Rock It Out
Project Proposal
EE/CS 120B
Spring 2015
by Alberto Tam Yong

Abstract

The Rock It Out console is a music game that awards points when the player matches the same pitch as the game provides. The pitch generated by the player can come from a piano, a guitar, or even his own voice, and the sound is captured using a microphone. The Rock It Out console will play a melody from a speaker and also display complementary information on an LED matrix that shows a baseline of the current pitch being played and compares it with the pitch being picked up from the microphone, given the player a visual guide of how to match the pitch better. In addition, an LCD display serves to show the points and instructions for the game.

Materials

- 2 X ATmega1284
- 1 X LCD Display
- 1 X LED Matrix
- 2 X Shift Registers
- 1 X Speaker
- 1 X Microphone
- 1 x LF353 Dual Op-Amp
- Assorted Resistors
- Assorted Capacitors
- Breadboards
- Jumper wires
- 1 X AVR Programmer (using ICSP)
- 1 X Bluetooth Module
- 1 X LM7805 5V Linear Voltage Regulator
- 3 X Buttons
- 1 X Trimpot with knob

Build-Upons

- LCD Display: Displays points and instructions for the game
- LED Matrix: Shows a graphical representation of the game pitch that the player has to match as well as the current pitch picked up from the microphone
- USART: The Rock It Out uses two ATmega1284 communicating via UART. One ATmega1284 will control the main functions of the game, drive the LED Matrix,

buttons, and LCD display, while the second ATmega1284 will act as a DSP (Digital Signal Processor) and analyze the microphone input.

Additional Build-Upons

- Shift Registers: Used to minimize number of pins used to drive the LED matrix
- Audio Processing: Software implementation using FFT and hardware implementation by adding filters to minimize noise, such as a Bandpass filter