K50 Pro Devices IO-Link Data Reference Guide

IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-K50P-20191101-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	2-bytes
Process Data Out length	10-bytes
Bit Rate	38400 bps
Minimum cycle time	5 ms

Parameter	Value
Port class	A
SIO mode	No
Smart sensor profile	N/A
Block parameterization	Yes
Data Storage	Yes

IO-Link Process Data In (Device to Master)

Subindex	Name	Number of Bits	Data Values
1	Output State	1	0 = Inactive, 1 = Active
2	State	2	0 = State 1, 1 = State 2, 2 = State 3, 3 = State 4 [1]

Example Process Data In

Octet 0								
Bit offset	15	14	13	12	11	10	9	8
Subindex	-	-	-	-	-	-	2	
Value							0	1
Example							State: State 2	

Octet 1								
Bit offset	7	6	5	4	3	2	1	0
Subindex	-	-	-	-	-	-	-	1
Value								1
Example								Output State: Active

[1] Subindex 2 does not apply for Advanced or LED Control Modes

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

IO-Link Process Data Out (Master to Device)

Multicolor Mode

Multicolor Mode			
Subindex	**Name**	**Number of Bits**	**Data Values**
1	State	2	0 = State 1 1 = State 2 2 = State 3 3 = State 4

Multicolor Mode Example Process Data Out

Octet 0								
Bit offset	79	78	77	76	75	74	73	72
Subindex	-	-	-	-	-	-	-	-

Octet 1								
Bit offset	71	70	69	68	67	66	65	64
Subindex	-	-	-	-	-	-	-	-

Octet 2								
Bit offset	63	62	61	60	59	58	57	56
Subindex	-	-	-	-	-	-	-	-

Octet 3								
Bit offset	55	54	53	52	51	50	49	48
Subindex	-	-	-	-	-	-	-	-

Octet 4								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	-	-	-

Octet 5								
Bit offset	39	38	37	36	35	34	33	32
Subindex	-	-	-	-	-	-	-	-

Octet 6								
Bit offset	31	30	29	28	27	26	25	24
Subindex	-	-	-	-	-	-	-	-

Octet 7								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	-	-	-

Octet 8								
Bit offset	15	14	13	12	11	10	9	8

Octet 8								
Subindex	-	-	-	-	-	-	-	-

Octet 9								
Bit offset	7	6	5	4	3	2	1	0
Subindex	-	-	-	-	-	-	1	
Value							1	0
Example							Multicolor Mode State: State 3	

Four State Full Logic Mode

Four State Full Logic Mode			
Subindex	**Name**	**Number of Bits**	**Data Values**
1	Job Input	1	0 = Off 1 = On

Four State Full Logic Mode Example Process Data Out

Octet 0								
Bit offset	79	78	77	76	75	74	73	72
Subindex	-	-	-	-	-	-	-	-

Octet 1								
Bit offset	71	70	69	68	67	66	65	64
Subindex	-	-	-	-	-	-	-	-

Octet 2								
Bit offset	63	62	61	60	59	58	57	56
Subindex	-	-	-	-	-	-	-	-

Octet 3								
Bit offset	55	54	53	52	51	50	49	48
Subindex	-	-	-	-	-	-	-	-

Octet 4								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	-	-	-

Octet 5								
Bit offset	39	38	37	36	35	34	33	32
Subindex	-	-	-	-	-	-	-	-

Octet 6								
Bit offset	31	30	29	28	27	26	25	24
Subindex	-	-	-	-	-	-	-	-

Octet 7								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	-	-	-

Octet 8								
Bit offset	15	14	13	12	11	10	9	8
Subindex	-	-	-	-	-	-	-	-

Octet 9								
Bit offset	7	6	5	4	3	2	1	0
Subindex	-	-	-	-	-	-	-	1
Value								1
Example								Job Input: On

Advanced Mode

Advanced Mode				
Subindex	**Name**	**Number of Bits**	**Data Values**	
1	Animation Type	4	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50	5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence
2	Animation Direction	1	0 = CCW, 1 = CW	
3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	
4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	
5	Vibration Feedback	2	0 = Off, 1 = On, 2 = Animation Pattern	
6	Dynamic Sequence Value	8	0-255	
7	Sequence Start Location	3	0 = LED1 1 = LED2 2 = LED3 3 = LED4	4 = LED5 5 = LED6 6 = LED7 7 = LED8
8	Color 1	5	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan	8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
9	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	
10	Color 2	5	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan	8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
11	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	

Advanced Mode Example Process Data Out

Octet 0								
Bit offset	79	78	77	76	75	74	73	72

Octet 0								
Subindex	-	-	-	-	-	-	-	-

Octet 1								
Bit offset	71	70	69	68	67	66	65	64
Subindex	-	-	-	-	-	-	-	-

Octet 2								
Bit offset	63	62	61	60	59	58	57	56
Subindex	11			10				
Value	0	0	0	0	1	0	0	0
Example	Color 2 Intensity: High			Color 2: Sky Blue				

Octet 3								
Bit offset	55	54	53	52	51	50	49	48
Subindex	9			8				
Value	0	0	1	0	0	0	0	1
Example	Color 1 Intensity: Medium			Color 1: Red				

Octet 4								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	7		
Value						0	1	1
Example						Sequence Start Location: LED 4		

Octet 5								
Bit offset	39	38	37	36	35	34	33	32
Subindex	6							
Value	0	1	1	1	1	0	1	0
Example	Dynamic Sequence Value: 122							

Octet 6								
Bit offset	31	30	29	28	27	26	25	24
Subindex	-	-	-	-	-	-	-	-

Octet 7								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	-	-	-

Octet 8								
Bit offset	15	14	13	12	11	10	9	8
Subindex	-	-	-	-	5		4	
Value					0	1	0	0
Example					Vibration Feedback: On		Animation Speed: Slow	

Octet 9								
Bit offset	7	6	5	4	3	2	1	0
Subindex	3			2	1			
Value	0	0	0	1	1	0	0	1
Example	Animation Pattern: Flash			Animation Direction: CW	Animation Type: Sequence			

LED Control Mode

LED Control Mode			
Subindex	**Name**	**Number of Bits**	**Data Values**
1	LED 1 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
2	LED 1 Intensity (0-10)	4	0-10 = 0-100%
3	LED 2 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
4	LED 2 Intensity (0-10)	4	0-10 = 0-100%
5	LED 3 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
6	LED 3 Intensity (0-10)	4	0-10 = 0-100%
7	LED 4 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
8	LED 4 Intensity (0-10)	4	0-10 = 0-100%
9	LED 5 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
10	LED 5 Intensity (0-10)	4	0-10 = 0-100%

LED Control Mode				
Subindex	**Name**	**Number of Bits**	**Data Values**	
11	LED 6 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan	8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
12	LED 6 Intensity (0-10)	4	0-10 = 0-100%	
13	LED 7 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan	8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
14	LED 7 Intensity (0-10)	4	0-10 = 0-100%	
15	LED 8 Color	4	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan	8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2
16	LED 8 Intensity (0-10)	4	0-10 = 0-100%	
17	Vibration Feedback	2	0 = Off, 1 = On, 2 = Pattern	
18	Vibration Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	
19	Vibration Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	

LED Control Mode Example Process Data Out

Octet 0								
Bit offset	79	78	77	76	75	74	73	72
Subindex	-	-	-	-	-	-	-	-

Octet 1								
Bit Offset	71	70	69	68	67	66	65	64
Subindex	-	19		18			17	
Value		1	0	0	1	0	1	0
Example		Vibration Speed: Medium		Vibration Pattern: Three Pulse			Vibration Feedback: Pattern	

Octet 2								
Bit offset	63	62	61	60	59	58	57	56
Subindex	16				15			
Value	0	1	0	1	1	0	1	1
Example	LED 8 Intensity: 5				LED 8 Color: Magenta			

Octet 3								
Bit offset	55	54	53	52	51	50	49	48
Subindex	14				13			
Value	0	1	0	1	1	0	1	0

Octet 3								
Example	LED 7 Intensity: 5				LED 7 Color: Violet			

Octet 4								
Bit offset	47	46	45	44	43	42	41	40
Subindex	12				11			
Value	0	1	0	1	1	0	1	1
Example	LED 6 Intensity: 5				LED 6 Color: Magenta			

Octet 5								
Bit offset	39	38	37	36	35	34	33	32
Subindex	10				9			
Value	0	1	0	1	1	0	1	0
Example	LED 5 Intensity: 5				LED 5 Color: Violet			

Octet 6								
Bit offset	31	30	29	28	27	26	25	24
Subindex	8				7			
Value	1	0	1	0	0	0	1	1
Example	LED 4 Intensity: 10				LED 4 Color: Amber			

Octet 7								
Bit offset	23	22	21	20	19	18	17	16
Subindex	6				5			
Value	1	0	1	0	0	1	1	0
Example	LED 3 Intensity: 10				LED 3 Color: Spring Green			

Octet 8								
Bit offset	15	14	13	12	11	10	9	8
Subindex	4				3			
Value	1	0	1	0	0	0	1	1
Example	LED 2 Intensity: 10				LED 2 Color: Amber			

Octet 9								
Bit offset	7	6	5	4	3	2	1	0
Subindex	2				1			
Value	1	0	1	0	0	1	1	0
Example	LED 1 Intensity: 10				LED 1 Color: Spring Green			

Parameters Set Using IO-Link

These parameters can be read from and/or written to an IO-Link model of the K50 Pro Touch.

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	AOI
0	1-16	Direct Parameter Page 1 (incl. Vendor ID & Device ID)				rw		
1	1-16	Direct Parameters Page 2				rw		
2		Standard Command		130 = Restore Factory Settings		wo		

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	AOI
3-11								
12		**Device Access Locks**						
	1	Parameter (write) Access Lock	1	0 = off, 1 = on	0	rw	y	
	2	Data Storage Lock	1	0 = off, 1 = on	0	rw	y	
	3	Local Parameterization Lock	1	0 = off, 1 = on		rw	y	
	4	Local User Interface Lock	1	0 = off, 1 = on		rw	y	
13-15								
16		Vendor Name string		Banner Engineering Corporation		ro		
17		Vendor Text string		More Sensors. More Solutions.		ro		
18		Product Name string		K50 Pro Touch with IO-Link K50 Pro Device with IO-Link		ro		
19		Product ID string		K50PTCKQ K50PTCKQP K50PTFKQP K50PTKQ K50PTKQP K50PTVKQ K50PTVKQP K50PTFVKQP K50PFF50KQ K50PFF100KQ K50PFF100KQP K50PFF100KQPMA K50PFF200KQ K50PPBKQ		ro		
20		Product Text string		K50 Pro Touch with IO-Link K50 Pro Device with IO-Link		ro		
21		Serial Number				ro		
22		Hardware Revision				ro		
23		Firmware Version				ro		
24		App Specific Tag (user defined)				rw	y	
25-35								
36		Device Status	8	0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure 5-255 = Reserved		ro		
37	1-6	Detailed Device Status	Array[6] of 3-octet			ro		
38-79								
80		Operating Mode	3	0 = Multicolor 1 = Four State Full Logic 2 = Advanced 3 = LED Control 4 = Demo	2	rw	y	
81		**Custom Animation Settings**						
	1	Custom Intensity (0 - 100%)	8	0-100	100	rw	y	
	2	Custom Flash Rate (0.5 - 25.5 Hz)	8	5-255	15	rw	y	
	3	Restrict To Gamut	8	0 = Off, 1 = On	0	rw	y	
82		**Input Settings**						
	1	Touch Sensitivity	2	0 = Low, 1 = Standard, 2 = High	1	rw	y	
	2	Function	1	0 = Momentary, 1 = Latched	0	rw	y	
	3	Mute Enable	1	0 = Off, 1 = On	0	rw	y	
	4	On Delay (ms)	8	0-65535	0	rw	y	

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	AOI
83		**Output Settings**						
	1	Output State	1	0 = Normally Closed, 1 = Normally Open	true	rw	y	
	2	Off Delay Type	1	0 = Leading Edge, 1 = Trailing Edge	0	rw	y	
	3	Off Delay (ms)	16	0-65,535	0	rw	y	
84		**State 1 Parameters**						
	1	Animation Type	4	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence	1	rw	y	
	2	Animation Direction	1	0 = CCW, 1 = CW	false	rw	y	
	3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	0	rw	y	
	4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	1	rw	y	
	5	Reserved	2		0	rw	y	
	6	Off Delay Type	1	0 = Leading Edge, 1 = Trailing Edge	false	rw	y	
	7	Off Delay (ms)	16	0-65535	0	rw	y	
	8	Static Sequence Value (0-225)	8	0-225	0	rw	y	
	9	Sequence Start Location	3	0 = LED1, 1 = LED2, 2 = LED3, 3 = LED4, 4 = LED5, 5 = LED6, 6 = LED7, 7 = LED8	0	rw	y	
	10	Color 1	5	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2	0	rw	y	
	11	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y	
	12	Color 2	5	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom1 15 = Custom2	0	rw	y	
	13	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y	
85		State 2 Parameters (same structure as Index 84						

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	AOI
86		State 3 Parameters (same structure as Index 84)						
87		State 4 Parameters (same structure as Index 84)						
88		**Custom Color 1** (subindex access not supported)						
	1	Red	8	0-255	255	rw	y	
	2	Green	8	0-255	255	rw	y	
	3	Blue	8	0-255	255	rw	y	
89		**Custom Color 2** (subindex access not supported)						
	1	Red	8	0-255	255	rw	y	
	2	Green	8	0-255	255	rw	y	
	3	Blue	8	0-255	255	rw	y	

IO-Link Events

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

Event Types		
Code	**Type**	**Description**
0 (0x0000)	Notification	No malfunction
20480 (0x5000)	Error	Device hardware fault/Device exchange

Error Types			
Code	**Additional Code**	**Name**	**Description**
128 (0x80)	0 (0x00)	Device application error - no details	Service has been refused by the device application and no detailed information of the incident is available
	17 (0x11)	Index not available	Access occurs to a not existing device
	18 (0x12)	Subindex not available	Access occurs to a not existing subindex
	32 (0x20)	Service temporarily not available	Parameter is not accessible because of the current state of the device application
	35 (0x23)	Access denied	Write access on a read-only parameter
	48 (0x30)	Parameter value out of range	Written parameter value is outside its permitted value range
	49 (0x31)	Parameter value above limit	Written parameter value is above its specific value limit
	51 (0x33)	Parameter length overrun	Written parameter length is above its predefined length
	52 (0x34)	Parameter length underrun	Written parameter length is below its predefined length
	53 (0x35)	Function not available	Written command is not supported by the device application
	54 (0x36)	Function temporarily unavailable	Written command is not available because of the current state of the device application
	65 (0x41)	Inconsistent parameter set	Parameter inconsistencies were found at the end of the block parameter transfer, device plausibility check failed

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