



# Dark combs™ by Andrew Zajac

- Made from recycled paper, natural resin, and selected natural pigments
- Strong, waterproof and hypoallergenic
- **Flattened by hand** and double checked for the **best air seal**
- Please **do not clean with alcohol**. Use soap and water instead!
- Products, sprays or mists containing alcohol can dull the finish on the tips of the tines (not to mention these products don't kill germs very effectively)

Having trouble? For further information and to watch the comb installation video, see this page:  
<http://harp.andrewzajac.ca/Combs>  
 OR  
 Contact me and we will troubleshoot together:  
<http://harp.andrewzajac.ca/Contact>

Thank you for your purchase of my harmonica combs. My high-performance combs are earth-friendly and made for demanding players. These combs are beautiful and designed to be extremely comfortable to play. They are CNC-Milled to precision. Each comb is finished and flattened by hand to ensure the highest performance and best tone.

They are ideal for all musicians who want great tone and high-level response from their instrument. Their durability will ensure years of regular use. Suitable for "overblow" harmonicas.

**Dark combs** made from an earth-friendly composite of recycled paper, resin produced from naturally occurring raw materials and selected natural pigments. This material is strong, dense, hypoallergenic, and does not emit any volatile organic compounds. It has been certified food safe, contains no petroleum-based chemicals and doesn't have an odour.

I have taken great care to make your comb flat and airtight. It will not absorb moisture and can be cleaned with soap and water. It requires no special maintenance and should only be cleaned as needed.

**Please avoid cleaning the comb with alcohol (or any product containing alcohol)** since this will dull the finish on the varnish and can cause it to flake. You may notice a bitter taste the first time you use the comb. This is harmless and is due to the manufacturing process.

This can be minimised by giving the combs a quick rinse with cool water before the first use.

The sides and back of my Dark combs have been lightly polished to a matte finish which has a nice appearance and feels comfortable to hold. Over time and with use, these surfaces will develop their own natural shine as they become worn in.

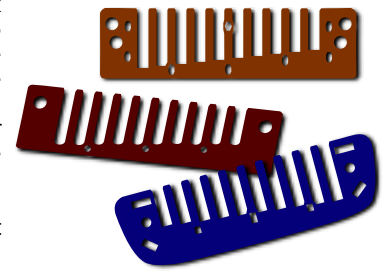
Please refer to the document "Preparing a reedplate for use with a flat comb" which can be downloaded from my website. The link is on the COMBS page. My combs are flat and make no provision for rivet ends that protrude from the draw reed plate. That means a small amount of work to sand down the draw reed plate must be done before you install the comb.

My combs have oval-shaped screw holes and can sit flush, protrude or be recessed according to your preference.

Unless specified, the slot lengths are "long" and will work well on all keys. "Short slot" combs are available and will fit Hohner harmonicas in the key of Dd or higher.

Contact me if you are looking for a replacement comb for a rare harmonica. I am happy to make one-off combs for vintage harmonicas.

Thanks!  
 Andrew Zajac - [harp.andrewzajac.ca](http://harp.andrewzajac.ca)



## How to install a custom comb

1. Remove the screws on either side of the covers and take off the covers. Press your finger against the bottom side screw (or nut) so that it stays still while you turn the top part. This also helps keep the covers in place until the screws are out. Put the covers and screws aside. I place them on a piece of paper so that nothing gets scratched.
2. Remove the screws that are holding the reed plates onto the factory comb. It doesn't matter which you remove first or last. Put the screws aside.
3. Prepare the reed plates. Follow the instructions on preparing the draw reed plate on the other side of this page. You may also want to measure flatness and, as needed, straighten both plates using the Reed Plate Claws™
4. Hold the new comb so that the tines are pointing up and the longer slots are to your left. Pick up one of the reed plates. If the tips of the reeds all line up, that's the draw plate - it goes on the bottom and the reeds go on the outside. If the base (rivet side) of the reeds all line up, that's the blow plate - it goes on the top and the reeds go on the inside. Place the reed plates on the comb. Hold them in place with your fingers and try to align any one of the screw holes. It doesn't matter which one.
5. Place a screw into the screw hole you have lined up and drive it in until it reaches the end and then unscrew it just a little bit. We want the plates to stay together but keep the ability to slide things around so that you can align all the other screw holes.
6. Insert the other screws and tighten them in the same way.
7. Align the comb and plates so that everything is centered and the tips of the tines are as you prefer them to be. Some like the comb to be further back, some like the tips to be flush with the plates and others like the tips to stick out a bit. A good way to start is by pressing the harp tines-side down onto a clean surface to align the comb and plates.
8. Once the plates and comb are perfectly aligned, tighten every screw using light finger pressure. It doesn't matter which one you do first or last, just do them all.
9. Check your work, play every hole to make sure no reeds have been obstructed with debris or are misaligned.
10. Place the top cover into place (it's the one with numbers if your model of harmonica has numbers). Make sure the front edge is properly seated in the groove the whole length. Hold the cover in place as you flip the harmonica around and position the bottom cover in the same way. Hold both covers in place with your fingers.
11. While the harp is up-side-down, insert the bottom part of the cover screws into one of the holes. Hold it in place with your finger and turn the harp right-side-up (while still holding the screw and both covers - it sounds more complicated than it is!)
12. Insert the top part of the screw, align it so that it threads into the bottom part and tighten until the screw is almost to the end. We still need the covers to slide around so that we can align the screw on the other side so don't tighten the screw all the way.
13. Insert the opposite side screw in the same way starting with the bottom piece.
14. Align both covers and tighten the cover screws once everything is as you want it to be.
15. Enjoy your upgraded harmonica!

## Preparing a reedplate for use with a flat comb.

All out-of-the-box harmonicas can benefit from increased airtightness. A very effective way to accomplish this is to make the draw reedplate fit tightly against a flat comb. Many stock combs can be made flat or replaced by a flat aftermarket comb. My combs offer superior flatness and will not warp over time. Installing one of my combs is the easiest and most economical way I know to provide an airtight harp.

The work to flatten the draw reedplate can be done in about two minutes by flat sanding. The rivets that secure the reeds to the reed plate protrude out of the bottom of the draw reedplate and don't allow the comb to touch the reedplate. Stock combs have small indentations in them to give these rivets room but those indentations can contribute to lower performance because there is less room for a good seal.

My flat combs don't leave room for these bumps. Instead, the bottom tips of the rivets must be sanded down. This does not impact the reeds in any way - they will still be securely attached to the plate once we are done.

Sanding also levels high spots in the brass between the slots which prevent the reed plate from making good contact with the comb.

Suzuki reeds are welded on to the reedplate and don't have protruding rivets. However sanding down the reedplate will increase airtightness by making the reedplate flatter.

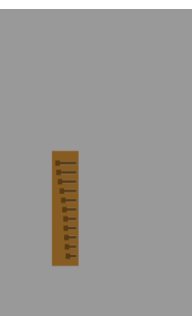
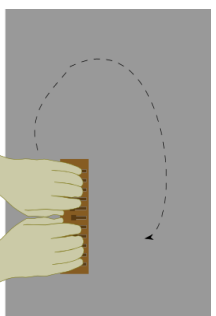
Manji reed plates are chrome plated and sanding off this coat may not appeal to you but rest assured that the underlying metal will not corrode when the plating is sanded off. And that part of the plate won't even show since it's up against the comb so it's not even a cosmetic problem. It's perfectly safe to flatsand a Manji reedplate and I encourage you to do so to benefit from increased airtightness.

Use 220 to 400 grit all-purpose wet/dry sandpaper. Tape it to a flat surface. Ideally, something perfectly flat like a mirror pane or a piece of glass should be used. But a flat countertop will also provide excellent results. Ensure that there is no debris under the sandpaper before you tape it down.

Do not use double-sided tape. The sandpaper should be completely flat against the surface.

Place the draw reedplate on the sandpaper. Wet the tips of your fingers a little so that they will allow you to have good traction and move the reedplate around the sandpaper.

Place the fingers of both hands over the top of the reedplate and evenly distribute downwards pressure. Briskly move the reedplate in a circular pattern so that the reedplate gets sanded in all directions.



It's better to make lots of quick passes with light pressure than fewer passes with hard pressure because we want to evenly distribute the work over the whole surface of the reedplate. Make sure the whole reedplate stays in contact with the paper - don't run off the edge of the sheet.

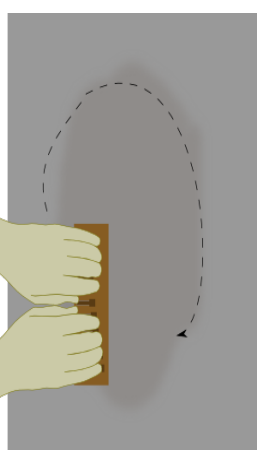
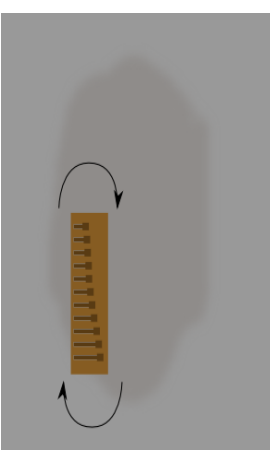
Don't press too hard or you will push the reeds through the slot and their tips will get sanded. If this happens, those reeds will be out of tune.

At first, the reedplate will feel rough but keep going! You will feel it smoothen out after a few moments.

After a few more spins, stop and rotate the reedplate 180 degrees (the reeds stay on the top side of the plate, not in contact with the sandpaper) and repeat the process.

Move the reedplate in a circular pattern so that the reedplate gets sanded in all directions. This evens out the work by redistributing our finger pressure.

Once you have completed sanding in both directions flip the reedplate over and look at the bottom side.



The sanded part will appear very bright. Darker areas are low spots.

Those low spots are areas where the comb will not fit tightly with the reedplate and you will lead to worse tone and poor performance. Repeat the flat sanding process until the low spots are under control. You may find that some reedplates are stubborn and need repeated attempts. But many reedplates don't have to be perfect to play well.



Rinse off the reedplate to get rid of any debris or dust and reassemble the harp.