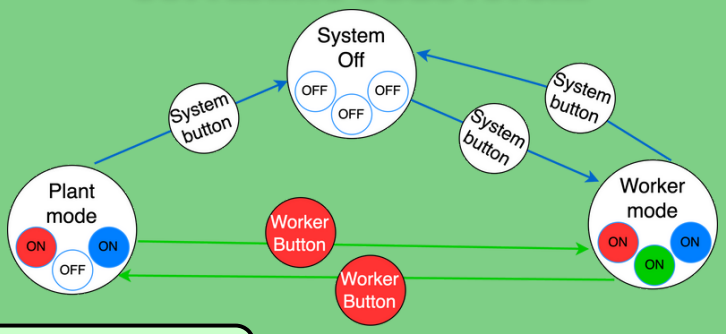
GREENHOUSE GOBLIN

SOFTWARE SUBSYSTEM

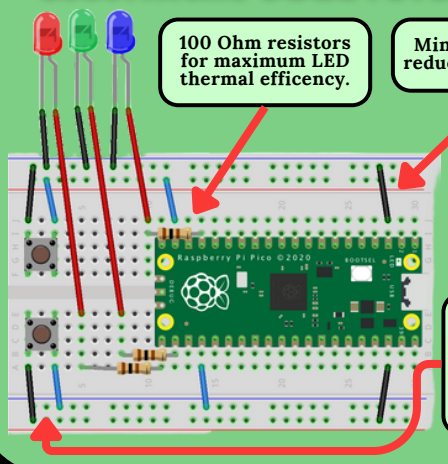


System input switches the system off or starts the system in Worker mode to accommodate the worker who activated it.

Worker input switches the state between Worker mode (White Light) and Plant Mode (Purple Light).

Thoroughly tested CircuitPython code.

ELECTRICAL SUBSYSTEM



100 Ohm resistors for maximum LED thermal efficency.

Minimal wires for reduced complexity.

Two buttons to separate user inputs for system and worker/plant states for greater ease of use.

Unique Hinged Lid Design for Ease of Access.

Ventilation Slots for Raspberry Pi Cooling.

Static Latches Secure Lid Simply.

Buttons Held to Top When Lid Opened.

Cable Access to Raspberry Through Back Port.

Separate System and Worker Button Differentiated with Text and Color for Ease of Use.

Highly Visible LED Locations.

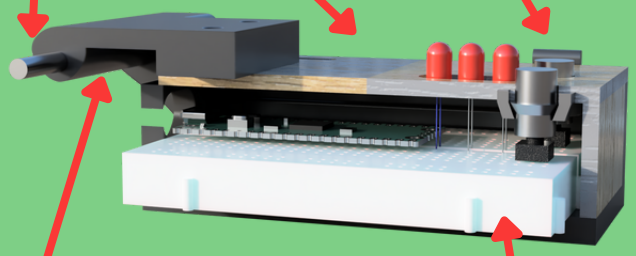
Slide-in Breadboard Retention System for Ease of Assembly and Security of Breadboard.

STRUCTURAL SUBSYSTEM

Robust and mechanically tested design to resist heavy use.

Laser cut front and top for precise cutouts and engraving for instructions.

Secured button-pushers to ensure ease of operation and isolation of electrical components.



Hinge and M3 screws aid ease of assembly and maintenance.

Cross-section view of CAD design

3D printed base for structural cohesiveness with static latch, hinge, and breadboard retention system.

MAIN OBJECTIVES

FO-1 — LEDs produce 7.44 · 10^{-2} mol/m²/day compared to 10 mol/m²/day, which can be scaled up for a further production model.

FO-2 — Spectral content of white light 465-660nm falls closely to optimal range of 400-700nm.

PO-1 — Protoype provides a strong foundation for a larger energy efficient model with a daily operating power of just 0.60 W.

PO-2 — Instructive engravings and color-coded buttons indicate how the device should be used and lid and breadboard mounting provide ease of access.

Key Requirements	FO-1	FO-2	PO-1	PO-2
Metric	DLI	Spectral content of light	daily operating power (W)	understaning and effectively handling
Prototype	$7.44 \cdot 10^{-2} \frac{mol}{m^2 \cdot day}$	465 – 660 nm	0.60 W	Instructuve engravings, multicolor buttons, easy assembly, etc.
Final Product	$10 \frac{mol}{m^2 \cdot day}$	400 – 700 nm	11.82 W	Online instructions and detailed usage manual
Provided requirments	$10 \frac{mol}{m^2 \cdot day}$	closer to white is better: 400 – 700 nm	Less is better	indicate how a user can/should interact with the design.

PROTOTYPE

SPECIFICATIONS

FO-1 $7.44 \cdot 10^{-2} \frac{mol}{m^2 \cdot day}$

FO-2 **Three models of operation and instructive box labels aid the operation of the device.**

PO-1

PO-2

$10 \frac{mol}{m^2 \cdot day}$