

FPGA Lab 6 – D/A Converter

Purpose: In this lab you will build an 8-bit digital to analog converter that will drive a speaker on your LiveDesign board. You will use a “codec” design for the converter, as discussed in class. This converter will be used in the next few labs as part of a tone generator and music player.

- 1) **Lab6 : D/A Converter.** In this project you will build a square-wave generator that drives the speaker on the LiveDesign board, with speaker amplitude set by the 8 dipswitches on the board. To set the frequency, use a counter module to generate a logic signal from an appropriate output bit of the counter (not the carry out) so that it oscillates at about 1 kHz. This line is then connected to the select input of an 8-bit multiplexer (made with the megafunction “LPM_MUX”), which selects for the output either the number B”00000000” or a number set by the dipswitches. The 8-bit output of the multiplexer is then connected to the codec D/A converter module. As documented in the schematic, the audio output pins are named “audioR” and “audioL”.
- 2) Check for proper operation of the codec. When running, the amplitude of the sound should be proportional to the number set by the dipswitches. Don’t forget to turn up the volume potentiometer, located just to the left of the dipswitches. It might be useful to test the 1 kHz generator part of the project by directly connecting this line to an audio output pin.