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Let's begin our satisfying journey to 3D Printed music by downloading a copy of Nuke's 3D model from <u>www.nuke.rocks</u>. You will obtain a ZIP file which you must decompress, and inside its contents you will find these STL files. We will print out one copy of each, except for our Tuner, which we will print 4 copies of.

File setup. You will import each of these parts into your 3D printer's interface (Repetier-host shown). Depending on your printer's available print area, you might need to rotate the pieces 45 degrees (or as needed) in order to fit. Make sure they are oriented right (you will see the reference orientation as you progress through the instructions.) and that they are touching the ground plane. You should not need to use support material to print any of Nuke's parts.

Print settings. All of Nuke's parts are designed to work best by being sliced at 20% rectilinear infill, with 3 shell layers, and 3 top and bottom solid layers. The ideal resolution is .3mm per layer on a .4mm nozzle. Many setups are different than this, but we designed Nuke to be straight forward in setup and construction, and you might just get it to come together on your first try! (don't be discouraged if you don't).

At 20% infill, Nuke is structurally stable, lightweight, uses less material and resonates better to your playing.

Level and clean your print bed. Having a level print bed can be the difference between a successful print and frustration. We prefer using BuildTak as a print surface because of its great adherence, ease of use and lifespan. We clean our BuildTak before each use by rubbing it with alcohol and a cotton ball, removing any grease or debris.

If your 3D Printer is equipped with a heated bed, activate it to reduce warping of the pieces being printed.

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Name	
*	Bridge_Rev1.stl
*	Fretboard_Rev1.stl
-	MidSection_Rev1.stl
-	Neck_Rev1.stl
-	TailSection_Rev1.stl
-	Tuner_Rev1.stl

Use a brim. Particularly in printers without a heated bed, we like using a 4 to 6mm brim on our first layer (a brim is a wide outline around your piece that increases its contact area with the print bed, increasing adhesion and minimizing heat warpage in PLA plastic). It can be easily removed and will assure all your pieces are warp-free and fit together easily.

Print a Mid Section. Let's begin by printing Nuke's mid section piece. This is the pivotal piece where everything else connects. (correct orientation shown).

Take care when removing pieces. I like to use a small chisel or paint knife to pry the parts off the print bed carefully. This can be a painful process, but be patient and your pieces (and print bed!) will come out unscathed.

Remove the brim. Using a hobby knife (or even your hands! some brims detach easily) remove the brim off the bottom of your piece. You will repeat this setup and process with every part you print.











Print a tail section. Now, let's print a tail section to connect to our mid section. The tail section is the largest part and will take the longest to print (correct orientation shown).

As you can see, the Mid section and Tail sections have dovetail connections, a design borrowed from fine carpentry. Depending on your printer setup, this joint can feel just right (slides in with moderate friction) loose, or too tight. If the fit is a bit too tight, use a file or sandpaper to slowly remove material from the pieces until you are satisfied.

Make it permanent. To make this joint permanent, we will use cyanoacrylate glue (super glue). Remember to align things carefully, and let the glue cure for about 20 minutes before connecting the next piece.

**Congratulations!** You have connected the two main structural components of the ukulele. Let's continue and print out the third main component.

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#### ASSEMBLY INSTRUCTIONS









**Print a neck component.** Up next we will print out a neck for our ukulele. (correct orientation shown). This piece has the largest dovetail joint which is designed to sustain the tension exerted by the nylon strings.

Note: we do not recommend using steel or wound strings on Nuke, the PLA plastic structure may deform and the plastic frets will wear.

Make it permanent. Apply glue to the dovetail and align the parts carefully.

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Fill in the gaps. Using extra glue in any gaps left in the dovetails is recommended as it increases the strength of the joint.

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Print a fretboard. When printing the fretboard piece, take particular care in leveling your print bed, cleaning it and making sure the piece is printed flat. This is critical to help your instrument have accurate intonation and good string action.

### ASSEMBLY INSTRUCTIONS

Apply an even coat of glue to the neck top (make sure you don't go too far up the neck as to not clog the string openings).

**Careful.** align the fretboard to the neck outline and make sure it sits tight against the neck section.

Fill in the gaps. Make sure any small gaps in this joint have glue in them.

Congratulations! You have built the main structure of your Nuke Ukulele. Up next we will print the bridge brace that houses the piezoelectric pickup.



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### ASSEMBLY INSTRUCTIONS



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#### ASSEMBLY INSTRUCTIONS

It's time to assemble the complete bridge unit to the main structure. In most cases, this joint can be achieved without glue, but your mileage may vary. Have a small hammer or mallet at hand to assist you in the assembly.

Tapping intermittently from front to back, drive the bridge into the dovetail holes.

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Excellent! Now the body of the ukulele is complete.

**Print some tuner pegs.** Time to print out a set of 4 tuners (The model has a flat side which must be facing down when orienting the part to print).







#### ASSEMBLY INSTRUCTIONS

The tuners are tapered, and fit into tapered holes in the ukulele body. They are friction-based, which means you must push them in as you turn them in order to lock the tuning.

All holes in the body are equal.

String it up! It's time to put some strings on your new Ukulele. We recommend standard tuning nylon strings for concert ukuleles (Nuke is a soprano ukulele, but soprano strings can be a bit short for its configuration).

Let's start by tensioning the 4th string (top-most) string. We will tie the string to the headstock of the instrument in the tradition of classical Spanish guitars. The string is first inserted downwards into the hole.





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### ASSEMBLY INSTRUCTIONS







The string goes around the headstock and back around itself for a first loop.

Do a second or third loop in the same manner.

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Pull on the long end of the string to tighten the knot.

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Wrap the string over the bridge and around the body of the ukulele.

### ASSEMBLY INSTRUCTIONS



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