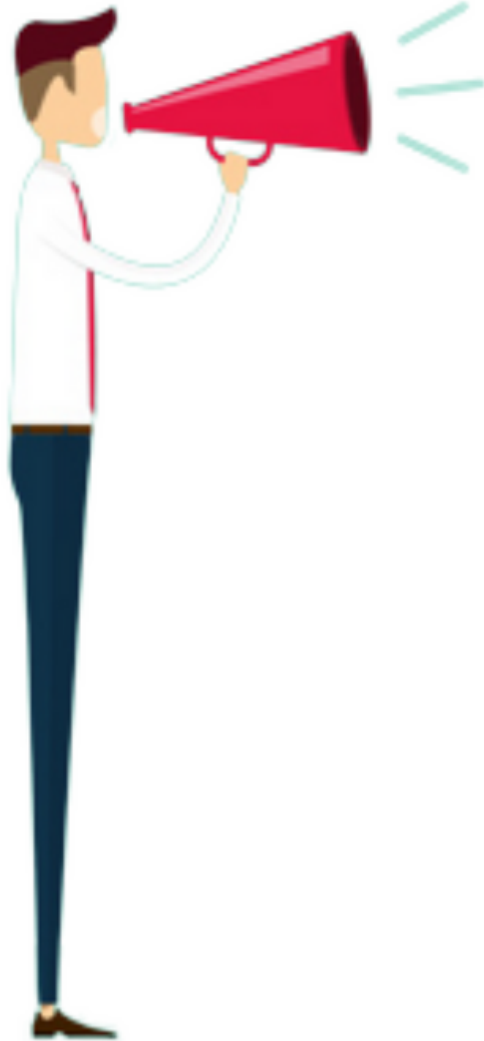


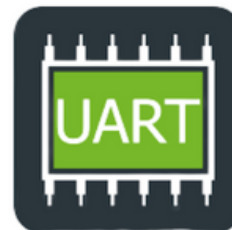


Communication protocols summary



lin

LOCAL INTERCONNECT NETWORK





LOCAL INTERCONNECT NETWORK

LIN Protocol

UART based

Single wire 12V

Half-duplex communication

Single master multi slave

Limited up to 16 slaves

Speed is 20 KPS

Time triggered

Communication between
sensors/actuators and ECU

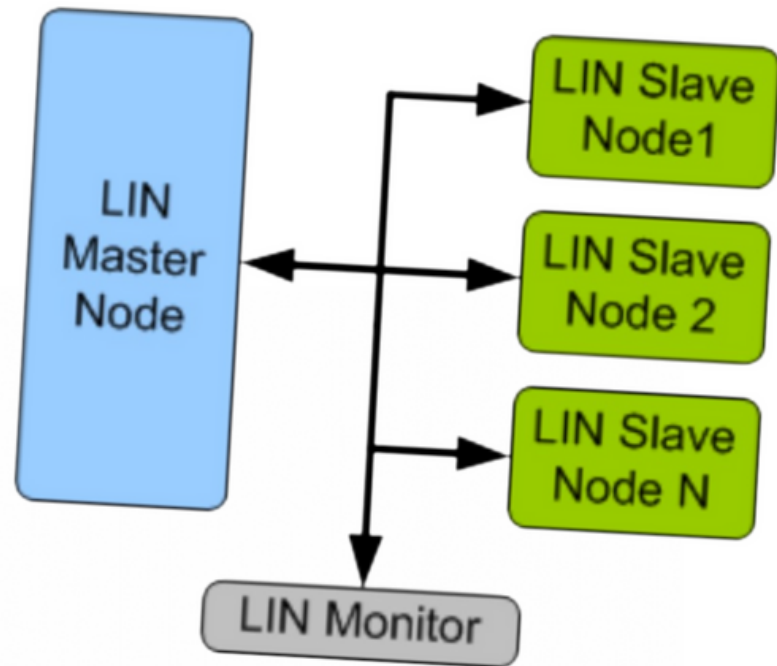
Low cost

Message based protocol

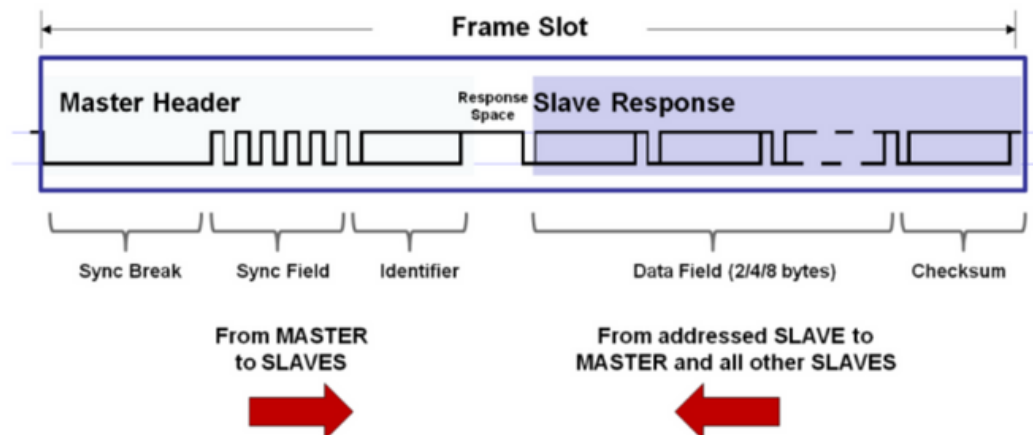
Error detection

Error detection:

1. Parity check
2. checksum



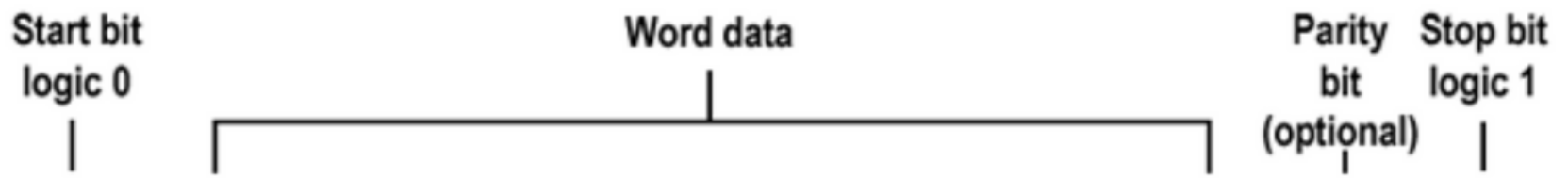
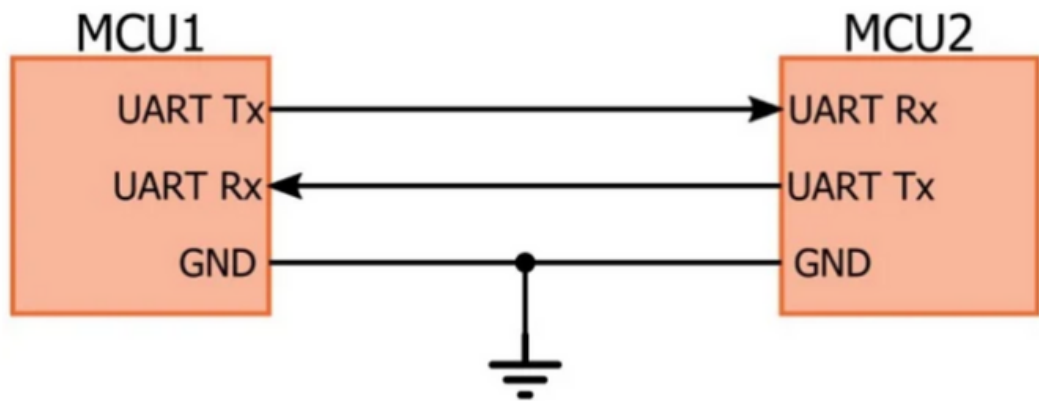
LIN Frame



Wires Used	2
Maximum Speed	Any speed up to 115200 baud, usually 9600 baud
Synchronous or Asynchronous?	Asynchronous
Serial or Parallel?	Serial
Max # of Masters	1
Max # of Slaves	1



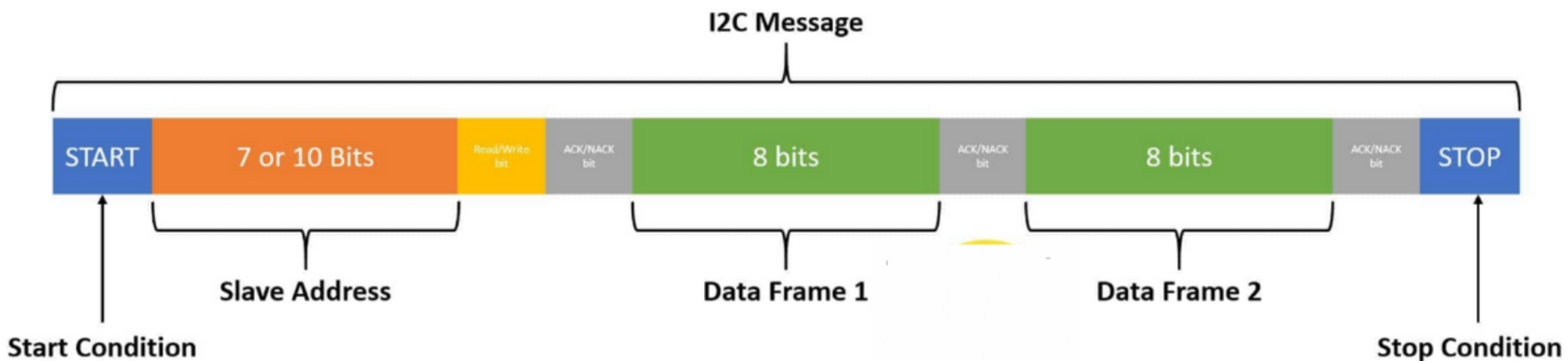
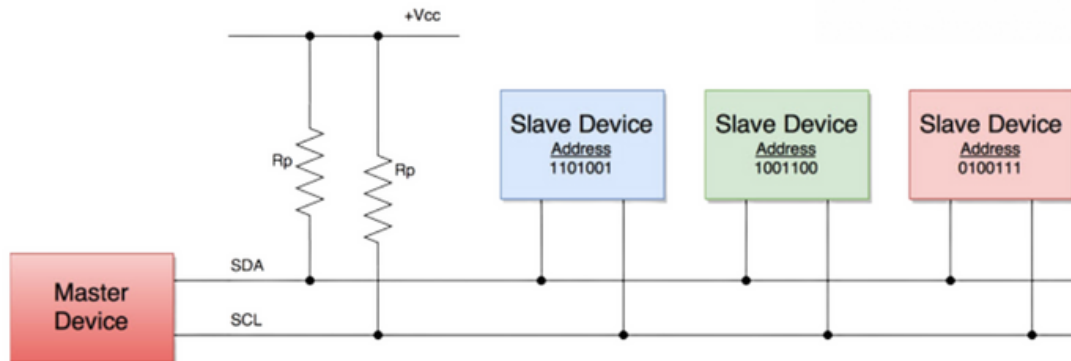
UART protocol



Wires Used	2
Maximum Speed	Standard mode= 100 kbps
	Fast mode= 400 kbps
	High speed mode= 3.4 Mbps
	Ultra fast mode= 5 Mbps
Synchronous or Asynchronous?	Synchronous
Serial or Parallel?	Serial
Max # of Masters	Unlimited
Max # of Slaves	1008



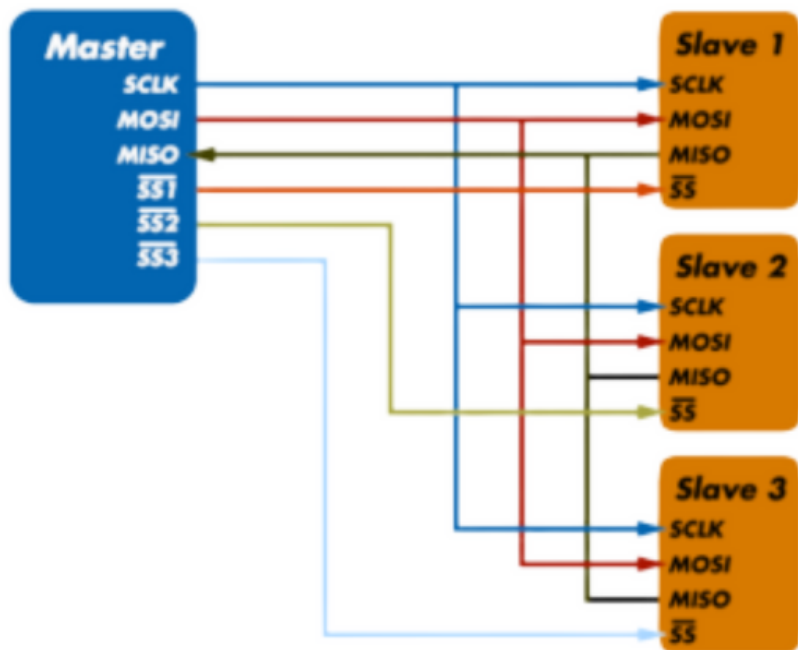
i2c protocol



Wires Used	4
Maximum Speed	Up to 10 Mbps
Synchronous or Asynchronous?	Synchronous
Serial or Parallel?	Serial
Max # of Masters	1
Max # of Slaves	Theoretically unlimited*



SPI protocol



SPI Mode	CPOL	CPHA	Data Latches at
0	0	0	Rising edge
1	0	1	Falling edge
2	1	0	Falling edge
3	1	1	Rising edge