

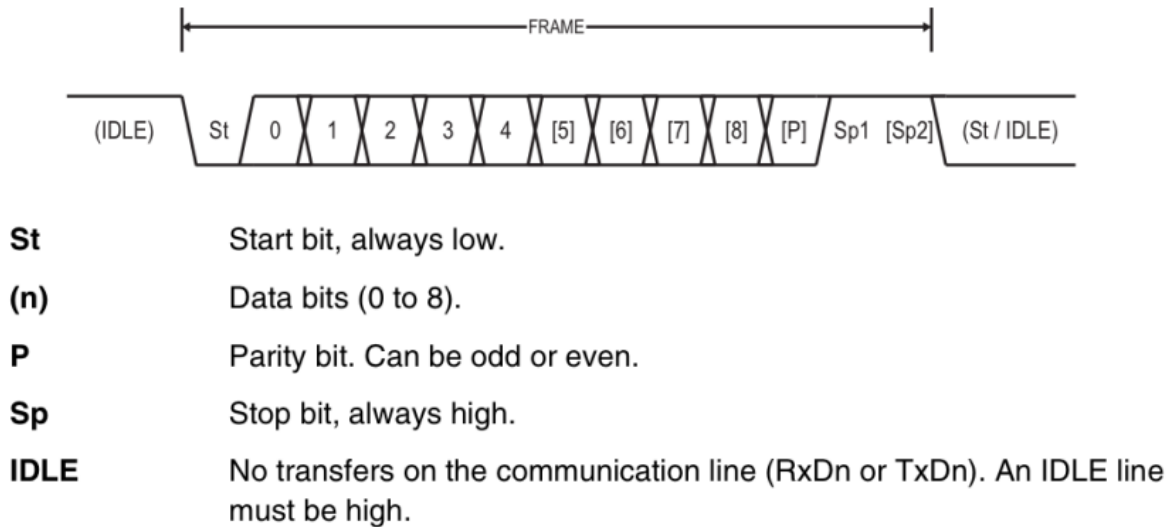
Serial Communication

https://blackboard.soton.ac.uk/webapps/blackboard/execute/content/file?cmd=view&content_id=_4922450_1&course_id=_190559_1

U(S)ART stands for - Universal (synchronous) asynchronous receiver-transmitter.

UART supports upper to 2 MBaud for serial communication.

Figure 18-4. Frame Formats

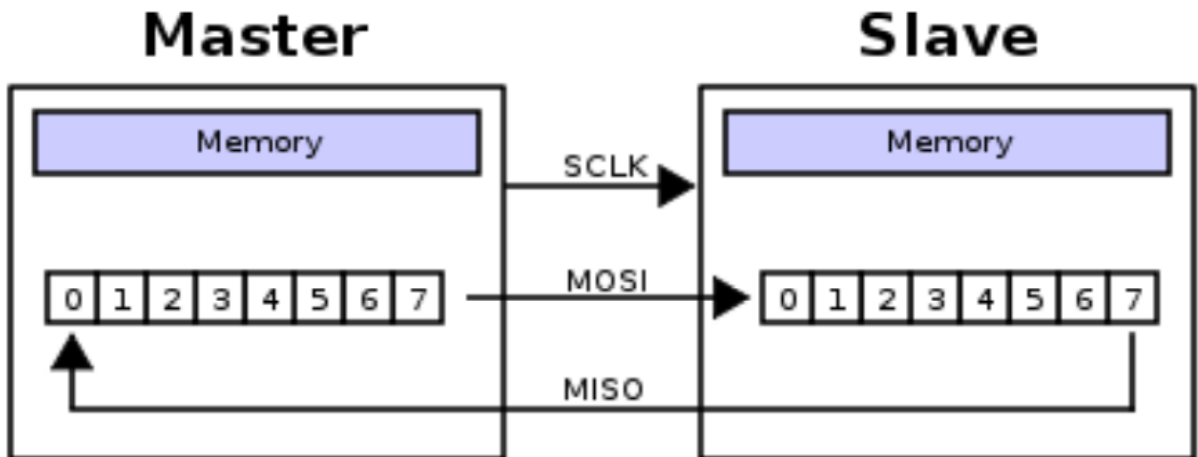


When an 8-bit ASCII character is transmitted over the UART at least 10 bits are sent, but with parity and a second stop bit then it can be as high as 12.

UART can only connect a master and slave together.

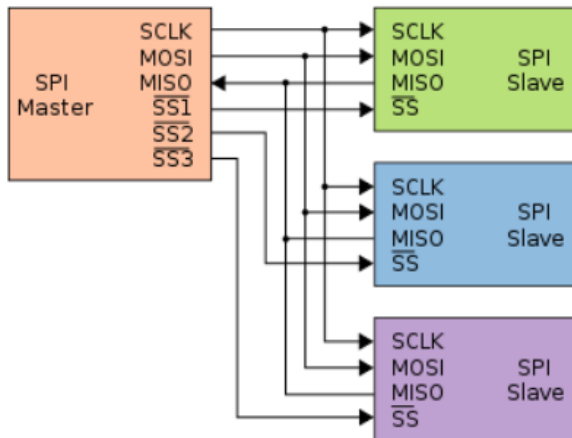
SPI stands for - Serial Peripheral Interface.

SPI supports upper to 100 MBaud for serial communication.



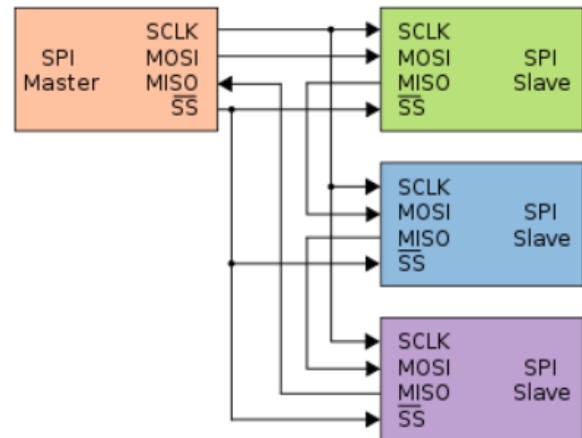
When an 8-bit ASCII character is transmitted over the SPI 8 bits are sent over the MOSI line, the \sim SS pin must also be selected for the slave to receive the information.

Individual Selects



Normal configuration.

Daisy Chained



Not supported by all devices

In individual select mode as many slaves can be connected as the number of \sim SS pins the master has. In daisy chained mode any number of slaves can be connected. This is functionally limited to 20 slaves because of signal degradation on the bus.

I2C stands for - Inter-Integrated Circuit

I2C is called TWI (Two Wire Interface) in avrdude.

I2C supports up to 5 MBaud for serial communication.

When an 8-bit ASCII character is transmitted over the I2C it follows the following series of operations.

- send a start bit,
- send the 7-bit slave address it wishes to talk to,
- send a direction bit (write(0), read(1))
- wait for/send an acknowledge bit
- send/receive data byte (8 bits)
- wait for/send an acknowledge bit
- send the stop bit

Meaning to send 8 bits of information 18 bits are sent and 2 acknowledgement bits are received.

I2C can support up to 128 simultaneous devices, these can be any number of master or slave devices.