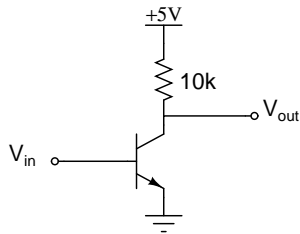


Transistor Switch and Emitter Follower

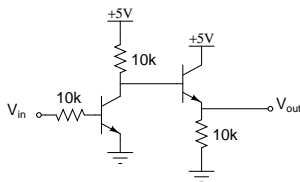
Use a 0 to 5 V, 1 kHz square wave as input for your circuit in this lab.

Task 1: Using a npn-transistor, a simple transistor switch can be constructed as in :



- 1.) Apply the input and examine the output waveform using a scope. Document the phase shift. What is the output impedance when $V_{out} = 5\text{ V}$?
- 2.) Let us load this transistor switch with a $10\text{ k}\Omega$ resistor to simulate the more realistic situation where your circuit drives some other input. How does the load compare to the output impedance from 1 above? What happens to the output voltage under these load conditions? Would AC coupling between the switch output and the load help to increase the voltage drop across the load? Check experimentally what voltage drop can be obtained. What capacitor value would be needed to keep the voltage within 10% of the unloaded value?

Task 2: Insert an emitter-follower circuit between the switch output and the $10\text{ k}\Omega$ resistor as shown in fig.. What is the output voltage now and why? Explain also the phase shift.



Task 3: Make a simple transistor switch again, but this time from a pnp-transistor. Repeat the first part of task 1 for this new circuit, i.e. find and document the phase shift and the output impedance.