

# ServoOne

## Specification

### Option 2 - Technology

SSI Encoder simulation

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### SSI encoder simulation

ID No: 1106.22B.1-00

Date: 02/2011

This documentation applies to:




Series	Model	Hardware version	Firmware version
ServoOne Single axis system 	SO82.xxx.0xx4 SO84.xxx.0xx4	from ...4.xxxx.0 from ...4.xxxx.0	from V2.15 / V201.07
ServoOne Multi axis system 	SO84.xxx.1xx4	from ...4.xxxx.0	from V2.15 / V201.07
ServoOne junior 	not available	--	--

Table V.1 Applicability



**NOTE:** This document does not replace the ServoOne 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 ServoOne series, refer to the additional documentation (Operation Manual, User Manual, etc.).

### Subject to technical modifications.

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.

Information and specifications may be changed at any time. For information on the latest version please refer to <http://drives.lt-i.com>.

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# 1. SSI Encoder Simulation

This document describes the SSI Encoder Simulation technology function of the ServoOne firmware and associated parameters, and provides information for commissioning.



**ATTENTION:** For more information on safety, mechanical and electrical installation, pin assignments and parameter configuration refer to the ServoOne Operation Manual and user documentation.

## 1.1 Features

Using SSI Encoder Simulation, the current actual position of the drive controlled by the ServoOne can be read by a higher-level control system. The ServoOne then behaves like an SSI encoder in relation to the control. SSI Encoder Simulation uses the technology board slot (X8). The technology board is automatically detected.

- Parameterizable number of multi-turn and single-turn bits
- Binary transfer
- Clock rates between 200 kBit/s and 1500 kBit/s are supported
- Fastest possible cycle time: 125 µs
- Optional transfer with parity bit (Odd/Even)
- Optional synchronization of control to read cycle
- Display of synchronization status
- Encoder monoflop time: ~25 µs
- Clear parameter structure for quick and easy commissioning

## 1.2 Pin assignment of SSI Encoder Simulation

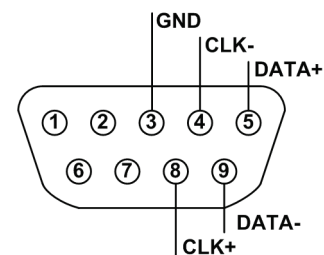


Figure 1.1 Pin assignment of SSI Encoder Simulation

Pin	Assignment
1	-
2	-
3	GND
4	CLK-
5	DATA+
6	-
7	-
8	CLK+
9	DATA-

Table 1.2 Pin assignment of SSI Encoder Simulation

## 2. Use of SSI Encoder Simulation

### 2.1 Enabling 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	EncSimEnable		r/w	UInt16	Enable SSI Encoder Simulation
2801	MultiT	Bit	r/w	UInt16	Number of multi-turn bits to transfer
2802	SingleT	Bit	r/w	UInt16	Number of single-turn bits to transfer
2803	Polarity		r/w	UInt16	No-load level of data line
					False Clock line resting at Low level
					True Clock line resting at High level
2804	Phase		r/w	UInt16	Indicates the clock edge at which new data are set
					False Sets data on the leading edge
					True Sets data on the following edge
2805	ParityEnable		r/w	UInt16	Enable the parity bit
2806	ParityType		r/w	UInt16	ODD Odd parity
					EVEN Even parity

Table 2.3 SSI Encoder Simulation parameters

ID	Parameter	Unit	Access	Data type	Description
2807	SyncOffset	μs	r/w	Float32	Shift of synchronization signal to closed-loop control cycle
2808	SyncUse		r/w	UInt32	Synchronization to read cycle
2809	InSync		r	UInt32	False ServoOne does not run synchronously with the read clock
					True ServoOne has synchronized to the read cycle
2810	EncobsUse		r/w	UInt32	Enables transfer of an additional encoder monitoring bit

Table 2.3 SSI Encoder Simulation parameters

### 2.3 Notes on parameterizing the SSI resolution

The ServoOne supports transfer of a total of 32 information bits which can be broken down in any way into single-turn and multi-turn information. When generating the position information, parameter CON\_PCON\_ActPosition (P 0412), likewise presenting a 32-bit variable, is used as the data source. The 32 bits of this parameter can likewise be broken down into multi-turn and single-turn information. It is important in parameter setting that the SSI Encoder Simulation does not, for example, transfer more single-turn bits than correspond to the internal resolution, as they could otherwise not be filled with information. Parameter MPRO\_FG\_PosNorm (P 0270) defines this resolution. The default setting for this parameter is 1048576, corresponding to  $2^{20}$ . So with default settings the ServoOne expects 12 multi-turn and 20 single-turn bits. In this case it would not make sense to transfer more than 12 multi-turn bits, as the number overflow would occur at the 12th bit, despite a higher parameter setting. Nor would it make sense to set the number of single-turn bits higher than 20 here, as in this case the additional bits are always filled with 0.

## 2.4 Parameterization of polarity and phase

Correct configuration of the polarity and phase is important for error-free operation of the SSI interface. The polarity setting is determined by the resting level of the SSI clock line. If the clock line rests at a Low level, parameter TOPT\_SSI\_Polarity (P 2803) should be set to False. True means the clock level rests at High level. The phase indicates when a new bit is placed on the data line and when the bit is then evaluated. If parameter TOPT\_SSI\_Phase (P 2804) is set to False, the data are always applied back to the resting level at the edge. If the setting is True, the data are applied away from the resting level at the edge.

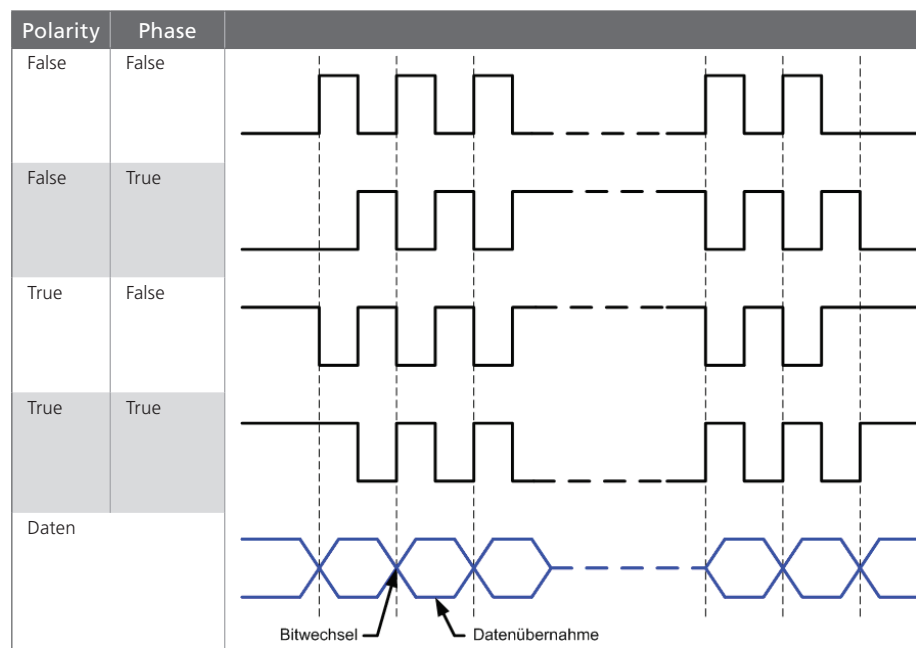


Table 2.4 Parameterization of polarity and phase

## 2.5 Suffixing a parity bit

A parity bit can optionally be suffixed after the user data. The parity bit is then transferred after the least significant bit (LSB). The parity bit is enabled by way of parameter TOPT\_SSI\_ParityEnable (P 2805). The parity can be set either as "odd" or "even". This can be selected by way of parameter TOPT\_SSI\_ParityType (P 2805).

## 2.6 Using synchronization

Where the SSI information is scanned at equidistant time intervals it is possible to synchronize the control cycle of the ServoOne to the scan cycle. The synchronization is executed to the first clock edge of a transfer. When using synchronized mode, it is important that the read cycle of the control system is an integer multiple of the speed control cycle. Synchronized scanning can be used to ensure that position values polled at the equidistant time intervals can be transferred to the higher-level control system. If multiple synchronized ServoOne units were scanned simultaneously, all actual position values would be generated at the same time.

Synchronization is enabled by way of parameter TOPT\_SSI\_SyncUse (P 2808). Parameter TOPT\_SSI\_InSync (P 2809) displays the synchronization status.



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Date: 02/2011



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