



# Headless Gourd Shaped Concert Ukulele



**Big.One**

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## Summary

An example of 3D model generated with my Gugulele OpenSCAD script... (see <https://github.com/bguan/gugulele>). Decorative...

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An example of 3D model generated with my Gugulele OpenSCAD script... (see <https://github.com/bguan/gugulele>).

- Decorative headless unibody gourd shaped design
- Single rectangular through-body spine
- Single oval off center sound hole
- T-Bracing
- Tail-end placement of Planetary tuners
- 3 pieces using M1.6 socket head screws or M2 self tapping wood screws

You can hear me playing the fully assembled unit in this demo youtube video: [https://youtu.be/wjND\\_2x5BcE](https://youtu.be/wjND_2x5BcE)

### Third Party Parts:

- Spine/rods e.g. <https://dragonplate.com/ecart/product.asp?PID=749&cID=20>
  - get a 24" long and cut it down to size, can't remember exactly...
  - if you don't use a rod, the neck will bow under string tension
- Gotoh UPT-UBB-B Tuners e.g. <http://www.theukulelesite.com/gotoh-upt-tuner-upgrade.html>
  - its possible to use cheaper friction tuners, but need to play with shims and washers like this user <http://www.thingiverse.com/make:325819>
  - he uses <https://www.amazon.com/gp/product/B002HFQ88Y>
- Screws (M1.6x12) for fretboard long holes e.g. <http://www.amazon.com/dp/B00XP4OD5Q>
  - can't remember how many you need, just buy a bag of 100
- Screws (M1.6x4) for bridge and fretboard short (mid-line) holes e.g. <https://www.amazon.com/dp/B00XP4ZWY2>
  - can't remember how many you need, just buy a bag of 100
- Lately I've been using M2 wood screws like these <https://www.amazon.com/gp/product/B01MTKUV85>

I printed this on big delta style printers, the model is oriented pointing up, like a flower vase. I use 100 micron, 33% lattice infill.

## How I Designed This

### OpenSCAD programming!

The hardest part for me is to deal with the lack of spline in OpenSCAD. I have to subtract scaled arc from rectangle and revolve it to get to a funnel shape for the shoulder, and similarly scaled different quadrants of sphere to get an ellipsoid. Also due to "functional" nature of OpenSCAD, I have to contort the fret calculation by using some crazy recursive function. Filleting also is a challenge as I have to accomplish that with Minkowski sum of small sphere and the main parts with sharp edges.

The most painful part is that OpenSCAD is painfully slow when rendering at high resolution, as it is single threaded and not utilizing GPU unlike professional 3D CAD tools. I intend to port the script to a different language/tech someday e.g. OnShape Feature Script.

Category: 3D Printing

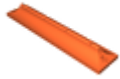
# Model files



**concert\_h2r2x2s8t4\_fretbd.stl**



**concert\_h2r2x2s8t4\_body.stl**



**concert\_h2r2x2s8t4\_brdg.stl**

[Find source .stl files on Thingiverse.com](#)

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