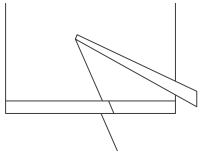
Bring ideas to life
VIA University College



Serial Peripheral Interface Bus - SPI

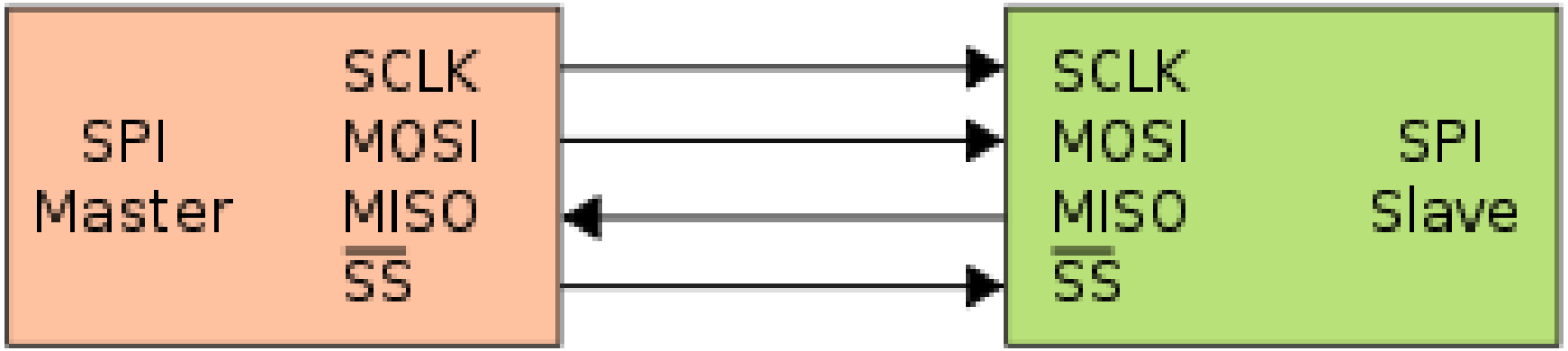
HWP I1

What is SPI?

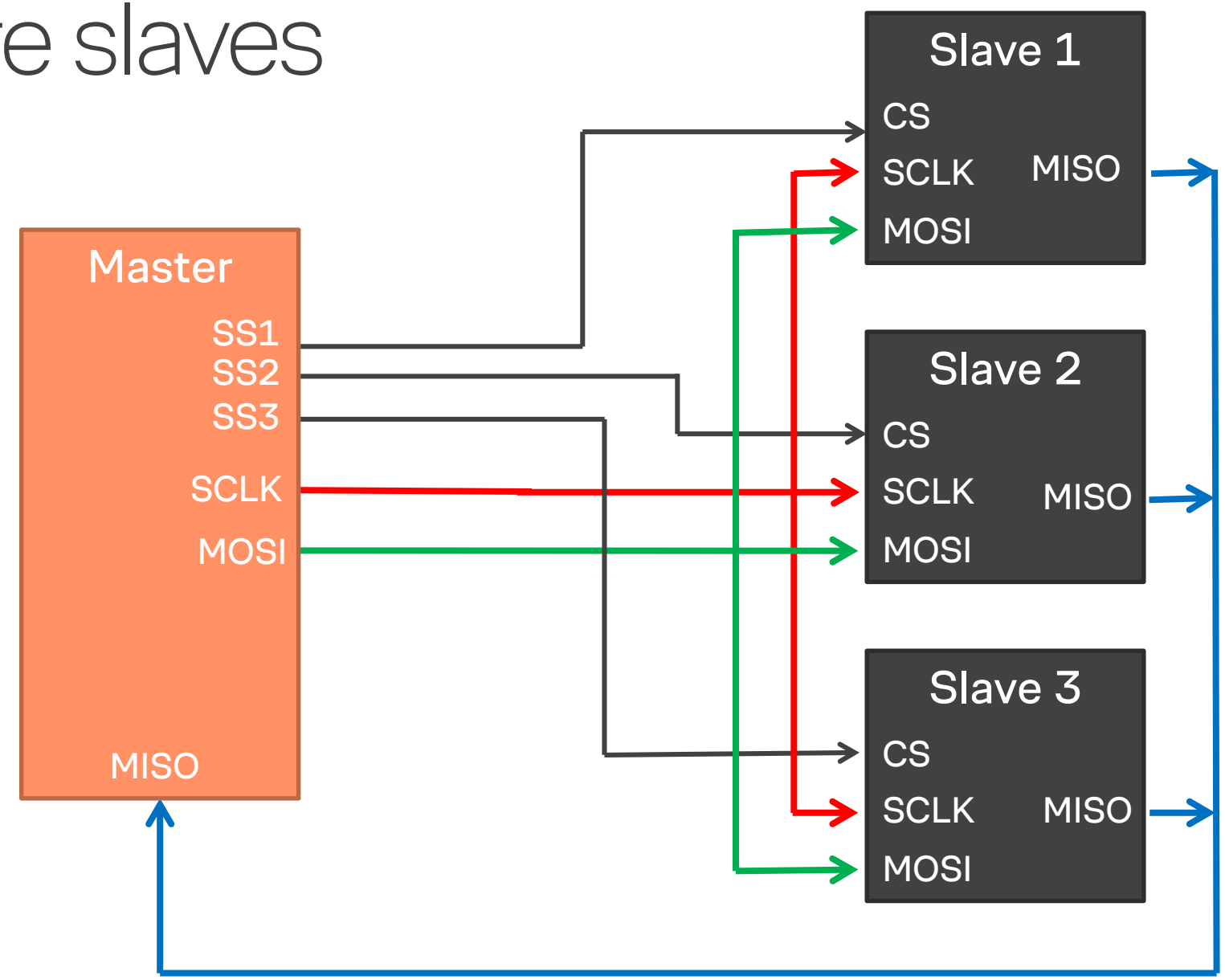
- Serial Peripheral Interface Bus
- Developed by Motorola
- Full duplex synchronous serial data link
- Typically used to communicate between MCU and peripherals
- Master/Slave operation
  - One master many slaves

Master - Slave

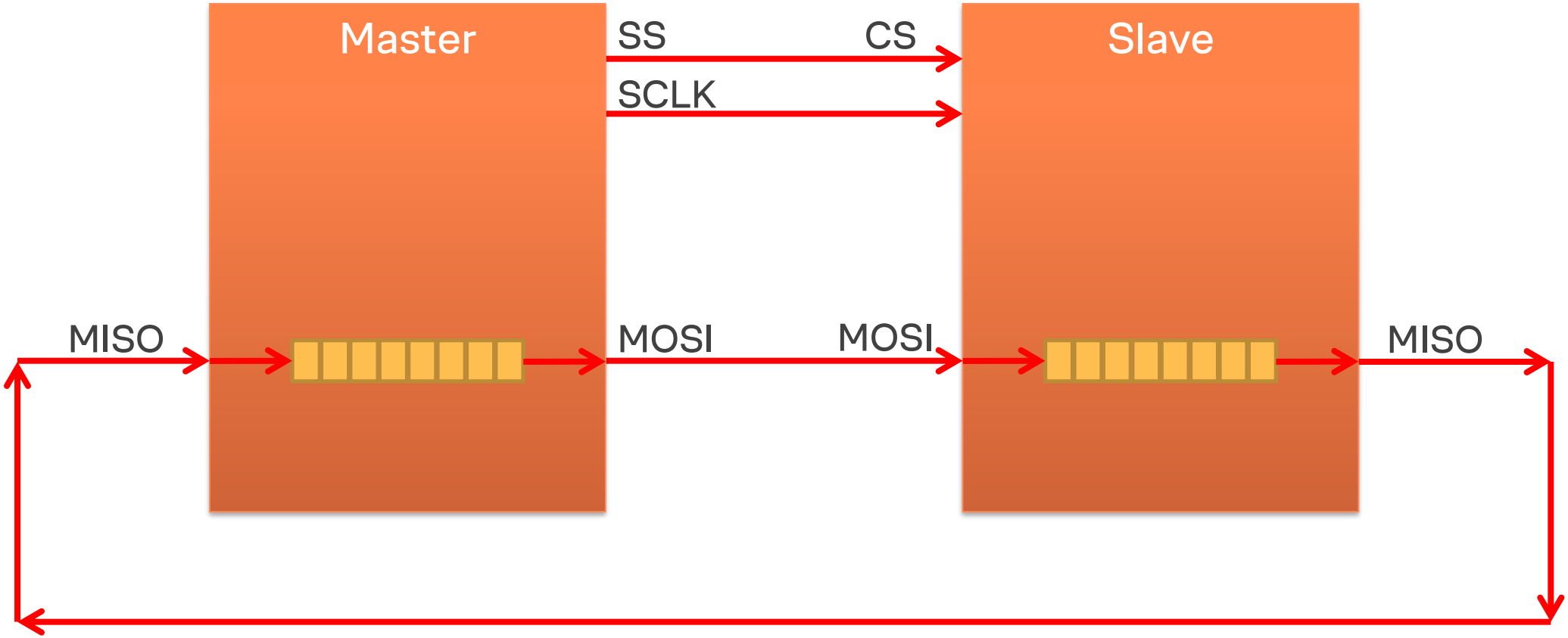
- SCLK: Clock
- MOSI: Master Out Slave In
- MISO: Master In Slave Out
- SS: Slave Select – one for each slave



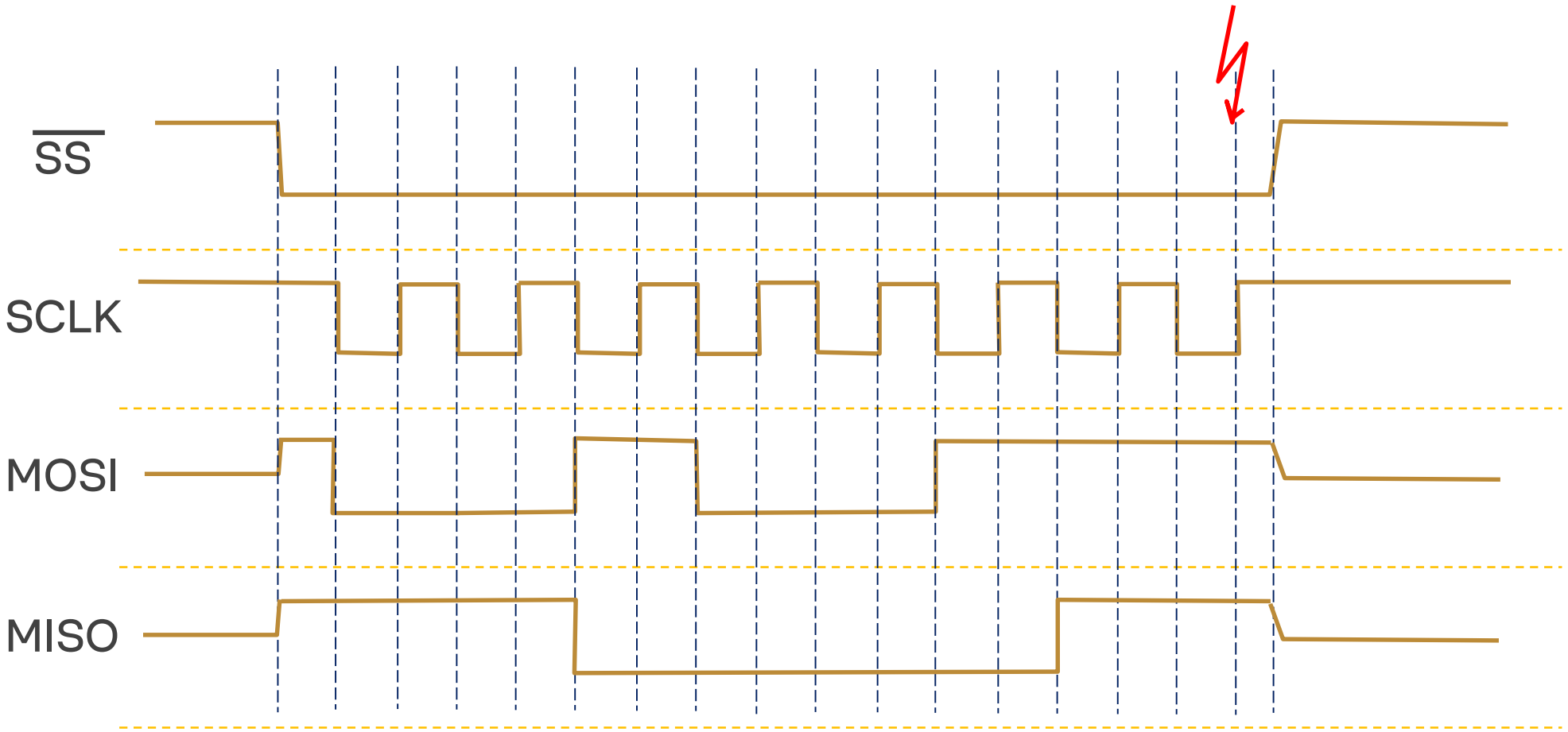
More slaves


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

Simultaneous Receive and Send

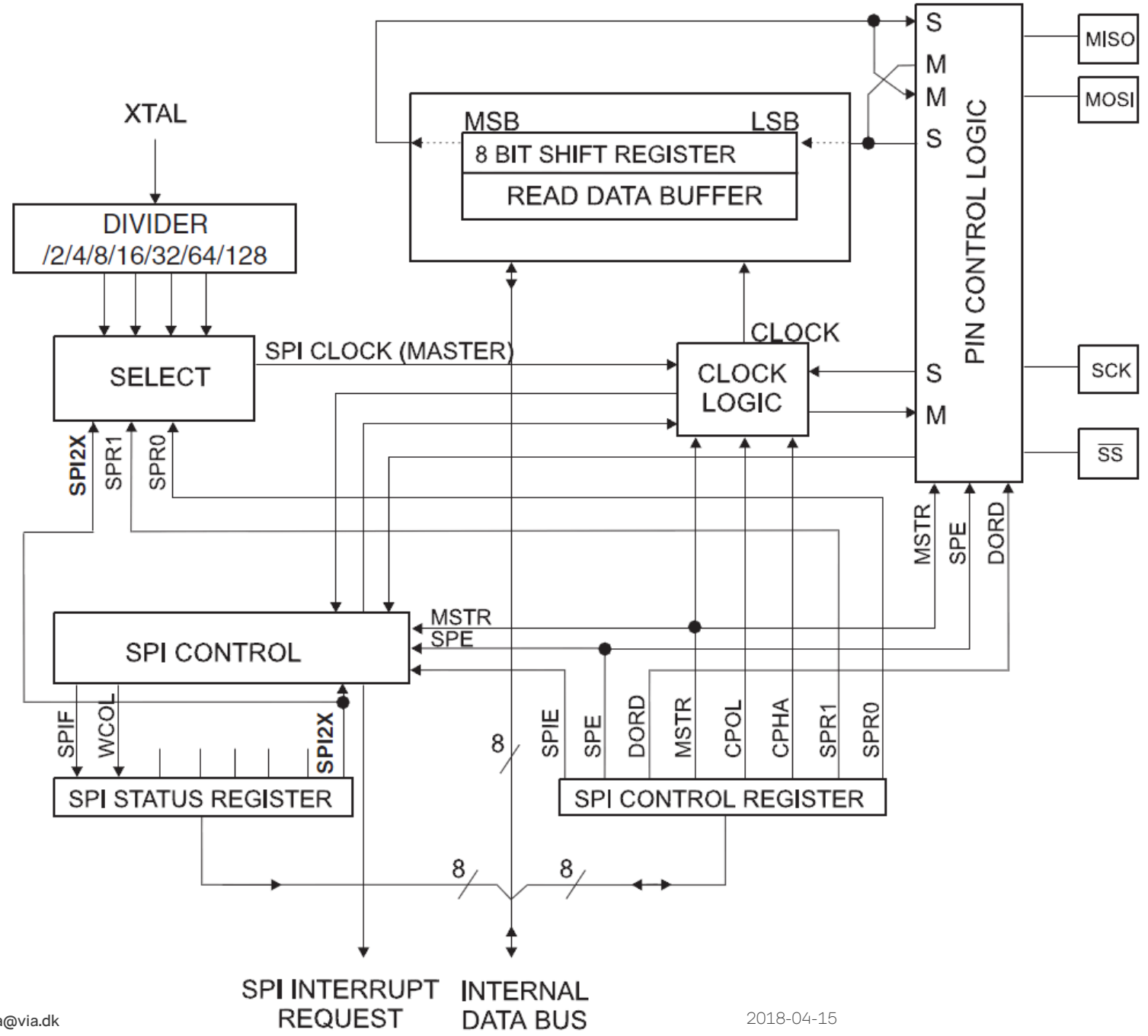


Communication Details



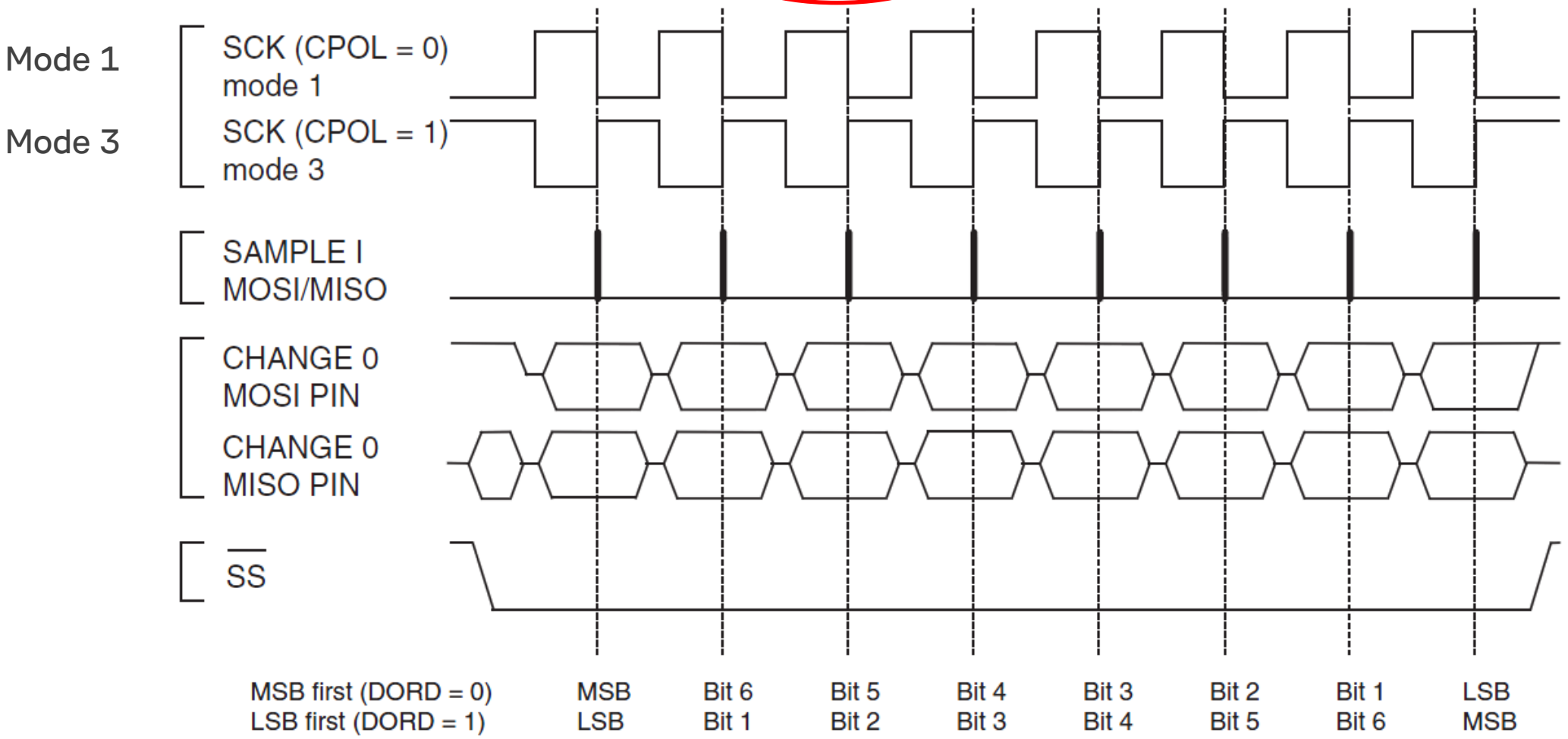
MSB first - sample on rising edge of SCLK
Master transmits 0xE4 slave transmits 0xC3

SPI
ATmega2560



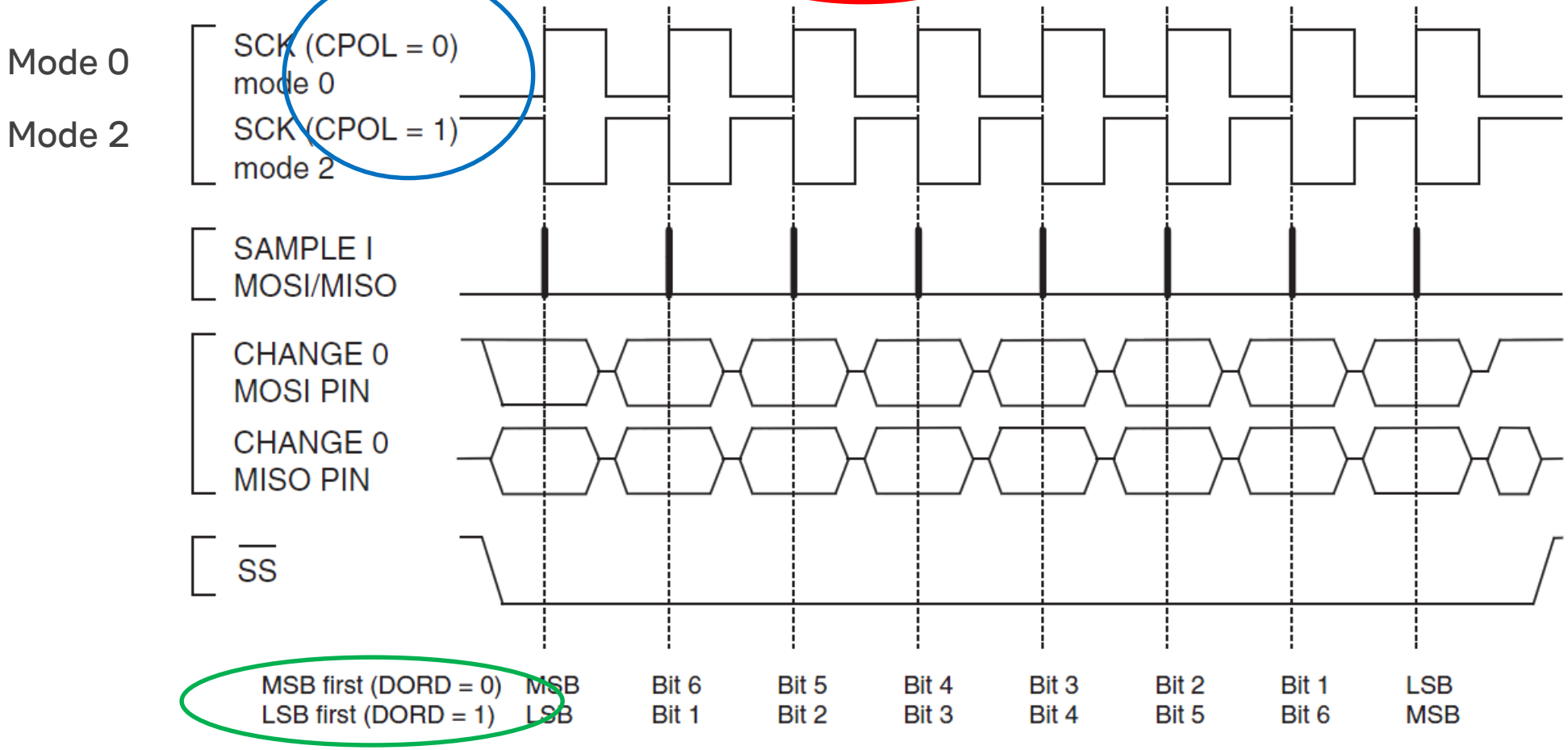
Sample on trailing SCLK edge

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

SPI-Modes

SPI Mode	CPOL (Clock Polarity)	CPHA (Clock Phase)
0	0	0
1	0	1
2	1	0
3	1	1

Important

- Take a look at *SPI Note.pdf*

Exercise 1

- Change your 7-segment display driver to use the SPI Bus to load the shift register
- Use SPI interrupt