Ethernet module for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature inputs
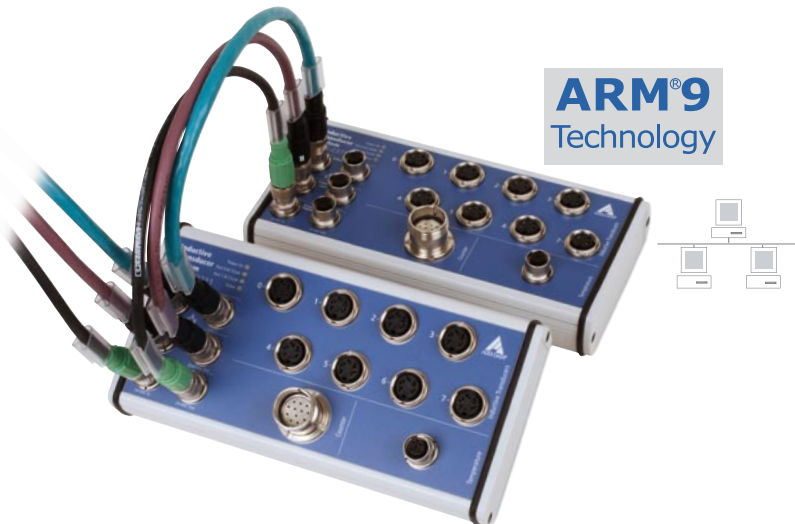
New!*

ARM®9
Technology

MSX-E3711

Simultaneous acquisition of
up to 8 inductive displacement transducers

For half-bridge or LVDT transducers

1 incremental counter input (32-bit)

1 input for temperature measurement (Pt100)

Trigger / synchro, cascadable

Degree of protection IP 65

RoHS
2002/95/EC

More Info:
www.addi-data.com

With the intelligent Ethernet module MSX-E3711, you can acquire up to 8 inductive displacement transducers simultaneously. An incremental counter input and an input for temperature measurement (Pt100) complete the functional range.
The 8 inductive transducers (half-bridge or LVDTs) can be connected directly via a 5-pin M18 connector and data acquired on-site with a 24-bit resolution.
The cascading of the modules via the 2-port Ethernet switch avoids the separate connection of each module to the computer. The external trigger signal (hardware trigger) can also be synchronised from one module to the next. Furthermore, the I/O modules can be synchronised. By combining the synchronisation and the cascading of the trigger signal, it is possible to acquire data from several modules simultaneously and to trigger the sensor acquisition with incremental encoders.
The MSX-E3711 is mounted in a robust, EMC protected metal housing which complies with the degree of protection IP 65.

Features

- Connection of all commercially available transducers (half-bridge or LVDT)
- 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 rate: 12.5 kHz per channel,
  samplin period for a sequence,
  of 1 to 8 channels: 0.080 ms
- Synchronisation of several modules
- 64 MB onboard SDRAM for storing data
- ARM®9 32-bit processor for data processing
- Integrated Ethernet switch
- Cascading of all MSX-E module types
- Cascading of the 24 V supply
- 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
- LED status display for fast error diagnostics

Acquisition modes:
- Auto Refresh mode: Automatic update of the acquired data in the background
- Sequence mode: Data acquisition in „packages""

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

Communication interface
- Web server (configuration and monitoring)
- Access via TCP/IP socket
- Command server (SOAP) for sending commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending module events (Diagnostics such as temperature, short-circuits...)
- Access via UDP
- Command server (MODBUS) for sending commands

Software:
- Software drivers for Windows Vista™ (32-bit)/XP/2000
- ADDIPACK (not all functions are supported)
- Direct access via SOAP (TCP/IP)
- Direct access via MODBUS (UDP)
- Programming examples .net2003, VC++ 6.0
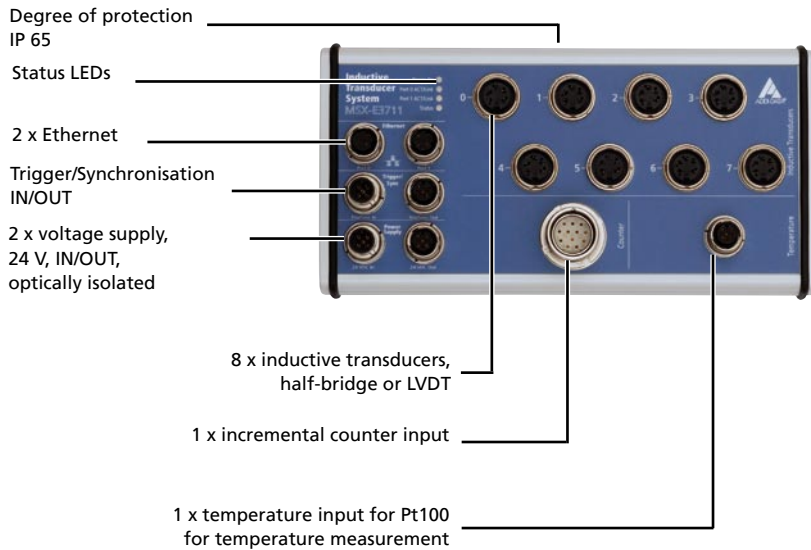- LABVIEW from 8.20 on request

*Preliminary
product information

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SPIRIT OF EXCELLENCE

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

New!*

Features

Degree of protection
IP 65

Status LEDs

2 x Ethernet

Trigger/Synchronisation
IN/OUT

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

8 x inductive transducers,
half-bridge or LVDT

1 x incremental counter input

1 x temperature input for Pt100
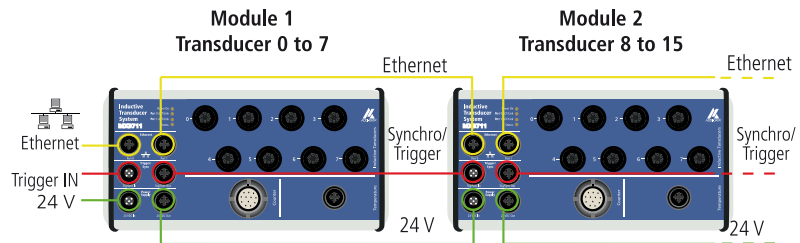for temperature measurement
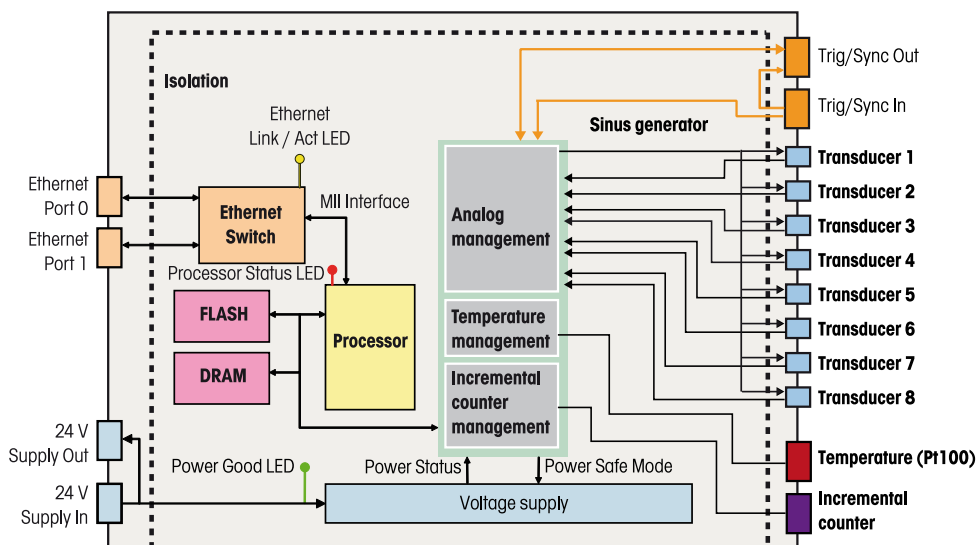
Calibration tool
SET3701

Synchronisation

Ethernet, synchronisation and supply signals can be put through from one module to the next. In this way, you can acquire and process distributed I/O signals directly at production machines. These features allow the I/O modules to be used for simple, distributed applications and for complex applications, in which numerous devices have to interact with signals that are far away from each other.

Module 1
Transducer 0 to 7

Module 2
Transducer 8 to 15

Ethernet

Ethernet
Trigger IN
24 V

Synchro/
Trigger
24 V

Ethernet

Synchro/
Trigger
24 V

Simplified block diagram

Isolation

Ethernet
Link / Act LED

Sinus generator

Ethernet
Port 0

Ethernet
Port 1

Ethernet
Switch

MII Interface

Processor Status LED

FLASH

Processor

DRAM

Analog
management

Temperature
management

Incremental
counter
management

Trig/Sync Out

Trig/Sync In

Transducer 1
Transducer 2
Transducer 3
Transducer 4
Transducer 5
Transducer 6
Transducer 7
Transducer 8

24 V
Supply Out

24 V
Supply In

Power Good LED

Power Status

Power Safe Mode

Voltage supply

Temperature (Pt100)

Incremental
counter

*Preliminary product informa-

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Connection of the inductive transducers

Inputs for inductive transducers

Channel features		
Number	8x 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	software-programmable
	10 kΩ	
	100 kΩ	
	10 MΩ	
Input ranges	± 3.3 V max.	
Transducers accuracy	On request	

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 Knaebel)
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	4 per female connector
Input types	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
Reference voltage, V_{REF}	1.4 V
Voltage supply of the encoder	5 or 24 V/500 mA max.

Version with 24 V inputs

This version is designed for the connection of 24 V encoders. Only 24 V signals can be connected to the input.

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
Other values on request	

Power Supply

Nominal voltage	24 V	⎓
Supply voltage	18-30 V	
Optical isolation	1000 V	
Current consumption at 24 V	On request	

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 input

Number of inputs	1 trigger input
Filters/protective circuitry	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

Synchro

Number of inputs	1
Number outputs	1
Max. cable length	20 m
Optical isolation	1000 V
Signal type	RS485

System requirements

Interface	Ethernet acc. to specification IEEE802.3
Dimensions	215 x 110 mm x 54 mm
Weight	760 g
Degree of protection	IP 65
Operating temperature	- 40 to + 85°C
Function connectors	
Ethernet	2x 4-pin flange type socket, D-coded M12 for Port 0 and 1Port1
Trigger/Synchro input	1 x 5-pin flange connector M12
Trigger/Synchro output	1 x 5-pin flange type socket M12
24 VDC input	1 x 5-pin flange connector M12
24 VDC output	1 x 5-pin flange type socket M12
Connectors for sensors	
For inductive transducers	8 x 5-pin flange type socket M18
For temperature sensors	1 x 5-pin flange type socket M12 1-, 2-, 4-wire Pt100
For the counter function	1 x 12-pin flange type socket M23

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Cable

Power Supply

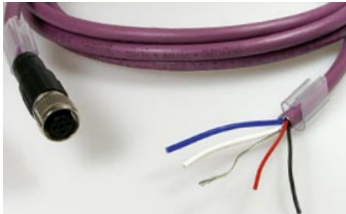Shielded cable,
M12 5-pin cable box/open end,
IP 65
CMX-20: 1.5 m
CMX-21: 3 m
CMX-22: 5 m
CMX-23: 10 m
CMX-29: On request

For cascading
Shielded cable,
M12 5-pin cable box/connector
IP 65
CMX-38: 0.6 m
CMX-30: 1.5 m
CMX-31: 3 m
CMX-32: 5 m
CMX-39: On request

Trigger/Synchro

Shielded cable,
M12 5-pin cable box/open end,
IP 65
CMX-40: 1.5 m
CMX-41: 3 m
CMX-42: 5 m
CMX-43: 10 m
CMX-49: On request

For cascading
Shielded cable,
M12 5-pin cable box/connector
IP 65
CMX-58: 0.6 m
CMX-50: 1.5 m
CMX-51: 3 m
CMX-52: 5 m
CMX-59: On request

Ethernet

CAT5E cable,
M12 D-coded cable connector/
RJ45 connector
CMX-60: 2 m
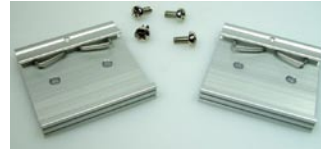**CMX-61:** 5 m
CMX-62: 10 m
CMX-69: On request

For cascading
CAT5E cable,
2 x M12 D-coded cable connector
CMX-78: 1 m
CMX-70: 2 m
CMX-71: 5 m
CMX-72: 10 m
CMX-79: On request

Options

MX-Rail: For DIN-rail mounting

MX-Screw: For wall mounting

PCMX-10:
Protection cap for M12 connector

PCMX-11:
Protection cap for M18 connector

PCMX-12: Protection cap for M23 box (without illustration)

Ordering information

MSX-E3711

Ethernet modules for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature inputs.
Incl. technical description and software drivers.

Versions

MSX-E3711-HB: for 8 HB inductive transducers, 1 counter input RS 422
MSX-E3711-LVDT: for 8 LVDT inductive transducers, 1 counter input RS 422
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
Shielded cable, M12 5-pin cable box/open end, IP 65

CMX-20:	1.5 m	**CMX-21:**	3 m
CMX-22:	5 m	**CMX-23:**	10 m
CMX-29:	Cable length on request		

For cascading:
Shielded cable, M12 5-pin cable box/connector IP 65

CMX-38:	0.6 m	**CMX-30:**	1.5 m
CMX-31:	3 m	**CMX-32:**	5 m
CMX-39:	Cable length on request		

Trigger/Synchro
Shielded cable, M12 5-pin cable box/open end, IP 65

CMX-40:	1.5 m	**CMX-41:**	3 m
CMX-42:	5 m	**CMX-43:**	10 m
CMX-49:	Cable length on request		

For cascading:
Shielded cable, M12 5-pin cable box/connector IP 65

CMX-58:	0.6 m	**CMX-50:**	1.5 m
CMX-51:	3 m	**CMX-52:**	5 m
CMX-59:	Cable length on request		

Ethernet
CAT5E cable, M12 D-coded cable connector/RJ45 connector

CMX-60:	2 m	**CMX-61:**	5 m
CMX-62:	10 m	**CMX-69:**	Cable length on request

For cascading: CAT5E cable, 2 x M12 D-coded cable connector

CMX-78:	0.6 m	**CMX-70:**	2 m
CMX-71:	5 m	**CMX-72:**	10 m
CMX-79:	on request		

Options

MX-Rail: Mounting set for DIN-rail mounting
MX-Screw: Mounting set for direct mounting on devices or machines
PCMX-10: 5 protection caps for M12 connector (4 x female, 1 x male) for Ethernet, trigger/synchro and power
PCMX-11: 10 protection caps for M18 connector (transducers)
PCMX-12: 1 protection cap for M23 connector (counter)

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