This folder contains the hardware and software components and setup instructions for our awake mouse imaging.

**Hardware**

* Pdfs and SolidWorks part/assembly files of the 3d printed components of our awake mouse set up
* Image of all hardware parts disassembled (Assembly Folder: Hardware\_Parts\_Labeled.png)
* Image of encoder to DAQ wiring connection (Assembly Folder: Encoder\_DAQ\_Wiring\_Diagram.png)
* 4 assembly videos and 1 assembly document (Assembly Folder)
  + 1 for head clamp (Assembly\_Video\_Head\_Clamp.mp4)
  + 1 for mouse wheel (Assembly\_Video\_Mouse\_Wheel.mp4)
  + 1 for encoder (Assembly\_Video\_Rotary\_Encoder.mp4)
  + 1 to combine all parts into the complete setup (Assembly\_Video\_Setup.mp4)
  + 1 instructions list (Assembly\_Instructions.docx)
* Chart below that outlines each part. Red, green, and blue colored background corresponds with red, green, and blue colored outlines in Assembly Folder: Hardware\_Parts\_Labeled.png.

**Software** (ReadMouseWheel Folder)

* National Instruments software
* MATLAB files
  + load\_wheel\_data
  + process\_wheel\_data

Instructions

1. Ensure Encoder and DAQ are properly connected (see: Assembly Folder: Encoder\_DAQ\_Wiring\_Diagram.png)
2. Ensure DAQ is plugged into the computer used for acquisition
3. Open ReadDigPort
4. Click start prior to data collection and stop after data collection
5. Move resulting .DAT file to appropriate folder location if not already
6. Read .DAT file into MATLAB process\_wheel\_data

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| --- | --- | --- | --- | --- | --- |
| **Name** | **PDF** | **SolidWorks** | **Model || Company** | **Cost Est.** | **Note** |
| **A** Head Clamp (Top)\* | A\_PDF | A\_SW | 3D printed | N/A | Clamp to mouse headplate |
| **B** Head Clamp (Bottom)\* | B\_PDF | B\_SW | 3D printed | N/A | Clamp to mouse headplate |
| **C** Screw | N/A | N/A | [SH6MS35 || THORLLABS Newton, NY, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=5894) | $13 for 25 pack | Hold head clamp |
| **D** Screw (2x) | N/A | N/A | [SH3M10 || THORLABS, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=5894) | $9 for 50 pack | Used to tighten head clamp |
| **E** Burette Clamp | N/A | N/A | [CE-CLAMP || HomeScienceTools](https://www.homesciencetools.com/product/burette-clamp/?nosto=nosto-page-category1) | $7 | Hold head clamp. Does not have to be this exact clip. Unscrew test tube clamp so head clamp can go in its place |
| **F** Mini-Series Post | \*\* | \*\* | [MS3R/M || THORLABS, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1257) | $9 | Part of head clamp stand |
| **G** Setscrew | N/A | N/A | [AE4E25E || THORLABS, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1257) | $5 | Secure pillar post to pedestal |
| **H** Pedestal Pillar Post | \*\* | \*\* | [RS3P8E || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=851) | $29 | Part of head clamp stand |
| **I** Clamping Fork | \*\* | \*\* | [CF175 || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=887) | $11 | Hold head clamp pedestal in place |
| **J** Screw (10x) | N/A | N/A | [SH4MS16 || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=5894) | $28 | Used to secure clamping forks, bearing mount, L-bracket |
| **K** Pedestal Pillar Post (4x) | \*\* | \*\* | [RS1.5P8E || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=851) | $100 | Part of mouse wheel holder; align with holes in bearing mount |
| **L** Clamping Fork (4x) | \*\* | \*\* | [CF125 || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=887) | $37 | Holds mouse wheel pedestals in place |
| **M** Bearing Mount (2x)\* | M\_PDF | M\_SW | 3D printed | N/A | Part of mouse wheel holder |
| **N** Assembly Rod | \*\* | \*\* | [ER8 || THORLABS Newton, NJ, USA](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=4125) | $12 | Part of mouse wheel axel |
| **O** Steel Ball Bearing (2x) | N/A | N/A | [R188 || McMaster-Carr Elmhurst, IL, USA](https://www.mcmaster.com/57155K356/) | $13 | Part of mouse wheel axel |
| **P** Mouse Wheel\* | P\_PDF | P\_SW | 3D printed | N/A | Mouse wheel |
| **Q** Breadboard Jumper Wires | N/A | N/A | [EDGELEC Guangdong, China](https://www.amazon.com/EDGELEC-Breadboard-Optional-Assorted-Multicolored/dp/B07GD2BWPY/ref=sr_1_3?dchild=1&keywords=ribbon+cable+jumper&qid=1605725977&sr=8-3) | $6 | Connects encoder to DAQ Board |
| **R** L-Bracket\* | R\_PDF | R\_SW | 3D printed | N/A | Holds encoder to end of axel |
| **S** Polyurethane Tube | N/A | N/A | [5108K52 || McMaster-Carr Elmhurst, IL, USA](https://www.mcmaster.com/5108K52/) | $2 | Connects encoder to axel |
| **T** Rotary Encoder | N/A | N/A | [ENS1J-B28 L00256L || Bourns, Inc. Riverside, CA, USA](https://www.digikey.at/product-detail/en/bourns-inc/ENS1J-B28-L00256L/ENS1J-B28-L00256L-ND/1089392) | $58 | Encoder to detect rotation |
| **U** DAQ Board | N/A | N/A | [USB-6001 || National Instruments Austin, TX, USA](https://www.ni.com/en-us/support/model.usb-6001.html) | $220 | Collects encoder information and connects to computer |
| Breadboard | N/A | N/A | [Variable || THORLABS Newton, NJ, USA](https://www.thorlabs.com/navigation.cfm?guide_id=40) | Variable | Holds entire setup |
| Tough PLA | N/A | N/A | [Ultimaker B.V. ED Utrecht, Netherlands](https://ultimaker.com/materials/tough-pla) | $50 per 2.85mm (750g) | 3D printing material |

**Estimated Total Cost: $559 (if all THORLABS parts are bought) plus printing cost. \*\*Any THORLAB component can be 3D printed from the files provided on their site if this is a more economical choice.**

\*We 3D printed all parts with Ultimaker S5 printer and CURA to slice models using specific settings:

* 0.4mm diameter nozzle
* 0.2mm layer height
* 50% infill
* Wall line count = 4
* No support
* The rest of the slicer settings were unchanged from CURA’s default for Tough PLA.

**Notes: Solidworks files may have limited use/functionality in other CAD programs.**