MiceBio Project

with Raspberry Pi and Multiplexing

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**Introduction and Description:**

This design was implemented to solve the problem of recording the daily activity levels of 16 mice in 16 cages. The design is to quantify their movement and give a timestamp of it. The following was achieved using a 16x1 multiplexer and a Raspberry Pi.

**Implementation:**

*Hardware Parts*

1 x Raspberry Pi

1 x 16 Channel Multiplexer

Breadboard

Jumper Cables

16 motion sensors

**Circuit:**

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**Current State:**

As of right now, the multiplexer takes in the readings from the multiplexer every 5 seconds. The most up to date reading and the previous reading are displayed on the terminal/console for all 16 sensors with timestamps. After the program is terminated, the results are outputted to a text file which displays the total movements of all the cages. Along with the individual movements with the timestamp.

**Future Plans and Improvements:**

Currently the one possible problem with this idea, is that the circuitry will probably get messy as all 16 sensors are attached. To get around this, we’d recommend soldering the components together and removing the use of the breadboard. In doing this it opens up the circuit space up and allows for all 16 sensors to be spread out and placed in their individual cages. Also, once the sensors are placed in the cages, they’ll need to be carefully hidden so as to not leave exposed wires for the mice to chew on. Lastly the sensor readings eventually should be sent to an online database/server to be used in either a website or app where the results can be used at the user’s discretion.

**Conclusion:**

This approach worked well with us and it still has much more potential. The nice thing with this setup is the Raspberry Pi has WiFi built in so sending the information online shouldn’t be too hard once the database or server is set up. Plus in case more cages are added, more multiplexer’s can be added and minimal software changes would be needed to handle this.

**Code:**

<https://github.com/Juan-Inzunza/BioMouseTracker>

**References for Multiplexer:**

https://www.sparkfun.com/products/9056