LinMot®

CANopen Interface for SG5

User Manual

This document applies to the following controllers:
E12x0-xx-xx
(with CANopen Interface SW installed)

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1 System overview

The LinMot E1200 series of servo controllers comply with the following specifications:

- *CiA 102 DS V2.0 CAN physical layer for industrial applications*
- *CiA 301 DS V4.0.2 – CANopen application layer and communication profile*
- *CiA 303-3 DR V1.3: CANopen additional specification – Part 3: Indicator specification*
- *CiA 306 DS V1.3: Electronic data sheet specification for CANopen*

Further information on specifications can be found under: http://www.can-cia.org/

The following resources are available:
- 4 TxPDO
- 4 RxPDO
- 1 TxSDO
- 1 RxSDO

The supported protocols include:
- NMT Error Control (Node Guarding Protocol or Heartbeat Protocol)
- PDO (Transmission type 254, 250 and 1)
- SDO Upload and Download
- NMT (Start, Stop, Enter PreOp, Reset Node, Reset Communication)
- Boot-Up Message

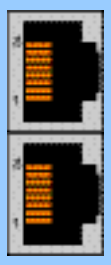
An EDS (Electronic Data Sheet) file is provided for convenient configuration of all CANopen functions of the servo controller via a PLC.

2 Connecting the CAN bus

The CANopen bus can be connected either via X7 or X8.

2.1 Pin assignment of the CMD Connector (X7, X8)

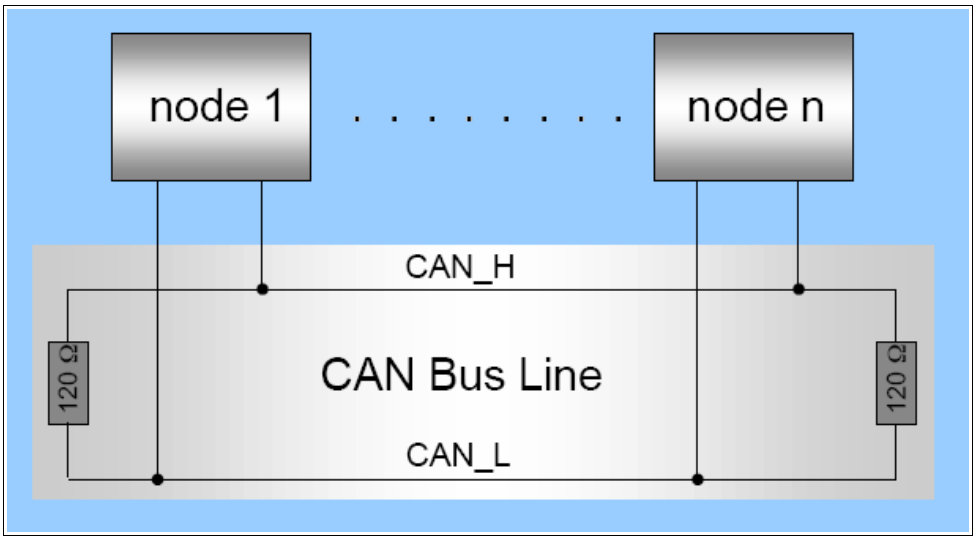
2 x RJ45 with 1:1 connected signals. Standard twisted pairs: 1/2, 3/6, 4/5, 7/8.
Use Ethernet cables according the EIA / TIA 568A standard.



Pin 1	RS485 A
Pin 2	RS485 B
Pin 3	RS485 Y
Pin 4/5	**Ground**
Pin 6	RS485 Z
Pin 7	**CAN H**
Pin 8	**CAN L**

2.2 CAN Termination

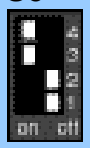
The CAN-bus must be terminated by two 120 Ohm resistors at both ends of the bus line, according to the following figure:



For easy installation, the LinMot CANopen controller has built-in termination resistors, which can be activated, if the LinMot controller is at the end of the bus line, and if there is no termination in the connector.

2.2.1 Activating the termination resistor

S5



Switch 1: AnIn2 pull-down (4k7 Pulldown on X4.4). Set to ON, if X4.4 is used as digital output

Switch 2: Termination resistor for RS485 on CMD (120R between pin 1 and 2 on X7/X8) on/off

Switch 3: CAN termination on CMD (120R between pin 7 and 8 on X7/X8) on/off

Switch 4: CAN termination on ME (120R between pin 7 and 8 on X10/X11) on/off

(Factory setting: all switches “off”)

To activate the built-in termination resistors, switch 3 of S5 has to be set to ON.

3 CANopen Parameters

The CANopen servo controllers have an additional parameter tree branch, which can be configured with the distributed LinMot-Talk software. With these parameters, the CANopen behaviour can be defined.
The LinMot-Talk1100 software can be downloaded from http://www.linmot.com.

It is also possible to configure the servo controller via a PLC by writing to the appropriate CANopen dictionary entries. This has to be done when the servo controller is in the pre-operational state.

If the PLC reconfigures the servo controller, the changes are not reflected in the parameter section of the LinMot-Talk software. The values sent via the PLC will take precedence over the configuration seen in the LinMot-Talk software!

Dis-/Enable With the Dis-/Enable parameter the LinMot servo controller can be run without the CANopen interface going online. So in a first step the system can be configured and run without any bus connection.

CANopen Interface\ Dis-/Enable	
Disable	Servo controller does not take part in the CANopen communication.
Enable	Servo controller takes part in the CANopen communication.

Baud Rate

In this section the parameters for the baud rate selection are located.

Baud Rate Source Select

Defines the source of the baud rate definition.

CANopen Interface\ Baud Rate \Baud Rate Source Select	
By Hex Switch S1	CAN bus baud rate dependent on S1: 0 = By BTR 1 = 125 kBit/s 2 = 250 kBit/s 3 = 500 kBit/s 4 = 1 Mbit/s
By Parameter	The CAN bus baud rate is selected by the “Baudrate Parameter”: - 125 kBit/s [1] - 250 kBit/s [2] - 500 kBit/s [3] - 1 Mbit/s [4]
By BTR	CAN bus baud rate is defined according to the Bit Timing Register

Baud Rate Parameter Definition

The baud rate parameter defines the CAN bus baud rate for the CANopen connection.

CANopen Interface\ Baud Rate\ Baud Rate Parameter Definition	
125 kBit/s	CAN bus baud rate = 125 kBit/s
250 kBit/s	CAN bus baud rate = 250 kBit/s
500 kBit/s	CAN bus baud rate = 500 kBit/s
1 Mbit/s	CAN bus baud rate = 1 Mbit/s

Advanced Bit Timing Setting

For special applications where no standard setting for the baud rate works, this parameter defines the bit timing for the CAN bus. The setting of the baud rate by Bit Timing Register is only necessary on special bus configurations: For example, if there are devices on the bus that have slow optocouplers.

Node-ID

In this section the Node-ID can be configured.

Node-ID Source Select

This parameter defines from which source the Node-ID is taken.

CANopen Interface\ Node-ID\ Node-ID Source Select	
By Hex Switch S2	The Node-ID is determined by the hex switch S2.
By Hex Switches S1 and S2	The Node-ID is determined by the two hex switches S1 and S2.
By Parameter	The Node-ID is determined via an additional parameter.

Node-ID Parameter Value

Used Node-ID, when “By Parameter” is selected as source.
The default value is 63 (3Fh).

PDO Configuration

TxPDO 1..4 Enable
Selector for enabling/disabling the transmit PDO 1..4.

CANopen Interface\ PDO Configuration\ TxPDO 1..4\ TxPDO 1..4 Enable	
Disable	The PDO is deactivated
Enable	The PDO is activated

Transmission Type
This defines the transmission type according to DS 301. The default value is 1 (cyclic synchronous). Type 254 (Asynchronous with inhibit time) is supported as well.
The transmission type 250 is LinMot specific (it is reserved according to DS 301).
If the transmission type 250 is selected, the transmit PDO is sent immediately after reception of the corresponding receive PDO (TxPDO 1 corresponds to RxPDO 1 and so on). It can be used to realize a simple Poll-Request / Poll-Response type bus structure.

Inhibit Time [us]
Defines the minimal time between two send events in multiples of 100us.

Event Time [ms]
Defines the maximal time between two send events in ms.

RxPDO 1..4 Enable
Selector for enabling/disabling the receive PDO 1..4.

CANopen Interface\ PDO Configuration\ RxPDO 1..4\RxPDO 1..4 Enable	
Disable	The PDO is deactivated
Enable	The PDO is activated

Transmission Type
This defines the transmission type according to DS 301. The default value is 1 (cyclic synchronous). Type 254 (Asynchronous with inhibit Time) is supported as well.
The transmission type 250 is LinMot specific (its reserved according to DS 301). If the transmission type 250 is selected, the transmit PDO is sent immediately after reception of the corresponding teceive PDO (TxPDO 1 corresponds to RxPDO 1 and so on). It can be used to realize a simple Poll-Request / Poll-Response type bus structure.

PDO Mapping

TxPDO 1
These parameters define the mapping of the transmit PDO 1.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ TxPDO 1	
Status Word [16Bit]	If this Boolean parameter is set, the status word is transmitted with TxPDO 1.
State Var [16Bit]	If this Boolean parameter is set, the state var (high byte = state / low byte = sub state) is transmitted with TxPDO 1.
Actual Position [32Bit]	If this Boolean parameter is set, the 32-bit actual position is transmitted with TxPDO 1.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to TxPDO 1 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in TxPDO 1 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

TxPDO 2
These parameters define the mapping of the transmit PDO 2.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ TxPDO 2	
Demand Position [32Bit]	If this Boolean parameter is set, the 32-bit demand position is transmitted with TxPDO 2.
Demand Current [32Bit]	If this Boolean parameter is set, the 32-bit demand current value (= motor current) is transmitted with TxPDO 2.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to TxPDO 2 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in TxPDO 2 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

TxPDO 3
These parameters define the mapping of the transmit PDO 3.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ TxPDO 3	
Warn Word [16Bit]	If this Boolean parameter is set, the warn word (= bit coded warnings) is transmitted with TxPDO 1.
Logged Error Code [16Bit]	If this Boolean parameter is set, the logged error code is transmitted with TxPDO 1.
Motion Cmd Status [16Bit]	Feedback of the motion command header (toggle, etc..)
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to TxPDO 3 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in TxPDO 3 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

TxPDO 4
These parameters define the mapping of the transmit PDO 4.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ TxPDO 4	
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to TxPDO 4 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in TxPDO 4 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

RxPDO 1
These parameters define the mapping of the receive PDO 1.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ RxPDO 1	
Control Word [16Bit]	If this Boolean parameter is set, the control word has to be transmitted with RxPDO 1.
Motion Cmd Header [16Bit]	Motion command interface header.
Motion Cmd Par Byte 0..3 [32Bit]	The first 4 bytes of the command parameters of the motion command interface.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to RxPDO 1 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in RxPDO 1 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

RxPDO 2
These parameters define the mapping of the receive PDO 2.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ RxPDO 2	
Motion Cmd Slave Header [16Bit]	To ensure data consistency with asynchronous communication modes, the slave headers have to be used when spreading motion commands across several PDOs.
Motion Cmd Par Byte 4..7 [32Bit]	The second 4 bytes of the command parameters of the motion command interface.
Motion Cmd Par Byte 8..9 [16Bit]	The first half of the third 4 bytes of the command parameters of the motion command interface.
Motion Cmd Par Byte 8..11 [32Bit]	The third 4 bytes of the command parameters of the motion command interface.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to RxPDO 2 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in RxPDO 2 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

RxPDO 3
These parameters define the mapping of the receive PDO 3.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ RxPDO 3	
Motion Cmd Slave Header [16Bit]	To ensure data consistency with asynchronous communication modes, the slave headers have to be used when spreading motion commands across several PDOs.
Motion Cmd Par Byte 10..13 [32Bit]	The fourth 4 bytes of the command parameters of the Motion Command Interface.
Motion Cmd Par Byte 14..15 [16Bit]	The second half of the fourth 4 bytes of the command parameters of the Motion Command Interface.
Motion Cmd Par Byte 12..15 [32Bit]	The fifth 4 bytes of the command parameters of the Motion Command Interface.
Motion Cmd Par Byte 16..19 [32Bit]	The sixth 4 bytes of the command parameters of the Motion Command Interface.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to RxPDO 3 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in RxPDO 3 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

RxPDO 4
These parameters define the mapping of the receive PDO 4.
Eight bytes can be mapped in total.

CANopen Interface\ PDO Mapping\ RxPDO 4	
Motion Cmd Slave Header [16Bit]	To ensure data consistency with asynchronous communication modes, the slave headers have to be used when spreading motion commands across several PDOs.
Motion Cmd Par Byte 16..19 [32Bit]	The sixth 4 bytes of the command parameters of the motion command interface.
By UPID [8-32Bit]	This parameter can be used for free mapping of any parameter or variable to RxPDO 4 (mapping through Unique Parameter ID = UPID, 0 = no mapping). The corresponding data size in RxPDO 4 is derived from the mapped UPID. For Boolean values one byte is used in the PDO with the lowest bit being the value of the Boolean.

NMT Error Control

The heartbeat mechanism takes precedence over the node guarding protocol.
If object 1017h of the object dictionary (Producer Heartbeat Time) is different from zero, the heartbeat protocol is used.
If this entry is zero and the guard time multiplied with the life time factor is not zero, the node guarding protocol is used instead.
If all of these values are zero, no error control mechanism will be active.

The E1200 is also capable of consuming a heartbeat. If object 1016h sub 1 of the object dictionary (Consumer Heartbeat Time 1) is different from zero, a heartbeat is consumed with the node-ID and time (given in ms) taken from this entry.

Node Guarding Protocol

Directory for configuring the node guarding protocol.

CANopen Interface\ NMT Error Control\ Node Guarding Protocol	
Guard Time	The guard time in ms, when the node guarding mechanism is active.
Life Time Factor	Multiplier used with the Guard Time.

The total time that has to pass for a node to trigger a failure is called the node life time. The node life time is the guard time multiplied by the life time factor. Node Guarding starts with the reception of the first guarding message.

Heartbeat Protocol

These parameters configure the heartbeat protocol.

CANopen Interface\ NMT Error Control\ Heartbeat Protocol	
Producer Time	Cycle time for producing a heartbeat in ms.
Consumer Time	Time for the consumed heartbeat in ms.
Consumed Node-ID (Master)	Node-ID of the master, who's heartbeat is monitored.

Legacy Sync Watchdog

These parameters configure the legacy watchdog of the sync telegram. This can be used together with heartbeat or node guarding.
This feature is not part of the DS 301 specifications and is LinMot specific.
The time between the arrival of two sync telegrams is measured. If the measured time exceeds 1.5 * LSW monitored cycle time an error is generated.
The Legacy Sync Watchdog is only active while the NMT-State of the controller is operational. Monitoring via the LSW starts automatically on the transition from Pre-Operational to Operational state.

Watchdog Enable
Enabling/Disabling the legacy sync watchdog feature.

CANopen Interface\ NMT Error Control\ Legacy Sync Watchdog\ LSW Enable	
Disable	The sync watchdog is deactivated.
Enable	The sync watchdog is activated.

LSW monitored Cycle Time
The real expected sync cycle time can be configured here.

4 CANopen Variables

CANopen

These variables show information about the status of the CANopen communication:

CANopen	
NMT State	Shows the NMT state of the controllers. (INITIALISING, STOPPED, PREOPERATIONAL, OPERATIONAL)
Node-ID	Active node-ID of the controller.
Baud Rate	Active baud rate of the controller.
Active Error Control Protocol	Shows if a guarding protocol is active. (None, Heartbeat Protocol, Node Guarding Protocol)
SyncCycle	Time in [us] between the reception of two SYNC messages.
CAN Bit Timing	Value of the CAN Bit Timing Register.

CANopen: Object Dictionary

All supported object dictionary entries can be read here.

5 Mapping of the PDOs

5.1 Default Mapping

The PDOs are mapped by default according to the following scheme:

5.1.1 Default Mapping of the Receive PDOs

RxPDO 1	Length
Control Word	[16Bit]
Motion Cmd Header	[16Bit]
Motion Cmd Par Byte 00..03	[32Bit]
RxPDO 2	**Length**
Motion Cmd Par Byte 04..07	[32Bit]
Motion Cmd Par Byte 08..11	[32Bit]
RxPDO 3	**Length**
Motion Cmd Par Byte 12..15	[32Bit]
Motion Cmd Par Byte 16..19	[32Bit]
RxPDO 4	**Length**
A maximum of 4 parameters with a total maximum length of 64 Bit can be mapped by UPID	[64Bit]

5.1.2 Default Mapping of the Transmit PDOs

TxPDO 1	Length
Status Word	[16Bit]
State Var	[16Bit]
Actual Position	[32Bit]
TxPDO 2	**Length**
Demand Position	[32Bit]
Demand Current	[32Bit]
TxPDO 3	**Length**
Warn Word	[16Bit]
Logged Error Code	[16Bit]
A maximum of 4 parameters with a total maximum length of 32 Bit can be mapped by UPID	[32Bit]
TxPDO 4	**Length**
A maximum of 4 parameters with a total maximum length of 64 Bit can be mapped by UPID	[64Bit]

If the application requires it, the mapping can be completely changed by the PDO Mapping parameter settings. Many applications do not require to use all resources.

5.1.3 Default Identifier

The default identifiers (11 bit identifier) are allocated by the following scheme:

10	9	8	7	6	5	4	3	2	1	0
Function Code				Node ID						

This results in the following table:

Object	Function Code (binary)	COB ID (hex)	COB ID (dec)	Object for Comm. Parameter / Mapping
NMT	0000b	00h	0	-
SYNC	0001b	80h	128	1005h / 1006h / 1007h
Emergency	0001b	81h – FFh	129-255	1014h
TxPDO 1	0011b	181h – 1FFh	385-511	1800h / 1A00h
TxPDO 2	0101b	281h – 2FFh	513-639	1801h / 1A01h
TxPDO 3	0111b	381h – 3FFh	641-767	1802h / 1A02h
TxPDO 4	1001b	481h – 4FFh	769-895	1803h / 1A03h
RxPDO 1	0100b	201h – 27Fh	897-1023	1400h / 1600h
RxPDO 2	0110b	301h – 37Fh	1025-1151	1401h / 1601h
RxPDO 3	1000b	401h – 47Fh	1153-1279	1402h / 1602h
RxPDO 4	1010b	501h – 57Fh	1281-1407	1403h / 1603h
TxSDO	1011b	581h – 5FFh	1409-1535	-
RxSDO	1100b	601h – 67Fh	1537-1663	-
NMT Error Control (NodeGuarding, Heartbeat)	1110b	701h – 77Fh	1793-1919	100Ch / 100Dh (NG) 1016h / 1017h (Heartbeat)

5.2 Using the Motion Command Interface in asynchronous transmission modes

Because the CMD interface of the LinMot controllers consists of more than 8 bytes, it is necessary to link two or more RxPDOs together to ensure data consistency.
This is done by the “Motion CMD Slave Header”. In order to execute a command, the toggle bits of all headers have to be changed to the same new value. On the slave header only the last 4 bits are evaluated, so it is possible to simply copy the “CMD Header” from RxPDO 1 to the “Motion CMD Slave Header” of RxPDOs 2-4.

6 Object Dictionary

In this chapter all entries in the object dictionary, which are supported by the E1200, are listed.

6.1 Communication Profile Area (1000h - 1FFFh)

Index	Sub-Index	Name	Access Type	Data Type
1000h	**-**	**Device Type**	**ro**	**Unsigned32**
		Always zero (= no standardized device profile).		
1001h	**-**	**Error register**	**ro**	**Unsigned8**
		Only bit 0 is supported, which indicates a generic error.		
1005h	**-**	**COB-ID SYNC**	**rw**	**Unsigned32**
		Defines the COB-ID of the Synchronization Object (SYNC).		
1006h	**-**	**Communication cycle period**	**rw**	**Unsigned32**
		This object defines the communication cycle period in µs. This period defines the SYNC interval. It is 0 if not used. The object is only relevant for SYNC producers and is not used in CANopen slaves.		
1007h	**-**	**Synchronous window length**	**rw**	**Unsigned32**
		Contains the length of the time window for synchronous PDOs in µs. It is 0 if not used. This parameter is for compatibility purposes only, it is not used in the LinMot drive.		
1008h	**-**	**Manufacturer Device Name**	**const**	**Unsigned32**
		Contains the last four ASCII characters of the article number (e.g. “1760”).		
100Ch	**-**	**Guard time**	**rw**	**Unsigned16**
		The guard time in milliseconds which is used together with the life time factor for the node guarding protocol. It is 0 if not used.		
100Dh	**-**	**Life time factor**	**rw**	**Unsigned8**
		The life time factor multiplied with the guard time results in the node life time for the node guarding protocol. It is 0 if not used.		
1014h	**-**	**COB-ID Emergency Object**	**rw**	**Unsigned32**
		Defines the COB-ID of the emergency object (EMCY).		

Index	Sub-Index	Name	Access Type	Data Type
1016h	-	Consumer heartbeat time	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	Consumer heartbeat time 1	rw	Unsigned32
		The consumer heartbeat time defines the expected heartbeat cycle time and thus has to be higher than the corresponding producer heartbeat time configured on the device producing this heartbeat. Monitoring starts after the reception of the first heartbeat. If the consumer heartbeat time is 0 the corresponding entry is not used. The time has to be a multiple of 1ms.		
1017h	-	Producer heartbeat time	rw	Unsigned16
		The producer heartbeat time defines the cycle time of the heartbeat. If not used it is to be set to 0. The time has to be a multiple of 1ms.		
1018h	-	Identity Object	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	Vendor ID	ro	Unsigned32
		The vendor ID contains a unique value allocated to each manufacturer of CANopen devices. The vendor ID of LinMot is 0000 0156h.		
	2h	Product Code	ro	Unsigned32
		Contains the controller type.		
	3h	Revision Number	ro	Unsigned32
		Contains the controller version.		
	4h	Serial Number	ro	Unsigned32
		Contains the last four ASCII characters of the serial number.		

Index	Sub-Index	Name	Access Type	Data Type
1400h	**-**	**Receive PDO Communication Parameter 0 (RxPDO 1)**	**-**	**-**
	0h	**Number of Entries**	**ro**	**Unsigned8**
	1h	**COB-ID**	**ro**	**Unsigned32**

31	30	29	28-11	10-0
0: PDO is valid 1: PDO is invalid	0: RTR allowed 1: no RTR allowed	0: (11-bit ID) 1: (29-bit ID)	All 0 if 11-bit identifier	11-bit identifier

		The PDO valid/not valid bit allows to select which PDOs are used in the operational state. Only this bit can be changed by writing to this parameter. The identifiers themselves cannot be changed. The default ID is 200h + Node-ID.		
	2h	**Transmission type**	**rw**	**Unsigned8**
		Only transmission types 1 (cyclic synchronous), 254 (asynchronous) and 250 (poll-request / poll-response) are supported. Type 250 is LinMot specific and not part of the CANopen standard. The Default is 1 (cyclic synchronous).		
1401h	**-**	**Receive PDO Communication Parameter 1 (RxPDO 2)**	**-**	**-**
	0h	**Number of Entries**	**ro**	**Unsigned8**
	1h	**COB-ID**	**ro**	**Unsigned32**
		The default ID is 300h + Node-ID. See 1400h sub 1h for additional details.		
	2h	**Transmission type**	**rw**	**Unsigned8**
		The default is 1 (cyclic synchronous). See 1400h sub 2h for additional details.		
1402h	**-**	**Receive PDO Communication Parameter 2 (RxPDO 3)**	**-**	**-**
	0h	**Number of Entries**	**ro**	**Unsigned8**
	1h	**COB-ID**	**ro**	**Unsigned32**
		The default ID is 400h + Node-ID. See 1400h sub 1h for additional details.		
	2h	**Transmission type**	**rw**	**Unsigned8**
		The default is 1 (cyclic synchronous). See 1400h sub 2h for additional details.		

Index	Sub-Index	Name	Access Type	Data Type
1403h	-	Receive PDO Communication Parameter 3 (RxPDO 4)	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	COB-ID	ro	Unsigned32
		The default ID is 500h + Node-ID. See 1400h sub 1h for additional details.		
	2h	Transmission type	rw	Unsigned8
		The default is 1 (cyclic synchronous). See 1400h sub 2h for additional details.		
1600h	-	Receive PDO Mapping Parameter 0 (RxPDO 1)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for RxPDO 1. A mapping entry is built as follows:		

16-31	8-15	0-7
index	sub-index	Object length

1601h	-	Receive PDO Mapping Parameter 1 (RxPDO 2)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for RxPDO 2 See 1600h sub 1-8h for additional details.		
1602h	-	Receive PDO Mapping Parameter 2 (RxPDO 3)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for RxPDO 3 See 1600h sub 1-8h for additional details.		

Index	Sub-Index	Name	Access Type	Data Type
1603h	-	Receive PDO Mapping Parameter 3 (RxPDO 4)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for RxPDO 4 See 1600h sub 1-8h for additional details.		
1800h	-	Transmit PDO Communication Parameter 0 (TxPDO 1)	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	COB-ID	ro	Unsigned32

31	30	29	28-11	10-0
0: PDO is valid 1: PDO is invalid	0: RTR allowed 1: no RTR allowed	0: (11-bit ID) 1: (29-bit ID)	All 0's if 11-bit identifier	11-bit identifier

		The PDO valid/not valid bit allows to select which PDOs are used in the operational state. Only this bit can be changed by writing to this parameter. The identifiers themselves cannot be changed. The default ID is 180h + Node-ID.		
	2h	Transmission type	rw	Unsigned8
		Only transmission types 1 (cyclic synchronous), 254 (asynchronous) and 250 (poll-request / poll-response) are supported. Type 250 is LinMot specific and not part of the CANopen standard. The Default is 1 (cyclic synchronous).		
	3h	Inhibit time	rw	Unsigned16
		This time is a minimum interval for PDO transmission in asynchronous modes. The value is defined as multiple of 100µs.		
	4h	Reserved	rw	Unsigned8
	5h	Event timer	rw	Unsigned16
		In asynchronous modes additionally an event time can be used for TPDOs. If an event timer exists for a TPDO (value not equal to 0) the elapsed timer is considered to be an event. The event timer elapses as a multiple of 1 ms . This event will cause the transmission of this TPDO in addition to otherwise defined events.		

Index	Sub-Index	Name	Access Type	Data Type
1801h	-	Transmit PDO Communication Parameter 1 (TxPDO 2)	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	COB-ID	ro	Unsigned32
		The default ID is 280h + Node-ID. See 1800h sub 1h for additional details.		
	2h	Transmission type	rw	Unsigned8
		The default is 1 (cyclic synchronous). See 1800h sub 2h for additional details.		
	3h	Inhibit time	rw	Unsigned16
		See 1800h sub 3h for additional details.		
	4h	Reserved	rw	Unsigned8
		-		
	5h	Event timer	rw	Unsigned16
		See 1800h sub 5h for additional details.		
1802h	-	Transmit PDO Communication Parameter 2 (TxPDO 3)	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	COB-ID	ro	Unsigned32
		The default ID is 380h + Node-ID. See 1800h sub 1h for additional details.		
	2h	Transmission type	rw	Unsigned8
		The default is 1 (cyclic synchronous). See 1800h sub 2h for additional details.		
	3h	Inhibit time	rw	Unsigned16
		See 1800h sub 3h for additional details.		
	4h	Reserved	rw	Unsigned8
		-		
	5h	Event timer	rw	Unsigned16
		See 1800h sub 5h for additional details.		

Index	Sub-Index	Name	Access Type	Data Type
1803h	-	Transmit PDO Communication Parameter 3 (TxPDO 4)	-	-
	0h	Number of Entries	ro	Unsigned8
	1h	COB-ID	ro	Unsigned32
		The default ID is 480h + Node-ID. See 1800h sub 1h for additional details.		
	2h	Transmission type	rw	Unsigned8
		The default is 1 (cyclic synchronous). See 1800h sub 2h for additional details.		
	3h	Inhibit time	rw	Unsigned16
		See 1800h sub 3h for additional details.		
	4h	Reserved	rw	Unsigned8
		-		
	5h	Event timer	rw	Unsigned16
		See 1800h sub 5h for additional details.		
1A00h	-	Transmit PDO Mapping Parameter 0 (TxPDO 1)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for TxPDO 1 See 1600h sub 1-8h for additional details.		
1A01h	-	Transmit PDO Mapping Parameter 1 (TxPDO 2)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for TxPDO 2 See 1600h sub 1-8h for additional details.		

Index	Sub-Index	Name	Access Type	Data Type
1A02h	-	Transmit PDO Mapping Parameter 2 (TxPDO 3)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for TxPDO 3 See 1600h sub 1-8h for additional details.		
1A03h	-	Transmit PDO Mapping Parameter 3 (TxPDO 4)	-	-
	0h	Number of mapped application objects in PDO	rw	Unsigned8
		Number of valid mapping entries. Can be between 0 and 8.		
	1h-8h	PDO Mapping Entry 1-8	rw	Unsigned32
		Contains the mapping for TxPDO 4 See 1600h sub 1-8h for additional details.		

6.2 Manufacturer specific Profile Area (2000h – 5FFFh)

6.2.1 UPID Commands

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

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	01h	RAM Value	rw	Bool - Unsigned32

Read / Write the RAM Value of a UPID. Any UPID from a Boolean type up to an unsigned32 type can be read or written.

Read RAM Value by UPID

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	01h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Write RAM Value by UPID

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data		Data	
Data	23h	yyh	yyh	01h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID
xx xx xx xx: Value to write (size depends on the UPID that will be written)

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	02h	ROM Value	rw	Bool - Unsigned32

Read / Write the ROM Value of a UPID. Any UPID from a Boolean type up to an unsigned32 type can be read or written. If a value in the ROM is changed, it is not immediately reflected in the RAM. Values are read from the ROM to the RAM on startup of the controller. Use the “RAM/ROM Write” command (sub-index 06h) to changes both values at the same time.

Read ROM Value by UPID

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	02h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Write ROM Value by UPID

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data		Data	
Data	23h	yyh	yyh	02h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID
xx xx xx xx: Value to write (size depends on the UPID that will be written)

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	03h	Min Value	ro	Bool - Unsigned32

The minimal possible value of the UPID is returned.

Read Min Value by UPID

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	03h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	04h	Max Value	ro	Bool - Unsigned32

The maximal possible value of the UPID is returned.

Read Max Value by UPID

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	04h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	05h	Default Value	ro	Bool - Unsigned32

The default value of the UPID is returned.

Read Default Value by UPID

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	05h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Index	Sub-Index	Description	Access Type	Data Type
2000h + UPID	06h	RAM/ROM Write	wo	Bool - Unsigned32

Write the RAM and ROM Value of a UPID. Any UPID from a Boolean type up to an unsigned32 type can be written.

Write RAM/ROM Value by UPID

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data		Data	
Data	23h	yyh	yyh	06h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID
xx xx xx xx: Value to write (size depends on the UPID that will be written)

Index	Sub-Index	Description	Access Type	Data Type
2000h	20h	Start Getting UPID List	wo	Unsigned16

With this command, the starting UPID can be set from which the command “Get Next UPID List item” begins returning info when called. This command has to be sent at least once before information on UPIDs can be retrieved via the “Get Next UPID List item” command.

Start getting UPID List

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data		Data	
Data	23h	yyh	yyh	20h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data
yy yy: 2000h + UPID

Index	Sub-Index	Description	Access Type	Data Type
2000h	21h	Get Next UPID List item	ro	Unsigned32

With this command information on UPIDs can be read. After the initialisation with the command “Start getting UPID List”, information on UIPIDs can be read with this command. The command can be repeatedly issued. With each new command, the information on the next existing UPID is sent.
When the end of the list is reached, the UPID FFFFh is sent.

Get Next UPID List item

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	yyh	yyh	21h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

yy yy: 2000h + UPID

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Address Usage		UPID found	
Data	42h	yyh	yyh	21h	yyh	yyh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB

yy yy: Address Usage
xx xx: UPID which was found

Address Usage is interpreted as follows:

	RAM Read allowed	RAM Write allowed	ROM Read allowed	ROM Write allowed					Live Parameter				Parameter is included when calculating the hash table.	This Parameter is used for security Features.		
Bit Nr.:	0 (LSB)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 (MSB)

Index	Sub-Index	Description	Access Type	Data Type
2000h	22h	Start Getting Modified UPID List	wo	Unsigned16
		This command is used in the same way as the “Start Getting UPID List” command (2000h sub 20h). Only UPIDs with values that differ from their default values are returned.		
2000h	23h	Get Next Modified UPID List item	ro	Unsigned32
		This command is used the in same way as the “Get Next UPID List item” command (2000h sub 21h). Only UPIDs with values that differ from their default values are returned.		

6.2.2 System Commands

Index	Sub-Index	Description	Access Type	Data Type
2000h	07h	Set ROM to default (OS)	wo	Unsigned8 - Unsigned32

Set all parameters of the OS to default values. This command needs about 0.5s to finish. Any data can be written for the command to be executed.

Set ROM to default (OS)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	07h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

Index	Sub-Index	Description	Access Type	Data Type
2000h	08h	Set ROM to default (MC SW)	wo	Unsigned8 - Unsigned32

Set all parameters of the MC SW to default values. This command needs about 2s to finish. Any data can be written for the command to be executed.

Set ROM to default (MC SW)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	08h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

Index	Sub-Index	Description	Access Type	Data Type
2000h	09h	Set ROM to default (Interface)	wo	Unsigned8 - Unsigned32

Set all parameters of the Interface to default values. This command needs about 0.5s to finish. Any data can be written for the command to be executed.

Set ROM to default (Interface)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	09h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

2000h	0Ah	Set ROM to default (Application)	wo	Unsigned8 - Unsigned32

Set all parameters of the Application to default values. This command needs about 0.5s to finish. Any data can be written for the command to be executed.

Set ROM to default (Application)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	0Ah	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

2000h	0Bh	Reset Controller	wo	Unsigned8 - Unsigned32

Initiates a software reset of the controller. Any data can be written for the command to be executed.

Reset Controller

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	0Bh	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

2000h	35h	Stop MC and APPL Software	wo	Unsigned8 - Unsigned32

MC SW and Application SW are stopped. Any data can be written for the command to be executed.

Stop MC and APPL Software

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	35h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB

xx xx xx xx: Any Data

Index	Sub-Index	Description	Access Type	Data Type
2000h	36h	Start MC and APPL Software	wo	Unsigned8 - Unsigned32

MC SW and Application SW are started. Any data can be written for the command to be executed.

Start MC and APPL Software

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	36h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

6.2.3 Curve Service Commands

See the *"LinMot 1100 Servo Controller Configuration over Fieldbus Interfaces"* for additional detail on the use of curve commands and a description of the content of the curve info and data blocks.

Index	Sub-Index	Description	Access Type	Data Type
2000h	40h	Curve Service: Save to Flash	wo	Unsigned8 - Unsigned32

All curves are saved from the RAM to the flash and are thus permanently saved. MC SW and application have to be stopped in order for this command to work (see command 2000h sub 35: Stop MC and Application Software). Any data can be written for the command to be executed.

Curve Service: Save to Flash

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	40h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

Index	Sub-Index	Description	Access Type	Data Type
2000h	41h	Curve Service: Delete all Curves (RAM)	wo	Unsigned8 - Unsigned32

All curves in the RAM are deleted. This does NOT delete curves from the flash. After a system reset, the curves are loaded again from the flash to the RAM. Any data can be written for the command to be executed.

Curve Service: Delete all Curves (RAM)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	41h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any Data

Index	Sub-Index	Description	Access Type	Data Type
2000h	42h	Curve Service: Poll Flash	ro	Unsigned8

Read Parameter to get the status of a flash operation:
Result = 00h : State = Idle
Result = 04h : State = Busy
This command can be used to check if a flash operation is still ongoing (e.g. command 2000h sub 40h: Curve Service:save to flash)

Curve Service: Poll Flash

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	42h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Result			
Data	42h	00h	20h	42h	xxh	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx: Result

Index	Sub-Index	Description	Access Type	Data Type
2000h	43h	Curve Service: Get Last Curve Service Command Result	ro	Unsigned32

This command is used the get the results of curve service commands which are initiated with an SDO write command from the PLC.
The result of the last executed curve service command is given in the following format:

Get Last Curve Service Command Result

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	43h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Result	CSCindex		CSCsub-index
Data	42h	yyh	yyh	43h	zzh	yyh	yyh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

zz: Result of the executed command. See the corresponding command for details on how to interpret these results, as its meaning differs from command to command.

yy yy: Index of the last executed curve service command which can have a result.

xx: Index of the last executed curve service command which can have a result.

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	50h	Curve Service: Add Curve	wo	Unsigned32

With this command a curve with the ID “CurveID” will be created. Up to 100 curves can be programmed into the controller. If a curve with the same ID already exists, an error will be generated which can be checked with the “Get Last Curve Service Command Result” command:

00h: No Error
D4h: Curve already exists

Curve Service: Add Curve

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	InfoBlockSize		DataBlockSize	
Data	23h	CurveID	20h	50h	xxh	xxh	yyh	yyh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx: Size of the curve info block in bytes
yy yy: Size of the curve data block in bytes

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	53h	Curve Service: Add Curve Data (32 Bit)	wo	Unsigned32

The Curve Data Block can be written in increments of 4 Bytes at a time. This way one setpoint (32Bit) can be written at a time
To write the Data Block, this command has to be repeatedly called, with each call containing the next setpoint of the Data Block.
With the “Get Last Curve Service Command Result” command, one can check if the Info Block has already been written:

00h: Data Block is finished
04h: Data Block is not finished
D0h: Error: Data Block was already finished

Curve Service: Add Curve Data (32Bit)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	InfoBlock Data			
Data	23h	CurveID	20h	53h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Curve data block data: one setpoint as a 32Bit value

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	54h	Curve Service: Add Curve Info Block (32 Bit)	wo	Unsigned32

The Curve Info Block can be written in increments of 4 bytes at a time.
To write the info block, this command has to be repeatedly called, with each call containing the next 4 bytes of the info block.
With the "Get Last Curve Service Command Result" command, one can check if the info block has already been written:

00h: Info Block is finished
04h: Info Block is not finished
D0h: Error: Info Block was already finished

Curve Service: Add Curve Info Block (32Bit)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	InfoBlock Data			
Data	23h	CurveID	20h	54h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Curve info block data

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	60h	Curve Service: Get Curve	ro	Unsigned32

The "Get Curve" command has to executed first in order to read a curve from the controller via SDO. With the commands "Get Curve Info Block" and "Get Curve Data Block" the corresponding blocks of the curve can be read afterwards.

Curve Service: Get Curve

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	60h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Result	CSInfoBlockSize	CSDataBlockSize	
Data	42h	CurveID	20h	60h	xxh	yyh	zzh	zzh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx: Result: 00h = Curve exists
D4h = Curve does not exist

yy: Curve Info Block Size in Bytes

zz zz: Curve Data Block Size in Bytes

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	61h	Curve Service: Get Curve Info Block	ro	Unsigned32

The Curve Info Block can be read in increments of 4 Bytes.
To read the Info Block, this command has to be repeatedly called, with each call one can read the next 4 Bytes of the Info Block.
With the “Get Last Curve Service Command Result” command, one can check if the Info Block has already been read:

00h: Info Block is finished
04h: Info Block is not finished
D0h: Error: Info Block was already finished

Curve Service: Get Curve Info Block

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	61h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	InfoBlock Data			
Data	42h	CurveID	20h	61h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Info Block Data

Index	Sub-Index	Description	Access Type	Data Type
2000h + CurveID	62h	Curve Service: Get Curve Data	ro	Unsigned32

The Curve Data Block can be read in increments of 4 Bytes.
To read the Data Block, this command has to be repeatedly called, with each call one can read the next 4 Bytes of the Data Block.
With the “Get Last Curve Service Command Result” command, one can check if the Data Block has already been read:

00h: Data Block is finished
04h: Data Block is not finished
D0h: Error: Info Block was already finished

Curve Service: Get Curve Data Block

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	62h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	DataBlock Data			
Data	42h	CurveID	20h	62h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Data Block Data

6.2.4 Error Log Commands

With these commands the error log of a controller can be read.

Index	Sub-Index	Description	Access Type	Data Type
2000h	70h	Get Error Log Entry Counter	ro	Unsigned32

This command returns the number of logged errors as well as the total number of occurred errors.

Get Error Log Entry Counter

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	70h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	NrOfLoggedErr		NrOfOccErr	
Data	42h	CurveID	20h	70h	xxh	xxh	yyh	yyh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx: Number of logged errors

yy yy: Number of occurred errors

2000h + EntryNr	71h	Get Error Log Entry Error Code	ro	Unsigned32

This command returns the corresponding error code to the entry number.

Get Error Log Entry Error Code

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	71h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	SourceID		Error Code	
Data	42h	CurveID	20h	71h	xxh	xxh	yyh	yyh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx: SourceID: ID of the part of the firmware which triggered the error:
1: OS
2: Motion Control Software
3: Interface (e.g. CANopen)
4: Application (e.g. EasySteps)

yy yy: Error Code: Further Information on the meaning of the error codes can be found in the manuals of the respective firmware parts.

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	72h	Get Error Log Entry Time low	ro	Unsigned32

This command returns the lower 32 bits of the controllers system time when the error has occurred.

Get Error Log Entry Time low

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	72h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Time Low			
Data	42h	CurveID	20h	72h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Lower 32 Bits of the system time the error occurred.

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	73h	Get Error Log Entry Time high	ro	Unsigned32

This command returns the higher 32 bits of the controllers system time when the error happened.

Get Error Log Entry Time high

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	73h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Time High			
Data	42h	CurveID	20h	73h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Higher 32 Bits of the system time the error occurred.

Index	Sub-Index	Description	Access Type	Data Type
2000h + ErrCode	74h + (Stringlet Nr. 0..7)	Get Error Code Text Stringlet	ro	Unsigned32

This command returns an error stringlet to a the corresponding error code. A stringlet is made up of four ASCII characters. Error code texts can have a maximum of 32 characters.

Get Error Code Text Stringlet

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

Data	SDO CS	Index		Sub-Index				
	40h	2000h + ErrCode		74h + Stringlet Nr.	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

Data	SDO CS	Index		Sub-Index	Stringlet			
	42h	2000h + ErrCode		74h + Stringlet Nr.	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Stringlet (each byte represents one character in ASCII format)

6.2.5 Command Table Commands

See the *"LinMot 1100 Servo Controller Configuration over Fieldbus Interfaces"* for additional detail on the use of the command table and a description of the CT entry format.

Index	Sub-Index	Description	Access Type	Data Type
2000h	80h	CT: Save to Flash	wo	Unsigned8 - Unsigned32

Write any data with this command to save the command table which is in the RAM to the ROM. The command table is loaded on startup of the controller from the ROM to the RAM.
Any data can be written for the command to be executed.

Command Table: Save to Flash

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

Data	SDO CS	Index		Sub-Index	InfoBlock Data			
	23h	00h	20h	80h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any data

Index	Sub-Index	Description	Access Type	Data Type
2000h	80h	CT: Poll Flash	ro	Unsigned8

Read Parameter to get the status of a flash operation:
Result = 00h : State = Idle
Result = 04h : State = Busy
This command can be used to check if a flash operation is still ongoing (e.g. command 2000h sub 80: CT:save to flash)

Command Table: Poll Flash

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	80h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Result			
Data	42h	00h	20h	80h	xxh	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx: Result

2000h	81h	CT: Delete all Entries (RAM)	wo	Unsigned32

Write anything to delete the complete Command Table in the RAM.

Command Table: Delete all Entries (RAM)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	00h	20h	81h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any data

2000h + EntryNr	82h	CT: Delete Entry (Entry Nr.)	wo	Unsigned32

Write anything to delete the CT entry with the corresponding number in the RAM. The ROM entry of the CT entry is not deleted this way.

Command Table: Delete Entry (Entry Nr.)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index	Data			
Data	23h	EntryNr	20h	82h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Any data

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	83h	CT: Write Entry (Entry Nr.)	wo	Unsigned32

This command has to be executed first if one wants to write write a CT entry to the RAM. This command writes the block size of the CT entry to the RAM. Afterwards the data for the entry can be written with the command “CT: Write Entry Data”.

Command Table: Write Entry (Entry Nr.)

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

Data	SDO CS	Index		Sub-Index	Block Size			
	23h	EntryNr	20h	83h	xxh	xxh	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx: Block size of CT entry

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	84h	CT: Write Entry Data	wo	Unsigned32

The CT entry data can be written in increments of 4 Bytes.
To write the entry data, this command has to be repeatedly called, while each call contains the next 4 bytes of data.
The entry will be activated when the last byte of the entry data has been written.

Command Table: Write Entry Data

COB-ID 600 + Node-ID, SDO Write from PLC to LinMot Controller:

Data	SDO CS	Index		Sub-Index	CT Entry Data			
	23h	EntryNr	20h	84h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: CT entry Data

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	85h	CT: Get Entry (Entry Nr.)	ro	Unsigned32

Read the block size of a CT Entry.

Command Table: Get Entry (Entry Nr.)

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

Data	SDO CS	Index		Sub-Index				
	40h	EntryNr	20h	85h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

Data	SDO CS	Index		Sub-Index	Block Size			
	42h	EntryNr	20h	85h	xxh	xxh	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx: Block size

Index	Sub-Index	Description	Access Type	Data Type
2000h + EntryNr	86h	CT: Get Entry Data	ro	Unsigned32

The CT entry data can be read in increments of 4 Bytes.
To read the entry data, this command has to be repeatedly called, while the response to each call contains the next 4 bytes of data.

Command Table: Get Entry Data

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	EntryNr	20h	86h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Entry Data			
Data	42h	EntryNr	20h	86h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Entry data

Index	Sub-Index	Description	Access Type	Data Type
2000h	87h	CT: Get Entry List (Entry 0..31)	ro	Unsigned32

With this command a bitfield is read, which indicates the presence of a CT entry (0 = CT entry present, 1 = No CT entry present).

CT: Get Entry List (Entry 0..31)

COB-ID 600 + Node-ID, SDO Read from PLC to LinMot Controller:

	SDO CS	Index		Sub-Index				
Data	40h	00h	20h	87h	-	-	-	-
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

Return Value

COB-ID 580 + Node-ID, Response from LinMot Controller to PLC:

	SDO CS	Index		Sub-Index	Entry presence bitfield			
Data	42h	00h	20h	87h	xxh	xxh	xxh	xxh
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

xx xx xx xx: Entry presence bitfield

Index	Sub-Index	Description	Access Type	Data Type
2000h	88h	CT: Get Entry List (Entry 32..63)	ro	Unsigned32

See command 2000h sub 87h for details.

Index	Sub-Index	Description	Access Type	Data Type
2000h	89h	CT: Get Entry List (Entry 64..95)	ro	Unsigned32

See command 2000h sub 87h for details.

Index	Sub-Index	Description	Access Type	Data Type
2000h	8Ah	CT: Get Entry List (Entry 96..127)	ro	Unsigned32
		See command 2000h sub 87h for details.		
2000h	8Bh	CT: Get Entry List (Entry 128..159)	ro	Unsigned32
		See command 2000h sub 87h for details.		
2000h	8Ch	CT: Get Entry List (Entry 160..191)	ro	Unsigned32
		See command 2000h sub 87h for details.		
2000h	8Dh	CT: Get Entry List (Entry 192..223)	ro	Unsigned32
		See command 2000h sub 87h for details.		
2000h	8Eh	CT: Get Entry List (Entry 224..255)	ro	Unsigned32
		See command 2000h sub 87h for details.		

7 Examples

7.1 Homing and motion commands

For details on the use of motion commands, consult the manual "*Usermanual MotionCtrlSW 1100*".

The following example shows the homing procedure and execution of a motion command via CANopen with the default PDO mapping:

1) Homing (Control Word = 083Fh)

RxPDO 1

	ControlWord		MCHeader		MC Par Bytes 0..3			
Data	3Fh	08h	00h	00h	00h	00h	00h	00h
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

2) Enter Operational State (Control Word = 003Fh)

RxPDO 1

	ControlWord		MCHeader		MC Par Bytes 0..3			
Data	3Fh	00h	00h	00h	00h	00h	00h	00h
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

3) Execute Motion Command : VAI 16Bit Go To Pos (090xh)

CMD Header	→			0901h
Par Byte 0…1	→	Target Position :	50mm	01F4h
Par Byte 2…3	→	Maximal Velocity :	1m/s	03E8h
Par Byte 4…5	→	Acceleration :	$10m/s^2$	0064h
Par Byte 6…7	→	Deceleration :	$10m/s^2$	0064h

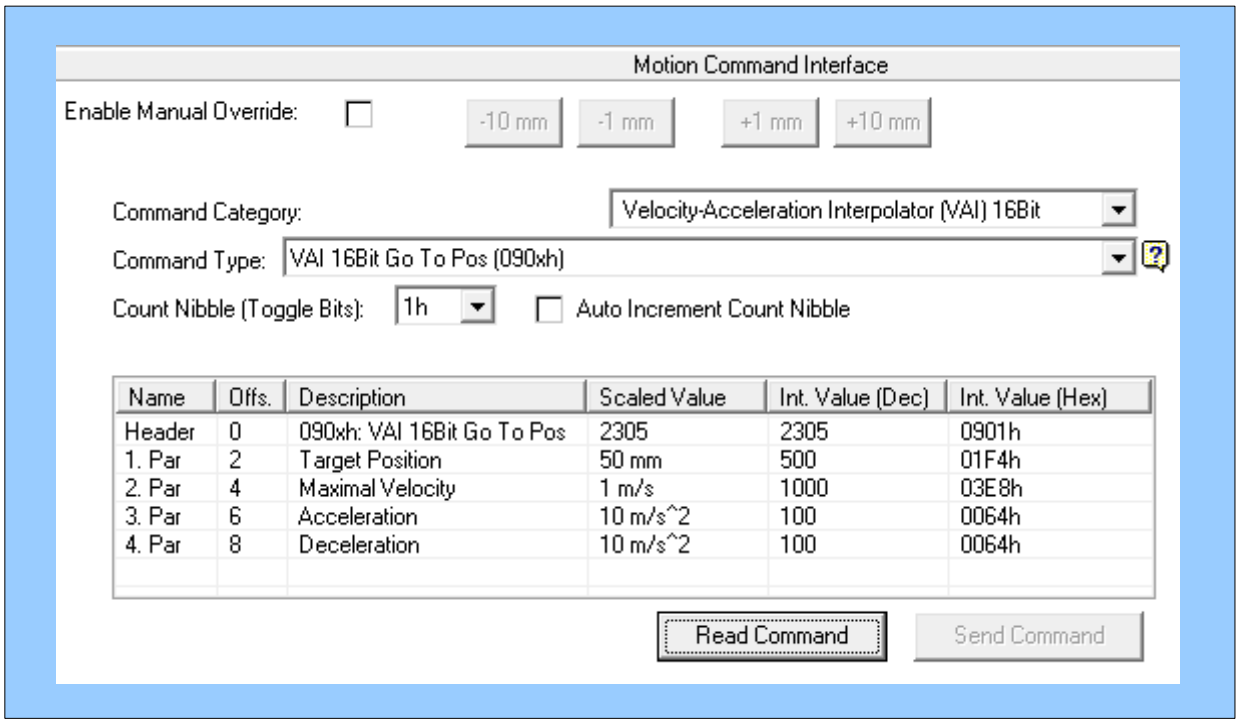
RxPDO 1

	ControlWord		MCHeader		MC Par Bytes 0..3			
Data	3Fh	00h	01h	09h	F4h	01h	E8h	03h
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

RxPDO 2

	MC Par Bytes 4..7				MC Par Bytes 8..11			
Data	64h	00h	64h	00h	00h	00h	00h	00h
Byte	01 (LSB)	02	03	04	05	06	07	08 (MSB)

In the LinMot-Talk1100 Control Panel, one can check the last executed motion command by pressing the «Read Command» button. It should look like this now that the command has been executed:



8 Reset Parameters to default values

There are three options to reset the parameters of a LinMot E12x0 controller to default values:

1) By manipulating the two rotary hex switches (resets ALL parameters):
   1. Power off the controller
   2. Set the switches to FFh
   3. Power on the controller (Error and Warn LEDs flash alternating)
   4. Set the switches to 00h
   5. Wait until Enable and Warn LED start to turn off and on
   6. Power off the controller

2) By writing index 2000h sub-index 7h, 8h, 9h, Ah of the object dictionary. After resetting the ROM values, a reset should be performed either by sending a “NMT Reset” command or by turning the controller off and on again. This has to be done to reload the RAM values from the ROM.

3) Reinstalling the firmware will always reset all parameters to default values

9 Configuration of the E1200 with an EDS File

The EDS file for the E1200 series is compliant with the standard:
"CiA 306 DS V1.3: Electronic data sheet specification for CANopen".
Visit http://www.can-cia.org/ for detailed information.

The EDS file is part of the Lintalk1100 software which can be downloaded from http://www.LinMot.com.

The EDS file is located at *"..\Firmware\Interfaces\CanOpen\EDS"* in the installation folder of the LinMot-Talk1100 software.

Consult the usermanual of your PLC for details on how to use an EDS file with it.

If an EDS file is used, in most cases the PLC will automatically download this configuration via SDO commands to the servo controller.
This is done before the controller is set to the operational state.
Any configuration settings that have been done in the LinMot-Talk1100 software are overwritten this way!

9.1 Configuring a PDO variable by UPID with the EDS file

For every PDO a maximum of 4 parameters can be mapped by their UPIDs.
If a parameter is configured to a PDO via its UPID, the used space in the PDO is dependent on the data type of the configured parameter. If a boolean variable is configured, one byte of the PDO is used.

9.1.1 Setting the UPIDs of the parameter to map to a PDO

The UPIDs to map can be set via the dictionary entries 4F01h sub 1-4h for RxPDO1 to 4F08h sub 1-4h for TxPDO4. The controller automatically maps those parameters to the PDOs. If to much data would be mapped to one PDO, an error is generated.

9.1.2 Getting UPID PDO data into PLC variables

Since any parameter with a UPID can be mapped this way, it is not possible to reflect this with the EDS file. The user has to configure the PDO mapping on the PLC with dummy variables for the UPIDs. This way the PLC recognizes that data will be transmitted at the according bytes in the PDO. For every PDO there are several of those placeholders (Objects 4F01h sub 5-Ah for RxPDO1 to 4F08h sub 5-Ah for TxPDO4).
The mapping entries in the object dictionary contain the entries for mapped UPIDs (4F01h – 4F08h) and NOT the placeholder-objects for the PLC.

9.1.3 Example

Configuration of TxPDO4 to transmit the following parameters:

- X4.4 Analog Voltage (UPID 1CA4h), UInt16
- Diff Analog Voltage (UPID 1CA6h), SInt16
- Difference Velocity (UPID 1B91h), Sint32

1. Configuring the UPIDs:

Object dictionary entry to write	Value
4F08h sub 1h (TPDO4 UPIDs 1)	1CA4h
4F08h sub 2h (TPDO4 UPIDs 2)	1CA6h
4F08h sub 3h (TPDO4 UPIDs 3)	1B91h

2. Set the PDO mapping in the PLC:

Object dictionary entry to map	Map entry to
4F08h sub 7h (TPDO4 2 Byte UPID mapped)	TPDO4
4F08h sub 8h (TPDO4 2 Byte UPID mapped)	TPDO4
4F08h sub 9h (TPDO4 4 Byte UPID mapped)	TPDO4

3. The TxPDO4 now contains the following data:

TxPDO 4

	X4.4 Analog Voltage		Diff Analog Voltage		Difference Velocity			
Data	**xxh**	**xxh**	**yyh**	**yyh**	**zzh**	**zzh**	**zzh**	**zzh**
Byte	**01 (LSB)**	**02**	**03**	**04**	**05**	**06**	**07**	**08 (MSB)**

The PDO mapping entries in the object dictionary look like this:

Mapping entry	Value
1A03h sub 1h (Transmit PDO Mapping Parameter 3: PDO mapping entry 1)	4F080110h
1A03h sub 2h (Transmit PDO Mapping Parameter 3: PDO mapping entry 2)	4F080210h
1A03h sub 3h (Transmit PDO Mapping Parameter 3: PDO mapping entry 3)	4F080320h

10 Interface Error Codes

Please refer to “Usermanual Motion Control Software” for the error codes of the MC software. The CANopen interface has the following additional error codes:

Error Code	Error Description	Recommended Actions
C1h	The Controller is not compatible with CANopen	The controller does not support CANopen interface software. Download an appropriate firmware to the controller.
C2h	The configured ID is not valid (switches or parameter)	Select a valid node address.
C5h	CANopen Error: Bus error	Check CAN termination, baud rate and cabling.
C6h	CANopen Error: general Bus error	Check CAN termination, baud rate and cabling.
C7h	CANopen Error: Bus error, stuff error	Check CAN termination, baud rate and cabling.
C8h	CANopen Error: Bus error, form error	Check CAN termination, baud rate and cabling.
C9h	CANopen Error: Bus error, ack error	Check CAN termination, baud rate and cabling.
CAh	CANopen Error: Bus error, bit 1 error	Check CAN termination, baud rate and cabling.
CBh	CANopen Error: Bus error, bit 0 error	Check CAN termination, baud rate and cabling.
CCh	CANopen Error: Bus error, CRC error	Check CAN termination, baud rate and cabling.
CDh	CANopen Error: Error Control Timeout	CANopen Timeout. Is the master running?
CFh	CANopen Error: Invalid ID by Hex Switch S1	Invalid baud rate selected by S1. Check S1. Only 1..4 are valid settings.
D0h	CANopen Error: Invalid Mapping in TxPDO 1	More than 8 byte data mapped into TPDO 1. Verify the mapping (by UPID should be 0 to be deactivated).
D1h	CANopen Error: Invalid Mapping in TxPDO 2	More than 8 byte data mapped into TPDO 2. Verify the mapping (by UPID should be 0 to be deactivated).
D2h	CANopen Error: Invalid Mapping in TxPDO 3	More than 8 byte data mapped into TPDO 3. Verify the mapping (by UPID should be 0 to be deactivated).
D3h	CANopen Error: Invalid Mapping in TxPDO 4	More than 8 byte data mapped into TPDO 4. Verify the mapping (by UPID should be 0 to be deactivated).
D4h	CANopen Error: Invalid Mapping in RxPDO 1	More than 8 byte data mapped into RPDO 1. Verify the mapping (by UPID should be 0 to be deactivated).

Error Code	Error Description	Recommended Actions
D5h	CANopen Error: Invalid Mapping in RxPDO 2	More than 8 byte data mapped into RPDO 2. Verify the mapping (by UPID should be 0 to be deactivated).
D6h	CANopen Error: Invalid Mapping in RxPDO 3	More than 8 byte data mapped into RPDO 3. Verify the mapping (by UPID should be 0 to be deactivated).
D7h	CANopen Error: Invalid Mapping in RxPDO 4	More than 8 byte data mapped into RPDO 4. Verify the mapping (by UPID should be 0 to be deactivated).
D8h	CANopen Error: Invalid UPID in TxPDO 1 Mapping	Check the UPID, which is configured by “mapping by UPID”.
D9h	CANopen Error: Invalid UPID in TxPDO 2 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DAh	CANopen Error: Invalid UPID in TxPDO 3 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DBh	CANopen Error: Invalid UPID in TxPDO 4 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DCh	CANopen Error: Invalid UPID in RxPDO 1 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DDh	CANopen Error: Invalid UPID in RxPDO 2 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DEh	CANopen Error: Invalid UPID in RxPDO 3 Mapping	Check the UPID, which is configured by “mapping by UPID”.
DFh	CANopen Error: Invalid UPID in RxPDO 4 Mapping	Check the UPID, which is configured by “mapping by UPID”.

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