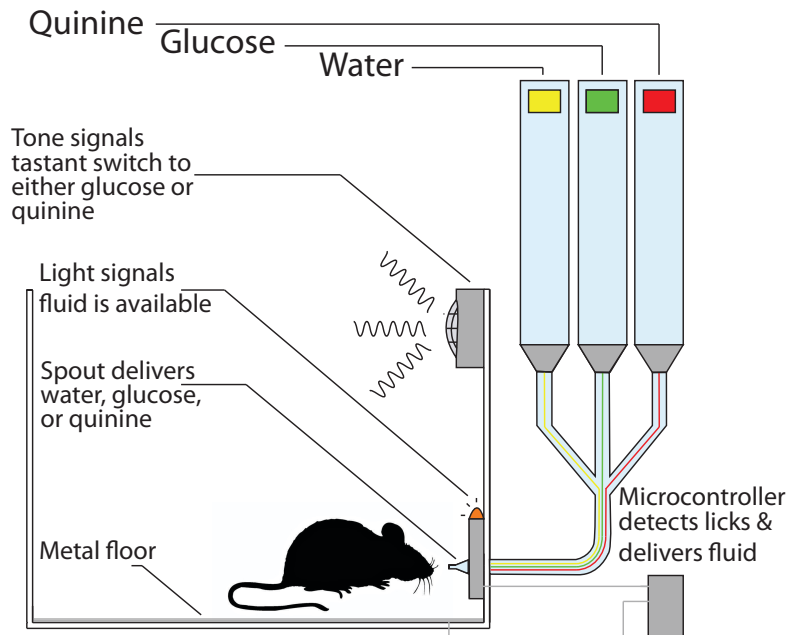


MultiTastant Spout
Construction Instructions
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Overview:

This directory contains open source design materials for a rodent behavioral environment for learning from positive and negative events. These materials are for an Arduino controlled lick spout that controls delivery of small amounts of three different tastants, playing of 2 different tones (11KHz and 4KHz in this design), and timing of an in-cage light cue.



Overall the system contains three components:

1. Spout Control Board (Arduino Uno Shield)

Eagle and Gerber design files contained in:

[3tastsp_v7_resistorcooldrive_battcheck/](#)

This is an Arduino shield contains hardware to control solenoid valves that deliver tastants, LED lights the inform the experimentalists about task events, a calibration button, locations for analog in signal that cues trial type, the raw analog input lick voltage signal (through BNC connectors), and and HDMI plug that transmits 8 digital output data signals out to your preferred data acquisition system. This control board is placed outside of the behavioral environment (typically a closed sound attenuated cupboard or box). This PCB can be sent out to a fabrication company. I use Seeedstudio and these gerber files match their production requirements.

2. Spout Interface Board

Eagle and Gerber design files contained in: **[sptinterface_v4_battcheck/](#)**

This printed circuit board delivers cues and power to the solenoid valves that control tastant delivery, the internal cue light, and also takes the raw voltage lick signal from the spout and runs it through a unity gain amplifier to protect the weak power lick signal from current draw in the rest of the system, in addition to producing two cue tones using 555 timer circuits on board. This board needs to be placed near the spout assembly (typically inside the behavioral enclosure, near but not inside the cage). This PCB can be sent out to a fabrication company. I use Seeedstudio and these gerber files match their production requirements.

3. **Spout Assembly**

OpenSCAD and .stl design files contained in: [**spoutassembly/**](#)

The spout itself is hand built from thin steel 24 gauge tubing arranged in a cylinder and that then interfaces with barbed connectors to link to solenoid valves that deliver the tastant. This spout assembly also holds the solenoid valves. 3 wires from the spout connect to the Spout Interface Board, the LED power, Ground, and a wire connected to the metal spout. I've included an OpenSCAD and .stl file of the parts needed for the spout assembly here

These three components are included in these design files. In addition to these three components, you will need a source to generate an analog input signal that cues trial type (I use a NIDAQ card), and Arduino UNO (loaded Arduino script [**PCB_3tast_v27_3tnblank_public.ino**](#) or your own modification), a cage and behavioral enclosure, a set of computer speakers to play the tones, and a 9V battery to power the tone production.

At this time, parts list and construction instructions are still being compiled, but if you would like to build a rig like this and need more complete information before I have updated, please don't hesitate to contact me via github.