

EtherCAT Communication Specification

UAM-05LEC



Revision History

Symbol	Revision Detail	Rev. Page	Rev. Date	Drafted	DWG. No
-	First Release (2021-05)				



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1. Introduction

This document outlines the data exchanged between UAM-05LEC and the controller over the EtherCAT network.

2. Abbreviations and Descriptions

FSoE: Fail Safe over EtherCAT

CoE: CAN Application Protocol over EtherCAT

EoE: Ethernet over EtherCAT

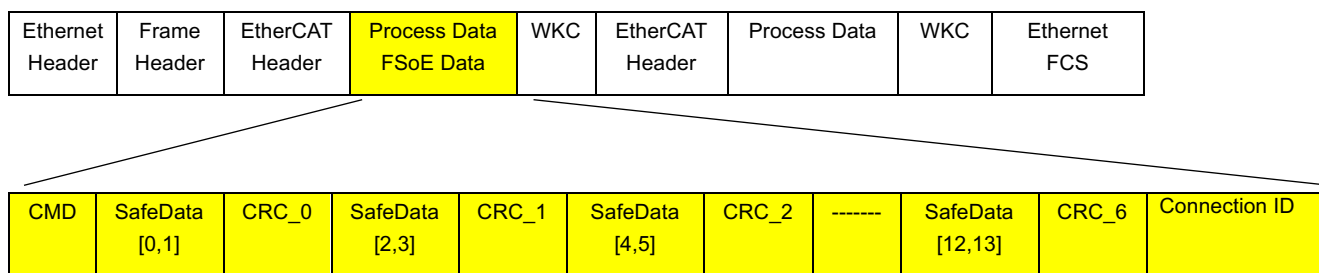
FoE: File Access over EtherCAT

CRC: Cyclic Redundancy Check

3. Data Structure

3.1 Safety Data

Safety data between UAM and controller are exchanged via FSoE communication. Data structure is shown below.



3.1.1 Safety Input Data (Data from the controller to UAM)

Table 3-1-1-1 Safety data from Controller to UAM

Safety data from master controller to UAM				
Size	Name	Bit field	Description	Value
2 bytes	Area Input	UINT8	Area Number	1 ~ 176
		UINT8	Area Number (Inverted)	79 ~ 254
2 bytes	Muting Input Signal State	Bit 1	Protection1 Muting 1	0: Signal is low 1: Signal is high
		Bit 2	Protection1 Muting 2	
		Bit 3	Protection2 Muting 1	
		Bit 4	Protection2 Muting 2	
		Bit 5	Protection3 Muting 1	
		Bit 6	Protection3 Muting 2	
		Bit 7	Protection4 Muting 1	
		Bit 8	Protection4 Muting 2	
		Bit 9	Protection5 Muting 1	0
		Bit 10	Protection5 Muting 2	
		Bit 11	Reserved	
		Bit 12	Reserved	
		Bit 13	Reserved	
		Bit 14	Reserved	
		Bit 15	Reserved	
		Bit 16	Reserved	
2 bytes	Other Input Signal State	Bit 1	Protection1 Override	0: Signal is low 1: Signal is high
		Bit 2	Protection2 Override	



		Bit 3	Protection3 Override	
		Bit 4	Protection4 Override	
		Bit 5	Protection5 Override	
		Bit 6	Reserved	
		Bit 7	Reserved	0
		Bit 8	Reserved	
		Bit 9	Protection1 Reset In	
		Bit 10	Protection2 Reset In	0: Signal is low 1: Signal is high
		Bit 11	Protection3 Reset In	
		Bit 12	Protection4 Reset In	
		Bit 13	Protection5 Reset In	
		Bit 14	Reserved	0
		Bit 15	Reserved	
		Bit 16	Reserved	
2 bytes	Encoder Speed	SINT16	Encoder A speed	-32768 ~ 32767 cm/s
2 bytes		SINT16	Encoder B speed	
2 bytes	Encoder Input Pattern	UINT8	Encoder Pattern Number	1 ~ 32
		UINT8	Encoder Pattern Number (Inverted)	223 ~ 254
2 bytes	Other	Bit 1	Laser off Mode	0: Laser off mode disable 1: Laser off mode enable
		Bit 2	Restart Safety function	Always 0 or 1: None 0 – 1 – 0 pulse of more than 60ms: Restart UAM safety function
		Bit3	Restart Communication	Always 0 or 1: None 0 – 1 – 0 pulse of more than 60ms: Restart communication
		Bit4 ~ 16	Reserved	0

Table 3-1-1-2 Safety Data from Controller to UAM with PDO mapping Index number

Index	Sub Index	PDO Data Index	PDO Data Sub Index	Name	Data Type	Access	Description
0x1600	-	-		FSOE RxPDO-Map	-	-	-
	1	0x7000	2	Master Command	UINT8	RO	Master Command
	2	0x7001	1	Area Number	UINT8	RO	Master SafeData_0
	3	0x7001	2	Inverted Area Number	UINT8	RO	Master SafeData_1
	4	0x7000	4	Master CRC_0	UINT16	RO	Master CRC_0
	5	0x7001	3	Protection1 Muting 1	BOOL	RO	Master SafeData_2_Bit_0
	6	0x7001	4	Protection1 Muting 2	BOOL	RO	Master SafeData_2_Bit_1
	7	0x7001	5	Protection2 Muting 1	BOOL	RO	Master SafeData_2_Bit_2
	8	0x7001	6	Protection2 Muting 2	BOOL	RO	Master SafeData_2_Bit_3
	9	0x7001	7	Protection3 Muting 1	BOOL	RO	Master SafeData_2_Bit_4
	10	0x7001	8	Protection3 Muting 2	BOOL	RO	Master SafeData_2_Bit_5
	11	0x7001	9	Protection4 Muting 1	BOOL	RO	Master SafeData_2_Bit_6
	12	0x7001	10	Protection4 Muting 2	BOOL	RO	Master SafeData_2_Bit_7
	13	0x7001	11	Protection5 Muting 1	BOOL	RO	Master SafeData_3_Bit_0
	14	0x7001	12	Protection5 Muting 2	BOOL	RO	Master SafeData_3_Bit_1
	15	0x7001	13	Reserved			
	16	0x7001	14				
	17	0x7001	15				
	18	0x7001	16				
	19	0x7001	17				
	20	0x7001	18				
	21	0x7000	5	Master CRC_1	UINT16	RO	Master CRC_1



22	0x7001	19	Protection1 Override	BOOL	RO	Master SafeData_4_Bit_0
23	0x7001	20	Protection2 Override	BOOL	RO	Master SafeData_4_Bit_1
24	0x7001	21	Protection3 Override	BOOL	RO	Master SafeData_4_Bit_2
25	0x7001	22	Protection4 Override	BOOL	RO	Master SafeData_4_Bit_3
26	0x7001	23	Protection5 Override	BOOL	RO	Master SafeData_4_Bit_4
27	0x7001	24	Reserved			
28	0x7001	25				
29	0x7001	26				
30	0x7001	27	Protection1 Reset In	BOOL	RO	Master SafeData_5_Bit_0
31	0x7001	28	Protection2 Reset In	BOOL	RO	Master SafeData_5_Bit_1
32	0x7001	29	Protection3 Reset In	BOOL	RO	Master SafeData_5_Bit_2
33	0x7001	30	Protection4 Reset In	BOOL	RO	Master SafeData_5_Bit_3
34	0x7001	31	Protection5 Reset In	BOOL	RO	Master SafeData_5_Bit_4
35	0x7001	32	Reserved			
36	0x7001	33				
37	0x7001	34				
38	0x7000	6	Master CRC_2	BOOL	RO	Master CRC_2
39	0x7001	35	Encoder A speed	SINT16	RO	Master SafeData_6 Master SafeData_7
40	0x7000	7	Master CRC_3	UINT16	RO	Master CRC_3
41	0x7001	36	Encoder B speed	SINT16	RO	Master SafeData_8 Master SafeData_9
42	0x7000	8	Master CRC_4	UINT16	RO	Slave CRC_4
43	0x7001	37	Encoder Pattern Number	UINT8	RO	Master SafeData_10
44	0x7001	38	Inverted Encoder Pattern Number	UINT8	RO	Master SafeData_11
45	0x7000	9	Master CRC_5	UINT16	RO	Master CRC_5
46	0x7001	39	Laser off Mode	BOOL	RO	Master SafeData_12_Bit_0
47	0x7001	40	Reserved			
48	0x7000	10	Master CRC_6	UINT16	RO	Master CRC_6
49	0x7000	3	Master Connection ID	UINT16	RO	Master Connection ID



3.1.2 Safety Output Data (Data from UAM to the controller)

Table 4-1-2-1 UAM to Host Safety Data

Safety data from host to slave				
Size	Name	Bit field	Details	Value
2 bytes	Detection State	Bit 1	Protection1 detection	0: Off (Obstacle detected/Error/Laser off mode/Setting mode) 1: On (Obstacle absent)
		Bit 2	Protection2 detection	
		Bit 3	Protection3 detection	
		Bit 4	Protection4 detection	
		Bit 5	Protection5 detection	
		Bit 6	Reserved	0
		Bit 7		
		Bit 8		
		Bit 9	Warning1 detection	0: Off (Obstacle detected/Error/Laser off mode/Setting mode) 1: On (Obstacle absent)
		Bit10	Warning2 detection	
		Bit 11	Warning3 detection	
		Bit 12	Warning4 detection	
		Bit 13	Reserved	0
		Bit 14		
		Bit 15		
		Bit 16		
2 bytes	Interlock	Bit 1	Protection1 Muting/Override	0: Device is not in Muting or Override state 1: Device is in Muting or Override state
		Bit 2	Protection2 Muting/Override	
		Bit 3	Protection3 Muting/Override	
		Bit 4	Protection4 Muting/Override	
		Bit 5	Protection5 Muting/Override	
		Bit 6	Reserved	0
		Bit 7		
		Bit 8		
		Bit 9	Protection1 Reset Request	0: Device is not ready to accept reset input 1: Device is ready to accept reset input
		Bit10	Protection2 Reset Request	
		Bit 11	Protection3 Reset Request	
		Bit 12	Protection4 Reset Request	
		Bit 13	Protection5 Reset Request	
		Bit 14	Reserved	0
		Bit 15		
		Bit 16		
2 bytes	Encoder Speed	Bit 1 ~16	Encoder Speed A	−32768 to 32767 cm/s
2 bytes		Bit 1 ~16	Encoder Speed B	
1 byte	Encoder Pattern Number	Bit 1 ~ 8	Encoder Pattern Number	1 ~ 32
1 byte		Bit 1 ~ 8	Encoder Pattern Number (Inverted)	
2 bytes	Operating Area	Bit 1 ~ 8	Operating area number	Area number 1 to 176
		Bit 1 ~ 8	Operating area number (inverted)	Area number 1 to 176
1 byte	Error Code	Bit 1 ~ 8	Error code	Error code 65 to 255
2 byte	Other State	Bit 1	Error State	0: No error 1: Error present
		Bit 2	Reserved	0
		Bit 3	Laser off Mode	0: Device is not in laser off mode 1: Device is in laser off mode
		Bit 4	Operation Mode	0: Normal operation 1: Setting mode
		Bit 5	Contamination Warning	0: Contamination Warning is off 1: Contamination Warning is on



		Bit 6	Contamination Error	0: Contamination error is off 1: Contamination error is on
		Bit 7	Reference Status	0: No error 1: Reference detection error
		Bit 8 ~ 16	Reserved	0
2 Byte	Reserved	Bit 1 ~16	Reserved	0

Table 3-1-2-1 Safety data from UAM to Controller with PDO mapping Index number

Index	Sub Index	PDO Mapping Index	PDO Mapping Sub Index	Name	Data Type	Access	Description
0x1A00	-	-		FSOE TxPDO-Map	-	-	-
	1	0x6000	2	Slave Command	UINT8	RO	Slave Command
	2	0x6001	1	Protection1 detection	BOOL	RO	Slave SafeData_0_Bit_0
	3	0x6001	2	Protection2 detection	BOOL	RO	Slave SafeData_0_Bit_1
	4	0x6001	3	Protection3 detection	BOOL	RO	Slave SafeData_0_Bit_2
	5	0x6001	4	Protection4 detection	BOOL	RO	Slave SafeData_0_Bit_3
	6	0x6001	5	Protection5 detection	BOOL	RO	Slave SafeData_0_Bit_4
	7	0x6001	6	Reserved	BOOL	RO	Slave SafeData_0_Bit_5
	8	0x6001	7	Reserved	BOOL	RO	Slave SafeData_0_Bit_6
	9	0x6001	8	Reserved	BOOL	RO	Slave SafeData_0_Bit_7
	10	0x6001	9	Warning1 detection	BOOL	RO	Slave SafeData_1_Bit_0
	11	0x6001	10	Warning2 detection	BOOL	RO	Slave SafeData_1_Bit_1
	12	0x6001	11	Warning3 detection	BOOL	RO	Slave SafeData_1_Bit_2
	13	0x6001	12	Warning4 detection	BOOL	RO	Slave SafeData_1_Bit_3
	14	0x6001	13	Reserved	BOOL	RO	Slave SafeData_1_Bit_4
	15	0x6001	14	Reserved	BOOL	RO	Slave SafeData_1_Bit_5
	16	0x6001	15	Reserved	BOOL	RO	Slave SafeData_1_Bit_6
	17	0x6001	16	Reserved	UINT1	RO	Slave SafeData_1_Bit_7
	18	0x6000	4	Slave CRC_0	UINT16	RO	Slave CRC_0
	19	0x6001	17	Protection1 Muting/Override	BOOL	RO	Slave SafeData_2_Bit_0
	20	0x6001	18	Protection2 Muting/Override	BOOL	RO	Slave SafeData_2_Bit_1
	21	0x6001	19	Protection3 Muting/Override	BOOL	RO	Slave SafeData_2_Bit_2
	22	0x6001	20	Protection4 Muting/Override	BOOL	RO	Slave SafeData_2_Bit_3
	23	0x6001	21	Protection5 Muting/Override	BOOL	RO	Slave SafeData_2_Bit_4
	24	0x6001	22	Reserved	BOOL	RO	Slave SafeData_2_Bit_5
	25	0x6001	23	Reserved	BOOL	RO	Slave SafeData_2_Bit_6
	26	0x6001	24	Reserved	BOOL	RO	Slave SafeData_2_Bit_7
	27	0x6001	25	Protection1 Reset Request	BOOL	RO	Slave SafeData_3_Bit_0
	28	0x6001	26	Protection2 Reset Request	BOOL	RO	Slave SafeData_3_Bit_1
	29	0x6001	27	Protection3 Reset Request	BOOL	RO	Slave SafeData_3_Bit_2
	30	0x6001	28	Protection4 Reset Request	BOOL	RO	Slave SafeData_3_Bit_3
	31	0x6001	29	Protection5 Reset Request	BOOL	RO	Slave SafeData_3_Bit_4
	32	0x6001	30	Reserved	BOOL	RO	Slave SafeData_3_Bit_5
	33	0x6001	31	Reserved	BOOL	RO	Slave SafeData_3_Bit_6
	34	0x6001	32	Reserved	BOOL	RO	Slave SafeData_3_Bit_7
	35	0x6000	5	Slave CRC_1	UINT16	RO	Slave CRC_1
	36	0x6001	33	Encoder Speed A	SINT16	RO	Slave SafeData_4 Slave SafeData_5
	37	0x6000	6	Slave CRC_2	UINT16	RO	Slave CRC_2
	38	0x6001	34	Encoder Speed B	SINT16	RO	Slave SafeData_6 Slave SafeData_7
	39	0x6000	7	Slave CRC_3	UINT16	RO	Slave CRC_3
	40	0x6001	35	Encoder Pattern Number	UINT8	RO	Slave SafeData_8
	41	0x6001	35	Encoder Pattern Number	UINT8	RO	Slave SafeData_9



				(Inverted)			
	42	0x6000	8	Slave CRC_4	UINT16	RO	Slave CRC_4
	43	0x6001	37	Operating area number	UINT8	RO	Slave SafeData_10
				Operating area number (Inverted)	UINT8		
	44	0x6001	38	Error code	UINT8	RO	Slave SafeData_11
	45	0x6000	9	Slave CRC_5	UINT16	RO	Slave CRC_5
	46	0x6001	39	Error State	BOOL	RO	Slave SafeData_12_Bit_0
	47	0x6001	40	Reserved	BOOL	RO	Slave SafeData_12_Bit_1
	48	0x6001	41	Laser off Mode	BOOL	RO	Slave SafeData_12_Bit_2
	49	0x6001	42	Operation Mode	BOOL	RO	Slave SafeData_12_Bit_3
	50	0x6001	43	Contamination Warning	BOOL	RO	Slave SafeData_12_Bit_4
	51	0x6001	44	Contamination Error	BOOL	RO	Slave SafeData_12_Bit_5
	52	0x6001	45	Reference Status	BOOL	RO	Slave SafeData_12_Bit_6
	53	0x6001	46	Reserved	UINT9	RO	Slave SafeData_12_Bit_7 Slave SafeData_13
	54	0x6000	10	Slave CRC_6	UINT16	RO	Slave CRC_6
	55	0x6000	3	Slave Connection ID	UINT16	RO	Slave Connection ID

3.1.3 Safety PDO Assign

Table 3-1-3-1 Safety PDO Assign with Index number

Index	Sub Index	Obj Type	Name	Data Type	Access	Assigned PDO Index	Description
0x1C12	-	Array	RxPDO Assign	-	-	-	-
	1		SubIndex 001	UINT16	RW	1600	FSoE RxPDO-Map
0x1C13	-	Array	TxPDO Assign	-	-	-	-
	1		SubIndex 001	UINT16	RW	1A00	FSoE TxPDO-Map



3.1.4 Safety Information

Table 3-1-4-1 Safety information

Index	Sub Index	Obj Type	Name	Data Type	Access	Description
0x9001	-	RECORD	FSoE Communication Parameters	-	-	The information data of the FSoE Module
	1	-	Version	STRING(2)	RO	Supported FSoE Version
	2	-	Slave Address	UINT16	RO	FSoE Slave address
	3	-	Connection ID	UINT16	RO	Connection ID, assigned by the FSoE Master
	4	-	Watchdog Time	UINT16	RO	Watchdog Time, Assigned by the FSoE Master
	5	-	Unique Device ID	STRING(6)	RO	0: Device ID is not used
	6	-	Connection Type	ENUM	RO	1: Slave Connection 0: Master Connection
	7	-	Com Parameter Length	UINT16	RO	2: Number of bytes of the communication parameter (Watch Dog timer)
	8	-	Appl Parameter Length	UINT16	RO	0: Length of application Parameter (not used)
	9	-	SRA CRC	UINT32	RO	0: CRC checksum of the Safety-related Application Parameter set (not used)
0xA000	-	RECORD	FSoE Connection Diagnosis	-	-	Status and diagnosis of the FSoE Module
	1	-	Connection State	ENUM[16]	RO	State of the FSoE Connection 100: Reset 101: Session 102: Connection 103: Parameter 104: Data 105: Failsafe
	2	-	Connection Diagnosis	UINT16	RO	Diagnosis Bits of FSoE Connection Bit 0 ~ 3: 0: No error 1: Wrong command 2: Unknown command 3: Wrong Connection ID 4: Wrong CRC 5: Watchdog expired 6: Wrong FSoE Address 7: Wrong Data 8: Wrong Communication Parameter Length 9: Wrong Communication Parameter 10: Wrong Application Parameter Length 11: Wrong Application Parameter Bit 4: 0: Error in FSoE Master 1: Error in FSoE Slave Bit 5: 1: FSoE slave is in Failsafe Bit 6: 1: Connection in startup Bit 7: 1: FSoE Master is in Failsafe



3.2 Other Data (Non-Safety Data)

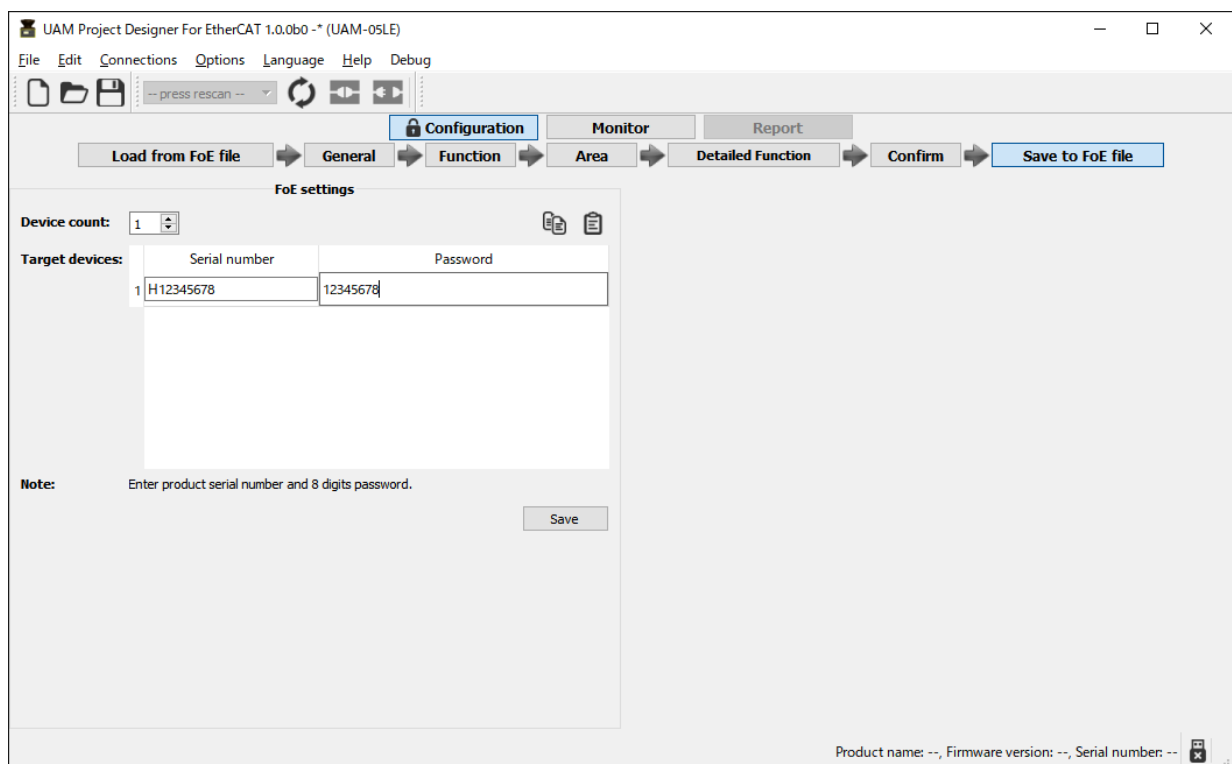
Non safety data between UAM and controller is exchanged using FoE, CoE and EoE communication of EtherCAT.

3.2.1 FoE Communication

Use the UAM project designer application to generate FoE file containing the configuration parameters of UAM. This file can be uploaded on the device using the FoE communication.

Generating the FoE File:

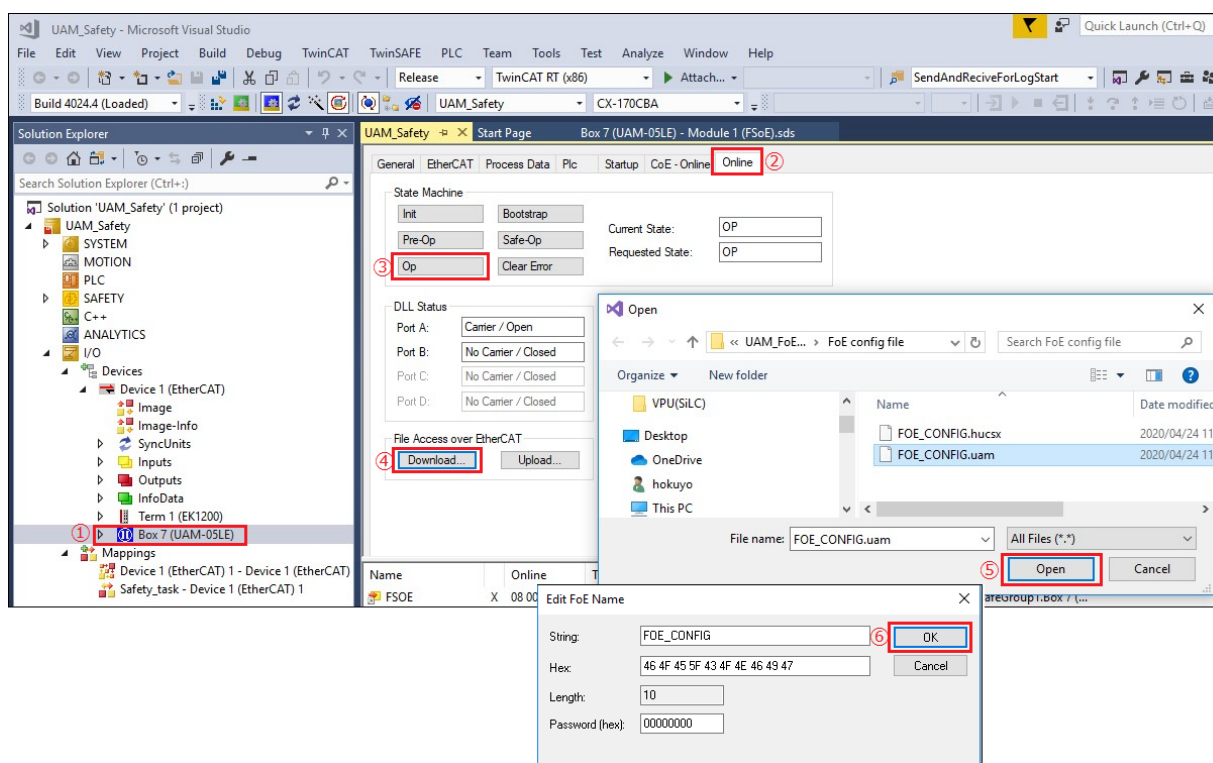
After configuring and confirming all parameters on UAM Project Designer click the “Save to FoE File”. The following window will appear. Enter the sensor’s serial number and password and click the “Save” button to generate and save the FoE file.



Uploading the setting using FoE file:

1. On the TwinCAT Project, go to “Device” and select “UAM-05LEC” from the list.
2. Click on the “Online” button
3. Check the “Current State” on the window. If it is not “OP”, click the “OP” button and wait for the state to change to “OP”.
4. Click “Download” button under “File access over EtherCAT” section.
5. Select the location of saved FoE file when file open dialog box appears and click “Open” button.
6. When “Edit FoE Name” dialog appears click the “OK” button to start the file upload (password or is not required). Supported file name is “foe_config”.





3.2.2 EoE Communication

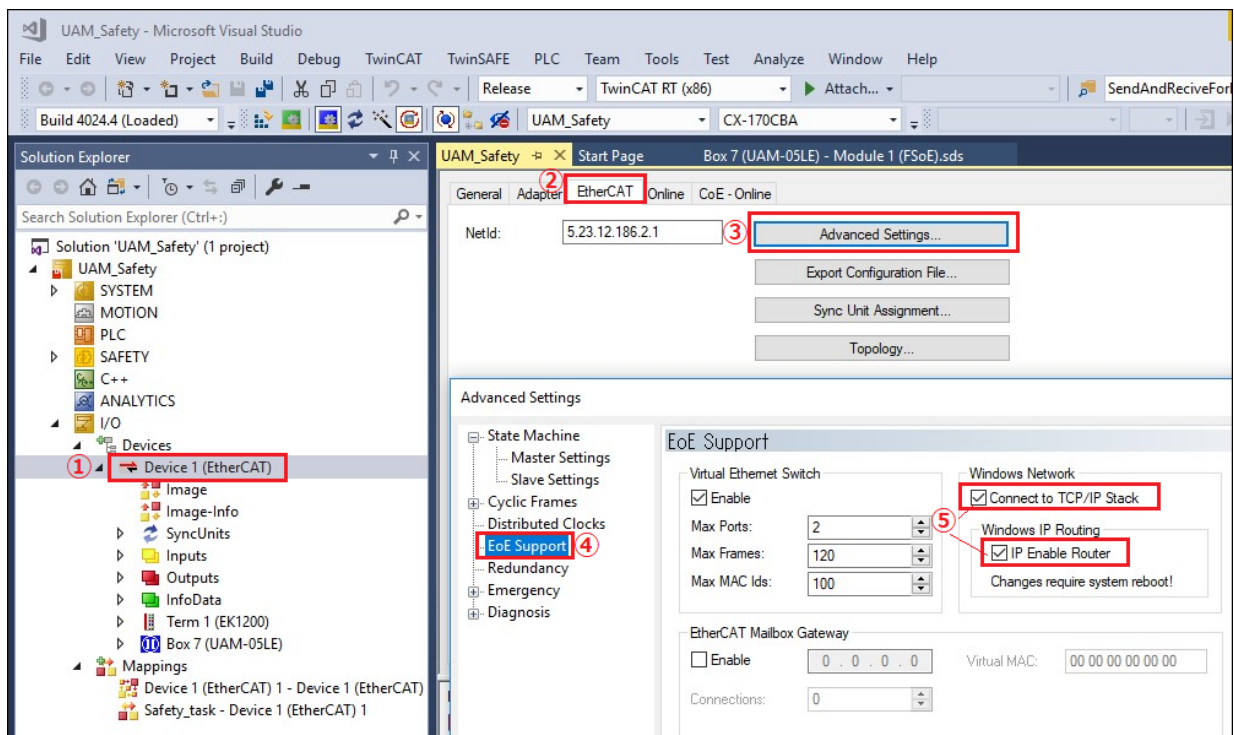
Measurement data for the monitoring can be obtained from UAM by using UAM Project designer or EoE compatible application developed by the user. Refer UAM-05LEC Communication Protocol Specification for details on data transfer. Configuration required for EoE communication is explained below.

EoE Communication Setting

Enabling the IP routing on Master controller using TwinCAT project.

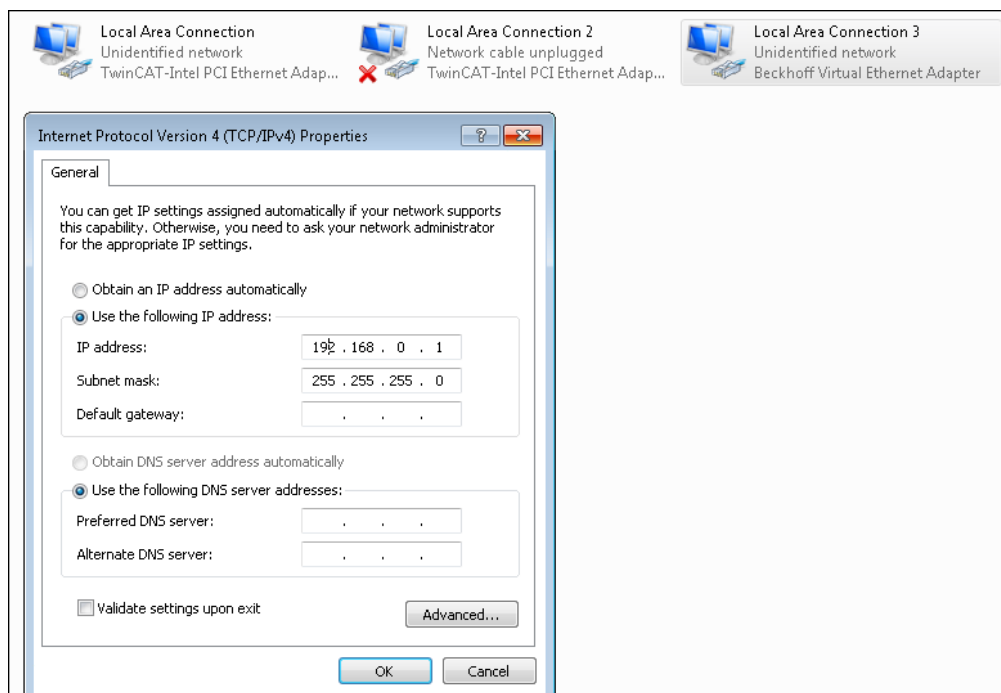
1. On the TwinCAT Project, go to “Devices” and select “Device 1 (EtherCAT)” from the list.
2. Click the “EtherCAT” button on the window.
3. Click the “Advance Setting” button. Advance setting dialog will appear.
4. Select the “EoE support” from the list.
5. Check the boxes next to “Connect to TCP/IP Stack” and “IP Enable Router” if not already checked.
6. Restart the system (PLC).





Setting up the Master Virtual IP:

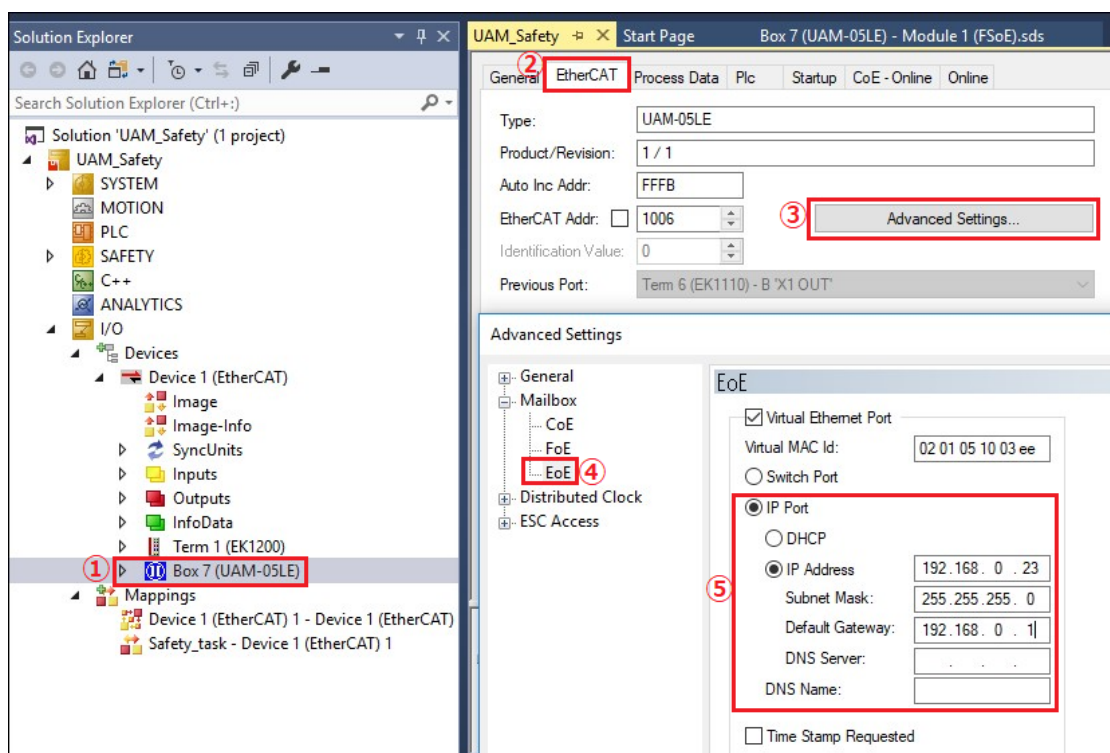
Run the TC3 XAE in Config Mode and select the Virtual Ethernet Adapter's IP address and subnet mask.



Configuring the UAM's IP address:

1. On the TwinCAT Project, go to "Device" and select "UAM-05LEC" from the list.
2. Click on the "EtherCAT" button on the window.
3. Click the "Advance Setting" button. Advance setting dialog will appear.
4. Expand the "Mailbox" menu and select "EoE" from the list.
5. Configure the IP address to be on the same network as Master Virtual IP. Set the default gateway to Master Virtual IP.

Note: If the host IP and UAM's IP address is different, add UAM's IP address on the static route of the host PC.



3.2.3 CoE Communication

UAM's configuration parameters obtained through CoE communication are shown in table 3-2-3-1.

Table 3-2-3-1 UAM Setting parameter obtained through CoE with Index number

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x1000	0x00	VAR	Device Type	UINT32	R	No	<Initial Value> 0x00000000 <Remarks> Bit 0~15 Used device profile. 0x0000 if not used. Bit 16~31 Addition information related to used device profile.
0x1008	0x00	VAR	Devic Name	STRING[29]	R	No	<Initial Value> "UAM-05LEC"
0x1009	0x00	VAR	Hardware Version	STRING[29]	R	No	<Initial Value> 00.00.00
0x100A	0x00	VAR	Software Version	STRING[29]	R	No	<Initial Value> 00.00.00_000000000000000000000000

0x100B	0x00	VAR	Serial Number	STRING[16]	R	No	<Initial Value> 0000000000000000
0x100C	0x00	VAR	EtherCAT Software Version	STRING[16]	R	No	<Initial Value> 00.00_00.00.00

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x1018	-	RECORD	Identity	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 4
-	0x01	-	Vendor ID	UINT32	R	No	<Initial Value> 0x000000832 <Remarks> Value supplied by ETG
-	0x02	-	Product Code	UINT32	R	No	<Initial Value> 0x000000000 <Remarks> Value supplied by the vendor.
-	0x03	-	Revision Number	UINT32	R	No	<Initial Value> 0x000000000 <Remarks> Value supplied by the vendor.
-	0x04	-	Serial Number	UINT32	R	No	<Initial Value> 0x000000000 <Remarks> Value supplied by the vendor for the product.

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x2000	-	RECORD	Sensor Setting	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Valu> 12
-	0x01	-	Minimum Detection Width	UINT8	R	No	<Initial Value> 30mm (0) <Remarks> 30mm (0) 50mm (1) 70mm (2) 150mm (3) 40mm (4)
-	0x02	-	Input Delay	UINT8	R	No	<Initial Value> 30ms (1) <Remarks> 30ms (1) 120ms (4) 270ms (9) 1000ms (34) 2000ms (67)
-	0x03	-	Laser Off Mode	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x04	-	LCD Inverted Mode	UINT8	R	No	<Initial Value> Normal (0) <Remarks>



							Normal (0) Inverted (1)
-	0x05	-	User Area Count	UINT8	R	No	<Initial Value> 0x00 (0) <Remarks> Range 0x01 ~ 0xB0 (0 ~ 176)
-	0x06	-	Reference Monitor	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x07	-	Auxiliary Output1 Mode	UINT8	R	No	<Initial Value> None (0) <Remarks> None (0) Error Output (1) Contamination Error Output (2) Contamination Warning Output (3) Synchronous Signal Output (4)
-	0x08	-	Auxiliary Output2 Mode	UINT8	R	No	<Initial Value> None (0) <Remarks> None (0) Error Output (1) Contamination Error Output (2) Contamination Warning Output (3) Synchronous Signal Output (4)
-	0x09	-	HW Muting 1	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x0A	-	HW Muting2	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x0B	-	HW Interlock1	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x0C	-	HW Interlock2	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)



Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x2001	-	RECORD	UDP Communication Setting	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 6
-	0x01	-	Communication	UINT8	R	No	<Initial Value> Disable (0) <Remarks> Disable (0) Enable (1)
-	0x02	-	Communication Mode	UINT8	R	No	<Initial Value> On Request Mode (0) <Remarks> On Request Mode (0) Target Mode (1)
-	0x03	-	Data Type	UINT8	R	No	<Initial Value> Status Only (0) <Remarks> Status Only (0) Status and Distance (1) Status, Distance, and Intensity (2) Status and Full Step Distance (3)
-	0x04	-	Data Interval				<Initial Value> 0x00 (0) <Remarks> Range 0 ~ 0xFF (0 to 255) cycles*
-	0x05	-	Port Number	UINT16	R	No	<Initial Value> 0x000 <Remarks> Range 0 ~ 0xFFFF (0 ~ 65535)
-	0x06	-	IP Address	STRING[12]	R	No	<Initial Value> 000000000000 <Remarks> Range 0 ~ 255255255255

*One cycle is 30ms (approx.).

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x2002	-	RECORD	Project Information Setting	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 3
-	0x01	-	Configuration Name	STRING[128]	R	No	<Initial Value> None <Remarks> Configuration name given during device setting.
-	0x02	-	Configuration Date	STRING[128]	R	No	<Initial Value> None <Remarks> Date of device configuration.
-	0x03	-	Configured By	STRING[128]	R	No	<Initial Value> None <Remarks> Person who configured the device.



Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0x2003	-	RECORD	Configuration ID	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 3
-	0x01	-	Configuration ID1	UINT32	R	No	<Initial Value> 0x00000000 <Remarks> Configuration ID with date
-	0x02	-	Configuration ID2	UINT32	R	No	<Initial Value> 0x00000000 <Remarks> Configuration ID without date

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0xF000	-	RECORD	Modular Device Profile	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 2
-	0x01	-	Index Distance	UINT16	R	No	<Initial Value> 0x16 <Remarks> Index distance between two modules
-	0x02	-	Maximum Number of Modules	UINT16	R	No	<Initial Value> 0x1 <Remarks> Maximum number of modules

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0xF050	-	RECORD	Detected Modules	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 1
-	0x01	-	Safety Module Ident	UINT32	R	No	<Initial Value> 0x000000C3 (195) <Remarks> Module ID of the active module

Index	Sub Index	Obj Type	Name	Data Type	Access	PDO	Description
0xF980	-	RECORD	Detected Modules	-	-	-	-
-	0x00	-	Entry count	UINT8	R	No	<Initial Value> 2
-	0x01	-	FSOE Address	UINT16	R	No	<Initial Value> 0x0000 (0) <Remarks> FSOE ID of the device
-	0x02	-	Serial Number	UINT16	R	No	<Initial Value> 0x0000 (0) <Remarks> Not used

4. FSOE Specification

Name	Value
Cyclic Time	More than 0.500ms in run mode
Cyclic Communication	60ms + FSOE cycle time*
Watchdog Time	60ms to 10s

* Depends on controller system.



5. UDP Communication

UAM supports the UDP communication. Device will output the status and measurement data based on the setting on UAM Project Designer. Refer to UAM Communication Protocol Specification for the types of data that can be obtained from UAM.

No	Pin assignment
1	+24V DC
2	0V DC
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC

5.1 On Request Mode

If “On Request Mode” is selected, UAM will output the specified data after every specified cycle. However, it is necessary to send the respective commands to start and end the data transmission. Refer to UAM Communication Protocol Specification for the commands.

5.2 Target Mode

If “Target Mode” is selected, UAM will output the specified data to the specified IP address after every specified cycle. It is not necessary to send start or end commands for data transmission.





HOKUYO AUTOMATIC CO.,LTD.

Higobashi Union Building, 1-9-6 Edobori, Nishi-ku, Osaka,
550-0002 Japan

TEL: +81-6-6441-2212 FAX: +81-6-6441-2203

URL: <http://www.hokuyo-aut.jp>

Email: overseas-sales@hokuyo-aut.co.jp



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