



# Brandeis

# FlyBox Redesign

## Brandeis University, Rosbash Lab / HHMI

### Context

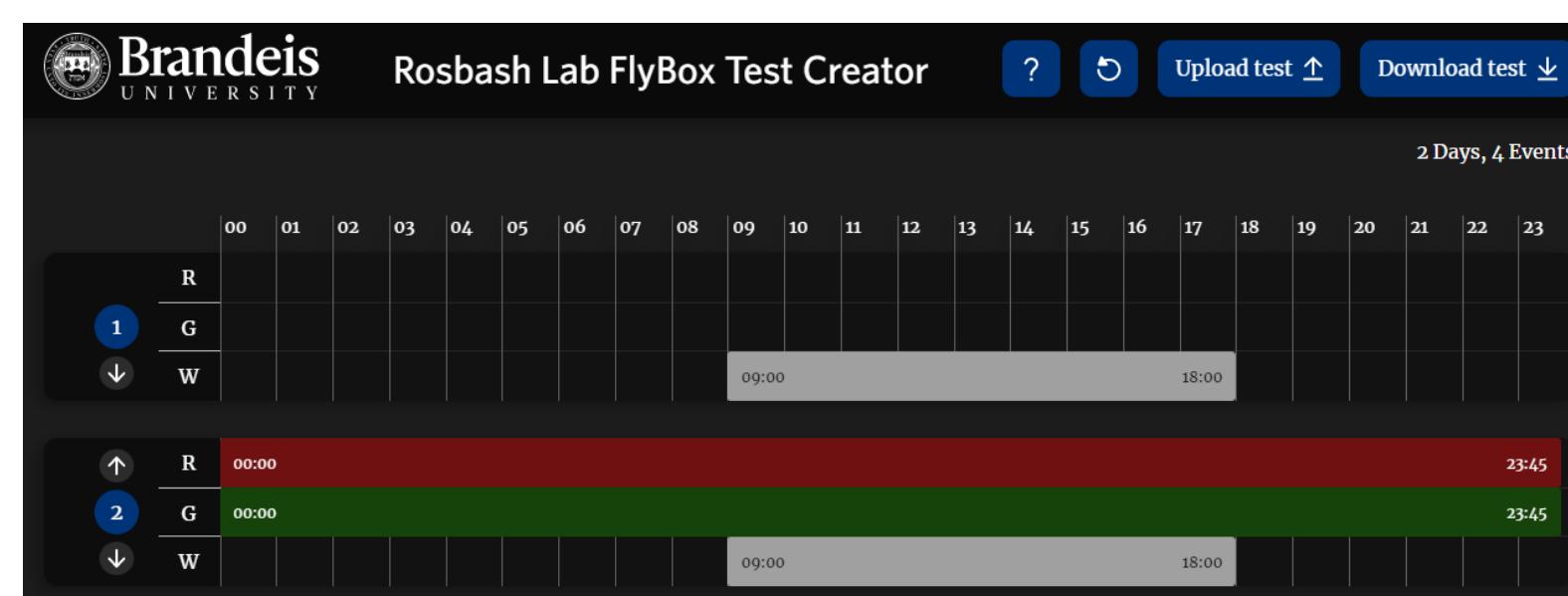
Brandeis's Rosbash Lab does groundbreaking research on circadian rhythms and neuroscience. This research relies upon data collected by the FlyBox, a box designed to house 96 fruit flies in a stable and replicable environment with means for providing video footage of the flies. The improved FlyBox provides a better working experience for researchers at Brandeis and other labs around the world.

### Design Requirements

- Light-tight enclosure
- Controllable white, red, and green lights that are diffused across the box
- Controllable IR LEDs that light flies from below
- Active cooling to keep box temperature near room temperature
- Infrared camera capable of taking high-quality photos of flies
- Graphical user interface (GUI) to create and edit FlyBox tests
- Detailed assembly instructions
- Bill of materials (BOM)

### FlyBox Test Creator

On the FlyBox Test Creator website, users can easily generate test files and export them onto microSD cards. Test files contain information on when specific lights should turn on and off over the course of several days.



### Our FlyBox

#### Front Electronics Panel

A microSD card reader, LCD display, and rotary knob allow the user to choose which test to run and show the status of the test while it is running

#### Internal Electronics Panel

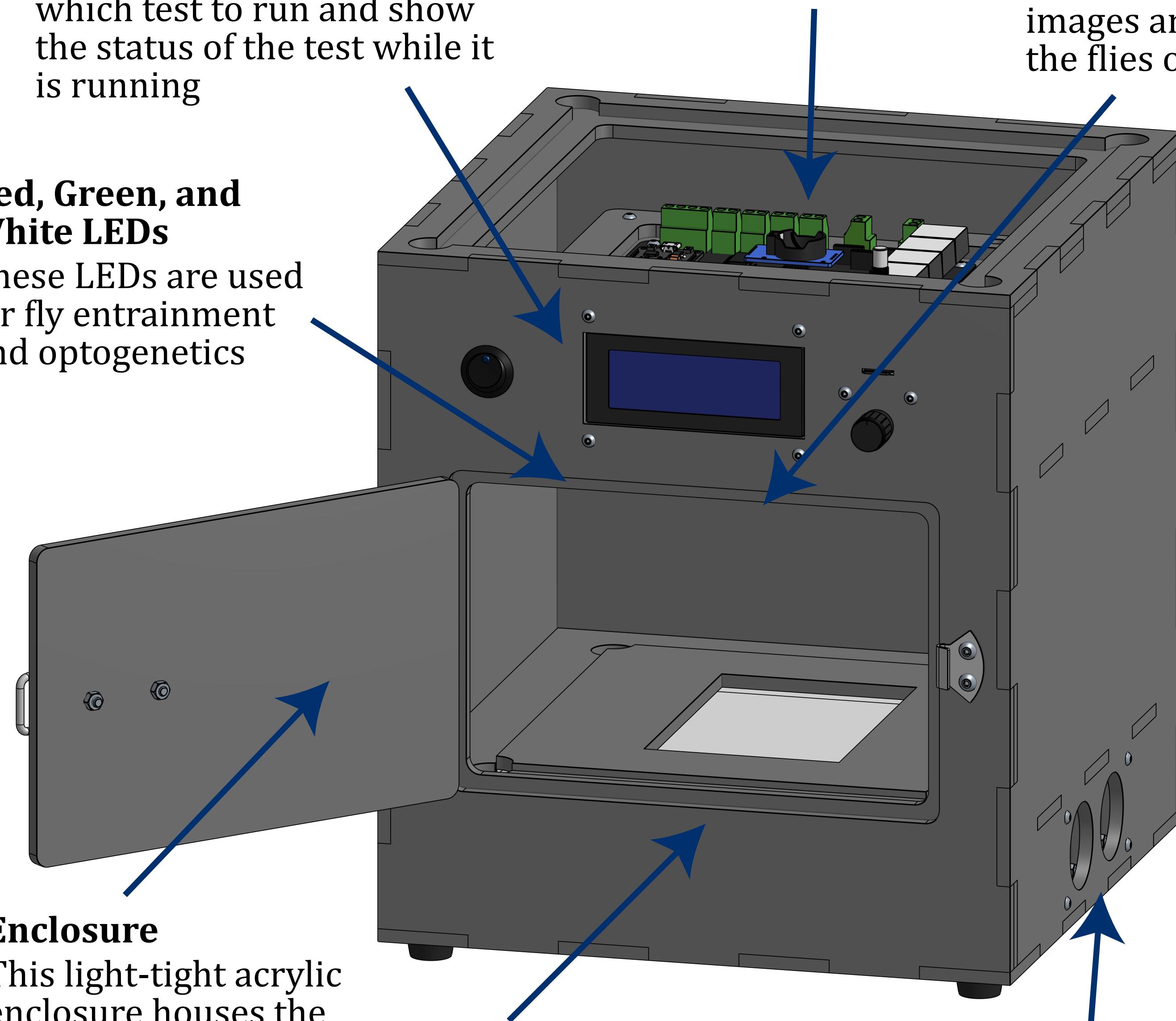
This custom PCB connects the microcontroller, fans, LEDs, and other electronics without soldering

#### Infrared Camera

The infrared USB web camera collects images and videos of the flies over time

#### Red, Green, and White LEDs

These LEDs are used for fly entrainment and optogenetics



#### Infrared LEDs

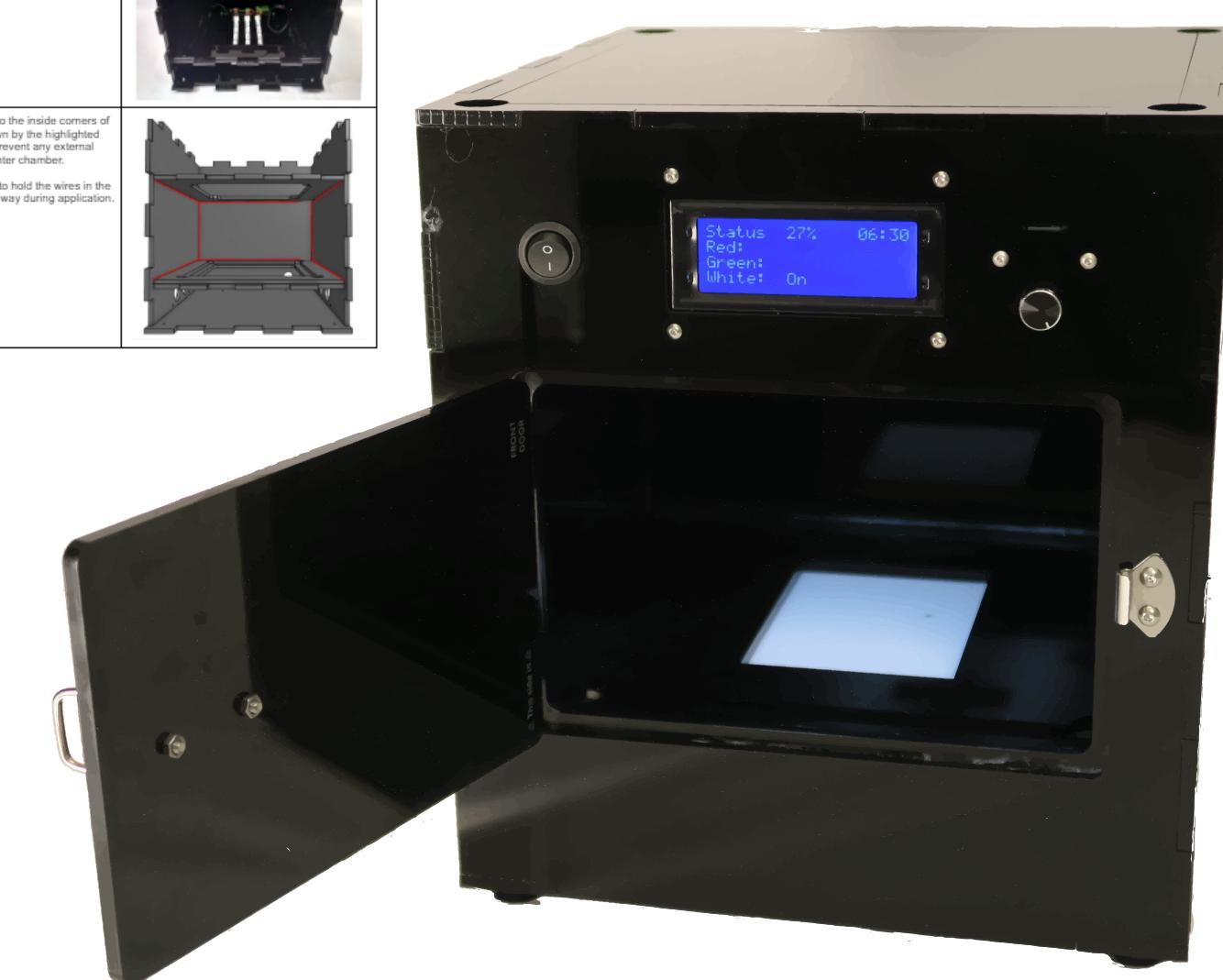
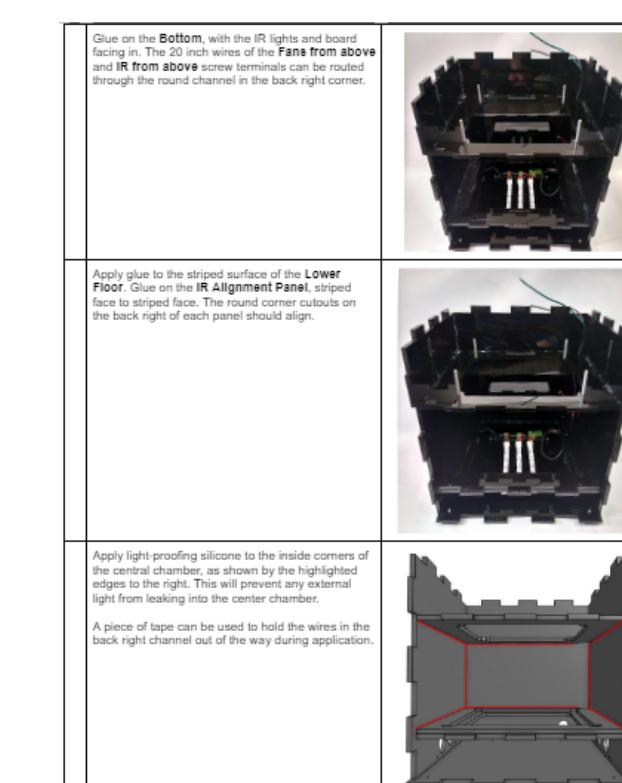
IR LEDs allow photos of the flies to be taken while the other LEDs are off

#### Fans

Four 40mm fans create an air current over the IR LEDs to keep the box near room temperature

### Design For Manufacturing

The FlyBox was designed to be easily assembled in a lab with basic tools. Components are either laser cut, 3D printed, or sourced "off the shelf". Step-by-step instructions with pictures lead the user through the assembly process.



### The Team



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### Special Thanks

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