IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-S15C-BIM-20230714-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.

Parameter	Value
IO-Link revision	V1.1
Process Data In length	144-bits
Process Data Out length	8-bits
Bit Rate	38400 bps
Minimum cycle time	8.8 ms
Device ID	659467
Port class	A
SIO mode	Yes
Smart Sensor Profile	No
Block parameterization	Yes
Data Storage	Yes

IO-Link Process Data In (Device to Master)

Process Data Input

Subindex	Name	Number of Bits	Data Values
1	Discrete 1 Input State	1	False = Inactive, True = Active
2	Discrete 2 Active State	1	False = Inactive, True = Active
3	Measurement 1	32	0..2147483647
4	Measurement 2	32	0..2147483647
5	Measurement 3	32	0..2147483647
6	Measurement 4	32	0..2147483647

Octet 0								
Subindex	6	6	6	6	6	6	6	6
Bit offset	143	142	141	140	139	138	137	136
Value	0	0	0	0	0	0	0	0

Octet 1								
Subindex	6	6	6	6	6	6	6	6
Bit offset	135	134	133	132	131	130	129	128
Value	0	0	0	0	0	0	0	0

Octet 2								
Subindex	6	6	6	6	6	6	6	6
Bit offset	127	126	125	124	123	122	121	120
Value	0	0	0	0	0	0	0	0

Octet 3								
Subindex	6	6	6	6	6	6	6	6

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Octet 3								
Bit offset	119	118	117	116	115	114	113	112
Value	0	0	1	0	0	0	0	0

Octet 4								
Subindex	5	5	5	5	5	5	5	5
Bit offset	111	110	109	108	107	106	105	104
Value	0	0	1	0	0	0	0	0

Octet 5								
Subindex	5	5	5	5	5	5	5	5
Bit offset	103	102	101	100	99	98	97	96
Value	0	0	1	0	0	0	1	1

Octet 6								
Subindex	5	5	5	5	5	5	5	5
Bit offset	95	94	93	92	91	90	89	88
Value	0	0	1	0	0	0	0	0

Octet 7								
Subindex	5	5	5	5	5	5	5	5
Bit offset	87	86	85	84	83	82	81	80
Value	0	0	1	0	0	1	0	1

Octet 8								
Subindex	4	4	4	4	4	4	4	4
Bit offset	79	78	77	76	75	74	73	72
Value	0	0	0	0	0	0	0	0

Octet 9								
Subindex	4	4	4	4	4	4	4	4
Bit offset	71	70	69	68	67	66	65	64
Value	0	0	0	0	0	0	0	0

Octet 10								
Subindex	4	4	4	4	4	4	4	4
Bit offset	63	62	61	60	59	58	57	56
Value	1	0	0	0	0	0	1	0

Octet 11								
Subindex	4	4	4	4	4	4	4	4
Bit offset	55	54	53	52	51	50	49	48
Value	0	0	1	1	0	1	0	1

Octet 12								
Subindex	3	3	3	3	3	3	3	3
Bit offset	47	46	45	44	43	42	41	40
Value	0	0	0	0	0	0	0	0

Octet 13								
Subindex	3	3	3	3	3	3	3	3
Bit offset	39	38	37	36	35	34	33	32

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Octet 13								
Value	0	0	0	0	1	0	1	0

Octet 14								
Subindex	3	3	3	3	3	3	3	3
Bit offset	31	30	29	28	27	26	25	24
Value	1	0	1	0	1	1	1	0

Octet 15								
Subindex	3	3	3	3	3	3	3	3
Bit offset	23	22	21	20	19	18	17	16
Value	0	1	1	0	0	0	0	0

Octet 16								
Subindex	///	///	///	///	///	///	///	///
Bit offset	15	14	13	12	11	10	9	8
Value	1	1	1	1	1	1	0	1

Octet 17								
Subindex	///	///	///	///	///	///	2	1
Bit offset	7	6	5	4	3	2	1	0
Value	1	1	1	0	1	1	1	0

Example Based Upon the Value Above

Subindex	Name	Data Value
1	Discrete 1 Input State	Inactive
2	Discrete 2 Active State	Active
3	Measurement 1	700000
4	Measurement 2	33333
5	Measurement 3	8585221
6	Measurement 4	32

IO-Link Process Data Out (Master to Device)

Process Data Output

Subindex	Name	Number of Bits	Data Values
1	Discrete 2 Output State	1	False = Off/Inactive, True = On/Active

Octet 0								
Subindex	///	///	///	///	///	///	///	1
Bit offset	7	6	5	4	3	2	1	0
Value	x	x	x	x	x	x	x	0

Example Based Upon the Value Above

Subindex	Name	Data Values
1	Discrete 2 Output State	False = Inactive

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Parameters Set Using IO-Link

These parameters can be read from and/or written to an S15C-B21-KQ 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?
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 164 = Reset All Metrics		wo	
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		0 = off, 1 = on	0	rw	y
12	2	Data Storage Lock		0 = off, 1 = on	0	rw	y
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
13		Profile Characteristic				ro	
14		PDInput Descriptor				ro	
15		PDOutput Descriptor				ro	
16		Vendor Name string		Banner Engineering Corporation		ro	
17		Vendor Text string		More Sensors. More Solutions.		ro	
18		Product Name string		S15C		ro	
19		Product ID string				ro	
20		Product Text string				ro	
21		Serial Number				ro	
22		Hardware Version				ro	
23		Firmware Version				ro	
24		App Specific Tag (user defined)				rw	y
25		Function Tag				rw	y
26		Location Tag				rw	y
27-35		*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	
38-39		*reserved*					
40		Process Data Input		*see Process Data In*		ro	
42-57		*unused/reserved*					
69		**All-Time Run Time**					
69	1	Run counter	32-bit Integer	0..2147483647		ro	y
70		**Resettable Run Time**					
70	1	Run counter	32-bit Integer	0..2147483647	0	rw	
76		**Vendor Specific Configuration**					
76	1	Measurement 1 Metric Selection	8-bit Uinteger	0 = Disabled 1 = Count 2 = Duration 3 = Events per minute 4 = Counts per Minute	1	rw	y
76	2	Measurement 1 Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y

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Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?
76	3	Measurement 1 Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	0	rw	y
76	4	Measurement 2 Metric Selection	8-bit Uinteger	0 = Disabled 1 = Count 2 = Duration 3 = Events per minute 4 = Counts per Minute	3	rw	y
76	5	Measurement 2 Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
76	6	Measurement 2 Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	0	rw	y
76	7	Measurement 3 Metric Selection	8-bit Uinteger	0 = Disabled 1 = Count 2 = Duration 3 = Events per minute 4 = Counts per Minute	1	rw	y
76	8	Measurement 3 Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
76	9	Measurement 3 Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	1	rw	y
76	10	Measurement 4 Metric Selection	8-bit Uinteger	0 = Disabled 1 = Count 2 = Duration 3 = Events per minute 4 = Counts per Minute	3	rw	y
76	11	Measurement 4 Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
76	12	Measurement 4 Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	1	rw	y
78		**All-Time Run Time Event Time**					
78	1	Event Time	32-bit Integer	0..2147483647	0	rw	y
79		**Resettable Run Time Event Time**					
79	1	Event Time	32-bit Integer	0..2147483647	0	rw	y
80		**IO Metrics**					
80	1	Port 1 Discrete 1 Count	32-bit Integer	0..2147483647		ro	
80	2	Port 1 Discrete 1 Duration	32-bit Integer	0..2147483647, 50 µS resolution		ro	
80	3	Port 1 Discrete 1 Events per Minute	32-bit Integer	1..300000		ro	
80	4	Port 1 Discrete 1 Counts per Minute	32-bit Integer	1..300000		ro	
80	5	Port 1 Discrete 1 Totalizer Counter	32-bit Integer	0..2147483647		ro	
80	6	Port 1 Discrete 2 Count	32-bit Integer	..2147483647		ro	
80	7	Port 1 Discrete 2 Duration	32-bit Integer	0..2147483647, 50 µS resolution		ro	
80	8	Port 1 Discrete 2 Events per Minute	32-bit Integer	1..300000		ro	
80	9	Port 1 Discrete 2 Counts per Minute	32-bit Integer	1..300000		ro	
80	10	Port 1 Discrete 2 Totalizer Counter	32-bit Integer	0..2147483647		ro	
81		**Selectable Metric Reset**					
81	1	Port 1 Discrete 1	Boolean	False = Do not reset, True = Reset	False	rw	
81	2	Port 1 Discrete 2	Boolean	False = Do not reset, True = Reset	False	rw	
81	3	Port 1 Discrete 1 Reset Count	32-bit Integer	0..2147483647	0	rw	
81	4	Port 1 Discrete 2 Reset Count	32-bit Integer	0..2147483647	0	rw	
87		**Port 1 Configuration**					
87	1	Discrete 1 IO Selection	8-bit Uinteger	0 = NPN input, 1 = PNP Input	1	rw	y
87	2	Discrete 1 Delay Mode	8-bit Uinteger	0 = Disabled 1 = On Off Delay 2 = On One-shot 3 = Off One-shot 4 = On Pulse-stretcher 5 = Off Pulse-stretcher 6 = Totalizer 7 = Retriggerable On One-shot 8 = Retriggerable Off One-shot	0	rw	y
87	3	Discrete 1 Delay Timer 1	32-bit Integer	0..2147483647 (Discrete 1 On Delay, One-shot, Pulse-stretcher time or Totalizer Count)	0	rw	y
87	4	Discrete 1 Delay Timer 2	32-bit Integer	0..2147483647 (Discrete 1 Off Delay or Totalizer time)	0	rw	y

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Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?
87	5	Discrete 2 IO Selection	8-bit Uinteger	0 = NPN Input 1 = PNP Input 2 = NPN Output with Pull Up 3 = PNP Output with Pull Down 4 = NPN Output with Push Pull 5 = PNP Output with Push Pull	1	rw	y
87	6	Discrete 2 Delay Mode	8-bit Uinteger	0 = Disabled 1 = On Off Delay 2 = On One-shot 3 = Off One-shot 4 = On Pulse-stretcher 5 = Off Pulse-stretcher 6 = Totalizer 7 = Retriggerable On One-shot 8 = Retriggerable Off One-shot	0	rw	y
87	7	Discrete 2 Delay Timer 1	32-bit Integer	0..2147483647 (Discrete 2 On Delay, One-shot, Pulse-stretcher time or Totalizer Count)	0	rw	y
87	8	Discrete 2 Delay Timer 2	32-bit Integer	0..2147483647 (Discrete 2 Off Delay or Totalizer time)	0	rw	y
87	9	Mirroring Enable	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y
87	10	Mirroring Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
87	11	Mirroring Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	0	rw	y
87	12	Mirroring Inversion	8-bit Uinteger	0 = Not inverted, 1 = Inverted	0	rw	y
87	13	Counts per Minute Mode	8-bit Uinteger	0 = Slow, 1 = Medium, 2 = Fast	1	rw	y
91		**Discrete White Host Out Mirroring Configuration**					
91	1	Mirroring Enable	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y
91	2	Mirroring Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
91	3	Mirroring Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	0	rw	y
91	4	Mirroring Inversion	8-bit Uinteger	0 = Not inverted, 1 = Inverted	0	rw	y
91	5	Mirroring Polarity	8-bit Uinteger	0 = NPN Output, 1 = PNP Output	1	rw	y
91	6	Mirroring Output Type	8-bit Uinteger	0 = Output with Internal Pull Up/Down 1 = Output Open Collector 2 = Output Push/Pull	0	rw	y
92		**Discrete Black Host Out Mirroring Configuration**					
92	1	Mirroring Enable	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y
92	2	Mirroring Port Selection	8-bit Uinteger	0 = Port 1	0	rw	y
92	3	Mirroring Channel Selection	8-bit Uinteger	0 = Discrete 1, 1 = Discrete 2	0	rw	y
92	4	Mirroring Inversion	8-bit Uinteger	0 = Not inverted, 1 = Inverted	0	rw	y
92	5	Mirroring Polarity	8-bit Uinteger	0 = NPN Output, 1 = PNP Output	1	rw	y
92	6	Mirroring Output Type	8-bit Uinteger	1 = Output Open Collector 2 = Output Push/Pull	1	rw	y

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.

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