Agenda

- Introduction
- The IO-Link Technology
- IO-Link Integration into CIP
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End user requirements

Microcontroller-based intelligent small sensors and actuators (devices) have a lot of different built-in parameters, yet they are not easily accessible. However, users are asking for functionality like

- Expanded diagnostics
- Simplified installation
- Automated parameter setting
Other Key Requirements

- The communication interface shall have the functionality of transmitting cyclic process data as well as acyclic data.
- Cycle times for process data shall meet the requirements for typical factory automation applications.
- The cycle time shall be scalable, providing process data transmission within 2ms.
- The communication interface shall be suitable for sensors and actuators as well and work reliably in a factory automation environment, therefore meeting all EMC requirements.
Easy Integration into Different Fieldbuses

- The communication interface standard should have no restrictions and have to be open to any vendor or supplier for masters and devices.
- Users want to have an accepted technology all over the world, fitting into all PLCs and field buses.
- All devices are to be integrated into specific engineering tools in an easy way.
- Management overhead such as using addresses, switches and bus administration should be avoided.
IO-Link Technology Domain
IO-Link on the “Last Mile”
Why IO-Link?

Target use cases

- Precise analog value transmission in harsh environments
- Replacement of analog 4..20mA interfaces
- Parameterization of small devices (sensors and actuators)
- Getting detailed diagnostic data
- Monitoring of device conditions
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IO-Link Compatibility with IEC 61131-2

IEC 60947-5-2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Definition</th>
<th>Standard</th>
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<tr>
<td>1</td>
<td>L+</td>
<td>24 V</td>
<td>IEC 61131-2</td>
</tr>
<tr>
<td>2</td>
<td>I/Q</td>
<td>Not connected, DI, or DO</td>
<td>IEC 61131-2</td>
</tr>
<tr>
<td>3</td>
<td>L-</td>
<td>0 V</td>
<td>IEC 61131-2</td>
</tr>
<tr>
<td>4</td>
<td>Q</td>
<td>&quot;Switching signal&quot; DI, DO (SIO)</td>
<td>IEC 61131-2</td>
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<td></td>
<td>C</td>
<td>&quot;Coded switching&quot; (COM1, COM2, COM3)</td>
<td>IEC 61131-9</td>
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</table>
Data Model of IO-Link
Device Description IODD

- XML-based
- Mandatory for all devices
- Enables user-friendly integration into PLC engineering tools or into an FDT container environment
Data Transfer at the Application Layer Level
IO-Link Transmission Frames (Subset)

Type_0
- MC
- CKT
- OD
- CKS

Type_1_1
- MC
- CKT
- PD₀
- PD₁
- CKS

Type_2_1
- MC
- CKT
- OD
- PD
- CKS
IO-Link Specifications

IO-Link Interface and System
Specification
Version 1.1.1
October 2011
Order No: 10.002

IO-Link Test
Specification
Version 1.1
May 2011
Order No: 10.032

IOOD
IO Device Description
Specification
Version 1.1
August 2011
Order No: 10.012
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IO-Link functions to be supported

- Process data transmission (1 Bit to 32 Byte)
- Service Data transmission (16 Bit index range)
- Event handling
- Direct parameter page support
- System commands
- Transmission of block parameters
- Easy device exchange based on the identification of devices
- Automatic device data exchange without tooling
- Change from communication into SIO mode and vice versa.
- Hot plug functionality
Current State of SIG Activities

- The SIG and its work plan have been established
- Companies involved in the SIG so far:
  - Balluff, Comtrol, Molex, Murrelektronik, Omron, Panduit, Rockwell Automation, Sick, TMG, Turck
- Two SIG meetings via teleconference have taken place
- The next teleconference is scheduled for October 24, 15:00 hours CEST, 9 a.m. Eastern DST, contact ODVA and Frank Moritz (Frank.Moritz@sick.de) if you want to participate
- Several possible integration concepts will be presented at the October 24 teleconference
Thank you for listening

Any Questions?