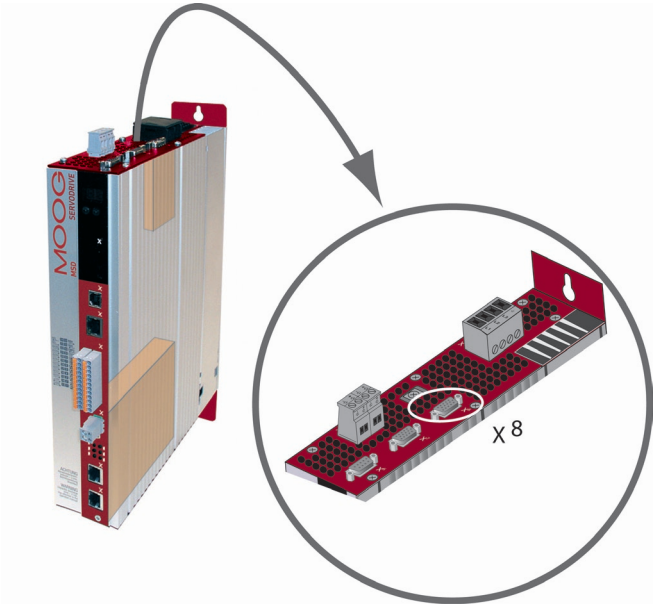

MSD Servo Drive

Specification

Option 2 - Technology

SSI Encoder Simulation

Specification
Option 2 - Technology

SSI Encoder Simulation

ID No: CB08760-001, Rev. 1.5

Date: 10/2019

NOTE:

This document does not replace the MSD Servo Drive Operation Manual. Please be sure to observe the information contained in the “For your safety”, “Intended use” and “Responsibility” sections of the Operation Manual. For information on installation, setup and commissioning, and details of the warranted technical characteristics of the MSD Servo Drive series, refer to the additional documentation (Operation Manual, Device Help, etc.).

This documentation applies to:

Series	Model	**Firm**ware version
MSD Servo Drive Single-Axis System	G392-xxxxx6xxxxx G395-xxx-x6xxxxx	from V124.25-00 from V124.25-00
MSD Servo Drive Multi-Axis System	G393-xxx-x6xxxxx G397-xxx-x6xxxxx	from V124.25-00
MSD **Single-Axis Servo Drive** Compact	not available	-

Table V.1 Applicability

Technical alterations reserved.

The contents of our documentation have been compiled with greatest care and in compliance with our present status of information.

Nevertheless we would like to point out that this document cannot always be updated parallel to the technical further development of our products.

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Table of Contents

1 SSI Encoder Simulation

This documentation describes the technology function SSI Encoder Simulation for the MSD Servo Drive firmware, the related parameters and provides information for commissioning.

ATTENTION:
You will find further information on safety, mechanical installation, electrical installation, terminal assignment and parameter configuration in the Operation Manual or the Device Help for the the MSD Servo Drive.

1.1 Performance Features

With the aid of the SSI Encoder Simulation, the current position of the drive controlled by the MSD Servo Drive can be read by a higher-level controller. Various sources are available for this purpose (**P2811**). The MSD Servo Drive behaves like an SSI encoder (without encoder supply) in relation to the controller. The SSI Encoder Simulation uses the technology card slot (X8). The technology card is detected automatically.

A further possible application is the SSI Encoder Simulation on X8 for a second MSD Servo Drive (Compact) on X7 (SSI implementation).

- Number of multiturn and singleturn bits can be set in the parameters
- Transmission using binary coding
- Clock speeds between 200 kbit/s and 1500 kbit/s are used.
  The MSD Servo Drive is a clock slave and adjusts to the clock master.
- Fastest possible cycle time: 125 µs
- Optional transmission with parity bit (odd/even)
- Optional synchronization of the control with the read cycle
- Indication of the synchronization status
- Encoder monoflop time: ~25 µs
- Clear parameter structure for straightforward, fast commissioning

1.2 Pin assignment for the SSI Encoder Simulation

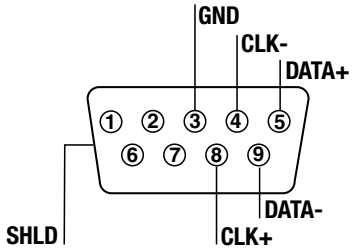

Bild 1.1 Pin assignment for the SSI Encoder Simulation

Pin	Assignment
1	n.c.
2	Reserved - connection not allowed
3	GND
4	CLK-
5	DATA+
6	n.c.
7	n.c.
8	CLK+
9	DATA-

Table 1.1 Pin assignment of SSI Encoder Simulation

2 Using the SSI Encoder Simulation

2.1 Activating the SSI Encoder Simulation

SSI Encoder Simulation is enabled as soon as parameter **TOPT_SSI_EncSimEnable (P 2800)** is set to 1. The parameter is located in the parameter group "Encoder > SSI Encoder simulation".

2.2 Parameter description for SSI Encoder Simulation

The parameters are in the parameter group "Encoder > SSI Encoder simulation", and all have the prefix "TOPT_SSI".

ID	Parameter	Unit	Access	Data type	Description	
2800	Mode		r/w	Ulnt16	Activation of the SSI encoder simulation	
					0	Not active
					1	Active
					2 - 4	Reserved
2801	MultiT	Bit	r/w	Ulnt16	Number multiturn bits to be transmitted	
2802	SingleT	Bit	r/w	Ulnt16	Number singleturn bits to be transmitted	
2803	Polarity		r/w	Ulnt16	No-load level on the data line	
					0	Clock line quiescent at a low level
					1	Clock line quiescent at a high level (recommended)
2804	Phase		r/w	Ulnt16	Defines the clock edge on which new data are set	
					0	Sets data on a leading edge (recommended)
					1	Sets data on a trailing edge

Table 2.1 SSI encoder simulation parameters

ID	Parameter	Unit	Access	Data type	Description	
2805	ParityEnable		r/w	Ulnt16	False(0)	No parity bit (recommended)
					True(1)	Activation of the parity bit
2806	ParityType		r/w	Ulnt16	ODD(0)	Odd parity
					EVEN(1)	Even parity
2807	SyncOffset	µs	r/w	Float32	Offset on the synchronization signal for the control cycle	
2808	SyncUse		r/w	Ulnt32	Synchronization with the read cycle	
2809	InSync		r	Ulnt16	False(0)	MSD is not running synchro-nously with the read cycle
					True(1)	MSD has synchronized with the read cycle
2811	TOPT.InOut_ EncSim_Source		r/w	Ulnt32	Signal source for the SSI simulation	
					ENCPCON(0)	Position from the position encoder, ScopeVar(153)
					INV_ ENCPCON(1)	As for (0), however negated
					EPSACT(2)	Actual position in increments (P412), ScopeVar(42)
					EPSREF(3)	Target position in increments (P413), ScopeVar(40)
					VM(4)	Call counter for the cyclic position lock function
					ENCPCON_ normscale(5)	As for (0), however differenti-ated and integrated, including the SpeedSign from P2236 MPRO_402_Polarity.Bit6
2820	GrayCode		r/w	Ulnt32	Coding of the signal transmitted	
					0	Binary code (fixed setting)
2821	Baud rate	kbit/s	r/w	Ulnt32	SSI baud rate for the transmission (redundant here)	
					0	250 K
					1	500 K
					2	750 K
					3	1000 K
2822	MultiTurnValue		r	Ulnt32	Currently calculated SSI multiturn value	
2823	SingleTurnValue		r	Ulnt32	Currently calculated SSI singleturn value	

Table 2.1 SSI encoder simulation parameters

2.3 Notes on setting the parameters for the SSI resolution

The MSD Servo Drive supports the transmission of a maximum of 32 position bits that can be divided as necessary into singleturn and multiturn information. During the generation of the SSI signals, the source specified in **P2811** is used.

It is important for setting the parameters that the SSI Encoder Simulation, for instance, transmits no more singleturn bits that correspond to the internal resolution because these bits cannot be filled with information. The parameter **MPRO_FG_PosNorm (P 0270)** defines this resolution. The factory setting for this parameter is 1048576, which corresponds to 2^{20}.

With the factory settings, the MSD Servo Drive expects 12 multiturn and 20 singleturn bits. In this case the transfer of more than 12 multiturn bits would not be appropriate because counter overflow would occur at the 12th bit despite a higher setting in the parameters. A setting for the singleturn bits higher than 20 would also not be appropriate because the additional bits would always be filled with 0.

2.4 Setting parameters for polarity and phase

The correct configuration of polarity and phase is important for the correct operation of the SSI interface. The setting for the polarity is defined by the quiescent level on the SSI clock line. With the recommended setting, the clock line is quiescent at the high level. The parameter **TOPT_SSI_Polarity (P 2803)** is to be set to "1". "0" stands for a low quiescent clock level.

The phase defines when a new bit is placed on the data line. With the recommended setting for the parameter **TOPT_SSI_Phase (P 2804)** of "0", the data are always placed on the data line with the leading, falling clock edge with a quiescent clock level "high". If set to "1", the data are placed on the line only on the trailing, rising edge.

For most SSI encoders, the normal settings are "Polarity = 1" and "Phase = 0".

Polarity	Phase	
False	False	
False	True	
True	False	
True	True	
Daten		

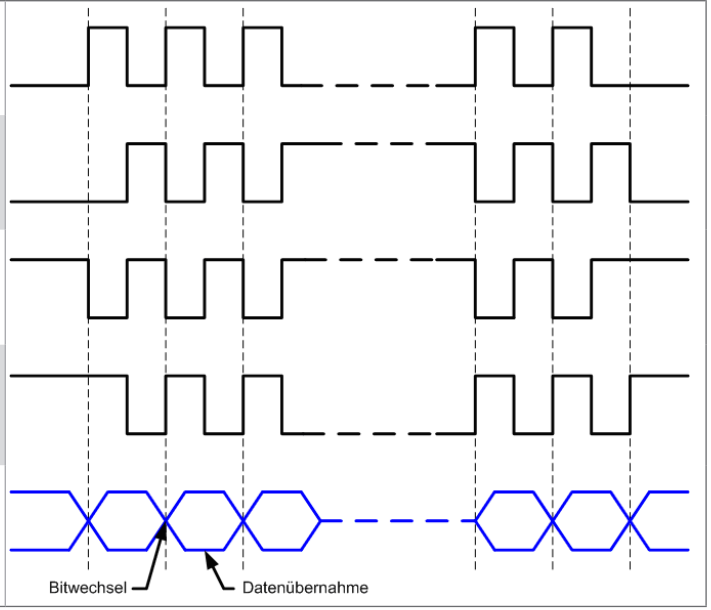

Table 2.2 Parameterization of polarity and phase

2.5 Suffixing a parity bit

Optionally, a parity bit can be added after the data. The parity bit is then transmitted after the least significant bit (LSB). The parity bit is activated via the parameter **TOPT_SSI_ParityEnable (P 2805)**. The parity can be either "odd" or "even". This aspect is selected using the parameter **TOPT_SSI_ParityType (P 2806)**.

2.6 Using the synchronization

With equispaced polling of the SSI information, it is possible to synchronize the control cycle of the MSD Servo Drive with the polling cycle. The first clock edge in a transmission is used for synchronization. On the use of synchronized operation, it is important that the controller's read cycle is an integer multiple of the speed control cycle. With synchronized polling it can be ensured that position values obtained with equispaced sampling can be transmitted to the higher-level controller. If several synchronized MSD Servo Drive are polled at the same time, all position actual values are generated at the same time.

The synchronization is activated via the parameter TOPT_SSI_SyncUse (P 2808). The status of the synchronization is depicted via the parameter TOPT_SSI_InSync (P 2809).

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The German version is the original of this Operation Manual.