



Sensor Bat Box

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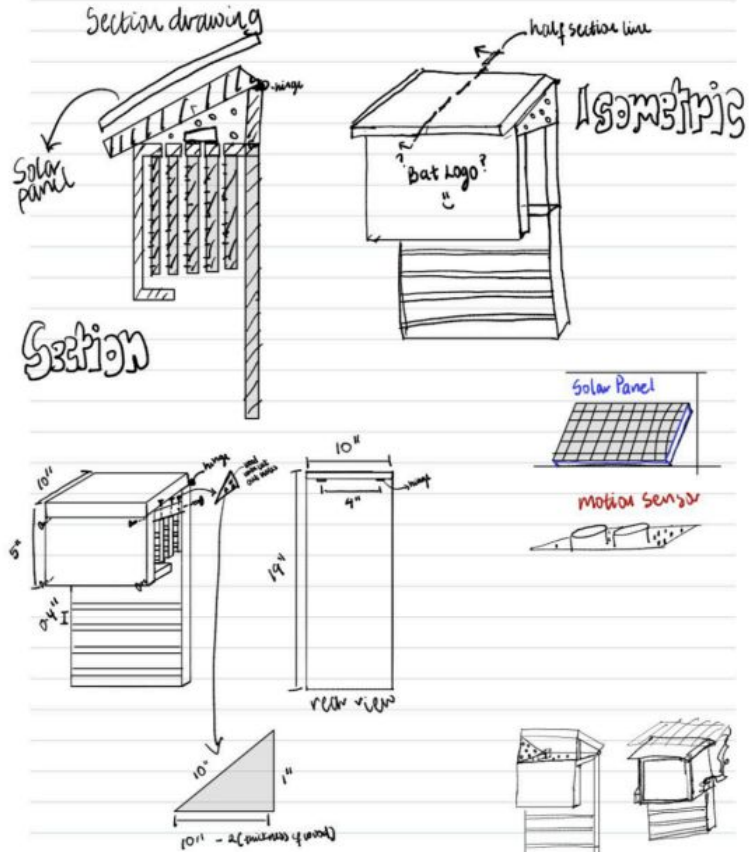
Where the bats will roost, how was it made

04

Materials

What was used and what it cost

BAT BOX concept



01

Overview

Client Criteria (In order of Priority)

01

Bat Safety

A safe, secure, and comfortable bat box

02

Bat Detection

An reliable bat transit detection system

03

Eco-friendly

Made from reasonably sourced materials

04

Installation/Maintenance

Relatively easy to install/maintain by a non-engineer

05

Budget

Affordable, and feasible

06

Temperature

Maintain a comfortable temperature range for bats

Design Specifications

Box Structure

The bat box should be able to withstand wind and water load



Budget

Below \$150 overall



Detection

The sensor should be able to detect bat transit within 95% accuracy



Temperature

Should always be within +/- 40°C





02

The Box

Box Outline



Components

Plywood, Screws, Wood glue.



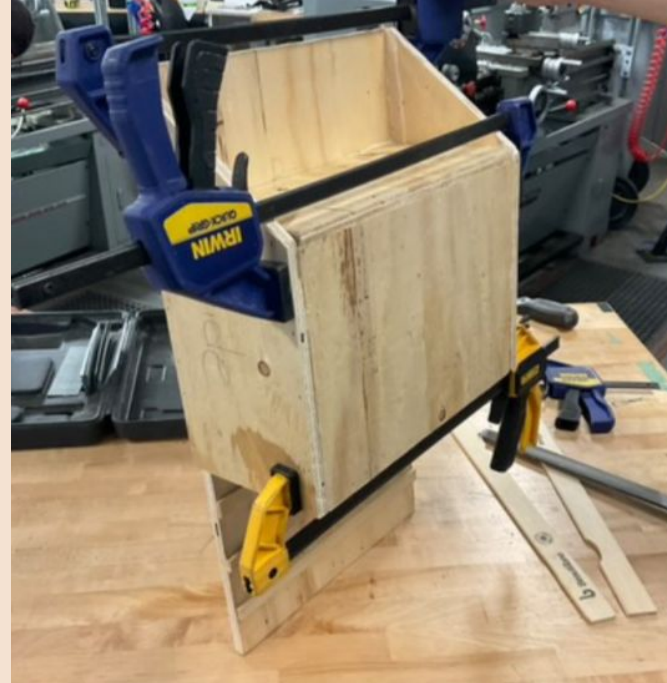
Structure

A trapezoidal box shape, with an extended back wall.



Cost

Less than \$50.



Box Prototype Testing Goals

Sensor

Able to detect and log transits in/out of the box with no less than 95% accuracy

Temperature

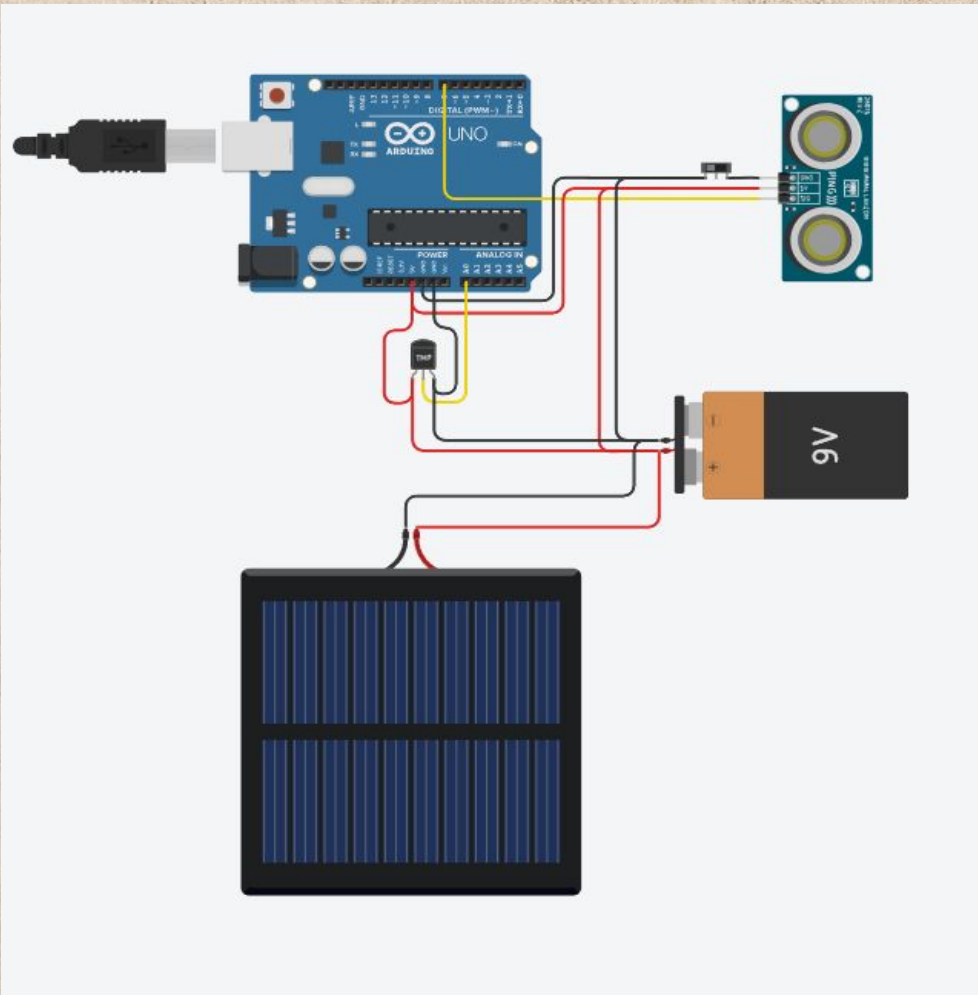
Remain between +/- 40°C at all times

Weather Proofing

Keeps out no less than 98% of water load

**Structural Durability
(Outside)**

Able to withstand moderate impact and/or wind load, up to 35kg



03

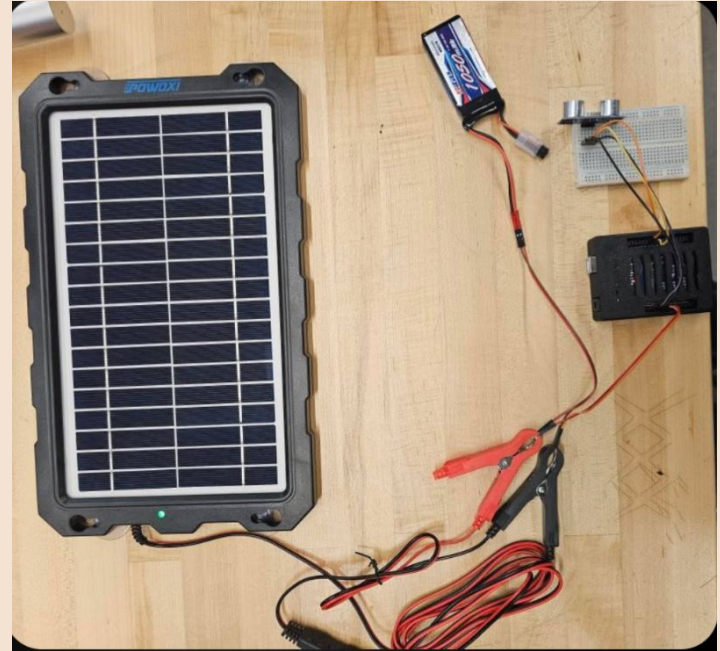
The Sensor

Circuit Components

	Part	Usage
01	Arduino Uno	Runs code and stores data
02	Rechargeable battery	Powers the circuit
03	Ultrasonic Motion Sensor	Detects bat transits
04	Solar Panel	Charges and maintains the battery

The Final Circuit

- A reliable, function circuit, that can maintain itself over extended periods of time
- Rechargeable battery (48 hour lifespan) trickled charged by the solar panel
- Arduino Uno powered by the battery, logging and storing data from ultrasonic motion sensor





04

Materials

Budget, or, What Everything Cost

Item	Dimension	Type/Make	Purpose	Quantity	Per Unit Cost (\$ CAD)	Cost (\$ CAD)
Plywood	4ft x 8ft	Spruce	Bat Box Structure	1	\$28.980	\$28.98
Nails	1 inch	DEWALT	Bat Box Assembly	30	\$0.010	\$0.30
Fastener Screws	3/4 inch	#8	Bat Box Assembly	2	\$0.399	\$0.80
Hinge Screws	3/8 inch	#10	Bat Box Assembly	1	\$2.490	\$2.49
Exterior Wood Adhesive	N/A	Gorilla Glue	Adhesive	1	\$5.970	\$5.97
Arduino Uno	N/A	Arduino Uno	Runs Sensor(s)	1	\$15.250	\$15.25
Arduino Jumper Cables	N/A	Male/Male	Connect sensor(s) to arduino	10	\$0.100	\$1.00
Motion Sensor	N/A	Arduino Uno	Senses transits	1	\$2.000	\$2.00
Solar Panels	10.66 x 6.88 x 0.1	N/A	Charging Sensor	1	\$15.990	\$15.99
Battery	N/A	Lithium Rechargeable	Reserve Battery Power for Sensor	1	\$13.990	\$13.99
Hinges	3in x 3.19in	Reversible	Opens roof for maintenance	1	\$9.780	\$9.78
Breadboard	N/A	N/A	Testing circuits	1	\$5.000	\$5.00
Total						\$101.55
Budget Remaining						\$48.45

Thanks

From: KIRRA