EXAMPLE NAME: SPI_SLAVE_EXAMPLE_XMC45

OVERVIEW: This example shows a use of the SPI_SLAVE and SPI_MASTER APPs. In this project two USIC channels of a XMC4500 device are communicating in a Loop-Back, one acting as Master and another as Slave in the same SPI bus. Master sends an array of data to the Slave and then Slave sends the received data back to the Master. The array sent and the final received by the Master are compared, P1.1 LED will glow if the data is not matching.

DESCRIPTION:

- SPI_SLAVE APP Configures one USIC channel as SPI SLAVE in a Full-duplex scenario and initializes the DMA channel as for being used by the runtime transmission APIs.
- SPI_MASTER APP Configures one USIC channel as SPI MASTER in a 10 MHz Full-duplex scenario and initializes the interrupts for being used by the runtime transmission APIs.
- DIGITAL_IO APP switch-on the onboard LED connected to P1.1 when the data read in the Mater does not match with the data read in the slave.

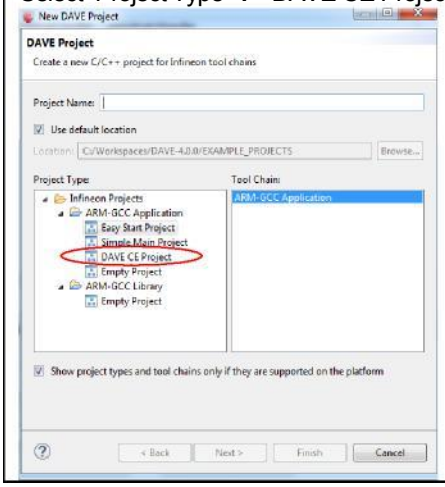
REQUIRMENTS:

Boards Required: XMC4500 Relax Kit Board

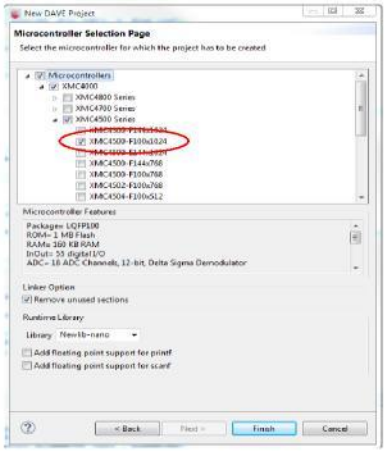
HOW TO CREATE THE PROJECT:

1. Open the DAVE CE and use  "Add IDE New Project Wizard" on the toolbar to add a new DAVE Project.

Enter Project Name
Select "Project Type 4 DAVE CE Project"

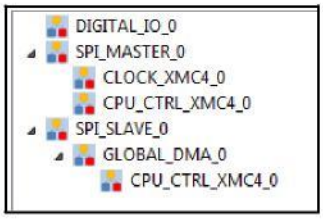


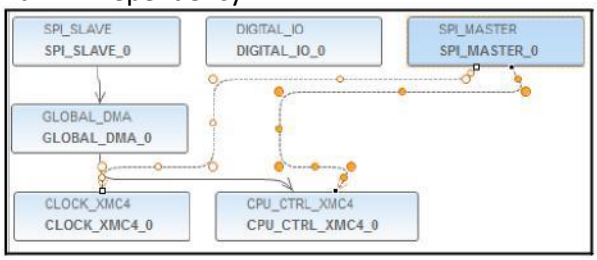
Select Processors Info
4XMC4500 Series 4 XMC4500-F100X1024



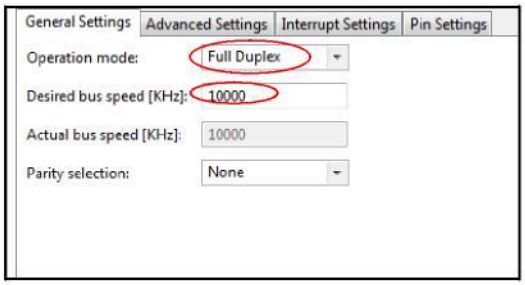
2. Use the "Add New App" in the toolbar to add 1 instance of SPI_MASTER, DIGITAL_IO and SPI_SLAVE APP. Configure the APP instances with the following configurations.

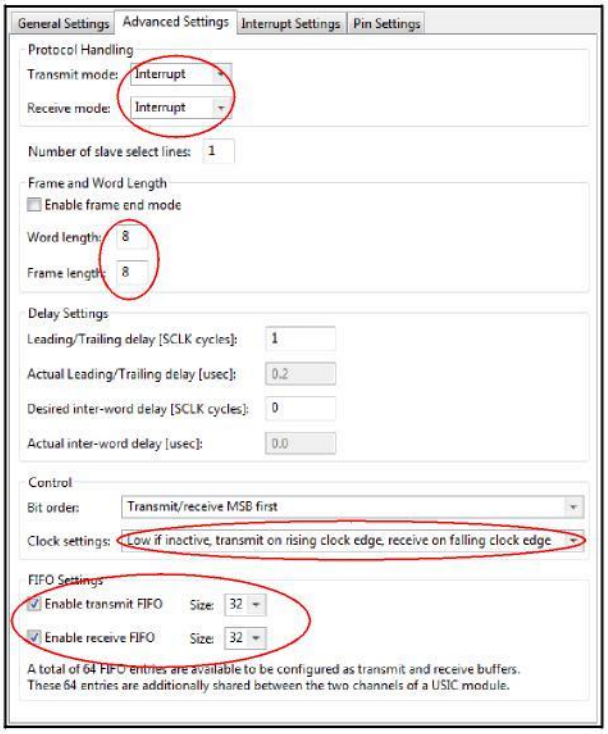
Views: APP Dependency Tree and APP Dependency

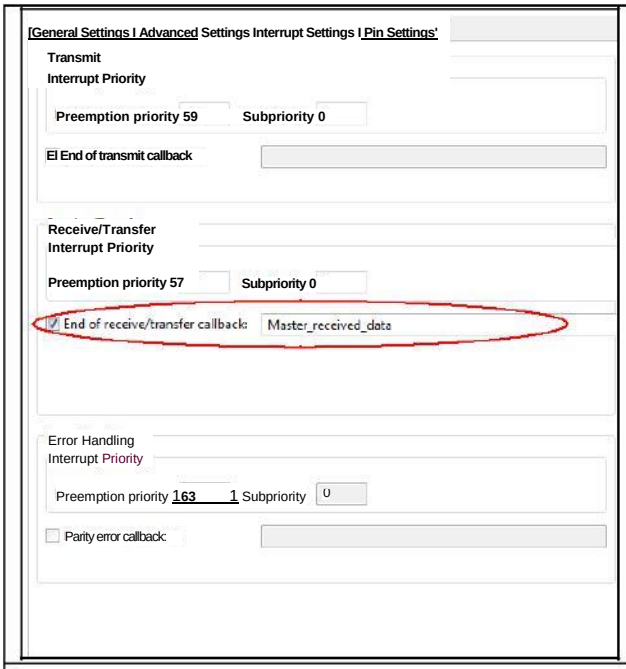




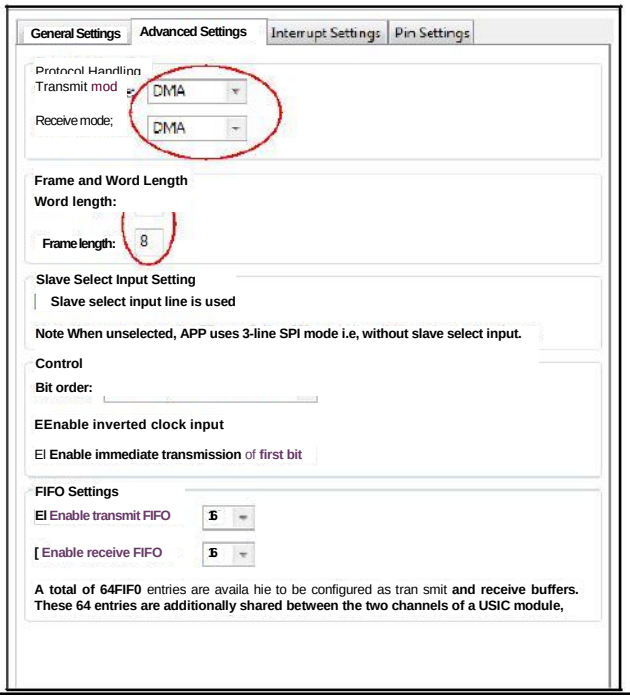
SPI_MASTER:

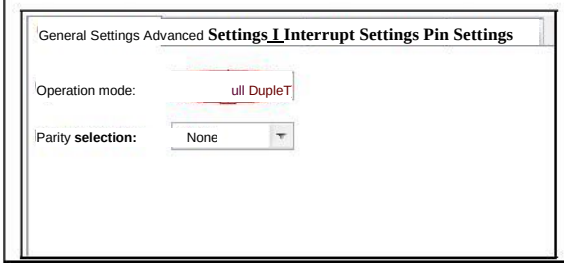


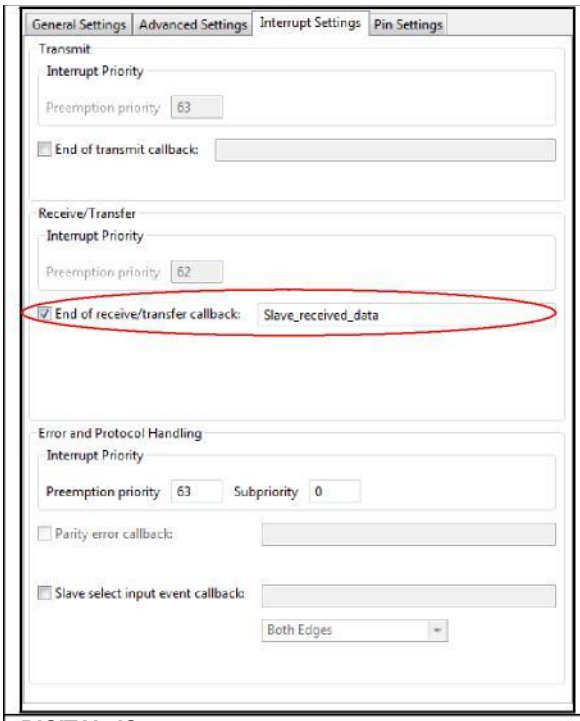



[General Settings I Advanced Settings Interrupt Settings I Pin Settings'
Transmit
Interrupt Priority
Preemption priority 59
Subpriority 0
El End of transmit callback
Receive/Transfer
Interrupt Priority
Preemption priority 57
Subpriority 0
End of receive/transfer callback:
Master_received_data
Error Handling
Interrupt Priority
Preemption priority 163 1 Subpriority 0
Parity error callback:

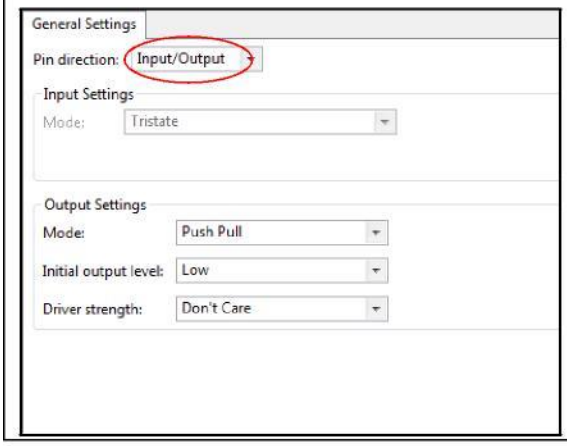
SPI_SLAVE:


General Settings
Advanced Settings
Interrupt Settings
Pin Settings
Protocol Handling
Transmit mod
DMA
Receive mode;
DMA
Frame and Word Length
Word length:
Frame length:
8
Slave Select Input Setting
Slave select input line is used
Note When unselected, APP uses 3-line SPI mode i.e, without slave select input.
Control
Bit order:
EEnable inverted clock input
El Enable immediate transmission of first bit
FIFO Settings
El Enable transmit FIFO
[Enable receive FIFO
A total of 64FIF0 entries are availa hie to be configured as tran smit and receive buffers. These 64 entries are additionally shared between the two channels of a USIC module,


General Settings Advanced Settings I Interrupt Settings Pin Settings
Operation mode:
ull DupleT
Parity selection:
None



DIGITAL_IO:



3. Use the  "Manual Pin Allocator" found in the toolbar, configure the pins for the SPI_MASTER, SPI_SLAVE and DIGITAL_IO APPs respectively.

APP Instance Name	APP Pin Name	Pin Number (Port)
DIGITAL_IO_0		
	pin	#78 (P1.1)
SPI_MASTER_0		
	MISO pin	#2 (P0.0)
	MOSI pin	#1 (P0.1)
	SCLKOUT pin	#3 (P0.10)
	Slave Select 0 pin	#4 (P0.9)
SPI_SLAVE_0		
	MISO pin	#97 (P0.5)
	MOSI pin	#98 (P0.4)
	SCLK pin	#95 (P0.11)
	Slave select pin	#96 (P0.6)

4. Generate the code for the configurations made and change main.c accordingly.
5. Build and download to the microcontroller.

HOW TO TEST:

Connect the cables to the selected pins. Download and run the demo in the XMC4500 Relax Kit board. If Pin P1_1 is not glowing the test is passed successfully.