Ethernet system for the acquisition of dynamic signals
8 or 2 SE/diff. inputs, 24-bit, simultaneous acquisition

MSX-E3601 / MSX-E3601-2
8 or 2 SE/diff. inputs, 24-bit
Simultaneous acquisition
8 or 2 current sources for ICP® or IEPE sensors
Onboard calibration
24 V digital trigger input

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

Analog inputs
- 8 or 2 SE or diff. inputs, 24-bit, AC/DC coupling
- One A/D converter per channel: simultaneous acquisition on all analog inputs
- Sampling rate up to 128 kHz
- Anti-aliasing filter
- BNC female connector:
  - inner conductor for positive input
  - outer conductor for negative input (diff) or GND (SE)
- Gain x1, x10, x100

Current sources
- 8 or 2 current sources for the direct connection of ICP® sensors (integrated circuit piezoelectric) or IEPE sensors (integrated electronics piezoelectric)
- 4 mA typ., 24 V max.

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

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

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

Synchronisation/time stamp

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

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

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

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

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

**Reading data from a MSX-E system**
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.

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

**Firmware and software adaptation**
Because MSX-E systems are very flexible, the MSX-E3601 firmware can be easily extended. Thus, calculations such as RMS or limit values etc. can be integrated.

Using the Development Mode, it is possible to create self-sufficient intelligent nodes.
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-E3601 / MSX-E3601-2:
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration

Features

- 8 analog inputs, BNC female connector:
  - inner conductor for pos. input
  - outer conductor for neg. input (diff) or GND (SE)
- 2 x Ethernet
- 2 x Trigger/Synchronisation IN/OUT
- 2 x voltage supply, 24 V IN/OUT, optically isolated

Simplified block diagram

ADDI-DATA connection technology

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
Specifications

**Analog inputs**

<table>
<thead>
<tr>
<th>Number of inputs</th>
<th>MSX-E3601</th>
<th>MSX-E3601-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
<td>DC, AC (software-configurable)</td>
<td>DC, AC (software-configurable)</td>
</tr>
<tr>
<td>Input type</td>
<td>Single-ended or differential (software-configurable)</td>
<td>Single-ended or differential (software-configurable)</td>
</tr>
<tr>
<td>Input ranges SE</td>
<td>± 10 V single-ended</td>
<td>± 5 V differential</td>
</tr>
<tr>
<td>Gain x10</td>
<td>± 1 V single-ended</td>
<td>± 0.5 V differential</td>
</tr>
<tr>
<td>Gain x100</td>
<td>± 0.1 V single-ended</td>
<td>± 0.05 V differential</td>
</tr>
<tr>
<td>ADC Type</td>
<td>Oversampled SAR</td>
<td>With linear phase FIR antialiasing digital filter</td>
</tr>
<tr>
<td>Resolution</td>
<td>24-bit</td>
<td></td>
</tr>
<tr>
<td>Sampling rate i</td>
<td>Up to 128 kHz</td>
<td></td>
</tr>
<tr>
<td>Selectable frequencies f</td>
<td>128 kHz to 1024 kHz</td>
<td></td>
</tr>
<tr>
<td>Filter response</td>
<td>Gain x100: 85 dB</td>
<td>Gain x10: 100 dB</td>
</tr>
<tr>
<td>Gain x1: 105 dB</td>
<td>Gain x1: &gt; 100 dB</td>
<td>Gain x1: &gt; 100 dB</td>
</tr>
<tr>
<td>Gain x10: 90 dB</td>
<td>Gain x10: 50 dB</td>
<td>Gain x10: 50 dB</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

**Voltage supply, Ethernet, Trigger, Synchronisation**

- **Ethernet**
  - CAT5E cable, M12 D-coded male connector/RJ45 connector
  - For cascading, CAT5E cable, 2 x M12 D-coded male connector

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

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

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

**System features**

- Interface: Ethernet acc. to specification IEE802.3
- Dimensions: 215 x 110 x 82 mm
- Weight: 860 g
- Degree of protection: IP 65
- Operating temperature: -40 °C to +85 °C
- Connectors for sensors
  - 8 x BNC female connector (MSX-E3601)
  - 2 x BNC female connector (MSX-E3601-2)

**Ordering information**

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