

Dutch violin

Very Basic assembling Instructions.

This is how I make my prototypes, quick and not well finished.

So feel free to improve.

Before starting, read "The Dutch Violin.pdf" first, it gives a lot of background information you will need!

For tips on milling look at "The 4th axis.pdf"

Tools:

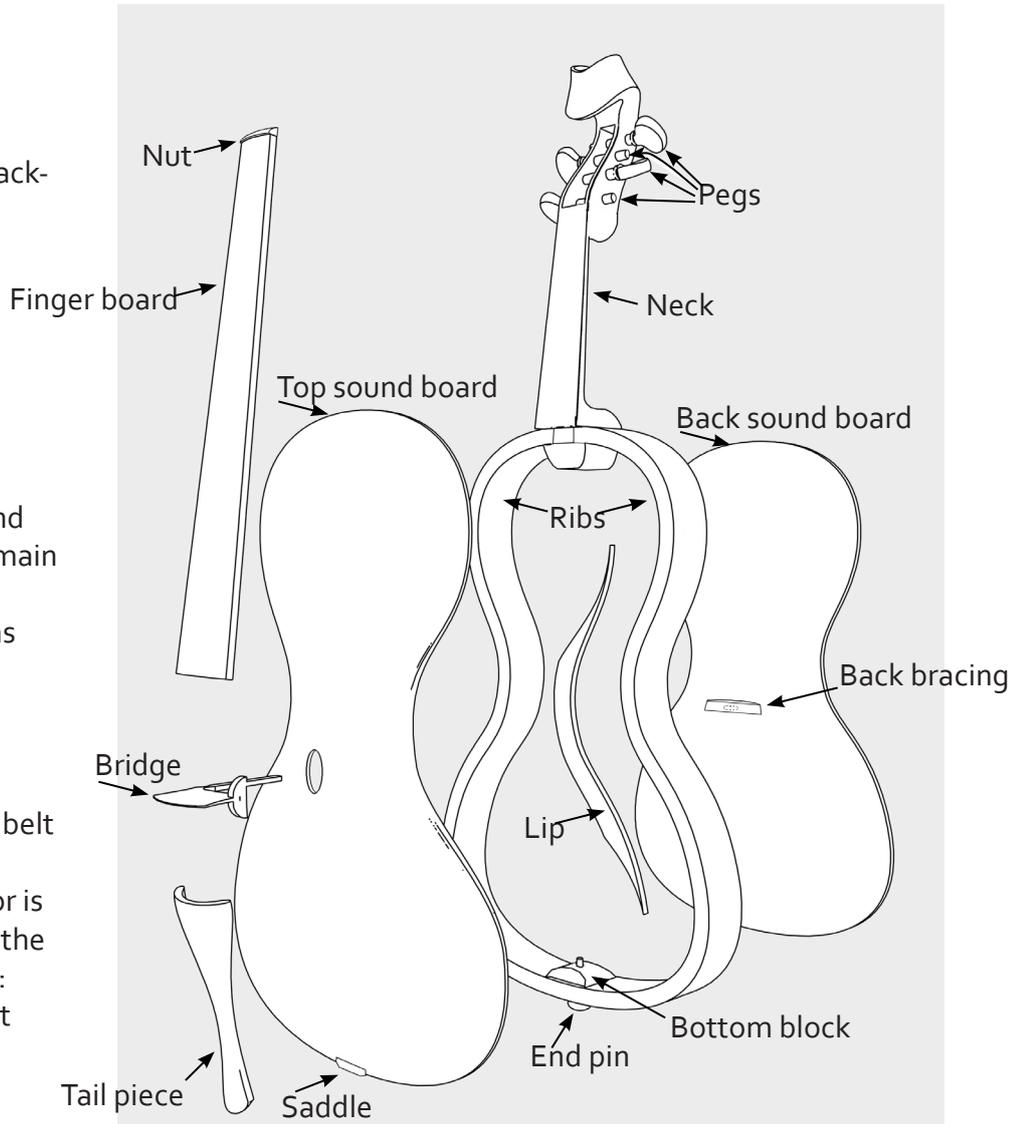
Apart from the cnc mill, I use a band saw and a belt grinder as the two main tools.

The thin band of a band saw means that you lose less wood when you need to re-saw your wood.

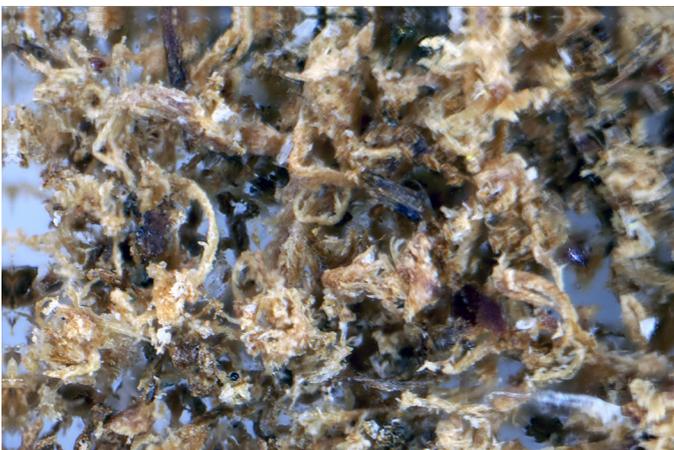
Dust:

Using a cnc mill, a band saw and a belt sander means dust, and lots of it.

Dust collection or a wide open door is the solution. Be extra careful with the belt sander and sanding is general: that dust is a lot finer than the dust from the mill and the saw.



Under the microscope: the same scale



Belt sander dust



Cnc mill ball nose 6 mm. dust

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-Form1.stl

The basic shape that can be used to bend the ribs and to make the rig for the glue up.

-Form2.stl

This gives you the shape of the sound board clamp.

Make some room for the neck in the top of the form

I used adhesive weather-strip on clamp to protect the wood.



form1 assembly rig



form2 glue clamp



form1 press rig

Sound boards

Type of wood: tone wood, usually spruce cedar or some other softwood.

The wood should sound bright when tapped. The brighter the better. The higher the better

The wood should have no defects, no knots and a continuous grain.

This indicates an even density.

Quarter sawn tone wood is usually wigs shaped. Use (ods.rel density) to calculate the relative density.

It should be light. I mean really light : the complete violin weights 460 gram.

If you have only two boards:

Use the heaviest board for the back and the lightest for the top.

If you have more: sort them from heavy to light, divide that series in pairs, and again use the heaviest for the back and the lightest for the top.

There are two sets of sound boards:

The 6 mm set is for high quality (low relative density) tone wood.

It is less forgiving but the instruments are very regular, best for viola's

The 4 mm set is more forgiving, best for violins.

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After milling:

Top and back have an extra 1,5 mm around the circumference. Sand the insides to remove fibers and most of the mill traces.

Top sound hole: (for placement see rim on the outside) 20 mm Ø.

It is not included as a hole in the file, so there is room for changes and experiments.

I cut it out with a cutting compass.

Set them aside and work on the rest of the violin.

Then: Weigh the boards: If they differ to much scrape and sand them to get them in balance.

Do not spent to much time at the last few grams.

This is what works:

1 The boards are made of the same tone wood

2 The boards need to weigh the same.

3 The center of gravity (red line) needs to be near the place of the bridge. (Within 20 mm)

4 The bridge stands on the highest points of the profiles.

5 The thickness of the profiles is inverted.

The rules are simple, if you want to break them, do it in is this order.

Try to break them one at the time.

In my experience rules four and five are key.

If you use different types of wood, Spruce and Cedar, use the best (highest) sounding for the top.

-Bracing top.stl

-Bracing back.stl

Bracings: I only mill the side that needs to be glued on.

The back bracing need an indentation to receive the bridge post.

Placement , see measurements.pdf

Bracings are there to support the bridge.

They also stiffen the sound boards.

I prefer to simply make them straight (2)

For a deeper base: use (1) on the back.

You can shorten the bracing on the back.

I now prefer to taper them into almost nothing.

If your Top need more stiffness use

Top (3) .

If you do not have any experience:

Use the standard (2) om both boards.

On to the two sound boards:

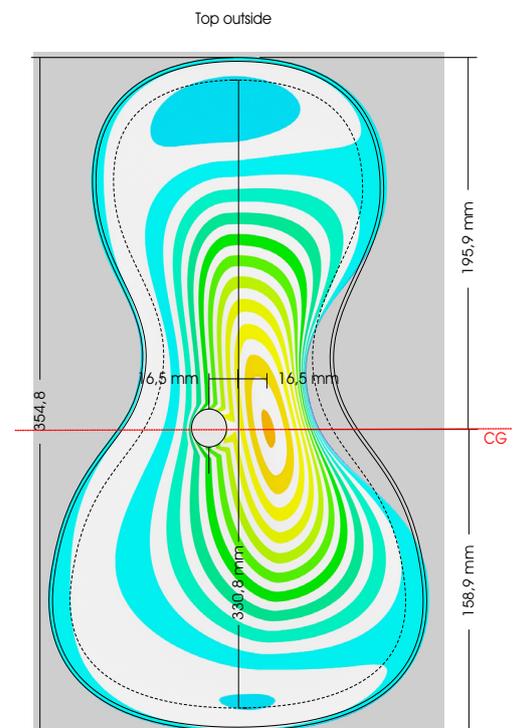
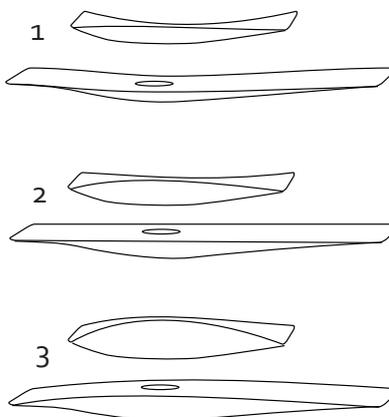
Mark the centers of the sound boards. (horizontal)

Align them, facing away from each other.

You should see the marking of the back bracing in the center of the sound hole.

If that fits, check the 16,5 mm to the center.

The shape should fit just there: Glue them in.



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Neck: use a fine hard wood
Maple is classic.
This is by far the most complex file of the violin so I added some supports and left out the holes for the pegs, keeping it as simple as possible.
Glue the two halves together.
I use rubber bands are used for clamping.



Ribs: I use Cieba bending plywood 5mm (Cieba Petadra or Fuma, It is very light)
Use the Form1 file.
I have used that file to mill 4 pieces of 22mm plywood and made the two halves of the press rig.
Make two strips of Cieba wet (1 hour in water does the trick for me) and press them together in the form.
If you have never done this before: always compress NEVER stress the wood.
Wait for them to dry, take them out, apply glue and press again in shape.
I use polyurethane construction glue
The final height is 32 mm. at the neck. Variations are possible.
The same Form1 file was used to make the assembly rig.



Fingerboard and tailpiece:

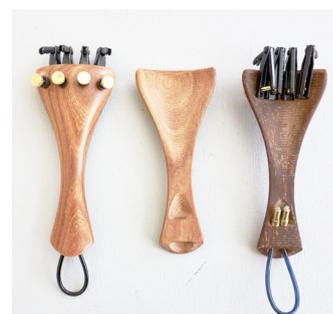
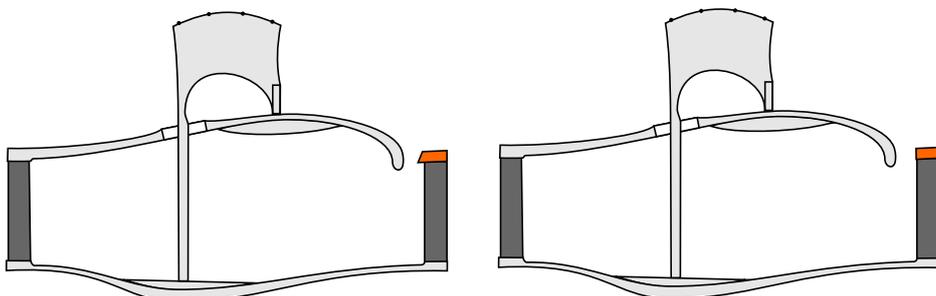
Use a very dense hardwood.
After milling:
Clean up the fingerboard, then sanding and polishing.
For the tailpiece you need to drill the four holes for the fine tuners and two smaller holes for the loop.
After that, sanding and polishing.
Top nut, saddle and bottom block are hand made. (Sorry)



Not included....

-Lip.stl

The lips are a bit oversized so you can change the size of the sound hole.



and what you do with it.

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The bridge:

Bridge violin. (.pdf, .ai, .dwg)

Stock +/- 4,5 mm thick again fine hardwood.

(I've used maple and cherry)

Sand it and taper the front side, glue on the foot



Pegs and end pin.

I buy them on line, To instal them you can buy a reamer online with the correct taper.

That was the simple solution for me since I realized that I had to make quite a lot of prototypes.

Assembly:

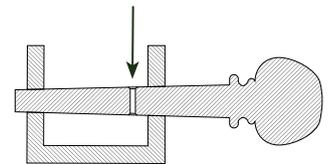
Align and glue the neck. Drill and ream the holes for the pegs. Sand and polish.

Make an assembly rig.

When you glue the ribs to the neck and the bottom block:

Make sure the neck is aligned in the centre and makes an angle of 8 degrees with the ribs.

Holes in the pegs.



Now align the top sound board on the ribs and make some room for the neck.

You can use thin wooden dowels (cocktail size) to fix that alignment.

Mark the space for the lip so you know where not to glue.

Glue the top sound board using the glue clamp (form3) and the assembly rig.

With a few clamps you clamp that form over glue up rig and the sound board, creating an even pressure to the rim.

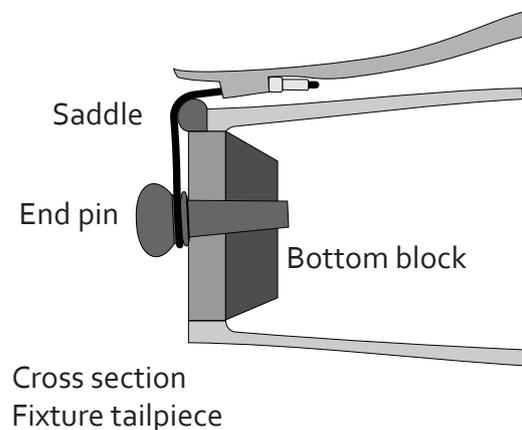
When dry, take out of the assembly rig, fit and glue on the lip using the little clamps.



P.S. Please place your maker mark on the ribs, NOT on the sound boards!



The little clamps



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Make and place saddle and drill a hole for the end pin.
Align and glue in the back sound-board, using the little clamps.
Check the alignment: the indentation must be under the centre of the round sound hole



Trim the sound-boards and lip flush with the ribs.
After that it is sanding and finishing.
Use the least possible amount of varnish on the sound-boards to reduce weight.

The fingerboard is glued in place. (I use rubber bands for clamping)
Make and place the top nut, Scrape or sand nut and fingerboard flush with the neck and polish.



Fit your bridge.
The long leg needs to be made to fit the back bracing. Not too Short!
To make the foot of the bridge fit the top sound board:
Use sandpaper and a protective layer of plastic under the sandpaper.
Lift the foot just so that you can slide the two layers under the foot.
Check the placement of the bridge.
Increase the string tension so that you can rotate the sandpaper.
Keep rotating and checking the place of the bridge.
If the bridge fits nicely, use some fine sandpaper for finishing

String the instrument.
Adjust the bridge height and the groves in the nut according to the Measurements.

Smile,
That's it.

