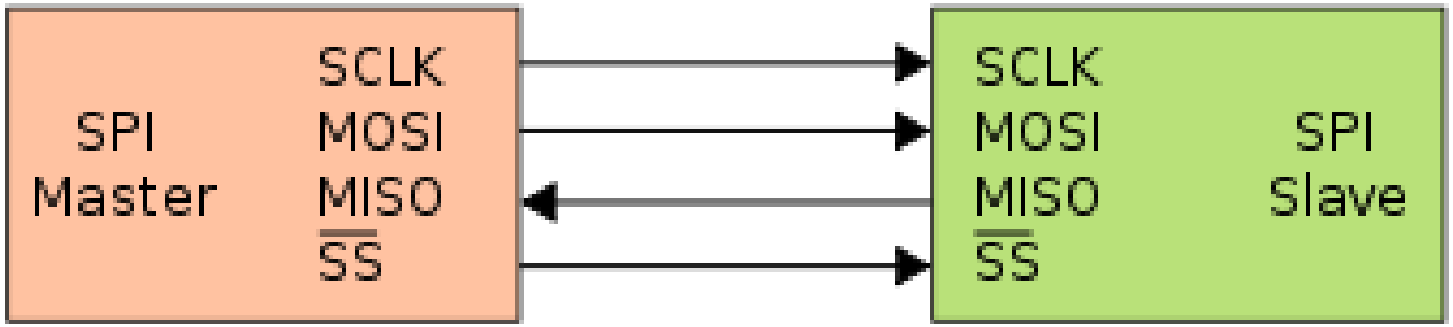
Serial Peripheral Interface Bus
SPI

What is SPI?

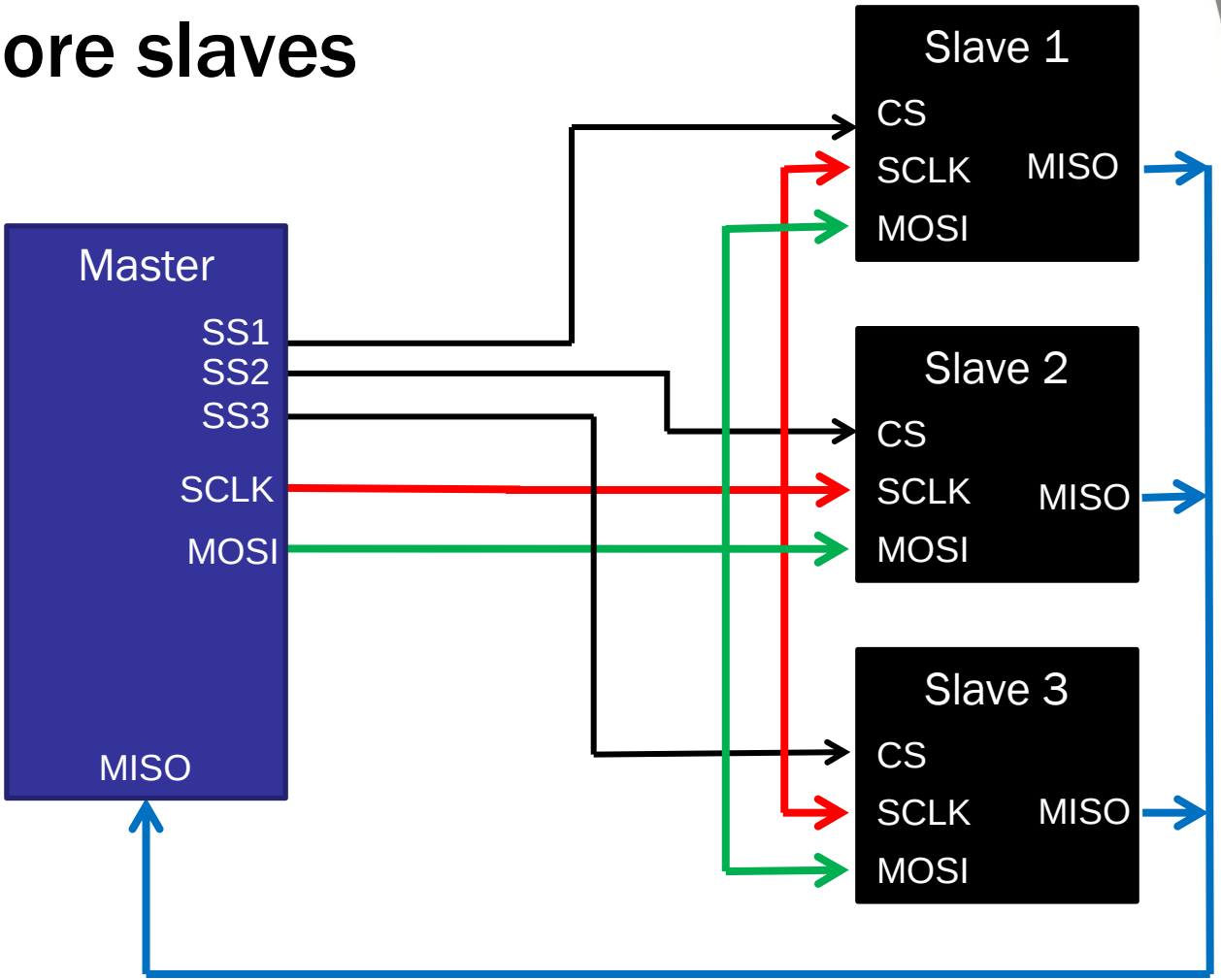
- Serial Peripheral Interface Bus
- Developed by Motorola
- Full duplex synchronous serial data link
- Typically used to communicate between MCU and peripherals
- Master/Slave operation
  - One master many slaves

Master - Slave

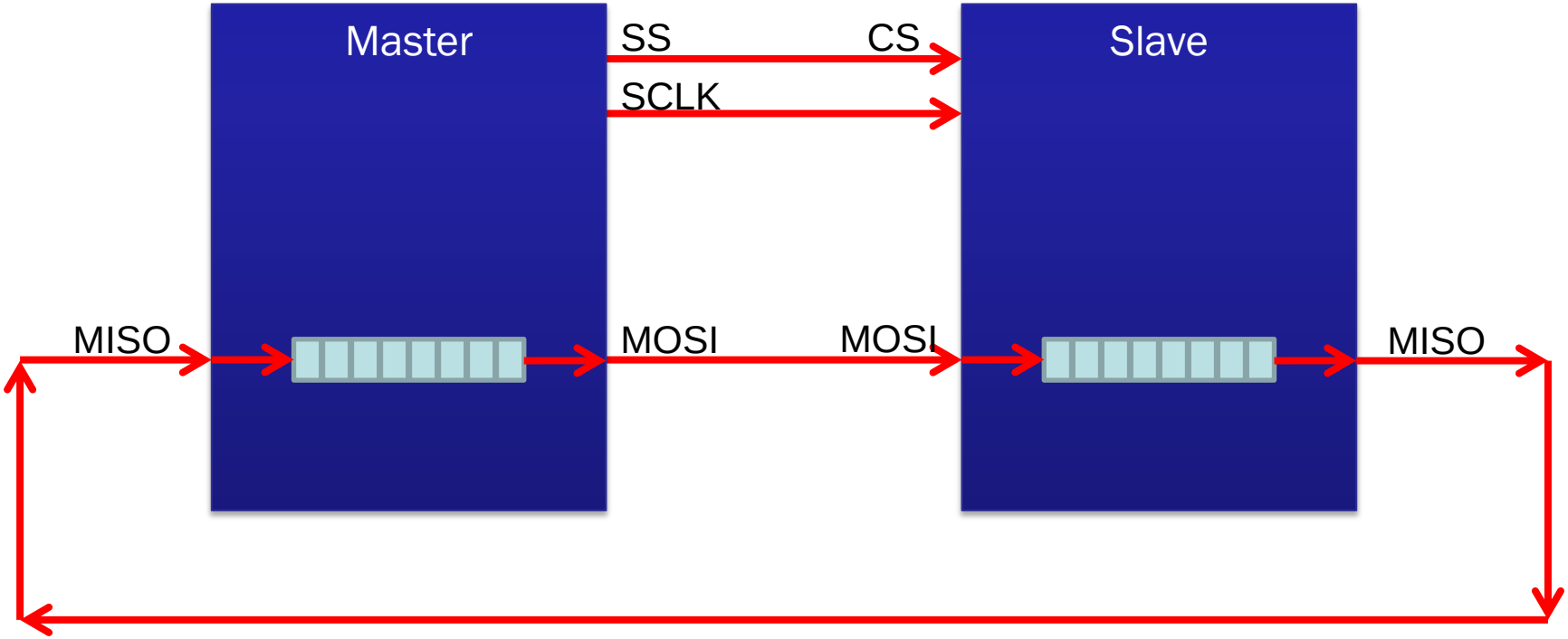
- SCLK: Clock
- MOSI: Master Out Slave In
- MISO: Master In Slave Out
- SS: Slave Select



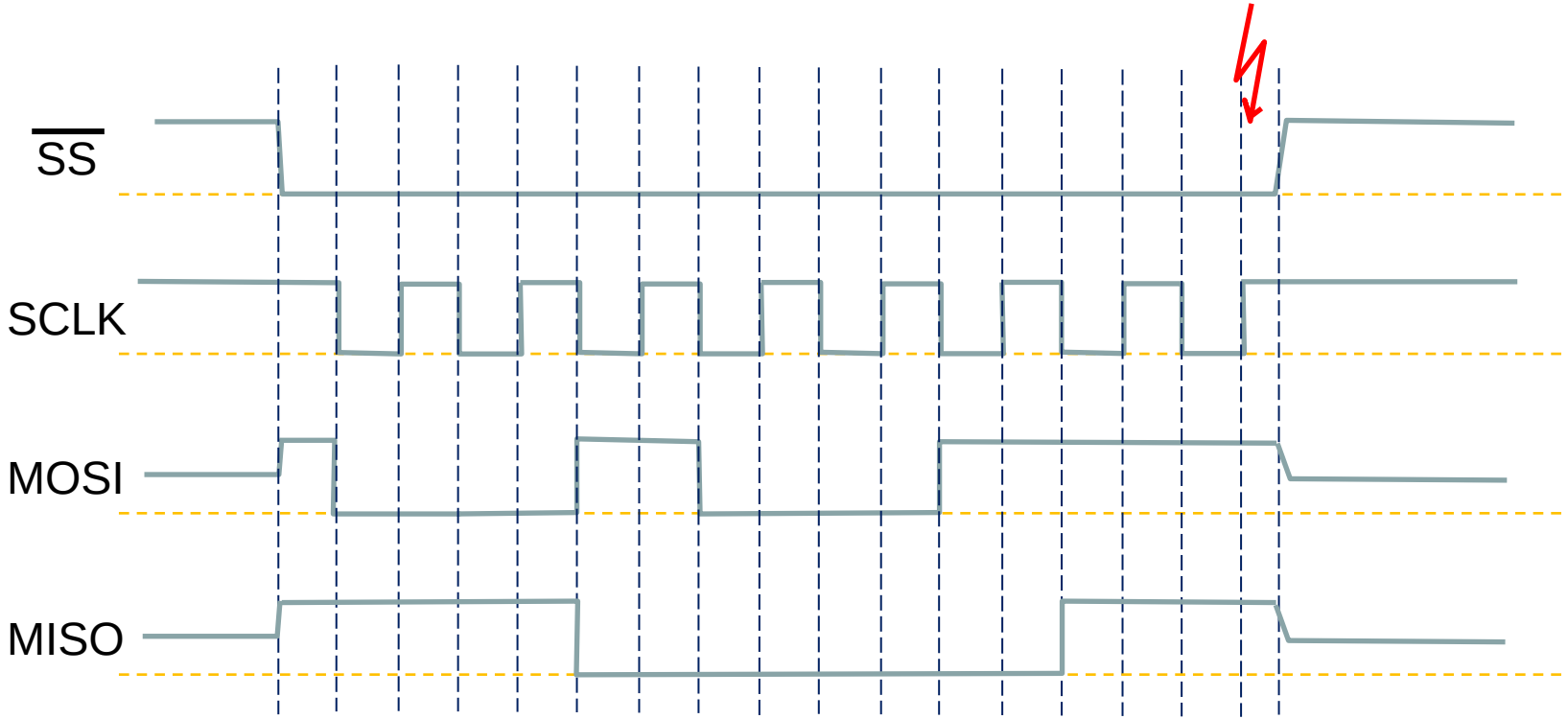
More slaves


Slave 1
CS
SCLK
MISO
MOSI
Master
SS1
SS2
SS3
SCLK
MOSI
MISO
Slave 2
CS
SCLK
MISO
MOSI
Slave 3
CS
SCLK
MISO
MOSI

Receive and Send

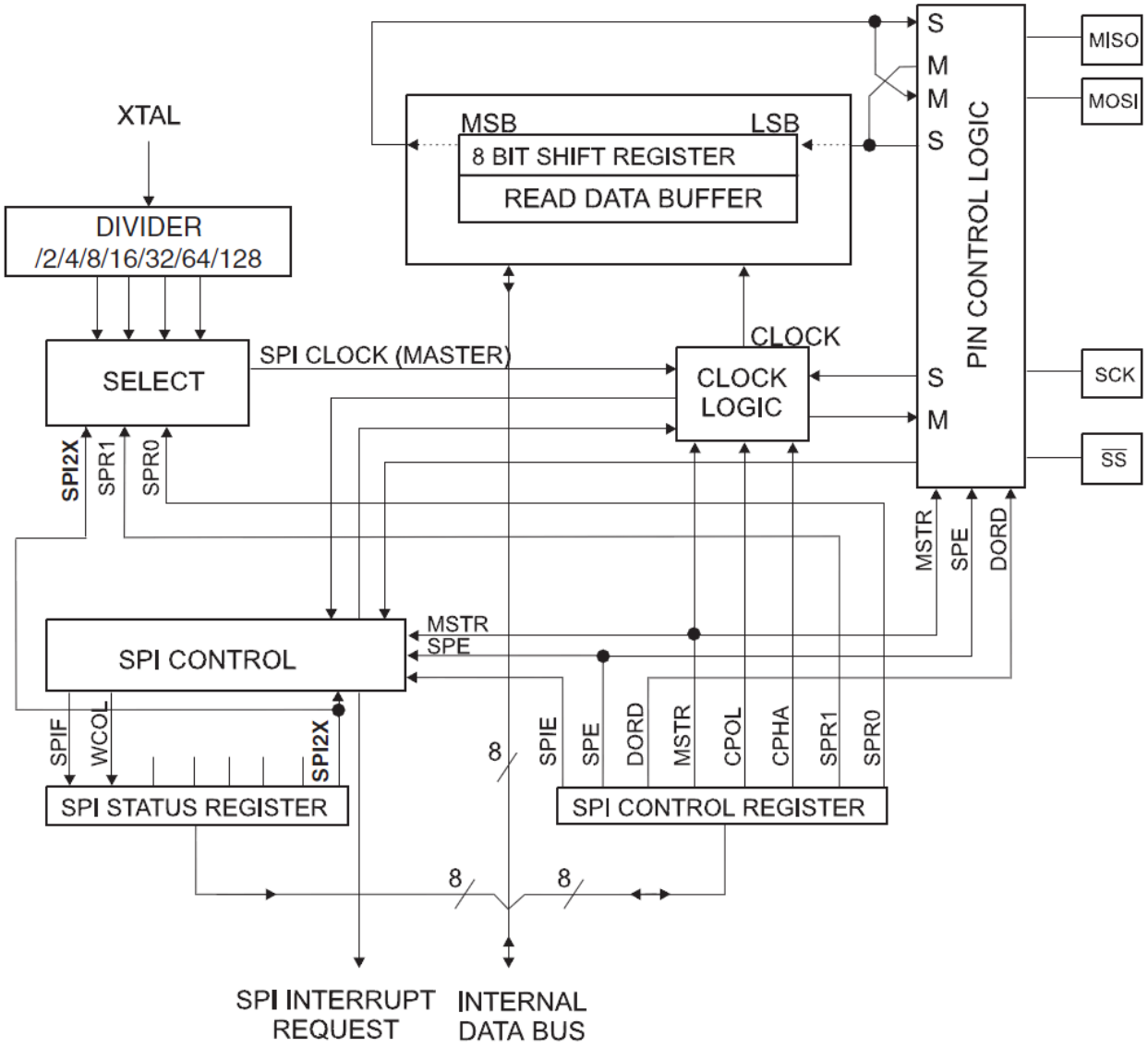


Communication Details



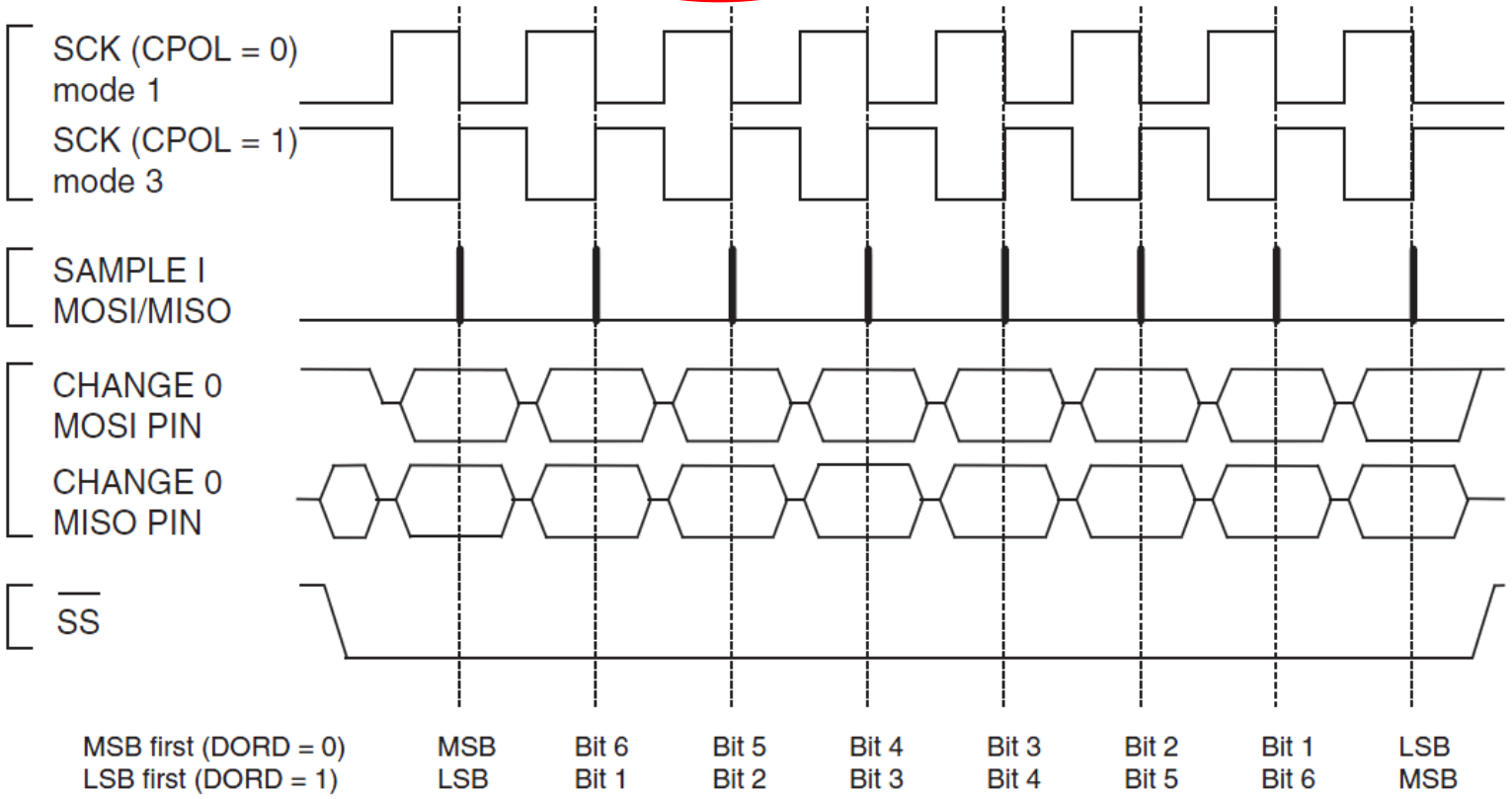
MSB first - sample on rising edge of SCLK
Master transmits 0x27 slave transmits 0xD3

SPI
ATmega1280



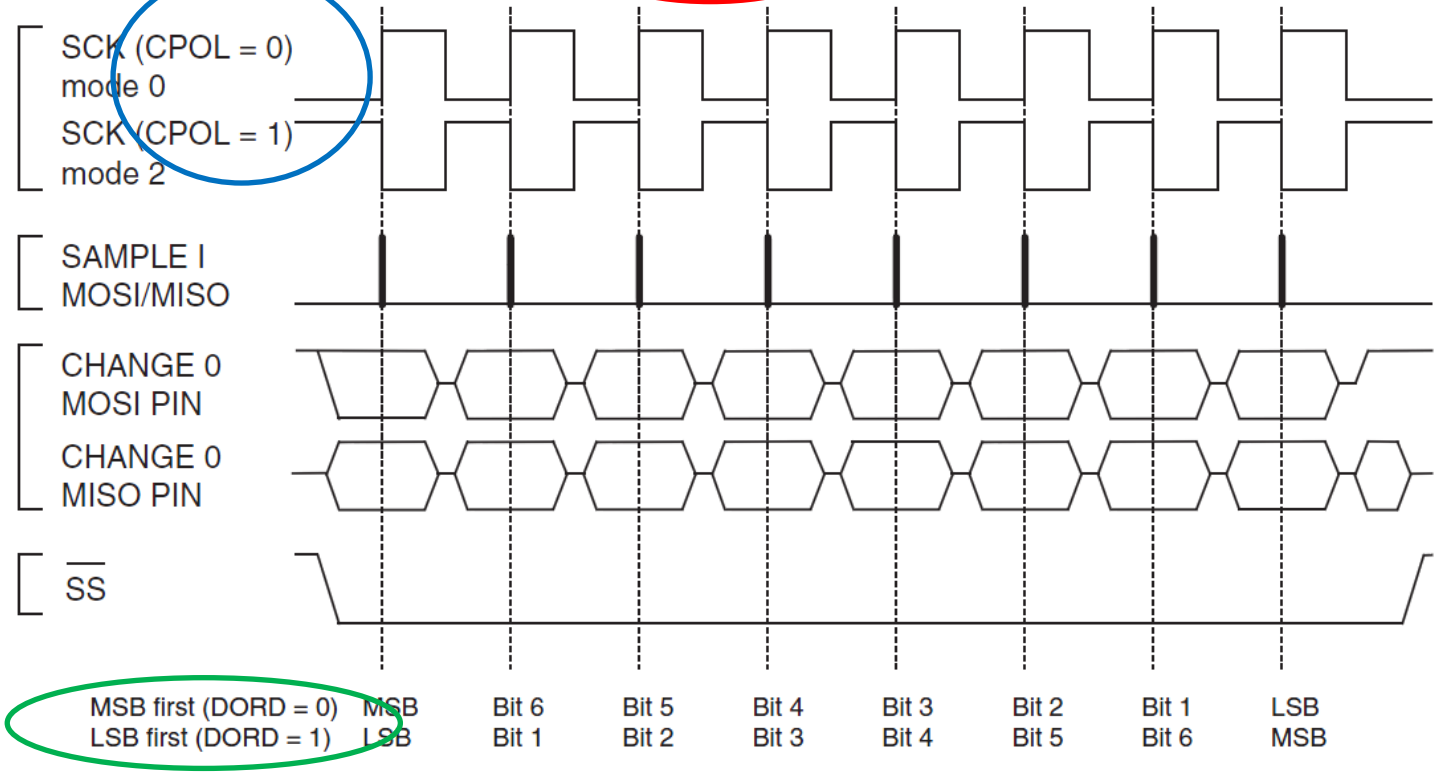
Sample on trailing SCLK edge

Figure 21-4. SPI Transfer Format with CPHA = 1



Sample on leading SCLK edge

Figure 21-3. SPI Transfer Format with CPHA = 0



Find details in Datasheet Chapter 21

Exercise 1

- Change your 7-segment display driver to use the SPI Bus to load the shiftregister

- Use SPI interrupt

Exercise 2

- Find the datasheet for the TC-72 Temperature sensor on the M1280 board
- Design and implement a driver for the sensor
- Implement:
  void init_tc72();
  int tc72_temperature();
- *tc72.h* and *tc72.c*