

Final Project Proposal

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Goal: My goal is to design an interface that will allow the user to interface with the keypad to play different musical notes. The note played will depend on the button pressed and it will play for as long as the button is held down.

Equipment Needed: Freescale PBMCUSLK Student Learning Kit, 4x4 Matrix Keypad, and the on-board display and buzzer.

Detailed Description: The device I'm trying to create is a form of a digital keyboard/synthesizer. As stated above, it will play music notes from the buzzer based on button input from the keypad (imagine each key on the keypad as a different key of a piano or keyboard). The length of each note will play for as long as it is held down. Additionally, the name of the note currently being played will be displayed on the board's LCD screen.

Implementation will use the code from Lab 8: Clock Pulse Generator as a skeleton and use bits and pieces from Lab 2: Reading and Writing using RAM (For the LCD Screen) and Lab 5: Keypad Interfacing (For taking input from the keypad). The hardware design will be identical to Lab 5's circuit, since the buzzer and display are hardwired to the board.

The code will be written so the center key on the board plays a note at 261.6 Hertz, which is referred to as "Middle C" in most musical practices. This note is used as a basis in music theory, so it is ideal to have as much range to either side of it as possible on a real instrument.

If time allows, I will expand the design to allow for multiple notes to be played simultaneously). This will require the proper combinations of each frequency to be played and placing more than one note name on the display.

Final Result: Once complete, though the interface may be clunky, the user will be able to use the device to play songs of their own creation on the board. Disclaimer: Notes may only be able to play so fast due to hardware limitations of the board and the musical range of notes that may be played will be limited due to the number of keys on the keypad. Implementation may or may not include chords (Multiple notes played at the same time).