

E3S-DC IO Link Konfigurasyonu

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Açıklama

Bu dökümanda E3S-DCP modeli IO link sensörün konfigurasyonu anlatılacaktır. Bu uygulamada bir adet E3S-DCP21-IL3, bir adet NX1P2 PLC, bir adet NX-PF güç kartı ve bir adet NX-ILM IO-Link master modülü kullanılacaktır. E3S-DCP devreye alma dökümanına aşağıdaki bağlantıdan ulaşabilirsiniz:

 <u>https://destek.omron.com.tr/wp-content/uploads/2020/02/E3S-DC-Sensorleri-</u> <u>Devreye-Alma.pdf</u>



IO Link Nedir?

IO link, sensör veya aktüatörlerle noktadan noktaya haberleşmenin yapıldığı bir iletişim prokolüdür. Bir IO Link sistemde, IO Link master ile bir veya birden fazla IO Link özelliğine sahip ürün bulunabilir.

NX-ILM veya GX-ILM master üniteleri, IO link aygıtlar ve kontrolcüler arasında haberleşmeyi sağlarlar. NX-ILM master ünitesi, NX serisi kontrolcüler ve haberleşme kuplör üniteleri ile kullanılır. Master ünitelerinin farklı modları vardır:

- SIO (DI) dijital input mod
- SIO(DO) dijital output mod
- Aktif olmayan mod

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Elektriksel Bağlantılar

NX-ILM master ünitesinin bağlantı şeması aşağıda gösterilmiştir:

IO-Link Mode



Note 1. If you do not use a signal connection for digital inputs for pin 2, a DI (white) connection is not required.

E3S-DCP21-IL3 kodlu ürünün bağlantı şeması aşağıda belirtilmiştir:



Sensör Data Adresleri

Bu uygulamada sensörün COM3 portundan haberleşme sağlanacaktır. NX-ILM master ünitesinde her renk için ayrı ayrı byte alanları kullanılır. E3S-DCP renk sensöründe kırmızı, yeşil ve mavi renkler için kullanılan byte alanları aşağıdaki tabloda gösterilmiştir:

E3S-DCP21-IL3	PDO Byte0	Bit data (RGB emitted states)					
	PDO Byte1	Bit data (output, stability, warning, error, etc.)					
	PDO Byte2	Red incident light level monitor LSB					
E CEM	PDO Byte3	Red incident light level monitor MSB					
	PDO Byte4	Green incident light level monitor LSB					
and the second	PDO Byte5	Green incident light level monitor MSB					
	PDO Byte6	Blue incident light level monitor LSB					
	PDO Byte7	Blue incident light level monitor MSB					

Sensör data adresleri aşağıdaki tabloda gösterilmiştir:

			PD0 bit)				分配 Assignment	详细 Details					
7	6	5	4	3	2	1	0	R 投光状态 State of red light emission	0: R 非投光 Red light not emitted 1: R 投光(2 点编程模式 R 投光时或 1 点编程模式时) Red light emitted (when R is emitted in the 2-point teaching mode or when the 1-point teaching mode)					
								G 投光状态 State of green light emission	0: G 非投光 Green light not emitted 1: G 投光(2 点编程模式 G 投光时或 1 点编程模式时) Green light emitted (when G is emitted in the 2-point teaching mode or when the 1-point teaching mode)					
								B 投光状态 State of blue light emission	0: B 非投光 Blue light not emitted 1: B 投光(2 点编程模式 B 投光时或 1 点编程模式时) Blue light emitted (when B is emitted in the 2-point teaching mode or when the 1-point teaching mode)					
								(Reserved)	0					
								(Reserved)	0					
								(Reserved)	0					
						— (Reserved)	0							
				— (Reserved)	0									
			PD1 bit					分配 Assignment	详细 Details					
7	6	5	4	3	2	1	0	控制输出 1 Control Output 1	0: OFF, 1: ON					
								控制输出 2 Control Output 2	0: OFF, 1: ON					
								(Reserved)	0					
								不稳定报警*4 Instability Alarm	0: 稳定状态 Stable 1: 不稳定状态 Unstable					
								(Reserved)	0					
									0					
		(Reserved) 轻度异常 Warning	因负载短路或服务数据异常等可恢复原因而无法继续执行动作 时的诊断输出 Diagnostic output when the sensor cannot continue operation due to a recoverable factor such as a load short-circuit or a service data error 0:正常 Normal (OFF) 1:异常 Error (ON)											
				严重异常 Error	传感器内部发生异常、需更换时的诊断输出 Diagnostic output when the sensor has an internal error and replacement is needed 0:正常 Normal (OFF) 1:异常 Error (ON)									

				b	it				
	7	6	5	4	3	2	1	0	
PD2	0 固定(Reserved) R 受光量监控器输出上位 4bit Upper 4bit of the monitoring (Incident Light Level R								
PD3		Lo	R wer 8bit of t	e 受光量监控器 he monitorin	器输出 下位 8b lg (Incident L	it ight Level Re	d)		
PD4	0 固定(Reserved)								
PD5		Lov	G wer 8bit of th	i 受光量监控器 e monitoring	器输出 下位 8b g (Incident Lig	it ght Level Gre	en)		
PD6		0 固定(Re	served)		B Upper 4bit of	受光量监控器 the monitorin	B输出 上位 4b g (Incident Lig	it ht Level Blue)	
PD7		Lo	B wer 8bit of t	9 受光量监控署 he monitorin	器输出 下位 8b g (Incident Li	it ght Level Blu	ie)		

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Sysmac Studio Programında IO Link Konfigurasyonu

1- Sysmac Studio programında PLC ve NX-PF kartı eklendikten sonra, NX-ILM400 master ünitesi eklenir. NX-ILM400 master ünitesi eklendikten konfigurasyonun yapılması için "Edit Unit Operation Settings" menüsüne girilir:



2- Bu dökümanda Port4 kullanılacağı için, "Port4 IO-Link Device Configuration Data/Process data out length" bölümü 4 byte olarak seçilir:

All parameters		
ltem name	Value	
Port2 IO-Link Device Configuration Data/IO-Link Revision	17	
Port2 IO-Link Device Configuration Data/Process data in length	8 Byte	
Port2 IO-Link Device Configuration Data/Process data out length	0 Byte	
Port2 IO-Link Device Configuration Data/Master Control	IO-Link Mode 🔹 🔻	
Port3 IO-Link Device Configuration Data/Device ID	0	
Port3 IO-Link Device Configuration Data/Vendor ID	0	
Port3 IO-Link Device Configuration Data/Serial Number		
Port3 IO-Link Device Configuration Data/IO-Link Revision	0	
Port3 IO-Link Device Configuration Data/Process data in length	2 Byte	
Port3 IO-Link Device Configuration Data/Process data out length	2 Byte	
Port3 IO-Link Device Configuration Data/Master Control	IO-Link Mode	
Port4 IO-Link Device Configuration Data/Device ID	0	
Port4 IO-Link Device Configuration Data/Vendor ID	0	
Port4 IO-Link Device Configuration Data/Serial Number		
Port4 IO-Link Device Configuration Data/IO-Link Revision	0	
Port4 IO-Link Device Configuration Data/Process data in length	2 Byte	
Port4 IO-Link Device Configuration Data/Process data out length	4 Byte	
Port4 IO-Link Device Configuration Data/Master Control	IO-Link Mode	
Port1 IO-Link Device Information Area/Device ID	0	
Port1 IO-Link Device Information Area/Vendor ID	0	
Port1 IO-Link Device Information Area/Serial Number		
	Return to Default Value	

3- Ardından ilgili I-O ların tanımlaması için "Edit I/O Allocation Settings" menüsüne girilir:

🔁 C	PU/Expa	ansion I	Racks	×										•
	0000	000000			-							Item name	Va	lue
											Dev	vice name	N2	
					8						Mo	odel name	NX-ILM40	0
					1						Pro	oduct name	IO-Link Ma	aster Unit
1 b	L				1						Uni	it version	1.1	
	0000	000000	.								NX	Unit Number	2	
	000	000000	00		1						NX	Unit Mounting Setti	Enabled	▼
				5 H							Ser	ial Number	0x0000000)0
											Pov	wer consumption	1.05	w
											Uni	it width	12	mm
											I/O	allocation settings	Digital Out Port1 Outp Port2 Outp Port3 Outp Port4 Outp I/O Port SI Port1_2 I/O Port3_4 I/O Digital Inp Port1 Inpu Port2 Inpu Port3 Inpu	tput Data : put Data01 : put Data01 : put Data01 : put Data01 : put Data01 : D Port Error O Port Error ut Data : 16 tt Data01 : 1 tt Data01 : 1
											Uni	it operation settings	Edit Ur Edit Ur Edit Ur Edit Ur Setting	t Data01 - 1 O Allocation gs nit Operation IS

4- Daha sonra "Input Data Set 2" bölümünden "Add I/O Entry" kısmında, "0x6004:02
Port1 Input Data02" girişi tanımlanır. Bu işlem sırasıyla aşağıda gösterilmiştir:

I/O Allocation Status: (1) I/O da	ata size Input 16/8192 [b]	ytes] Output 10,	/8192 [bytes]							
I/O Entry Mapping List			I/O entries included in the Input Data Set 4							
		Input 128[bits] Output 80[bits]	Index	Size	Data Type	I/O entry name				
Selection Input/Output I/	/O entry mapping name	Flag	0x6007:01		(RAY[01] OF BYTE	Port4 Input Data01				
Output	Output Data Set 1	Editable								
Output	Output Data Set 2	Editable								
Output	Output Data Set 3	Editable								
Output	Output Data Set 4	Editable								
Input I	Input Data Set 1	Editable								
Input I	Input Data Set 2	Editable								
1 Input I	Input Data Set 3	Editable								
Input I	Input Data Set 4	Editable								
Add I/O Entry				×						
0x6006:0A Port3 Input Data10 0x6006:0B Port3 Input Data11 0x6006:0C Port3 Input Data12 0x6006:0D Port3 Input Data13 0x6006:0F Port3 Input Data14 0x6006:0F Port3 Input Data15 0x6006:0F Port3 Input Data02 0x6007:02 Port4 Input Data03 0x6007:03 Port4 Input Data03 0x6007:05 Port4 Input Data05 0x6007:05 Port4 Input Data06 0x6007:05 Port4 Input Data06 0x6007:07 Port4 Input Data06 0x6007:07 Port4 Input Data07 0x6007:08 Port4 Input Data08					2 Add I/O Entr OK	y Delete I/O Entry Cancel Apply				
Data type : ARRAY[01] OF BY Size : 16[bit]	ТЕ					- 4 ×				
Comment : Port4 Input Data02	2	4				I				
			OK Can	cel						

5- Ardından eklenen inputun geldiğini gördükten sonra eklenebilmesi için Ok butonuna basılır:

/O Allocation Status: (1) I/O data size Input 18/8192 [bytes] Output 10/8192 [bytes]											
I/O Entry Mapping List Input 144[bit: Output 80[bit Selection Input/Output I/O entry mapping name Flag Output Output Data Set 1 Editable Output Output Data Set 2 Editable Output Output Data Set 3 Editable Output Output Data Set 4 Editable Input Input Data Set 1 Editable Input Input Data Set 2 Editable Input Input Data Set 3 Editable Input Input Data Set 3 Editable Input Input Data Set 3 Editable Input Input Data Set 3 Editable	I/O entries included in the Input Data Set 4 Index Size Ox6007:01 16fbit1 ARRAY[01] OF BYTE Port4 Input Data01 P 0x6007:02 16[bit] ARRAY[01] OF BYTE Port4 Input Data02 P										
Add I/O Entry Delete OK Cancel	I/O Entry Apply										

6- Ardından sensörün tanımlanması için "CPU Extension Racks" bölümünde, NX-ILM modünün üzerinde farenin sağ tuşuna basılarak, "IO-Link Master Simple Settings" menüsüne girilir:

🔄 CPU/Expansion Racks 🗙	
	Cut Ctrl+X
	Copy Ctrl+C
	Paste Ctrl+V
	Delete Del
	Undo Ctrl+Z
	Redo Ctrl+Y
	Change Model
	Edit Unit Operation Settings
	Paste Unit Operation Settings
	Import NX Unit Settings and Insert New Unit
	Export NX Unit Settings
	Import All NX Unit Settings
	Export All NX Unit Settings
	Show Model/Unit Name
	Get Serial Numbers of All NX Units
	Compare and Merge with Actual Unit Configuration
	Compare operation settings of all NX Units
	Clear All Memory of NX Unit
	Restart for NX Bus / NX Unit
	IO-Link Master Simple Settings

7- Ekranda beliren bölümde E3S-DCP21-IL3 sensör konfigurasyona eklenir. Bu işlemler sırası ile aşağıda belirtilmiştir:

🔄 CPL	J/Expansion Racks 🗙				•		Toolbox 🗸 🗸
IO-Li	nk Master Simple Settings						Vendor
When	you register an IO-Link device, Unit operation set	tings and I/O	allocation settir	ngs of the Mast	er are automatically edited.		All vendors OMRON Corporation IO-Link
IO-Link I Por 1 2 3 4	Master: Unit 2[NXBusMaster]:NX-ILM400(N2) rt Device 3 Calified S-DCP21-IL2				Item name Value IO-Link Device Name E3S-DCP21-IL2 Vendor ID 612 Device ID 65548 IO-Link Revision 1.1(17) Serial Number Serial		
- Proces	ss data structure	-	l	1	IO-Link Device Verification Setting No ch		E3S
Name	2	Data type	Bit offset	Bit length	Backup Setting Disabled		E3S-DCP21-II 2 IO-I ink 1 1 IOD
I I I I I I I I I I I I I I I I I I I	ocess-Data Input	Record	0	64	Load Rejection Output Setting Enabled	2	Photoelectric Sensor
	Control Output 1	Boolean	48		Input Filter Value Setting 1ms	I	E3S-DCP21-IL3 IO-Link 1.1 IODI
	Control Output 2	Boolean	49	1	Master Control IO-Link Mode		Photoelectric Sensor
	Instability Alarm	Boolean			Digital Input Collection Setting Disabled		
	Warning	Boolean	54		Offset Setting of Digital Input Collection		
	Error	Boolean					
	Light Emitting Color	UInteger	56				
	Incident Light Level Red	UInteger					
	Incident Light Level Green	UInteger	16				
	Incident Light Level Blue	UInteger					
	ap						
	an anna an ann ann ann an ann an ann an	ico					
	Senerate process data structure of the IO-Link devi	ice -					
	syte array (reset to default)					Į.	
					OK Cancel	j	

8- Bu işlemler bittikten sonra yapılan tüm ayarlar, PLC ye online olunup Synchronize butonu ile gönderilir:



9- Yapılan ayarlar PLC ye gönderildikten sonra, "Online" modda iken IO Map açılır. Burda ürün algılama yapmaz iken Port4 Incident Light Level Red değişkeni 16#1 değerini gösterir:

	Position	Port	Description	R/W	Data Type	Value	Variable	Variable Comment
new_Controller_0 V		▼ Port1 Input Data01	E3Z-D-IL3	R	ARRAY[0.1]			E I
Configurations and Setup		Port1 Detection Level	Port1 Detection Level	R	USINT	16		
30 EtherCAT		Port1 Control Output 1	Port1 Control Output 1	R	BOOL	TRUE		
To CPU/Expansion Backs		Port1 Control Output 2	Port1 Control Output 2	R	BOOL	TRUE		
CRI Pack		Port1 Instability Alarm (Non-Ligh	Port1 Instability Alarm (Nor	R	BOOL	FALSE		
V = CPU Kack		Port1 Instability Alarm (Light Rec	Port1 Instability Alarm (Ligh	R	BOOL	FALSE		
L Unit 1 : NX-PH0630 (Port1 Warning	Port1 Warning	R	BOOL	FALSE		
L Unit 2 : NX-ILM400		Port1 Error	Port1 Error	R	BOOL	FALSE		
📕 I/O Map		Port2 Input Data01	E3AS-F1500IPT	R	ARRAY[0.1]			
▼ R Controller Setup		Port2 Input Data02	E3AS-F1500IPT	R	ARRAY[01]			
Let Operation Settings		Port3 Input Data01	E2E(Q)-X_B1T12	R	ARRAY[01]	é		
ut Built-in EtherNet/IP Po		▼ Port4 Input Data01	EBS-DCPZ1-IL3	8	ARRAY[0.1]			
Puilt in 1/O Cattings		Port4 Light Emitting Color	Port4 Light Emitting Color	R	BYTE	16#7		
		Port4 Control Output 1	Port4 Control Output 1	R	BOOL	FALSE		
LE Option Board Settings		Port4 Control Output 2	Port4 Control Output 2	R	BOOL	FALSE		
🛛 🗉 Memory Settings		Port4 Instability Alarm	Port4 Instability Alarm	R	BOOL	FALSE		
►	_	Port4 Warning	Port4 Warning	R	BOOL	FALSE		
er Cam Data Settings	_	Port4 Error	Port4 Error	R	BOOL	FALSE		
► Event Settings	_	✓ Port4 Input Data02	E3S-DCP21-IL3	R	ARRAY[01]			
Task Settings	_	Port4 Incident Light Level Red. h	Port4 Incident Light Level R	R	RYTE	16#0		
The Data Trace Settings		Port4 Incident Light Level Red_Ic	Port4 Incident Light Level R	R	BYTE *	16#1		
Data Hace Settings		▼Port4 Input Data03	E3S-DCP21-IL3	R	RYTE			
Programming		Port4 Incident Light Level Green	Port4 Incident Light Level C	R	BA	16#0		
V 🖻 POUs		Port4 Incident Light Level Green	Port4 Incident Light Level C	R	BYTE	16#0		
♥ @ Programs		▼ Port4 Input Data04	E3S-DCP21-IL3	R	ARRAY[0.1]			
V 🖽 Program0		Port4 Incident Light Level Blue_h	Port4 Incident Light Level B	R	BYTE	16#0		
L @ Section0		Port4 Incident Light Level Blue_k	Port4 incident Light Level B	ĸ	BAIF	16#0		
L ≫ Functions								
The Function Blocks	-Monitor type							Bit order
	🔵 Data type 🌒) Binary 🌑 Hex 💿 Signed decimal 🌑 U	nsigned decimal					🔘 MSB-LSB 🔘 LSB-MSB
▶ m Data				_	_	_		
► En Tasks	Build							÷1×
	🙁 OF ERICIES 🛕 (- Warnings						
		Description I Program	Location					
N	and the second second second second							
Filter	Output Build							

X 🖲 🖬 🖄 つ ් 🖬	山 人 影 目 目 影 主 〇 页 一	🗛 🚳 🚱 🏇	% () 🖞 🖗	H	ଷ୍ ସ୍ "ଧ୍				
Multiview Explorer 🚽 🖡	CPU/Expansion Racks 📰 I/O Map 🗙							Toolbox		÷ 0
Mountwe Lipplies	Position	Description BecTro Hulls Annt Control Couper 1 Annt Control Couper 1 Annt Control Couper 2 Annt Instability Alarm (Ligh Annt Marning) Annt Sharing Sharing Color Annt Sharing Couper 1 Annt Sharing Couper 2 Annt Sharing Couper 1 Annt Sharing Couper 2 Annt Sharing Co	R. R. R. R. R. R. R. R. R. R. R. R. R.	Data Type ARRAY(0.1) (USINT BOOL BOOL BOOL BOOL BOOL BOOL BOOL BOO	Value 15 TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE 1600 1601 1600	Variable	Variable Comment	Costraire 9 and		
Les Section0 L(# Functions L(# Functions Blocks ► = Data ► Trasks Br.	Content Routen Logini Level alloc, a contor type Data type Binary Hex Signed decimal Ur dat menoral Apple.comment 1 Description Program	nsigned decimal	9 N				Bit order MSB-LSB LSB LSB-MSB	ONLINE CRR/ALM	192-168-250.1 RUN mode	×

10-Kırmızı renk algılandığında ise, bu değer 16#AB gösterir:

Not: Rengin yoğunluğuna göre bu değer değişmektedir. Sensör 0-1 çıkış vermektedir. Burda rengin algılanıp algılanmadığına bakılmıştır.