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

MSX-E3027

16 analog inputs, differential, 16-bit

Voltage or current inputs

4 GB extended memory

Buffered real-time clock

Stainless steel housing – IP 67

Fast distributed data acquisition

*Operating temperature

RoHS 2002/95/EC

on request

DatabaseConnect
see page 114

More information on www.addi-data.com

Features

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

Analog inputs

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

Safety features

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

Interfaces

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

Communication interfaces

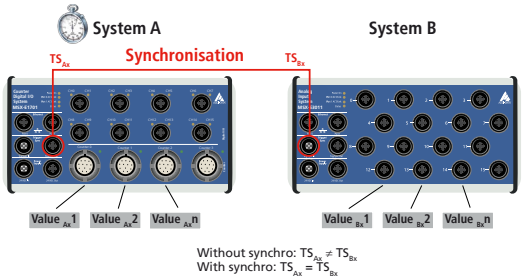
- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and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

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

Synchronisation/time stamp

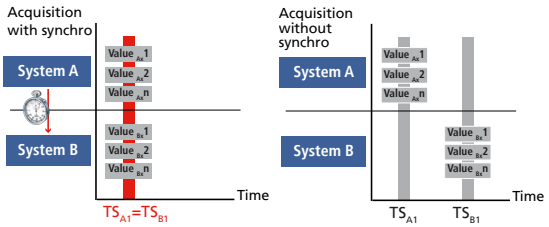
Time stamp

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



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

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



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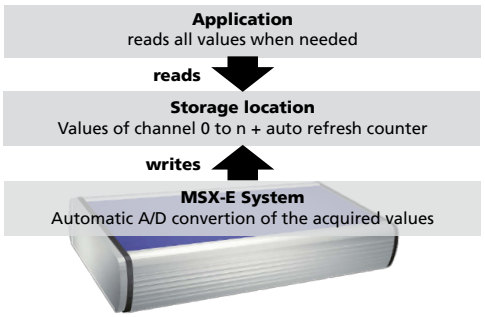
Acquisition modes

Auto-refresh mode

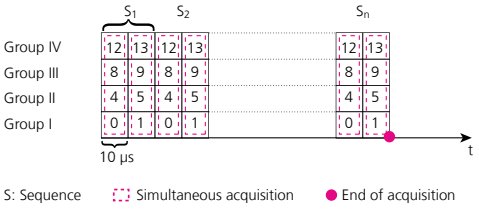
In auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system.
The client (e.g. PC, server, PLC, …) reads the acquired values asynchronously to the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



Sequence mode

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

Example: 8 channels, each with 10 µs

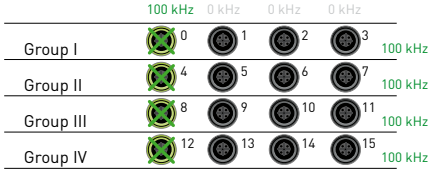


S: Sequence Simultaneous acquisition End of acquisition

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

Horizontal wiring (with 4 gauges/sensors)

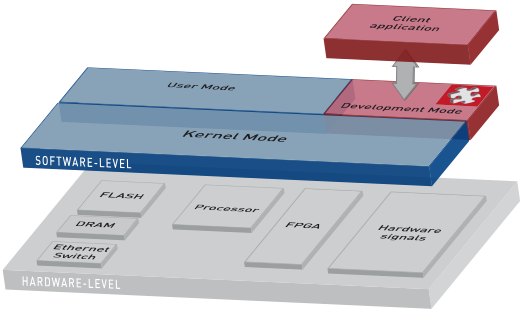
Vertical wiring (with 4 gauges/sensors)



Onboard programming / stand-alone operation

Development mode

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



Buffered real-time clock

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

* Preliminary product information

ConfigTools

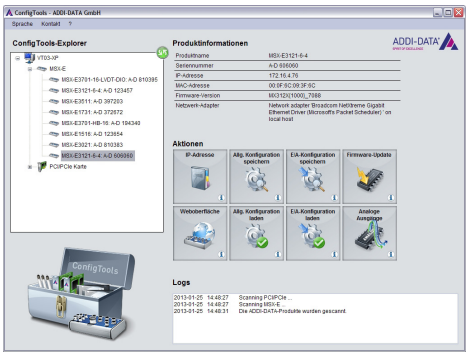
The **ConfigTools** program allows an easy administration of the MSX-E systems. These are automatically detected in the network. **ConfigTools** consists of common and specific functions.
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another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

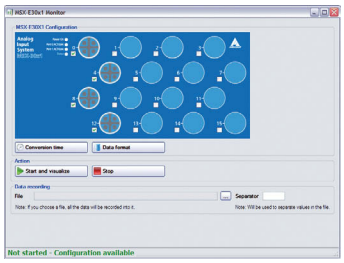
ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3027:

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

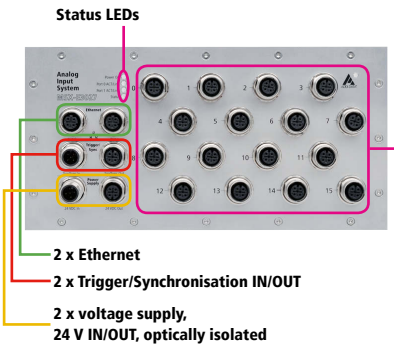
Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.



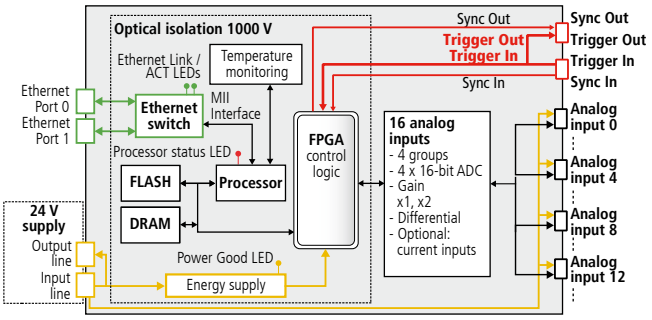


Example of monitor function: Testing the analog inputs.

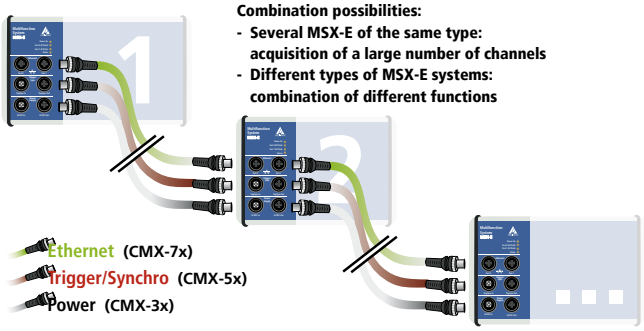
Features



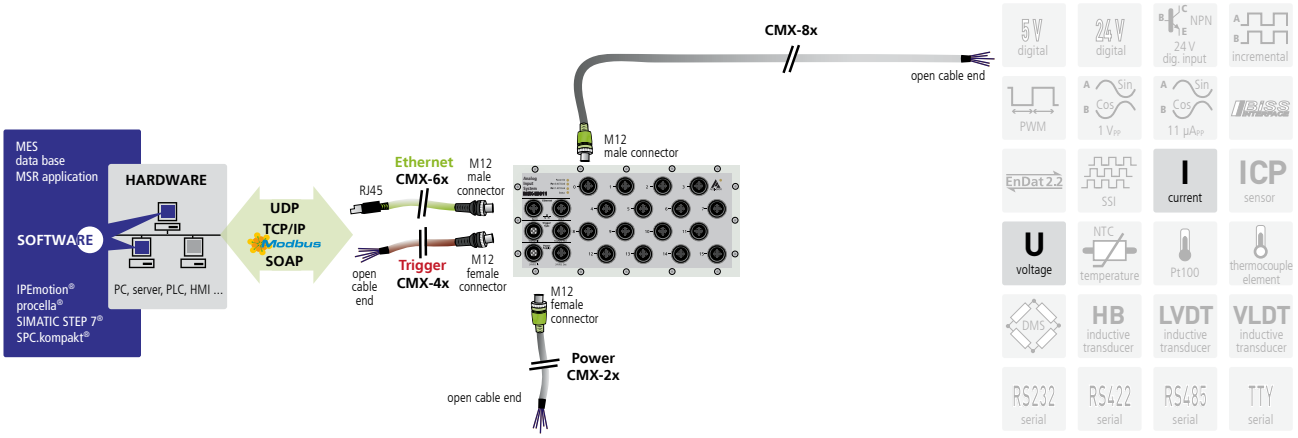
Simplified block diagram



Cascading



ADDI-DATA connection technology



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Specifications*

Analog inputs

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

Data storage

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

Voltage supply, Ethernet, Trigger, Synchro

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

System features

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

Ordering information

MSX-E3027

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

Connection cables

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

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

Options

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

* Preliminary product information

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