# Flip-Down Flat-Screen Mount

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## Abstract
Flat screen televisions, because of their low weight and comparably small size, can be mounted in smaller and less conventional places. Current flip-down mounts are either difficult to use or are already incorporated with a TV. The goal of this project was to create a fast and easy to use mount that allowed the user their choice of TV, but could fold away regularly to conserve space.

## Benchmark
Because we designed a mount that did not incorporate a television, we chose the Premier Mount LCD TV Mount (pictured left, Figure 1) as our benchmark. This mount was popular due to its low price and good quality.

## Design Evolution
Our initial design consisted of a wide-bracket rigid mount. After reviewing our benchmark and its popularity depicted in reviews, we decided to retain its main features and supplement them with improved ones in our design. Through analysis of literature and survey results as well as a patent review, we decided a decrease in force and time required for operation would best improve our product. To avoid the use of tools during operation, our design used a pull-pin specifically placed to lock behind the bar in the lowered position and lock into the arm in the raised position. After modeling our design in SolidWorks and generating dimensioned drawings, we machined a proof of concept model (pictured left, Figure 4).

## Enginnering Challenges
The engineering challenges identified for this design included:

- Support a 35lb, 24 inch TV
- Improve features without compromising price
- Allow a wide variety of viewing angles
- Able to mount in variety of places and hold a variety of TV's
- Full adjustability with no tools
- Comply with TV mounting standards

## Analysis and Results
After building a prototype and obtaining our benchmark product, we tested the time and force required to make an adjustment, with results shown in Figure 2. These measurements are a good gauge for ease of use. Finite element testing was used to ensure robustness of our design. As can be seen in Figure 5, the maximum stress on the top mount and arm never exceeded the yield stress in the material for the maximum allowable weight of 35 lbs.

## Conclusion
Physical testing validated ease of use and our finite element testing showed that the robustness should provide a long lifespan. As the flat-screen TV market proliferates, there should be an increase in demand for our product from customers with space constraints. Further design improvements include a spring-assisted swing arm and more appealing aesthetics.

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## References
VESA SPWG Standards – www.vesa.org  
US Patents: 6418010, 6347433, 6105919