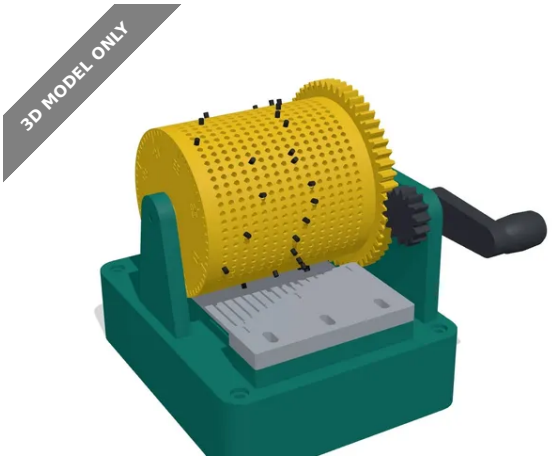
Printables by JOSEF PRUSA



Music Box

S **Shapekit**

VIEW IN BROWSER

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Summary

A hand-cranked music box with a drum you program with filament pins. Two octaves, tuned by hand.

Hobby & Makers > Music

Tags: box music comb drum crank musicbox melody shapekit

Made by Shapekit. 3D viewer, colour preview and more free models: https://shapekit.cc/music-box.html

A music box you program yourself. The drum has a hole for every note at every step, 960 in all: push short pieces of filament into the holes, turn the crank, and the pins pluck a printed comb of 15 tines, two octaves of C major. The ZIP has pin charts for Ode to Joy, Twinkle, Twinkle, Little Star and Frère Jacques as a round, and a blank one for your own tune: wrap a chart round the drum and push a pin through every dot. The comb is printed PLA, so it sounds softer and rounder than a steel music box, and you tune each tine with a file and a tuner app.

- **8** printed parts
- **12 × 11 × 11 cm** assembled (L × W × H)
- **≈ 0.2 kg** filament in total

- **56 mm** height of the frame, the tallest part (94 × 144 mm on the bed)

Parts

Case: A closed box under the frame. The frame plate on top of it is the soundboard; the box gives the notes their body. Four bosses in the corners take the screws.

- Size: 116 × 94 × 25 mm
- Print: Open side up. No supports.
- Filament: ≈ 63 g

Frame: The plate, the two cheeks that carry the drum and the crank, and the block the comb is screwed to, in one piece, so the drum and the comb always line up. The rosette of holes lets the sound out.

- Size: 116 × 94 × 53 mm
- Print: Flat side down. No supports: the holes in the cheeks have pointed tops.
- Filament: ≈ 61 g

Drum: 960 holes, 15 notes along it and 64 steps round it, for the pins that play the tune. The 56-tooth gear is part of it. Numbers on the far end count the steps and a notch marks where step 1 starts.

- Size: 73 × 72 × 72 mm
- Print: Gear down. No supports: the pin holes have pointed tops and the far end closes with a 45° cone.
- Filament: ≈ 100 g

Comb: 15 tines tuned to two octaves of C major, from C4 (38.9 mm long) to C6 (19.4 mm). A groove on top marks each C. The slots let it slide 2 mm along the tines, so the pins meet the tips where they should.

- Size: 63 × 58 × 6 mm
- Print: Flat, tines on the bed, at 100% infill and 0.12 mm layers. In PLA: the tine lengths are worked out for it.
- Filament: ≈ 14 g

Crank pinion: 14 teeth on a 6 mm shaft that runs through the cheek: four turns of the crank turn the drum once.

- Size: 21 × 20 × 18 mm
- Print: Gear down. No supports.
- Filament: ≈ 2 g

Crank arm: Fits the hex on the shaft, held by an M3 × 8 and a washer. The peg at the other end carries the knob.

- Size: 42 × 23 × 14 mm
- Print: Flat, peg up.
- Filament: ≈ 3 g

Knob: Turns on the peg of the arm, held by an M3 × 8 and a washer.

- Size: 16 × 13 × 13 mm
- Print: Standing up.
- Filament: ≈ 2 g

Pin gauge: Cuts the pins to length: stand it on the table, push filament down a hole until it stops and cut it off flush with the top. Every pin comes out 6.5 mm long, so it sticks out 2 mm from the drum.

- Size: 34 × 14 × 12 mm
- Print: Flat. Not part of the box: only in the download.
- Filament: ≈ 3 g

What else you need

- 86 mm of 3 mm steel rod for the drum to turn on.
- 1.75 mm filament for the pins, 6.5 mm a pin: Ode to Joy takes 46 pins, about 30 cm. Any colour that stands out against the drum.
- M3 screws: 4 × 12 for the case, 3 × 16 with washers for the comb, 2 × 8 with washers for the crank and the knob.
- A flush cutter for the pins, pliers to pull them out again, and a small file for tuning the tines.
- A tuner app on your phone.

Print settings

- **0.2 mm** layer height (0.12 mm for the comb)
- **3** walls
- **15%** infill; 100% for the comb
- **PLA** material: the tine lengths are worked out for PLA

For a 0.4 mm nozzle. Filament amounts are estimates for these settings.

How to build it

1. **Print the parts**: Nothing needs supports. Print the comb in PLA, flat with the tines on the bed, at 100% infill and 0.12 mm layers: that is what the tine lengths are worked out for.
2. **Cut the pins**: Stand the pin gauge on the table, push filament down a hole until it touches the table and cut it off flush with the top. Every

pin comes out 6.5 mm long. The pins should go into the drum with a firm push; if a hole is too tight, open it with a 1.8 mm drill turned by hand.

3. **Program the drum**: Print a page of the pin charts (in the ZIP) at 100%, cut out the strip and wrap it round the drum: gear on the right, bottom edge at the notch on the far end. Push a pin through every black dot until it stops, then tear the paper off. To change the tune, pull the pins out with pliers.
4. **Drum and crank**: Push the 3 mm rod through the far cheek, through the drum with its gear on the crank side, and into the other cheek. Slide the shaft of the crank pinion through its hole from the inside, fit the arm on the hex with an M3 × 8 and a washer, and the knob on the peg the same way.
5. **Set the comb**: Screw the comb onto its block with three M3 × 16 and washers, not yet tight. Turn the crank slowly and slide the comb until every pin pushes its tine down at the very tip and lets it snap back, while the drum itself never touches a tine. Then tighten the screws.
6. **Tune it**: Check each tine with a tuner app. If a note is low, file a little off the tip to raise it; if it is high, file the underside near the root a little thinner to lower it. Take 0.1 mm off a tip and the note goes up by about a tenth of a semitone.
7. **Close the case**: Set the frame on the case and screw it down with four M3 × 12. Stand the box on a table: the table makes it louder.
8. **Play**: Turn the crank clockwise, about once every four seconds: that is the tempo the charts are written for. The drum plays the tune once for every four turns, and then starts again.

Small parts and short pins: keep them away from young children.

More

3D viewer, colour preview and the full guide: https://shapekit.cc/music-box.html

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Model files



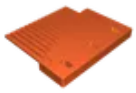
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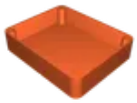
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music-box-crank-pinion.stl



music-box-comb.stl



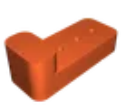
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music-box-frame.stl



music-box-drum.stl



music-box-pin-gauge.stl

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