# Low Level Buses

## Research for SPI:

Serial peripheral interface for synchronous serial communication for short distances and mostly used in embedded systems, Standard from Motorola.

Master-Slave architecture, full-duplex communication using four wires.

* SCLK: Serial Clock (output from master).
* MOSI: Master Output Slave Input, or Master Out Slave In (data output from master)
* MISO: Master Input Slave Output, or Master In Slave Out (data output from slave).
* SS: Slave Select (often active low, output from master).

Master configures the clock which must be supported from the slave device

The master then selects the slave device with a logic level 0 on the select line. If a waiting period is required, such as for an analog-to-digital conversion, the master must wait for at least that period of time before issuing clock cycles.

Frequency up to a few MHz, limiting also the wire length

Connection of more devices possible

SPI is used to talk to a variety of peripherals, such as:

* Sensors: temperature, pressure, ADC, touchscreens, video game controllers
* Control devices: audio codecs, digital potentiometers, DAC
* Camera lenses: Canon EF lens mount
* Communications: Ethernet, USB, USART, CAN, IEEE 802.15.4, IEEE 802.11, handheld video games
* Memory: flash and EEPROM
* Real-time clocks
* LCD, sometimes even for managing image data
* Any MMC or SD card