to operate together.



Simplified block diagram



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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 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	

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
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 and software drivers.

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 Knäbel 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

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/Os (option)

MSX-E3701 / MSX-E3701-x / MSX-E3700

Acquisition of 4, 8 or 16 inductive displacement transducers

For half-bridge, LVDT, Mahr or Knäbel transducers

24 V digital output with compare logic

24 V digital trigger input

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 76

SPC.kompakt

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More information at www.addi-data.com

With the intelligent Ethernet systems MSX-E3701 and MSX-E3700 you can acquire 4, 8 or 16 half-bridge, LVDT, Mahr or Knäbel displacement transducers with 24-bit resolution. The 4-transducer version is now also available with one 24 digital output and compare logic. The transducers can be connected directly through the 5-pin M18 connectors.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time. The ARM®9 processor allows the system to perform calculations. The timer function can generate a synchro trigger signal in order to start acquisitions.

Features

- **New:** 32 digital inputs/outputs, 24 V
- Connection of all commercially available transducers (half-bridge, LVDT, Mahr-compatible or Knäbel)
- 4, 8 or 16 channels depending on the version, cascadable
- 24-bit resolution
- Fast distributed data acquisition
- 16 MB onboard SDRAM for storing data
- ARM®9 32-bit processor for data processing
- Diagnostics possibility at short-circuits or line break of the transducers
- Robust normed metal housing
- Power Save Mode: reduction of the power consumption when no acquisition runs
- 1 digital output, 24 V with compare logic for input 0 (optional, only available for MSX-E3701-x-4)
- Extended temperature range -40 °C to +85 °C available (MSX-E3701-EXT)

Acquisition modes:

- Auto-refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in "packages"
- With trigger or synchro input

Safety features

- LED status display for fast error diagnostics
- Input filters
- Diagnostic possible at short-circuits or line break
- Internal temperature monitoring

Transducer precision: Example of a measurement

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

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

Applications

- Gear wheel control • Gauge block control
- Acquisition of sensor data
- Quality assurance, automatic parts control
- Industrial process control
- Profile and surface measurement

Interfaces

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

Software:

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-Bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0
- Programming examples LabVIEW from 8.5 on request
- Programming examples for Linux on request
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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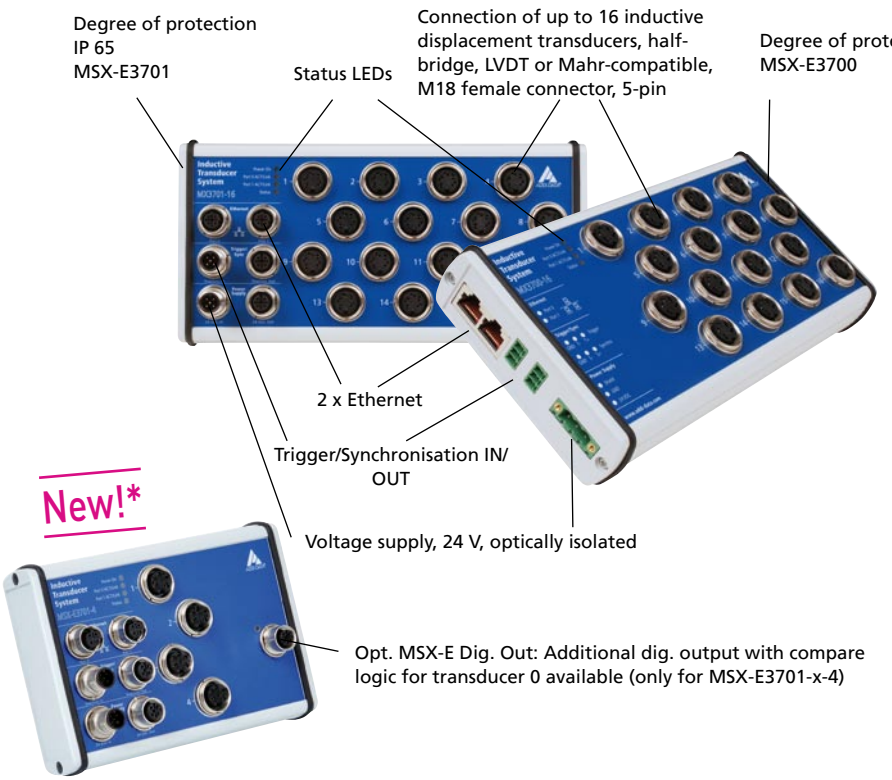
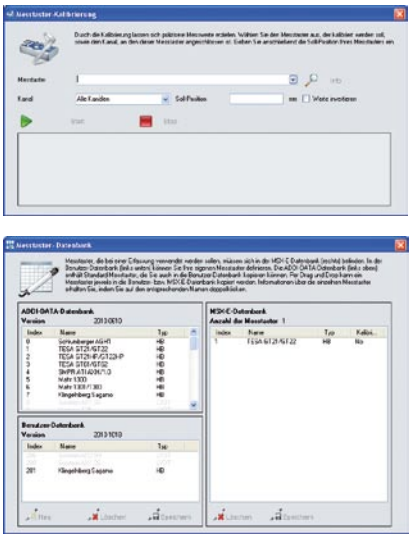
Features



Calibration tool



Synchronisation

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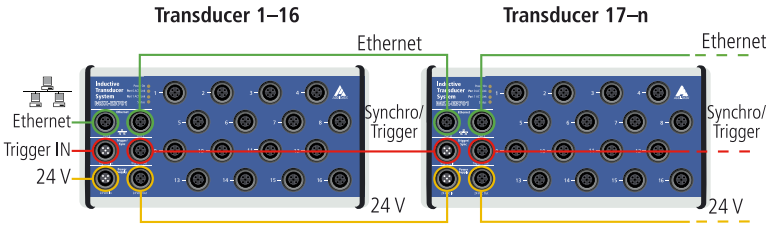
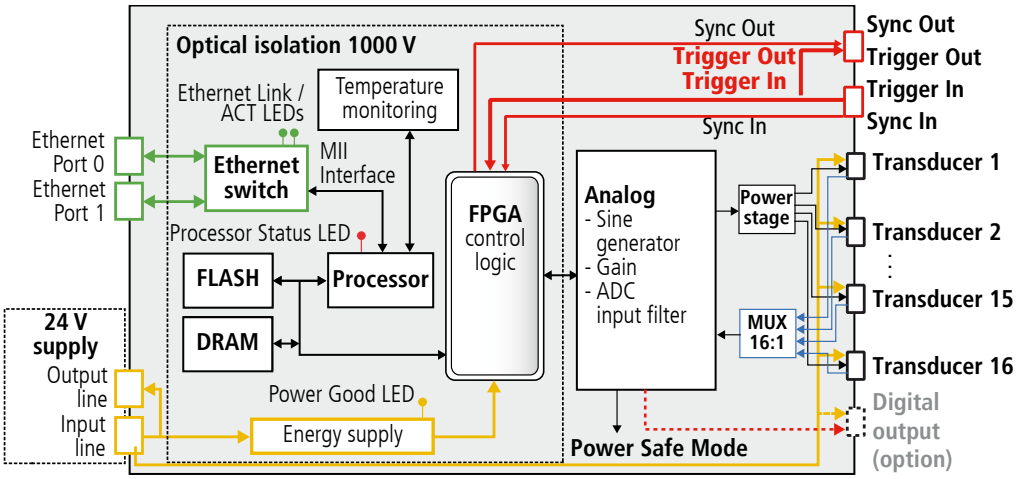
With these features, the MSX-E systems are suited both for simple distributed applications and for complex applications, in which multiple devices with physically widely separated signals have to operate together.



Simplified block diagram



* Preliminary product information

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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
	$f_s = \frac{f_P}{SP \times n}$	fs 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 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

Voltage supply

Nominal voltage:	24 V	⎓
Supply voltage:	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 Knäbel IET0200 transducers at 5 V power, 50 kHz and 1 V_{rms}
Reverse voltage protection		

Digital output (option for MSX-E370x-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
Supply voltage:	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 Synchro	
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:	0 to + 60 °C
	MSX-E370x-EXT:	-40 °C to + 85°C

MSX-E3701 interface connectors

Ethernet	2 x 4-pin M12 female connector, D-coded for Port 0 and 1Port1
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		Number of transducers	Type of transducer	Digital output 24 V (option)	Degrees of protection
	0 to 60 °C	–40 °C to 85 °C				
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-16-EXT		✓				
MSX-E3701-HB-8	✓		8			
MSX-E3701-HB-8-EXT		✓				
MSX-E3701-HB-4	✓		4		✓	
MSX-E3701-HB-4-EXT		✓				
MSX-E3701-LVDT-16	✓		16	LVDT		
MSX-E3701-LVDT-16-EXT		✓				
MSX-E3701-LVDT-8	✓		8			
MSX-E3701-LVDT-8-EXT		✓				
MSX-E3701-LVDT-4	✓		4		✓	
MSX-E3701-LVDT-4-EXT		✓				
MSX-E3701-K-8	✓			Knäbel		
MSX-E3701-K-8-EXT		✓				
MSX-E3701-M-8	✓		8	Mahr-compatible		
MSX-E3701-M-8-EXT		✓				
MSX-E3701-M-4	✓		4		✓	
MSX-E3701-M-4-EXT		✓				
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, Knäbel.
Incl. technical description and software drivers

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 Knäbel 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

MSX-E3701-EXT: IP 65, with extended temperature range

Available versions like MSX-E3701. When ordering, please add -EXT to the product version.
Example: **MSX-E3701-LVDT-16-EXT:** For 16 LVDT inductive displacement transducers

MSX-E3701-DIO: like MSX-E3701-EXT, with 32 digital I/O

Available versions like MSX-E3701. When ordering, please add -DIO to the product version.
Example: **MSX-E3701-LVDT-16-DIO:** For 16 LVDT inductive 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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Ethernet system for serial interfaces
4 ports for RS232, RS422, RS485 or 20 mA CL

New!*

MSX-E7511

4 serial interfaces

RS232, RS422, RS485, 20 mA Current Loop

Onboard evaluation of user data

128-byte FIFO buffer for each port

16C950 compatible UART

Optical isolation

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 at www.addi-data.com

The intelligent Ethernet system MSX-E7511 has 4 configurable serial ports.
The ARM®9 processor allows to process the user data from each port directly on the system. Thus it is possible e. g. to filter data or to calculate it and to export only the values needed. The system is therefore ideal for the direct processing of serial protocols on site.
The systems can be freely cascaded and synchronised in the µs range. You can thus acquire data from several systems at the same time.

Features

- 64 MB onboard SDRAM for storing data
- Onboard ARM®9 32-bit processor
- Robust normed metal housing

Serial interfaces

- 9-pin D-Sub male connectors
- 4 serial ports
- RS232, RS422, RS485, 20 mA Current Loop (configurable when ordering)
- 128-byte FIFO buffer for each port
- 16C950 compatible UART
- Max. baud rate 1MBaud
- Modem control signals (RTS/CTS) for RS232 (RS422 on request)

Data processing

- Acquisition of raw data
- The evaluation of raw data is programmable in the development mode
- Optional: firmware adaptation for direct calculation

Safety

- LED status display for fast error diagnostics
- Optical isolation
- Internal temperature monitoring
- Power Save Mode: Reduced power consumption when no acquisition runs

Applications

- Translation of serial protocols
- Free programming of serial protocols
- Direct signal processing on site
- Conversion of user data

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In
- 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

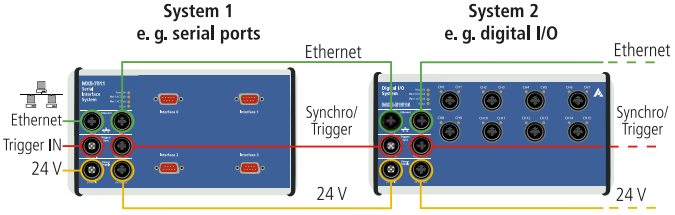
Software

- Software drivers for Windows 7 (32-bit)/Vista™ (32-bit)/ XP/2000. On request: Windows 7 (64-bit), Linux
- Direct access via SOAP (TCP/IP), WSDL files
- Direct access via Modbus TCP and Modbus (UDP)
- Programming examples .net2005, VC++ 6.0 on request: LabVIEW from 8.5, Linux
- Instruction manual for connecting a PLC (SIMATIC® S7®)

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

Synchronisation

Ethernet, synchronisation and supply signals can be looped from one system to the next. In this way, you can acquire and process distributed I/O signals directly at production machines.



*Preliminary product information

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Specifications*

Serial interfaces

Number of ports:	4
Mode:	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:	Automatically
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
Connectors:	4 x 9-pin D-Sub male connectors

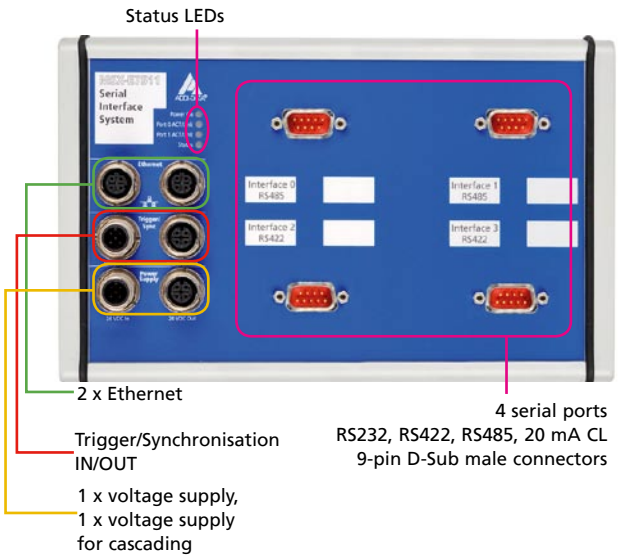
Voltage supply, Ethernet, Trigger, Synchro

The specifications for the voltage supply, Ethernet, Trigger, Synchronisation and Electromagnetic Compatibility apply to all MSX-E systems. See page 35.

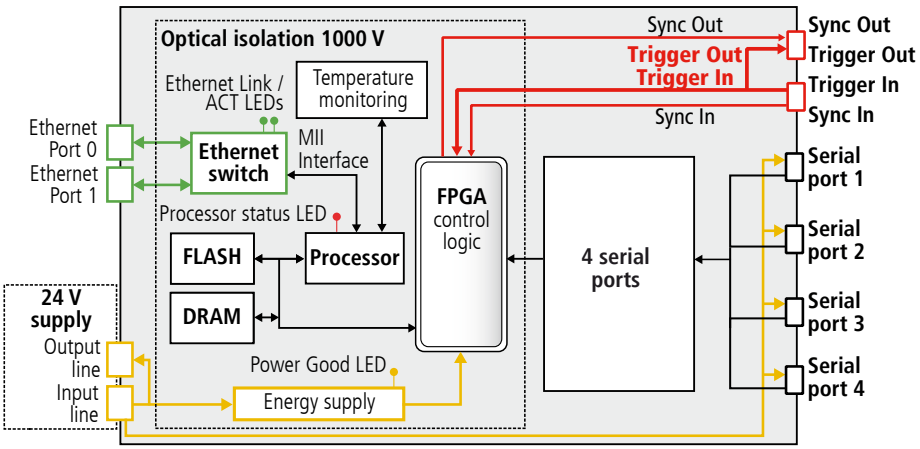
System features

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

Features



Simplified block diagram



Ordering information

MSX-E7511

Ethernet system for serial interfaces, 4 ports for RS232, RS422, RS485 or 20 mA CL. Incl. technical description and software drivers

Versions

MSX-E7511-XXXX

A:	RS232, optically isolated
B:	RS422, optically isolated
C:	RS485, optically isolated
D:	20mA CL

Exemple: **MSX-E7511-AACC**
Port 1 = RS232, Port 2 = RS232, Port 3 = RS485, Port 4 = RS485

Connection cables

For serial interfaces
ST073-RS232 (A): RS232 cable, open end, 9-pin D-Sub fem. connector
ST073-RS422 (B): RS422 cable, open end, 9-pin D-Sub fem. connector
ST073-RS485 (C): RS485 cable, open end, 9-pin D-Sub fem. connector
ST073-CL (D): 20mA CL cable, open end, 9-pin D-Sub fem. connector

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**

* Preliminary product information

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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
- Ease of 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

MSX-E systems		DatabaseConnect compatible
MSX-E1516:	Ethernet digital I/O system, 16 digital I/O	yes
MSX-E1701:	Ethernet multifunction counter system, digital I/O	on request
MSX-E1711:	Ethernet multifunction counter system, sin/cos, digital I/O	on request
MSX-E1721:	Ethernet multifunction counter system, sin/cos, digital I/O	on request
MSX-E3121:	Ethernet analog input system	yes, max. 1 kHz/channel
MSX-E3011:	Ethernet analog input system	yes, max. 1 kHz/channel
MSX-E3021:	Ethernet analog input system	yes, max. 1 kHz/channel
MSX-E3027:	Ethernet analog input system	yes, max. 1 kHz/channel
MSX-E3211:	Ethernet system for temperature acquisition	on request
MSX-E3311:	Ethernet system for pressure acquisition	on request
MSX-E3601:	Ethernet system for the acquisition of dynamic signals	on request
MSX-E3711:	Ethernet system for length measurement, 24-bit, simultaneous	on request
MSX-E3701:	Ethernet system for length measurement	on request
MSX-E3700:	Ethernet system for length measurement	on request

DatabaseConnect

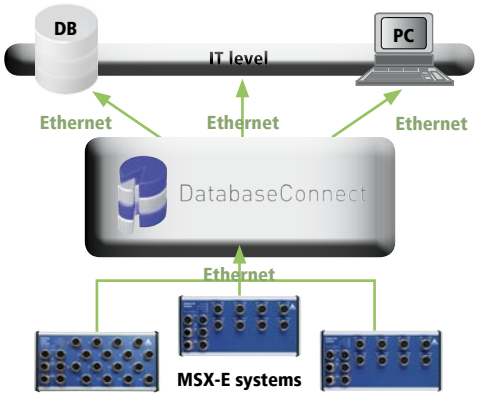
Use cases

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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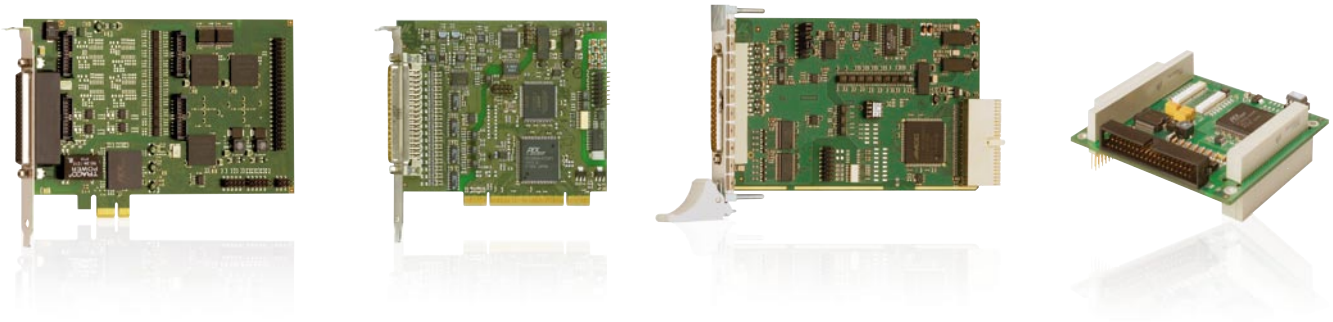
INTERFERENCE FREE PC BOARDS

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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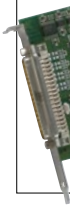
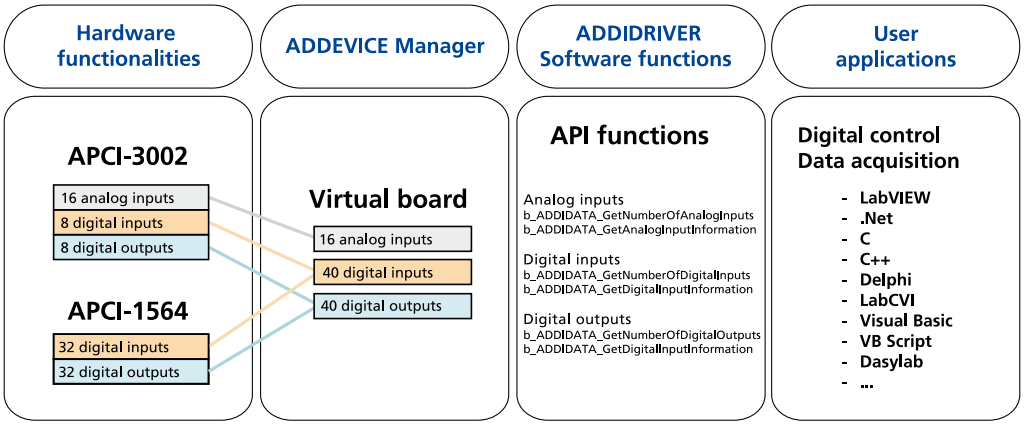


ADDI-DATA PC boards are supplied with an extensive software package for a fast and convenient integration into your application: the clever driver concept ADDIPACK, a wide range of drivers and samples and a configuration tool assist you from the beginning.

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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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 assure 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 79), 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 capacity of your board's hardware and software resources 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.
More information about compatibility can be found in the download section on our website www.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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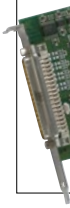

New! New!

PCI EXPRESS®	Digital						Counter	Analog			Watch-dog	Serial Interfaces*
	APCIe-1502	APCIe-1532	APCIe-1532-12V	APCIe-1516	APCIe-1564	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	500 V	500 V	500 V	1000 V	optional
Digital, 24 V												
Input channels, *incl. interruptible*	16 *15*	16 *15*		8	32 *16*	16 *15*		4 *1*	4 *1*	4 *1*	8	
24 V / 12 V	24 V	24 V	12 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	
Output channels, 24 V	16	16		8	16			4	4	4		
Output current per channel	500 mA (typ.)	500 mA (typ.)		500 mA (typ.)	500 mA (typ.)	Relays 2A		65 mA (typ.)	65 mA (typ.)	65 mA (typ.)	Relay 2 A	
Relays						16					8	
Watchdog / Timer / Counter	1 x watchdog/ timer, 1 x 12-bit timer 2 x 16-bit counters	1 x watchdog/ timer, 1 x 12-bit timer 1 x 16-bit counters		watchdog	1 x watchdog/ timer, 1 x 12-bit timer 3 x 16-bit counters	watchdog timer		2x16-bit timers, incl. 1 which can be used as watchdog	1 x 16-bit timer	2x16-bit timers, incl. 1 which can be used as watchdog	7 watch-dogs/ timers	
Reprogrammable function modules												
– *Incremental counter,* – *SSI synchronous serial interface,* – *Counter/timer,* – *Pulse acquisition,* – *Frequency, pulse width, period duration measure-ment, PWM* – *dig. inputs and outputs* – *BiSS-A/B, BiSS-C* – *Parallel interface* – ...							4					
Input frequency							Up to 5 MHz New: 10 MHz					
Signals							TTL, RS422, 24 V					
Analog												
Analog inputs, 16-bit								16 SE / 8 diff.	16 SE / 8 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 or 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 modes configura-tion through MX modules												RS232, RS422, RS485, 20 mA CL
Software	Current driver list on the web: **www.addi-data.com**											
Page	82	82		84	86	88	90	94	96	98	100	102

*Base Boards

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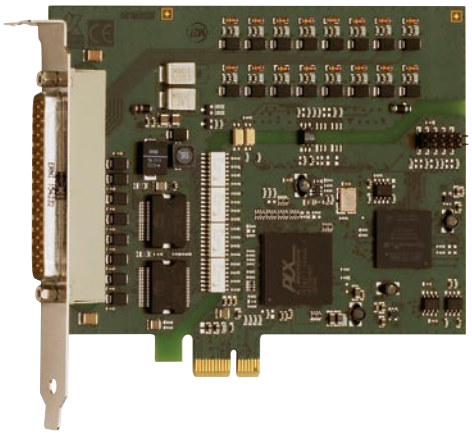
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V, for PCI Express

New!* 12 V version



APCIe-1532 / APCIe-1532-12V / APCIe-1502

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 106

Also for *CompactPCI™*
See CPCI-1500, page 184

Also for PC/104-PLUS
see PC104-PLUS1500 page 178

Signed 64-bit drivers for Windows 7/XP

LabVIEW™

LabWindows/CVI™

*Preliminary product information

Features

Inputs

- 16 optically isolated inputs, 24 V (APCIe-1532 / APCIe-1502) 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

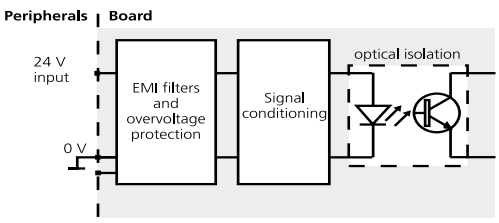
Timer / Counter

- 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

Protective circuit for the input channels



- 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:

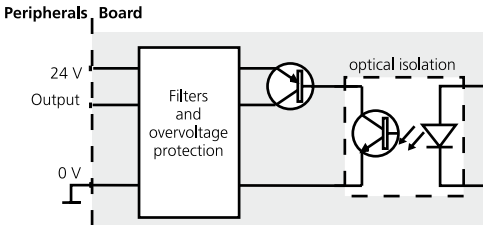
- Digital input • Digital output • Watchdog
- Timer • Counter

On request:

Further operating systems, compilers and samples.

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

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) / 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 / 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 2-15:	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 2-15:	5 KHz	5 KHz
Logic input levels:	**at 24 V**	**at 12 V (APCIe-1532-12V)**
Channel 1-15 (or 2-15) UH (max.):	30 V / 3,1 mA, typ.	16 V / 2.3 mA, typ.
UH (min.):	19 V / 1 mA, typ.	9 V / 1 mA, typ.
UL (max.):	14 V / 0.2 mA, typ.	6 V / 0.5 mA, typ.
UL (min.):	0 V / 0 mA, typ.	0 / 0 mA, typ.
Channel 0: Specifications see technical description at www.addi-data.com		
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:	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:	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

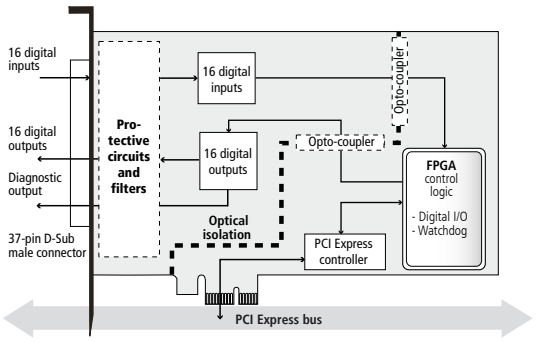
EMC – Electromagnetic compatibility

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.

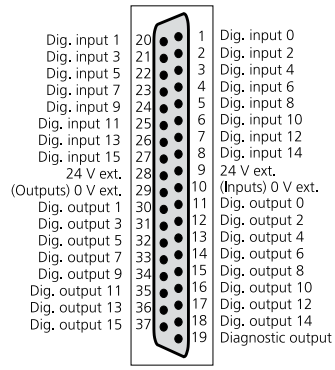
Physical and environmental conditions

Dimensions:	129 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

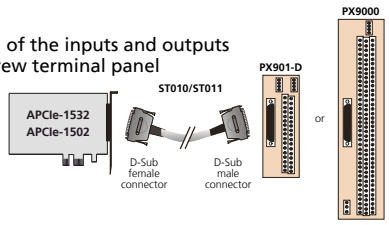


Pin assignment – 37-pin D-Sub male connector



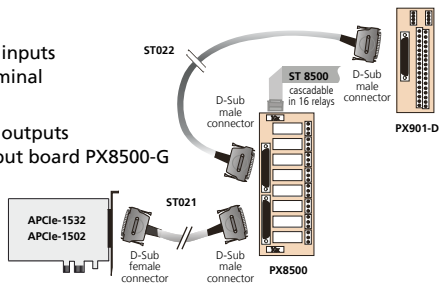
ADDI-DATA connection

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

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
APCIe-1532-12V: 16 inputs, 12 V, 16 outputs, 11-36 V
APCIe-1502: 16 inputs, 24 V, 16 outputs, 11-36 V, 2 counters

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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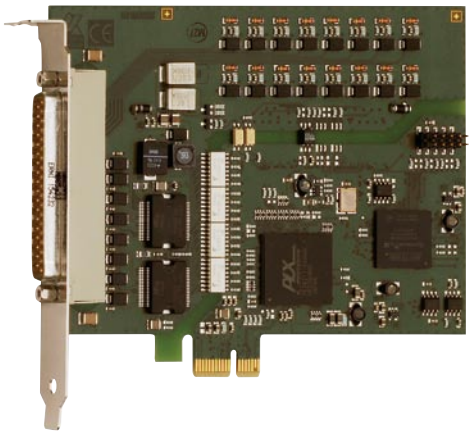
Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V, for PCI Express



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 108

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:

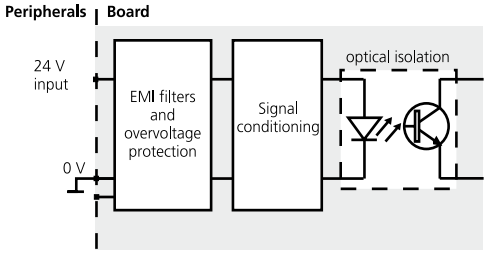
- Digital input • Digital output • Watchdog

On request:

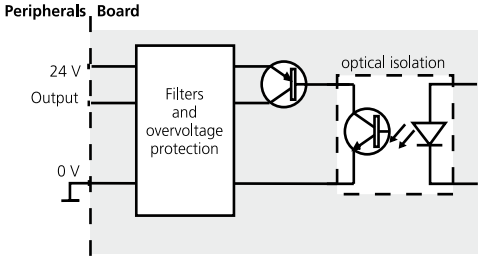
Further operating systems, compilers and samples.

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

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 / 3.1 mA, typical
	UH (min.):	19 V / 1 mA, typical
	UL (max.):	14 V / 0.2 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:	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 (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)

Safety

Shutdown logic:	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

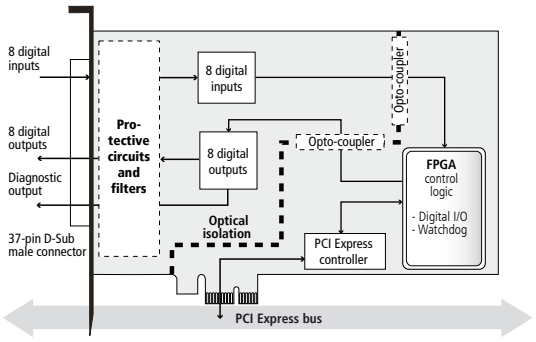
EMC – Electromagnetic compatibility

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.

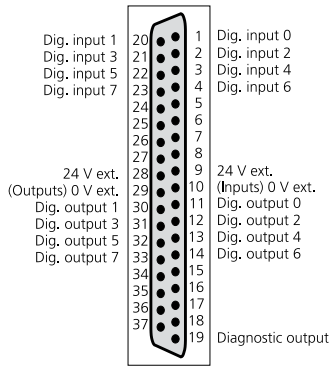
Physical and environmental conditions

Dimensions:	129 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

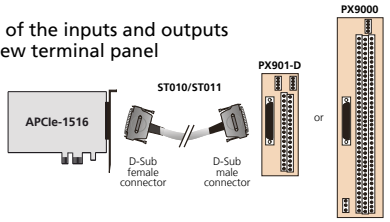


Pin assignment – 37-pin D-Sub male connector



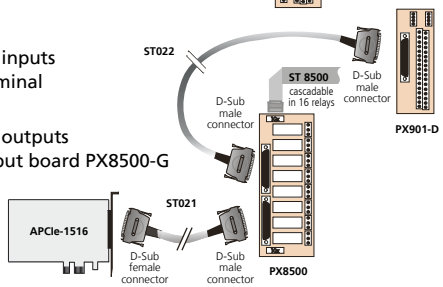
ADDI-DATA connection

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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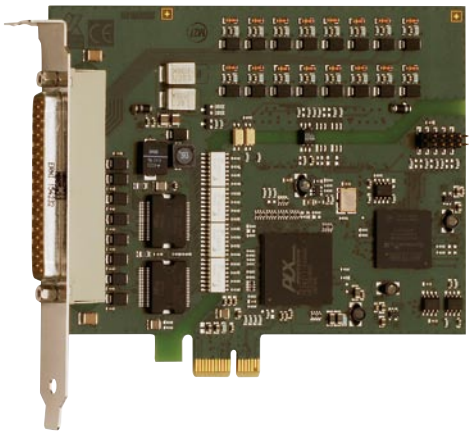
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V, for PCI Express

New!*



APCIe-1564

PCI Express interface

32 digital inputs, 24 V,
including 16 interruptible inputs

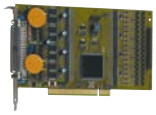
32 digital outputs, 24 V, 500 mA/channel

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 110

Signed 64-bit drivers for Windows 7/XP

LabVIEW™

LabWindows/CVI™

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
- 2 timers (12-bit resolution)
- 1 watchdog (12-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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server2003 (real-time)
- Signed 64-bit drivers for Windows 7/XP

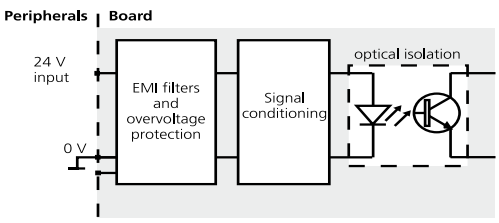
Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:
- Digital input • Digital output • Watchdog
- Timer • Counter

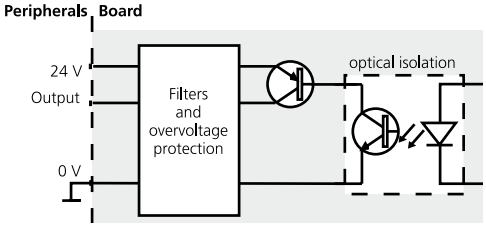
On request:
Further operating systems, compilers and samples.

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

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 0-2:	6.6 mA	at 24 V, typical
	Channel 3-31:	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	
	UH (min.):	19 V / 1 mA, typical	
	UL (max.):	14 V / 0.2 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

Timer:	12-bit, programmable from 1µs to 4095 s

Safety

Shutdown logic:	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

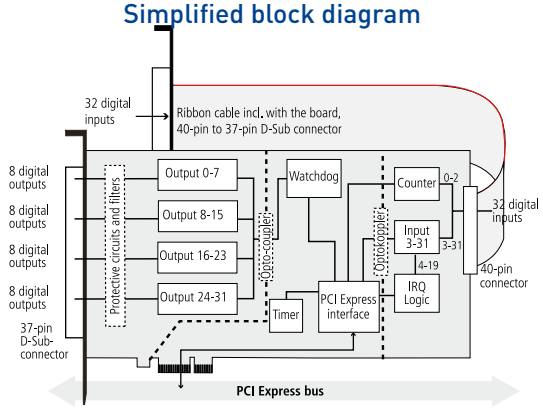
EMC – Electromagnetic compatibility

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.

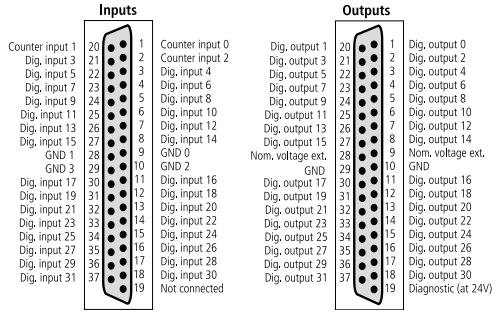
Physical and environmental conditions

Dimensions:	129 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

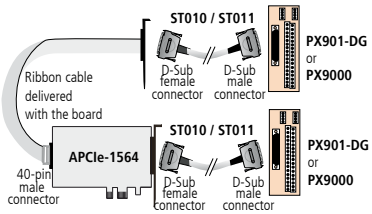


Pin assignment – 37-pin D-Sub male connector

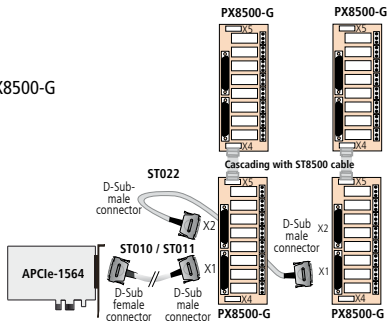


ADDI-DATA connection

Example 1:
- Connection of the inputs (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
ST021: Round cable between APCIe-1532 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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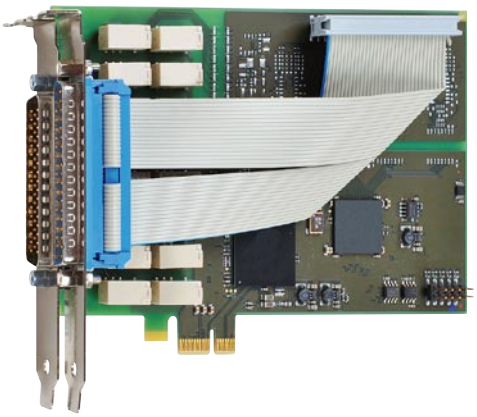
Relay board, optically isolated, 8/16 relays, 8/16 digital inputs, 24 V



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 120

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/XP

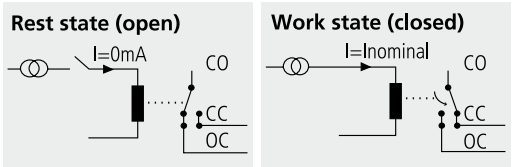
Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions:
- Digital input • Digital output
- Watchdog • Timer

On request:
Further operating systems, compilers and samples.

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

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
Responding 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

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

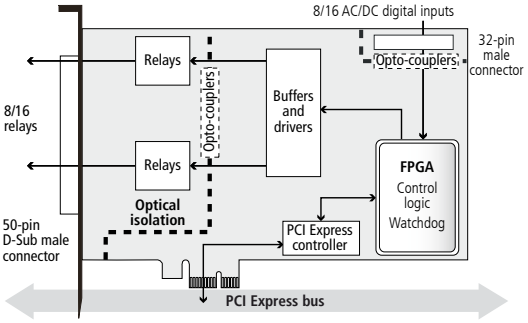
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC 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:	16-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



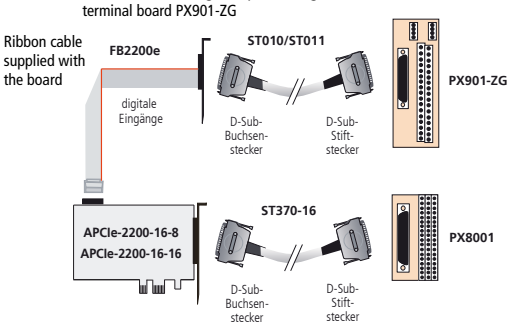
Pin assignment – 50-pin D-Sub connector
APCIe-2200-16-8/APCIe-2200-16-16

Pin		Pin		Pin		Pin
34	OC of relay 0	18	CC of relay 0	1	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	2	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	8	CO of relay 7	8
42	OC of relay 8	26	CC of relay 8	9	CO of relay 8	9
43	OC of relay 9	27	CC of relay 9	10	CO of relay 9	10
44	OC of relay 10	28	CC of relay 10	11	CO of relay 10	11
45	OC of relay 11	29	CC of relay 11	12	CO of relay 11	12
46	OC of relay 12	30	CC of relay 12	13	CO of relay 12	13
47	OC of relay 13	31	CC of relay 13	14	CO of relay 13	14
48	OC of relay 14	32	CC of relay 14	15	CO of relay 14	15
49	OC of relay 15	33	CC of relay 15	16	CO of relay 15	16
50	-			17	-	17

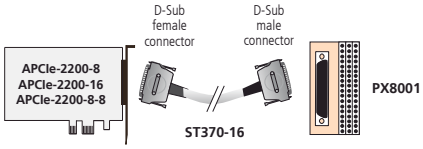
OC: Opening contact CC: Closing contact CO: Change-over contact

ADDI-DATA connection

Example 1: APCIe-2200-16-8/ APCIe-2200-16-16
- Connection of the relay outputs through screw terminal panel PX8000
- Connection of the digital inputs through ribbon cable to the screw terminal board 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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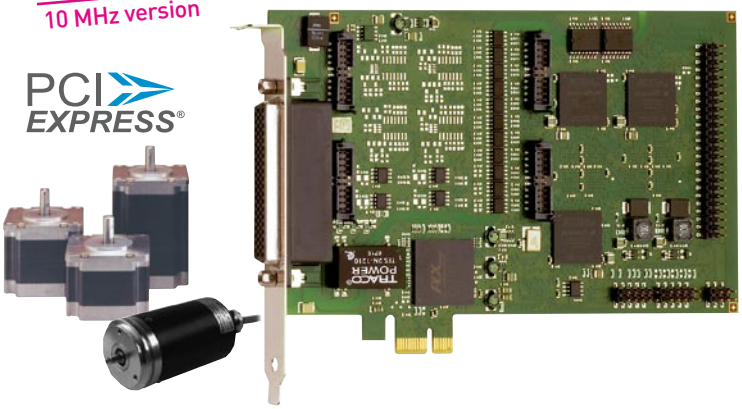
Multifunction counter board, optically isolated, fast counter inputs - programmable functions, for PCI Express

New!*
10 MHz version

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, ...

Function selection through software

Optical isolation

Inputs and outputs: RS485, TTL, 24 V

Customised functions

RoHS 2002/95/EC

Also for PCI
see APCI-1710
page 124

Also for *CompactPCI™*
see CPCI-1710
page 188

Signed 64-bit drivers for Windows 7/Vista/XP

on request

LabVIEW™

The board APCIe-1711 is a fast multifunction and multi-channel 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
- RS485 driver with max 5 MHz max. (10 MHz for the APCIe-1711-10MHz – without ESD protection)
- With RS485/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
- Customised functions

Available channels on one function module

- 4 channels, programmable either as digital inputs or outputs, optically isolated, RS485
- 3 channels, digital inputs, optically isolated, 24 V
- 1 digital power outputs, optically isolated, 24 V

Additional channels

- 28 TTL E/A, without optical isolation

Versions

	RS485/ TTL-I/O	24 V inputs	5 V outputs	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:

- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- Microsoft VC++ • Borland C++

On request:

Further operating systems, compilers and samples.

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

*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	Timer/ counter

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

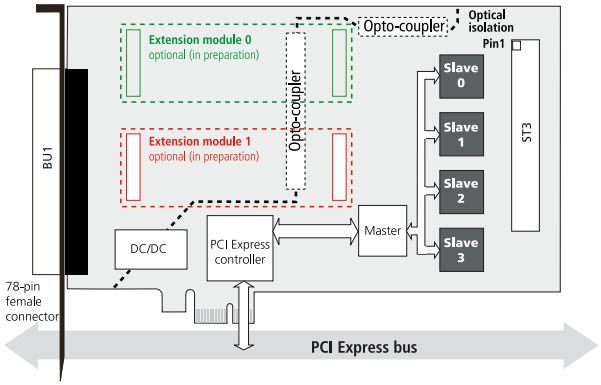
Each module can be programmed with the function of your choice. You can operate simultaneously up to 4 different functions on one board. If your application must be modified, you can load a new function quickly and easily.

Overview of signal geber and functions

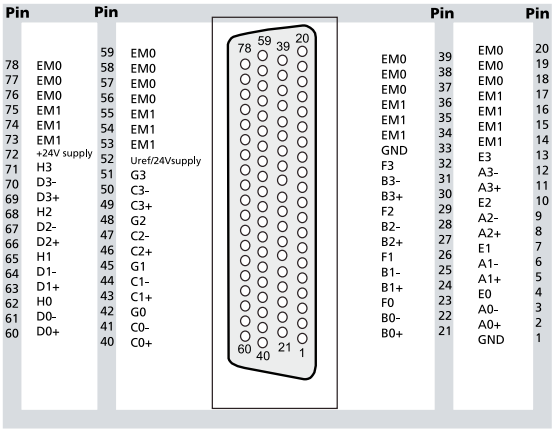
Application	Number of signal generator or functions for each function module	Max. use of the function module for each APCIe-1711	Max. number of signal generator or function for each APCIe-1711	Page
Incremental counter	1 (32-bit) or 2 (16-bit)	4	4 or 8	126
SSI	3	4	12	126
Chronos	1	4	4	127
BiSS-Master	6	4	24	92
Counter/ Timer	3	4	12	128
TOR	2	4	8	129
Pulse acquisition	4	4	16	130
PWM	2	4	8	130
ETM	2	4	8	131
Digital I/O	8	4	32	131
TTL	24	1	24	131
Parallel interface	1	4	1	92

Customer-tailored modifications,
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

Simplified block diagram

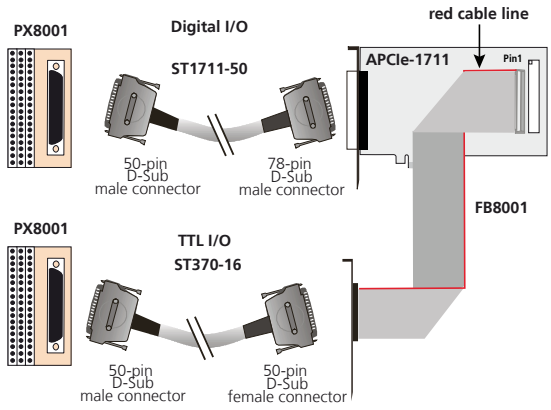


Pin assignment – 78-pin D-Sub female connector



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 of 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.

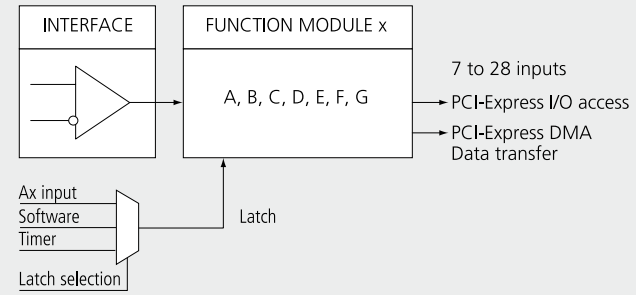
Used signals

On connector	Polarity	Function
Ax +/-	24 V*/ RS485	Digital input
Bx +/-	24 V*/ RS485	Digital input
Cx +/-	24 V*/ RS485	Digital input
Dx +/-	24 V*/ RS485	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 1 V

x: Number of the module (See pin assignment page 91)
* 24 V for the APCIe-1711-24 V

Block diagram Parallel interface



Function BiSS-Master

The **BiSS-Master** function is a bidirectional sensor interface for the communication with up to 6 sensors. BiSS A/B and C are supported.

Features of the BiSS-Master function:
- 1 function module with two channels to which a maximum amount of 6 sensors can be assigned freely.
- Sensor data transmission
- Register data transmission

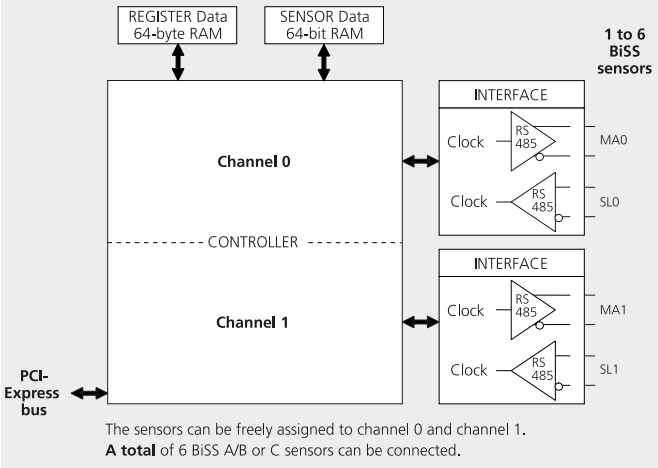
More information about the function range of the BiSS interface on www.biss-interface.com.

Used signals

Signals	On connector	Polarity	Function
Output0_x	Ax +/-	RS485	Dig. output 0 (clock line from master to slave) MA 0
Input0_x	Bx +/-	RS485	Dig. input 0 (data line from slave to master) SL 0
Output1_x	Cx +/-	RS485	Dig. output 1 (clock line from master to slave) MA 1
Input1_x	Dx +/-	RS485	Dig. input 1 (data line from slave to master) SL 1

x: Number of the module (See pin assignment page 91)

Block diagram BiSS-Master



The sensors can be freely assigned to channel 0 and channel 1.
A total of 6 BiSS A/B or C sensors can be connected.

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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, RS485)
- PWM (pulse width modulation, 2 x per module)
- BiSS-Master (fast sensor interface)
- ETM (Timer interface for period duration measurement, edge time, ...)
- TTL (TTL I/O without isolation)
- Parallel interface
- Customised functions

Signals

Digital I/O signals, TTL or RS485, 24 V

Inputs

Differential inputs or outputs (A, B, C, D)		
Differential inputs, RS485:	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 (channels E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	18 V
	UL max.:	16 V
	UL min.:	0 V
Maximal input frequency:	1 MHz (at nominal voltage) depending on the function	

Outputs

Differential inputs or outputs (A, B, C, D)	
Nominal voltage:	3.3 VDC
Maximum output frequency:	5 MHz (diff. outputs) depending on the function
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.	5 V to 30 VDC (via 24 V ext. pin)
Maximum current for 4 outputs:	90 mA per output / 270 mA for all outputs (PTC)
Overtemperature:	165 °C (all 24 V outputs switch off) protection against overtemperature (24 V inputs)

Technical data APCIe-1711-24 V version

24 V inputs (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 : (Standard)	Unominal:	24 V
	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:	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 / 340 mA 12 V / 80 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 RS485 (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

* Preliminary product information

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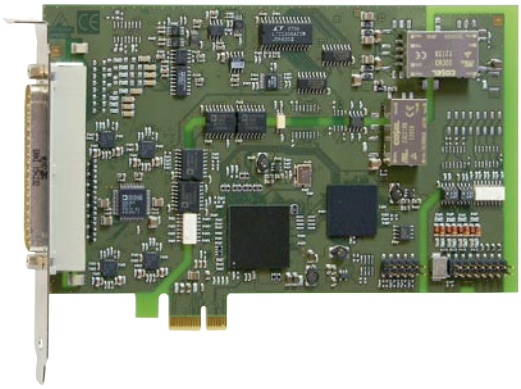
Multifunction board, optically isolated, 16 SE/8 differential inputs, 4/8 analog outputs, 16-bit

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 138
Also for *CompactPCI™*
see CPCI-3120, page 192

Signed 64-bit drivers for Windows 7/XP

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

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:
- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/XP

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, download menu

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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 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.

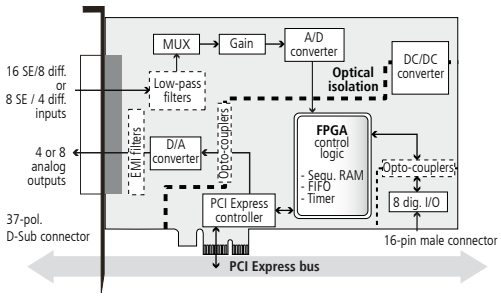
EMC – Electromagnetic compatibility

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.

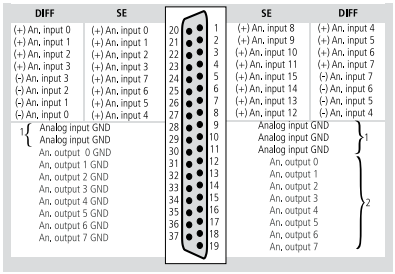
Physical and environmental conditions

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

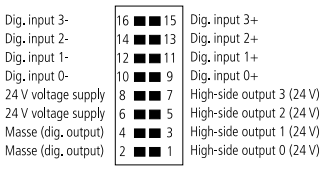


Pin assignment – 37-pin D-Sub male connector

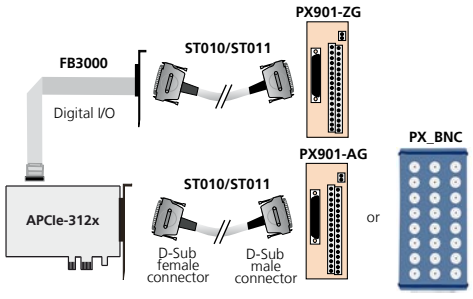


1: The analog inputs have a common ground line
2: Each analog output has its own ground line

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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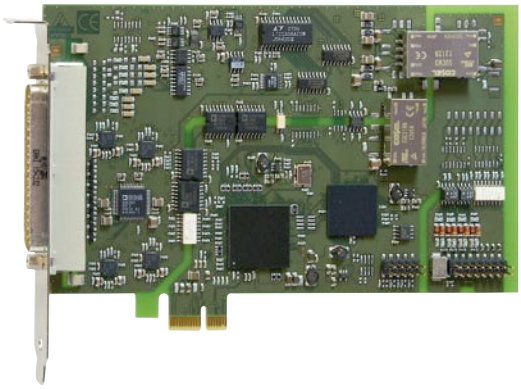
Analog input board, optically isolated, 16 SE/8 differential inputs, 16-bit



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 148
and APCI-3010 / APCI-3016, page 142

Also for *CompactPCI™*
see CPCI-3001, page 194

Signed 64-bit drivers for Windows 7/XP

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:

- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/XP

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, download menu

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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
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.

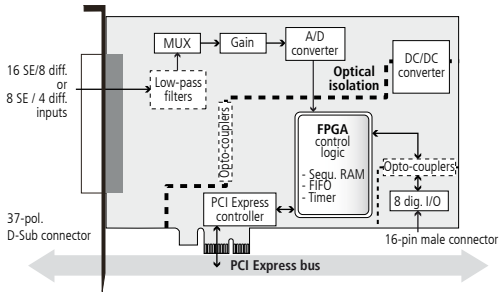
EMC – Electromagnetic compatibility

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.

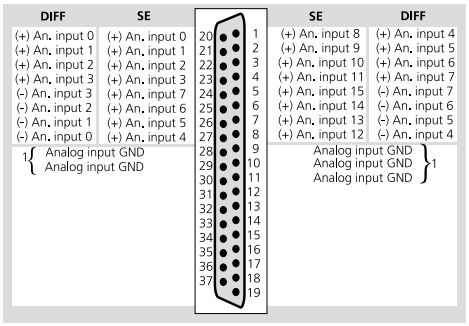
Physical and environmental conditions

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

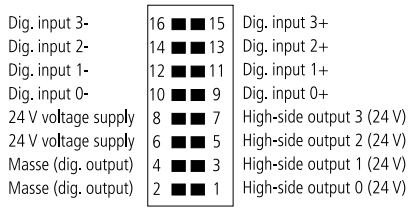


Pin assignment – 37-pin D-Sub male connector

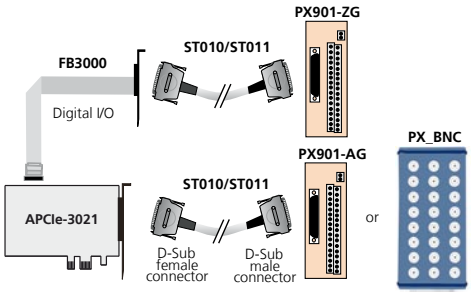


1: The analog inputs have a common ground line

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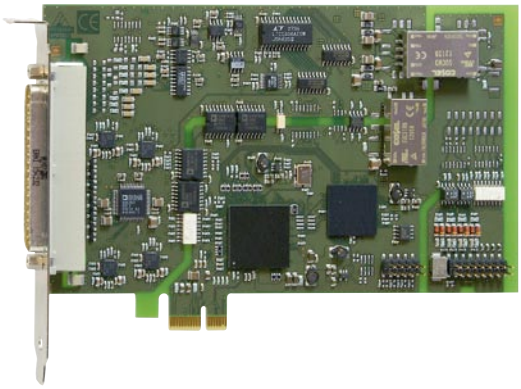
Fax: +49 7229 1847-222 www.addi-data.com

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
see APCI-3504, page 150
and APCI-3501, page 152

Signed 64-bit drivers for Windows 7/XP

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.

Standard drivers for:

- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/XP

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, download menu

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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.

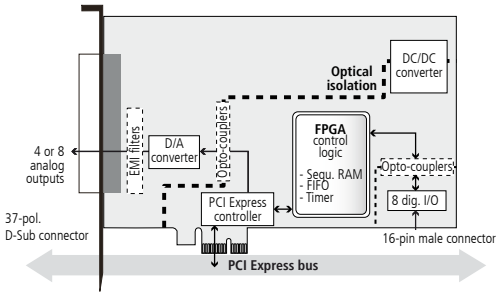
EMC – Electromagnetic compatibility

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.

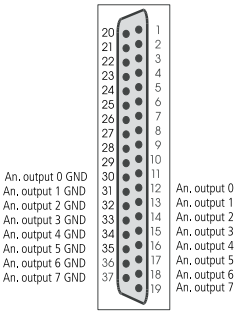
Physical and environmental conditions

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



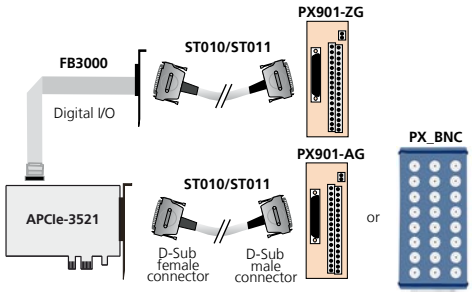
Pin assignment – 37-pin D-Sub male connector



Pin assignment – 16-pin male connector

Dig. input 3-	16 15	Dig. input 3+
Dig. input 2-	14 13	Dig. input 2+
Dig. input 1-	12 11	Dig. input 1+
Dig. input 0-	10 9	Dig. input 0+
24 V voltage supply	8 7	High-side output 3 (24 V)
24 V voltage supply	6 5	High-side output 2 (24 V)
Masse (dig. output)	4 3	High-side output 1 (24 V)
Masse (dig. output)	2 1	High-side output 0 (24 V)

ADDI-DATA connection



Ordering information

APCIe-3521

Analog output board, optically isolated, 8/4 differential outputs, 16-bit.
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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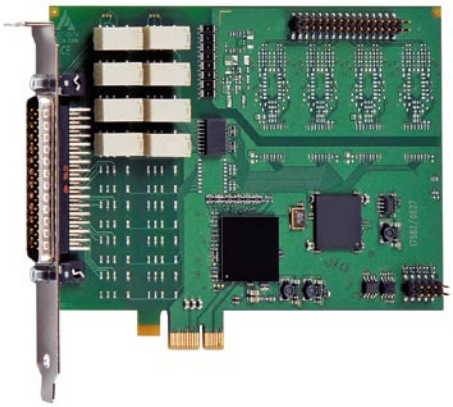
Watchdog board, optically isolated, 7 watchdogs/timer

New!*



APCIe-040

7 watchdogs/timer

8 electromechanical relays with change-over contacts

8 digital inputs 24 V
incl. 7 interruptible inputs

2 alarm levels

Temperature monitoring from -45 °C to + 135 °C

Optical isolation 1000 V

RoHS 2002/95/EC

Also for PCI
see APCI-035, page 168

on request

LabVIEW™

LabWindows/CVI™

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 soft- and hardware monitoring. In this way, external devices can 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
- 8 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
- 8 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

- 8 inputs, optically isolated, incl. 7 interruptible inputs
- Input voltage 24 V

Software drivers

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

Standard drivers for:

- 32-bit drivers for Windows 7/Vista/XP/2000/ (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

- Watchdog • Timer • Temperature

On request:

Further operating systems, compilers and samples.

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

In preparation

The software **Watch & Act©** monitors the software and hardware levels of the PC or server on which it is installed. System services can be stopped or restarted as needed. Combined with the watchdog board APCIe-040, it is possible to monitor the complete system, i. e. in case of error the PC or server can be rebooted. It is also possible to watch external devices such as diagnostic or monitoring systems and to control modems or other dialing devices.

* 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
Responding 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:	8, incl. 7 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)

Temperature monitoring

Accuracy:	± 2 °C
Measurement range:	-45 °C to 135 °C (real range of application 0-60 °C)
Resolution:	8-bit

Safety

Test voltage:	1000 V

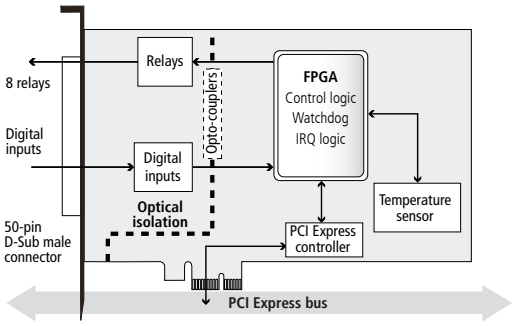
EMC – Electromagnetic compatibility

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:	-
Front connector:	50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

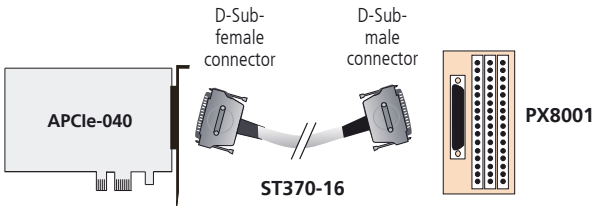


Pin assignment

Pin		Pin			Pin		Pin
34	OC of relay 0	18	CC of relay 0	34 18 1	1	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	35 2	2	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	36 3	3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37 4	4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38 5	5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39 6	6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40 7	7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41 8	8	CO of relay 7	8
42	Digital input 0 (+)	26	-	42 9	9	Digital input 0 (-)	9
43	Digital input 1 (+)	27	-	43 10	10	Digital input 1 (-)	10
44	Digital input 2 (+)	28	-	44 11	11	Digital input 2 (-)	11
45	Digital input 3 (+)	29	-	45 12	12	Digital input 3 (-)	12
46	Digital input 4 (+)	30	-	46 13	13	Digital input 4 (-)	13
47	Digital input 5 (+)	31	-	47 14	14	Digital input 5 (-)	14
48	Digital input 6 (+)	32	-	48 15	15	Digital input 6 (-)	15
49	Digital input 7 (+)	33	-	49 16	16	Digital input 7 (-)	16
50	-			50 33 17	17	-	17

OC: Opening contact CC: Closing contact CO: Change-over contact

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-040-8-8: 7 watchdogs, 8 relays, 8 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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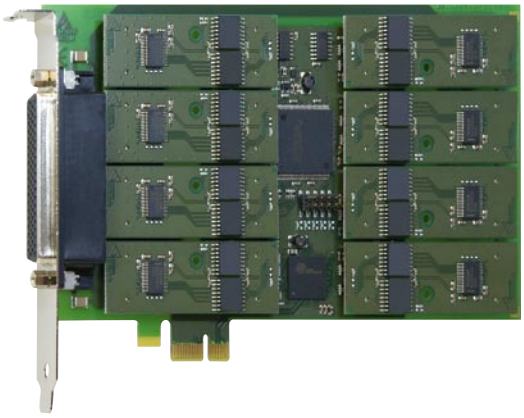
1 to 8-port serial interface, RS232, RS422, RS485, 20 mA CL, modular mounting through modules



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 172

Also for *CompactPCI™*
see CPCI-7500, page 196

Signed 64-bit drivers for Windows 7/Vista/XP

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
- Detection of false start bits
- Internal diagnostic possibility, break, parity, overrun and framing error

Applications

- Industrial serial communication
- Data acquisition
- Industrial process control
- Multi-user systems
- PLC interface
- Modem and printer control
- Multidrop applications
- etc.

Software drivers

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

Standard drivers for:
- 32-bit drivers for Windows 7/Vista/XP/2000/ (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

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

ADDIPACK functions
- Watchdog • Timer • Temperature

On request:
Further operating systems, compilers and samples.

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

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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	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	1MBaud	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) 2x9-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-7800: 8-port serial interface (1 x 78-pin D-Sub
Each incl. technical description and software drivers.

APCIe-7500/4C: 4-port serial interface (4 x 9-pin D-Sub)

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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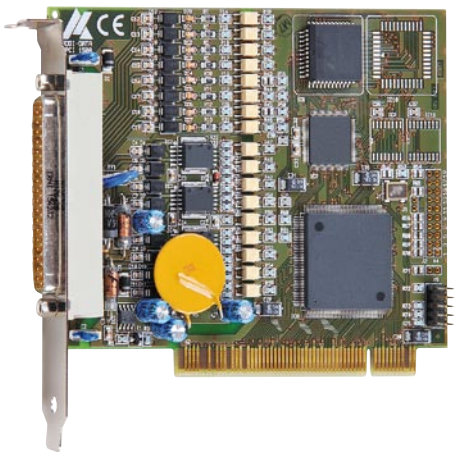

Correct state identification

With the digital boards by ADDI-DATA you can reliably find out the state (0 or 1) of the connected devices or sensors. Thus there is no undefined range that could result in switching errors.

The digital boards are used in the industrial I/O regulation, in signal switching, as interface to automatic test devices, for the on/off monitoring of electrical consumers or as an interface to machines. In this way, for example, ventilation, valves, pumps and electromechanical relays can be activated.

A wide 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

Informations see page 30

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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SPIRIT OF EXCELLENCE

Product overview

New!

	Digital I/O, 24 V				Digital input, 24 V		Digital output, 24 V		Relay board	Digital I/O, TTL
	APCI-1500 New! APCI-1500-12V	APCI-1516	APCI-1564 APCI-1564-5V	APCI-1564_3,3V	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	3.3 V / 5 V	3.3 V / 5 V
FPGA			✓						✓	
Filters and protective circuits	✓	✓	✓		✓	✓	✓	✓	✓	✓
Input channels	16	8	32		32	16				48 TTL (APCI-1648) 96 TTL (APCI-1696)
Optical isolation 1000 V	✓	✓	✓		✓	✓				
Interruptible input channels	14		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 (APCI-1564-5V)		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)
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)				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]				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)	
Timer / Counter (depth)	3/- (16-bit)		1/3 (32-bit)							
Page	106	108	110		112	114	116	118	120	122
Software	Driver download: www.addi-data.com, **download menu**									

(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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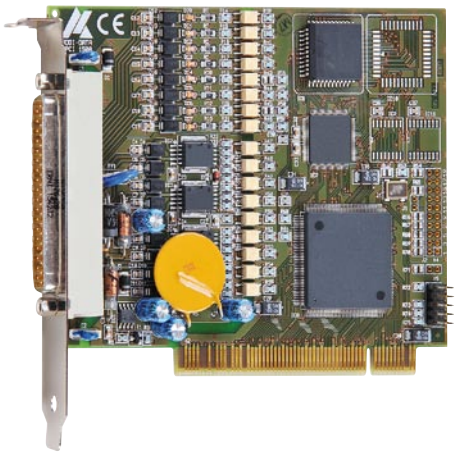
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V / 12 V

New!* 12 V version



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 184

Also for PC/104-PLUS
See page 178

Also for PCI EXPRESS® see page 82

Signed 64-bit drivers for Windows 7/Vista/XP

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, APCI-1532 for the PCI 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server2003 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP/Server 2008
- 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, download menu

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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

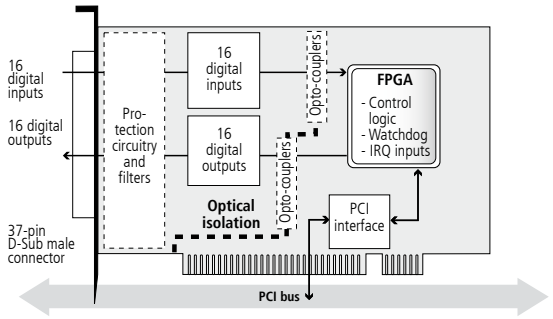
EMC – Electromagnetic compatibility

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.

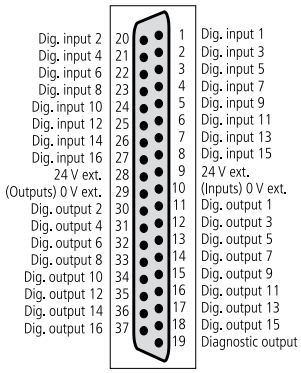
Physical and environmental conditions

Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	Short board, 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

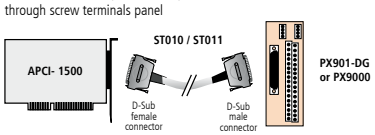


Pin assignment – 37-pin D-Sub male connector

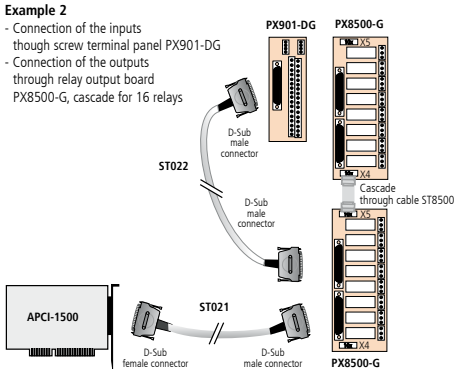


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminals panel



Example 2
- Connection of the inputs though screw terminal panel PX901-DG
- Connection of the outputs through relay output board PX8500-G, cascade for 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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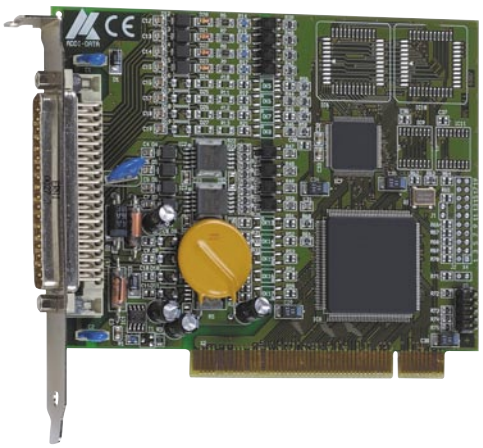
Digital I/O board, optically isolated, 16 digital inputs and outputs, 24 V



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 84

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

LabWindows/CVI™

DASYLab10 Data Acquisition System Laboratory

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP

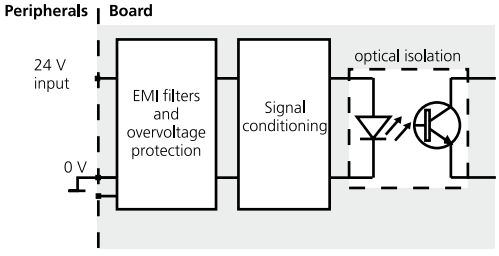
Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:
- Digital input • Digital output • Watchdog

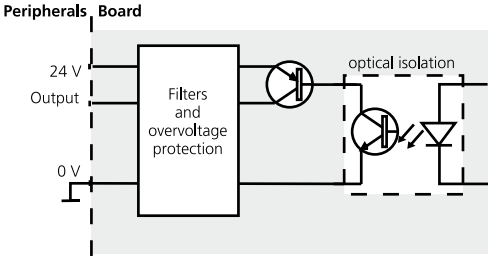
On request:
Further operating systems, compilers and samples.

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

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

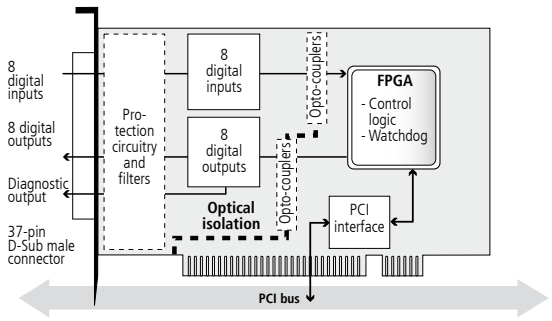
EMC – Electromagnetic compatibility

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.

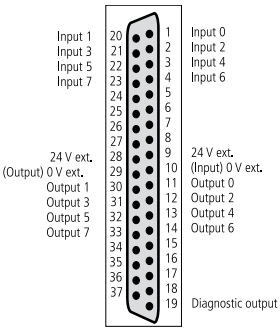
Physical and environmental conditions

Dimensions:	131x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	Short board, 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

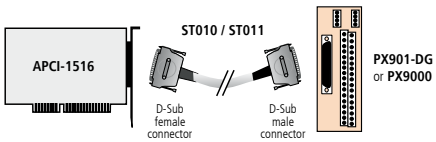


Pin assignment – 37-pin D-Sub male connector

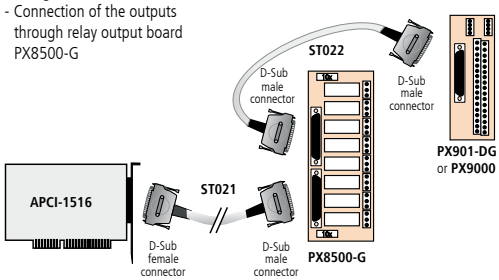


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminals boards



Example 2
- Connection of the inputs though screw terminal board 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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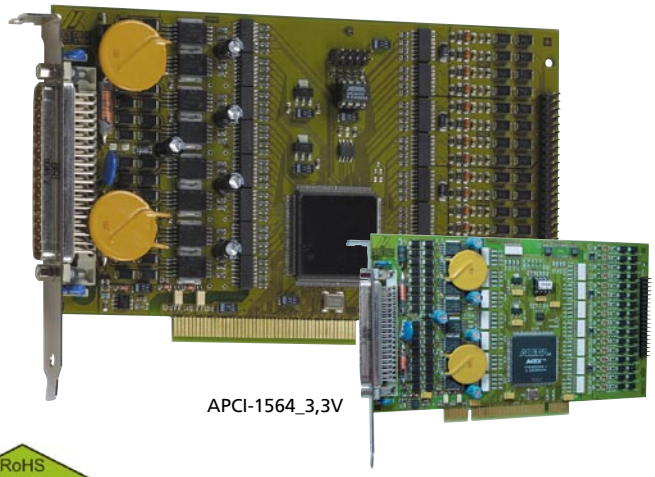
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V



APCI-1564_3,3V

APCI-1564/APCI-1564_3,3V/APCI-1564-5V

PCI 5 V (APCI-1564, APCI-1564-5V)
PCI 3.3 V (APCI-1564_3,3V)

32 digital inputs, 24 V or 5 V, including 16 interruptible, filtered

32 digital outputs, 24 V or 5 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

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS® see page 86

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

LabWindows/CVI™

DIAdem®

Features

- 32-bit, 33 MHz, PCI interface
- PCI 5 V (APCI-1564, APCI-1564-5V)
- PCI 3.3 V (APCI-1564_3,3V)

Inputs

- 32 optically isolated digital inputs, 24 V or as 5 V version (APCI-1564-5V), 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 or 5 V (APCI-1564-5V)
- 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
- 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server 2003 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP
- 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:

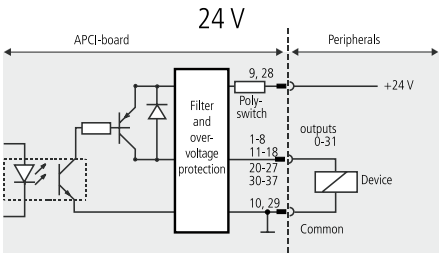
Digital input • Digital output
Watchdog • Timer • Counter

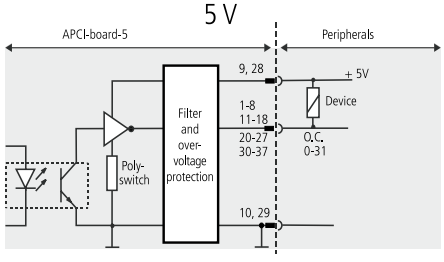
On request:

Further operating systems, compilers and samples.

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

Connection principle of the 24 V outputs (APCI-1564, APCI-1564_3,3V) and 5 V outputs (APCI-1564-5V)





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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	
Nominal voltage 24 V (APCI-1564 and APCI-1564_3,3V):	Digital inputs	counter inputs
Input current at 24 V:	4 mA typ.	10,5 mA typ.
Logic input levels:	U nominal: 24 V	24 V
UH max.:	26 V / 5 mA typ.	12.3 mA typ.
UH min.:	19 V / 1.3 mA typ.	5.2 mA typ.
UL max.:	14 V / 0.6 mA typ.	3.2 mA typ.
UL min.:	0 V / 0 mA	0
Nominal voltage 5V(APCI-1564-5V):	Digital inputs	Counter inputs
Input current at 5 V:	6 mA typ.	8.5 mA typ.
Logic input levels:	U nominal: 5 V	5 V
UH max.:	6 V / 8.4 mA typ.	6 V / 11.3 mA typ.
UH min.:	3.3 V / 3 mA typ.	3.3 V / 3.7 mA typ.
UL max.:	2.7 V / 1.9 mA typ.	2.7 V / 2.1 mA typ.
UL min.:	0 V / 0 mA	0
Signal delay:	70 µs	1 µs
Maximal input frequency:	5 kHz	500 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 (APCI-1564); or 5 V (APCI-1564-5V)
Supply voltage:	10 V to 36 V, min. 5 V (via front connector)
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: 120 µs
Switch-off time:	I out=0.5 A, load = resistance: 40 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: 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

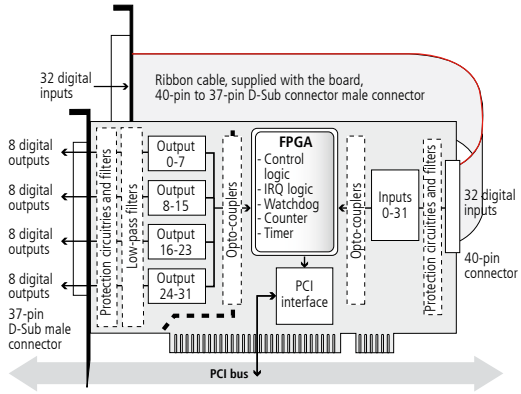
EMC – Electromagnetic compatibility

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.

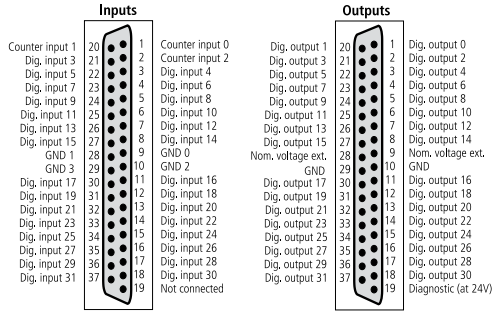
Physical and environmental conditions

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:	395 mA ± 15 mA typ.
Front connector:	37-pin D-Sub male connector for 32 dig. 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

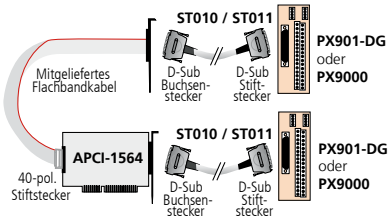


Pin assignment – 37-pin D-Sub male connector

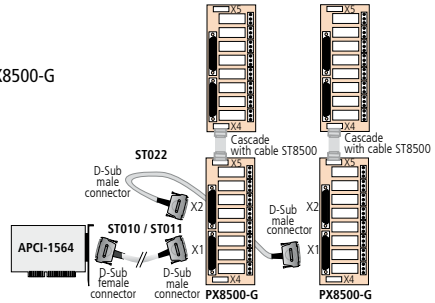


ADDI-DATA connection

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-1564-5V

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
APCI-1564-5V: Digital I/O board, optically isolated, 64 digital inputs and outputs, 5 V. Incl. ribbon cable, technical description, software drivers

Accessories

PX901-D: Screw terminal panel
PX901-DG: Screw terminal panel for DIN rail
PX 901-ZG: Screw terminal panel (only for APCI-1564-5V)
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)
ST021: Between APCI-1564 and PX8500-G, shielded, 2 m
ST022: Between 2 relay output boards PX8500-G
ST8500: Ribbon cable for cascading two PX8500-G

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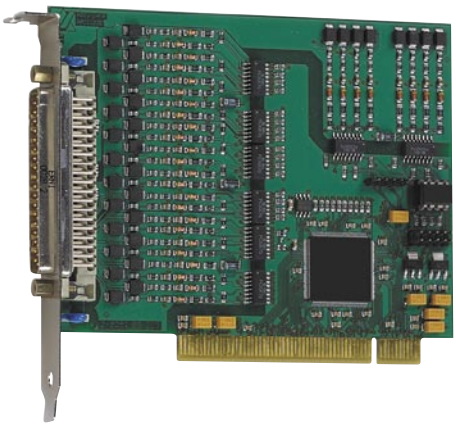
Digital input board, optically isolated, 32 digital inputs, 24 V / 5 V



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

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server 2003 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP
- 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:

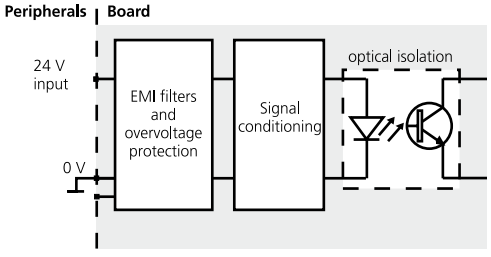
Digital input

On request:

Further operating systems, compilers and samples.

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

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; OR priority	
Nominal voltage:	24 V; or 5 V (APCI-1032-5)	
Input current at U nominal:	6 mA typ.	
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.	3.3 V/3 mA typ.
UL max.:	14 V/current 1.3 mA typ.	2.7 V/1.9 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	

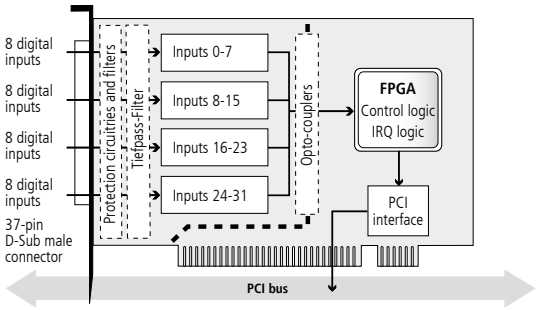
EMC – Electromagnetic compatibility

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.

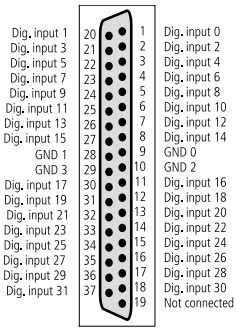
Physical and environmental conditions

Dimensions:	131 x 99 mm (PCI short)
System bus:	PCI 32-bit 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) 180 mA ± 15 mA typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

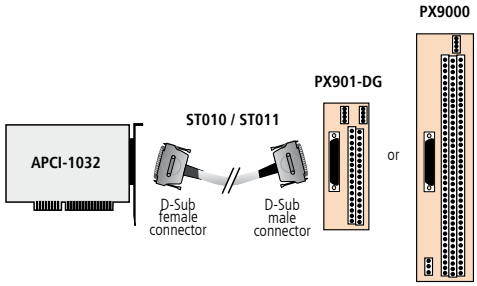


Pin assignment – 37-pin D-Sub male connector



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: 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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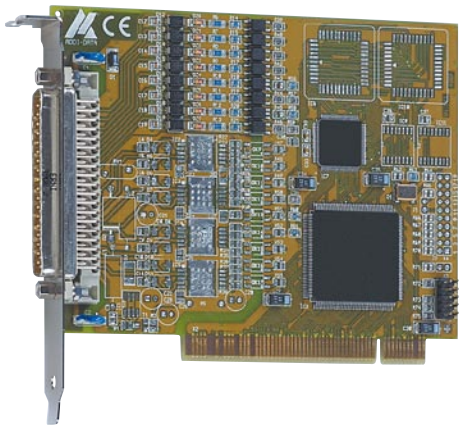
Digital input board, optically isolated, 16 digital inputs, 24 V



APCI-1016

16 digital inputs, 24 V

Optical isolation 1000 V

Input filters

Reverse voltage protection

RoHS 2002/95/EC

PCI 32-bit

Signed 64-bit drivers for Windows 7/XP

LabVIEW™

LabWindows/CVI™

DIAdem®

Features

- 16 optically isolated digital inputs, 24 V

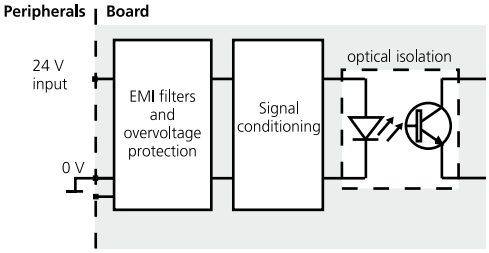
Safety features

- 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
- ...

Protective circuit for the input channels



Software drivers

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

Standard drivers for:

- Linux (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers f. Windows 7/XP

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, download menu

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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

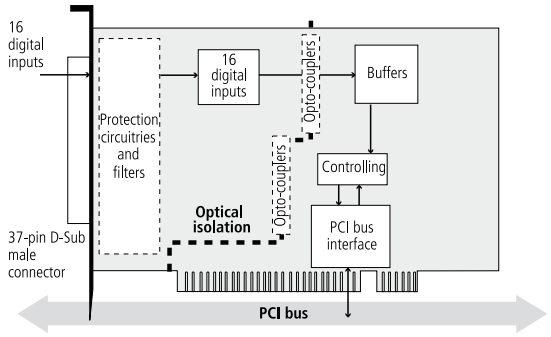
EMC – Electromagnetic compatibility

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.

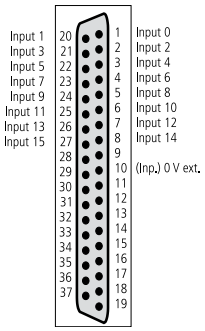
Physical and environmental conditions

Dimensions:	131 x 99 mm (PCI short)
System bus:	PCI 32-bit 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)

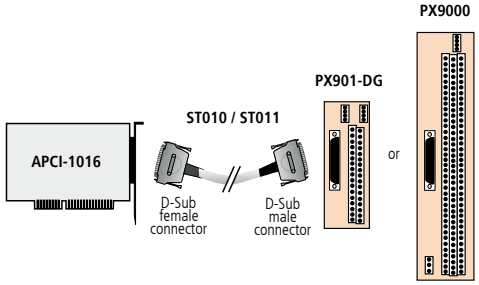
Simplified block diagram



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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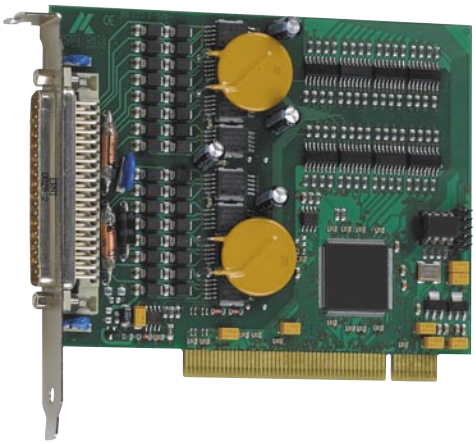
Digital output board, optically isolated, 32 digital outputs, 24 V / 5 V



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

Signed 64-bit drivers for Windows 7/Vista/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:

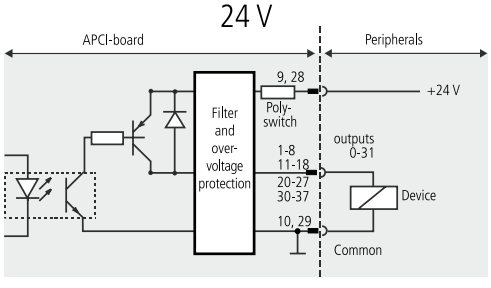
Digital output • Watchdog

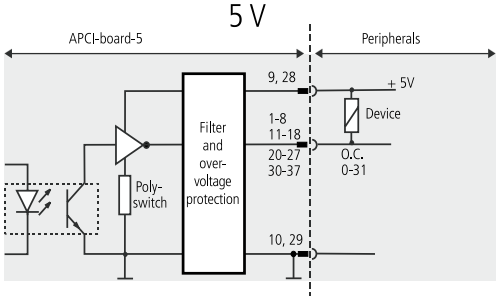
On request:

Further operating systems, compilers and samples.

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

Connection principle of the outputs at 24 V (APCI-2032) and 5 V (APCI-2032-5)





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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:	10 V to 36 V, min. 5 V (shutdown); for 5 V version - 5 V-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 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

Shut-down 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
Watchdog:	8-bit, programmable, 20 ms up to 5 s in steps of 20 ms

EMC – Electromagnetic compatibility

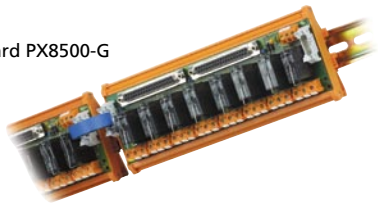
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

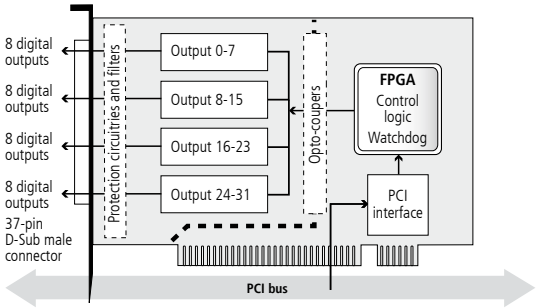
Dimensions:	PCI short 131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	Short board, 1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	224 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-DG with cable ST010

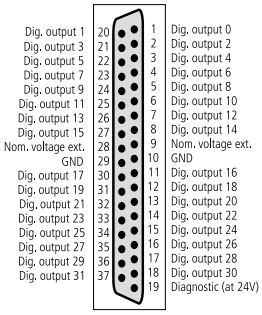
Relay output board PX8500-G



Simplified block diagram

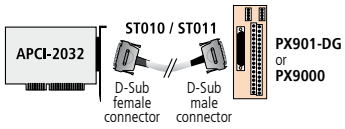


Pin assignment – 37-pin D-Sub male connector

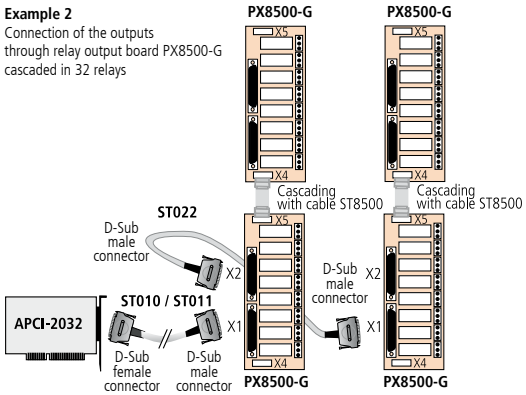


ADDI-DATA connection

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: 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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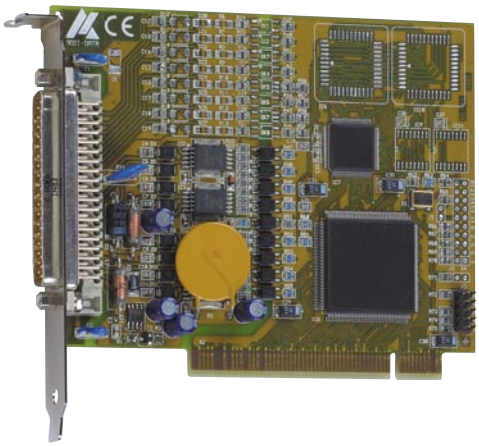
Digital output board, optically isolated, 16 digital outputs, 24 V



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

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:

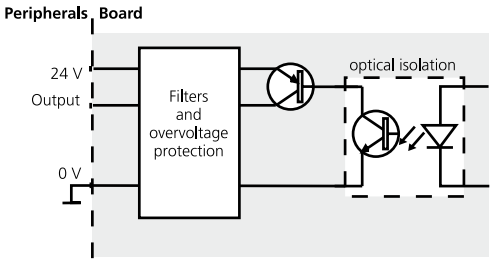
Digital output • Watchdog

On request:

Further operating systems, compilers and samples.

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

Protective circuit for the output channels



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ADDI-DATA® SPIRIT OF EXCELLENCE

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

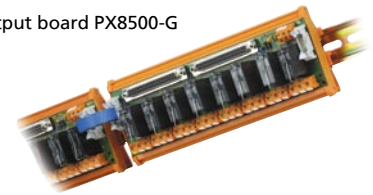
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

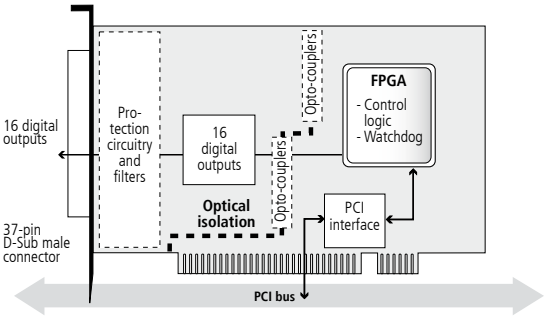
Dimensions:	131 x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG)
Space required:	Short board, 1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	233 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-DG with cable ST010

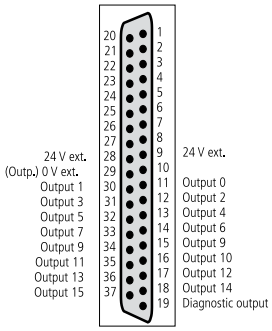
Relay output board PX8500-G



Simplified block diagram

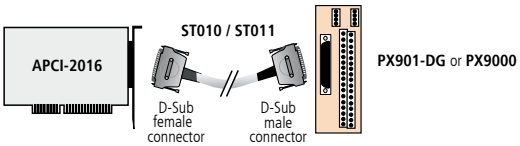


Pin assignment – 37-pin D-Sub male connector

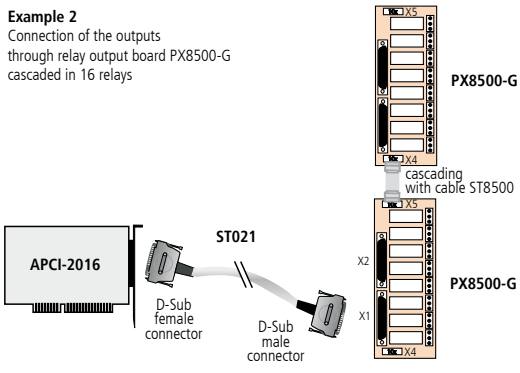


ADDI-DATA connection

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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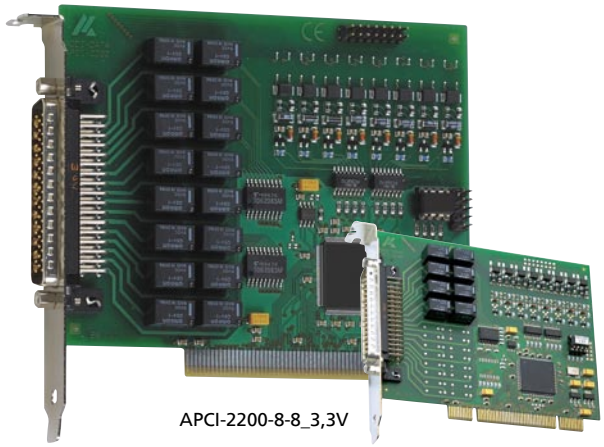
Relay board, optically isolated, 8/16 relays, 8 digital inputs, 24 V



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 88

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI • DIAdem

ADDIPACK functions:

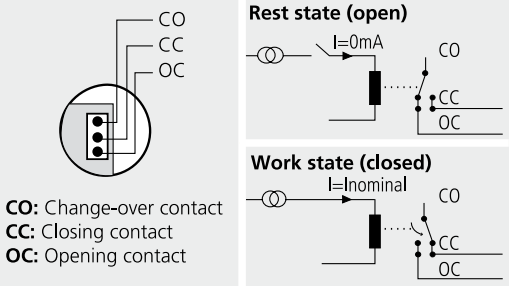
Digital output • Watchdog

On request:

Further operating systems, compilers and samples.

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

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
Responding 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

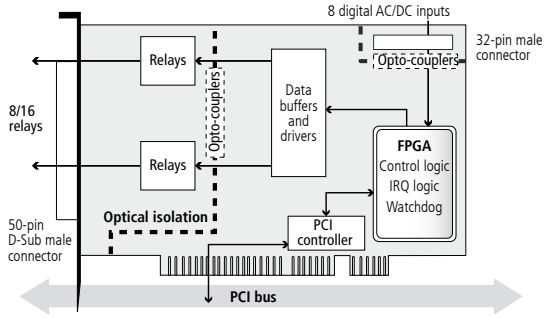
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

Dimensions:	131 x 99 mm (PCI short)
System bus:	PCI 32-bit 5 V acc. to specification 2.1 (PCISIG) or 3.3 V
Space required:	PCI short, 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



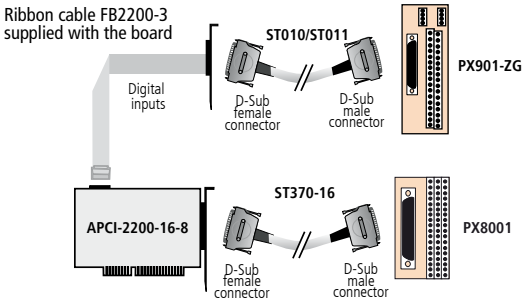
Pin assignment – 50-pin D-Sub connector APCI-2200-16-8

Pin		Pin			Pin	
34	OC of relay 0	18	CC of relay 0	34 ... 18	1	CO of relay 0
35	OC of relay 1	19	CC of relay 1	35	2	CO of relay 1
36	OC of relay 2	20	CC of relay 2	36	3	CO of relay 2
37	OC of relay 3	21	CC of relay 3	37	4	CO of relay 3
38	OC of relay 4	22	CC of relay 4	38	5	CO of relay 4
39	OC of relay 5	23	CC of relay 5	39	6	CO of relay 5
40	OC of relay 6	24	CC of relay 6	40	7	CO of relay 6
41	OC of relay 7	25	CC of relay 7	41	8	CO of relay 7
42	OC of relay 8	26	CC of relay 8	42	9	CO of relay 8
43	OC of relay 9	27	CC of relay 9	43	10	CO of relay 9
44	OC of relay 10	28	CC of relay 10	44	11	CO of relay 10
45	OC of relay 11	29	CC of relay 11	45	12	CO of relay 11
46	OC of relay 12	30	CC of relay 12	46	13	CO of relay 12
47	OC of relay 13	31	CC of relay 13	47	14	CO of relay 13
48	OC of relay 14	32	CC of relay 14	48	15	CO of relay 14
49	OC of relay 15	33	CC of relay 15	49 ... 33	16	CO of relay 15
50	-			50	17	-

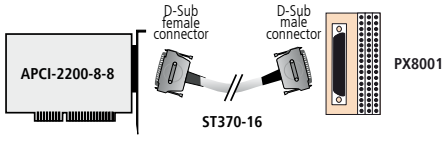
OC: Opening contact CC: Closing contact CO: Change-over contact

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 board 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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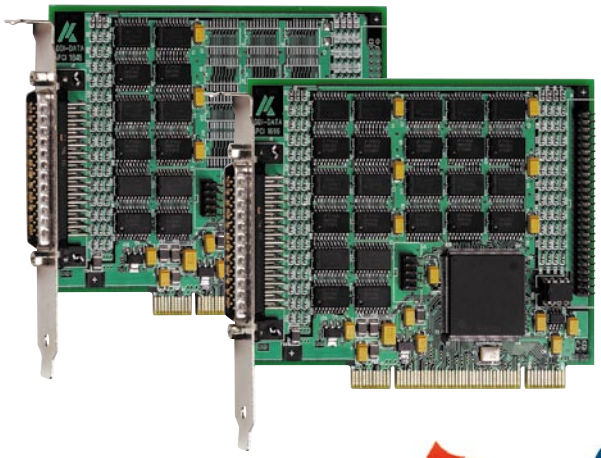
TTL I/O board,
48 or 96 digital TTL inputs and outputs



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

RoHS 2002/95/EC

PCI 32-bit

Signed 64-bit drivers
for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers f. Windows 7/XP

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, download menu

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:	PCI short board + 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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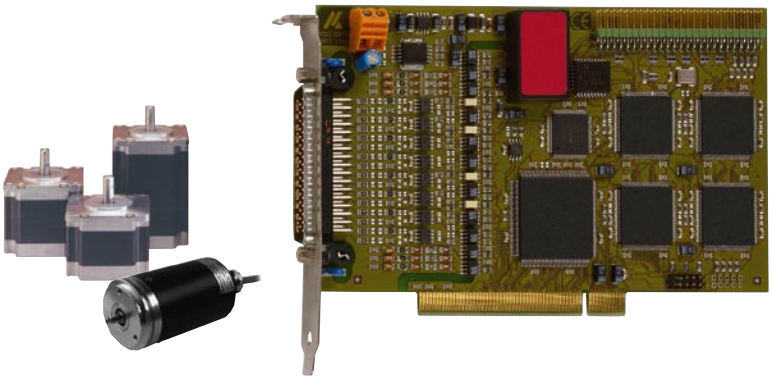
Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM, ...



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

PCI 32-bit

Also for *CompactPCI™*
See CPCI-1710
page 188

Also for
PCI EXPRESS®
see APCIe-1711
page 90

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-1710-24 V)
- 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 (82x54)
- 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-1710-24)
  - 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP
- 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, download 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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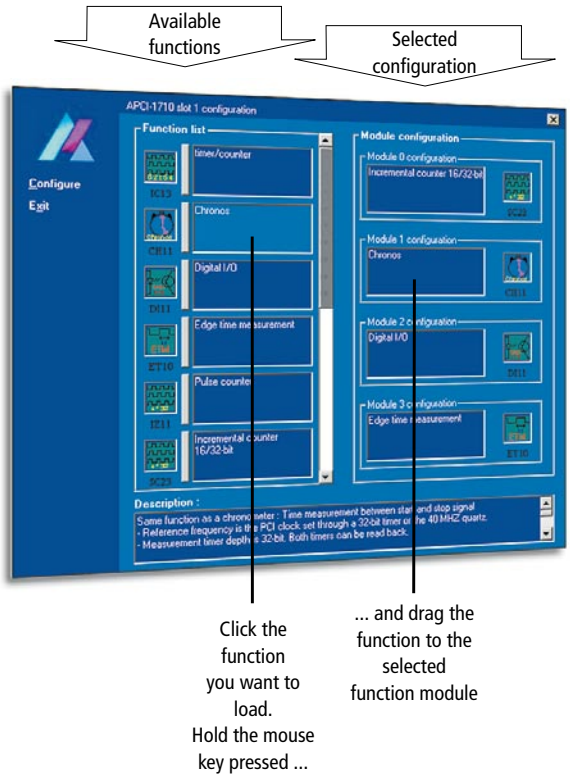
Wide range of applications through the free combination of functions

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 1	**Function module 2**	**Function module 3**	**Function module 4**
1 x 32-bit incremental counter	1 x 32-bit incremental counter	4 x pulse acquisition	3 x timer/ counter

Configuration example 2			
Function module 1	**Function module 2**	**Function module 3**	**Function module 4**
3 x SSI	3 x SSI	1 x 32-bit incremental counter	8 x digital I/O, 24 V



Customer-tailored modifications, designed to suit your needs.
Hardware and software, firmware, PLDs, ... Contact us!

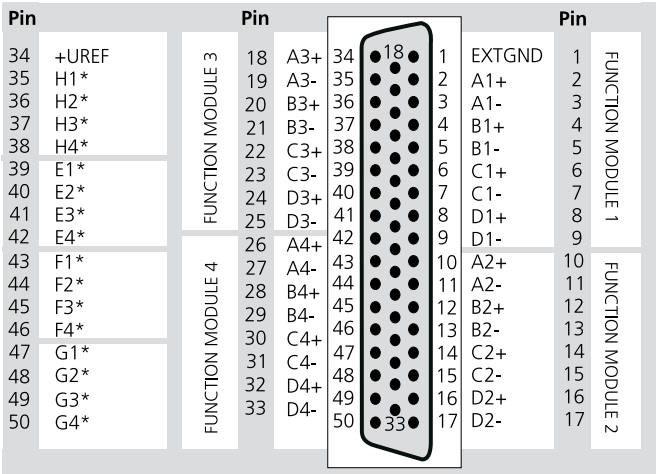
Programmable onboard modules

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.

Application and description of the functions

Application	Number of sensors or functions per function module	Max. use of the function module per APCI-1710	Max. number of sensors or functions per APCI-1710	Page
Incremental counter	1 (32-bit) or 2 (16-bit)	4	4 or 8	126
SSI	3	4	12	126
Chronos	1	4	4	127
BiSS-Master	1	4	4	127
Counter/ Timer	3	4	12	128
TOR	2	4	8	129
Pulse counter	4	4	16	130
PWM	2	4	8	130
ETM	2	4	8	131
Digitale E/A	8	4	32	131
TTL	24	1	24	131

Pin assignment



*Each number corresponds to the number of the function module

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Function Incremental encoder

1 or 2 incremental encoders can be connected to a module programmed with this function.

- 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

Possible configurations as follows:

- 1 counter channel with a 32-bit counter depth, for TTL or differential incremental encoders (option 24 V: APCI-1710-24 V)
- 2 counter channels with a 16-bit counting depth for TTL or differential incremental encoders (option 24 V: APCI-1710-24 V)
- 1 "INDEX" input for reference point logic
- 1 "UAS" input, which can be used as error input
- 1 "REF" input as usual digital input or for reference point logic
- 2 "EXTSTB" inputs, to latch the counter value
- Fast counting

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

Used signals

Signals	On connector	Polarity	Function
A	Ax +/-	Diff./TTL/24 V*	A signal of the 1st incremental encoder
B	Bx +/-	Diff./TTL/24 V*	B signal of the 1st incremental encoder
INDEX	Cx +/-	Diff./TTL/24 V*	INDEX signal of the incremental encoder in 32-bit mode
C	Cx +/-	Diff./TTL/24 V*	A signal of the 2nd incremental encoder in 16-bit mode.
UAS	Dx +/-	Diff./TTL/24 V*	Error signal input in 32-bit mode.
D	Dx +/-	Diff./TTL/24 V*	B signal of the 2nd incremental encoder in 16-bit mode
REF	E	24 V/5 V optional	Usual digital input, readable through register can also control the reference point logic
ExtStrb_a	F	24 V/5 V optional Active High	Digital input, which latches the counter 16/32-bit in the first latch register. Can also generate an interrupt.
ExtStrb_b	G	24 V/5 V optional Active High	Digital input, which latches the counter 16/32-bit the 2nd latch register. Can also generate an interrupt.

x: Number of the function module (See pin assignment page 125)

* 24 V for the APCI-1710-24 V

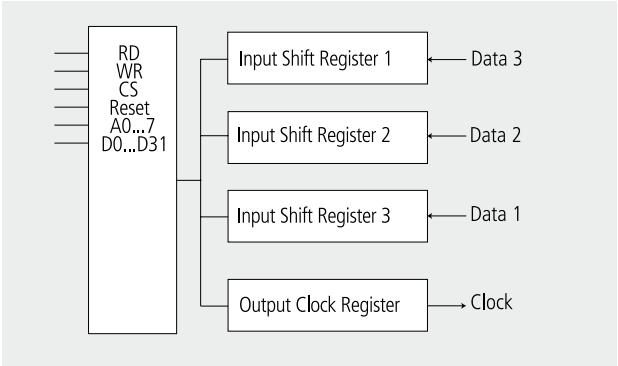
Function Synchronous serial interface (SSI)

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
- Tolerance measurement ...

Block diagram SSI



Connection of 1 up to 3 SSI encoders per function module:

- Common clock pulse for the 3 interfaces (depending on the clock frequency and line length)
- The clock frequency is software-programmable
- The number of data bits is programmable, which allows a flexible resolution.
- GRAY to BINARY conversion possible

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

On connector	Polarity	Function
Ax +/-	Diff.	Clock output signal for the SSI encoders
Bx +/-	Diff./TTL/24 V*	DATA input 1 for the first encoder
Cx +/-	Diff./TTL/24 V*	DATA input 2 for the second encoder
Dx +/-	Diff./TTL/24 V*	DATA input 3 for the third encoder
Ex	24 V/5 V optional	Digital input 1
Fx	24 V/5 V optional	Digital input 2
Gx	24 V/5 V optional	Digital input 3
Hx	24 V/5 V optional	Digital output

* 24 V for the APCI-1710-24 V

x: Number of the function module (See pin assignment page 125)

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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

- Complete isolation through opto-couplers for the input and output channels for avoiding earth circuits
- 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.

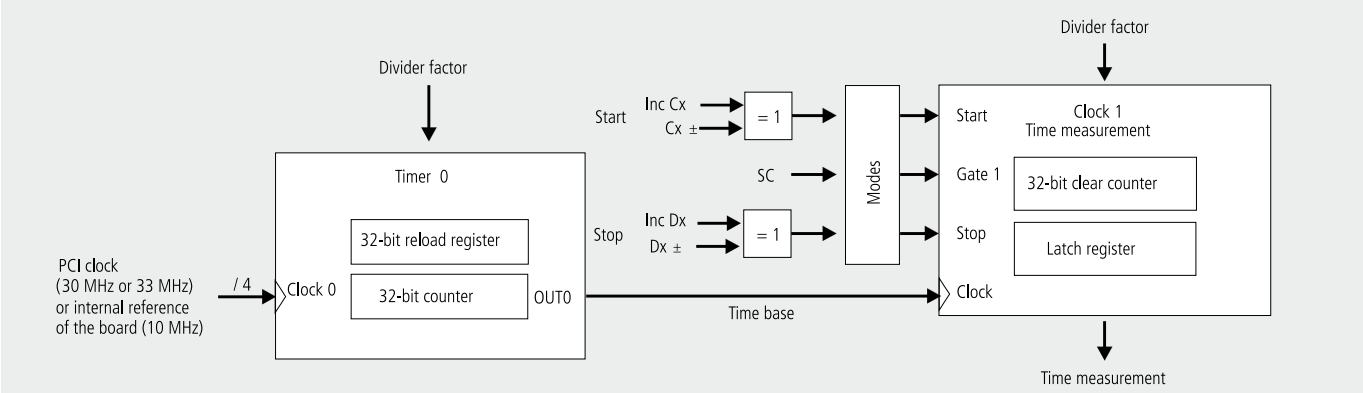
Used signals

Signals	On connector	Polarity	Function
Ax	+/-	Diff./TTL, 24 V*	Dig. output 1; set to "0" after reset
Bx	+/-	Diff./TTL, 24 V*	Dig. 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
E	x	24 V/5 V optional	Digital input 0, inverting
F	x	24 V/5 V optional	Digital input 1, inverting
G	x	24 V/5 V optional	Digital input 2, inverting
H	x	24 V/5 V optional	Dig. output 0; set to "0" after reset

x: Number of the function module (See pin assignment page 125)

* 24 V for the APCI-1710-24 V

Block diagram Chronos



Function BiSS-Master

The function "BiSS-Master" is a **bi**directional **s**ensor 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:

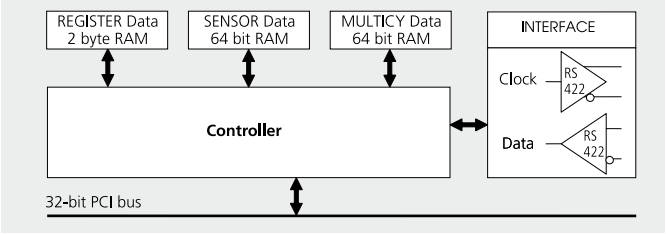
- One channel available, to which a BiSS slave can be connected
- The functionality „automatic sensor data request" is not available
- Data buffer for two sensor registers available
- The board APCI-1710-10K20 is required

Used signals

Signals	On connector	Polarity	Function
Input1_x	Cx +/-	Diff.	Dig. input 1 (data line from slave to master)
Output1_x	Ax +/-	Diff.	Dig. output 1 (clock line from master to slave)

x: Number of the function module (See pin assignment page 125)

Block diagram BiSS-Master



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Function Counter/Timer

Function equivalent to Intel® 82C54

The module programmed with this function can be used as a programmable interval timer/counter (similar to Intel 82C54) with 3 x 32-bit.
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 through opto-couplers for the input and output channels for avoiding earth circuits
- 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
- PCI clock or 10 MHz of the quartz oscillator available as clock (PCI/4), selectable through software

Typical applications:

- Event counter
- Programmable rate generator
- Binary rate multiplier
- Square-wave generator
- Complex motor controller

Programmable modes

3 x 32-bit counters/timers are available on one function module.
Each counter/timer can be programmed independently in one of the 6 following modes (mode0 to mode5).

Mode definition

CLK PULSE:	falling edge after a rising edge of the counter clock input.
TRIGGER:	rising edge of the counter gate input.
COUNTER LOADING:	counter transfer from the counter register to the counter

Mode0: Interrupt on terminal count

Mode0 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.

Mode1: Hardware retriggerable one-shot

This mode is identical to mode0 except for the GATE input. The GATE input is not used to activate or deactivate the timer, but to trigger it.

Mode2: Rate generator

This mode is used for generating a real-time clock interrupt. The output is initially set to „High“. When the initial count has decremented to 1, the output goes „Low“ for one clock pulse. The output then goes „High“ again, the counter reloads the initial count (ul_ReloadValue) and the process is repeated. An interrupt can be generated at the end of the cycle.

Mode3: Square wave mode

Mode3 is used for baud rate generation. It is similar to Mode2 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. Mode3 is periodic; the same sequence is repeated indefinitely.

Mode4: 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.

Mode5: Hardware-triggered strobe (retriggerable)

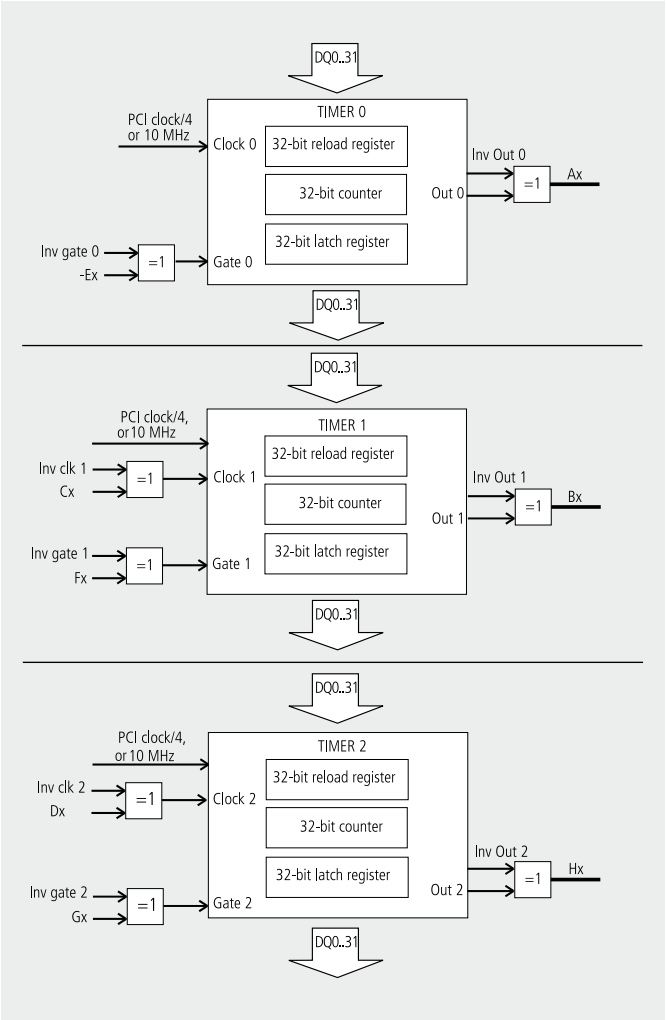
This mode is identical to mode4 except for the GATE input. The GATE input is not used to activate or deactivate the timer, but to trigger it.

Used signals

On D-Sub	Polarity	Function
Ax +/-	Diff./TTL	Output of the first counter/timer
Bx +/-	Diff./TTL	Output of the second counter/timer
Hx	24 V/5 V optional	Output of the third counter/timer
Ex	24 V/5 V optional	GATE Input of the first counter/timer
Fx	24 V/5 V optional	GATE Input of the second counter/timer
Gx	24 V/5 V optional	GATE Input of the third counter/timer
-	-	Internal clock (PCI-Clock/4)
Cx +/-	Diff./ 24V*	Clock counter input of the second counter/timer
Dx +/-	Diff./ 24V*	Clock counter input of the third counter/timer

x: Number of the function module (see pin assignment page 125)
* 24 V for the APCI-1710-24V

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 Timer/counter 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:

- Complete isolation through opto-couplers for the input and output channels to avoid earth circuit
- Interrupt status at the end of the measuring period
- Inputs and output can be inverted through software
- Software GATE

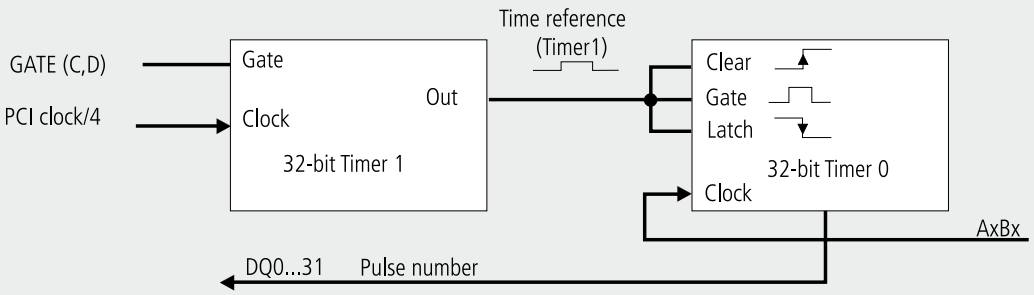
The function "TOR" occupies 4 inputs (A to D) of the corresponding function module of the APCI-1710 or CPCI-1710.

Used signals

On connector	Polarity	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 125)
*24 V for the APCI-1710-24 V

Block diagram TOR



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Function Pulse counter

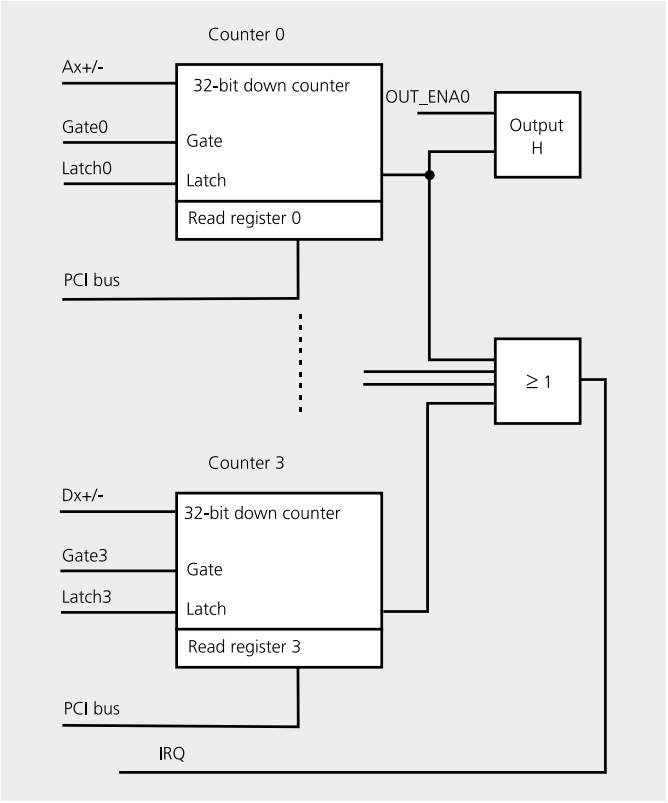
The “pulse counter” is an interface for the acquisition of external digital pulses. Each rising or falling edge on the counter input starts decrementing from the initially set counter value. An interrupt is generated at logical “0”, i.e. the digital output is set or reset.

- 4 x 32-bit down counters
- Optical isolation through opto-couplers for the input and output channels for avoiding earth circuits
- 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

On connector	Polarity	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 125)
* 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 through opto-couplers for the input and output channels for avoiding earth circuits.
- Interrupt status after end of period
- Selection of the start level
- Selection of the stop level
- Hardware gate
- Software gate

Typical applications

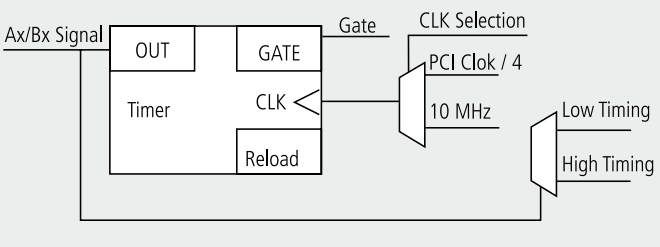
- Frequency generation
- Pulse width modulation
- Drive technology

Used signals

On connector	Polarity	Function
Ax +/-	Diff./TTL	Digital output (PWM0)
Bx +/-	Diff./TTL	Digital output (PWM1)
Cx +/-	Diff./TTL	External Gate (PWM0)
D x+/-	Diff./TTL	External Gate (PWM1)

x: Number of the function module (See pin assignment page 125)
The PWM function cannot be programmed on the APCI-1710-24 V.

Block diagram PWM



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Function ETM (Edge Time Measurement)

The "ETM" function is a timer interface, which allows to measure simultaneously the time of a period and the time of the "High" or "Low" levels of this period. 2 functions are implemented:

- 1 x 32-bit timer which is set as the reference time
- 2 x 32-bit measuring timers which measure the time of the period and of the "High" or "Low" levels

Properties:

Optical isolation through opto-couplers for the input and output channels for avoiding earth circuits

- Interrupt can be generated at the end of the measurement
- Timer can be read back
- Inputs and outputs can be inverted through software
- Software GATE

The interface includes:

- 1 gate input
- 2 independent 32-bit timers which can be written or read back through the data bus.

Typical applications

- Period duration measurement
- Level duration measurement

Used signals

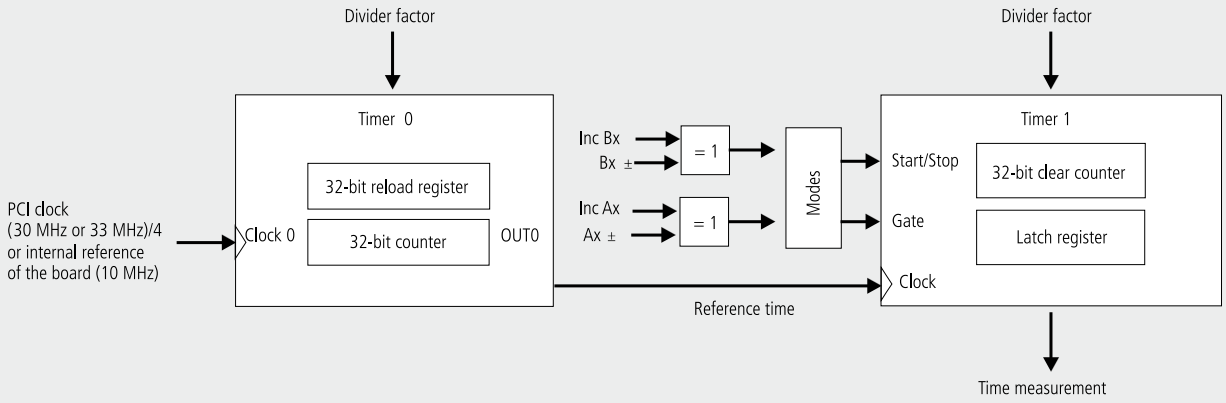
The ETM function requires 4 inputs (A to D) on each function module of the APCI-1710 or CPCI-1710 (see page 130).
Up to 8 ETM (2 per module) can be used on one board.

Used signals

On connector	Polarity	Function
Ax +/-	Diff./TTL/24 V*	Gate input of the ETM counter 0
Bx +/-	Diff./TTL/24 V*	Input of the ETM counter 0
Cx +/-	Diff./TTL/24 V*	Gate of the ETM counter 1
Dx +/-	Diff./TTL/24 V*	Input of the ETM counter 1

x: Number of the function module (see pin assignment page 125)
*24 V for the APCI-1710-24V

Block diagram ETM



Function Digital input and output

The digital I/O 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

On connector	Polarity	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 125)
*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:	500 mA short-circuit current/
output at 24 V, R_{load} < 0.1 R:	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 board version APCI-1710-24 V	
	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

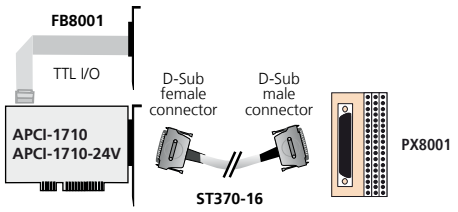
EMC – Electromagnetic compatibility

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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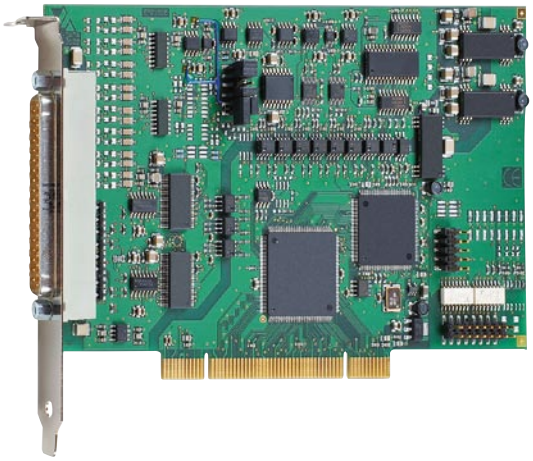
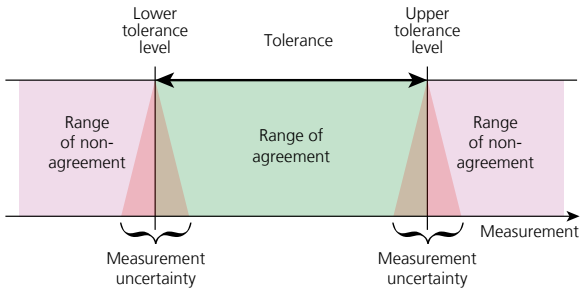


High-precision measurement

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.

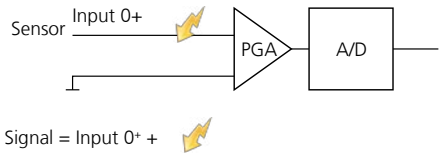
Precision through interference resistance

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 boards that are intended for the use in a harsh industrial environment.

Single-ended or differential inputs

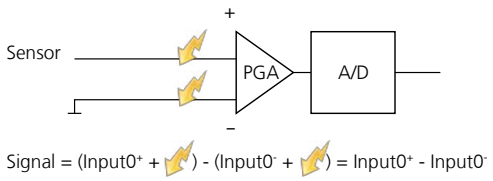
When measuring input voltage you can choose between 2 modes with important differences:

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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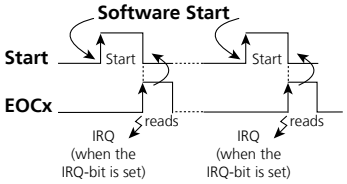
Acquisition modes of the analog inputs

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.

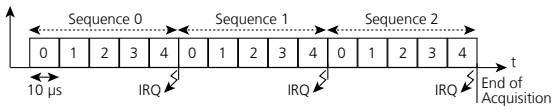


B. Sequence modes

With the DMA function (Direct Memory Access) for a direct data exchange with the PC memory
There are 2 available sequence modes:

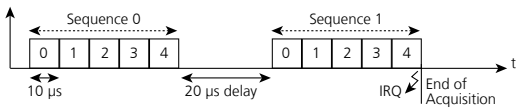
1. Simple sequence mode

In this example the interrupt is generated at the end of each sequence after 5 acquisitions.
The complete acquisition process ends after 3 sequences.



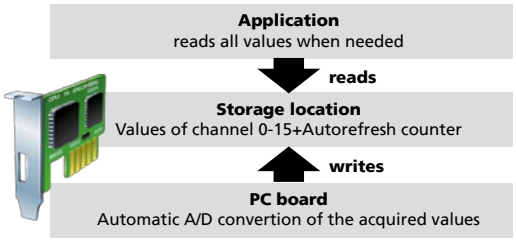
2. Sequence mode with delay

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.

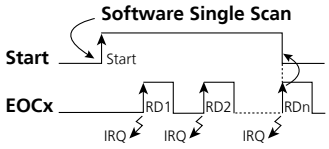


D. Scan mode

There are 6 different scan modes:

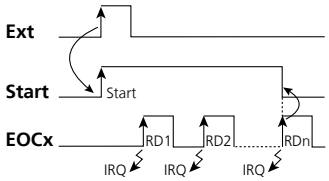
1. Software single scan

The interrupt routine of the user is called up after the last IRQ.

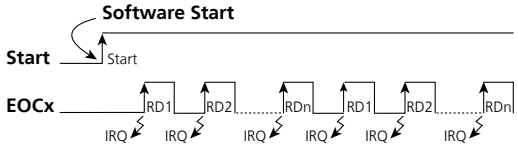


2. Hardware triggered single scan

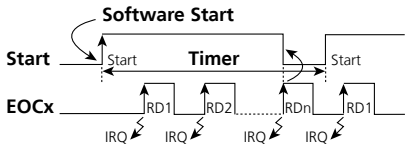
This scan can be triggered with increasing or decreasing edge. The hardware trigger allows to start the acquisition independently from the software or to start the acquisition of more than one board at the same time.



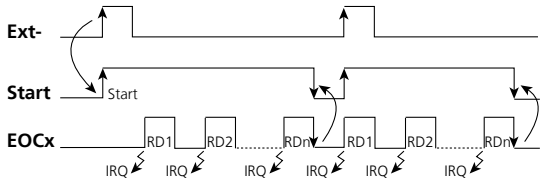
3. Continuous scan (software)



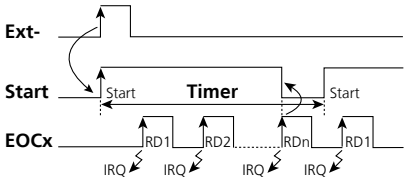
4. Continuous scan with timer delay (software)



5. Continuous scan (hardware)



6. Continuous scan with timer delay (hardware)



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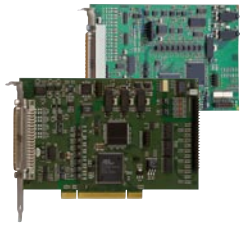
PCI BOARDS: ANALOG I/O

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-3504	APCI-3504C	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**	**5 V**	**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	1024	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	4	4 or 8
Resolution (-bit)	14	12	12						12	12	14
Optical isolation	✓	✓	✓						✓	✓	✓
0-10 V ± 10 V	✓	✓	✓						✓	✓	✓
Current outputs										0-20 mA	
Setup time	30 µs	15 µs	15 µs						15 µs	70 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	1 / – / – 12-bit	1 / – / – 12-bit
Page	138	140	140	142	142	144	146	148	150	150	152
Software	Current driver list on the web: **www.addi-data.com**										

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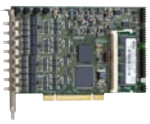
Temperature, pressure, noise, vibration and length measurement

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	154	158	160	164	166
Software	Current driver list on the web: **www.addi-data.com**				

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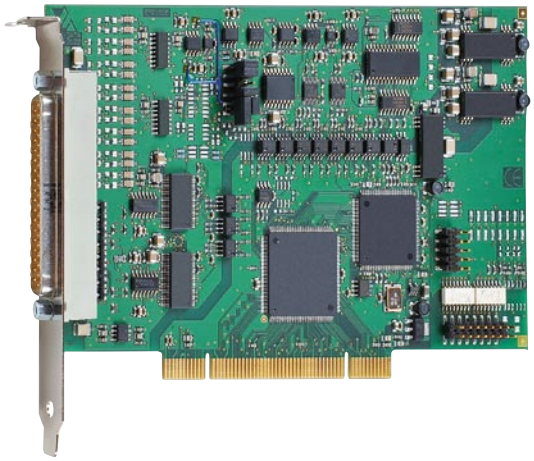
Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4/8 analog outputs,16-bit



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 192

Also for PCI EXPRESS®
see APCIe-3121
page 94

Signed 64-bit drivers for Windows 7/Vista/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP
- RTX drivers (real-time)

Drivers and samples for the following compilers and software packages:

- .NET auf Anfrage
- 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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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.

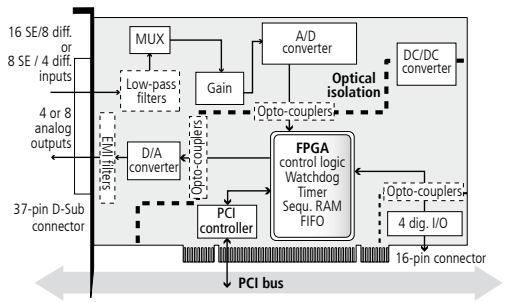
EMC – Electromagnetic compatibility

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:	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 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

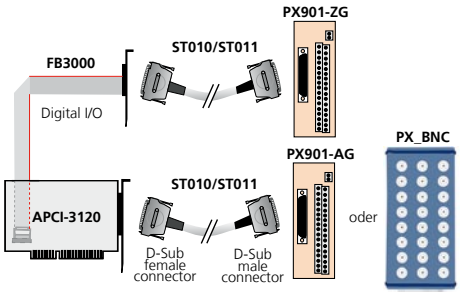
DIFF	SE		SE	DIFF
(+) An. input 0	(+) An. input 0	20 / 1	(+) An. input 8	(+) An. input 4
(+) An. input 1	(+) An. input 1	21 / 2	(+) An. input 9	(+) An. input 5
(+) An. input 2	(+) An. input 2	22 / 3	(+) An. input 10	(+) An. input 6
(+) An. input 3	(+) An. input 3	23 / 4	(+) An. input 11	(+) An. input 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
Analog input GND		29 / 10	Analog input GND	
An. output 0 GND		30 / 11	Analog input GND	
An. output 1 GND		31 / 12	An. output 0	} 2
An. output 2 GND		32 / 13	An. output 1	
An. output 3 GND		33 / 14	An. output 2	
An. output 4 GND		34 / 15	An. output 3	
An. output 5 GND		35 / 16	An. output 4	
An. output 6 GND		36 / 17	An. output 5	
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: 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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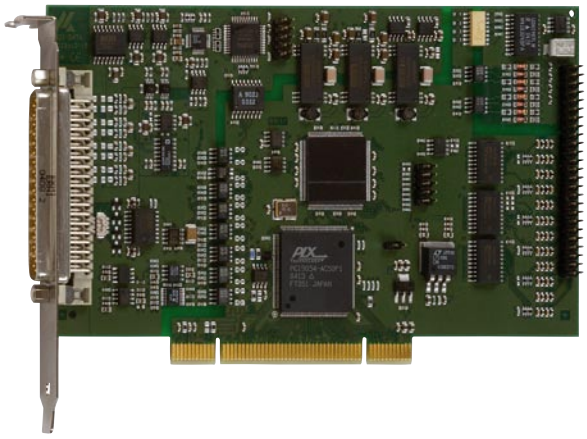
Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4 analog outputs, 12-/16-bit



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

Signed 64-bit drivers for Windows 7/Vista/XP

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 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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

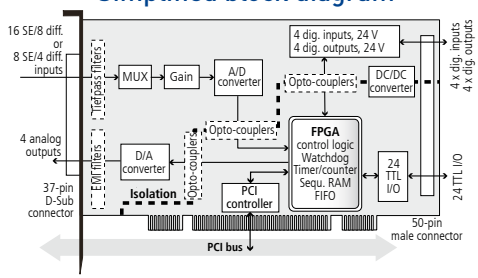
EMC – Electromagnetic compatibility

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.

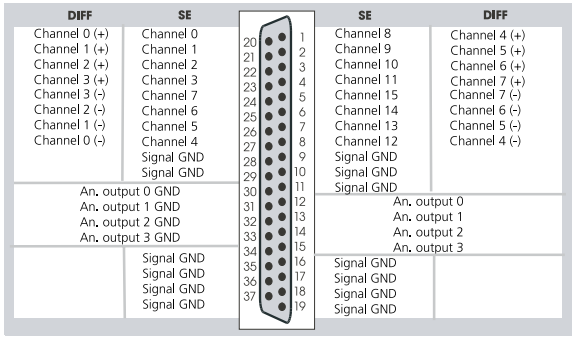
Physical and environmental conditions

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

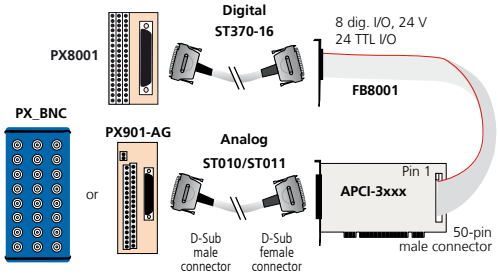


Pin assignment – 50-pin male connector

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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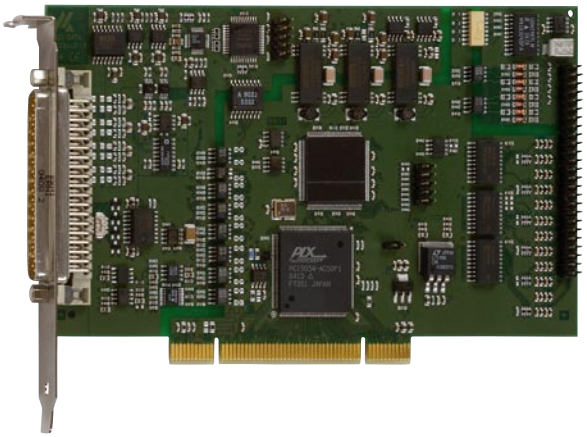
Analog input board, optically isolated, 16/8/4 SE or 8/4/2 diff. inputs, 12-/16-bit



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

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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.

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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.

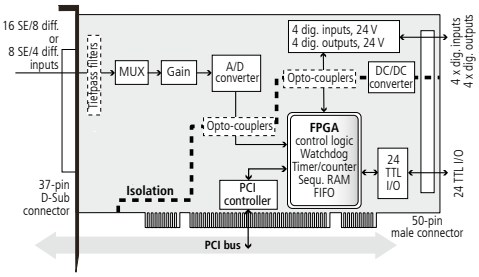
Physical and environmental conditions

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)

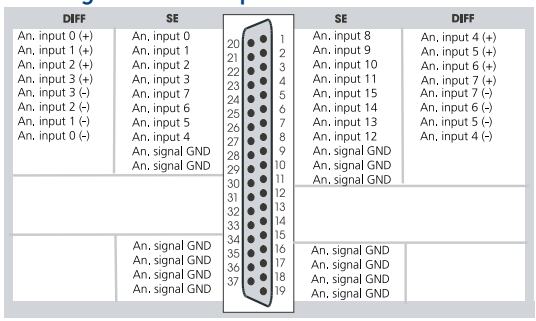
Screw terminal panel PX901-AG with cable ST010

Connection box PX_BNC with cable ST010

Simplified block diagram



Pin assignment – 37-pin D-Sub male connector

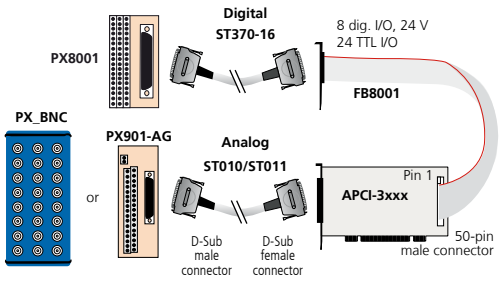


Pin assignment – 50-pin male connector

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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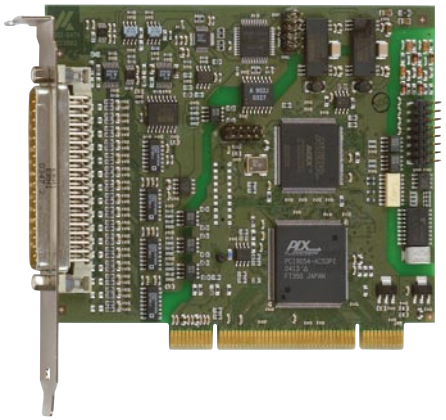
Analog input board, optically isolated, 16 differential inputs, 16-bit



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

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

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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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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:	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

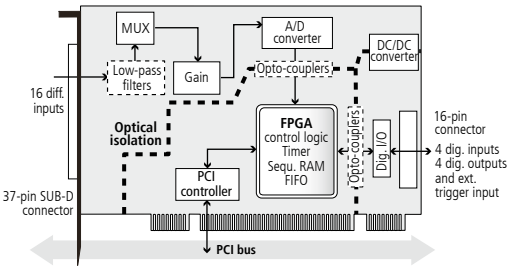
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

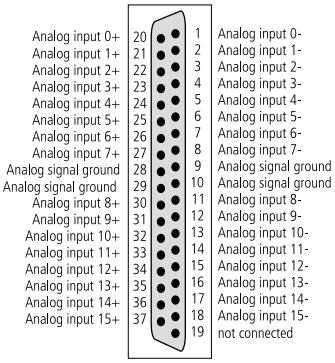
Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to specification 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O
Operating voltage:	+ 5 V, ± 5 % from the PC
Current consumption:	814 mA ± 10 mA
Front connector:	37-pin D-Sub male connector
Additional 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

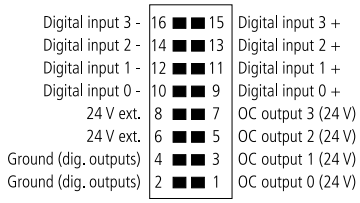
Simplified block diagram



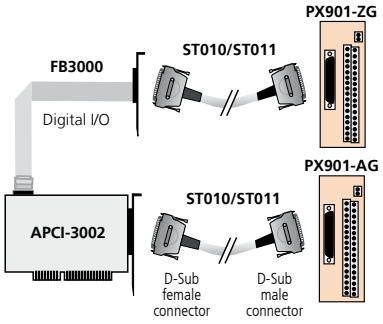
Pin assignment – 37-pin D-Sub male connector



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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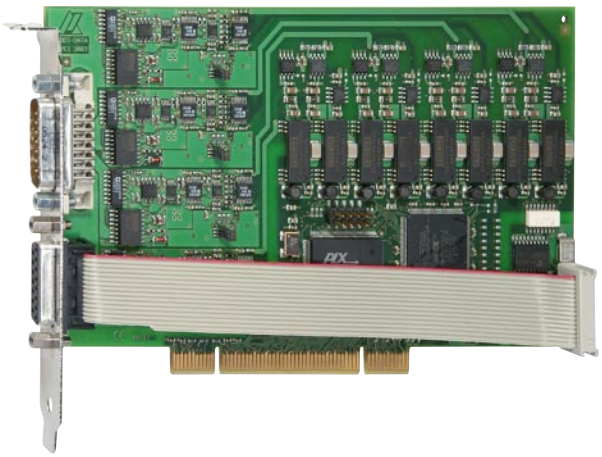
Analog input board, optically isolated, 4 differential inputs, 16-bit



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

Signed 64-bit drivers for Windows 7/XP

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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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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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ADDI-DATA®
SPIRIT OF EXCELLENCE

PCI

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

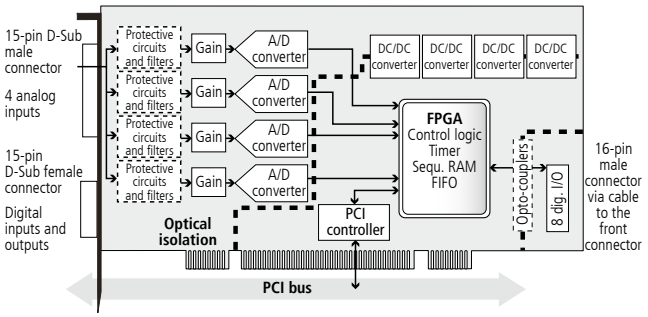
EMC – Electromagnetic compatibility

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.

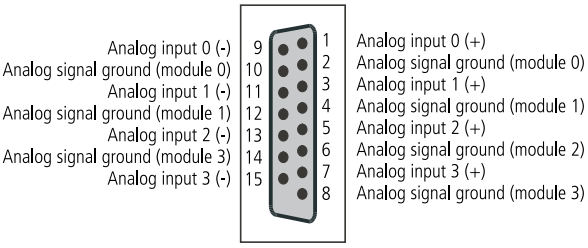
Physical and environmental conditions

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)

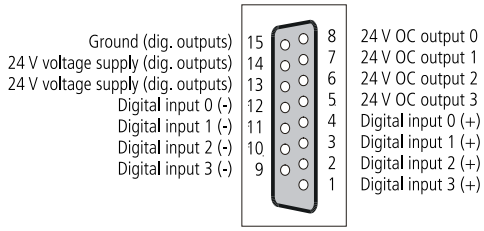
Simplified block diagram



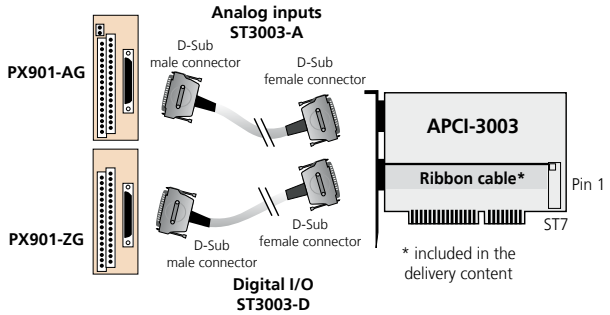
Pin assignment analog – 15-pin D-Sub male connector



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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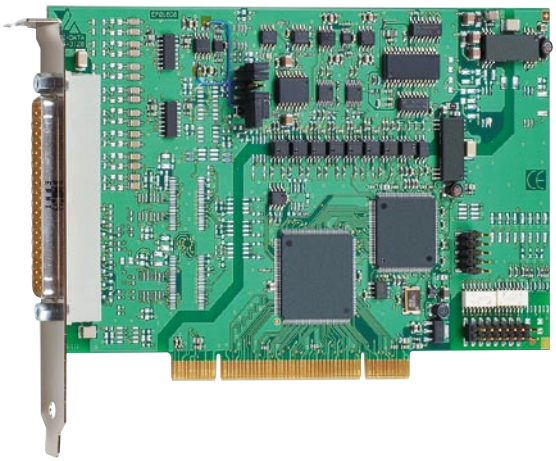
Analog input board, optically isolated, 16/8/4 SE or 8/4 differential inputs, 12-bit



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 96

Compatible version for *CompactPCI™*
See CPCI-3001
page 194

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

LabWindows/CVI™

DIAdem

DASYLab™

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers f. Windows 7/Vista/XP

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

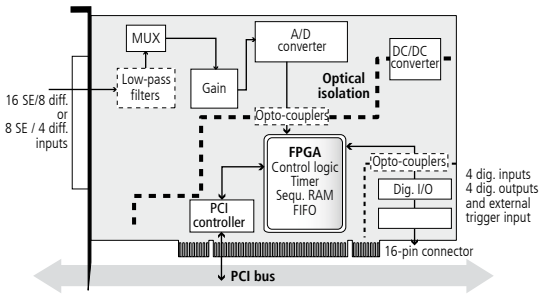
EMC – Electromagnetic compatibility

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.

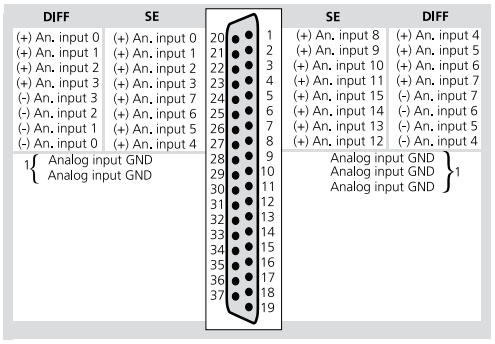
Physical and environmental conditions

Dimensions:	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 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

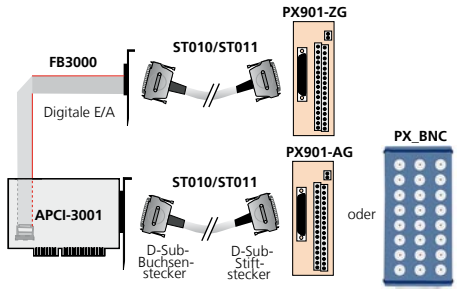


1: The analog inputs have a common ground line

Pin assignment – 16-pin male connector

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-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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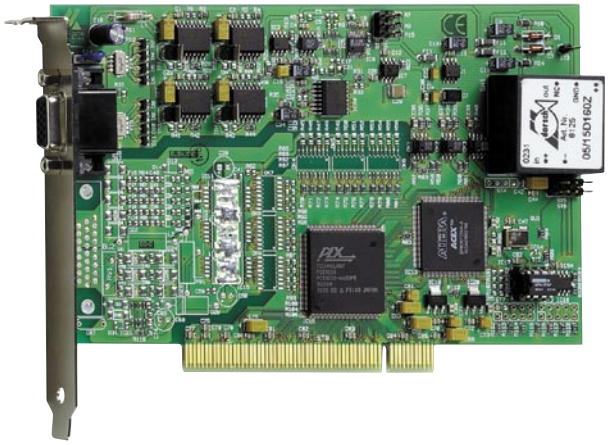
Analog output board, optically isolated, 4 analog outputs, 12-bit



APCI-3504 / APCI-3504C

4 analog outputs, 12-bit

Voltage or current outputs

Optical isolation 500 V

Connection through screw terminal panel PX9200

Timer, watchdog

RoHS 2002/95/EC

PCI 32-bit

Also for
PCI EXPRESS
see APCIe-3521 page 98

Signed 64-bit drivers for Windows 7/XP

LabVIEW™

LabWindows/CVI™

Features

Analog outputs
- 4 analog outputs, optically isolated 500 V
- 12-bit resolution
- Output voltage / current after reset: 0 V/0 mA
- Each output has its own ground line (without optical isolation)

Voltage outputs
- Setup time 15 µs typ
- Output voltage range: -10 V to +10 V
- Maximum output current: ± 5 mA
- Short-circuit current: ± 20 mA

Current outputs
- Maximum output current: 0 to 20 mA
- Setup time 70 µs typ (at 20 mA step)
- Maximum load: 500 Ω

Safety features
- Optical isolation 500 V
- Creeping distance IEC 61010-1
- Protection against high-frequency EMI
- Noise neutralisation of the PC supply

Applications

- Image processing systems
- Factory automation
- ...

Software drivers

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

Standard drivers for:
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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 • Timer • Watchdog

On request:
Further operating systems, compilers and samples.

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

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Specifications

Analog outputs

Number of outputs:	4
Optical isolation:	500 V through opto-couplers
Resolution:	12-bit
Output type:	Single-ended
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
Current outputs	
Max. output current:	0 to 20 mA
LSB:	4.883 µA
Time to Ready:	typ. 4.5 µs
Setup time:	typ. 70 µs (in 20 mA steps)
Maximum load:	500 Ω
Short-circuit current:	+25 mA
Output current after reset:	0 mA

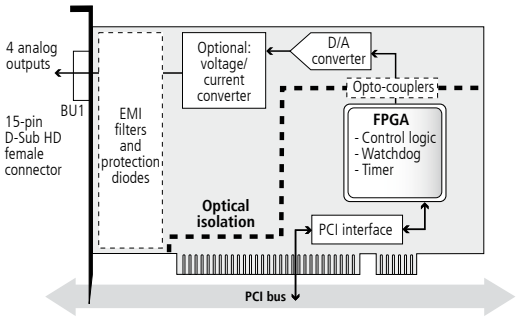
EMC – Electromagnetic compatibility

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.

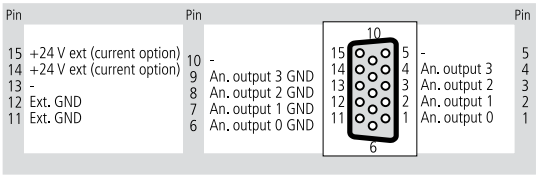
Physical and environmental conditions

Dimensions:	131x 99 mm
System bus:	PCI 32-bit 5 V acc. to specification 2.2 (PCISIG)
Space required:	Short board, 1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	560 mA typ. ± 10 %
Front connector:	15-pin D-Sub HD female connector
Temperature range:	0 to 60 °C (with forced cooling)

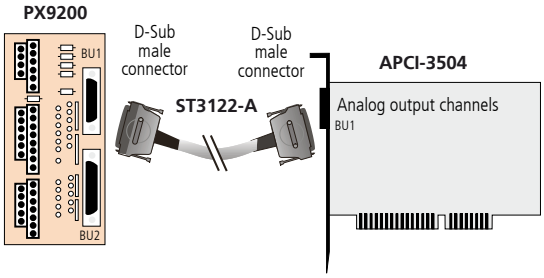
Simplified block diagram



Pin assignment
15-pin D-Sub HD female connector



ADDI-DATA connection



Ordering information

APCI-3504

Analog output board, optically isolated, 4 analog outputs, 12-bit.
Incl. technical description and software drivers.

Versions

APCI-3504 Version with 4 analog voltage outputs
APCI-3504-C Version with 4 analog current outputs

Accessories

PX9200: Screw terminal panel
ST3122-A: High-density round cable, shielded, twisted pairs, 2 m

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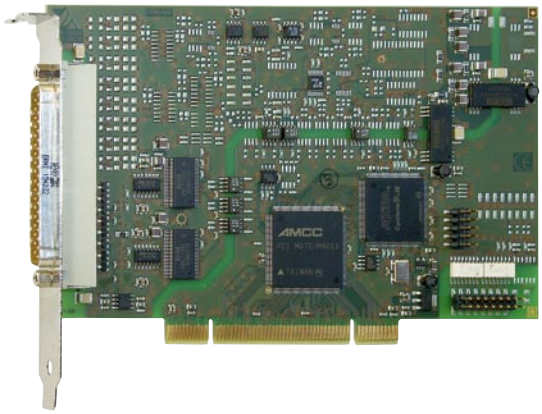
Analog output board, optically isolated, 8 analog outputs, 14-bit



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 98

Signed 64-bit drivers for Windows 7/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP
- 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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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

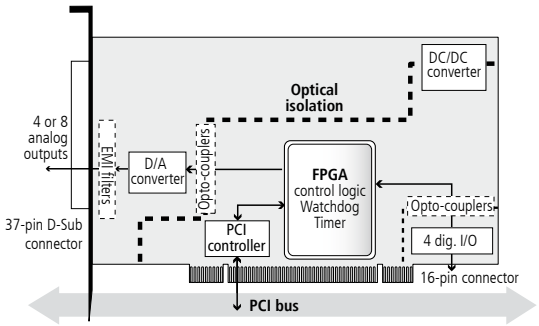
The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC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

Physical and environmental conditions

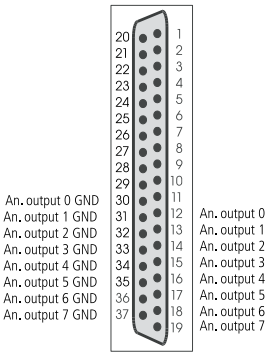
Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5 V acc. to specification 2.1 (PCISIG)
Space required:	1 PCI slot for analog outputs, 1 slot opening for digital I/O with FB3000
Operating voltage:	+5 V, ±5 % from the PC
Current consumption:	440 mA ± 10 % typ.
Front connector:	37-pin D-Sub male connector
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

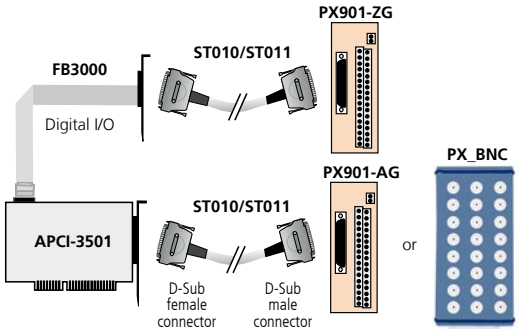
Simplified block diagram



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

Phone: +49 7229 1847-0 info@addi-data.com
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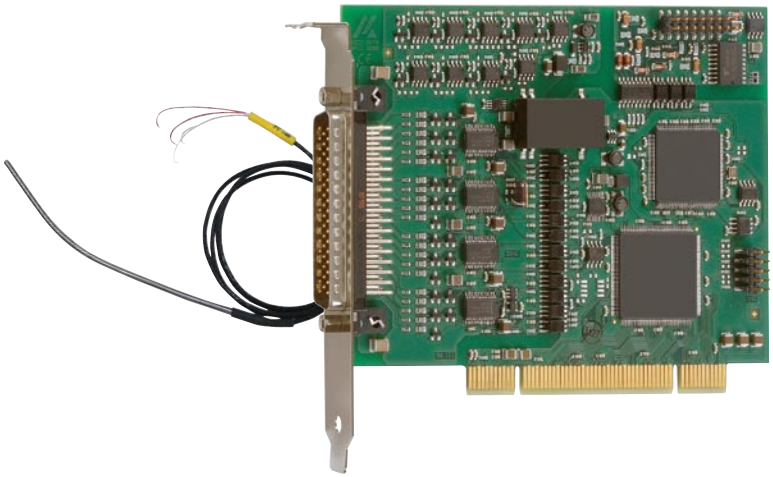
Temperature measurement board, optically isolated, 16/8/4 channels for thermocouples, Pt100, RTD, 18-bit



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

Signed 64-bit drivers for Windows 7/Vista/XP

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 functions: 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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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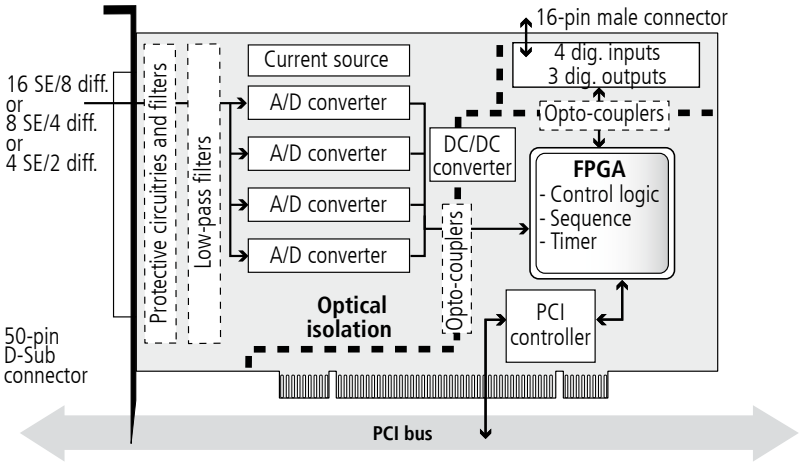
Simplified block diagram



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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)	detection	no detection
Resistance thermometer (diff.)	detection	detection
Potentiometer (diff.)	detection	detection

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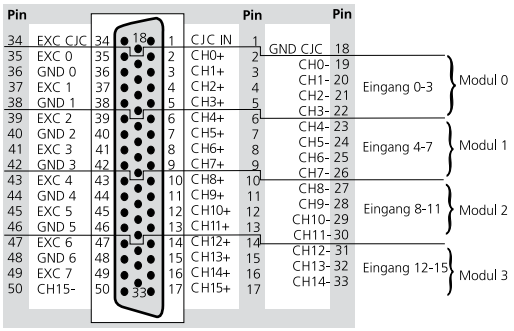
Screw terminal panel with cold junction compensation PX3200-G

Screw terminal panel PX3200-G with cable ST3200

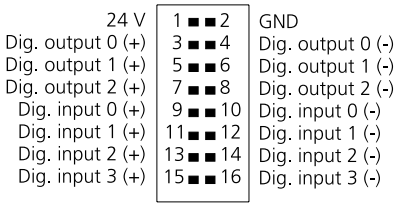
The PX3200-G screw terminal panel is used for connecting thermocouples/ RTDs. It is connected to the APCI-3200 through the ST3200 cable.
The housing of the female connector is connected to two ground terminals so that the board is additionally earthed for more security. All components of the board are 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

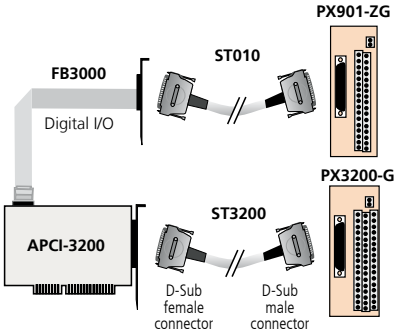
Pin assignment – 50-pin D-Sub male connector



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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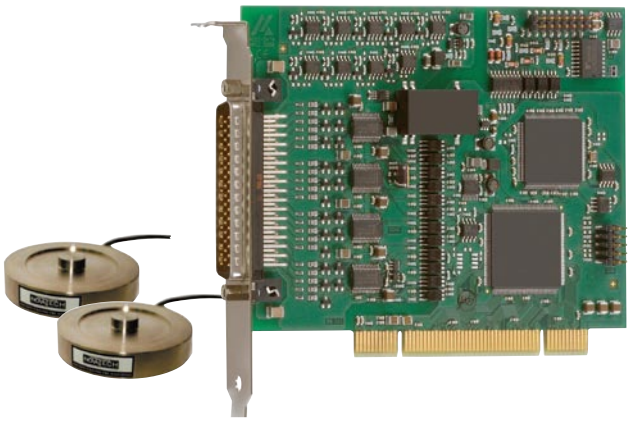
Pressure measurement board, optically isolated, up to 8 channels for strain gauges, 18-bit



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

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:

- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)

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

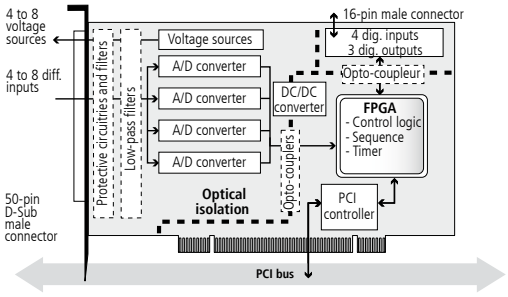
EMC – Electromagnetic compatibility

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		Pin		Pin		Pin		
34	NC	34	18	1	NC	1	NC	18
35	EXC 0	35		2	CH0+	2	NC	19
36	GND 0	36		3	CH0-	3	NC	20
37	EXC 1	37		4	CH1+	4	NC	21
38	GND 1	38		5	CH1-	5	NC	22
39	EXC 2	39		6	CH2+	6	NC	23
40	GND 2	40		7	CH2-	7	NC	24
41	EXC 3	41		8	CH3+	8	NC	25
42	GND 3	42		9	CH3-	9	NC	26
43	EXC 4	43		10	CH4+	10	NC	27
44	GND 4	44		11	CH4-	11	NC	28
45	EXC 5	45		12	CH5+	12	NC	29
46	GND 5	46		13	CH5-	13	NC	30
47	EXC 6	47		14	CH6+	14	NC	31
48	GND 6	48		15	CH6-	15	NC	32
49	EXC 7	49		16	CH7+	16	NC	33
50	NC	50	33	17	CH7-	17		

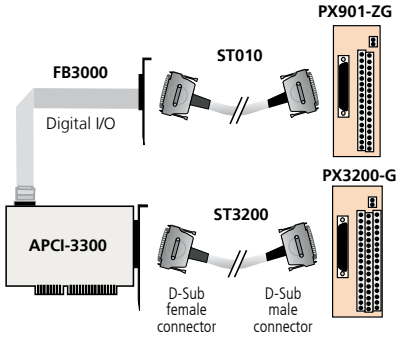
Module 0 (input 0-1)
Module 1(input 2-3)
Module 2 (input 4-5)
Module 3 (input 6-7)

NC: not connected
EXC: Voltage source

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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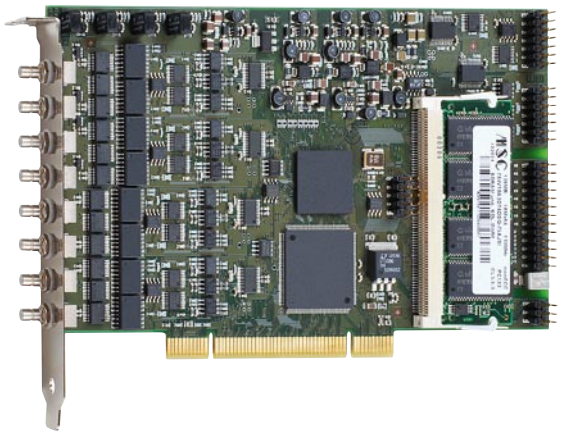
Noise and vibration measurement board, optically isolated, multifunction board, 8 analog inputs, 24-bit

New!*



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

Signed 64-bit drivers for Windows 7/XP

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

Software drivers for:

- Linux (real-time), 32-bit drivers for Windows 7/Vista/XP/2000 (real-time) and signed 64-bit drivers for Windows 7/XP

Samples for the following compilers:

Visual C++ • Borland C

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

*Preliminary product information

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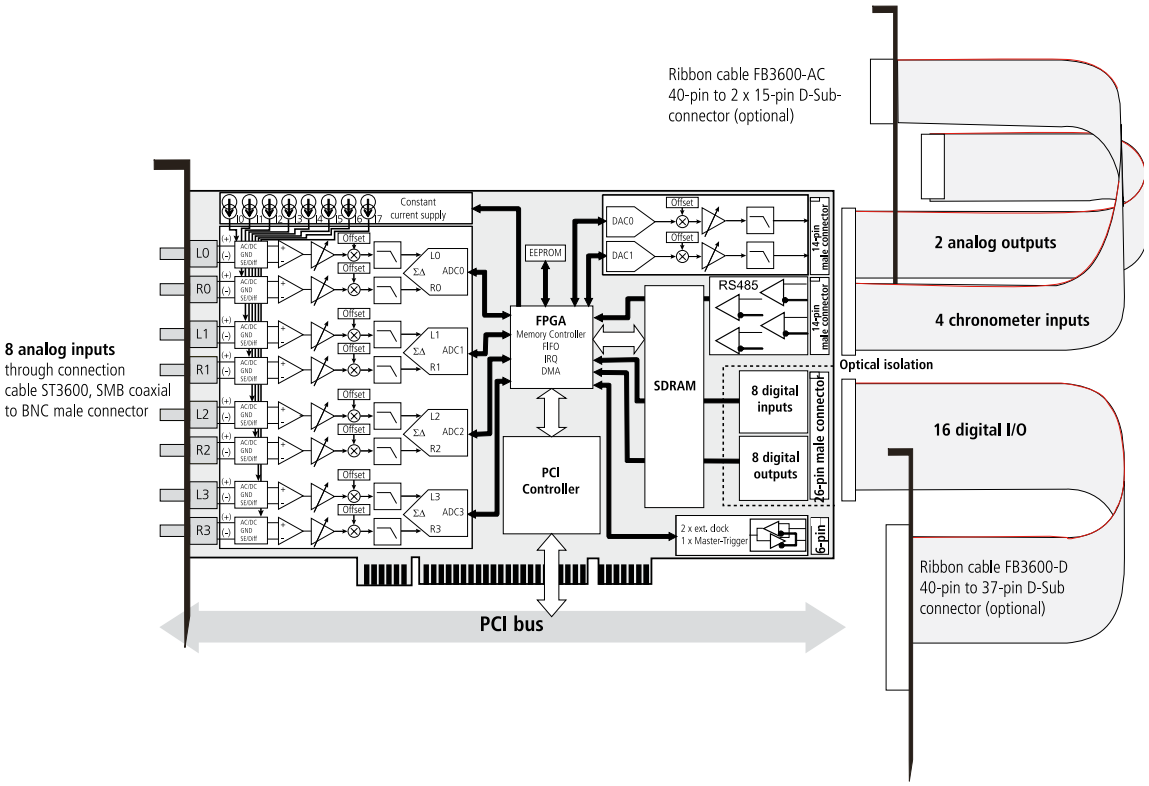
Simplified block diagram



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

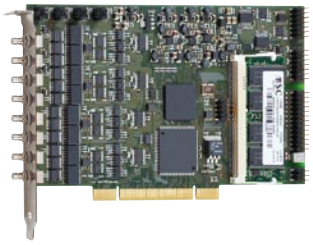
Number:	4 x chronometer, 2 x gate on chronos 1+2
Input type:	RS485
Max. speed:	1 MHz max.
Counting depth:	32-bit
Divisor:	From 2^0 to 2^{15} per chronometer
FIFO depth:	256 DWORD
Data transfer:	DMA, I/O, IRQ
Differential threshold voltage:	-200 mV min -50 mV max.
Input resistance:	120 differential
ESD 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)



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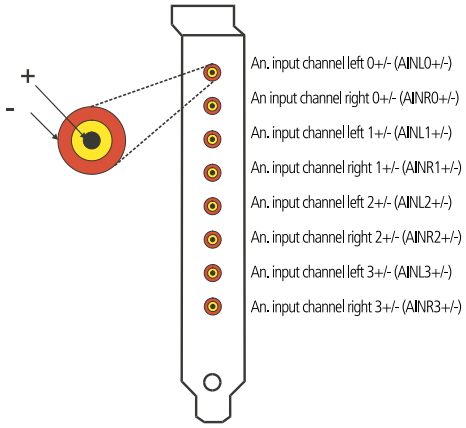
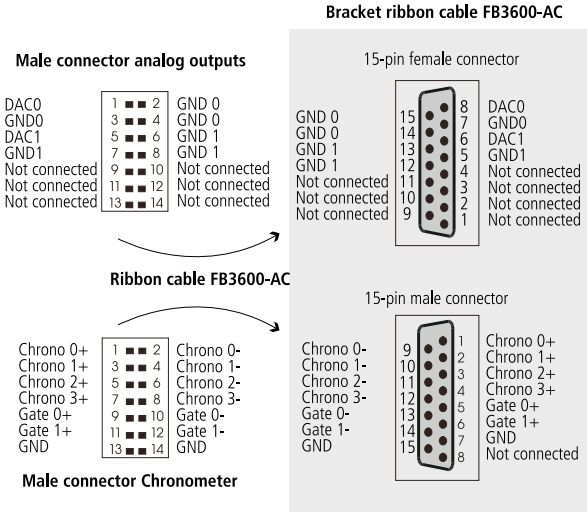
Connection of 8 analog inputs on front connector

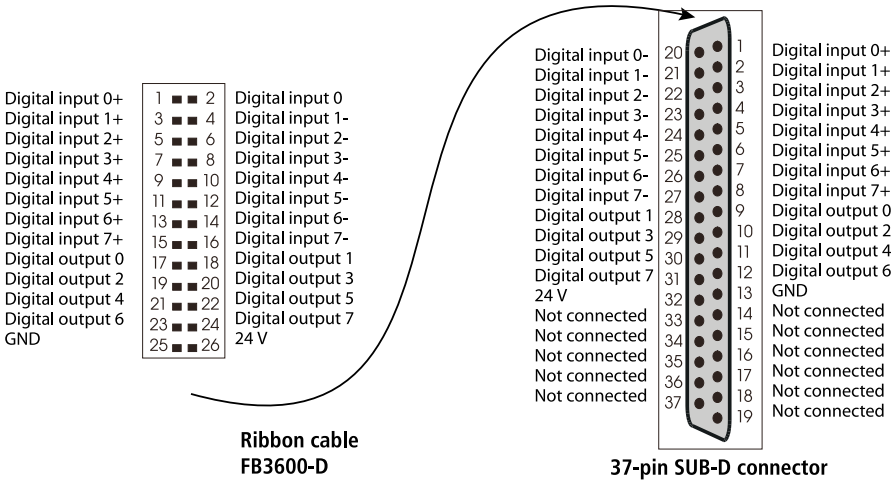


Pin assignment of the chronometer and analog outputs (ribbon cable FB3600-AC)



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

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

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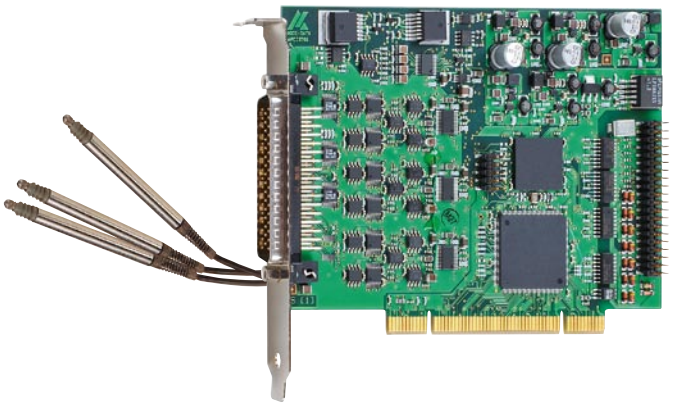
ADDI-DATA®
SPIRIT OF EXCELLENCE

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

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)

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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ADDI-DATA® SPIRIT OF EXCELLENCE

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

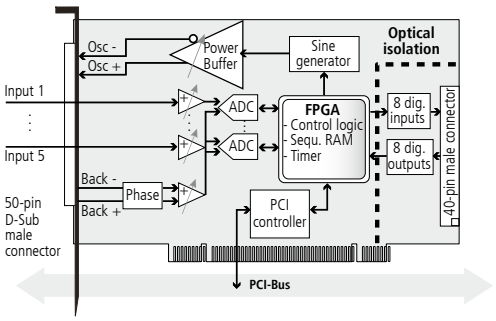
EMC – Electromagnetic compatibility

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.

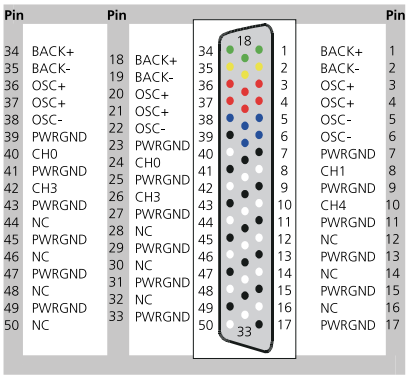
Physical and environmental conditions

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

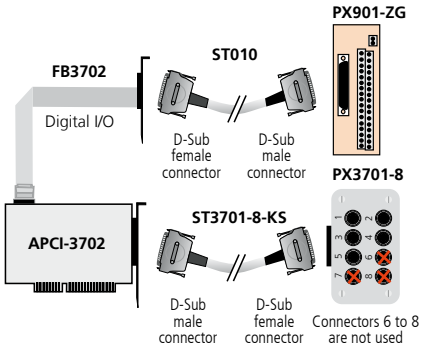


Pin assignment
50-pin D-Sub male connector



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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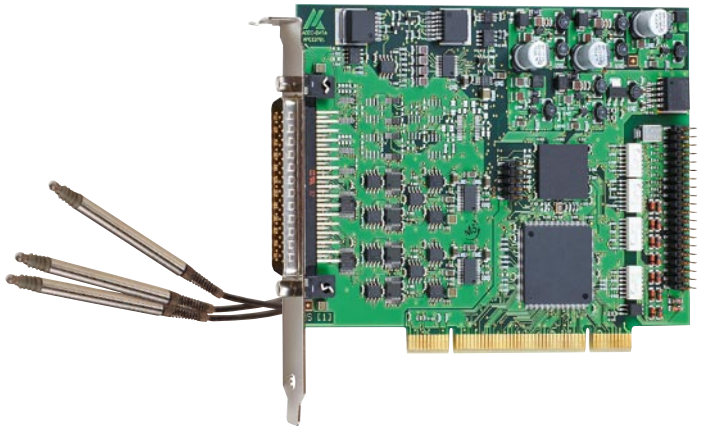
Length measurement board, 16-bit, 16 or 8 inductive transducers, LVDT, half-bridge



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

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

With the length measurement board APCI-3701, you can connect directly and acquire up to 16 half-bridge or LVDT transducers. The 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7 and XP

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

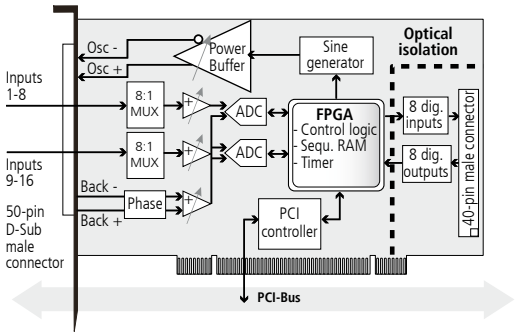
EMC – Electromagnetic compatibility

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.

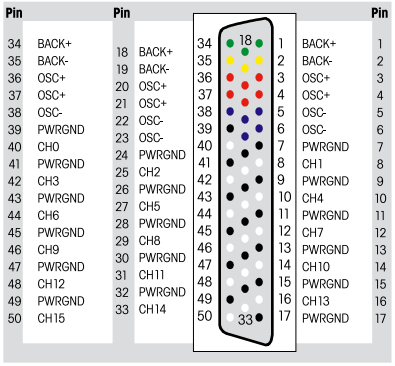
Physical and environmental conditions

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

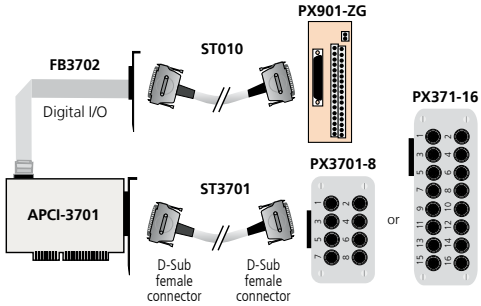


Pin assignment
50-pin D-Sub male connector (APCI-3701-16)



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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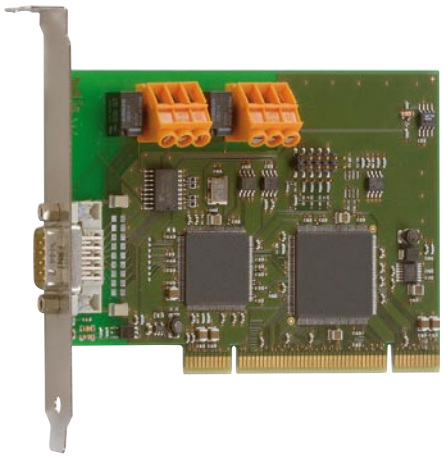
Watchdog board, optically isolated, 4 watchdogs/timers



APCI-035

4 watchdogs/timers

2 relays with change-over contacts

1 digital input, 24 V

2 alarm levels

Temperature monitoring

from - 45 °C to + 135 °C

RoHS 2002/95/EC

PCI 32-bit

Also for PCI EXPRESS

see APCIe-040 page 100

Signed 64-bit drivers for Windows 7/XP

LabVIEW™

LabWindows/CVI™

Maximise the reliability of your telecom, ISP, Voice Mail, File Server or industrial systems under Windows operating systems with the APCI-035 PCI watchdog board.
The board is equipped with 4 watchdogs for simultaneous soft- and hardware monitoring. In this way, external devices can be monitored (e. g. alarm systems, PLCs) and controlled (e. g. modems, dialing devices).
In addition, the PCI watchdog board APCI-035 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.

Features

- PCI 3.3 V or 5 V

Watchdog

- 4 watchdogs/timers
- 1 trigger channel/gate input (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
- Two completely separated programmable alarm levels: Level 1 generates an interrupt or switches the warning relay, level 2 switches the reset relay.
- 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.
- 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 4 watchdogs is readable
- 1 digital input (watchdog trigger or timer gate)
- Watchdog 1 can switch 2 software-controlled relays

Safety

- Optical isolation 500 V

Temperature measurement

- 1 temperature onboard sensor
- Alarm function when a programmable limit value is exceeded

Applications

- Control of industrial PC-based process
- Time measurement • Temperature monitoring
- Timer-driven software applications

Software

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

Standard drivers for:

- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions

Watchdog • Timer • Temperature

On request:

Further operating systems, compilers and samples.

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

In preparation

The software **Watch & Act©** monitors the software and hardware levels of the PC or server on which it is installed. System services can be stopped or restarted as needed. Combined with the watchdog board APCI-035, it is possible to monitor the complete system, i. e. in case of error the PC or server can be rebooted. It is also possible to watch external devices such as diagnostic or monitoring systems and to control modems or other dialing devices.

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Specifications

APCI-035

Addressing:	32-bit
Addressing range:	256 Byte
Interrupt:	through BIOS
Optical isolation:	500 V (from the PC to the peripheral)

Watchdog/timer

Depth:	8-bit
Switching time of the reset relays:	2 s
4 x programmable watchdogs/timers:	Time selectable from 2 µs to 255 min
Time units:	µs, ms, s, min

Temperature monitoring

Accuracy:	± 2 °C
Measurement range:	-45 °C to 135 °C (real range of application 0-60 °C)
Resolution:	8-bit

Relay data

Type of contacts:	2 change-over contacts
Max. switching voltage:	60 VDC, 48 VAC
Max. switching current:	1 A
Max. switching capacity:	62.5 VA, 30 W
Min. permissible load:	1 mA / 5 VAC
Nominal load:	1 A 24 VDC
Contact resistance:	< 100 mΩ
Contact material:	Ag + Au-plated
Responding 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 at 24 V:	10^5 operations

Digital input

Nominal input current at 24 V:	6 mA
Nominal input voltage:	24 V
Switching threshold:	>16 V for logical "1".

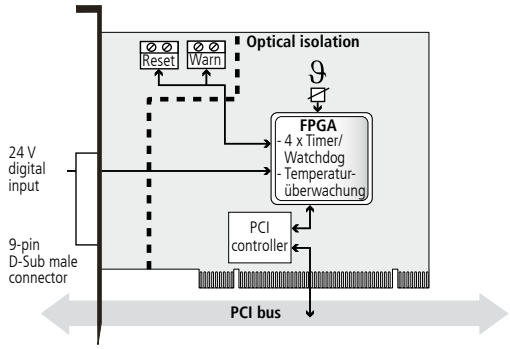
EMC – Electromagnetic compatibility

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

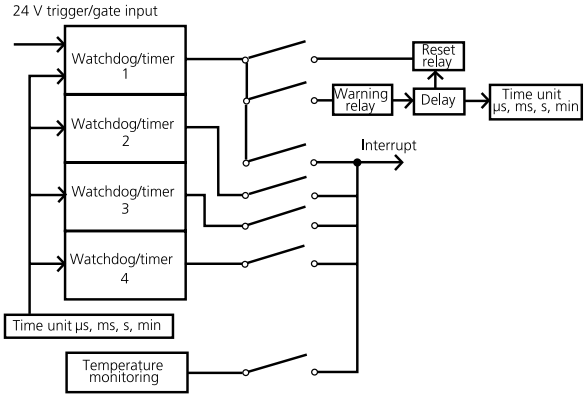
Dimensions:	120 x 85 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	240 mA ± 10 % typ.
Front connector:	9-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram



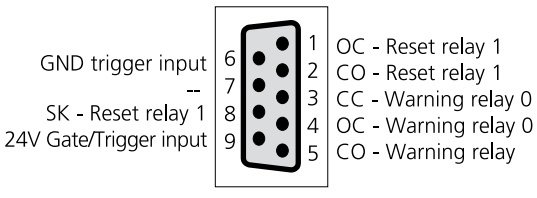
Possible alarm system settings

Function settings through software



Level 1: Interrupt / warning relay
Level 2: Reset relay / reset generated through reset switch of the PC system

Pin assignment – 9-pin D-Sub male connector



CO: Change-over contact
CC: Closer contact
OC: Opening contact

Ordering information

APCI-035
Watchdog board, optically isolated, 4 watchdogs/timers.
Incl. technical description and software drivers.

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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.

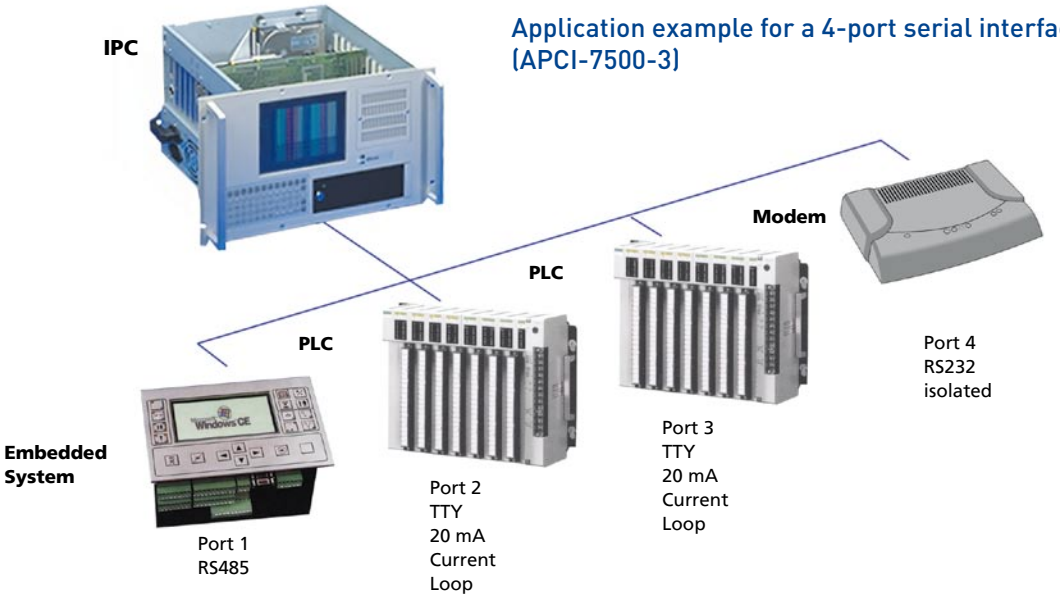
Flexible Mode configuration
ADDI-DATA serial interfaces are based on a concept of a basic circuit board and modules. For the 1-port, 2-port, 4-port or 8-port interfaces the following modules are available in standard or 20 mA current loop (TTY) version: RS323, RS422 and RS485. The modules can be freely 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. In addition, for higher transfer rates, a 128-byte FIFO buffer is built in.

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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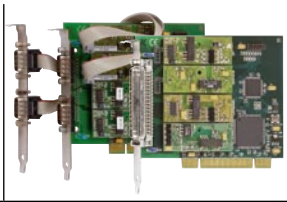
Serial interfaces (base boards)

				
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	172	172	172	172

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 (SI-422-PEP)				
Autom. transmitter control					✓	✓	
Current consumption	16 mA	1 mA	15 mA	5 mA	15 mA	5 mA	82 mA

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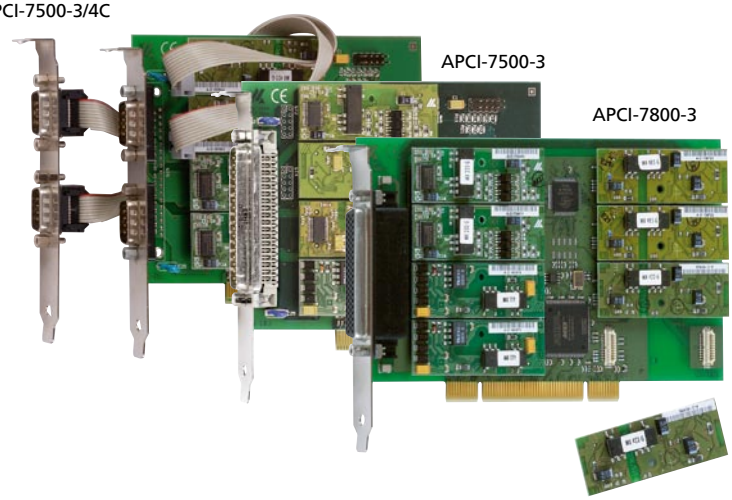
1 to 8-port serial interface, RS232, RS422, RS485, 20 mA CL, modular mounting through modules

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 102

Also for *CompactPCI™*
See CPCI-7500 page 196

Signed 64-bit drivers for Windows 7/Vista/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

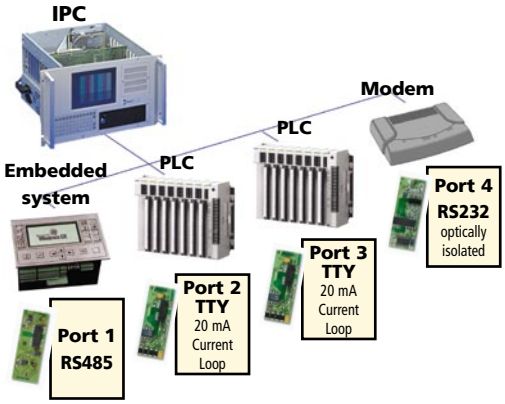
- Microsoft VC++
- Visual Basic • Delphi

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 (SI-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) 2x9-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

PCI 32-bit

Signed 64-bit drivers for Windows 7/XP

Customer-tailored modifications
designed to suit your needs. Hardware and software, firmware, PLDs, ...
Contact us!

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 or Langham controllers 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 (real-time)
- Signed 64-bit drivers for Windows 7/XP
- 32-bit drivers for Windows 7/Vista
- Windows XP/2000/NT 4.0: API as 32-bit DLL + SYS drivers
- Windows 98/Windows ME: API as 32-bit DLL + VXD drivers

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, download menu

*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

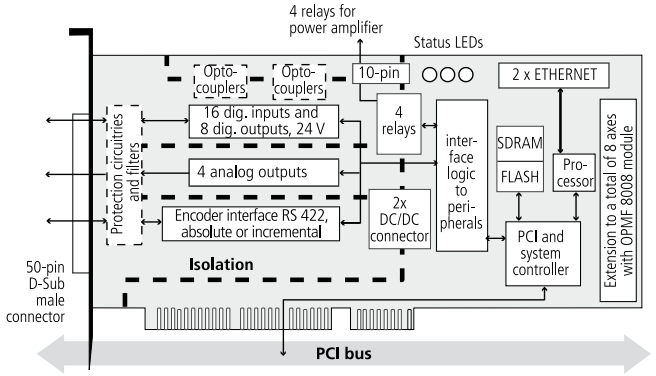
EMC – Electromagnetic compatibility

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 FB8001: 1 slot opening
Operating voltage:	+ 5 V and 3.3 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 FB8001:	Axis 7, 8: 50-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram

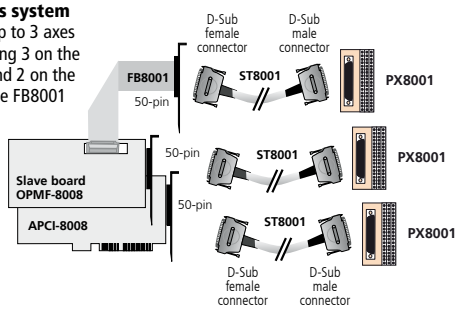


Pin assignment – 50-pin D-Sub male connector

Pin		Pin		Pin		Pin	
34	Setpoint value 3 /step 3	18	Setpoint value 2/step 2	34	18	1	Setpoint value 1/step 1
35	Setpoint value 3 /step 3	19	Setpoint value 2/step 2	35		2	Setpoint value 1/step 1
36	True value 3	20	True value 2	36		3	True value 1
37	True value 3	21	True value 2	37		4	True value 1
38	True value 3	22	True value 2	38		5	True value 1
39	True value 3	23	True value 2	39		6	True value 1
40	True value 3 /step 3	24	True value 2/step 2	40		7	True value 1/step 1
41	True value 3 /step 3	25	True value 2/step 2	41		8	True value 1/step 1
42	Dig. input 9	26	Dig. output 1	42		9	Dig. input 1
43	Dig. input 10	27	Dig. output 2	43		10	Dig. input 2
44	Dig. input 11	28	Dig. output 3	44		11	Dig. input 3
45	Dig. input 12	29	Dig. output 4	45		12	Dig. input 4
46	Dig. input 13	30	Dig. output 5	46		13	Dig. input 5
47	Dig. input 14	31	Dig. output 6	47		14	Dig. input 6
48	Dig. input 15	32	Dig. output 7	48		15	Dig. input 7
49	Dig. input 16	33	Dig. output 8	49		16	Dig. input 8
50	0 V ext. for dig. I/O			50	33	17	+ 24 V

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 FB8001



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 FB8001 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, optically isolated (option available up to 3 times, max. 24 dig. 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.
FB8001: From the 7th axis on (OPMF/7, OPMF/8) or with 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.
FBRELAY: For releasing the relays
FBRELAY_9: Standard, 9-pin cable with bracket
FBRELAY_25: more than 3 axes: 25-pin cable.
FB8008_60_25: **FB8001 + FBRELAY_25**
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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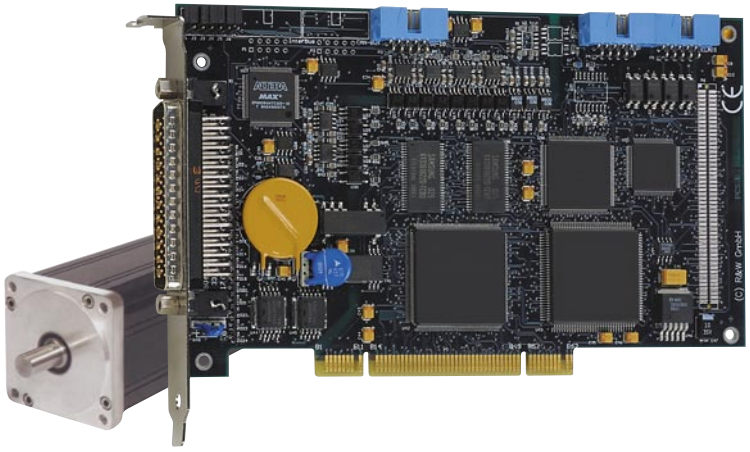
ADDI-DATA® SPIRIT OF EXCELLENCE

Motion control
for servo or stepper motors



APCI-8001

For 3 servo or stepper motors

Onboard 64-bit RISC processor

Optical isolation

16-bit analog output channels

Can be extended to a total of 8 axes

PCI 32-bit

Also for *CompactPCI™*
See CPCI-8004 page 198

Signed 64-bit drivers for Windows 7/Vista/XP

Customer-tailored modifications
designed to suit your needs. Hardware and software, firmware, PLDs, ...
Contact us!

The board APCI-8001 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 or Langham controllers are also involved in the axis control.
The "open" controlling concept of the APCI-8001 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-8001 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 (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

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

Standard drivers for:

- Linux (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- Microsoft C Lib. • Borland C Lib.
- Visual C++ • Visual Basic • Delphi

On request:

Further operating systems, compilers and samples.

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

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Specifications

APCI-8001

CPU system:	64-bit-RISC processor 150 MHz
RAM:	16 MB
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-8001 all interpolations 2D .. 8D depending on the number of 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 2 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:	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
Interrupts:	Through PCI BIOS
DMA:	Bus master
Auxiliary voltage:	24 V external for digital I/O

Safety

Optical isolation:	1000 V

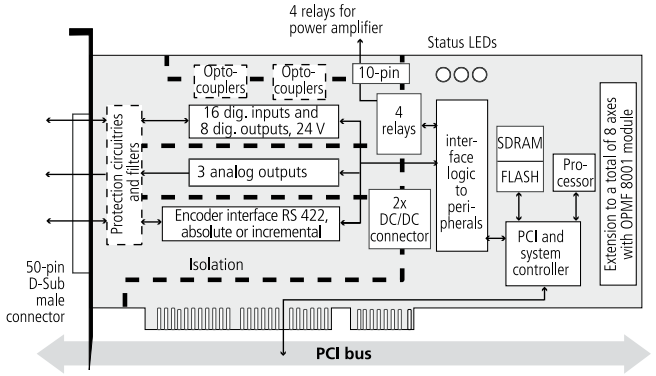
EMC – Electromagnetic compatibility

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-8001: 1 PCI slot Slave board OPMF: 1 PCI slot Cable FB8001: 1 slot opening
Operating voltage:	+ 5 V and 3.3 V ± 5 % from the PC
Front connector APCI-8001:	Axis 1, 2, 3: 50-pin D-Sub male connector
Front connector OPMF-3001:	Axis 4, 5, 6: 50-pin D-Sub male connector
Ribbon cable FB8001:	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

Pin		Pin		Pin		Pin	
34	Setpoint value 3 /step 3	18	Setpoint value 2/step 2	34	18	1	Setpoint value 1/step 1
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36	True value 3	20	True value 2	36		3	True value 1
37	True value 3	21	True value 2	37		4	True value 1
38	True value 3	22	True value 2	38		5	True value 1
39	True value 3	23	True value 2	39		6	True value 1
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41	True value 3 /step 3	25	True value 2/step 2	41		8	True value 1/step 1
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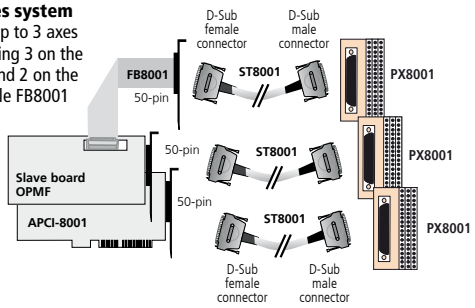
43	Dig. input 10	27	Dig. output 2	43		10	Dig. input 2
44	Dig. input 11	28	Dig. output 3	44		11	Dig. input 3
45	Dig. input 12	29	Dig. output 4	45		12	Dig. input 4
46	Dig. input 13	30	Dig. output 5	46		13	Dig. input 5
47	Dig. input 14	31	Dig. output 6	47		14	Dig. input 6
48	Dig. input 15	32	Dig. output 7	48		15	Dig. input 7
49	Dig. input 16	33	Dig. output 8	49		16	Dig. input 8
50	0 V ext. for dig. I/O			50	33	17	+ 24 V

ADDI-DATA connection

Example for an 8-axes system
APCI-8001: 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 FB8001



Ordering information

APCI-8001: 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-8001-STP: Motion control board for stepper motors. 16 dig. inputs and 8 dig. outputs, 24 V, optically isolated. Incl. technical description and software drivers.
APCI-8001-1: Motion control board for 1 servo or stepper motor. 16 dig. inputs and 8 dig. outputs, 24 V, opt. isolated. Incl. technical description, software drivers.

Options:

OPMF/4 (OPMF/4-STP): 4th axis – 8 inputs and 4 dig. outputs in addition
OPMF/5 (OPMF/5-STP): 5th axis – 16 inputs and 8 dig. outputs in addition
OPMF/6 (OPMF/6-STP): 6th axis – 16 inputs and 8 dig. outputs in addition
For the option OPMF/7 and more the FB8001 cable is required
OPMF/7 (OPMF/7-STP): 7th axis – 24 inputs and 12 dig. outputs in addition
OPMF/8 (OPMF/8-STP): 8th axis – 24 inputs and 12 dig. outputs in addition
OPMF-AI12: 4 analog inputs (option available in single or double, max. 8 analog inputs).
OPMF-DIO: 8 digital inputs and 4 dig. outputs, optically isolated (option available up to 3 times, max. 24 dig. inputs and 12 outputs)
OPMF-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.INTERBUS-8001: Master connection of the APCI-8001
FB-INTERBUS: Ribbon cable between OPMF and 9-pin D-Sub male connector with bracket for connecting the INTERBUS.
OPT.CAN-8001: CAN bus connection of the APCI-8001 (not CAN Open).

Accessories:

FB-CAN: Ribbon cable between OPMF and 9-pin D-Sub male connector with bracket for connecting the CAN bus.
FB8001: From the 7th axis on (OPMF/7, OPMF/8) or with option OPMF-AI12. Ribbon cable between OPMF and a 50-pin D-Sub male connector with bracket.
On request with female connector.
FBRELAY: For releasing the relays
FBRELAY_9: Standard, 9-pin cable with bracket
FBRELAY_25: more than 3 axes: 25-pin cable.
FB8001_60_25: **FB8001 + FBRELAY_25**
PX8001: 3-row terminal panel for DIN rail
ST8001: Cable for connecting APCI-8001 and OPMF, 50-pin.

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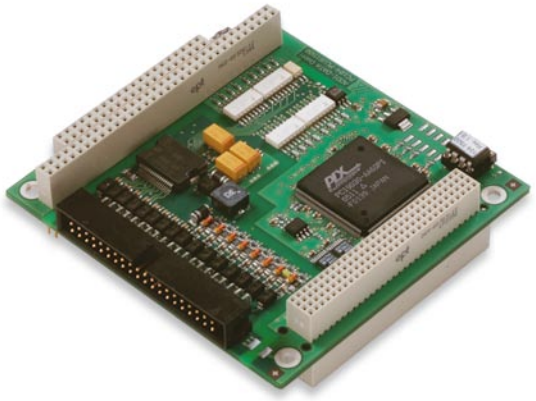
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for PC/104-Plus



*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

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 (real-time)
- 32-bit drivers for Windows XP Embedded/ 2000 Embedded

Drivers and samples for the following compilers and software packages:

- Microsoft CVC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions

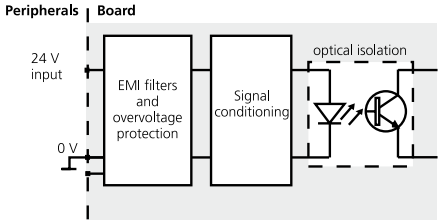
- Digital input • Digital output
- Watchdog • Timer • Counter

On request:

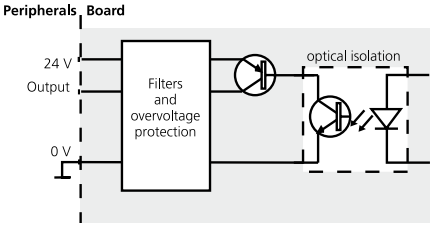
Further operating systems, compilers and samples.

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

Protective circuit for the input channels



Protective circuit for the output channels



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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

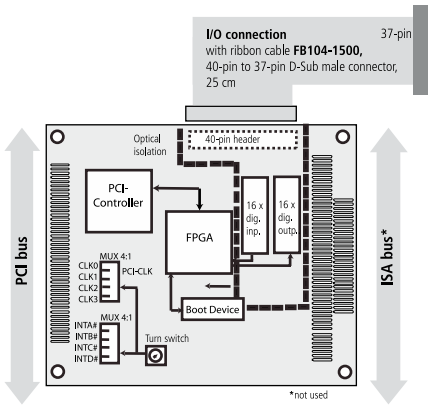
EMC – Electromagnetic compatibility

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.

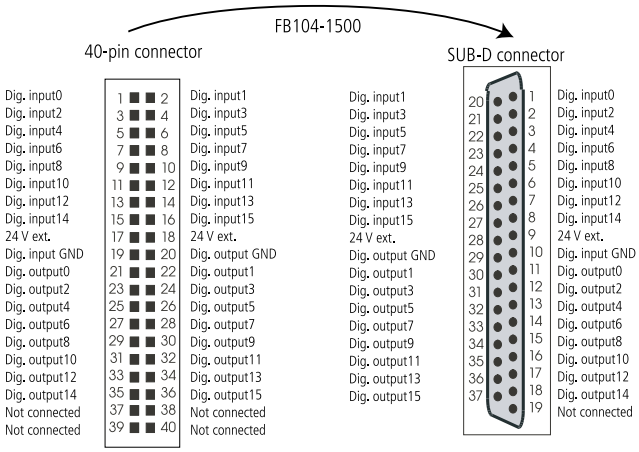
Physical and environmental conditions

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

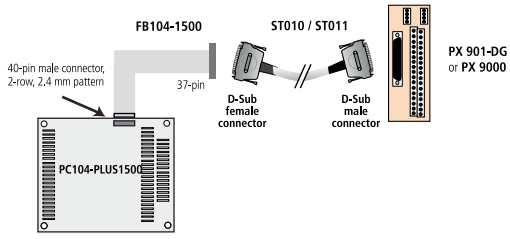
Simplified block diagram



Pin assignment – 40-pin to 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 SUB-D 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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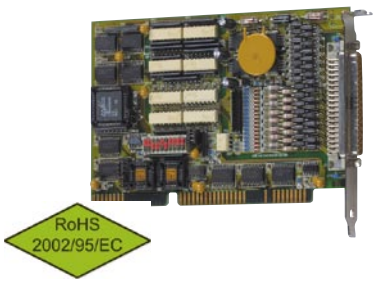
Digital, counter and analog boards for the ISA bus

All datasheets see www.addi-data.com



Digital I/O board, optically isolated, 32 digital I/O, 24 V

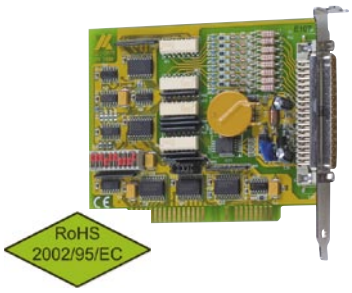
PA 1500

16 digital inputs 24 V, incl. 14 interruptible inputs

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V, input and output filters

Watchdog, timer, reset of the outputs to „0“ at Power-On



Digital I/O board, optically isolated, 16 digital I/O, 24 V

PA 1508

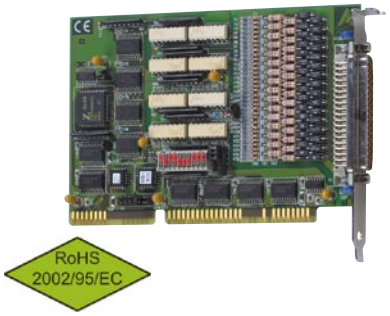
8 digital inputs, 24 V

Optical isolation between all input channels

8 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V, overvoltage protection

2 diagnostic outputs, programmable watchdog

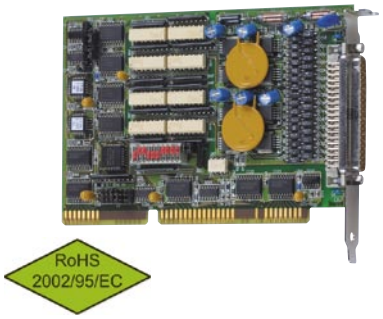


Digital input board, optically isolated, 32 digital inputs, 24 V

PA 1000

32 digital inputs, 24 V, incl. 14 interruptible inputs

Optical isolation 1000 V, voltage reversal protection, timer



Digital output board, optically isolated, 32 digital outputs, 24 V

PA 2000

32 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Overvoltage and short-circuit protection

3 timers, watchdog

Diagnostics reports in case of error

Ordering information

Digital input and output boards for the ISA bus

PA 1500: Digital I/O board, optically isolated, 32 digital I/O, 24 V. Incl. technical description and software drivers

PA 1508: Digital I/O board, optically isolated, 16 digital I/O, 24 V. Incl. technical description and software drivers.

PA 1000: Digital input board, optically isolated, 32 digital inputs, 24 V. Incl. technical description and software drivers.

PA 2000: Digital output board, optically isolated, 32 digital outputs, 24 V. Incl. technical description and software drivers.

Accessories

PX901-D: Screw terminal board, LED status display

PX901-DG: Screw terminal board, LED status display, for DIN rail

PX9000: 3-row screw terminal board, for DIN rail, LED status display

PX8500-G: Relay output board for DIN rail, cascadable

PX9100-DG: **for PA 1508** Screw terminal board, for DIN rail, LED status display

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)

ST022: Round cable between PX 8500 und PX 901, shielded, 2 m

ST021: **for PA 1500** Round cable between PA 1500 und PX 8500, shielded, twisted pairs, 2 m

The PA boards are suited for use with a 8-bit ISA bus.

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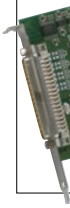


RoHS 2002/95/EC

Pulse acquisition board for 3 or 6 incremental encoders

PA 1700-2

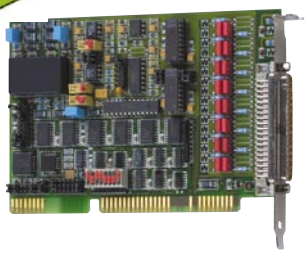
- 3/6 incremental encoders, 32/16-Bit
- TTL or differential signals
- Frequency measurement, pulse width modulation
- Up to 10 MHz frequency measurement
- Automatic recognition of direction
- 4 TTL I/O

Ordering information

PA 1700-2
Pulse acquisition board for 3 or 6 incremental encoders.
Incl. technical description and software drivers.

Versions, options and accessories see www.addi-data.com
The PA boards are suited for use with a 8-bit ISA bus.

RoHS 2002/95/EC



Analog input board, 16/8 SE or 8/4 diff. inputs, 12-bit

PA 302

- 16/8 single-ended or 8/4 differential inputs
- Voltage or current inputs
- 12-bit resolution
- 125 kHz throughput
- 3 timers
- Trigger function

RoHS 2002/95/EC

Multifunction board, 16 SE or 8 diff. inputs, 8 analog outputs, 16-bit

PA 311-16-8

- 16 single-ended or 8 differential inputs
- 8 analog outputs
- 16-bit resolution
- 100 kHz throughput
- DMA access
- 24 TTL I/O, 3 timers
- Software trigger

Ordering information

PA 302
Analog input board, 16/8 SE or 8/4 diff. inputs, 12-bit. Incl. technical description and software drivers.

PA 311-16-8
Multifunction board, 16 SE or 8 diff. inputs, 8 analog outputs, 16-bit. Incl. technical description and software drivers.

Versions, options and accessories see www.addi-data.com
The PA boards are suited for use with a 8-bit ISA bus.

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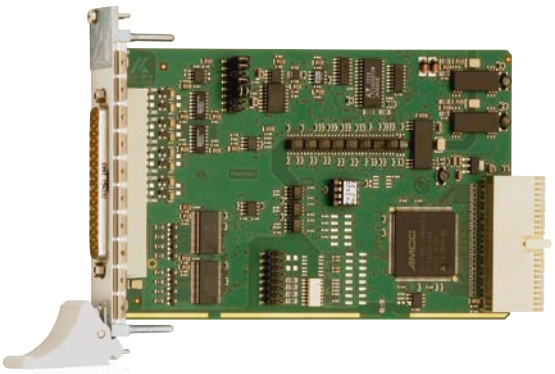

CompactPCI™

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.

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 boards are equipped with a FPGA component. Use the full potential of your PC board hardware and software resources and thus accelerate your processes.

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.

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

READY FOR HARSH INDUSTRIAL ENVIRONMENT

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 32

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	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 SE / 8 diff.	16 SE / 8 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	184	186	188	190	192	194	196	198

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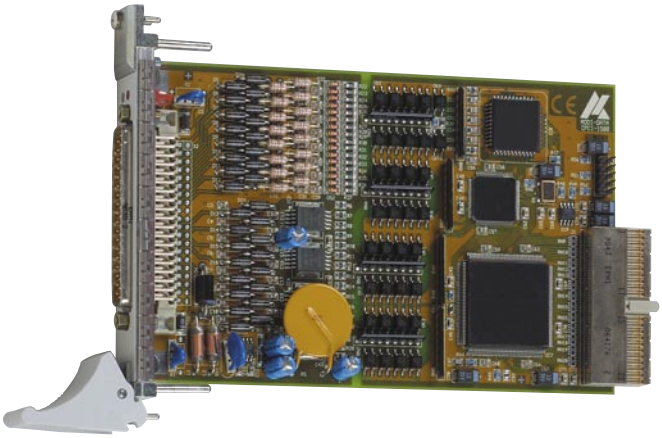
Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V



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 82

Also for PCI See APCI-1500 page 106

URS-1500-6U
6U bracket

Signed 64-bit drivers for Windows 7/Vista/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server 2003 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP
- 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, download menu

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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

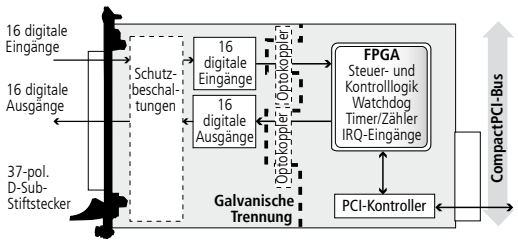
EMC – Electromagnetic compatibility

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.

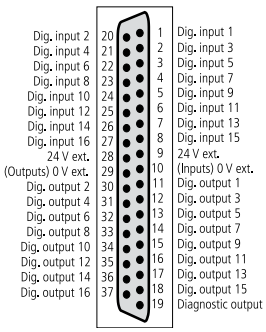
Physical and environmental conditions

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

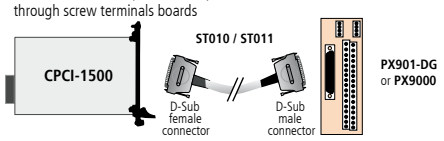


Pin assignment – 37-pin D-Sub male connector

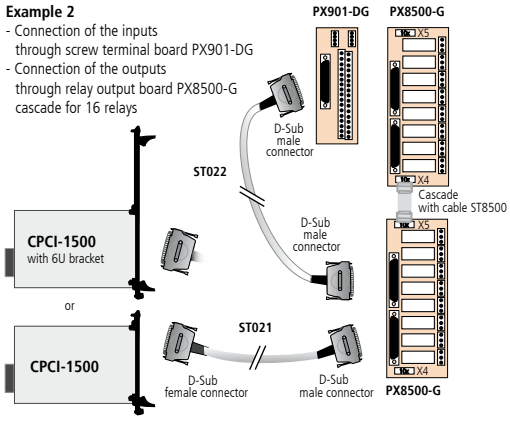


ADDI-DATA connection

Example 1
Connection of the inputs and outputs through screw terminals boards



Example 2
- Connection of the inputs through screw terminal board PX901-DG
- Connection of the outputs through relay output board PX8500-G cascade for 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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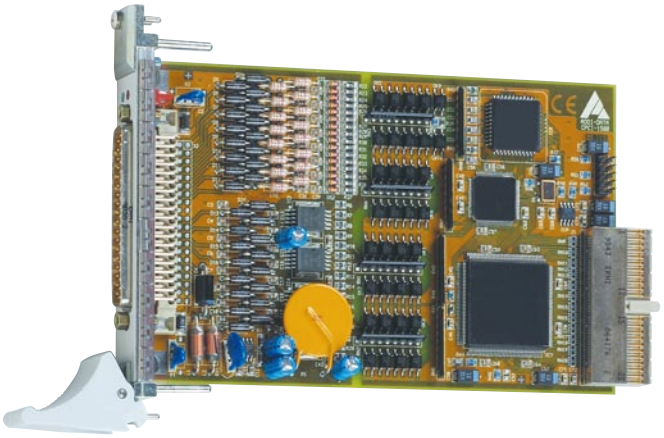
Digital I/O board, optically isolated, 64 digital inputs and outputs, 24 V

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 86

Also for PCI See page 110

URS-1500-6U
6U bracket

Signed 64-bit drivers for Windows 7/Vista/XP

LabVIEW™

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

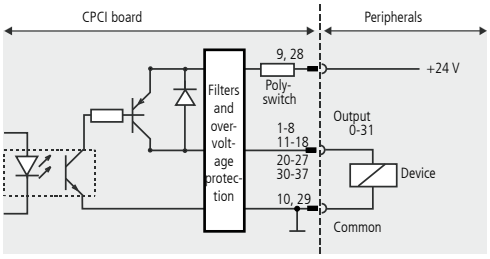
Outputs

- 32 optically isolated digital outputs, 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 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server 2003
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++
- LabVIEW (on request)

On request:

Further operating systems, compilers and samples.

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

*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 - 0-2: 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:	U nominal: 24 V	24 V
UH max.:	26 V / 5 mA typ.	12.3 mA typ.
UH min.:	19 V / 1.3 mA typ.	5.2 mA typ.
UL max.:	14 V / 0.6 mA typ.	3.2 mA typ.
UL min.:	0 V / 0 mA	0

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:	10 V to 36 V, min. 5 V (via front connector)
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: 120 µs
Switch-off time:	I out=0.5 A, load = resistance: 40 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: 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

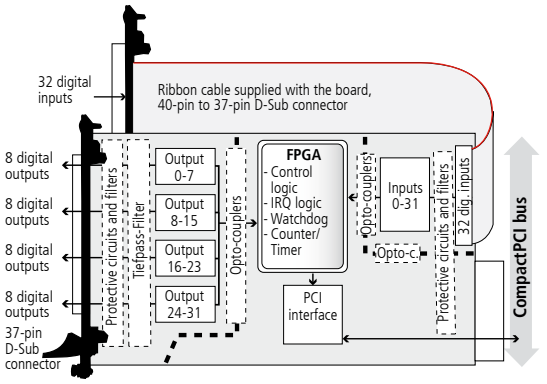
EMC – Electromagnetic compatibility

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.

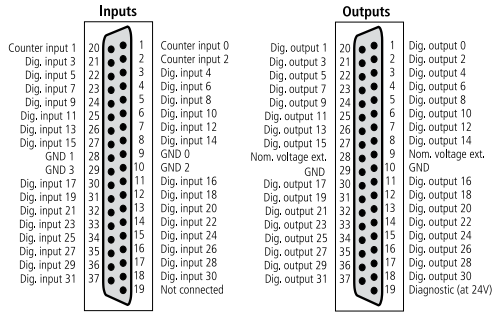
Physical and environmental conditions

Dimensions::	3U/4TE or 6HE
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:	0 to 60 °C (with forced cooling)

Simplified block diagram

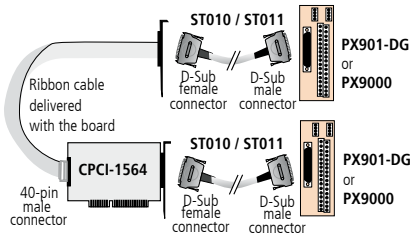


Pin assignment – 37-pin D-Sub male connector

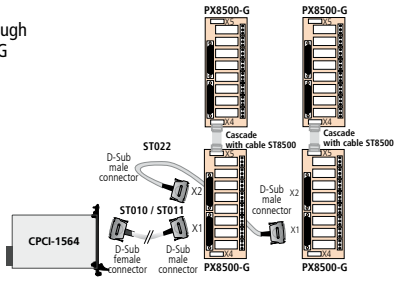


ADDI-DATA connection

Example 1:
- Connection of the inputs (ribbon cable)
- Connection of the outputs through screw terminal board PX901-DG or PX9000



Example 2:
Connection of the outputs through screw terminal 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)
ST021: Between CPCI-1564 and PX8500-G, shielded, 2 m
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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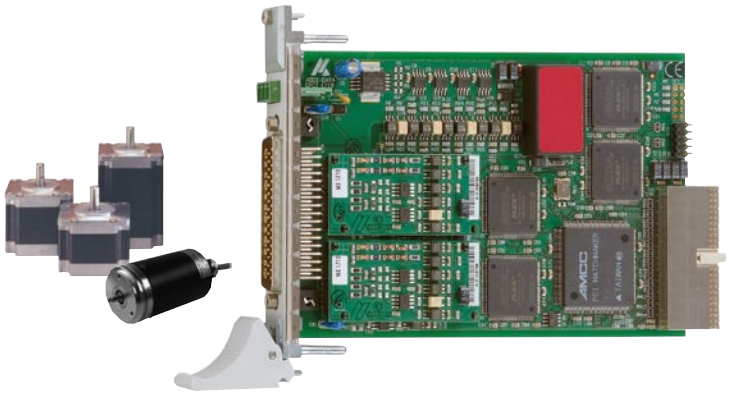
Multifunction counter board, optically isolated, encoder, incremental counter, timer/counter, SSI, PWM, ...



CPCI-1710 / CPCI-1711

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 90

Also for PCI see page 124

URS-1710-6U
6U bracket

Description of the **functions** see datasheet of the **APCI-1710** page 124

Signed 64-bit drivers for Windows 7/Vista/XP

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 (82x54)
- 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP
- 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, download menu

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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

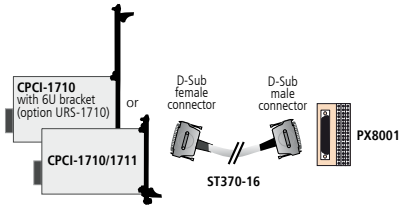
EMC – Electromagnetic compatibility

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!**
CPCI-1711: Multifunction counter board, optically isolated, with 2 function modules. Incl. technical description and software drivers.

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

New!*

CPCI-3009

16/8/4 SE or 8/4/2 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

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 (82x54)
- 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 (real-time)
- 32-bit drivers for Windows XP (real-time)

On request:

Further operating systems, compilers and samples.

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

*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 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

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

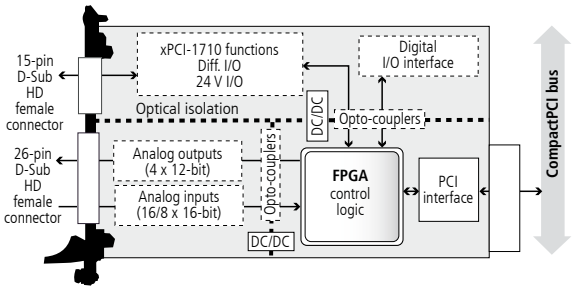
EMC – Electromagnetic compatibility

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 datasheet of the board APCI-1710 on page 124

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)

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

* Preliminary product information

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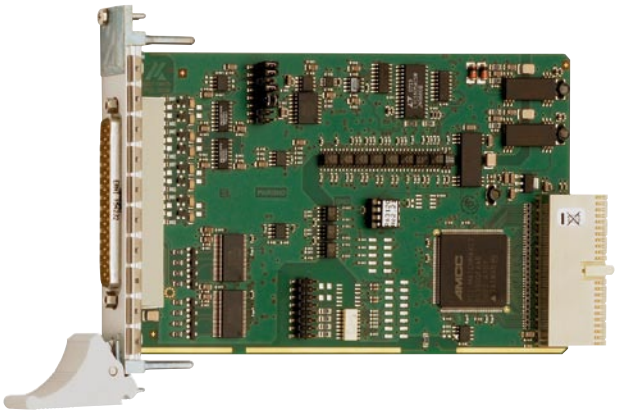
Multifunction board, optically isolated, 16 SE or 8 diff. inputs, 8 analog outputs, 16-bit



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 94

Also for PCI
See APCI-3120, page 138

URS-3120-6U
6U bracket with FB3001

LabVIEW™

LabWindows/CVI™

DASYLab™

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (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, download menu

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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.

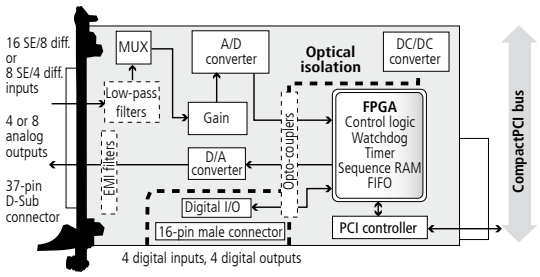
EMC – Electromagnetic compatibility

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.

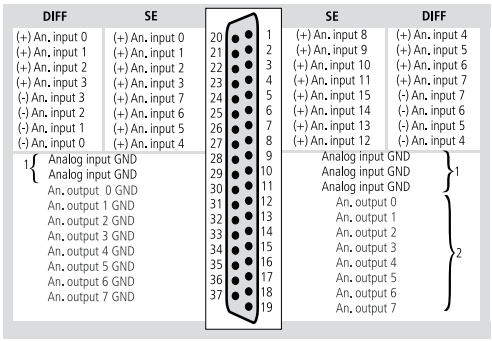
Physical and environmental conditions

Dimensions:	3U/4TE
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 vom 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

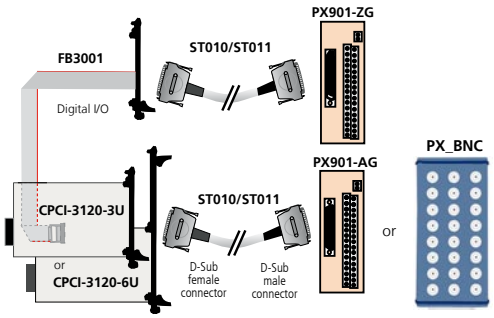


1: The analog inputs have a common ground line
2: Each analog output has its own ground line

Pin assignment – 16-pin connector

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-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)

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
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
FB3001: Ribbon cable for digital I/O, with 37-pin D-Sub male connector on 3U bracket

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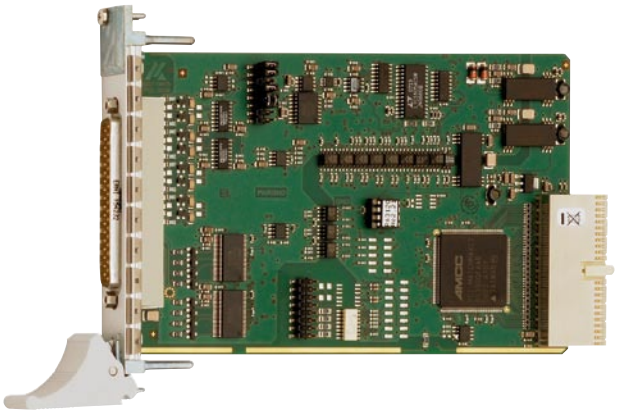
Analog input board, optically isolated, 16 SE or 8 diff. inputs, 12-bit



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 96

Also for PCI
See APCI-3001, page 148

Signed 64-bit drivers for Windows 7/XP

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 als 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/XP

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.

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

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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 progr. 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

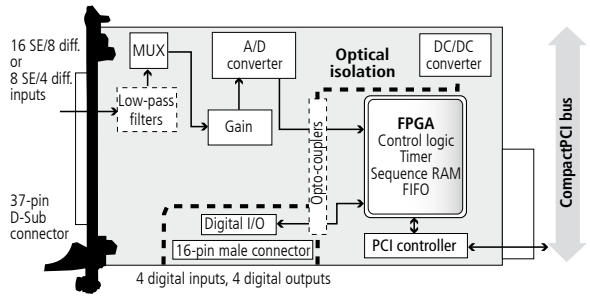
EMC – Electromagnetic compatibility

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.

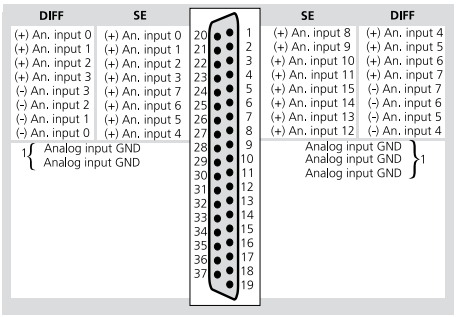
Physical and environmental conditions

Dimensions:	3U/4TE
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

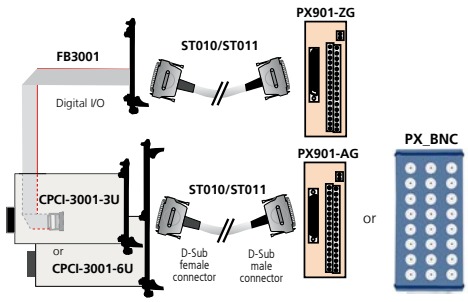


1: The analog inputs have a common ground line

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
CPCI-3001-8 8 SE/4 diff. inputs
CPCI-3001-4 4 SE inputs

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
PX_BNC: BNC connection box for connecting the analog I/O
PX901-ZG: Screw terminal panel for connecting the dig. I/O, for DIN rail
ST010: Standard round cable, shielded, twisted pairs, 2 m
ST011: Standard round cable, shielded, twisted pairs, 5 m
FB3001: Ribbon cable with 37-pin D-Sub male connector on 3U bracket for the digital I/O

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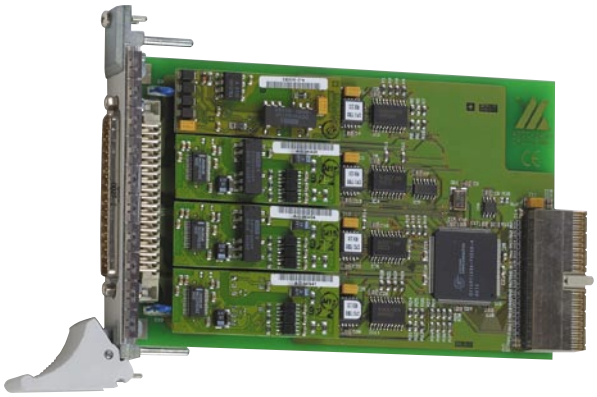
4-port serial interface, RS232, RS422, RS485, 20 mA CL



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 102

Also for PCI
See APCI-7500, page 172

URS-7500-6U
6U bracket

Signed 64-bit drivers for Windows 7/Vista/XP

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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000/Server 2003 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

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

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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)

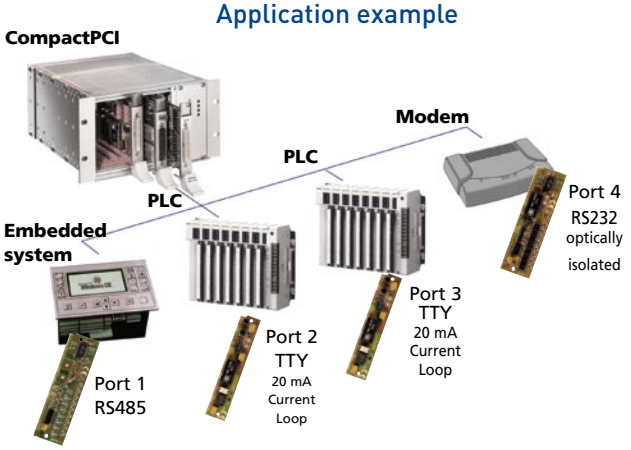
EMC – Electromagnetic compatibility

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 dig. inputs and 12 dig. outputs, optically isolated

CompactPCI™ 32-bit

Also for PCI

See page 174 and 176

Signed 64-bit drivers for Windows 7/Vista/XP

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 or Langham controllers 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 (real-time)
- 32-bit drivers for Windows 7/Vista/XP/2000
- Signed 64-bit drivers for Windows 7/Vista/XP

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, download menu

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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

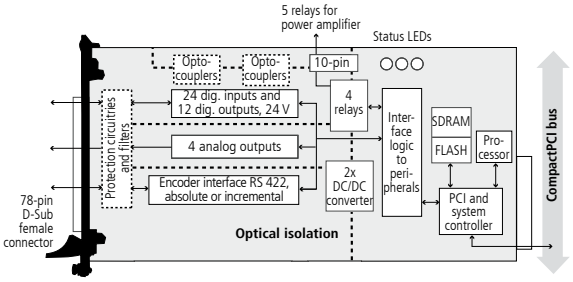
EMC – Electromagnetic compatibility

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.

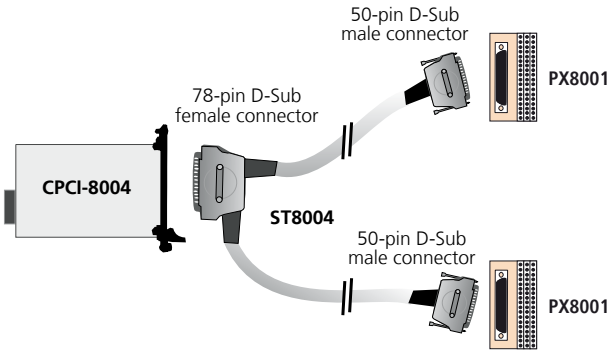
Physical and environmental conditions

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 copperbraid 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	PX9200	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	Panel for connecting 22 signal lines and 4 analog channels	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
Function indication with LEDs	**PX901-D**: yes	For 24 V and sensor supply		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	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-8001, APCIe-1711, APCI-2200, APCIe-2200 APCI-311x/301x, CPCI-8004	Multifunction board APCI-3122 and analog board APCI-3504	ADDI-DATA digital boards with digital outputs	ADDI-DATA analog boards
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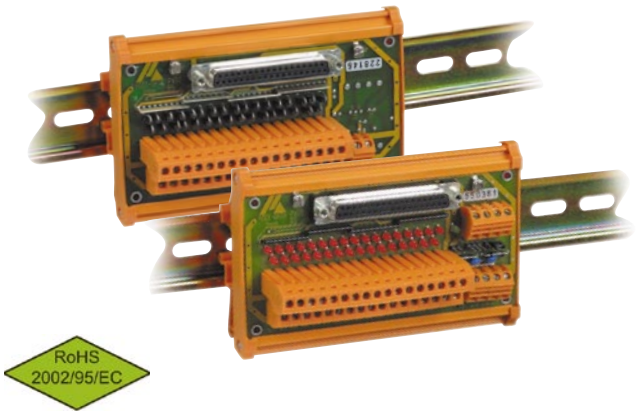
Screw terminal panel for DIN rail



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 the 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. The designations on the terminals indicate the 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

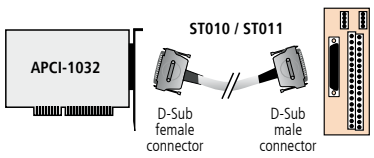
Applications

- 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
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 analog output boards with current outputs and for connecting the digital I/O on some ADDI-DATA boards. 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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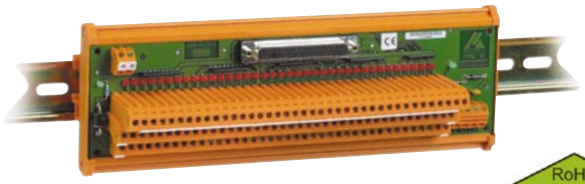
Screw terminal panels for DIN rail



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

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
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 OPMF, 50-pin

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Screw terminal panel for DIN rail

PX9200

Separate connector for digital I/O and analog outputs

LED status indication for digital signals

Protection through transil diodes for analog signals

DIN-rail mounting

The terminal panel PX9200 combines the connection of analog and digital channels. It features 2 separate male connectors between the digital and the analog signals. Both signal types are driven through one own layer board and are protected from each other.
The two terminals blocks for the digital signals allow to connect 22 lines distributed as follows: 12 lines for digital output signals and 10 lines for digital input signals. The cable ST3122-D is used for digital data transfer to the ADDI-DATA boards and is equipped with a 26-pin D-Sub high-density female connector.
The terminal block for the analog signals allow to connect 4 analog channels with a separated ground line. The cable ST3122-A is used for analog data transfer to the ADDI-DATA boards and is equipped with a 15-pin D-Sub high-density female connector.
All components of the layer board are included in an earthing strip which is itself connected to the earthing terminal.
The screw terminals are labelled to differentiate the different signals (analog/digital).
The PX9200 is supplied with LEDs for status display of the digital signals.
The analog signals are protected against fast transients and the mechanical layout allows the separation from the digital signals. The voltage supply for the analog or digital functions are driven separately.

Features

- Max. connection of 22 digital signal lines and 4 analog channels with separated ground line
- Separate ground connection
- Connection through screw terminals
- Separated connection blocks for analog and digital channels
- Terminals can be labelled
- With housing for DIN rail mounting
- All terminals for screw terminals for large conductor cross sections: up to 2.5 mm²

Safety features

- Transil diodes on the analog channels
- Separate lines for analog and digital channels

Applications

- Process control
- Industrial measurement
- Acquisition of sensor data
- Signal analysis

Specifications

Signal line terminals:	for the connection of peripherals
Status indication:	22 LEDs for digital status indication, including: – 12 yellow LEDs for digital outputs – 10 orange LEDs for digital inputs
	One additional LED (green) for the voltage supply of the analog and digital channels
Safety features:	Varistors and transil diodes
Connector:	26-pin high-density D-Sub female connector (digital)
	15-pin high-density D-Sub female connector (analog)
Dimensions:	(L x W x H) 132 x 87 x 65 mm
Temperature range:	0-60 °C

ST3122, High-density round cable, 2 m

Ordering information

PX9200

Screw terminal panel. Incl. technical description.

PX9200: for multifunction board APCI-3122 and analog output board APCI-3504 with status indication through LEDs

Accessories

Please order separately!

ST3122-D: High-density round cable, 2 m, shielded, twisted pairs, for digital inputs and outputs

ST3122-A: High-density round cable, 2 m, shielded, twisted pairs, for analog outputs

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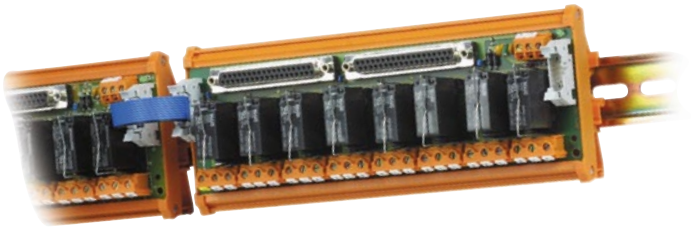
8-port relay output board



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

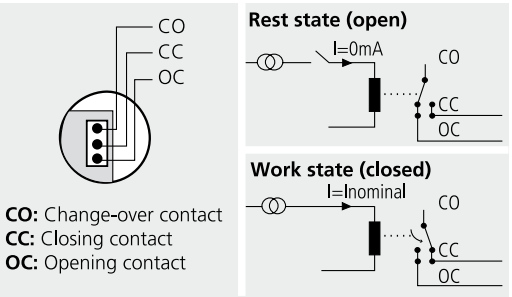
Safety features

- 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
Responding 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

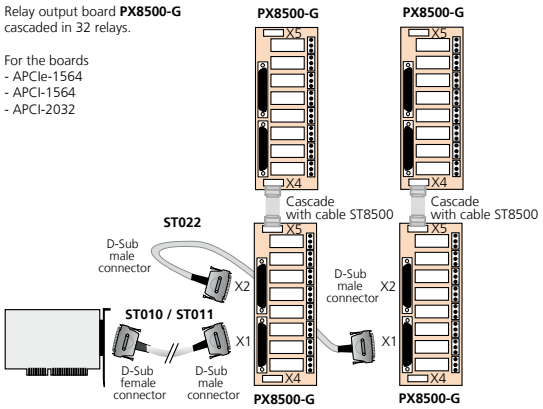
Operating voltage:	+ 24 V
Current consumption:	210 mA typ.
Dimensions (L x W x H):	with housing 212 x 87 x 72 mm
Connector:	2 x 37-pin D-Sub female connector
X1:	For the connection to the PC
X2:	For cascading the PX8500 in max. 32 relays, for example the digital output board APCI-2032. In this case the 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.

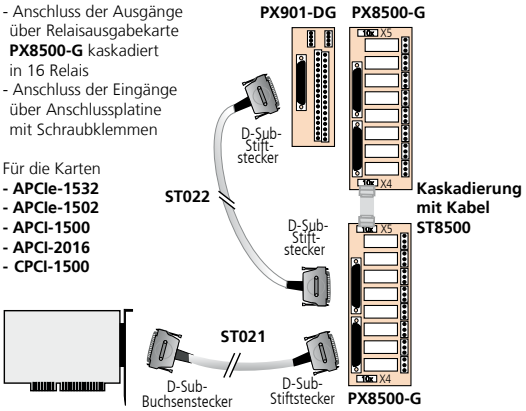
For the boards
- APCIe-1564
- APCI-1564
- APCI-2032



PX8500 cascaded in 16 relays

- Anschluss der Ausgänge über Relaisausgabekarte **PX8500-G** kaskadiert in 16 Relais
- Anschluss der Eingänge über Anschlussplatine mit Schraubklemmen

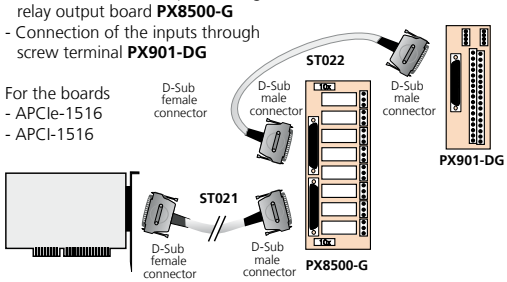
Für die Karten
- **APCIe-1532**
- **APCIe-1502**
- **APCI-1500**
- **APCI-2016**
- **CPCI-1500**



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 an 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 an APCI-2032, APCI-1564
ST011:	Same as ST010, 5 m

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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

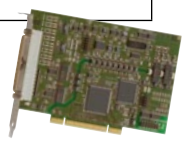
The connection box has 16 BNC connectors In 0 to In 15 for the connection of the analog input channels (Channel 0-15) of many ADDI-DATA input and multifunction boards (see table on the right).
The BNC ground is connected to the ground of the analog signals.
The connection of the differential channels (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	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

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

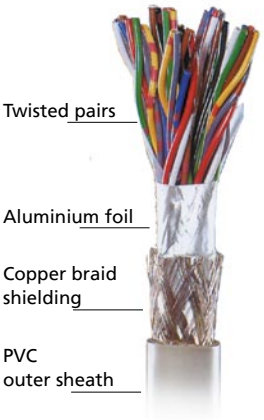
- Plain copper conductor, fine-strand according to IEC 60228
- Special PVC conductor insulation
- Twisted-pair conductors
- Core identification according to DIN 47100
- Conductors laid up in layers
- Aluminium foil
- Tinned copper braid shielding
- Covering grade approx. 85%
- Special outer sheath, grey 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 connector 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 mm^2)
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 mm^2 (ST010-S and ST011-S with a connector cross section of 0.25 mm^2)
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



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Shielded standard cables with metallised hoods

RoHS 2002/95/EC

Bent connector

ST01x-S
for high currents

Open
cable end

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 connector	✓	✓	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 (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 PX8000, 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
ST3122-A	Cable for the APCI-3122 and APCI-3504 , for the analog outputs 15-pin male connector / 15-pin male connector	✓	✓	2 m
ST3122-A_5	Cable for the APCI-3122 and APCI-3504, for the analog outputs 15-pin male connector / 15-pin male connector	✓	✓	5 m
ST3122-D	Cable for the APCI-3122 and APCI-3504, for the digital I/O 26-pin male connector / 26-pin male connector	✓	✓	2 m

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Bent connector

Cable designation	Description	Twisted pairs	Shielded round cable	Length
ST3122-D_5	Cable for the APCI-3504, for the digital I/O 26-pin male connector / 26-pin male connector	✓	✓	5 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
ST3701	Cable for the APCI-3701, 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, 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 serial interfaces				
ST074	Connection cables for 4-port serial interfaces 37-pin female connector / 4 x 25-pin D-Sub male connector		✓	35 cm
ST075	Connection cables for 4-port serial Interfaces 37-pin female connector / 4 x 9-pin D-Sub male connector		✓	35 cm
ST075_ABGW	Connection cables for 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	Connection cables for 8-port serial interfaces 78-pin male connector / 8 x 9-pin female connector		✓	35 cm
ST7825	Connection cables for 8-port serial interfaces 78-pin male connector / 8 x 25-pin male connector		✓	35 cm

Ribbon cables

Cable designation	Description
FB MSX-DIG-IO	For the MSX-Box option MSX-DIG-IO, 9-pin ribbon cable with D-Sub connector with bracket.
FB-INTERBUS	For the APCI-8001, 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 APCI-800x, APCI-30xx and APCI-31xx. Ribbon cable, 50-pin D-Sub male connector with bracket.
FB8001	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 with bracket for external CAN connection

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

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Imprint

Editor
ADDI-DATA GmbH
Marketing department
Airpark Business Center
Airport Boulevard B210
77836 Rheinmünster
Germany
+49 7229 1847-0
+49 7229 1847-222
E-Mail: info@addi-data.com
Internet: www.addi-data.com

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ADDI-DATA GmbH
Airpark Business Center
Airport Boulevard B210
77836 Rheinmuenster
Germany

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

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