



Quadrant



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Summary

A fun navigational quadrant

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This is a quadrant, a tool for measuring altitude angles. Sight along the right edge at a star, and the index arm indicates the angle.

This is a two part model - quadrant body and index arm. The OpenSCAD source that generates the two models is provided for those that want to modify it.

To construct this, you will also need:

- One M4x12 machine screw
- One M4 washer
- One M4 acorn nut
- Loctite recommended to secure acorn nut

Additionally, the index arm has an internal space to capture a washer (or several) to add weight. The default parameters are sized for:

Three M6 fender washers

To add the washers, use Cura's Pause at Height post-processing instruction (or equivalent). In the slice preview, find the first layer that covers the capture pocket, subtract 1, and put that number in as the pause layer.

(Cura's user interface uses one-based layer indexes, while pause-at-layer is zero-based.)

Slice without supports, but there is one small feature on the index arm that needs a custom support.

This model was developed for an activity in a planetarium, so to make it easier to use in the dark, it includes an optional ledge on the right side to give something to hold a laser pointer against. You can turn this off in the parameters if you don't want it.

You can use a filament change to make the markings stand out from the body. When I print this, I like to choose a color, and print the first few layers in that color, then switch to glow-in-the-dark to print up to the markings bed, then switch back to the original color for the markings and the rest of the print. This allows the quadrant to be used in the dark.

There are quite a few parameters to play around with if you want to use different hardware than the M4 set that I used, or make it a different size.

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Printing

Index Arm

Supports must be off for the washer capture.

Supports off, but add a custom support for the catch.

Slice, and use the preview to find the layer that will cover the washer. Cura's UI shows the layer number as one-based indexed, but the "Pause at height" extension needs zero-based, so subtract 1.

Add a "Pause at height" and put in the layer number you found. Keep the temperature at printing temperature.

Wait for the pause and carefully put the washer into the capture pocket. Gently nudge it down flush.

Continue printing.

Model files



quadrant.scad



indexarm-9.stl



quadrant-9.stl

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