Prototype Cost Analysis

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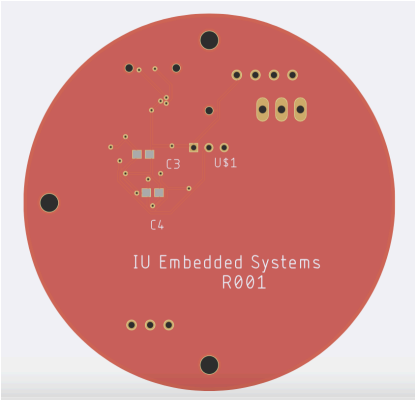
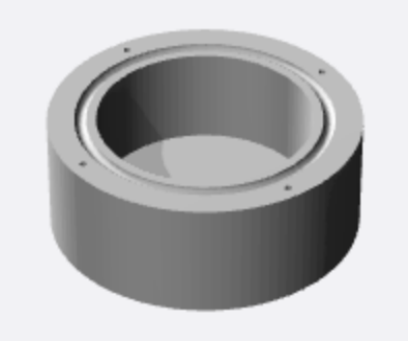
Background

Our design includes a PCB board, 3D-printed enclosure, and laser cut lid. The custom PCB board includes essential components such as the capacitor and chip resistor. The 3D-printed enclosure base holds the PCB board on standoffs secured with Phillips screws and has a hole in the bottom to allow for access to the communication port. The lid is manufactured out of clear acrylic to allow for light to reach the TSL237 light sensor and is held down to the base, also by Phillips screws. Our quotes for these design components come from Macrofab, Shapeways, and Sculpteo, respectively.

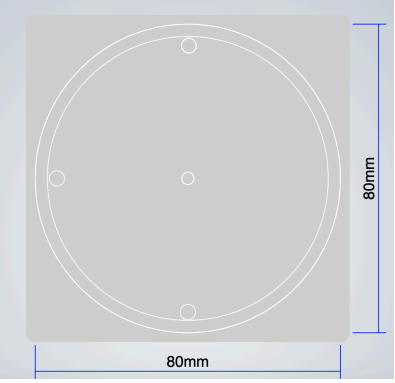
PCB board



3D enclosure



Laser cut lid



Cost Analysis

Macrofab

Populated board

Est. ship date 18 days out

Qty	Cost
5	514.21
20	568.75
50	806.98
100	1112.51

Shapeways

3D enclosure

White Natural Versatile Plastic

Qty	Cost
5	327.20
20	1308.80
50	3272.00
100	6544.00

Sculpteo

Laser cut lid

Acrylic Clear 3mm

80 x 80mm

Qty	Cost
5	24.65
20	79.60
50	191.50
100	378.00

Conclusion

Based on the prototyping cost, recommendations to make the cost as low as possible include ordering in advance and in bulk. Ordering a quantity of 5 PCB boards with an estimated ship date of 18 days out costs $514.21, but a ship date of 10 days for the same quantity costs $1,755.01, over triple the cost. In addition, the unit price drops as the quantity increases. For example, ordering a quantity of 5 lids from Sculpteo costs $4.93 per unit, but a quantity of 100 decreases the unit price to $3.78. To ensure the lowest cost, prototypes should be ordered in advance to avoid paying priority shipping costs and in bulk to decrease unit prices.