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

New!*

MSX-E3122

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

Voltage or current inputs

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

64 digital I/O, 24 V

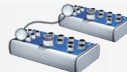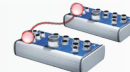24 V digital trigger input

Integrated Ethernet switch

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

IP 65

ARM®9 Technology

Cascadable, can be synchronised in the µs range

On request: Compare logic for synchro trigger signal

RoHS 2002/95/EC

on request

DatabaseConnect
see page 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

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

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

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

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

Interfaces

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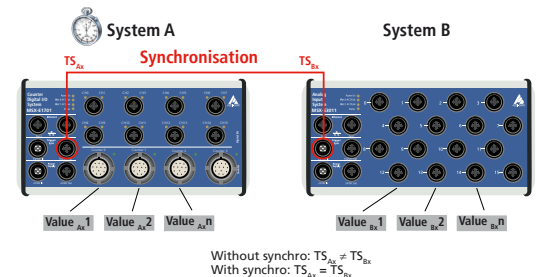- Line in for 24 V supply and cascading

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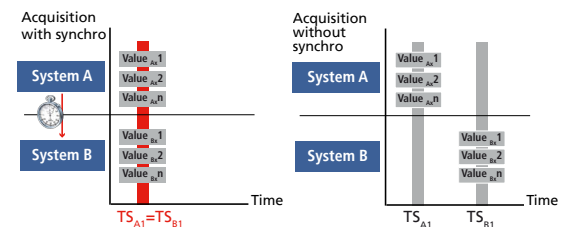- Command server Modbus TCP and Modbus (UDP) for sending commands

Synchronisation/time stamp

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

System A   Synchronisation   System B

TS_{Ax} TS_{Bx}

Value$_{Ax}$1   Value$_{Ax}$2   Value$_{Ax}$n   Value$_{Bx}$1   Value$_{Bx}$2   Value$_{Bx}$n

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.
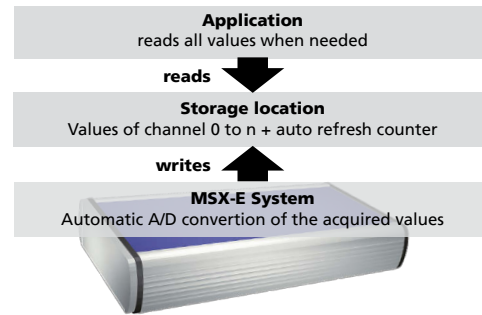
Acquisition with synchro

System A
Value$_{Ax}$1
Value$_{Ax}$2
Value$_{Ax}$n

System B
Value$_{Bx}$1
Value$_{Bx}$2
Value$_{Bx}$n

$TS_{A1}=TS_{B1}$ Time

Acquisition without synchro

System A
Value$_{Ax}$1
Value$_{Ax}$2
Value$_{Ax}$n

System B
Value$_{Bx}$1
Value$_{Bx}$2
Value$_{Bx}$n

TS_{A1} TS_{B1} Time

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Acquisition modes

Auto-refresh mode

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


Sequence mode

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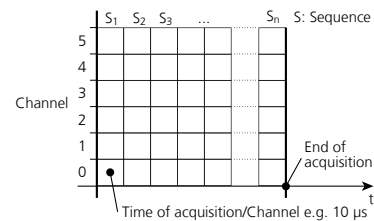

Acquisition triggered through trigger or synchro input

Example: A measurement process is to be started through an external trigger impulse. For each trigger, 10 sequences are to be acquired. After the acquisition of the 10 sequences they are to be sent to the client.
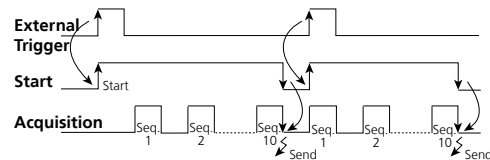
Reading data from a MSX-E system

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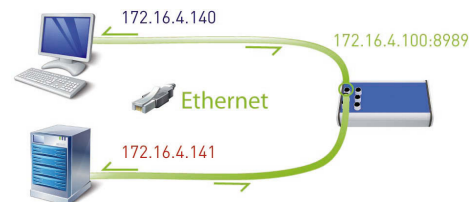

Onboard programming / stand-alone operation

New: Cycle mode

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

```
GLOBAL
END

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

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

Development mode

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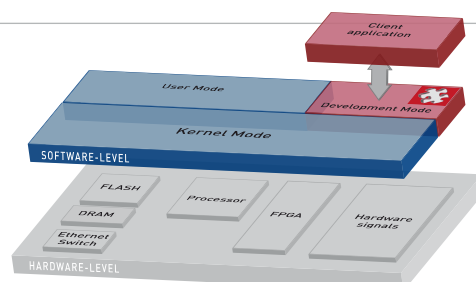
*Preliminary product information

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.
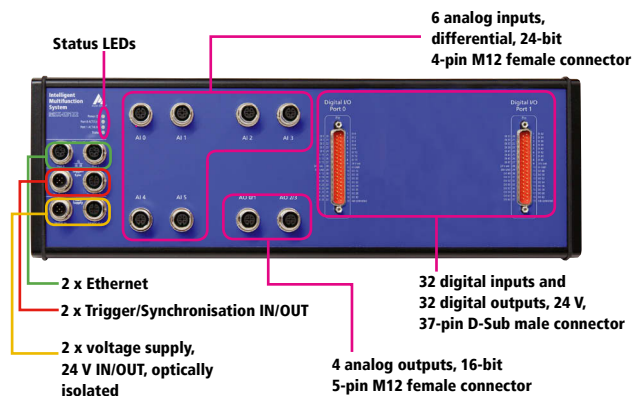
ConfigTools functions for MSX-E3122:

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

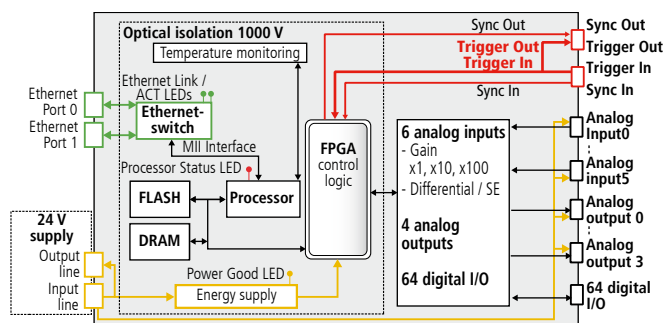Very easy use through the „ConfigTools" program; The MSX-E system is automatically detected in the network.
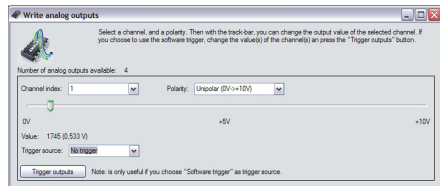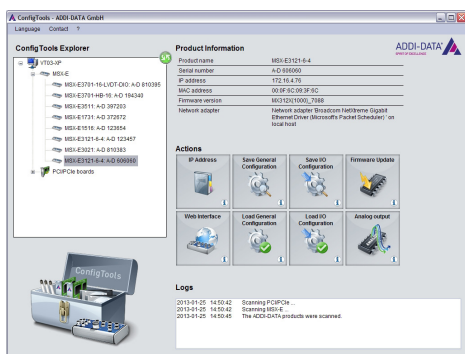
Example of monitor function: Testing the analog outputs – Value output without programming.

Features

Status LEDs

6 analog inputs, differential, 24-bit 4-pin M12 female connector

2 x Ethernet

2 x Trigger/Synchronisation IN/OUT

2 x voltage supply, 24 V IN/OUT, optically isolated

32 digital inputs and 32 digital outputs, 24 V, 37-pin D-Sub male connector

4 analog outputs, 16-bit 5-pin M12 female connector

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

Ethernet **(CMX-7x)**
Trigger/Synchro **(CMX-5x)**
Power **(CMX-3x)**
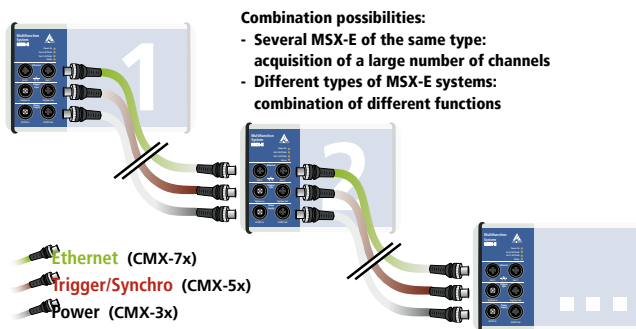
ADDI-DATA connection technology

* Preliminary product information

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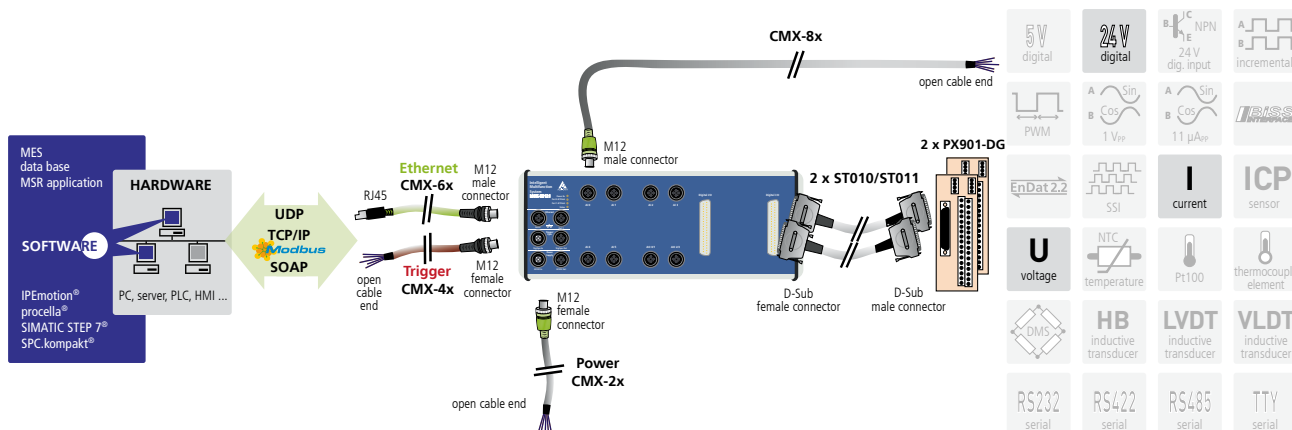
Specifications*

Analog inputs

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

Analog outputs

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

Digital inputs

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

Digital outputs

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

Voltage supply, Ethernet, Trigger, Synchro

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

System features

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

Ordering information

MSX-E3122

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

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

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

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

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

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

* Preliminary product information