Asynchronous 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' (DCE) or a 'terminal' (DTE)?

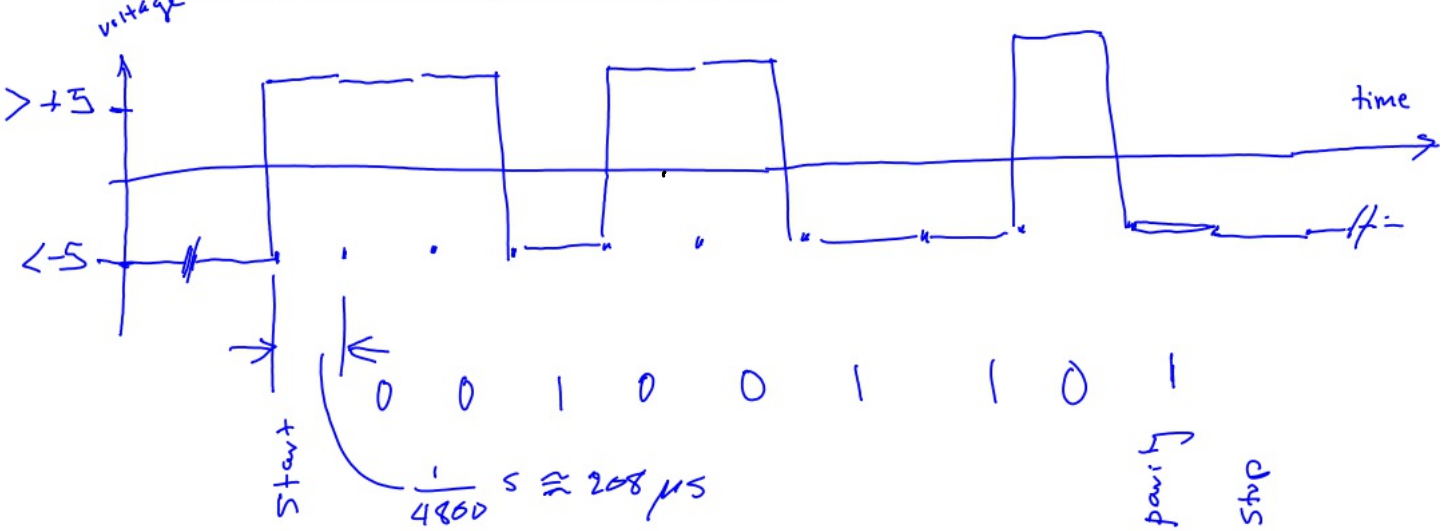
it depends — TxD is output on DTE
TxD is an input on a DCE.
RxD is the opposite.
A "PC" is typically a DTE.
A "mainframe" is typically a DCE (assuming you can find one).

Exercise 2: Will the parity bit allow the receiver to detect all single-bit errors? All double-bit errors?

Yes — a single bit error changes the '1' count from odd to even or vice-versa.
No — two errors results in no change to the "even-ness" of the parity.

Exercise 3: Draw the waveform used to send the ASCII character 'd' (hex 64) at 4800 bps with eight data bits and even parity.

0x64 = 0110 0100



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

The receiver samples bits earlier each bit. If the difference is too large it may even sample the wrong bit.

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?