

MakeBU 2015

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On the weekend of March 28-29, we attended Boston University's second annual MakeBU hackathon and embarked on a hardware hack to change learning the piano. Our hack, Piano Lights, won first place overall as well as the first place sponsor prize, 'Hackiest Hack', presented by Downtyme.

Our design, which operates on an Arduino Mega 2560, utilizes a TFT touch screen display to allow users to easily interact with the program and hardware. The user selects his or her desired song from a list on the display and the opening notes are illuminated on the keyboard. As the user plays the notes indicated by the LEDs, the program waits for MIDI input to move to the following note immediately when the user strikes the correct key(s) that are illuminated. The device is battery powered and could be mass manufactured for under \$35 using an ATmega168, clock, optoisolator, and LED controllers. Piano Lights provides a plethora of advanced functionality never before introduced, and it can be manufactured for a fraction of the cost of competing devices to teach piano.



Jake and Max devised the plan for the hack and designed the hardware layouts. Jake drew the schematics and wired the LED strips while Max wrote the Arduino software to run the hack and wrote a Java tool for the computer that allows users to create new songs for the device. Kurt and Zach used Solidworks to design the LED housings, and then Jake, Zach and Kurt used the *Solidoodle 3* 3D printer to print the housings in natural PLA plastic. Building Piano Lights was an amazing experience that taught us new skills using Raspberry Pi and serial communication, and gave us an idea and device with unlimited potential for expansion and business.