

MSSI-2

Technical Documentation SSI (Synchronous Serial Interface) Submodule

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Revision History

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Note:

The cover of this document shows the current revision status and the corresponding date. Since each individual page has its own revision status and date in the footer, there may be different revision statuses within the document.

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MSSI-2



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MSSI 2 SSI (Synchronous Serial Interface) Submodule

16-Bit 24-Bit, Option of 25-Bit Resolution/Two Channels

1 General

The MSSI-2 input module is a submodule for use in a FOX-20 Basic Module. The submodule provides two synchronous serial inputs.

For operation in the I/O system, you can install up to four MSSI-2s in the four slots of a FOX-20 basic module. This makes possible a maximum of 8 SSI inputs per FOX-20. In addition, you can combine MSSI-2s with different modules, e.g. digital outputs.

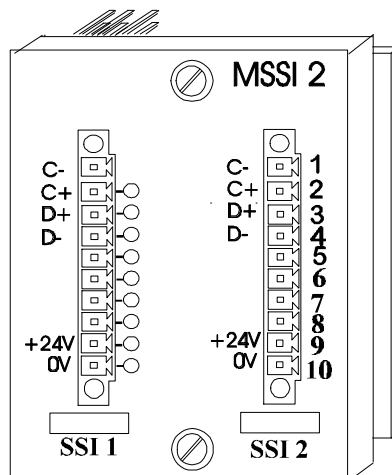


Figure: Two-Channel SSI-2 Module

2 Technical data of MSSSI-2

Inputs	Two synchronous serial inputs
Input Level	Input voltage RS-485
Resolution	16-bit/24-bit
Supply Voltage	24 V DC ($\pm 20\%$)
Current Consumption	0.05 A (without load and input currents)
Housing	Module with front panel is mounted in the FOX-20 using two screws.
Dimensions (WxHxD)	58 x 72 x 50 mm, weight 100 g
Temperature	Operation: $\pm 0..+55^{\circ}$ C Storage: $-20..+70^{\circ}$ C

3 Signal description and example of MSSSI-2 connection

Pin	Signal	I/O	Description
L-1	C-	Clock-	Clock line for encoder 1
L-2	C+	Clock+	Clock line for encoder 1
L-3	D+	Data+	Data line for encoder 1
L-4	C-	Data-	Data line for encoder 1
L-5			
L-6			
L-7			
L-8			
L-9	+24 V	Supply.	Supply voltage for the encoder
L-10	0 V	Ground	
Pin	Signal	I/O	Description
R-1	C-	Clock-	Clock line for encoder 2
R-2	C+	Clock+	Clock line for encoder 2
R-3	D+	Data+	Data line for encoder 2
R-4	D-	Data-	Data line for encoder 2
R-5			
R-6			
R-7			
R-8			
R-9	+24V	Supply.	Supply voltage for the encoder
R-10	0 V	Ground	

Pin designations: L: left-hand row
R: right-hand row

4 Message traffic to the FOX-20 when reading the SSI channels

4.1 Message structure for FOX-20

FOX-20 allows you to use all the possible digital and analog submodules, as well as synchronous serial interface modules, for example. In this case, there are only 16 bits of user data in the FOX-20 message. Data byte DB0 is for addressing the slot and the word no./channel no. within a slot; data byte DB1 is for future expansion and currently always contains the value 80 hex. The 16 bits of user data are transferred in data bytes DB2 and DB3.

If the MSSI-2 needs only 16 bits of encoder data, this can be carried out using one message.

16-bit resolution:

Every access of the SSI encoder is carried out by one (1) message.

If, on the other hand, all 24 bits of the encoder are used, two additional messages are needed. The first message interrupts the update of the encoder. It is now possible to completely read out one encoder with two subsequent messages. The last message reenables the updates for the module.

The system carries out accessing of the SSI encoder by means of two (2) messages to disable the update and to enable the updates as well as two (2) messages per SSI channel to load the encoder position.

The FOX code (30 hex) is used as the control byte in the FOX-20 (30 hex means FOX-20 message).

The FOX-20-internal slot/word/channel address is specified in data byte DB0 of the message.

DB0 is divided into two:

The top nibble contains the number of the submodule. The first submodule that is plugged in to the left-hand slot of the FOX-20 basic module is given submodule number 1.

From right to left, the possible numbers read 1, 2, 3 and 4.

The bottom nibble defines the channel of the submodule. Example: SSI encoder channel 1 is given channel number 1, SSI encoder channel 2 is given channel number 2. The top nibble defines the word address of the slot. SSI channel 1 occupies word 1 and word 2, SSI channel 2 occupies word 3 and word 4.

The actual user information is in DB2 and DB3.

At 16-bit resolution, DB2 contains the low byte and DB3 the high one.

At 24-bit resolution, DB2 contains the first message and the low byte, DB3 contains the middle byte; in the second message, DB2 contains the high byte.

4.2 Messages for MSSI-2 in FOX-20

ADR	= Module address	= 1 .. 254 dec
ContrlByte	= Read/Write FOX-20	= 30 hex
DB0	= ChannelSelect	= HighNibble := SubmoduleSlot 1..4 LowNibble := WordNumber 1,2,3,4,5,6,7,8 and 15
DB1	= Must be 80 hex	
DB2	= LSB data	
DB3	= MSB data	

4.3 Examples of FOX-20 messages:

Example 1:

Two MSSI-2 submodules with two channels each are plugged in the FOX-20. All four (4) encoder positions are to be read out. The encoders supply a 24-bit resolution.

The first message tells the FOX-20 basic module that the encoder position is to be latched on all 24-bits, and that it is not to carry out any more updates until enabling. Stopping updating is achieved by writing a 1 in DB2 on slot no. 0, word address 15:

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0000	1111	1000 0000	0000 0001	xxxx xxxx

The second message reads in the least-significant word of the first encoder (slot 1, word/channel 1):

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0001	0001	1000 0000	Encoder DB0	Encoder DB1

The third message reads in the most-significant word of the first encoder (slot 1, word/channel 2):

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0001	0010	1000 0000	Encoder DB2	xxxx xxxx

The fourth message reads in the most-significant word of the second encoder (slot 1, word/channel 3):

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0001	0011	1000 0000	Encoder DB0	Encoder DB1

The fifth message reads in the most-significant word of the second encoder (slot 1, word/channel 4):

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0001	0100	1000 0000	Encoder DB2	yyyy yyyy

The sixth message reenables the module the system updates the positions again.
Write a 0 in DB 2 on slot 0, word/channel 15:

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0000	1111	1000 0000	0000 0000	0000 0000

Example 2:

One MSSI-2 submodule with two channels is plugged in the FOX-20. One encoder position is to be read out. The sixteen-bit resolution is adequate, since a linear absolute encoder, for example, is being used.

Access to slot 1/SSI encoder 1, 16-bit resolution

Encoder Position = 0100 0000 0011 1100

Address	ControlByte	DB	0	DB 1	DB 2	DB 3
Address	ControlByte	Slot	Word	Fixed 80 hex	Low Byte	High Byte
e.g. 1 (Box 1)	0011 0000	0001	0001	1000 0000	EncoderDB 0	Encoder DB1