

SPI, I2C, UART - Basic features and general comparison

| Protocol | UART | I2C | SPI |
|---------------------------|---------------------|-----------------------------|---------------------------|
| Complexity | Simple and reliable | Scalable and flexible | Fast and simple |
| Speed | Slowest | Faster than UART | Fastest |
| Number of Devices | Up to 2 devices | Complex, up to $2^{7/10}$ | Many, also complex |
| Number of wires | 2 (Tx, Rx) | 2 (SDA, SCL) | 4 (SS, SCL, MISO, MOSI) |
| Duplex | Full Duplex | Half Duplex | Full Duplex |
| No. of masters and slaves | No master slave | Multiple masters and slaves | 1 master, multiple slaves |
| Data transmission | Asynchronous | Synchronous | Synchronous |

Source: <https://www.seeedstudio.com/blog/2019/09/25/uart-vs-i2c-vs-spi-communication-protocols-and-uses/>

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