Lecture 4 - Serial Interfaces

Exercise 1: Is the "Transmit Data" (TxD) signal an input or an output? How about "Receive Data" (RxD)? Is a computer a 'modem' or a 'terminal'?

(1) it depends   TxD is   o/p on DTE
                            i/p on DCE
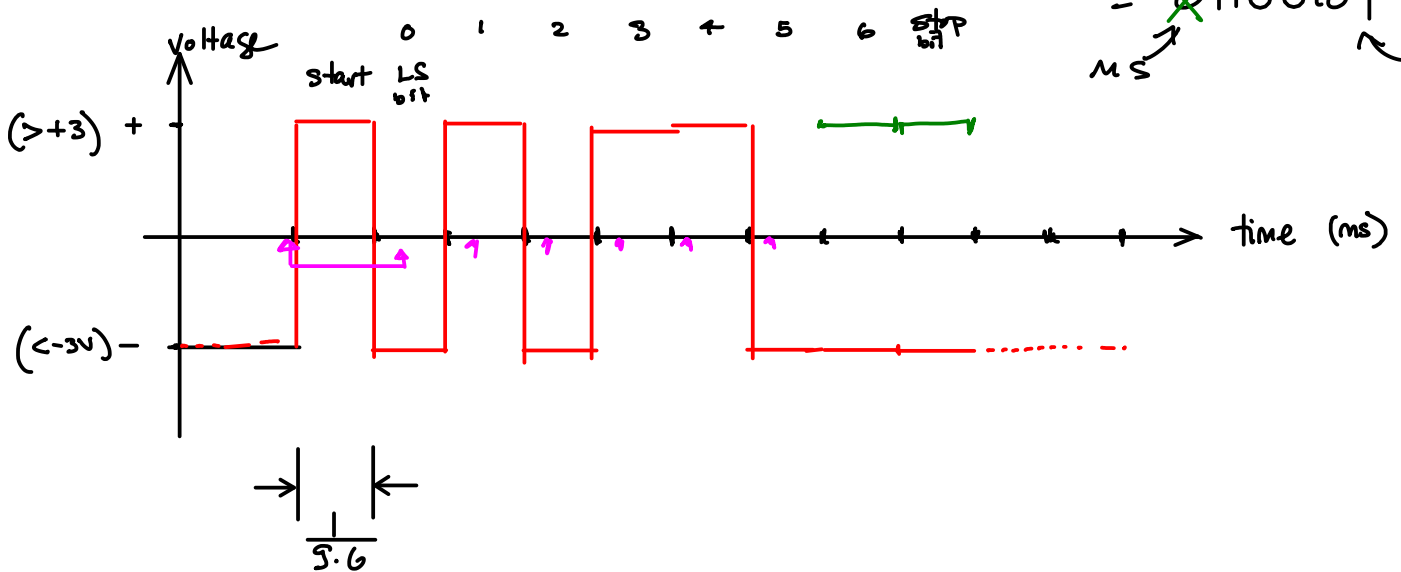
         RxD is

P C's are typically   DTEs.

Exercise 2: Draw the waveform used to send the ASCII character 'e' (hex 65) at 9600 bps with seven data bits and no parity.

'e' = 0x65

= 01100101

MS ↗   ↖ LS bit

Exercise 3: Will the parity bit allow the receiver to detect all single-bit errors? All double-bit errors?

yes. — one error
    will switch from odd to even or vice-versa

no - two errors
    parity will be unchanged.

Exercise 4: What happens if the receiver's clock is running faster than the transmitter clock?

— receiver sample earlier & earlier in time
— may sample in the wrong bit if error is large enough.

Exercise 5: What would happen if the receiver was expecting 8-bit characters and the transmitter was sending 7-bit characters? What about the reverse case?

TX   S 0 1 2 . . . . 6 S

RX   S 0 1 2 . . . . . 6 7 S
                        ↳ receiver sees the stop bit (low, '1')
                            as the MS bit value (bit 7)

TX S 0 1 2 . . . . 7 S
RX S 0 1 2 . . -6 _
                  stop

        if MS TX bit is 1 : RX sees low → extra stop bit
                      is 0 : RX would see a "framing
                                              error"