

UART, SPI & I2C

Electrical Engineering

Five serial buses compared on wire count, speed and how devices get addressed.

Pin count is usually what settles the choice.

Bus	Wires	Character
UART	2, plus ground	Point to point, no clock line
SPI	4, plus one select each	Fast, full duplex, no addresses
I2C	2, both pulled up	Addressed, many devices, slower
1-Wire	1, plus ground	Very slow, tolerates long runs
USB	Differential pair	Host driven, complex stack

SPI trades pins for speed and I2C trades speed for pins. Everything else about the choice usually follows from that.