

# Ethernet system for pressure/force measurement

## 16/8 channels for strain gauges, 24-bit



### MSX-E3311

16/8 differential inputs, 24-bit

For strain gauges

Simultaneous acquisition of up to 8 channels

24 V digital trigger input



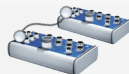
Integrated  
Ethernet  
switch



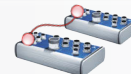
\*Operating temperature



ARM<sup>®</sup>9  
Technology



Cascadable,  
can be synchronised  
in the  $\mu$ s range



On request:  
Compare logic for  
synchro trigger signal



on request



DatabaseConnect  
see page 114



More information on  
[www.addi-data.com](http://www.addi-data.com)

### Features

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

### Safety features

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

### Inputs for strain gauges

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

### Interfaces

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

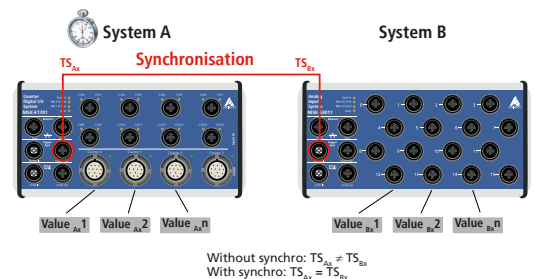
### Communication interfaces

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

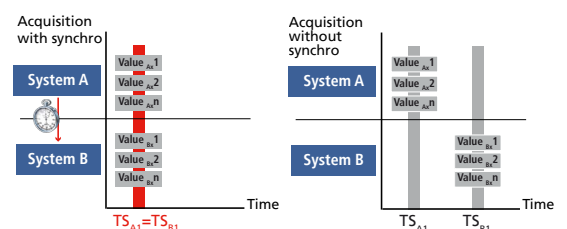
### Synchronisation/time stamp

#### Time stamp

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



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

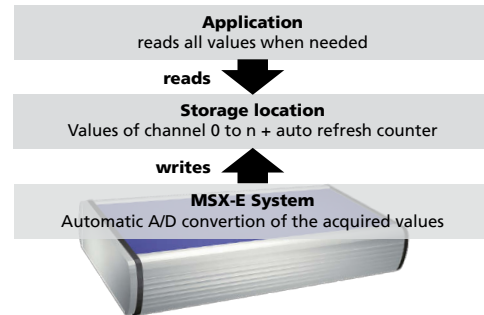




## Acquisition modes

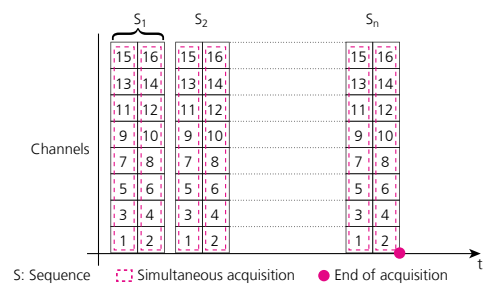
### Auto-refresh mode

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



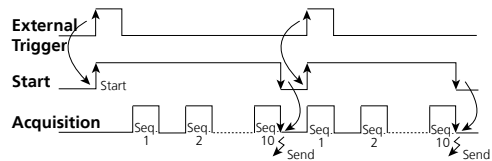
### Sequence mode

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



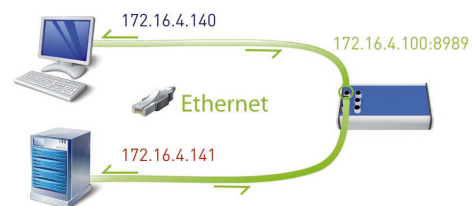
### Acquisition triggered through trigger or synchro input

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



### Reading data from a MSX-E system

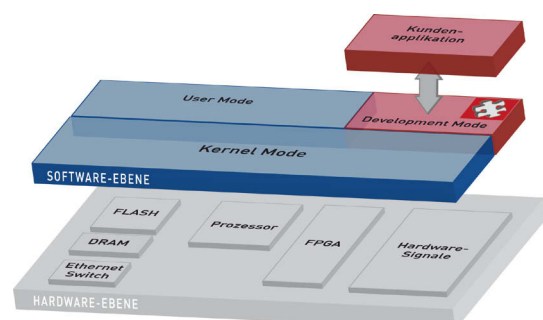
MSX-E systems are multi-client capable, this means several clients (e.g. PC, server, PLC, ...) can read the measurement values of one MSX-E system at the same time. For this, each client establishes a socket connection to the data server of the MSX-E system (port 8989). As soon as the measurement values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



## Onboard programming / stand-alone operation

### Development mode

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



## ConfigTools

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

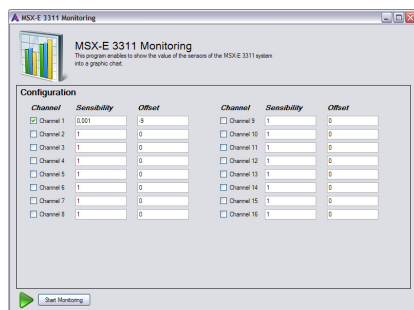
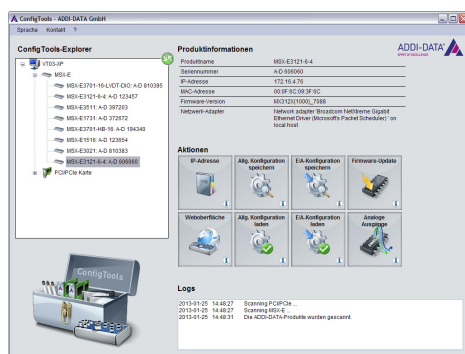
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

**ConfigTools** is included in the delivery.

### ConfigTools functions for MSX-E3311:

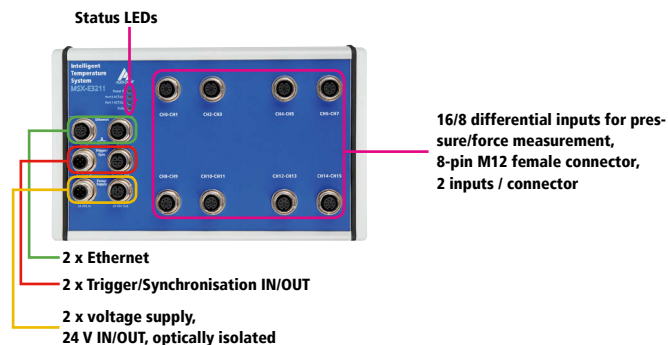
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Monitor for Inputs for strain gauges

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

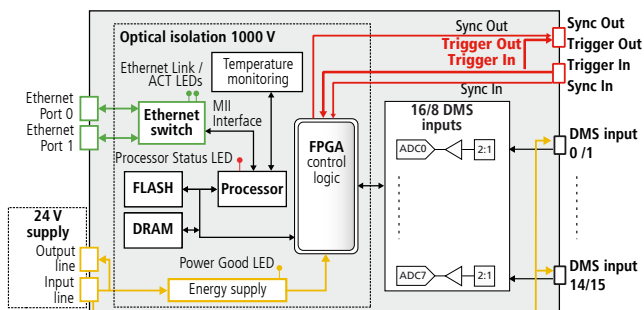


Example of monitor function for Inputs for strain gauges

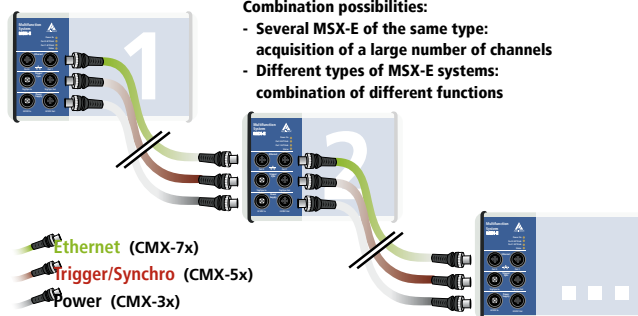
## Features



## Simplified block diagram

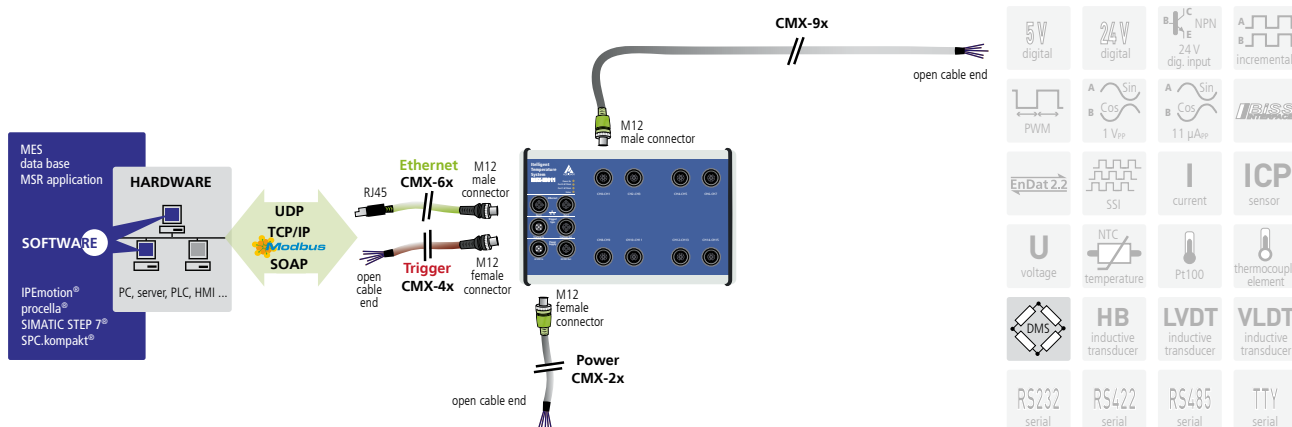


## Cascading



- Combination possibilities:
- Several MSX-E of the same type: acquisition of a large number of channels
  - Different types of MSX-E systems: combination of different functions

## ADDI-DATA connection technology





## Specifications

### Inputs for strain gauges

|                                 |   |                  |   |
|---------------------------------|---|------------------|---|
| Number of inputs:               | 16 or 8 differential inputs for strain gauges<br>2 inputs per M12 connector |                  |   |
| Resolution:                     | 24-bit  |                  |   |
| Optical isolation:              | 1000 V  |                  |   |
| Throughput per M12 connector:   | max. 788 Hz for 1 channel, max. 528 Hz for 2 channels                       |                  |   |
| Voltage supply for the sensors: | 10 V, 50 mA   |                  |   |
| Voltage supply:                 | ~10 V / optional 5 V (onboard calibration) 100 mA max.                      |                  |   |
| Real Sampling frequency:        | on<br>1 channel   | on<br>2 channels | Sampling frequency<br>(software-configurable) |
|                                 | 2.37 Hz   | 1.585 Hz         | 5 Hz  |
|                                 | 4.73 Hz   | 3.154 Hz         | 10 Hz   |
|                                 | 9.37 Hz   | 6.243 Hz         | 20 Hz   |
|                                 | 18.9 Hz   | 12.6 Hz          | 40 Hz   |
|                                 | 37.35 Hz  | 24.89 Hz         | 80 Hz   |
|                                 | 73 Hz   | 48.65 Hz         | 160 Hz  |
|                                 | 145 Hz  | 96.8 Hz          | 320 Hz  |
|                                 | 276.4 Hz  | 184.26 Hz        | 640 Hz  |
|                                 | 407.83 Hz   | 271.96 Hz        | 1 kHz   |
|                                 | 788 Hz  | 525.48 Hz        | 2 kHz   |

### Voltage supply, Ethernet, Trigger, Synchro

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

### System features

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

## Ordering information

### MSX-E3311

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

### Versions

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

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

**Opt.MSX-E-5Vss:** Bridge supply voltage adjustment to 5 V (**optional**)

### Connection cables

#### Voltage supply

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

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

#### Trigger/Synchro

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

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

#### Ethernet

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

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

#### Options

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

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

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