
Interfacing nRF2401 with SPI

GENERAL

This white paper describes how to connect the nRF2401, operating in ShockBurst™ mode, to a SPI bus.

THE CONNECTION

The nRF2401 has a bi-directional data pin, while a SPI has two lines, MISO and MOSI, that act as input or output.

The Data pin on the nRF2401 is input when the chip is in programming modus and TX modus. In RX modus it will be an output. To prevent that the Data pin on the nRF2401 drives the MISO or MOSI lines when another SPI unit uses the bus, the Data pin is connected to the SPI bus trough two 10K resistors.

This is shown in Figure 1

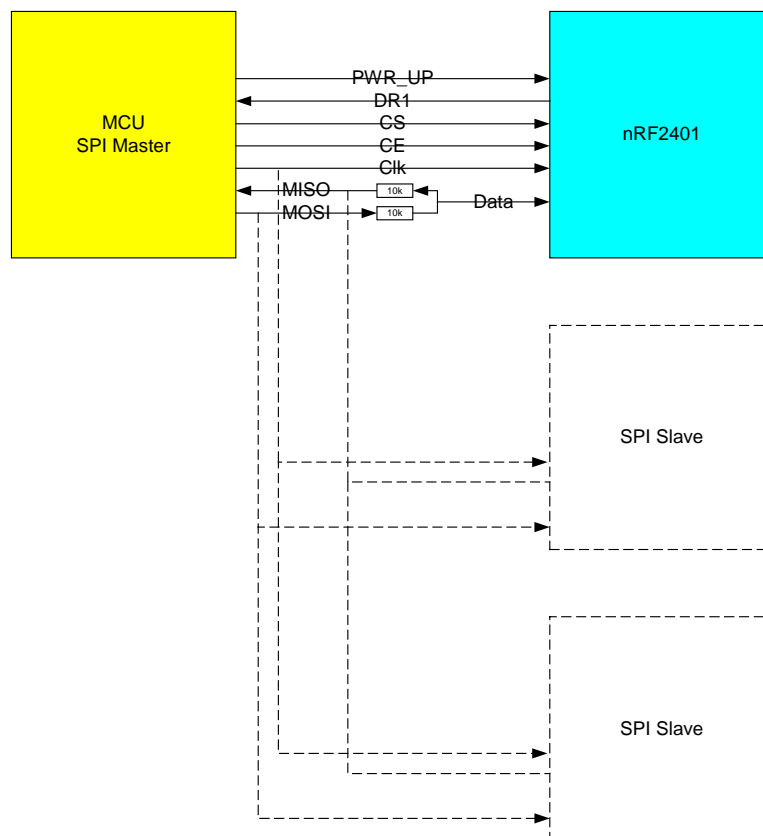


Figure 1 Connecting the nRF2401 to a SPI bus



The MCU (microcontroller unit) will be able to communicate with several SPI slave units on the same SPI bus. A fully compatible SPI slave will tri-state its output when not selected by the master. This will cause the MISO line to be driven by the Data pin on the nRF2401 when it is set as an output.

The following case studies will show how this connection will work.

1. Master wants to configure nRF2401.
 - Setting CS high and CE low sets the nRF2401 in configuration mode.
 - Data pin on nRF2401 is input.
 - Master writes data out through MOSI and read in through MISO.
 - Data will be written to Data pin on nRF2401.

2. Master wants to send data to nRF2401.
 - Setting CE high sets the nRF2401 in TX load mode.
 - Data pin on nRF2401 is input.
 - Master writes data out through MOSI and read in through MISO.
 - Data will be written to Data pin on nRF2401 and loaded into TX FIFO.
 - CE low starts a ShockBurst™ transmission.

3. Master wants to read data from nRF2401.
 - nRF2401 is in receive mode and has received a packet.
 - Master writes data out through MOSI and read data from nRF2401 in through MISO.
 - Since the two resistors are in place, the data written on MOSI will not affect the data from the nRF2401.

4. Master wants to communicate with another SPI device.
 - Slave SPI device is enabled.
 - Slave SPI device will set MISO as output.
 - Slave SPI device MISO pin will see a 10K load between MISO line and nRF2401 Data pin.
 - Master SPI device MOSI pin will see a 10K load between MOSI line and nRF2401 Data pin.



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