

ASCLIN_SPI_Master_1 for KIT_AURIX_TC397_TFT

SPI Master Communication via ASCLIN module

AURIX™ TC3xx Microcontroller Training
V1.0.1



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Scope of work

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

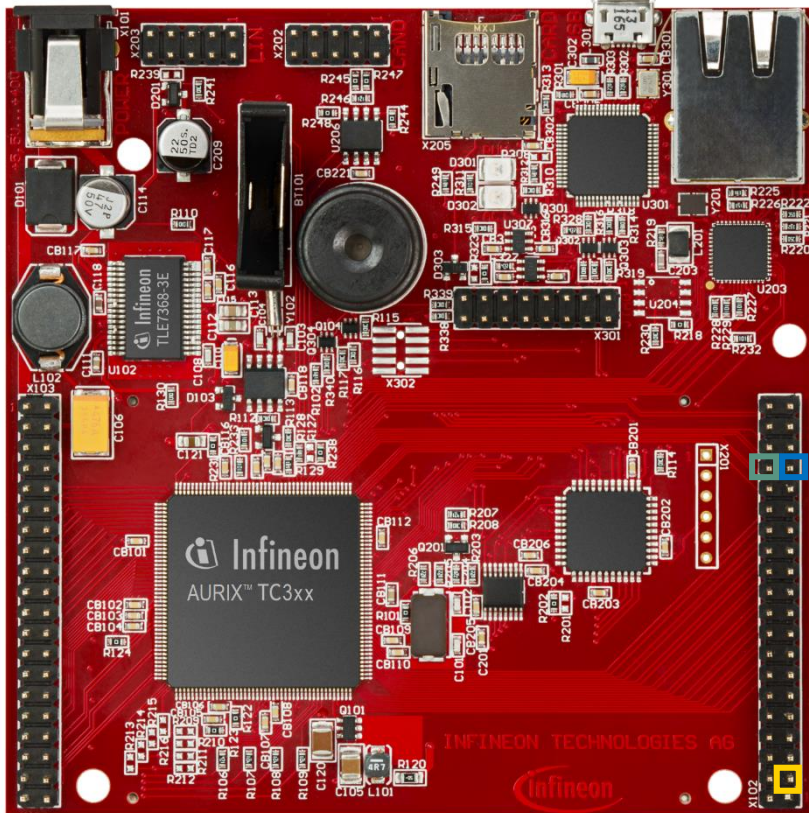
The two bytes message is sent through MTSR (MOSI) port pin P15.4 in loopback mode. This signal can be visualized on the oscilloscope screen.

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_TC397_5V_TFT. The port pin P15.4 (SPI-MTSR) 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.



MRST

	X102		
P14.5	40	39	P14.4
P33.10	38	37	P20.9
P15.7	36	35	P15.6
P15.5	34	33	P15.4
P15.3	32	31	P15.2
P22.3	30	29	P22.2
P22.1	28	27	P22.0
P33.11	26	25	P23.4
P23.3	24	23	P23.2
P23.1	22	21	P23.0
P33.6	20	19	P33.8
P33.12	18	17	P33.1
P33.2	16	15	P33.3
P33.4	14	13	P33.5
AN0	12	11	AN8
AN2	10	9	AN3
AN11	8	7	AN13
AN20	6	5	AN21
GND	4	3	GND
V_UC	2	1	VCC_IN

MTSR

Ground

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
- › ***rxBuffer***, ***rxBufferSize***, ***txBuffer***, ***txBufferSize*** – to configure the buffers that will hold the incoming/outgoing data

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

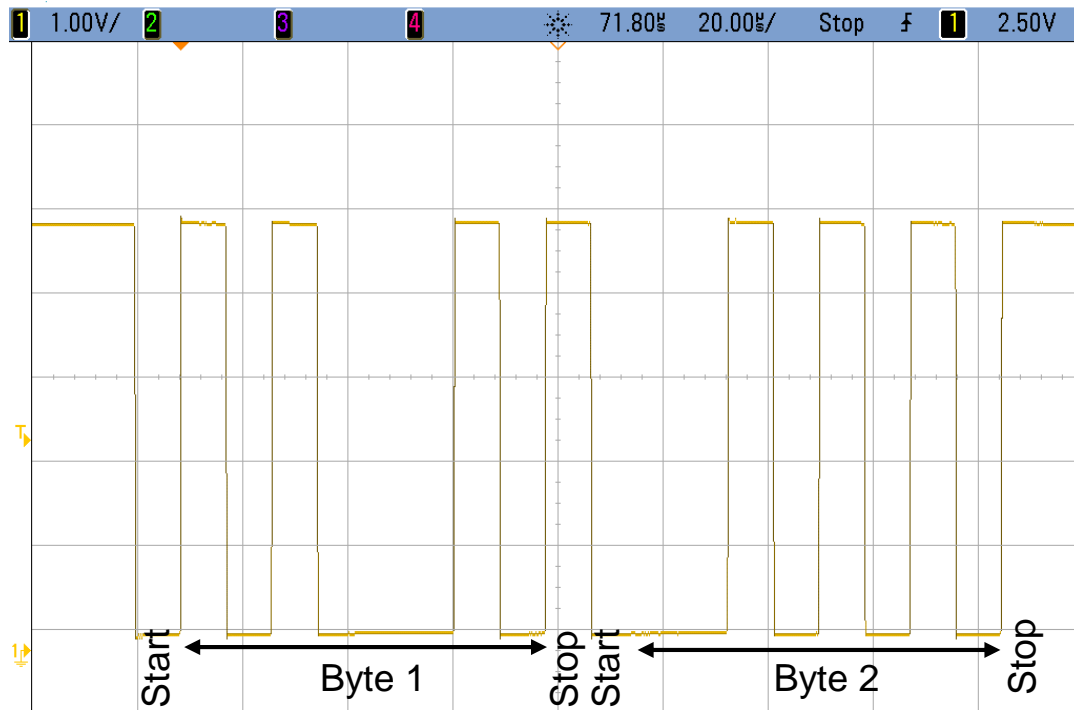
The SPI message exchange function:

- › 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:
- › <https://www.infineonforums.com/forums/13-Aurix-Forum>

Revision history

Revision	Description of change
V1.0.1	Update of version to be in line with the code example's version
V1.0.0	Initial version

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Document reference

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