

MUST 382 / EELE 491

Spring 2014

Mini-projects

(1) Sound-activated switch

Design a simple active circuit that will monitor the input signal level and then close an electrical switch (relay) when the signal exceeds some pre-set threshold. The switch should stay closed for at least 5 seconds, or longer if the input signal level stays above the threshold.

(2) 440 Hz signal generator

Create a simple circuit that will produce a line-level signal (500 mV peak to peak) with fundamental frequency of 440 Hz. Determine the accuracy and precision of the design, and consider a few options and tradeoffs.

(3) 4-input audio summer (mixer), battery powered

Design a circuit that will take four separate audio signals (single-ended line-level) and electrically add them together to create a single output signal. The circuit must be battery powered (e.g., 9V cell), and provide (at least) unity gain from each of the four inputs to the output.

(4) Simple metronome

A circuit is needed to produce an audible click or tone at a repetitive interval. The metronome circuit should allow adjustment over a musically-useful range of click rates.

(5) Visual signal indicator

Design a circuit that will light two LEDs to show the audio signal level present. The circuit should light one LED when the level exceeds 500 mV peak to peak, and another LED should light when the signal level exceeds 2 V peak to peak. When triggered, the LEDs should stay on for at least 200 ms. Battery operation is preferred.

(6) Simple powered speaker

Design a circuit that will accept a line-level signal from an audio source (like a computer or Ipod) and will power a mid-sized 8 Ω dynamic loudspeaker driver. Aim to be able to deliver at least 100 mW.