
LinMot[®]

EtherCAT[®]

Documentation of the EtherCAT Interface of the following
Drives:

- E1250-EC-UC
- E1450-EC-QN



EtherCAT Interface

User Manual

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Document version 4.3.3 / Whp, December 2013

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1 System overview

EtherCAT is the open real-time Ethernet network originally developed by Beckhoff. The LinMot act as Slave in this network and is implemented with the standard ASIC ET1100 from Beckhoff.

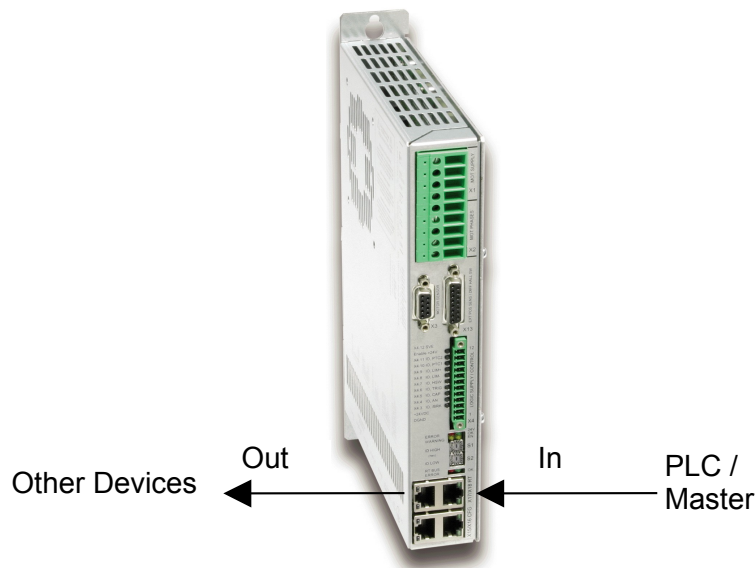
For further information on the EtherCAT fieldbus please visit:
<http://www.ethercat.org/>

1.1 References

All user manuals are distributed with the LinMot-Talk software the newest version can be downloaded from the LinMot homepage in the download section.

Ref	Title	Source
1	User Manual Motion Control SW	www.linmot.com
2	LinMot Drive Configuration over Fieldbus Interfaces SG5	www.linmot.com

1.2 Connecting In and Out



In the EtherCAT the cabling is directed, so In and Out is different! The right realtime RJ45 (X17) connector is the input and the left realtime RJ45 (X18) connector is the output.

2 Setup in the PLC

In the following steps the integration of a LinMot EtherCAT drive in the PLC is described. In the example a Beckhoff master PLC is used.

2.1 Copy Device Description File

The LinMot drive is described with *.xml device description file distributed with the LinMot-Talk software.

Copy this file to PLC so it can access it.

Example Source path of EtherCAT Device description file:

C:\Programme\LinMot\LinTalk1100 3.11 Build 20091204\Firmware\Interfaces\EtherCATXML\LinMot_ECAT_Servos_V1_4.xml

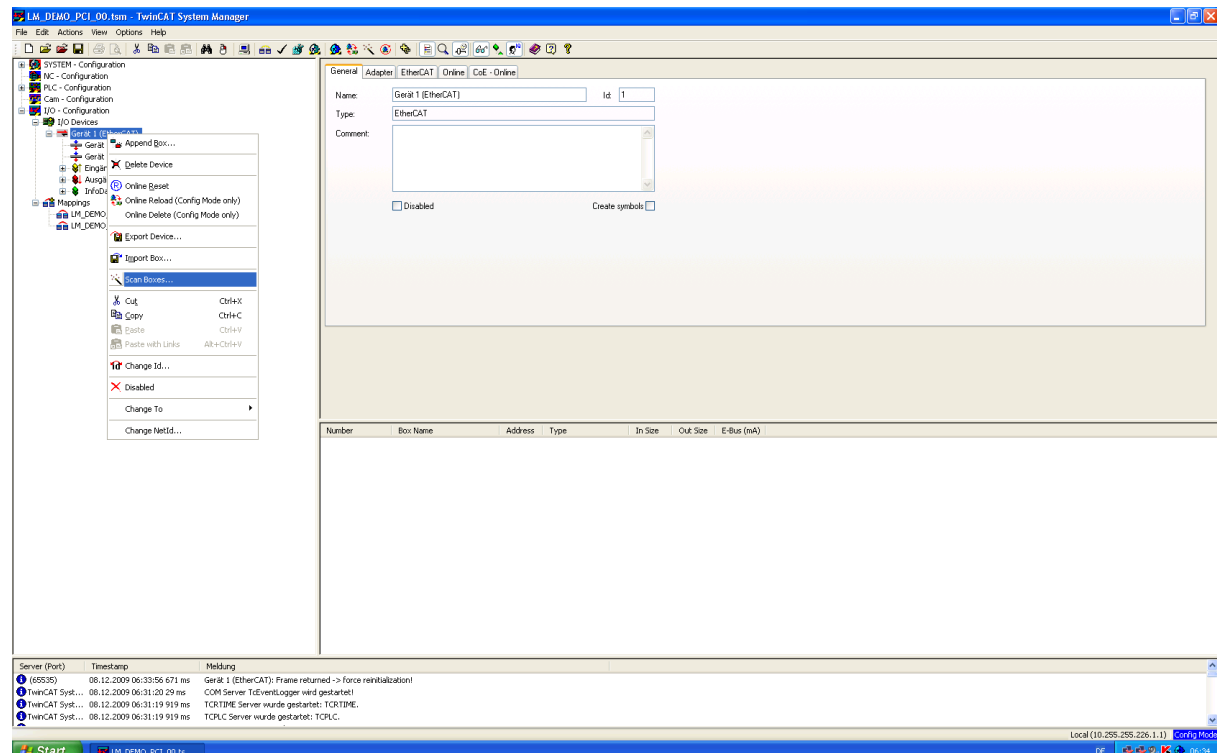
Example Destination path of EtherCAT Device description file:

C:\TwinCAT\Io\EtherCAT\LinMot_ECAT_Servos_V1_4.xml

If this is done the PLC should recognize all LinMot drive on the EtherCAT fieldbus automatically.

2.2 Scan the EtherCAT slave devices

Connect the EtherCAT LinMot drive to the EtherCAT-Master and power on the signal supply. Then scan for the connected devices in the System Manager:



Scan for EtherCAT slave devices

After this scan all recognized devices are imported to the project:

The screenshot shows the TwinCAT System Manager interface. The left sidebar displays a project tree with 'Gerät 1 (EtherCAT)' expanded to show 'Box 5 (E1250-EC-UC)'. The main window shows the configuration for this device, including fields for Name, Type, and Comment. Below the configuration area is a table of variables:

Name	Online	Type	Size	>Addr...	In/Out	User...	Linked to
StatusVer	0x0000 (0)	UINT	2.0	53.0	Input	0	
StatusWord	0x0000 (0)	UINT	2.0	55.0	Input	0	
WarmWord	0x0000 (0)	UINT	2.0	57.0	Input	0	
DemandPosition	0x00000000 (0)	DINT	4.0	59.0	Input	0	
ActualPosition	0x00000000 (0)	DINT	4.0	63.0	Input	0	
DemandCurrent	0x00000000 (0)	DINT	4.0	67.0	Input	0	
WcState	1	BOOL	0.1	1522.2	Input	0	
State	0x0002 (2)	UINT	2.0	1556.0	Input	0	
AdcAddr	0A FF FF E2 02 01 ...	ANSADDRESS	8.0	1558.0	Input	0	
AoxletId	0A FF FF E2 02 06	ARRAY [0...]	6.0	1566.0	Input	0	
ControlWord	0x0000 (0)	UINT	2.0	53.0	Output	0	
Motion Command Header	0x0000 (0)	UINT	2.0	55.0	Output	0	
Motion Command Par 1	0x00000000 (0)	DINT	4.0	57.0	Output	0	
Motion Command Par 2	0x00000000 (0)	DINT	4.0	61.0	Output	0	
Motion Command Par 3	0x00000000 (0)	DINT	4.0	65.0	Output	0	
Motion Command Par 4	0x00000000 (0)	DINT	4.0	69.0	Output	0	
Motion Command Par 5	0x00000000 (0)	DINT	4.0	73.0	Output	0	

The bottom status bar shows a log of messages, including 'Gerät 1 (EtherCAT): Frame returned -> force reinitialization!' and 'COM Server TcEventManager wird gestartet!'.

In this example the scan found an EK1100 and the LinMot drive E1250-EC-UC and are imported to the project.

3 Process Data Object (PDO) Configuration

The cyclic process data is configured in the master and transmitted to the slave during startup. The default mapping is documented in the tables below. The inputs and outputs correspond to the PLC point of view. For a detailed description of the exchanged data and its meaning refer to [1].

For a detailed description of the PDO data refer to [1] or have a look at the TwinCAT demo program, which is included with the LinMot-Talk software.

3.1 Input PDO Modules

3.1.1. Default Inputs

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B00	18	-	Variables	RECORD
0x1B62:00	2	0	StateVar	Uint16
0x1D51:00	2	2	StatusWord	Uint16
0x1D8E:00	2	4	WarnWord	Uint16
0x1B8A:00	4	6	DemandPosition	Int32
0x1B8D:00	4	10	ActualPosition	Int32
0x1B93:00	4	14	DemandCurrent	Int32

Default input PDO mapping of 18 Bytes the index is the UPID value of the variable

3.1.2. Configuration Module Input

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B08	8	-	Variables	RECORD
0x1B09:00	2	0	Config Status Word	Uint16
0x1B0A:00	2	2	Config Index/..	Uint16
0x1B0B:00	4	4	Config Value	Word32

This module is the feedback data module of the module 1708 "Configuration Module Output".

3.1.3. Input Demvel

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B10	4	-	Variables	RECORD
0x1B8B:00	4	0	DemandVelocity	Int32

3.1.4. Input ActVel

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B11	4	-	Variables	RECORD
0x1B8E:00	4	0	ActualVelocity	Int32

3.1.5. Input ActVelFilt

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B12	4	-	Variables	RECORD
0x1BAF:00	4	0	ActualVelocityFilt	Int32

3.1.6. Input CAM Counts

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B18	4	-	Variables	RECORD
0x1C50:00	4	0	CAM Counts	Int32

3.1.7. MC-Link A1 Inputs

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1B00	18	-	Variables	RECORD
0x1B62:00	2	0	StateVar	Uint16
0x1D51:00	2	2	StatusWord	Uint16
0x1D8E:00	2	4	WarnWord	Uint16
0x1B8A:00	4	6	DemandPosition	Int32
0x1B8D:00	4	10	ActualPosition	Int32
0x1B93:00	4	14	DemandCurrent	Int32
0x1B09:00	2	18	Config Status Word	Uint16
0x1B0A:00	2	20	Config Index/..	Uint16
0x1B0B:00	4	22	Config Value	Word32

MC-Link A1 PDO mapping of 26 Bytes the index is the UPID value of the variable. With this module a B1150-ML-XX connected on X11 can be monitored.

3.2 Output PDO Modules

3.2.1. Default Outputs

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1700	24	-	Variables	RECORD
0x1D52:00	2	0	ControlWord	Uint16
0x1DB0:00	2	2	MotionCommandHeader	Uint16
0x1E40:00	4	4	MotionCommand Par 1	Word32
0x1E41:00	4	8	MotionCommand Par 2	Word32
0x1E42:00	4	12	MotionCommand Par 3	Word32
0x1E43:00	4	16	MotionCommand Par 4	Word32
0x1E44:00	4	20	MotionCommand Par 5	Word32

Default output PDO mapping of 24 Bytes the index is the UPID value of the variable

The default PDO output data contains the control word and the generic motion command interface over which all types of motion commands can be accessed.

3.2.2. Configuration Module Output

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1708	8	-	Variables	RECORD
0x1709:00	2	0	Config Control Word	Uint16
0x170A:00	2	2	Config Index/..	Uint16
0x170B:00	4	4	Config Value	Word32

With this module the LinMot drive can be completely configured. So it gives access over parameters curves command table entries and the error log. The detail functionality is

described in the document [2] "Configuration over fieldbus SG5". As response module "Configuration Module Input" (0x1B08) has to be configured.

3.2.3. CAM Start Enable

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1718	2	-	Variables	RECORD
0x1528:00	2	0	CAM Start Enable	Uint16

Bit 0 of the 16 bit data field is mapped to CAM Start Enable Flag (UPID 1528). Write 0 to all other bits.

3.2.4. MC-Link A1 Outputs

Index	Size [Byte]	Byte Offset	Name	Data Type
0x1740	24	-	Variables	RECORD
0x1D52:00	2	0	ControlWord	Uint16
0x1DB0:00	2	2	MotionCommandHeader	Uint16
0x1E40:00	4	4	MotionCommand Par 1	Word32
0x1E41:00	4	8	MotionCommand Par 2	Word32
0x1E42:00	4	12	MotionCommand Par 3	Word32
0x1E43:00	4	16	MotionCommand Par 4	Word32
0x1E44:00	4	20	MotionCommand Par 5	Word32
0x1709:00	2	24	Config Control Word	Uint16
0x170A:00	2	26	Config Index/..	Uint16
0x170B:00	4	28	Config Value	Word32

MC-Link Outputs PDO mapping of 32 bytes the index is the UPID value of the variable. With this module a B1150-ML-XX connected on X11 can be controlled.

3.3 User defined Input PDO Modules

Within the Beckhoff System Manager you can also define your individual IO process data. In the following example the "Digital Input Word" UPID: 1C85h is mapped.

Name	Value	RawData	UPID	Type	Scale	Offset	Attr
State Machine Main State	2	02h	1B5Eh	UInt8	1	0	R
State Machine Sub State	0	00h	1B5Fh	UInt8	1	0	R
State	Ready To Switch On	02h	1B60h (...)	UInt8 Enumerator			R
State Var	0200h	0200h	1B62h	UInt16	1	0	R
Demand Position	0 mm	00000000h	1B84h	Sint32	0.0001 mm	0 mm	R
Demand Velocity	0 m/s	00000000h	1B8Bh	Sint32	1E-6 m/s	0 m/s	R
Demand Acceleration	0 m/s ²	00000000h	1B9Ch	Sint32	1E-5 m/s ²	0 m/s ²	R
Actual Position	0.0421 mm	00001A5h	1B8Dh	Sint32	0.0001 mm	0 mm	R
Actual Velocity	0 m/s	00000000h	1B8Eh	Sint32	1E-6 m/s	0 m/s	R
Actual Velocity Filtered	0 m/s	00000000h	1B8Fh	Sint32	1E-6 m/s	0 m/s	R
Difference Position	-0.0421 mm	FFFFFF5Bh	1B90h	Sint32	0.0001 mm	0 mm	R
Difference Velocity	0 m/s	00000000h	1B91h	Sint32	1E-6 m/s	0 m/s	R
Demand Current Pos Cnt	-7.5 A	FFFFFF284h	1B92h	Sint32	0.001 A	0 A	R
Demand Current	0 A	00000000h	1B93h	Sint32	0.001 A	0 A	R
Demand Position 16 Bit	0	0000h	1B94h	Sint16	1	0	R
Actual Position 16 Bit	0	0000h	1B95h	Sint16	1	0	R
IO State Word	0200h	0200h	1C84h	UInt16	1	0	R
IO State Bit 0 (x4.3)	FALSE	0h	1C8Eh	Bool			R
IO State Bit 1 (x4.4)	FALSE	0h	1C8Fh	Bool			R
IO State Bit 2 (x4.5)	FALSE	0h	1C90h	Bool			R
IO State Bit 3 (x4.6)	FALSE	0h	1C91h	Bool			R
IO State Bit 4 (x4.7)	FALSE	0h	1C92h	Bool			R
IO State Bit 5 (x4.8)	FALSE	0h	1C93h	Bool			R
IO State Bit 6 (x4.9)	FALSE	0h	1C94h	Bool			R
IO State Bit 7 (x4.10)	FALSE	0h	1C95h	Bool			R
IO State Bit 8 (x4.11)	FALSE	0h	1C96h	Bool			R
IO State Bit 9 (x4.12)	TRUE	1h	1C97h	Bool			R
x4 Infi Outputs	0000h	0000h	1C98h	UInt16	1	0	R/W
Digital Inputs Word	0200h	0200h	1C99h	UInt16	1	0	R
Digital Input Force Mask	0000h	0000h	1CC0h	UInt16	1	0	R/W
Digital Input Force Value	0000h	0000h	1CC1h	UInt16	1	0	R/W
x4 Output Mask	01FFh	01FFh	1C88h	UInt16	1	0	R
Digital Output Force Mask	0000h	0000h	1CC2h	UInt16	1	0	R/W
Digital Output Force Value	0000h	0000h	1CC3h	UInt16	1	0	R/W
x4.4 Analog Voltage	0.0108108108 V	0004h	1CA4h	UInt16	0.0027027027 V	0 V	R
MC SW PVT Stream	0 V	00000000h	1CA7h	FloatIEEE754	0.0027027027 V	0 V	R
Diff Analog Voltage	-0.02148227712 V	FFFFCh	1CA6h	Sint16	0.00537056328 V	0 V	R
Diff Analog Voltage Filtered	0 V	00000000h	1CA8h	FloatIEEE754	0.00537056328 V	0 V	R

The screenshot shows the 'Process Data' tab in the TwinCAT System Manager. It displays the 'PDO List' and 'PDO Assignment' sections.

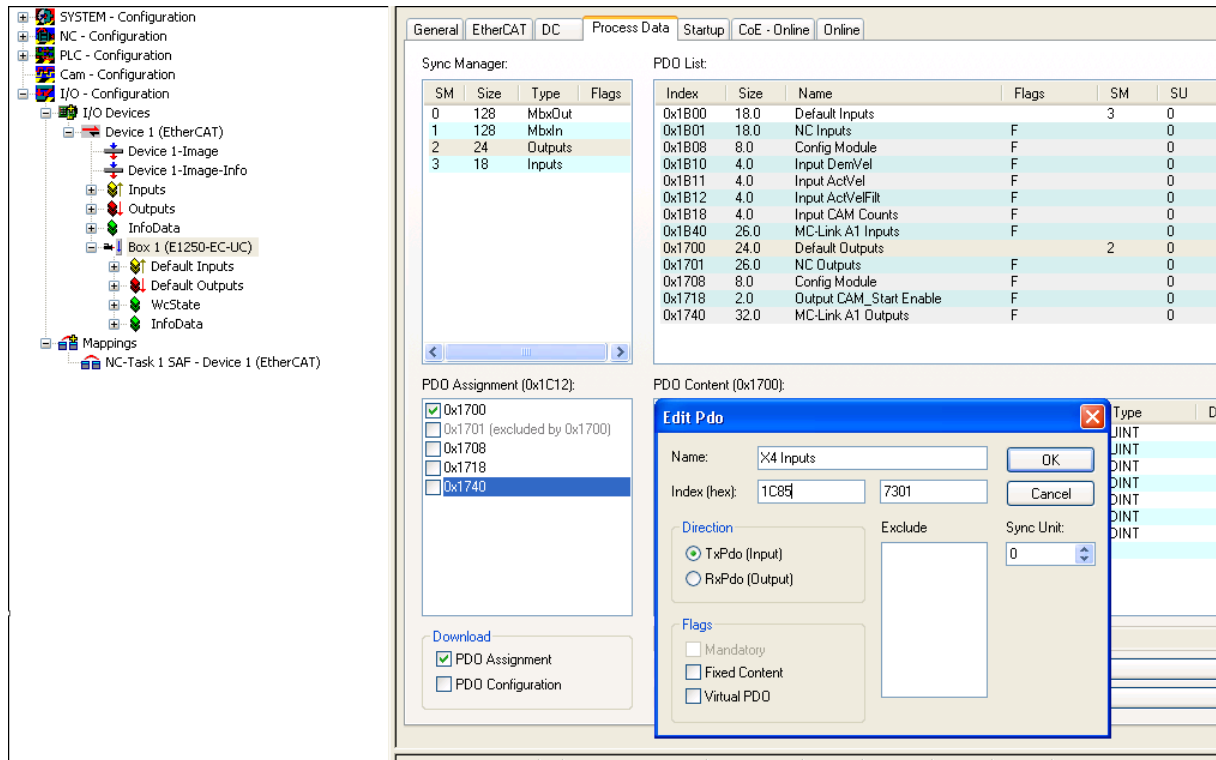
SM	Size	Type	Flags
0	128	MbxOut	
1	128	MbxIn	
2	24	Outputs	
3	18	Inputs	

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs		0	0
0x1708	8.0	Config Module		0	0
0x1718	2.0	Output CAM_Start Enable		0	0
0x1740	32.0	MC-Link A1 Outputs		0	0

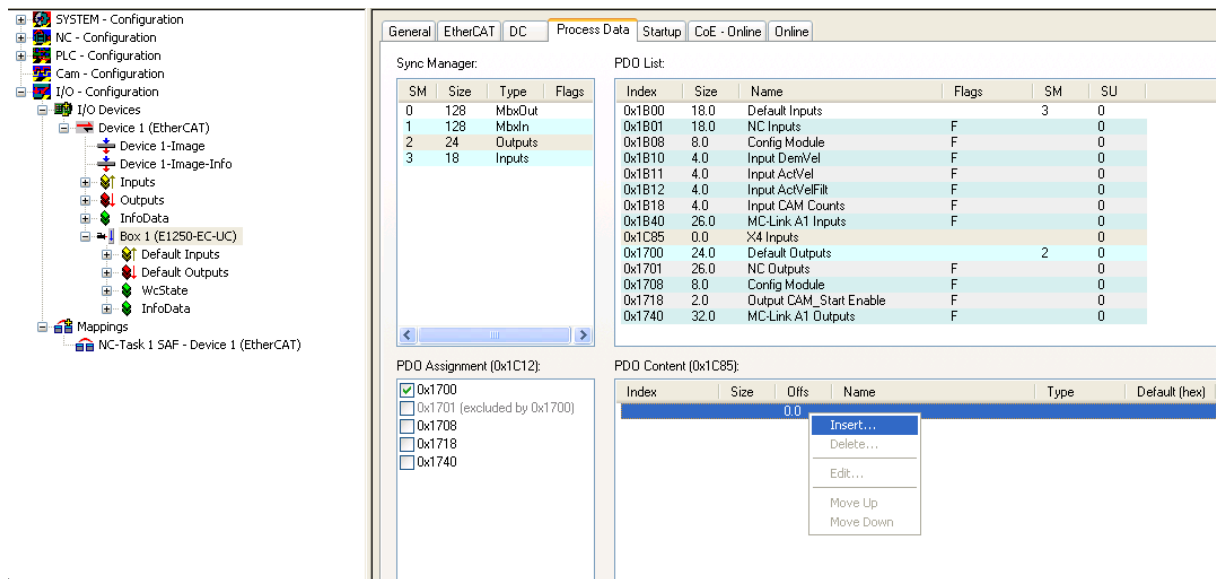
<input checked="" type="checkbox"/>	0x1700	
<input type="checkbox"/>	0x1701 (excluded by 0x1700)	
<input type="checkbox"/>	0x1708	
<input type="checkbox"/>	0x1718	
<input type="checkbox"/>	0x1740	

Index	Size	Offs	Name	Type	Default (hex)
0x1D52:00	2.0	0.0	Control Word	UINT	
0x1DB0:00	2.0	2.0	Motion Command Header	UINT	
0x1E40:00	4.0	4.0	Motion Command Par 1	DINT	
0x1E41:00	4.0	8.0	Motion Command Par 2	DINT	
0x1E42:00	4.0	12.0	Motion Command Par 3	DINT	
0x1E43:00	4.0	16.0	Motion Command Par 4	DINT	
0x1E44:00	4.0	20.0	Motion Command Par 5	DINT	
		24.0			

First define a new process data group by inserting into the PDO list.



Then give a name and choose the correct UPID as index of the data you want to map. Then push the OK button.



Then select the new defined process data and define the data format by inserting PDO content.

SYSTEM - Configuration

- NC - Configuration
- PLC - Configuration
- Cam - Configuration
- I/O - Configuration
 - I/O Devices
 - Device 1 (EtherCAT)
 - Device 1-Image
 - Device 1-Image-Info
 - Inputs
 - Outputs
 - InfoData
 - Box 1 (E1250-EC-UC)
 - Default Inputs
 - Default Outputs
 - WcState
 - InfoData
 - Mappings
 - NC-Task 1 SAF - Device 1 (EtherCAT)

General EtherCAT DC Process Data Startup CoE - Online Online

Sync Manager:

SM	Size	Type	Flags
0	128	MbxOut	
1	128	MbxIn	
2	24	Outputs	
3	18	Inputs	

PDD List:

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1C85	0.0	X4 Inputs		0	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs	F	0	0
0x1708	8.0	Config Module	F	0	0
0x1718	2.0	Output CAM_Start Enable	F	0	0
0x1740	32.0	MC-Link A1 Outputs	F	0	0

PDD Assignment (0x1C12):

- 0x1700
- 0x1701 (excluded by 0x1700)
- 0x1708
- 0x1718
- 0x1740

PDD Content (0x1C85):

Index	Size	Offs	Name	Type	Default (hex)
					0.0

Edit Pdo Entry

Name: X4 Inputs

Index (hex): 1C85 7301

Sub Index: 0

Data Type: UINT

Bit Length: 16

From Dictionary:

Download

- PDD Assignment
- PDD Configuration

Name Online Type Size

StateVar 0x0200 (512) UINT 2.0

Here you can again define a name and index (choose the UPID again) and choose the correct data format UINT16 in this case. Then push the OK button again. At the moment only 2 bytes and 4 bytes data size is supported!

SYSTEM - Configuration

- NC - Configuration
- PLC - Configuration
- Cam - Configuration
- I/O - Configuration
 - I/O Devices
 - Device 1 (EtherCAT)
 - Device 1-Image
 - Device 1-Image-Info
 - Inputs
 - Outputs
 - InfoData
 - Box 1 (E1250-EC-UC)
 - Default Inputs
 - X4 Inputs
 - Default Outputs
 - WcState
 - InfoData
 - Mappings
 - NC-Task 1 SAF - Device 1 (EtherCAT)

General EtherCAT DC Process Data Startup CoE - Online Online

Sync Manager:

SM	Size	Type	Flags
0	128	MbxOut	
1	128	MbxIn	
2	24	Outputs	
3	20	Inputs	

PDD List:

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1C85	2.0	X4 Inputs		3	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs	F	0	0
0x1708	8.0	Config Module	F	0	0
0x1718	2.0	Output CAM_Start Enable	F	0	0
0x1740	32.0	MC-Link A1 Outputs	F	0	0

PDD Assignment (0x1C13):

- 0x1B00
- 0x1B01 (excluded by 0x1B00)
- 0x1B08
- 0x1B10
- 0x1B11
- 0x1B12
- 0x1B18
- 0x1B40
- 0x1C85

PDD Content (0x1C85):

Index	Size	Offs	Name	Type	D
0x1C85:00	2.0	0.0	X4 Inputs	UINT	
					2.0

Now you can choose the new generated PDO Data.

3.4 User defined Output PDO Modules

Within the Beckhoff system manager you can also define your individual IO process data. In the following example the "X4 Intf Outputs" UPID: 1C89h is mapped. To write the outputs over the communication the IO also has to be defined as Interface Outputs!

Name	Value	RawData	UPID	Type	Scale	Offset	Attr
State Machine Main State	2	02h	1B5Eh	UInt8	1	0	R
State Machine Sub State	0	00h	1B5Fh	UInt8	1	0	R
State	Ready To Switch On	02h	1B60h [...]	UInt8 Enumerator			R
State Var	0200h	0200h	1B62h	UInt16	1	0	R
Demand Position	0 mm	00000000h	1B84h	SInt32	0.0001 mm	0 mm	R
Demand Velocity	0 m/s	00000000h	1B88h	SInt32	1E-6 m/s	0 m/s	R
Demand Acceleration	0 m/s ²	00000000h	1B8Ch	SInt32	1E-5 m/s ²	0 m/s ²	R
Actual Position	0.0421 mm	00001A5h	1B90h	SInt32	0.0001 mm	0 mm	R
Actual Velocity	0 m/s	00000000h	1B94h	SInt32	1E-6 m/s	0 m/s	R
Actual Velocity Filtered	0 m/s	00000000h	1B98h	SInt32	1E-6 m/s	0 m/s	R
Difference Position	-0.0421 mm	FFFFFE5Bh	1B9Ch	SInt32	0.0001 mm	0 mm	R
Difference Velocity	0 m/s	00000000h	1B98h	SInt32	1E-6 m/s	0 m/s	R
Demand Current Pos Ctl	-7.5 A	FFFFE284h	1B92h	SInt32	0.001 A	0 A	R
Demand Current	0 A	00000000h	1B94h	SInt32	0.001 A	0 A	R
Demand Position 16 Bit	0	0000h	1B96h	SInt16	1	0	R
Actual Position 16 Bit	0	0000h	1B98h	SInt16	1	0	R
IO State Word	0200h	0200h	1C84h	UInt16	1	0	R
IO State Bit 0 (X4.3)	FALSE	0h	1C8Eh	Bool			R
IO State Bit 1 (X4.4)	FALSE	0h	1C8Fh	Bool			R
IO State Bit 2 (X4.5)	FALSE	0h	1C90h	Bool			R
IO State Bit 3 (X4.6)	FALSE	0h	1C91h	Bool			R
IO State Bit 4 (X4.7)	FALSE	0h	1C92h	Bool			R
IO State Bit 5 (X4.8)	FALSE	0h	1C93h	Bool			R
IO State Bit 6 (X4.9)	FALSE	0h	1C94h	Bool			R
IO State Bit 7 (X4.10)	FALSE	0h	1C95h	Bool			R
IO State Bit 8 (X4.11)	FALSE	0h	1C96h	Bool			R
IO State Bit 9 (X4.12)	TRUE	1h	1C97h	Bool			R
X4 Intf Outputs	0000h	0000h	1C89h	UInt16	1	0	RW
Digital Inputs Word	0200h	0200h	1C85h	UInt16	1	0	R
Digital Input Force Mask	0000h	0000h	1CC0h	UInt16	1	0	RW
Digital Input Force Value	0000h	0000h	1CC1h	UInt16	1	0	RW
X4 Output Mask	01FFh	01FFh	1C86h	UInt16	1	0	R
Digital Output Force Mask	0000h	0000h	1CC2h	UInt16	1	0	RW
Digital Output Force Value	0000h	0000h	1CC3h	UInt16	1	0	RW
X4.4 Analog Voltage	0.0108108108 V	0004h	1CA4h	UInt16	0.0027027027 V	0 V	R
X4.4 Analog Voltage Filtered	0 V	00000000h	1CA7h	FloatIEEE754	0.0027027027 V	0 V	R
Diff Analog Voltage	-0.02148227712 V	FFFCCh	1CA6h	SInt16	0.00537056928 V	0 V	R
Diff Analog Voltage Filtered	0 V	00000000h	1CA8h	FloatIEEE754	0.00537056928 V	0 V	R

The screenshot shows the 'Process Data' configuration window in TwinCAT System Manager. The 'PDD List' table is expanded to show a new entry being added.

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1C85	2.0	X4 Inputs		3	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs	F	0	0
0x1708	8.0	Config Module	F	0	0
0x1718	2.0	Output CAM_Start Enable	F	0	0
0x1740	32.0	MC-Link A1 Outputs	F	0	0

The 'PDD Assignment (0x1C13)' list shows the following entries:

- 0x1B00
- 0x1B01 (excluded by 0x1B00)
- 0x1B08
- 0x1B10
- 0x1B11
- 0x1B12
- 0x1B18
- 0x1B40
- 0x1C85

The 'PDD Content (0x1740)' table shows the following entries:

Index	Size	Offs	Ns	Type	D
0x1D52:00	2.0	0.0	Co	Move Up	UINT
0x1D80:00	2.0	2.0	Mo	Move Down	UINT
0x1E40:00	4.0	4.0		Motion Command Par 1	DINT
0x1E41:00	4.0	8.0		Motion Command Par 2	DINT
0x1E42:00	4.0	12.0		Motion Command Par 3	DINT
0x1E43:00	4.0	16.0		Motion Command Par 4	DINT
0x1E44:00	4.0	20.0		Motion Command Par 5	DINT
0x1709:00	2.0	24.0		Config Control Word	UINT
0x170A:00	2.0	26.0		Config Index Out	UINT
0x170B:00	4.0	28.0		Config Value Out	DINT
		32.0			

First define a new process data group by inserting into the PDD List.

The screenshot shows the EtherCAT configuration interface. On the left is a tree view of the system configuration. The main window is divided into several panes:

- Sync Manager:** A table with columns SM, Size, Type, and Flags. It lists three entries: SM 0 (128 MbxOut), SM 1 (128 MbxIn), and SM 2 (24 Outputs).
- PDD List:** A table with columns Index, Size, Name, Flags, SM, and SU. It lists various process data objects like Default Inputs, NC Inputs, Config Module, Input DemVel, Input ActVel, Input ActVelFilt, Input CAM Counts, MC-Link A1 Inputs, X4 Inputs, Default Outputs, NC Outputs, Config Module, Output CAM_Start Enable, and MC-Link A1 Outputs.
- PDD Assignment (0x1C13):** A list of checkboxes for PDDs. 0x1B00 is checked, 0x1B01 is excluded, and 0x1C85 is checked.
- PDD Content (0x1740):** A table with columns Index, Size, Offs, Name, Type, and Default (hex). It lists various control words and motion command parameters.
- Edit Pdo Dialog:** A small window titled "Edit Pdo" with fields for Name ("X4 Inff Outputs"), Index (hex) ("1C89"), and Sync Unit ("0"). It has radio buttons for TxPdo (Input) and RxPdo (Output), and checkboxes for Mandatory, Fixed Content, and Virtual PDD.

Then give a name and choose the correct UPID as index of the data you want to map. Then push the OK button.

This screenshot shows the same EtherCAT configuration interface as above, but with the "PDD Content" table selected. A context menu is open over the first row (Index 0.0), showing options: Insert..., Delete..., Edit..., Move Up, and Move Down.

The **PDD List** table now includes an entry for Index 0x1C89 (0.0) with Name "X4 Inff Outputs".

The **PDD Content (0x1C89)** table has one row with Index 0.0, Size 0.0, and Name 0.0.

Then select the new defined process data and define the data format by inserting PDD content.

The screenshot shows the 'Process Data' tab in the EtherCAT configuration software. The 'PDD List' table is as follows:

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1C85	2.0	X4 Inputs		3	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs	F	0	0
0x1708	8.0	Config Module	F	0	0
0x1718	2.0	Output CAM_Start Enable	F	0	0
0x1740	32.0	MC-Link A1 Outputs	F	0	0
0x1C89	0.0	X4 Intf Outputs			0

The 'Edit Pdo Entry' dialog box is open, showing the following fields:

- Name: X4 Intf Outputs
- Index (hex): 1C89 (7305)
- Sub Index: 0
- Data Type: UINT
- Bit Length: 16

Here you can again define a name and index (choose the UPID again) and choose the correct data format UINT16 in this case. Then push the OK button again. At the moment only 2 bytes and 4 bytes data size is supported!

The screenshot shows the 'I/O - Configuration' tree on the left, with 'Box 1 (E1250-EC-UC)' expanded to show 'X4 Intf Outputs'. The 'PDD List' table is updated as follows:

Index	Size	Name	Flags	SM	SU
0x1B00	18.0	Default Inputs		3	0
0x1B01	18.0	NC Inputs	F	0	0
0x1B08	8.0	Config Module	F	0	0
0x1B10	4.0	Input DemVel	F	0	0
0x1B11	4.0	Input ActVel	F	0	0
0x1B12	4.0	Input ActVelFilt	F	0	0
0x1B18	4.0	Input CAM Counts	F	0	0
0x1B40	26.0	MC-Link A1 Inputs	F	0	0
0x1C85	2.0	X4 Inputs		3	0
0x1700	24.0	Default Outputs		2	0
0x1701	26.0	NC Outputs	F	0	0
0x1708	8.0	Config Module	F	0	0
0x1718	2.0	Output CAM_Start Enable	F	0	0
0x1740	32.0	MC-Link A1 Outputs	F	0	0
0x1C89	2.0	X4 Intf Outputs			0

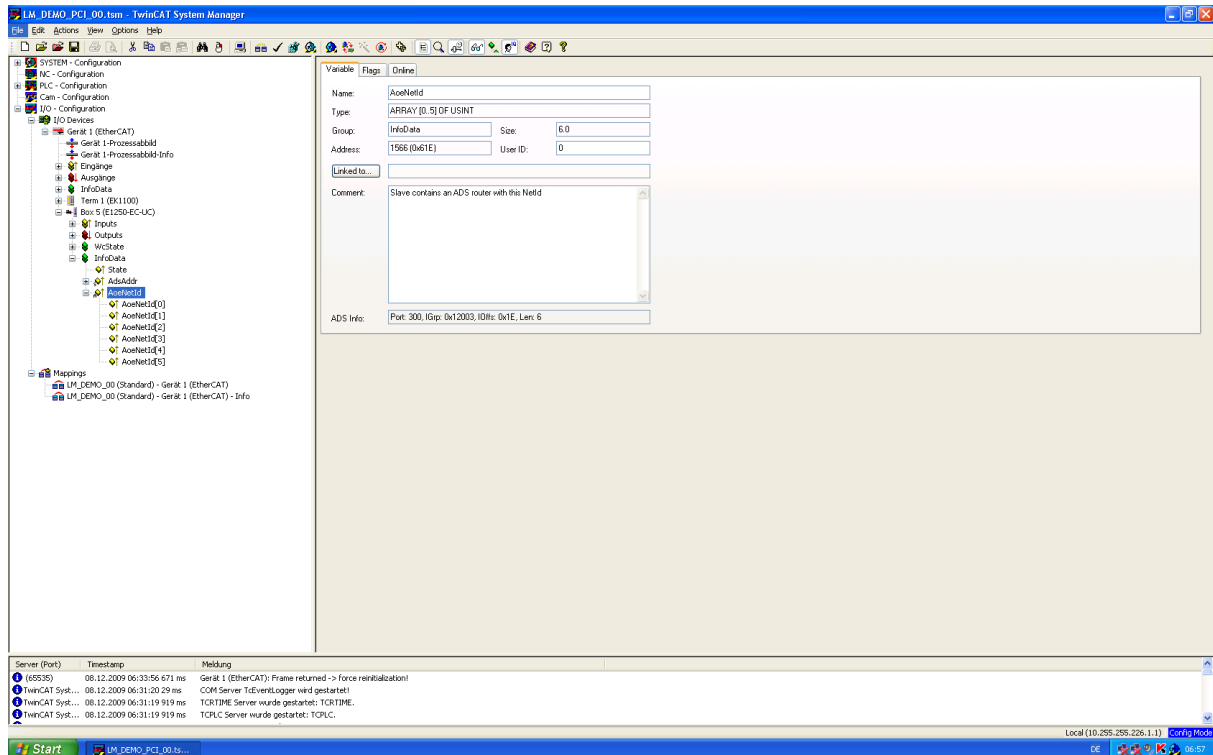
The 'PDD Content (0x1C89)' table is also updated:

Index	Size	Offs	Name	Type	D
0x1C89:00	2.0	0.0	X4 Intf Outputs	UINT	
		2.0			

Now you can choose the new generated PDO Data.

4 Asynchronous Configuration Protocol AoE

For configuration purpose (Parameter, Curves, Command Table and Program Handling) the Beckhoff ADS-Protocol is used. Within EtherCAT this protocol is integrated as AoE (ADS over EtherCAT). For this reason the AoENetId has to be used for ADS over EtherCAT.



AoENetId with Beckhoff

4.1 ADS Services Overview

For the LinMot drives in the ADS index group, the service is coded. In the index offset normally the UPID for parameters or curve ID for curves is coded.

ADS Service	Index Group	Index Offset	Description
Read	0040h	UPID	Parameter UPID read RAM value
Write	0041h	UPID	Parameter UPID write RAM value
Read	0042h	UPID	Parameter UPID read ROM value
Write	0043h	UPID	Parameter UPID write ROM value
Read	0044h	UPID	Parameter Start read UPID list
Read	0045h	-	Parameter Get next UPID list item
Read	0046h	UPID	Parameter Start read modified UPID list
Read	0047h	-	Parameter Get next modified UPID list item
Write	0048h	Inst	Parameter Default SW instance
Write	0050h	-	Curves delete all in RAM
Write	0051h	ID	Curves delete single curve in RAM
Read	0052h	ID	Curves read info and data size
Read	0053h	ID	Curves read info block data
Read	0054h	ID	Curves read setpoint data
Write	0055h	ID	Curves start write curve in RAM
Write	0056h	ID	Curves write curve info block data in RAM
Write	0057h	ID	Curves write curve set point data in RAM
Write	0058h	ID	Curves start modify curve in RAM
Write	0059h	ID	Curves modify curve info block data in RAM
Write	005Ah	ID	Curves modify curve set point data in RAM
Read	005Eh	ID Off	Curves read presence list
Write	005Fh	-	Curves start write curves from RAM to FLASH
Write	0060h	-	Command Table delete all entries in RAM
Write	0061h	ID	Command Table delete single entry in RAM
Read	0062h	ID	Command Table read data size
Read	0063h	ID	Command Table read data
Write	0065h	ID	Command Table start write entry in RAM
Write	0066h	ID	Command Table write entry data in RAM
Read	006Eh	ID Off	Command Table read presence list
Write	006Fh	-	Command Table start write entries from RAM to FLASH
Write	0070h	-	Reset device
Write	0071h	Inst	Stop SW instances
Write	0072h	Inst	Start SW instances

For a general description and an overview of the concepts used in fieldbus configuration, please refer to the document *“LinMot 1100 Drive Configuration over Fieldbus Interfaces”*.

4.2 ADS Parameter Services

The LinMot drive supports a unique parameter access for all parameter data types (bit, byte, uint16, ..). The parameter data can always be mapped into a 4 bytes data field. The parameter itself is specified by its UPID (unique parameter ID).

4.2.1. Parameter UPID read RAM value

Read the RAM value of the parameter specified by its UPID.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0040h (LinMot Service ID)
Input	IDXOFFS	UDINT	UPID
Input	LEN	UDINT	always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

Example:

VARIABLES:

```

FbAdsRead:    ADSREAD;          (* instance of ADSREAD function block *)
NetID:       T_AmsNetId;       (* AoE net ID of slave device *)
Port:        T_AmsPort;       (* ADS port of slave device *)
TimeOut:     TIME;            (* time out value for AoE communication *)
RdVal:       DWORD;           (* 4byte buffer for read response *)
bErr:        BOOL;            (* flag for error return *)
ErrId:       DUINT;           (* error ID *)

```

CODE:

```

(* starting parameter UPID read RAM value
(* should be called only once per reading
=====*)

FbAdsRead(READ:= FALSE);      (* reset READ input to assure rising edge for start reading *)
FbAdsRead(
    NETID := NetID,          (* AoE NetId of slave device to read *)
    PORT  := Port,           (* ADS port of slave device to read *)
    IDXGRP := 0x0040,        (* Parameter UPID read RAM value service ID *)
    IDXOFFS := 0x13A2,      (* UPID value of parameter P Gain of position controller *)
    LEN    := 4,            (* read length 4 bytes for all LinMot parameter types *)
    DESTADDR:= ADR(RdVal),  (* pointer to read result data buffer *)
    READ   := TRUE,         (* generate rising edge on input for start reading *)
    TMOUT  := TimeOut,      (* timeout value for read command *)
    BUSY   := RdBusy,       (* busy output for detecting end of reading *)
    ERR    := bErr,         (* error output for assure correct reading *)
    ERRID  := ErrId);       (* error id for debugging problem *)

(* polling for read response
(* should be called cyclic
=====*)
FbAdsRead(
    BUSY := RdBusy,         (* busy output for detecting end of reading *)
    ERR  := bErr,           (* error output for assure correct reading *)
    ERRID := ErrId);       (* error id for debugging problem *)

IF(RdBusy = FALSE)
    IF(bErr = FALSE)
        PosCtrlPGain = DWORD_TO_UINT(RdVal)
    ELSE

```

```

(* eval error condition *)
END_IF
END_IF

```

4.2.2. Parameter UPID write RAM value

Write the RAM value of the parameter specified by its UPID.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0041h (LinMot Service ID)
Input	IDXOFFS	UDINT	UPID
Input	LEN	UDINT	always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.2.3. Parameter UPID read ROM value

Read the ROM value of the parameter specified by its UPID.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0042h (LinMot Service ID)
Input	IDXOFFS	UDINT	UPID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.2.4. Parameter UPID write ROM value

Write the RAM value of the parameter specified by its UPID.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0043h (LinMot Service ID)
Input	IDXOFFS	UDINT	UPID
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error

Output	ERRID	UDINT	Error id
--------	-------	-------	----------

4.2.5. Parameter start read UPID list

Specify the SW layer by its start UPID of which the UPID list will be read out. The list contains all parameters and variables of the SW layer.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0044h (LinMot Service ID)
Input	IDXOFFS	UDINT	Start UPID: 0000h: OS SW layer 1000h: MC SW layer 2000h: Intf SW layer 3000h: Appl SW layer
Input	LEN	UDINT	Always 8 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (8bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID: 00h: ok

4.2.6. Parameter get next UPID list item

Read the UPID, address usage and ROM value of the parameter and the RAM value of the variables.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0045h (LinMot Service ID)
Input	IDXOFFS	-	Not evaluated
Input	LEN	UDINT	Always 8 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (8bytes)) Bytes 0..1 UPID Bytes 2..3 Address usage Bytes 4..7 ROM Value
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID: 00h: ok C6h: No new UPID found

4.2.7. Parameter start read modified UPID list

Specify the SW layer by its start UPID of which the UPID list will be read out. The list contains only the parameter that differs in the ROM value of its default value.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0046h (LinMot Service ID)
Input	IDXOFFS	UDINT	Start UPID: 0000h: OS SW layer 1000h: MC SW layer 2000h: Intf SW layer 3000h: Appl SW layer
Input	LEN	UDINT	0
Input	DESTADDR	DWORD	ADR(read_buffer (8bytes)) Bytes 0..1 UPID Bytes 2..3 Address usage Bytes 4..7 ROM Value
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID: 00h: ok

4.2.8. Parameter get next modified UPID list item

Read the UPID, Address usage and ROM value of the parameter of the defined SW layer specified by its start UPID.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0047h (LinMot Service ID)
Input	IDXOFFS	-	Not evaluated
Input	LEN	UDINT	Always 8 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (8bytes)) Bytes 0..1 UPID Bytes 2..3 Address usage Bytes 4..7 ROM Value
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID: 00h: ok C6h: No new UPID found

4.2.9. Parameter Default SW instance

With this command all parameters of one SW instances can be set to the default value.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0048h (LinMot Service ID)
Input	IDXOFFS	UDINT	SW instance selection 0: OS SW layer 1: MC SW layer 2: Interface SW layer 3: application SW layer
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3 ADS Curves Services

4.3.1. Curves delete all in RAM

Delete all curves in RAM.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0050h (LinMot Service ID)
Input	IDXOFFS	UDINT	Not evaluated
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.2. Curves delete single curve in RAM

Delete single curves in RAM.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0051h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID to delete
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.3. Curves read info and data size

Read the info block and curve setpoint data size of the specified curve.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0052h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes)) 0..1 : Info block size in bytes 0x0046 2..3 : setpoint data size in bytes (4 bytes per setpoint)
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.4. Curves read info block data

Read the info block data of the specified curve. This command has to be repeated 18 times.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0053h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.5. Curves read setpoint data

Read the setpoint data of the specified curve. This command has to be repeated until all data is read out.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0054h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.6. Curves start modify curve in RAM

Read the info block and curve setpoint data size of the specified curve.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0058h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(write_buffer (4bytes)) 0..1 : Info block size in bytes 0x0046 2..3 : setpoint data size in bytes (4 bytes per setpoint)
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.7. Curves modify curve info block data in RAM

Write the info block data of the specified curve. This command has to be repeated 18 times.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0059h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(write_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.8. Curves modify curve setpoint data in RAM

Write the setpoint data of the specified curve. This command has to be repeated until all data is written.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	005Ah (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(write_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.3.9. Curves start write curve to RAM

Initiates writing a curve to RAM. Then the “Curves write curve info block data to RAM” service has to be called several times. Only non existing curve IDs can be written. If the curve exists, it has to be deleted before (Command. “Curves delete single curve in RAM”). Repeated curve writing can lead to a full curve memory. In this case the complete curve memory has to be deleted with the command “Delete all curves”.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0055h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID to write
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes)) Bytes 0..1 curve info block size Bytes 2..3 curve data block size
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.10. Curves write curve info block data to RAM

Write the curve header data to RAM. This command has to be repeated until the whole curve info block data is written. Then the “Curves write curve info block data to RAM” service has to be called several times.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0056h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID to write
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.11. Curves write curve setpoint data to RAM

Write the curve setpoint data to RAM. This has to be repeated until the whole setpoint data block is written

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0057h (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID to write
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.12. Curves read presence list

Write the RAM value of the parameter specified by its UPID.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	005Eh (LinMot Service ID)
Input	IDXOFFS	UDINT	IDOff : 0: curves 1..32 32: curves 33..64 64: curves 65..96 96: curves 96..100
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.3.13. Curves start write curves from RAM to FLASH

Save the whole curve section from RAM to FLASH memory.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	005Fh (LinMot Service ID)
Input	IDXOFFS	UDINT	-
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.4 ADS Command Table Services

4.4.1. Command Table delete all entries from RAM

Delete all command table entries in RAM.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0060h (LinMot Service ID)
Input	IDXOFFS	UDINT	Not evaluated
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.4.2. Command Table delete single entry from RAM

Delete a single command table entry in RAM.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0061h (LinMot Service ID)
Input	IDXOFFS	UDINT	Command Table ID to delete
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.4.3. Command Table read data size

Start command to read a Command Table entry. The entry size will be returned.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0062h (LinMot Service ID)
Input	IDXOFFS	UDINT	Command Table ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes)) 0..3 : Command Table size in bytes 0x0040
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.4.4. Command Table read data

Read the Command Table data. This command has to be repeated until all 64 bytes are read.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0063h (LinMot Service ID)
Input	IDXOFFS	UDINT	Command Table ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(read_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.4.5. Command Table start write entry in RAM

Start command to write a Command Table entry in the RAM.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0065h (LinMot Service ID)
Input	IDXOFFS	UDINT	Command Table ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(write_buffer (4bytes)) 0..3 : Command Table size in bytes 0x0040
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.4.6. Command Table write entry data in RAM

Write the Command Table data. This command has to be repeated until all 64 bytes are written.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0066h (LinMot Service ID)
Input	IDXOFFS	UDINT	Command Table ID
Input	LEN	UDINT	Always 4 bytes
Input	DESTADDR	DWORD	ADR(write_buffer (4bytes))
Input	READ	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error id

4.4.7. Command table read presence list

Gets the presence list of all Command Table entries.

FUNCTION_BLOCK ADSREAD			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	006Eh (LinMot Service ID)
Input	IDXOFFS	UDINT	(Bit=0 means Entry exists) IDOff : 0: entries 1..31 32: entries 33..63 64: entries 65..95 96: entries 96..127 128: entries 128..159 160: entries 160..191 192: entries 192..223 224: entries 224..255
Input	LEN	UDINT	Always 4 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (4bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.4.8. Command Table start write entries from RAM to FLASH

Copy the whole Command Table section from RAM to FLASH memory.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	006Fh (LinMot Service ID)
Input	IDXOFFS	UDINT	Curve ID to write
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.5 Program handling

4.5.1. Reset device

Resets the device.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0070h (LinMot Service ID)
Input	IDXOFFS	UDINT	-
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value >6s
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

Typical restart time are 5 seconds, take this fact in account, when setting the ADS timeout value.

4.5.2. Stop SW instances

Stop the selected SW instances e.g. for saving the curves into the FLASH memory.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0071h (LinMot Service ID)
Input	IDXOFFS	UDINT	SW instance selection Bit 0: MC-SW layer Bit 1: Interface SW layer Bit 2: application SW layer
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

4.5.3. Start SW instances

Start the selected SW instances e.g. after flashing the curves.

FUNCTION_BLOCK ADSWRITE			
Direction	Name	Type	Description
Input	NETID	T_AmsNetId	AoE NetID
Input	PORT	T_AmsPort	ADS Port
Input	IDXGRP	UDINT	0072h (LinMot Service ID)
Input	IDXOFFS	UDINT	SW instance selection Bit 0: MC-SW layer Bit 1: Interface SW layer Bit 2: application SW layer
Input	LEN	UDINT	Always 0 bytes
Input	SRCADDR	DWORD	ADR(write_buffer (0bytes))
Input	WRITE	BOOL	Rising edge starts reading
Input	TMOUT	TIME	Timeout value
Output	BUSY	BOOL	Indicates reading active/finished
Output	ERR	BOOL	Indicates reading error
Output	ERRID	UDINT	Error ID

5 Asynchronous Configuration Protocol CoE

5.1 Communication Profile Area(1000h-1FFFh)

Index	Name	Flags	Value
1000	Device type	RO	0x00000000 (0)
1008	Device name	RO	E1250-EC-UC
1009	Hardware version	RO	V1RD
100A	Software version	RO	4.3 Beta 20110901
1018:0	Identity	RO	> 4 <
1018:01	Vendor ID	RO	0x4C4E5449 (1280201801)
1018:02	Product code	RO	0x009606E3 (9832163)
1018:03	Revision	RO	0x00000106 (262)
1018:04	Serial number	RO	0x1595000A (362086410)

5.2 Manufacturer specific Profile Area(2000h-5FFFh)

Parameters can be modified via their UPIDs (Unique Parameter ID) via CoE. To use a UPID command, an SDO read (FB_EcCoeSdoReadEx) or write (FB_EcCoeSdoWriteEx) has to be performed on the index "2000h + UPID". The sub-index specifies the command which is performed.

Sdo Service	Index	Sub-Index	Description
Read	2000h+UPID	01h	Parameter UPID read RAM value
Write	2000h+UPID	01h	Parameter UPID write RAM value
Read	2000h+UPID	02h	Parameter UPID read ROM value
Write	2000h+UPID	02h	Parameter UPID write ROM value
Read	2000h+UPID	03h	Parameter UPID read minimal value
Read	2000h+UPID	04h	Parameter UPID read maximal value
Read	2000h+UPID	05h	Parameter UPID read default value
Write	2000h+UPID	06h	Parameter UPID write RAM and ROM value
Write	2000h	07h	Parameter Default OS SW instance
Write	2000h	08h	Parameter Default MC SW instance
Write	2000h	09h	Parameter Default Intf SW instance
Write	2000h	0Ah	Parameter Default Appl SW instance
Write	2000h	0Bh	Reset device
Write	2000h	24h	Parameter Start Read UPID List
Read	2000h	25h	Parameter Read next UPID List entry
Write	2000h	26h	Parameter Start Read modified UPID List
Read	2000h	27h	Parameter Read next modified UPID List entry
Write	2000h	35h	Stop MC and Appl SW instances
Write	2000h	36h	Start MC and Appl SW instances
Write	2000h	40h	Curves copy curves from RAM to FLASH
Write	2000h	41h	Curves delete all in RAM
Write	2000h+ID	50h	Curves start write curve in RAM
Write	2000h+ID	54h	Curves write curve info block data in RAM
Write	2000h+ID	53h	Curves write curve set point data in RAM
Read	2000h+ID	60h	Curves read info and data size
Read	2000h+ID	61h	Curves read info block data
Read	2000h+ID	62h	Curves read setpoint data

Read	2000h	70h	Read error counters
Read	2000h+ID	71h	Read error code of logged entry
Read	2000h+ID	72h	Read error time low of logged entry
Read	2000h+ID	73h	Read error time high of logged entry
Read	2000h+ID	74h	Read error text stringlet 0 of error code
Read	2000h+ID	75h	Read error text stringlet 1 of error code
Read	2000h+ID	76h	Read error text stringlet 2 of error code
Read	2000h+ID	77h	Read error text stringlet 3 of error code
Read	2000h+ID	78h	Read error text stringlet 4 of error code
Read	2000h+ID	79h	Read error text stringlet 5 of error code
Read	2000h+ID	7Ah	Read error text stringlet 6 of error code
Read	2000h+ID	7Bh	Read error text stringlet 7 of error code
Write	2000h	80h	Command Table copy entries from RAM to FLASH
Write	2000h	81h	Command Table delete all entries in RAM
Write	2000h+ID	82h	Command Table delete single entry in RAM
Write	2000h+ID	83h	Command Table start write entry in RAM
Write	2000h+ID	84h	Command Table write entry data in RAM
Read	2000h+ID	85h	Command Table read entry data size
Read	2000h+ID	86h	Command Table read entry data
Read	2000h	87h	Command Table read presence list entries 0..31
Read	2000h	88h	Command Table read presence list entries 32..63
Read	2000h	89h	Command Table read presence list entries 64..95
Read	2000h	8Ah	Command Table read presence list entries 96..127
Read	2000h	8Bh	Command Table read presence list entries 128..159
Read	2000h	8Ch	Command Table read presence list entries 160..191
Read	2000h	8Dh	Command Table read presence list entries 192..223
Read	2000h	8Eh	Command Table read presence list entries 224..255

5.2.1. Parameter UPID read RAM value

Read the RAM value of the parameter specified by its UPID, and stores the result in the 4 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	01h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.2. Parameter UPID write RAM value

Write the content of the write_buffer to the RAM value of the parameter specified by its UPID. The write_buffer can have an unique size of 4 bytes.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	01h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pSrcBuf	DWORD	ADR(write_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.3. Parameter UPID read ROM value

Read the ROM value of the parameter specified by its UPID, and stores the result in the 4 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	02h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.4. Parameter UPID write ROM value

Write the content of the write_buffer to the ROM value of the parameter specified by its UPID. The write_buffer can have an unique size of 4 bytes.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	02h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pSrcBuf	DWORD	ADR(write_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.5. Parameter UPID read minimal value

Read the minimal value of the parameter specified by its UPID, and stores the result in the 4 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	03h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.6. Parameter UPID read maximal value

Read the maximal value of the parameter specified by its UPID, and stores the result in the 4 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	04h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.7. Parameter UPID read default value

Read the default value of the parameter specified by its UPID, and stores the result in the 4 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	05h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.8. Parameter UPID write RAM & ROM value

Write the content of the write_buffer to the RAM and ROM value of the parameter specified by its UPID. The write_buffer can have a unique size of 4 bytes.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	06h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + UPID
Input	pSrcBuf	DWORD	ADR(write_buffer (4bytes))
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.9. Parameter default OS SW instance

All parameters of the OS SW instance are set to their default value.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	07h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.10. Parameter default MC SW instance

All parameters of the MC SW instance are set to their default value.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	08h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.11. Parameter default Intf SW instance

All parameters of the interface SW instance are set to their default value.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	09h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.12. Parameter default Appl SW instance

All parameters of the application SW instance are set to their default value.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	0Ah (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.13. Reset device

This service resets the device.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	0Bh (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.14. Start read UPID List

Specify the SW layer by its start UPID of which the UPID list will be read out. The list contains all parameters and variables of the SW layer.

FUNCTION_BLOCK FB_EcCoESdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AoE NetID
Input	nSlaveAddr	T_AmsPort	ADS Port
Input	nSubIndex	UDINT	0024h (LinMot Service ID)
Input	nIndex	UDINT	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (4bytes)) Start UPID: 0000h: OS SW layer 1000h: MC SW layer 2000h: Intf SW layer 3000h: Appl SW layer
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bCompleteAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.15. Read next UPID List entry

Read the response state, UPID, address usage and ROM value of the parameter and the RAM value of the variables. The reading of the list doesn't stop at the end of a SW instance, only at the end of all instances.

FUNCTION_BLOCK FB_EcCoESdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AMS NetID
Input	nSlaveAddr	T_AmsPort	ADS Port
Input	nSubIndex	UDINT	0025h (LinMot Service ID)
Input	nIndex	UDINT	2000h
Input	pDstBuf	Struct	ADR(read_buffer (10bytes))
Input	cbBufLen	UDINT	Always 10 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bCompleteAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

Response Data Structure

Offset	Name	Type	Description
0	Res State	UINT	0x0000: No error 0x00C5: Reading not initialized 0x00C6: No UPID found (finished)
2	UPID	UINT	UPID of Parameter Or Variable
4	Value	UDINT	Value of Parameter
8	Address usage	UINT	

5.2.16. Start read modified UPID List

Specify the SW layer by its start UPID of which the UPID list will be read out. The list contains all parameters and variables of the SW layer.

FUNCTION_BLOCK FB_EcCoESdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AoE NetID
Input	nSlaveAddr	T_AmsPort	ADS Port
Input	nSubIndex	UDINT	0026h (LinMot Service ID)
Input	nIndex	UDINT	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (4bytes)) Start UPID: 0000h: OS SW layer 1000h: MC SW layer 2000h: Intf SW layer 3000h: Appl SW layer
Input	cbBufLen	UDINT	Always 4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bCompleteAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error

Output	nErrId	UDINT	Error ID
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5.2.17. Read next modified UPID List entry

Read the response state, UPID, address usage and ROM value of the next modified parameter. The reading of the list doesn't stop at the end of a SW instance, only at the end of all instances.

FUNCTION_BLOCK FB_EcCoESdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AMS NetID
Input	nSlaveAddr	T_AmsPort	ADS Port
Input	nSubIndex	UDINT	0027h (LinMot Service ID)
Input	nIndex	UDINT	2000h
Input	pDstBuf	Struct	ADR(read_buffer (10bytes))
Input	cbBufLen	UDINT	Always 10 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bCompleteAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

Response Data Structure

Offset	Name	Type	Description
0	Res State	UINT	0x0000: No error 0x00C5: Reading not initialized 0x00C6: No UPID found (finished)
2	UPID	UINT	UPID of Parameter Or Variable
4	Value	UDINT	Value of Parameter
8	Address usage	UINT	

5.2.18. Stop MC and Application SW instances

This service stops the execution of the MC and application SW layers. This command should be used before configuring (writing to ROM values) of these instances.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	35h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.19. Start MC and Application SW instances

This service starts the execution of the MC and application SW layers. This command should be used after configuring (writing to ROM values) of these instances are finished.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	36h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.20. Curves copy curves from RAM to FLASH

This service copies the actual in the RAM defined curves to the FLASH memory, so they are available after power up. Use this command only with stopped MC SW!

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	40h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.21. Curves delete all curves in RAM

This service deletes all curves in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	41h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.22. Curves start write curve in RAM

This service initiate the writing of a new curve in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	50h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer)
Input	cbBufLen	UDINT	4 bytes: - UINT: Info Data Size - UINT: Set Point Data Size
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.23. Curves write curve info block data in RAM

This service writes the curve info data block in the RAM, it has to be repeated until the whole info data block is written.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	53h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer)
Input	cbBufLen	UDINT	4 bytes data of curve info block
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.24. Curves write curve set point data in RAM

This service writes the curve setpoint data block in the RAM, it has to be repeated until all setpoints are written.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	53h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer)
Input	cbBufLen	UDINT	4 bytes of setpoint data
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.25. Curves read info and setpoint data block size in RAM

Read the status and size of the data blocks of the curve defined by its ID the data is stored in the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	60h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (6bytes)) - UINT: Status - UINT: Info block size - UINT: Set point data block size
Input	cbBufLen	UDINT	6 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.26. Curves read info block data in RAM

Read the info data block of the curve defined by its ID the 4 byte result is stored together with the read status in the 6 bytes of the read_buffer. This command has to be repeated until the whole info data block is read (status = 0).

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	61h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (6bytes)) - UINT: Status - DWORD: data
Input	cbBufLen	UDINT	6 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.27. Curves read set point data in RAM

Read the set point data block of the curve defined by its ID the 4 byte result is stored together with the read status in the 6 bytes of the read_buffer. This command has to be repeated until the whole set point data block is read (status = 0).

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	62h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (6bytes)) - UINT: Status - DWORD: data
Input	cbBufLen	UDINT	6 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.28. Read error counters

Read the number of logged errors and total occurred errors and stores them in the read buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	70h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - UINT: Number of logged errors - UINT: Number of total errors
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.29. Read logged error item Code and instance

Read the error code of the specified (ID) logged error item..

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	71h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - UINT: Error code - UINT: Error instance
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.30. Read logged error item time low

Read the error time millisecond part of the specified (ID) logged error item.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	72h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - DINT: Error time [ms]
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.31. Read logged error item time high

Read the error time hours part of the specified (ID) logged error item..

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	73h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - DINT: Error time [h]
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.32. Read error short text

Read the short text of an error defined by its error code, for each stringlet (4 characters) a service number 74h.. 7Bh is defined.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	74h (LinMot Sdo Service ID) + stringlet Count 0..7)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - 4 characters of error short text
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.33. Command Table copy entries from RAM to FLASH

This service copies the actual in the RAM defined Command Table entries to the FLASH memory so they are available after power up. Use this command only with stopped MC SW!

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	80h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.34. Command Table delete all entries in RAM

This service deletes all Command table entries in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	81h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.35. Command Table delete entry in RAM

This service delete a single Command Table entry defined by its ID in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	82h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer (0 bytes))
Input	cbBufLen	UDINT	0 bytes (4 bytes also accepted)
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.36. Command Table start write entry in RAM

This service initiate the writing of a new Command Table entry in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	83h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer)
Input	cbBufLen	UDINT	4 bytes: - UDINT: Entry Data Size
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.37. Command Table write entry data in RAM

This service writes the Command Table data block in the RAM.

FUNCTION_BLOCK: FB_EcCoeSdoWriteEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	84h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pSrcBuf	DWORD	ADR(write_buffer)
Input	cbBufLen	UDINT	4 bytes of entry data
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.38. Command Table entry data size in RAM

Read the the entry size of the Command Table entry specified by its ID, and stores the result in the 6 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	85h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (6bytes)) - UINT: Status - UDINT: entry size
Input	cbBufLen	UDINT	6 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.39. Command Table read entry data in RAM

Read the Command Table entry data specified by its ID, and stores the result in the 6 bytes of the read_buffer.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	86h (LinMot Sdo Service ID)
Input	nIndex	WORD	2000h + ID
Input	pDstBuf	DWORD	ADR(read_buffer (6bytes)) - UINT: Status - DWORD: data
Input	cbBufLen	UDINT	6 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

5.2.40. Command Table read presence list

Read the Command Table entry list defined by its subindex-ID, and stores the result in the 4 bytes of the read_buffer. A zero of the corresponding bit means command table entry is present, a one means the corresponding entry doesn't exist.

FUNCTION_BLOCK: FB_EcCoeSdoReadEx			
Direction	Name	Type	Description
Input	sNetId	T_AmsNetId	AmsNetId of master
Input	nSlaveAddr	UINT	Address of slave
Input	nSubIndex	Byte	87h + ID (LinMot Sdo Service ID) ID = 0: entries 0..31 ID = 1: entries 32..63 ID = 2: entries 64..95 ID = 3: entries 96..127 ID = 4: entries 128..159 ID = 5: entries 160..191 ID = 6: entries 192..223 ID = 7: entries 224..225
Input	nIndex	WORD	2000h
Input	pDstBuf	DWORD	ADR(read_buffer (4bytes)) - DWORD: presence list, 0 means entry exists
Input	cbBufLen	UDINT	4 bytes
Input	bExecute	BOOL	Rising edge starts writing
Input	tTimeout	TIME	Timeout value
Input	bComplAccess	BOOL	FALSE
Output	bBusy	BOOL	Indicates reading active/finished
Output	bError	BOOL	Indicates reading error
Output	nErrId	UDINT	Error ID

6 EtherCAT Parameters and Variables

6.1 Parameters

The EtherCAT Interface has an additional parameter tree branch (Parameters → EtherCAT), which can be configured with the distributed LinMot-Talk software.

With these parameters, the EtherCAT interface can be enabled or disabled.

The LinMot-Talk software can be downloaded from <http://www.linmot.com> under the section download, software & manuals.

EtherCAT Dis-/Enable

With the Dis-/Enable parameter the LinMot drive can be run without the Ethernet EtherCAT Interface going online. So in a first step the system can be configured and run without any bus connection.

ETHERCAT\ Dis-/Enable	
Disable	The drive runs without ETHERCAT.
Enable	The drive runs with ETHERCAT connection.

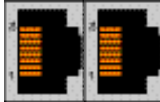


IMPORTANT: If the ETHERCAT Interface is disabled, the integrated ETHERCAT-ASIC rests in reset state! No messages will be sent to other devices connected to the ETHERCAT-Network via the E1250 or E1450 drive.

7 Connecting to the EtherCAT Network

7.1 Pin Assignment of the Connectors X17-X18

The ETHERCAT connector is a standard RJ45 female connector with a pin assignment as defined by EIA/TIA T568B:

X17 – X18	ETHERCAT Connector		
	Pin	Wire color code	Assignment 100BASE-TX
	1	WHT/ORG	Rx+
	2	ORG	Rx-
	3	WHT/GRN	Tx+
	4	BLU	-
	5	WHT/BLU	-
	6	GRN	Tx-
	7	WHT/BRN	-
	8	BRN	-
RJ-45	Use standard patch cables (twisted pair, S/UTP, AWG26) for wiring. This type of cable is usually referred to as a "Cat5e-Cable".		

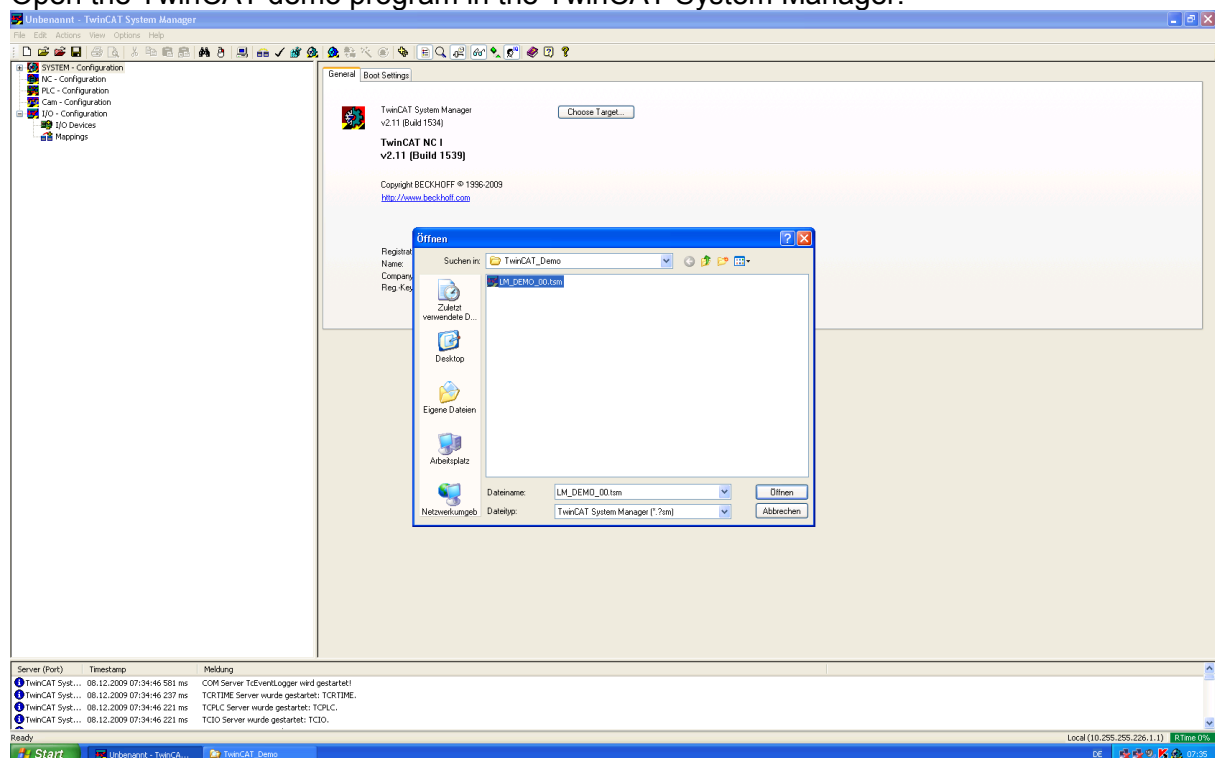
8 TwinCAT Demo Program

With the LinMot-Talk software a TwinCAT demo program is included as start point for new LinMot users, to get familiar with the concepts that stands behind LinMot motion SW. For getting started with this demo program connect a LinMot EtherCAT drive directly to the master. Wire the signal supply (24V Dc) and the motor power supply. Wire also the “Safety Voltage Enable” on X4.12 to 24V. Then connect the motor to the servo power on the signal supply and configure the motor with the help of the LinMot-Talk software.

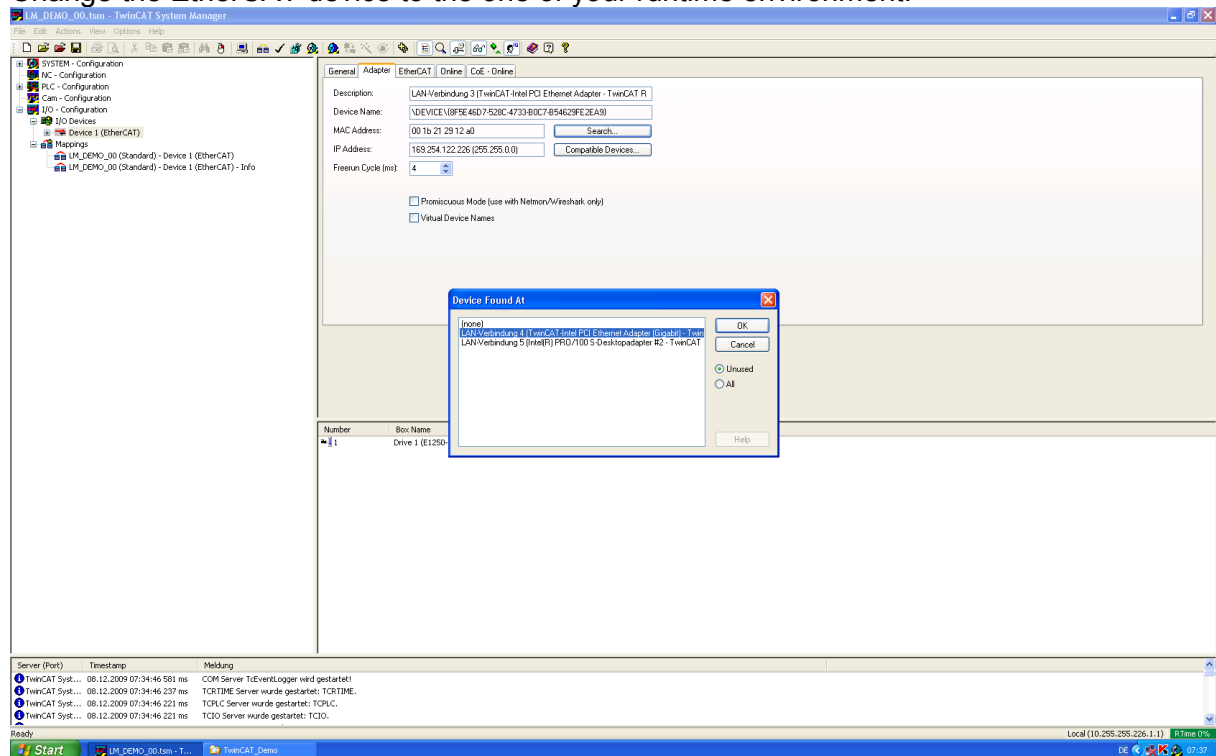
The demo program files are saved under the path:

C:\Program Files\LINMOT\LinMot-Talk 4 Build 20100616\Firmware\Interfaces\EtherCAT\TwinCAT_Demo\

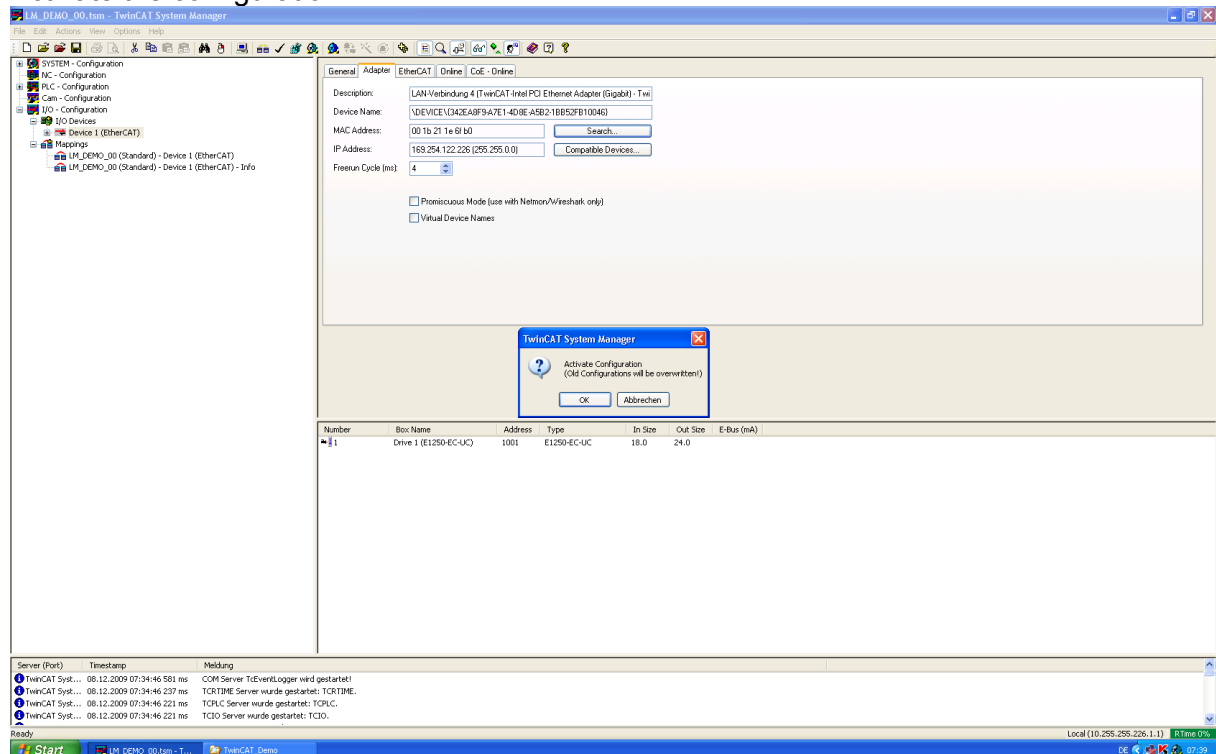
Open the TwinCAT demo program in the TwinCAT System Manager:



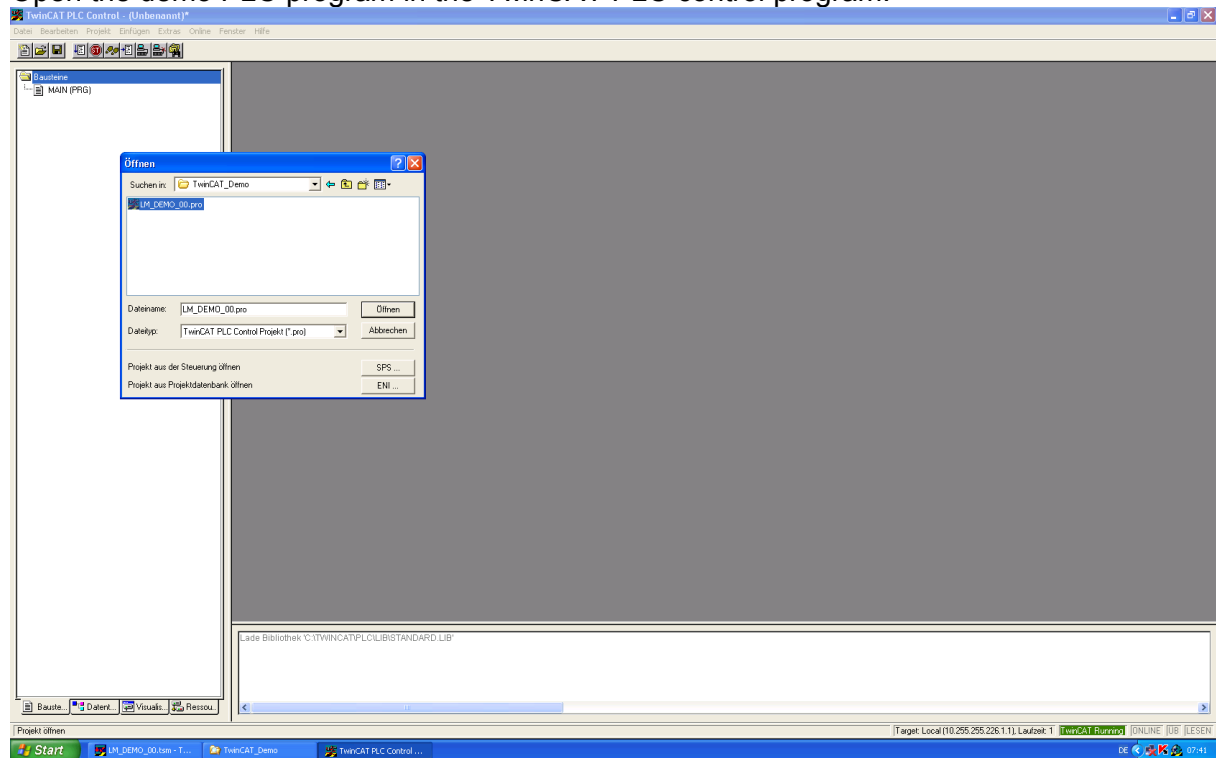
Change the EtherCAT device to the one of your runtime environment:



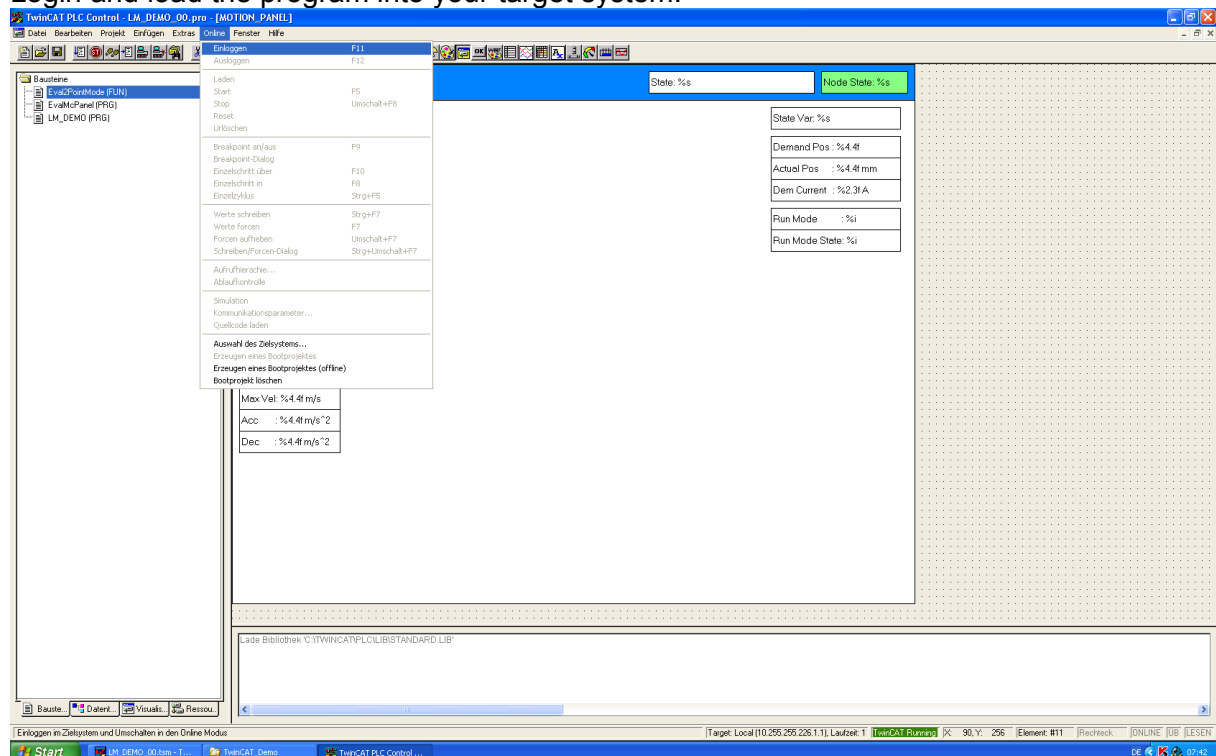
Activate the configuration:



Open the demo PLC program in the TwinCAT PLC control program:



Login and load the program into your target system:



Start the PLC program:

The screenshot shows the TwinCAT PLC Control software interface. The title bar reads "TwinCAT PLC Control - LM_DEMO_00.pro* - [MOTION_PANEL]". The menu bar includes "Datei", "Bearbeiten", "Projekt", "Einfügen", "Extras", "Online", "Fenster", and "Hilfe". The left sidebar shows a project tree with "Bauteile" expanded, containing "WZG/StartMode (LIN)", "EventPanel (FRG)", and "LM_DEMO (FRG)". The main area is divided into several sections:

- Einloggen/Ausloggen:** F11, F12
- Laden:** F5
- Start:** Umschalt+F5
- Reset/Unlöschen:** (no key)
- Breakpoint an/aus:** F9
- Breakpoint-Dialog:** F10
- Einerschritt über:** F8
- Einerschritt in:** Strg+F5
- Werte schreiben:** Strg+F7
- Werte forcieren:** F7
- Forcieren aufheben:** Umschalt+F7
- Schreiben/Forcieren-Dialog:** Strg+Umschalt+F7
- Aufruhruche.../Ablaufkontrolle:** (no key)
- Simulation:** (no key)
- Konstanten/Abstraktionsparameter.../Quelle laden:** (no key)
- Auswahl des Zielzustands.../Erzeugen eines Bootprojektes (offline)/Bootprojekt löschen:** (no key)

Below the menu, there are input fields for "Max Vel: 0.1000 m/s", "Acc: 1.0000 m/s^2", and "Dec: 1.0000 m/s^2". On the right, there are several status indicators: "State: ???", "Node State: FALSE", "State Var: 0", "Demand Pos: 0.0000", "Actual Pos: 0.0000 mm", "Dem Current: 0.000 A", "Run Mode: 0", and "Run Mode State: 0". The bottom status bar shows "Target Local (10.255.255.228.1.1), Laufzeit: 1 ONLINE: SIM LAUFT BP FORCE IUB LESSEN".

Change to the Visualisation Control panel view:

The screenshot shows the TwinCAT PLC Control software interface in the CONTROL_PANEL view. The title bar reads "TwinCAT PLC Control - LM_DEMO_00.pro* - [CONTROL_PANEL]". The menu bar is the same as in the previous view. The left sidebar shows a project tree with "Visualisierungen" expanded, containing "CONTROL_PANEL", "MAIN_PANEL", and "MOTION_PANEL". The main area is divided into several sections:

- Control Panel:** (selected)
- Motion Panel:** (not selected)
- State:** Not Ready To Switch On
- Node State:** FALSE
- State Var:** 0

The main area contains a grid of 16 status indicators, each with a number and a description:

0: Switch On	0: Operation Enabled	0: Motor Hot Sensor
1: Safety Voltage Enable	1: Switch On Active	1: Motor Short Time Overload
2: / Quick Stop	2: Enable Operation	2: Motor Supply Voltage Low
3: Enable Operation	3: Error	3: Motor Supply Voltage High
4: Abort	4: Safety Volt. Enable	4: Position Lag Always
5: / Freeze	5: / Quick Stop	5: Position Lag Standing
6: Go To Position	6: Switch On Locked	6: Controller Hot
7: Error Acknowledge	7: Warning	7: Motor Not Homed
8: Jog Move +	8: Event Handler Active	8: PTC 1
9: Jog Move -	9: Special Motion Active	9: PTC 2
10: Special Mode	10: In Target Position	10: Reserved
11: Home	11: Homed	11: Reserved
12: Clearance Check	12: Fatal Error	12: Reserved
13: Go To Initial Position	13: Motion Active	13: Reserved
14: Linearizing	14: Range Indicator 1	14: Interface Warn Flag
15: Phase Search	15: Range Indicator 2	15: Application Warn Flag
Ctrl Word: 3F	Status Word: 40F2	Warn Word: 80

The bottom status bar shows "Target Local (10.255.255.228.1.1), Laufzeit: 1 ONLINE: SIM LAUFT BP FORCE IUB LESSEN".

Release the Control Word bit 0 "Switch On":

The screenshot shows the 'CONTROL_PANEL' window with the 'Control Panel' tab selected. The 'State: Not Ready To Switch On' indicator is visible. The 'Node State' is 'FALSE'. The '0: Switch On' bit is highlighted in green. The 'State Var' is '0'. The 'Ctrl Word' is '3F'. The 'Status Word' is '40F2'. The 'Warn Word' is '80'.

0: Switch On	0: Operation Enabled	0: Motor Hot Sensor
1: Safety Voltage Enable	1: Switch On Active	1: Motor Short Time Overload
2: /Quick Stop	2: Enable Operation	2: Motor Supply Voltage Low
3: Enable Operation	3: Error	3: Motor Supply Voltage High
4: /Abort	4: Safety Volt. Enable	4: Position Lag Always
5: /Freeze	5: /Quick Stop	5: Position Lag Standing
6: Go To Position	6: Switch On Locked	6: Controller Hot
7: Error Acknowledge	7: Warning	7: Motor Not Homed
8: Jog Move +	8: Event Handler Active	8: PTC 1
9: Jog Move -	9: Special Motion Active	9: PTC 2
10: Special Mode	10: In Target Position	10: Reserved
11: Home	11: Homed	11: Reserved
12: Clearance Check	12: Fatal Error	12: Reserved
13: Go To Initial Position	13: Motion Active	13: Reserved
14: Linearizing	14: Range Indicator 1	14: Interface Warn Flag
15: Phase Search	15: Range Indicator 2	15: Application Warn Flag
Ctrl Word: 3F	Status Word: 40F2	Warn Word: 80

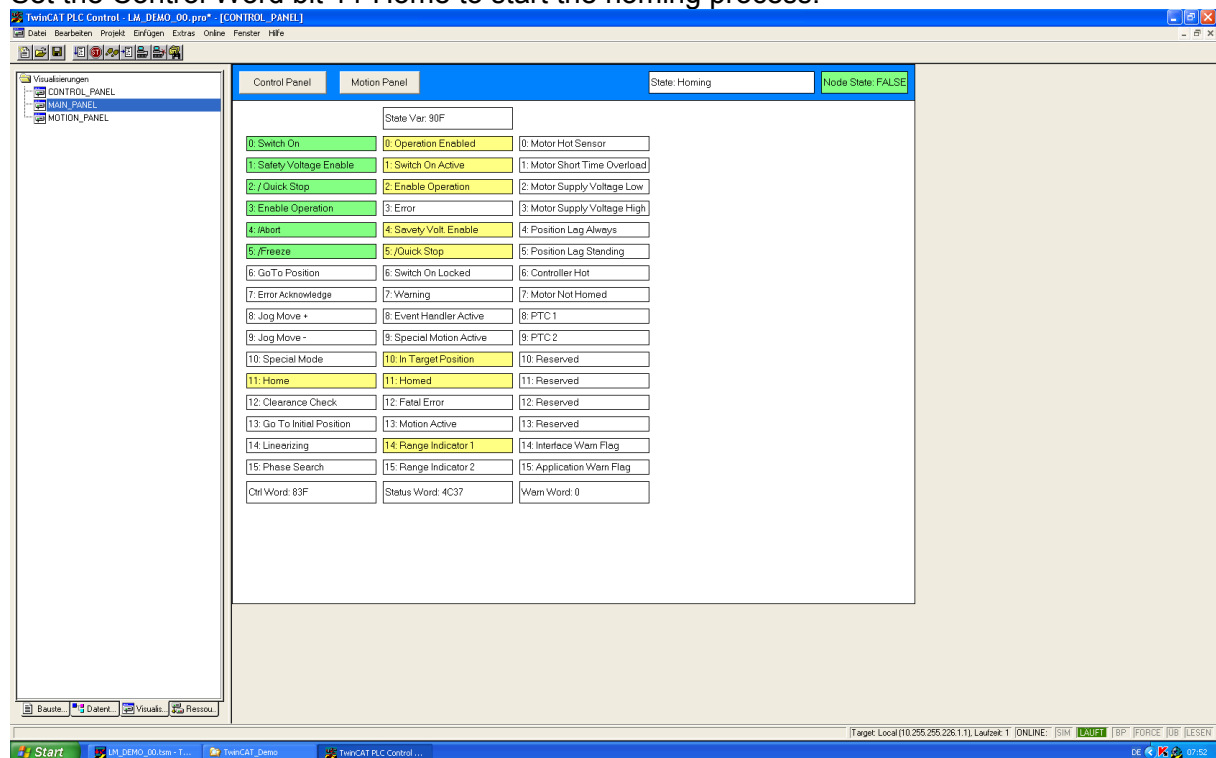
Set the Control Word bit 0 "Switch On":

The screenshot shows the 'CONTROL_PANEL' window with the 'Control Panel' tab selected. The 'State: Operation Enabled' indicator is visible. The 'Node State' is 'FALSE'. The '0: Switch On' bit is highlighted in yellow. The 'State Var' is '800'. The 'Ctrl Word' is '3F'. The 'Status Word' is '40B7'. The 'Warn Word' is '80'.

0: Switch On	0: Operation Enabled	0: Motor Hot Sensor
1: Safety Voltage Enable	1: Switch On Active	1: Motor Short Time Overload
2: /Quick Stop	2: Enable Operation	2: Motor Supply Voltage Low
3: Enable Operation	3: Error	3: Motor Supply Voltage High
4: /Abort	4: Safety Volt. Enable	4: Position Lag Always
5: /Freeze	5: /Quick Stop	5: Position Lag Standing
6: Go To Position	6: Switch On Locked	6: Controller Hot
7: Error Acknowledge	7: Warning	7: Motor Not Homed
8: Jog Move +	8: Event Handler Active	8: PTC 1
9: Jog Move -	9: Special Motion Active	9: PTC 2
10: Special Mode	10: In Target Position	10: Reserved
11: Home	11: Homed	11: Reserved
12: Clearance Check	12: Fatal Error	12: Reserved
13: Go To Initial Position	13: Motion Active	13: Reserved
14: Linearizing	14: Range Indicator 1	14: Interface Warn Flag
15: Phase Search	15: Range Indicator 2	15: Application Warn Flag
Ctrl Word: 3F	Status Word: 40B7	Warn Word: 80

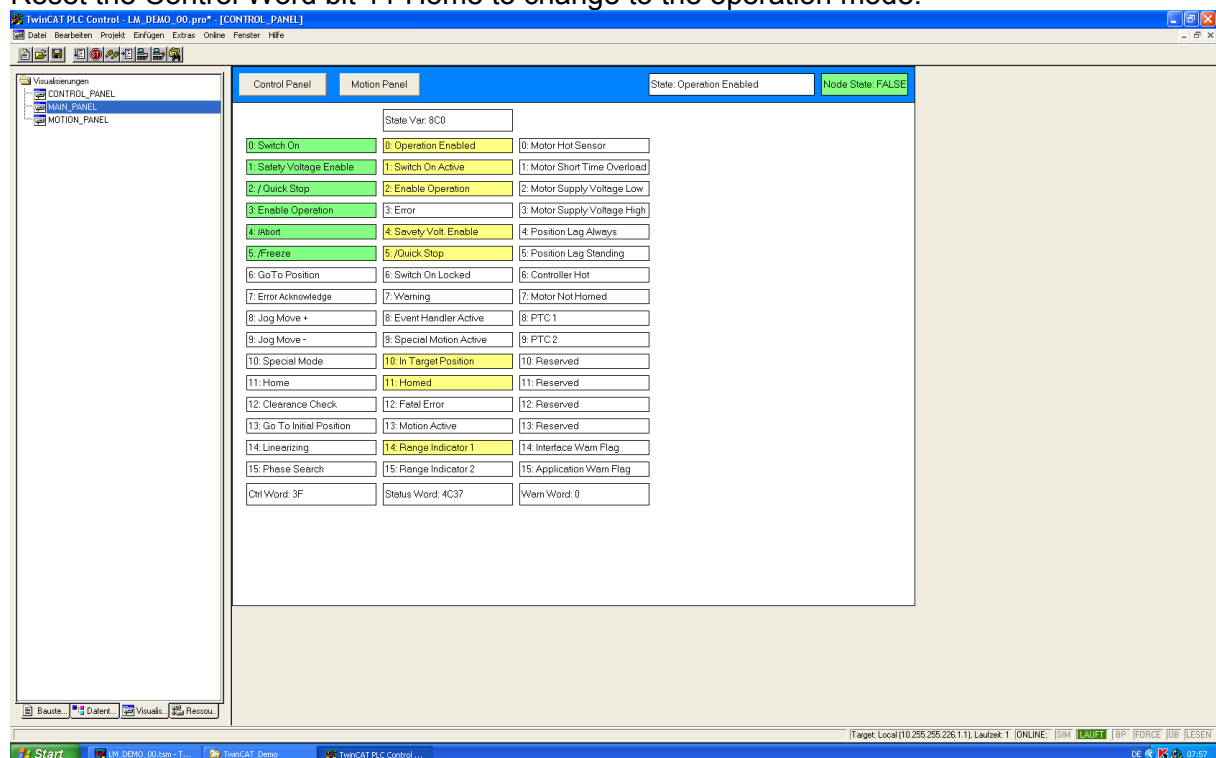
Now the motor is in the position controlled mode.

Set the Control Word bit 11 Home to start the homing process.



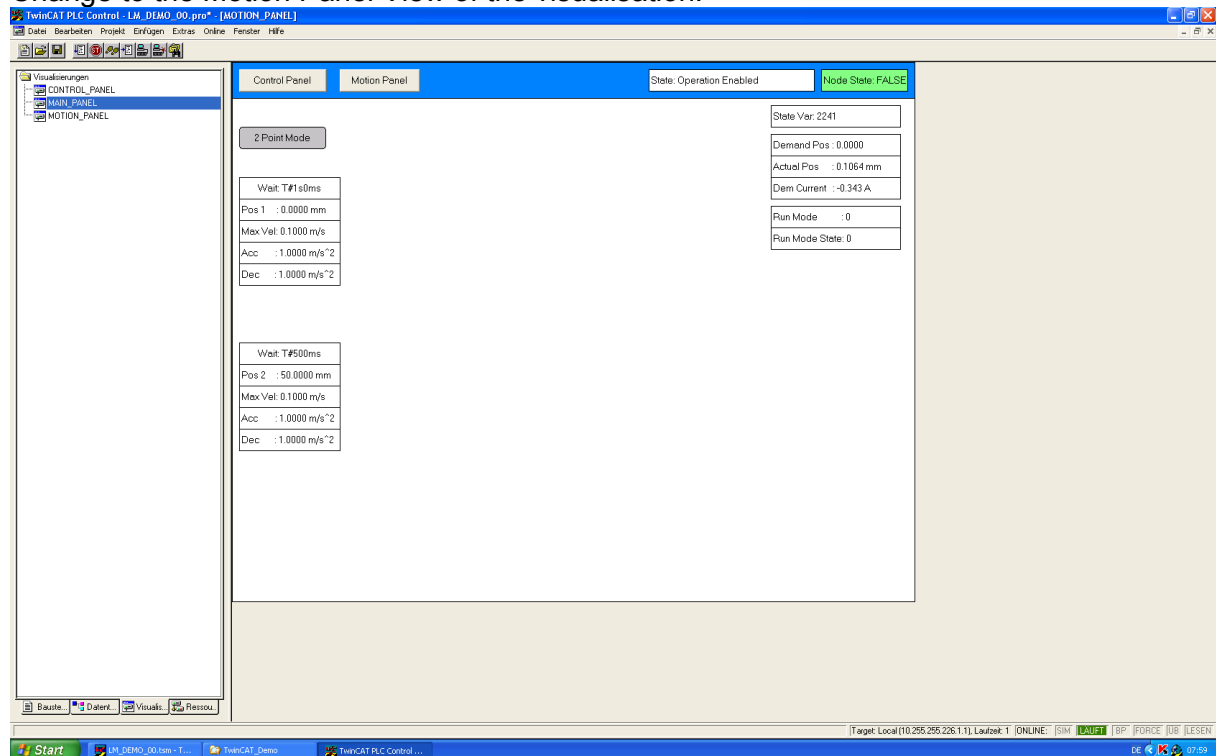
If the State Var changes to 0x90F the homing is finished, which is also indicated by the vanished bit 7 in the Warn Word “Motor not Homed” and the set bit 11 in the Status Word “Homed”

Reset the Control Word bit 11 Home to change to the operation mode:



In the operation mode the high byte of the State Var is 8. In this state the drive accepts motion commands.

Change to the Motion Panel View of the visualisation:



In the “2 Point Mode” the motor alternately moves between Pos 1 and Pos 2. These values probably have to be adapted if your motor is limited to a smaller stroke. To activate the mode just press the “2 Point Mode” button. Now the motor should change between the two positions. The motion parameters can be changed any time and are taken to account at the next motion start. The lowest nibble of the State Var contains the count nibble of the motion command header. Every time this nibble changes, the motion control SW interprets the data of the generic motion control interface. This consists of the motion control header (which selects the type of motion that has to be executed), its count nibble to assure consistent data and the motion command parameters section, which depends on the type of motion command.

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