SPI

Protocols / Fast synchronous I/O

A shared clock and data bus with a separate chip-select for each device.

01 Signals

SCK
Controller-generated serial clock.

MOSI / COPI
Controller output -> peripheral input.

MISO / CIPO
Peripheral output -> controller input.

CS / SS
Select line, usually active LOW; one per peripheral.

02 Multiple devices

Shared
Share SCK/MOSI/MISO and GND; give each device its own CS.

Idle
Keep every unselected CS inactive, including during boot.

Bus release
Unselected peripherals must release MISO; some modules need buffering.

03 Configuration

Mode
Match CPOL/CPHA (mode 0-3), bit order and maximum clock rate to the device.

Uno / Nano
MOSI D11, MISO D12, SCK D13; CS example D10.

Transactions
Set device settings, assert CS, transfer bytes, deassert CS. Arduino: beginTransaction/endTransaction.

Before you power on

SPI does not use I2C addresses. Match logic voltages and keep wires short at higher clock rates.

SPI / continued

Datasheets & further reading

Arduino SPI reference

https://docs.arduino.cc/language-reference/en/functions/communication/SPI/