

Musical Hopscotch

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Construction with a Mold

The mold is made with smooth HDPE non-stick surfaces. It has a collapsible interior, allowing easy disassembly and reusability. The mold is sealable to reduce the potential of leaks.

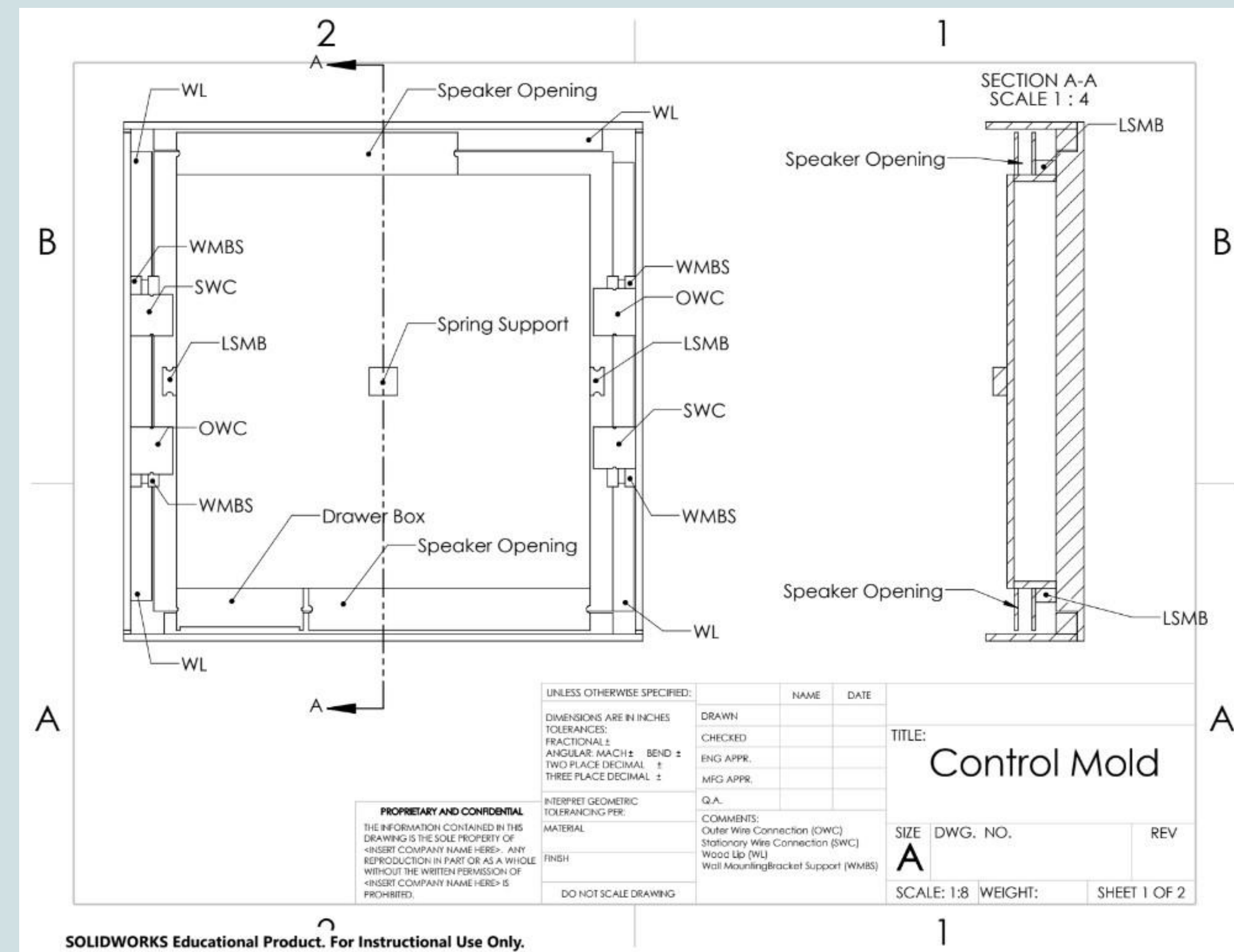


Figure 1: The control tile mold layout with mold inserts labelled.

The new tile walls are cast using a 2:1 high strength epoxy resin. All the inserts in the walls are simply 3D printed or cut from wood. The wood inserts allow for mounting using screws. The 3d printed parts are standardised for maximum ease of use by students and teachers.

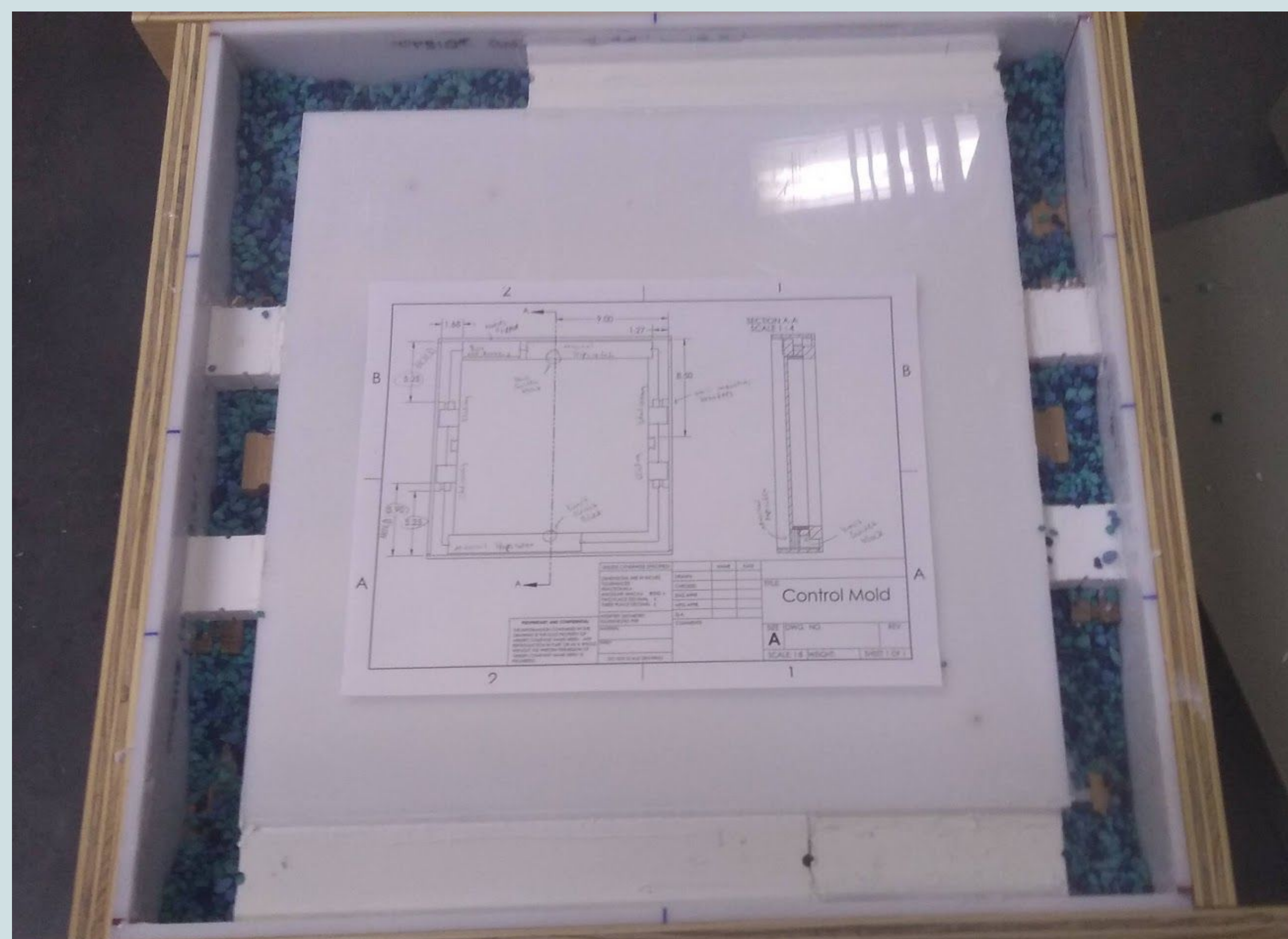


Figure 2: The mold before the first epoxy pour.

Musical Playground Background

The Cottonwood Valley Charter school started the musical playground by consulting James Ruff. Mr. Ruff helped the 6th graders build a xylophone for the playground. Mr. Ruff began the second iteration of this project and decided to enlist the mechanical engineering design team with this project. We were given the opportunity to design and make a musical Hopscotch game.

Design Requirements Met

- Ease of maintenance and operation for teachers
- Have playtime of 4-5 hours
- Must be strong enough to withstand use by children and adults without posing a safety risk.
- Weather resistant
- Play harmonious musical notes
- Compact wiring design



Figure 3: The tile after being taken from the mold

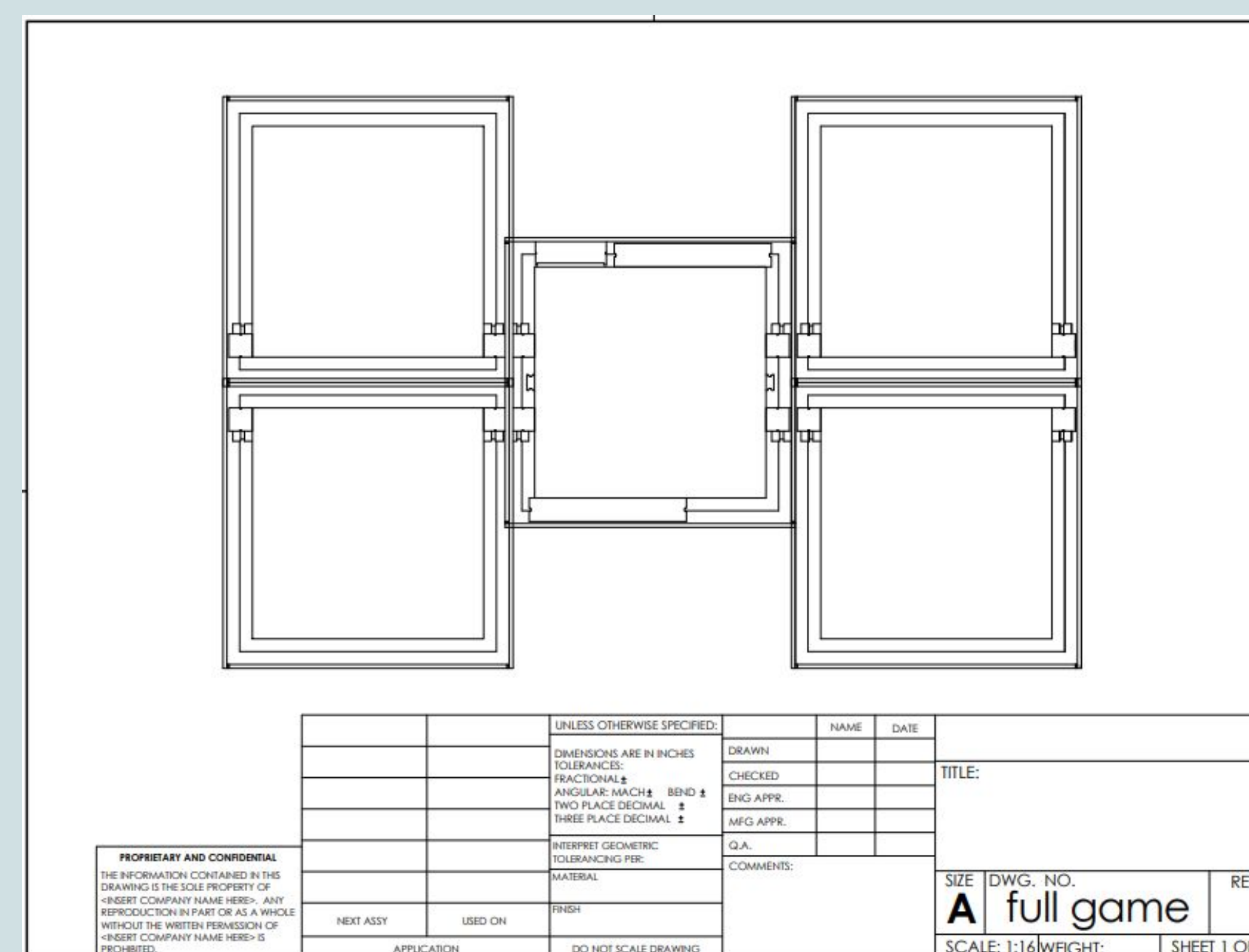


Figure 4: The completed game

Electronics and Inter-Tile Wiring

An Arduino Mega, limit switches, and speakers are used inside the tile system in order to detect what parts of the tiles are being pressed in order to produce the different tones for each side. Each tile is connected to the arduino and connects to the speaker.

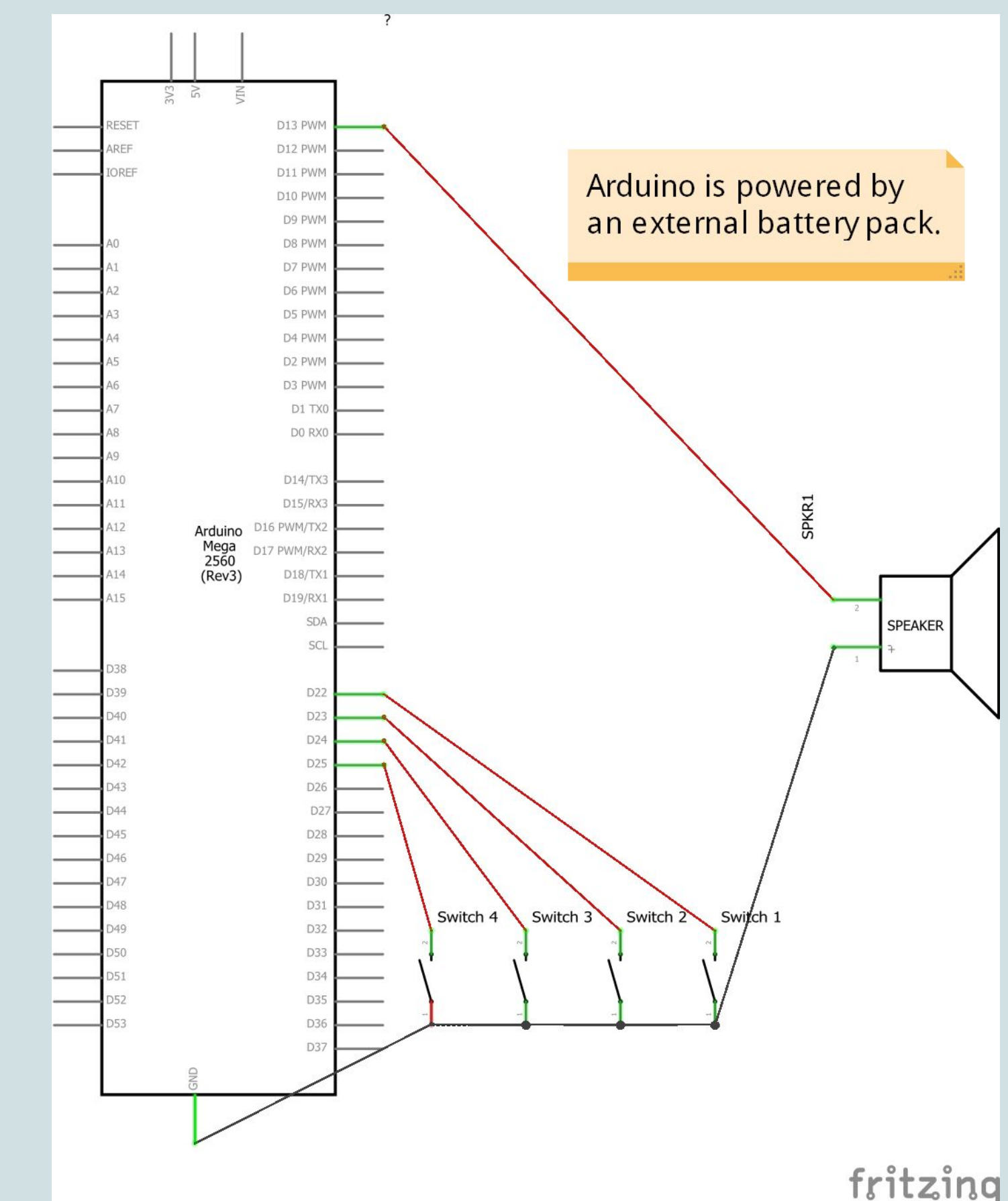


Figure 5: Wiring Diagram

3D printed wire connections are set into the tiles to allow easy connections between tiles. The arduino receives the input from each of the connections in a control tile and the switches located in the tile itself. These signals are then played on the speaker.



Team: Matthew Fisher, Kriss Coss (Safety Officer), Kelsie Whisenhunt (Team Lead), Marco Valenzuela, Jacob Cruz (procurement officer), Dillon Cvetic-Thomas

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