

Exercise 2

1. How fast can a signal propagate through a properly terminated RG58 coaxial cable? You need send a signal from a computer digital interface so it arrives 100 m from the control system 500 ± 20 ns after another digital signal generated by the interface. What should the time difference be between the generation of the two signals by the computer interface so that they occur in coincidence (i.e. at the same time)? Hint: the velocity of light is 3×10^8 ms⁻¹ but this is not the speed of the signal in the cable.
2. You need to connect to a computer interface a thermocouple in a furnace on an oven used to melt metals in an electrically noisy factory environment with large earth leakage currents. What type of analogue measurement is suitable? Make a drawing of the configuration.
3. Compare in a table the characteristics of USB 2.0 and the GPIB / IEEE 488 buses for interfacing laboratory instruments. Comment on the suitability of different busses.