

# ASCLIN\_SPI\_Master\_1 for KIT\_AURIX\_TC275\_LK

SPI master communication via ASCLIN module

AURIX™ TC2xx Microcontroller Training  
V1.0.0



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## Scope of work

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**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

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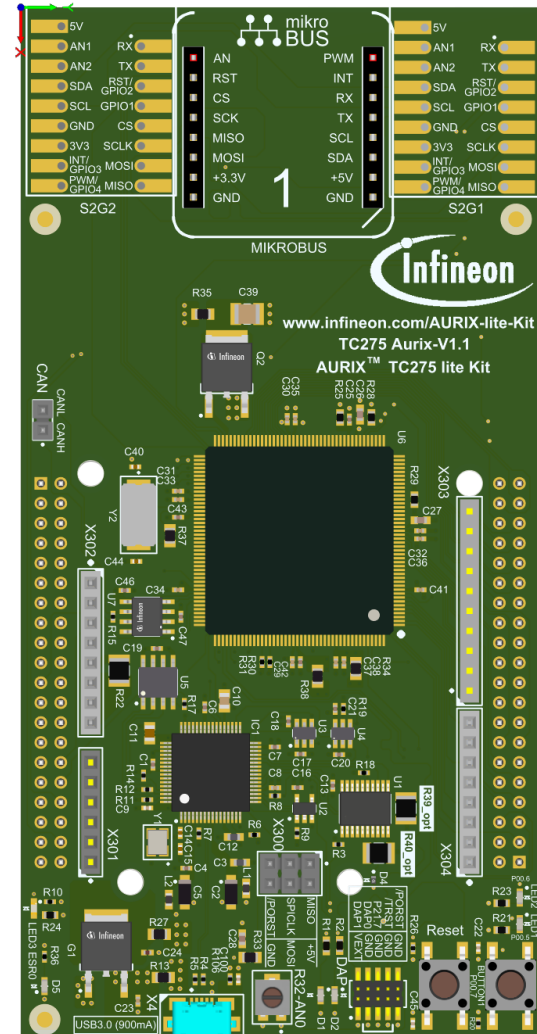
- › The Asynchronous/Synchronous Interface (ASCLIN) module provides synchronous serial communication like SPI with external devices, using data-in and data-out signals only
- › The ASCLIN module in SPI configuration can support master mode only with four-wire or three-wire (without slave select output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

# Hardware setup

This code example has been developed for the board KIT\_AURIX\_TC275\_LITE.

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.



# Implementation

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## 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

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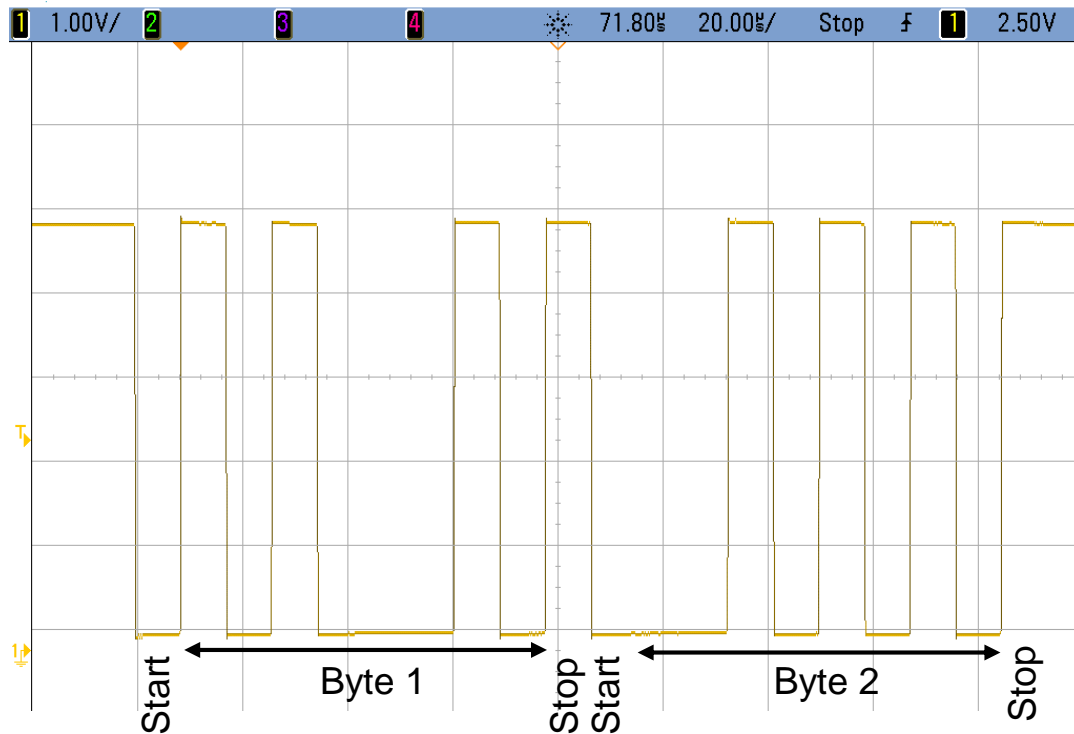
## The SPI message exchange function:

- › 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

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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

**Note:** The code should run for a few seconds in order to grant enough time for the transmission to be done.



# 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](https://github.com/Infineon/AURIX_code_examples)



- › For additional trainings, visit our webpage:
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**Document reference**

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**KIT\_TC275\_LK**

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