

ASCLIN_SPI_Master_1 for KIT_AURIX_TC375_LK

SPI Master Communication via ASCLIN module

AURIX™ TC3xx Microcontroller Training
V1.0.0



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Scope of work

An ASCLIN module configured as SPI master sends a two bytes message.

The two bytes message is sent through MTSR (MOSI) port pin P15.4 in loopback mode. This signal can be visualized on the oscilloscope screen.

Introduction

- › The Asynchronous/Synchronous Interface (ASCLIN) module provides synchronous serial communication like SPI with external devices, using data-in and data-out signals only.
- › The ASCLIN module in SPI configuration can support master mode only with four-wire or three-wire (without slave select output signal) and up to 16-bit data width.

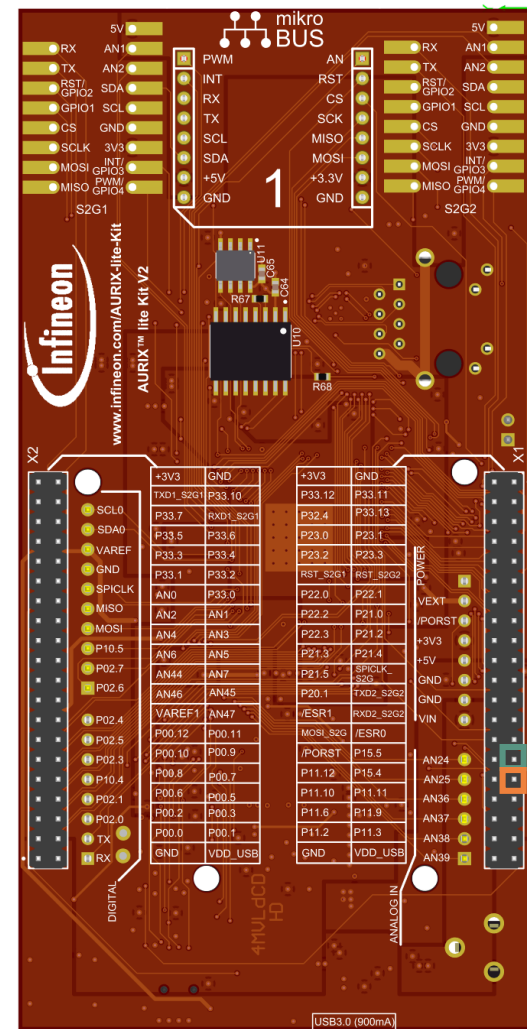
Hardware setup

This code example has been developed for the board KIT_A2G_TC375_LITE.

The port pin P15.4 (SPI-MTSTR) should be connected to the port pin P15.5 (SPI-MRST) in order to form an internal loopback.

Those pins can also be connected to an oscilloscope probe for observing the SPI signal.

	X1		
+3V3	2	1	GND
P33.12	4	3	P33.11
P32.4	6	5	P33.13
P23.0	8	7	P23.1
P23.2	10	9	P23.3
RST_S2G1 - P23.4	12	11	P23.5 - RST_S2G2
P22.0	14	13	P22.1
P22.2	16	15	P21.0
P22.3	18	17	P21.2
MDIO - P21.3	20	19	P21.4
P21.5	22	21	P20.10 - SPICLK_S2G
P20.1	24	23	P20.0 - TXD2_S2G2
/ESR1	26	25	P20.3 - RXD2_S2G2
MOSI_S2G - P20.14	28	27	/ESR0
Reset - /PORST	30	29	P15.5
CLK50 - P11.12	32	31	P15.4
RX_DO - P11.10	34	33	P11.11 - CRS_DV
TX_EN - P11.6	36	35	P11.9 - RX_D1
TX_D1 - P11.2	38	37	P11.3 - TX_D0
GND	40	39	VDD_USB



MRST (MISO)
MTSR (MOSI)

Implementation

Configuration of the ASCLIN module:

Configuration of the ASCLIN module for SPI communication is done in the setup phase by initializing an instance of the ***IfxAsclin_Spi_Config*** structure with the following parameters:

- › ***baudrate*** – structure to set the actual communication speed in bit/s
- › ***interrupt*** – structure to set:
 - transmit and receive interrupt priorities (***txPriority***, ***rxPriority***)
 - ***typeOfService*** – defines which service provider is responsible for handling the interrupt, which can be any of the available CPUs, or the DMA
- › ***pins*** – structure to set which GPIO port pins are used for the communication

The function ***IfxAsclin_Spi_initModuleConfig()*** fills the configuration structure with default values and ***IfxAsclin_Spi_initModule()*** initializes the module with the user configuration.

All the above functions can be found in the iLLD header ***IfxAsclin_Spi.h***.

Implementation

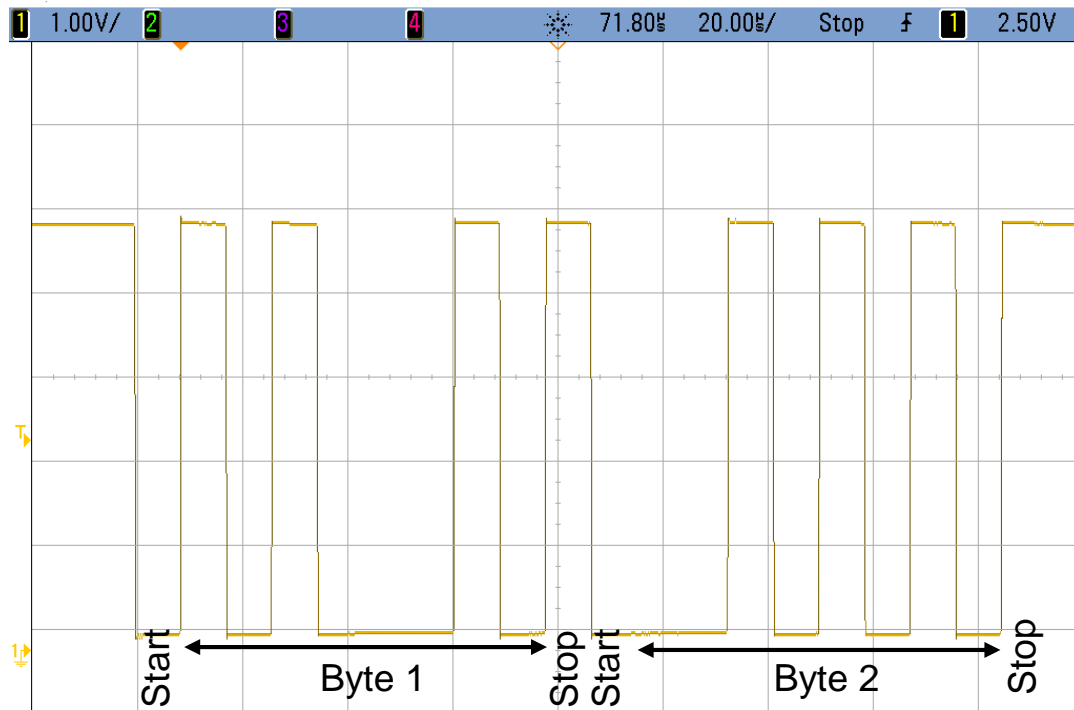
The SPI message exchange function:

- › The data-out (MTSR/MOSI) is connected via internal loopback to the data-in (MRST/MISO).
- › The two bytes message is sent via the function ***exchange_ASCLIN_SPI_message()*** which is called once after initialization of the ASCLIN module.
- › The two bytes message is sent from the ***g_spiTxBuffer*** to the ***g_spiRxBuffer*** using the function ***lfxAsclin_Spi_exchange()*** from the ***lfxAsclin_Spi.h*** header file.

Run and Test

After code compilation and flashing the device, perform the following steps:

- > Connect the oscilloscope probe to the MTSR pin (P15.4)
- > Reset and run the program by pressing the PORST push button
- > Check the oscilloscope for the SPI signal:



Run and Test

An additional test without using an oscilloscope can be performed with the debugger.

- › Before transmission, the buffer ***g_spiTxBuffer*** is filled with a two bytes message and the buffer ***g_spiRxBuffer*** is empty.

- › After transmission, both buffers should hold the same message:
 - By using the debugger, you can watch the content of both buffers before and after transmission by setting a breakpoint to ***exchange_ASCLIN_SPI_message()***.
 - When reaching this breakpoint, check the content of both buffers (it should be different).
 - After stepping over this function, the content of the buffers must be equal.

References



- › AURIX™ Development Studio is available online:
- › <https://www.infineon.com/aurixdevelopmentstudio>
- › Use the „*Import...*“ function to get access to more code examples.



- › More code examples can be found on the GIT repository:
- › https://github.com/Infineon/AURIX_code_examples



- › For additional trainings, visit our webpage:
- › <https://www.infineon.com/aurix-expert-training>



- › For questions and support, use the AURIX™ Forum:
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Edition 2021-03

Published by

**Infineon Technologies AG
81726 Munich, Germany**

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Email: erratum@infineon.com

Document reference

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