

Layer-Setting-Service (LSS)

For CANopen-Devices, which, due to mechanical dimensions or environmental conditions (IP65 etc.) do not have mechanical possibilities to set base parameters (baudrate, node address) the Layer-Setting-Service (LSS) is defined in CiA DSP-305. Using the Layer Setting Service (LSS) a LSS master can change baudrate and node address of a LSS slave over the CAN bus. To do this, the LSS master sets the LSS slaves into configuration mode. Afterwards the LSS master transmits the new baudrate using the „Configure Bit Timing“ service. The LSS slave acknowledges this with a CAN telegram, telling the master if it supports the requested baudrate or not. If the slave accepts the baudrate, the LSS master sends the „Activate Bit Timing“ service to the LSS slave, so that after a time „switch delay“ the new baudrate should be activated. After the activation, the master sets the slave back into operation mode,

The LSS service can also be used to change the node address of the slave. To do this, the LSS master again sets the LSS slave into configuration mode. Then the slave is given its new node address. The slave acknowledges this by confirming if the new address is supported or not. After switching back to operation mode, the slave initializes a software reset to initialize its communication objects with the new node id. Additional LSS services are described in Standard CiA DSP-305.

Identifier	DLC	Daten							
		0	1	2	3	4	5	6	7
0x7E5	8	0x04	mod	reserviert					

Switch Mode Global Service

- mod:** new LSS mode
- 0 = set operation mode
- 1 = set configuration mode

<i>Identifizier</i>	<i>DLC</i>	<i>Daten</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
0x7E5	8	0x13	tab	ind	reserviert				

Configure Bit Timing Service

tab: defines the baudrate table to be used
 0 = baudrate table, according to CiA DSP-305
 1 ... 127 = reserved
 128 ... 255 = user definable

ind: index into baudrate table, defining the new baudrate for the device

<i>Identifizier</i>	<i>DLC</i>	<i>Daten</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
0x7E4	8	0x13	err	spec	reserviert				

Antwort auf Configure Bit Timing Service

err: error code
 0 = successfully completed
 1 = baudrate not supported
 2 ... 254 = reserved
 255 = special error code in **spec**
spec: manufacturer specific error code (if **err** = 255)

<i>Identifizier</i>	<i>DLC</i>	<i>Daten</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
0x7E5	8	0x15	delay		reserviert				

Activate Bit Timing Service

delay: relative time in ms before activating the new baudrate

<i>Identifizier</i>	<i>DLC</i>	<i>Daten</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
0x7E5	8	0x11	nid	reserviert					

Configure Node-ID Service

nid: new node address for the LSSslave
(range 1 to 127)

<i>Identifizier</i>	<i>DLC</i>	<i>Daten</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
0x7E4	8	0x11	err	spec	reserviert				

Antwort auf Configure Node-ID Service

err: error code

0 = successfully completed

1 = node address invalid (out of range 1 to 127)

2 ... 254 = reserved

255 = special error code in **spec**

spec: manufacturer specific error code (if **err** = 255)

Tabellenindex	Baudrate
0	1000 kBit/s
1	800 kBit/s
2	500 kBit/s
3	250 kBit/s
4	125 kBit/s
5	100 kBit/s
6	50 kBit/s
7	20 kBit/s
8	10 kBit/s

Baudratentabelle nach CiA DSP-305

Examples:

1. Setting node address

Send : 7E5 04 01 00 00 00 00 00 -> Set configuration mode
Send : 7E5 11 44 00 00 00 00 00 -> Set node address 0x44
Receive: 7E4 11 00 00 00 00 00 00 -> Success
Send : 7E5 17 00 00 00 00 00 00 -> Store configuration
Receive: 7E4 17 00 00 00 00 00 00 -> Success
Send : 7E5 04 00 00 00 00 00 00 -> Set operation mode (reset)
Receive: C40 -> New bootup message

2. Setting baudrate

Send : 7E5 04 01 00 00 00 00 00 -> Set configuration mode
Send : 7E5 13 00 02 00 00 00 00 -> Set 500 kBits
Receive: 7E5 13 00 00 00 00 00 00 -> Success
Send : 7E5 15 10 00 00 00 00 00 -> Set 500 kBits
Receive: C40 -> New bootup message (500k)

3. Reset internally stored settings

Stored values do have higher priority than dip switch settings, so higher node addresses are available (up to 127) even if there are not enough dip switches available.
However to reset an unknown encoder setting to dip switch defaults:

1. Power off the encoder
2. Set all dip switches to off
3. Power up the encoder -> Internal settings are erased
4. Set address by setting the dip switches, power off and back on.

Caution: For using LSS stored settings at least one dip switch (baud or node address) needs to be set to one, otherwise parameters are deleted at power up.