R45C IO-Link to Dual Analog Converter - IO-Link Data Reference Guide

IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-R45C-IIUU-20221118-IODD1.1.xml. The IODD file and support files can be found on www.bannerengineering.com under the download section of the product family page.

Communication Parameters

The following communication parameters are used.

- IO-Link revision: V1.1
- Process Data In length: 64-bits
- Process Data Out length: 64-bits
- Bit Rate: 38400 bps
- Minimum cycle time: 7.6 ms
- Device ID: 659471
- Port class: A
- SIO mode: Yes
- Smart Sensor Profile: Yes
- Block parameterization: Yes
- Data storage: Yes

Process Data In (Device to Master)

Two analog models are supported by the IODD file. The voltage model is presented in mV and the current model is presented in µA.

If the model is the voltage version (V_ModelType = 0), then Process Data Input = value × 0.001 V.

If the model is the current version (V_ModelType = 1), then Process Data Input = value × 0.000001 A.

Process Data Input Configuration - Analog Data

Subindex	Name	Number of Bits	Data Values
1	Measurement Value 1	32	Value 1 of the measurement device
2	Measurement Value 2	32	Value 2 of the measurement device

Octet 0								
Subindex	1	1	1	1	1	1	1	1
Bit offset	63	62	61	60	59	58	57	56
Value	0	0	0	0	0	0	0	0
Octet 1								
Subindex	1	1	1	1	1	1	1	1
Bit offset	55	54	53	52	51	50	49	48
Value	0	0	0	0	0	0	0	0
Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	47	46	45	44	43	42	41	40
Value	0	0	1	0	0	1	1	1
Octet 3								
Subindex	1	1	1	1	1	1	1	1
Bit offset	39	38	37	36	35	34	33	32
Value	0	0	0	1	1	0	0	0
Octet 4								
Subindex	3	3	3	3	3	3	3	3
Bit offset	31	30	29	28	27	26	25	24
Value	0	0	0	0	0	0	0	0
Octet 5								
Subindex	3	3	3	3	3	3	3	3

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Octet 5								
Bit offset	23	22	21	20	19	18	17	16
Value	0	0	0	0	0	0	0	0
Octet 6								
Subindex	3	3	3	3	3	3	3	3
Bit offset	15	14	13	12	11	10	9	8
Value	0	0	0	0	1	0	0	1
Octet 7								
Subindex	3	3	3	3	3	3	3	3
Bit offset	7	6	5	4	3	2	1	0
Value	0	0	1	0	1	1	0	1

Example Based Upon the Value Above

- Measurement Value 1 = 10008
  - Scaled Measurement Value = 10.008 V
- Measurement Value 2 = 2349
  - Scaled Measurement Value = 2.349 V

Process Data Input Configuration - Digital Measuring Sensor

Subindex	Name	Number of Bits	Data Values
1	Measurement Value 1	16	Value 1 of the measurement device
2	Measurement Scale 1	8	Scale 1 of the measurement device Voltage = -3 Current = -6
3	Measurement Value 2	16	Value 2 of the measurement device
4	Measurement Scale 2	8	Scale 2 of the measurement device Voltage = -3 Current = -6

Octet 0								
Subindex	1	1	1	1	1	1	1	1
Bit offset	63	62	61	60	59	58	57	56
Value	0	0	0	0	0	0	0	0
Octet 1								
Subindex	1	1	1	1	1	1	1	1
Bit offset	55	54	53	52	51	50	49	48
Value	0	0	0	1	1	0	0	0
Octet 2								
Subindex	2	2	2	2	2	2	2	2
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	0	1
Octet 3								
Subindex	///	///	///	///	///	///	///	///
Bit offset	39	38	37	36	35	34	33	32
Value	0	0	0	0	0	0	0	0
Octet 4								
Subindex	3	3	3	3	3	3	3	3
Bit offset	31	30	29	28	27	26	25	24
Value	0	0	0	0	1	0	0	1

Octet 5								
Subindex	3	3	3	3	3	3	3	3
Bit offset	23	22	21	20	19	18	17	16
Value	0	0	1	0	1	1	0	1
Octet 6								
Subindex	4	4	4	4	4	4	4	4
Bit offset	15	14	13	12	11	10	9	8
Value	1	1	1	1	1	1	0	1
Octet 7								
Subindex	///	///	///	///	///	///	///	///
Bit offset	7	6	5	4	3	2	1	0
Value	0	0	0	0	0	0	0	0

Example Based Upon the Value Above

- Measurement Value 1 = 10008
- Measurement Scale 1 = -3
    - Scale Measurement Value = 10.008 V
- Measurement Value 2 = 2349
- Measurement Scale 2 = -3
    - Scaled Measurement Value = 2.349 V

Process Data Out (Master to Device)

If the model is the voltage version (V_ModelType = 0), then Process Data Input = value × 0.001 V.

If the model is the current version (V_ModelType = 1), then Process Data Input = value × 0.000001 A.

Process Data Output

Subindex	Name	Number of Bits	Data Values
1	Analog Out Value 1	32	The value to send to the analog output on Port 1
2	Analog Out Value 2	32	The value to send to the analog output on Port 2

Octet 0								
Subindex	1	1	1	1	1	1	1	1
Bit offset	63	62	61	60	59	58	57	56
Octet 1								
Subindex	1	1	1	1	1	1	1	1
Bit offset	55	54	53	52	51	50	49	48
Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	47	46	45	44	43	42	41	40
Octet 3								
Subindex	1	1	1	1	1	1	1	1
Bit offset	39	38	37	36	35	34	33	32
Octet 4								
Subindex	2	2	2	2	2	2	2	2
Bit offset	31	30	29	28	27	26	25	24
Octet 5								
Subindex	2	2	2	2	2	2	2	2

Octet 5								
2Bit offset	23	22	21	20	19	18	17	16
Octet 6								
Subindex	2	2	2	2	2	2	2	2
Bit offset	15	14	13	12	11	10	9	8
Octet 7								
Subindex	2	2	2	2	2	2	2	2
Bit offset	7	6	5	4	3	2	1	0

Parameters Set Using IO-Link

These parameters can be read from and/or written to an R45C IO-Link to Dual Analog Converter. Also included is information about whether the variable in question is saved during Data Storage and whether the variable came from the IO-Link Smart Sensor Profile.

Unlike Process Data In, which is transmitted from the IO-Link device to the IO-Link master cyclically, these parameters are read or written acyclically as needed.

Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
0	1-16	Direct Parameter Page 1 (incl. Vendor ID & Device ID)				ro		
1	1-16	Direct Parameters Page 2				rw		
2		Standard Command		130 = Restore Factory Settings 162 = Start discovery 163 = Stop discovery		wo		y
3		Data Storage Index (device-specific list of parameters to be stored)				rw		
4-11		*reserved by IO-Link Specification*						
12		**Device Access Locks**						
12	1	Parameter Write Access Lock *(deprecated)*						
12	2	Data Storage Lock *(deprecated)*						
12	3	Local Parameterization Lock		0 = off, 1 = on	0	rw	y	
12	4	Local User Interface Lock		0 = off, 1 = on	0	rw	y	
16		Vendor Name string		Banner Engineering Corporation		ro		
17		Vendor Text string		More Sensors. More Solutions.		ro		
18		Product Name string				ro		
19		Product ID string				ro		
20		Product Text string				ro		y
21		Serial Number				ro		
23		Firmware Version				ro		y
24		App Specific Tag (user defined)				rw	y	y
25-35		*reserved*						
36		Device Status	8-bit integer	0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure 5..255 Reserved		ro		
37		Detailed Device Status	Array[6] of 3-octet			ro		
40		Process Data Input		*see Process Data In*		ro		
41		Process Data Output		*see Process Data Out*		ro		
60		**SSC1.BDC1 Setpoints**						

Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
60	1	Setpoint SP1	32-bit Integer	Sensor Switching Channel 1 SP1 Switchpoint = Analog In LED lower switchpoint	0.004 A 0.2 V	rw		
60	2	Setpoint SP2	32-bit Integer	Sensor Switching Channel 1 SP2 Switchpoint = Analog In LED upper switchpoint	0.02 A 10 V	rw		
61		**SSC1.BDC1 Configuration**						
61	1	Switchpoint Logic *(deprecated)*	8-bit Uinteger					
61	2	BDC Mode *(deprecated)*	8-bit Uinteger					
61	3	Hysteresis	16-bit Uinteger	Hyteresis value for the Sensor Switching Channel 1 switchpoint	0.0001 A 0.05 V	rw		
64		**Port 1 Mirroring Configuration**						
64	1	Mirroring Output Enable	8-bit Uinteger	0=Disabled, 1=Enabled	0	RW	Y	
64	2	Mirroring Input Port Selection	8-bit Uinteger	0=Analog In 1, 1=Analog In 2	0	RW	Y	
65		**Port 2 Mirroring Configuration**						
65	1	Mirroring Output Enable	8-bit Uinteger	0=Disabled, 1=Enabled	0	RW	Y	
65	2	Mirroring Input Port Selection	8-bit Uinteger	0=Analog In 1, 1=Analog In 2	1	RW	Y	
69		**All-Time Run Time**						
69	1	Run counter (0.25 hr)	32-bit Uinteger	0..2147483647		ro	y	
70		**Resettable Run Time**						
70	1	Run counter (0.25 hr)	32-bit Uinteger	0..2147483647	0	rw		
71		**Pulse Frequency Configuration**						
71	1	Near Frequency (Hz)	32-bit Integer	100..45000	100	rw	y	
71	2	Far Frequency (Hz)	32-bit Integer	100..45000	600	rw	y	
72		**Pulse Frequency LOS Frequency (Hz)**						
72	1	Pulse Frequency LOS Frequency = Frequency used to indicate Loss-of-Signal	32-bit Integer	50..45000	50	rw	y	
76		**Vendor Specific Configuration**						
76	1	Process Data Input Configuration	8-bit Uinteger	0 = Analog Value 1 = Digital Measurement Value	0	rw	y	
76	2	IOL Filter Time (ms)	16-bit Uinteger		200	rw	y	
76	3	Process Data Out 1 Outside Valid Range (POVR1)	8-bit Uinteger	0 = Hold 1 = Low 2 = High	1	rw	y	
76	4	Process Data Out 2 Outside Valid Range (POVR1)	8-bit Uinteger	0 = Hold 1 = Low 2 = High	1	rw	y	
76	5	Secondary Output Function = Pin 2 (White) host side output	8-bit Uinteger	0 = Disabled, 1 = Pulse Frequency Modulation	0	rw	y	
76	6	PFM Input Port Selection	8-bit Uinteger	0 = Analog In 1, 1 = Analog In 2	0	rw	y	
78		**All-Time Run Time Event Time**						
78	1	Event Time (0.25 hr)	32-bit Uinteger	0..2147483647	0	rw	y	
79		**Resettable Run Time Event Time**						
79	1	Event Time (0.25 hr)	32-bit Uinteger	0..2147483647	0	rw	y	
86		Model Type	8-bit Uinteger	0 = Voltage, 1 = Current	0	ro		
16396		**SSC2.BDC1 Setpoints**						

Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
16396	1	Setpoint SP1	32-bit Integer	Sensor Switching Channel 2 SP1 Switchpoint = Analog In LED lower switchpoint	0.004 A 0.2 V	rw		
16396	2	Setpoint SP2	32-bit Integer	Sensor Switching Channel 2 SP2 Switchpoint = Analog In LED upper switchpoint	0.02 A 10 V	rw		
16397		**SSC2.BDC1 Configuration**						
16397	1	Switchpoint Logic *(deprecated)*	8-bit Uinteger					
16397	2	BDC Mode *(deprecated)*	8-bit Uinteger					
16397	3	Hysteresis	16-bit Uinteger	Hyteresis value for the Sensor Switching Channel 2 switchpoint	0.0001 A 0.05 V	rw		
16512		**MDC Descriptor - Channel 1**		**Measuring Data Channel Descriptor - Smart Sensor Profile 2nd Edition**				
16512	1	Lower Limit	32-bit integer			ro		
16512	2	Upper Limit	32-bit integer			ro		
16512	3	Unit	16-bit uinteger	1209 = A, 1240 = V		ro		
16512	4	Scale	8-bit integer	-6 (µA), -3 (mV)		ro		
16513		**MDC Descriptor - Channel 1**		**Measuring Data Channel Descriptor - Smart Sensor Profile 2nd Edition**				
16513	1	Lower Limit	32-bit integer			ro		
16513	2	Upper Limit	32-bit integer			ro		
16513	3	Unit	16-bit uinteger	1209 = A, 1240 = V		ro		
16513	4	Scale	8-bit integer	-6 (µA), -3 (mV)		ro		

IO-Link Events

Events are acyclic transmissions from the IO-Link device to the IO-Link master. Events can be error messages and/or warning or maintenance data.

Code	Type	Name	Description
25376 (0x6320)	Error	Parameter error	Check data sheet and values
36000 (0x8CA0)	Warning	All-time Run Time Event	Event indicating the corresponding configured running time has elapsed.
36001 (0x8CA1)	Warning	Resettable Run Time Event	Event indicating the corresponding configured running time has elapsed.

© Banner Engineering Corp. All rights reserved