



Korg Opsix/ Wavestate/ Modwave Desktop Module Conversion



Beavertank

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Summary

A fully printed case for converting your Korg Opsix, Wavestate, or Modwave into a desktop module.

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Tags: [desktop](#) [korg](#) [wavestate](#) [modwave](#) [opsix](#)

(Updated 2/7/24 - An additional error was found on the opsix case split - right.stl thanks to [@RyanPulsifer_1346108](#) and it has now been corrected.

Updated 1/17/24 - an error was found on the opsix case split - right.stl, a corrected version of this as well as the full model and step file were uploaded)

Ever since Korg released their three similar form factor synths, the Opsix, Wavestate, and Modwave, people have wished Korg had also released desktop module versions of them without the keyboard. The desire for these module versions was so strong a Kickstarter was successfully run, and delivered on, by Tall Dog Electronics for just such a conversion case for these synths. Their case looks great, and sturdy, but also costs ~\$200 USD and since I already had a 3D printer and know how to design for it I thought I'd take a crack at a solution myself.

This is the end result:



At last, my Opsix is a desktop module.

All in all it will take about 536g of filament, so slightly more than half a standard 1kg roll, making it quite a bit cheaper than the metal version (assuming you already own a 3D printer anyway). The synth won't get

warm enough that PLA will have an issue so you can safely print it in anything you'd like, although a styrene (like ABS or ASA) is easiest to glue given its reaction to superglue and will tend to bond best with paint so if you plan to paint it like I did that may be a consideration.

No modifications to the hardware are necessary and the process is fully reversible if you decide you want the keyboard back someday.

It will print on anything with a print area as large as a Prusa i3, or larger, and only the middle piece needs support - my recommendation is to print it on one of its cut faces, oriented so that the square holes are closest to the bed. Depending on how well your printer bridges it may print as-is, but for safety's sake and to ensure the openings are dimensionally accurate I recommend enabling support for the bridging faces of the square openings only.

Although my experience has been entirely with the Opsix the measurements and internals of all three Korg synths are the same and these directions can be followed regardless of which model you have. Please note - this may not be true for any of the V2 models, I don't have any experience with them so I can't promise anything.

While everything fits nicely the power plug will fit slightly differently than on the stock case - the entire plug, plastic surround and all, will enter partially into the case. This is a tight fit, but it DOES fit. If you would like it slightly looser you can trim away a small amount of plastic, but as designed it fits snugly and serves to reduce strain on the on-board plug.

- Printing -

Print the left and right pieces with the outer cheeks on the printbed. Print the middle piece with one of the cut faces on the printbed (as noted above I recommend adding support to the bridging surfaces of the square holes and orienting the print with the square holes closest to the heatbed to minimize the length of supports).

Because the pieces will ultimately need to be glued together, and this bond will ultimately be structural, the choice of plastic and glue is very important. I recommend finding a way to solvent weld your pieces together. While there are more options than these, this is what I would consider:

- ABS or ASA - these can be permanently joined with normal cyanoacrylate superglue or solvent welded with acetone;
- PLA - your best bet is a glue containing dichloromethane (or just DCM itself), I would look toward Scigrip #3 or Scigrip #4

- PETG - once again dicholormethane is your friend, so Scigrip #3 or #4 is a good bet

Before attempting to join the printed pieces I recommend practicing on other prints of the same material so you know how they will behave. ABS/ASA, PLA, and PETG will all behave differently with these glues/solvents and the time to join will also vary. It's best to know what to expect before you're working with the large, important pieces.

I printed mine with 2 shells, 15% infill, and 3 bottom and 5 top shells. The resulting pieces were strong enough, and very solid when fully assembled with the faceplate of the synth. You may wish to add additional shell layers to strengthen the plastic pieces, or simply be careful about the amount of force you are applying to any part of the plastic as you assemble it. Once it's fully assembled this is no longer an issue.

- Assembly -

Before you can assemble the new case you first have to disassemble the existing synthesizer.

There are nine screws to remove to take the faceplate off the device, four on the front and five on the back. The five on the back (circled below) are philips head screws, the four on the front are 2.5mm hex head screws.



Remove the circled philips head screws from the back.



Remove the circled hex head screws from the front, don't remove the smaller hex head screws covered with Xs.

After these screws have been removed gently pry the faceplate up, levering only on the plastic and not the metal faceplate, beginning on the left side. There are wire connections on the right side of the faceplate so be careful when lifting until you can see where these wires are and if you are straining them.

Unplug both plugs connecting the faceplate board with the mainboard, the best way I found to do this was to wedge a fingernail between the edge of the connector and the surround to pop it slightly loose. Once this is loosened it is possible to gently take the entire wire loom in your hand and rock it back and forth slightly to pop the other end loose. At this point a gentle pull will take it entirely off the board.

After you have removed the faceplate set the remainder of the synth aside and return to the printed parts.

With some trial and error I found the easiest way to assemble and glue everything together was to begin by screwing either the right or left segment to the synth faceplate. I recommend fully screwing it in place, using both the philips screws on the back and the hex screws on the front.

After this, test fit the middle piece and if it fits nicely screw it on using only one of the philips screws from the back; don't fully tighten this screw. This will allow the middle piece to pivot slightly on the single screw. Be gentle with this motion, you don't want to snap off the riser you are screwed into, but rotate the middle piece slightly so there is space between it and the cheek you screwed on - add glue to the gap. Repeat on the other side.

Once all of the glue is in place screw in the remaining philips head screws, clean up any running glue, and set aside to dry.

Caution! Keep the glue farther from the faceplate than you think is necessary. Learn from my mistake - you don't want to glue the faceplate to the case and additional glue can be added to this area if needed later.

This method can't be easily repeated with the remaining end piece, so after test fitting it to be sure it fits nicely add glue to the already screwed in place middle face then assemble and screw into place the remaining end piece. Again I recommend fully screwing the end piece into place using both the philips head screws on the back and the hex head screws on the front. Clean up any running glue and set aside to dry.

Caution! Once again, keep the glue farther from the faceplate than you think is necessary. Learn from my mistake - you don't want to glue the faceplate to the case and additional glue can be added to this area if needed later.

When the glue has dried/cured remove all the screws you just put in place and remove the faceplate from the case. At this point you should have a fully assembled case.



Your assembled case should look something like this - without the mainboard. That's coming soon.

Closely examine the joints and add glue/solvent to any gaps as needed to ensure as solid a joint between the pieces as possible.

- Post Processing (optional) -

Depending on how well your prints came out, how nicely everything assembled, and how picky you may be about the final appearance you may wish to do some post processing on your prints.

I experienced some warping on my prints (thanks ASA) and used standard bondo to fill any gaps or discrepancies between pieces and to produce a smoother appearance. I did my best to smooth the bondo into place during application, but no application is ever perfect so after it cured I sanded, cleaned, re-applied, and sanded again until I was satisfied with the overall appearance.

If you choose to go this path don't be impatient like I was and make sure the bondo surface is as perfectly smooth as possible, painting will accentuate any issues with the surface finish of the bondo.



Make sure yours is smoother than this. It sure looked smooth, but when painted it clearly wasn't.

Because I wanted to paint my case I then applied automotive gap filler primer. I applied three coats, letting it dry between each, and this was sufficient to hide effectively all the layer lines on my .2mm layer height print.



Multiple thin coats is better than one thick one.

After the primer dried I applied two coats of black spray paint, just standard rustoleum semi-gloss black, and let it dry.

- Final Assembly -

Once again, before we can finish assembling the synth in its new desktop form we have to finish disassembling the old synth.

Take care with the mainboard - this is the part of the synth that can most easily be damaged by static discharge. I didn't take special precautions other than only touching the edges of the board and generally practicing care, but a single zap here can kill your entire synth, so your level of precaution is up to you.

Returning to the shell of the old synth we need to remove the mainboard attached to the bottom of the case. First, though, we need to remove the last remaining cable - this one from the keyboard. Use the same trick of a fingernail under one edge, a wiggle, and then full removal to get it off.

There are four philips head screws inside the case and four outside the case holding this board in place. Remove all eight screws, set them aside, then bring out your printed case.



Two views of the interior mainboard mounting screws.



Two views of the rear mainboard mounting screws.

A note on screws - The philips head screws used to hold the faceplate to the case and the philips head screws used on the interior of the case to hold the mainboard in place are identical and interchangeable. The philips head screws used on the back of the case to hold the mainboard in place are different - they are a finer thread pitch and considerably longer. It should be easy enough to distinguish between the two that you don't need to carefully bag or label them, but it is worth bearing in mind so you can avoid confusion when it comes to reassembly.

First test fit the board to make sure the holes properly line up and all the pieces that should stick through the panel do so. If everything looks good get the board positioned so you can begin to screw in the four screws inside the case.

My recommendation is to screw these in half way - far enough that they won't fall out but not so far that the board can't shift around.

Next, rotate the case so the back is facing you and screw in the four screws on this side. I recommend screwing all four in about half way, then tightening them fully one after another.

Once the back screws have been fully tightened return to the interior and tighten those four screws as well.

Finally, connect the mainboard to the faceplate board (the connectors are similar but not identical in size so it should be easy to find which one goes where) and put the faceplate in place. Screw the four hex head screws into place on the faceplate then flip the entire assembly over and screw in all the philips head screws on the back.

Congratulations! You're done!



Model files



Split STLs

3 files



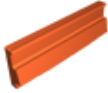
opsix-case-split-left.stl



opsix-case-split-middle.stl



opsix-case-right.stl



opsix-case.stl



opsix-case.step

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