

Pre-Lab***BJT Switches***

1. When an npn BJT is biased into the Cutoff or Saturation mode, functionally the transistor operates as a switch. This laboratory exercise will use the 2N1711 npn BJT as well as the LM386 Operational Amplifier. Find datasheets for both devices.
2. For the Alarm Clock project, you will need to have an alarm sound. This exercise will provide you with one possible circuit for your alarm sound. Simulate a design in Multisim that uses a voltage signal input to the LM386 with the output connected to an 8 Ω resistor (which models a speaker). In your design, configure an npn BJT to function as a switch (connected in series with the 8 Ω resistor) to enable the speaker to be turned on and off.

Laboratory Work

1. Build your alarm sound circuit – be sure to use a real loud speaker instead of the modeling resistor.
2. Explore what happens as you increase input signal frequency, input signal amplitude, switching frequency, and duty cycle. Also, explore how an input square wave and triangle wave ‘sound’ compared with a pure sinusoid.
3. From your experimental exploration, determine and record the circuit parameters (mentioned in step 2) that you believe would function as an effective alarm signal.