How to: Replace your Z3 roadster soft top.

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Vinci @ Bimmerforums

Introduction

This guide covers the process of replacing the original (OE) soft top on a 1997 and newer BMW Z3 (including M) roadster, with a new OE top. The 1996 models had slightly different straps and tension cable, but can be retrofitted with the later-model top that is currently available. This guide does not explore those differences.

In this guide, I replace the sealing frame that goes around the soft top. I have read that this can be optional, but I did not make any effort to preserve my old one, so any related steps are up to the reader to figure out.

This guide is offered as-is, and the author accepts no responsibility for damages or losses resulting from the use of it.

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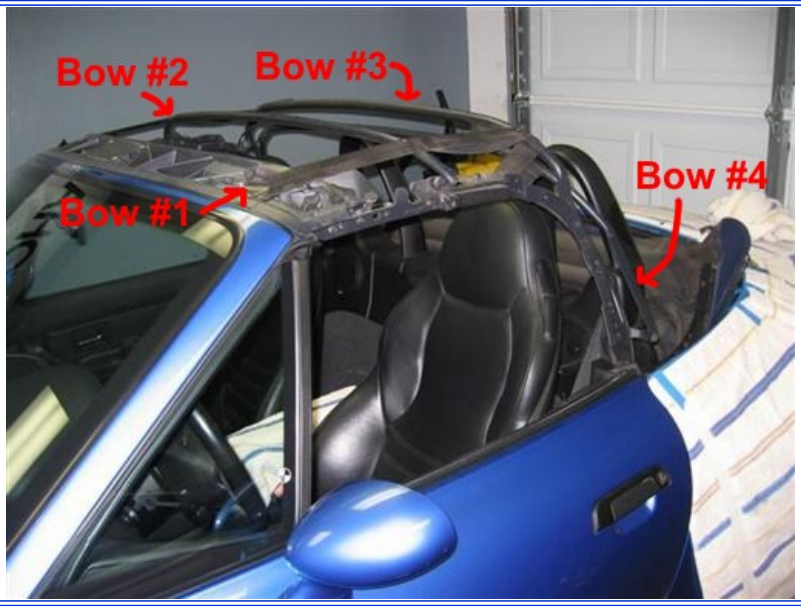
Bow numbering.

Throughout this guide, I will refer to the bows that make up the top frame by number. The numbering begins with the front bow, where the latches are, and ends with the rear-most bow. There are 4 bows in total. In the photo, bow #4 is folded forward.



Tools/parts.

There are many common tools needed for this job, so I will assume that kind of DIY'er that would take on this project will have those tools on hand. Below is a list of all the necessary BMW parts, as well as some tools that I consider a little less common.

- OE top - (BMW part number varies, based on color)
- Sealing frame - - (BMW 51 71 8 398 104)
- Rivet set - - (BMW 54 31 8 407 994)
- Rivet gun - - (I'm not sure what die the rivets require, but my Craftsman gun came with one that worked)
- Double-sided tape - - (BMW 54 11 2 290 978 or 3M 2175C)
- 3/4" x 1/8" butyl rubber tape - - (BMW 83 19 0 153 321 or generic equivalent from an R/V supply place)
- T25 and T40 torxdrivers - - (A T40 socket is best, but you can make due with a driver)
- Upholstery clip tools - - (VIM Tools #DT6200. You can work without them, but they make life a lot easier.
- Electric drill and bits - - (1/8" bit and/or smaller)

Tool/part notes:

- It may be possible to replace the top without replacing the sealing frame, but having done the job, I would not count on being able to re-use it.
- The rivet set contains far more rivets than are needed for the top replacement
- Either of the double-sided tapes listed are fine. I put them both side-by-side, and there is no funtional difference that I could see. For what it's worth, the 3M tape is commonly available, and far cheaper.
- The butyl tape is extremely hard to find in the typical places. However, R/V stores all seem to carry it. I picked up mine online for very cheap. Buy extra, in case you screw up.
- I can't believe how useful the upholstery tools are in a variety of projects. The VIM set is identical to the sets sold by Snap-On and Mac, aside from the handle color.

Step 1: Protect your paint.

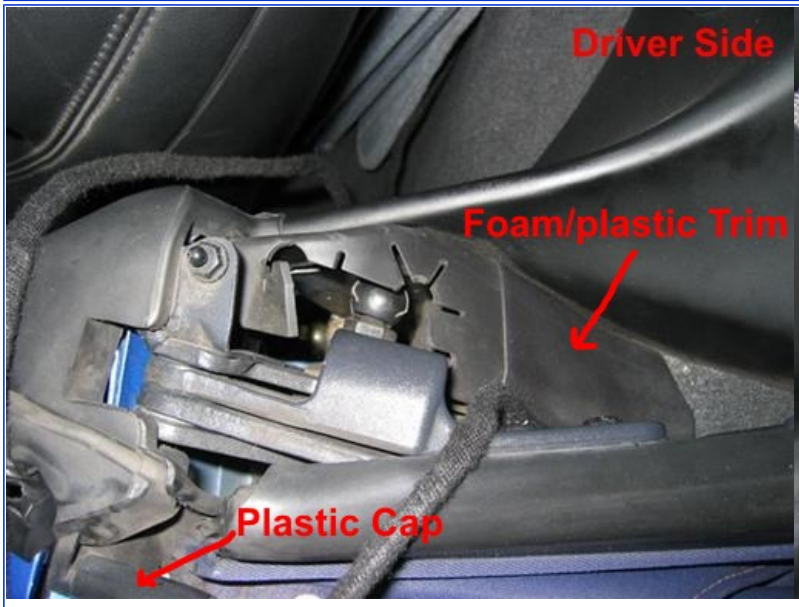
You will be working with metal tools and metal top components all around the rear of the car throughout this replacement, so make sure to protect your paint. I laid down a strip of painter's tape around the immediate edge of the body, folding it around the edge to help protect the interior edge of the body as well.

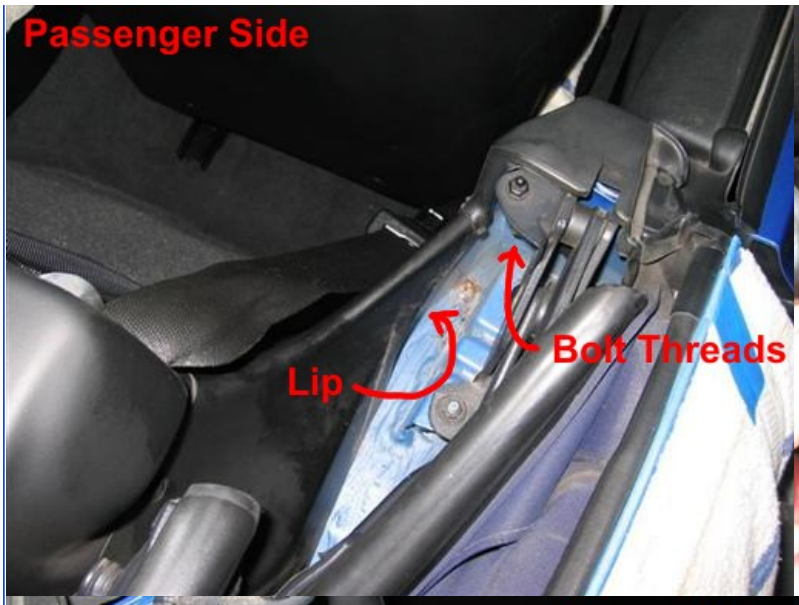

I then attached several clean, old towels to the body. These are thick enough to protect from most accidental body contact. I also suggest having several more towels to cover the interior while working inside the car.

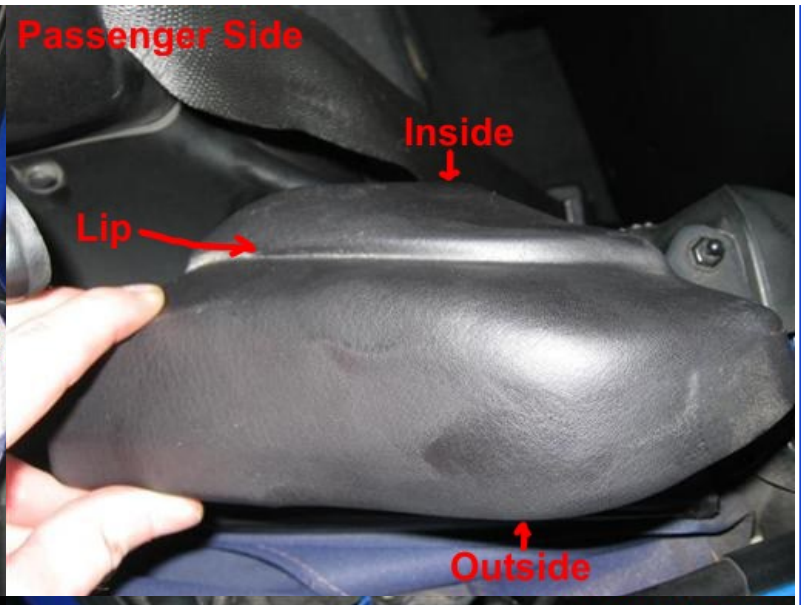

Step 2: Remove a pair of trim pieces.

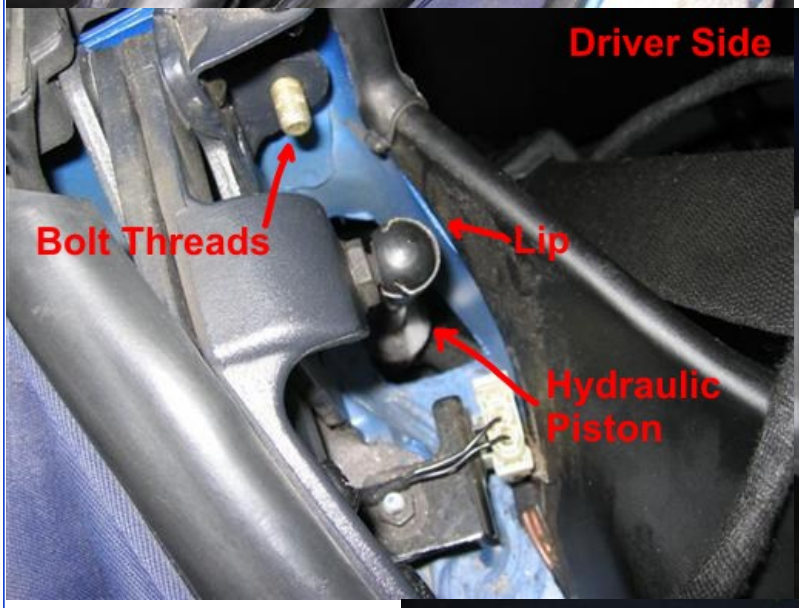
Drop the top. Remove the trim pieces next to the main soft top frame hinge. The trim pieces are made of a firm, plastic-coated foam, and the driver-side trim piece also has a hard plastic dust cover for the hydraulic top piston.

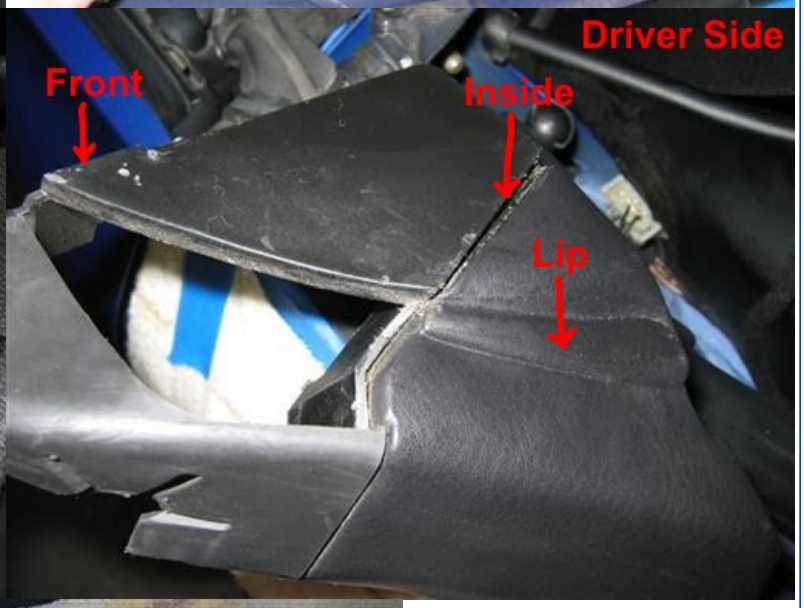
These pieces are held in by a little "lip" that catches under the edge of the interior plastic trim as well as the threads of a large bolt that helps keep the piece located correctly. They are very tight against the trim panel, and are nearly impossible to remove with your fingers. I wrapped the end of my large, round opening, trim tool with a couple winds of painter's tape and inserted it in the space between the foam trim piece and the plastic interior piece, towards the front of the car. As you can see in the photos, the lip that holds the piece in is only in the front. With some very gentle prying, I was able to compress the foam trim piece enough to lift it out by hand. While lifting the piece out, be mindful of the bolt threads in the front and compress the foam trim to get around it. Set the trim pieces aside.











There is a plastic cap covering the end of the rubber seal on each side of the car. These are very easy to damage and cost around $15 each to replace, so remove those before moving forward. Set the plastic caps aside.

Step 3: Remove the top well carpet.

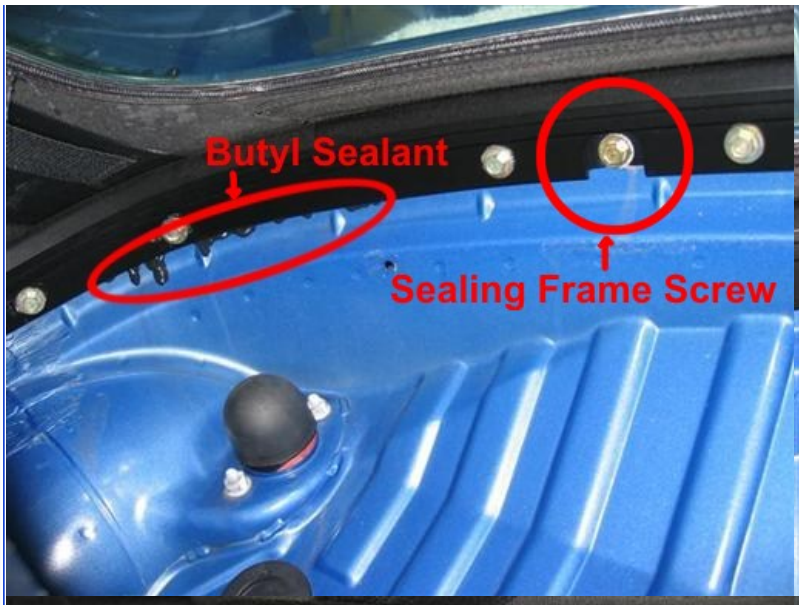
The carpet is held in by 4 blind plugs across the back of the well, the lip of the tack strip, and the lip of the surrounding trim. To remove it, use a large, round opening panel tool to pop the blind plugs out. Blind plugs are essential single-use fasteners, so don't be surprised when they come out pretty mangled. They can often be re-used, if you're in a pinch, but I highly recommend replacing them.

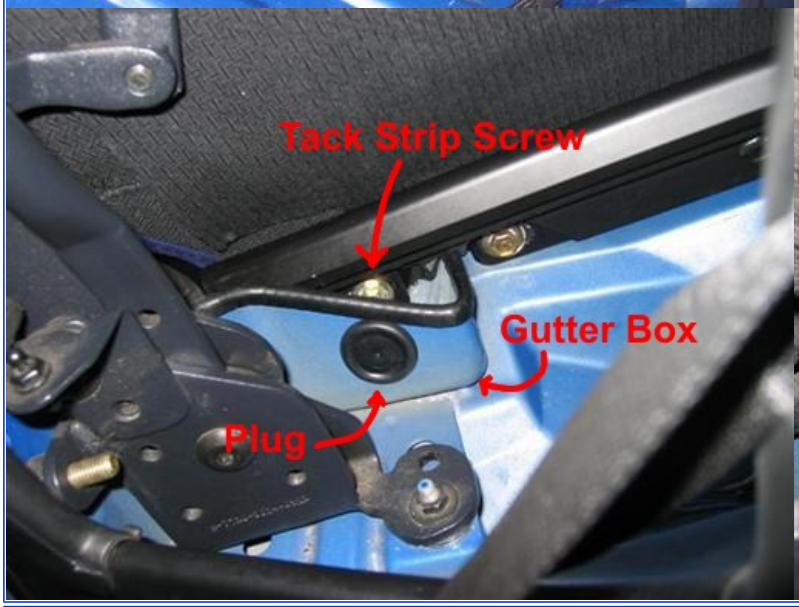
Next, untuck the carpet from the lip of the tack strip. You can start on either side of the car and pull it free by sliding your finger under the edge. With the carpet untucked, you will need to remove the 3 screw covers directly behind the subwoofer compartment, in the top well. Be very careful when removing the screw covers, as they are very fragile and over $5 each to replace. With the covers removed, removed the 3 Phillips-head screws. You should now be able to wiggle the carpet free and remove it from the car and set it aside.

Step 4: Remove the tack strip and sealing frame screws.

There are 15 10mm head-hex screws holding the metal tack strip in place and 4 10mm hex-head screws holding the sealing frame to the body. I highly recommend replacing the sealing frame at the same time as top, as the sealing frame is very easy to damage or destroy when removing the tack strip later on.

If you are replacing the sealing frame, remove all 15 tack strip screws and the 4 sealing frame screws. If you are not replacing the sealing frame, do not remove the 4 sealing frame screws. The forward-most tack strip screws are inside little "gutters" at the very front of the top well. To remove them, you will need to remove the black sealing plugs and use a short socket extension to reach the bolts.





With all the screws removed, you will notice that the tack strip doesn't move freely. This is because it is being held in place by butyl rubber sealant along the outside. Don't worry about this for the time being, as the tack strip doesn't come out until the end of disassembly. Bag all the screws and set them aside.

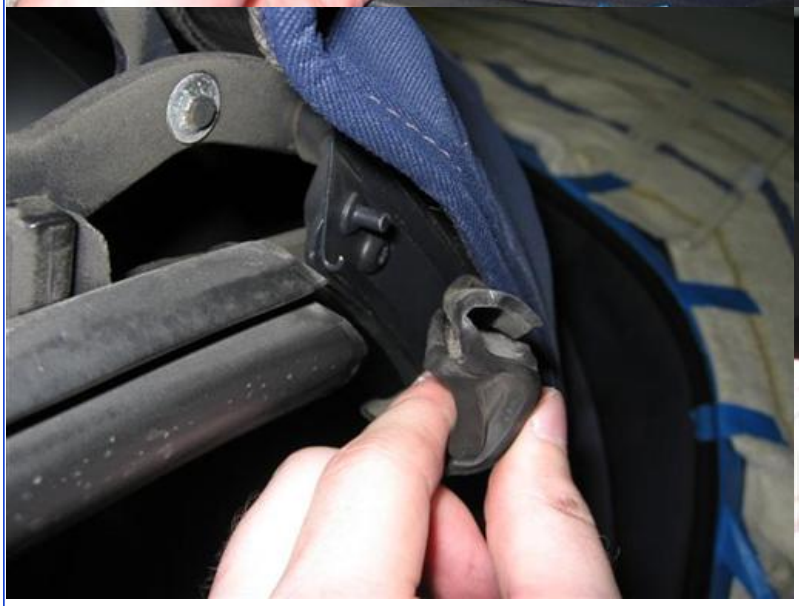
Step 5: Remove the upper window seals and seal frames.

Drop the top. There are 3 rubber seals that go around the top of both the driver and passenger windows. You will need to remove the front-most and rear-most seals. Do not remove the short center seal. It doesn't need to come out, and is very helpful to have in place when aligning the seals during reassembly.

The seals are held in place by channels in their respective seal frame. To remove the seals, simply grab the edge of the seal and gently pull it back, away from the seal frame. Mark each of the seals to reflect which side it came off and what its orientation was.









Next, remove the seal frames for the seals you just removed. The straight frames are each held in place by 3 short T25 torx-head screws. The curved frames are held in place by 4 long T25 torx-head screws. With the curved seal frames removed, you can now remove the 2 short T25 torx screws holding the curved top bracket to the top frame. Each screw has a small amount of blue thread locker on it, so it may take a little extra effort to break them loose. You will be removing a total of 18 T25 torx screws (10 short and 8 long). Bag those screws.

The seal frames may have u-shaped shims installed behind the mounting holes. Be sure to keep track of how many there were behind each mounting hole so that you can put them back as they came off. Like the seals, mark each of the seal frames with the side it came off and its orientation. I also noted the number of shims at each mounting position, in case I knocked some loose later on. Set the seals, seal frames, and screws aside.




Step 6: Remove the front metal top retainer.

There is a long, curved, metal strip that runs the entire width of the front edge of the top. This strip holds the canvas in place in the front of the top. There are 10 Phillips-head screws holding it in place. Remove those screws and the metal strip. Bag the screws and set them and the metal strip aside.

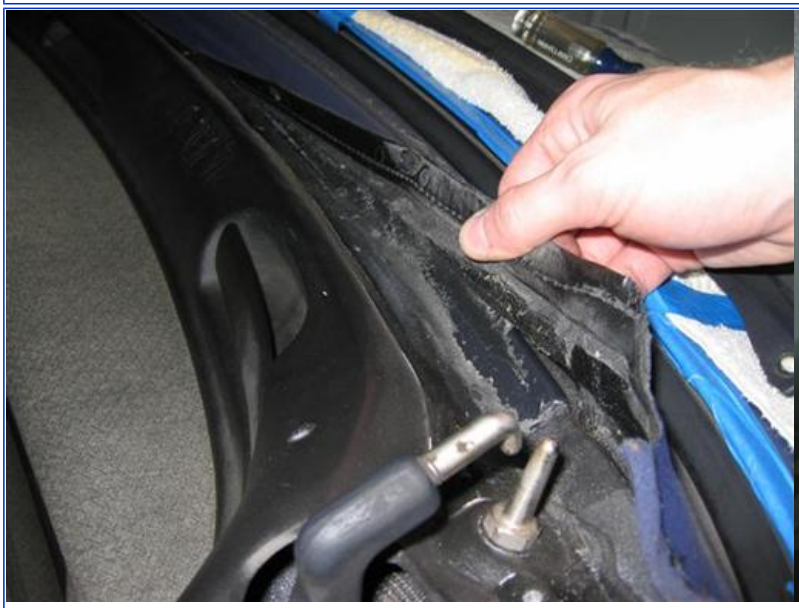
Step 7: Remove the tension cable covers and release the tension cables.

There is a tension cable running along the edge of the top on each side to keep the edge of the top tight. These cables are attached to the top frame and will need to be detached.

Expose the tension cable by removing front-most 2 round-top Phillips-head screws and pulling back the plastic, l-shaped cover. It is semi-soft plastic, so a screwdriver can be used to gently pop the cover loose. You will see the black tension cable running through a nylon grommet in the top frame and through a metal guide. Remove the remaining round-top Phillips-head screw, holding the metal guide in place.




The top fabric is now only held in place by some double-sided tape all along the front of the top frame. Go along the front of the top and pull the fabric loose and fold it back a little. This will expose the locking mechanism in the front of the top frame, as well the mounting for the tension cables.





The tension cables are attached to small springs at the end. When the top is most of the way down, the spring is under the least amount of tension, and will be easier to remove. Remove the tension spring screw. Pull the nylon tension cable grommets out of the top frame. I used a pair of needle-nose pliers to do this. The grommets will almost certainly be destroyed, but the new top comes with new ones pre-installed. With the grommets out, pull the tension cable out of the frame through the hole the grommet previously occupied.


The tension cable and front-most portion of the top will now be free from the top frame. Bag the 8 Phillips-head screws removed in this step and set them aside.

Step 8: Detach the top from the bows.

The top has 3 strips of fabric that attach to the rear 3 bows via double-sided tape. Each of those bows then has a black, plastic cover over it. Remove the plastic covers by pulling down on one end. They are held on by friction. With the covers off, the fabric strips attaching the top to the bows are now exposed. Peel the fabric strips off the bows. My fabric strips were so rotted that they disintegrated when I started in on them, so you will see fabric still attached to the bows in my pictures, even though the top is separated.


Step 9: Drill out the rivets.

There are 10 total rivets holding the top to the top frame in various ways. The only way to remove them is by drilling out the center of the rivet and popping it out with a screwdriver. It is a very good idea to cover up the interior when drilling out the rivets, as there will be metal shavings flying around, they can be a pain to vacuum out later.

When drilling out the rivets, the top will need to be in various open positions to allow you access to the rivet heads. This can be annoying, as the top will not stay in any of the open positions permanently. The top will slowly collapse closed over the course of a few minutes, so be prepared to re-position the top as needed.

The holes that the rivets occupy are a little over 1/8" in diameter, so a 1/8" drill bit should be appropriate. However, I had better luck with slightly smaller bits. Play around with different sizes if you have trouble, but do not go larger than 1/8" or you risk enlarging the hole in the frame and making your new rivets useless.

The first two rivets to be removed are located on the ends of bow #2. Drill them each out.

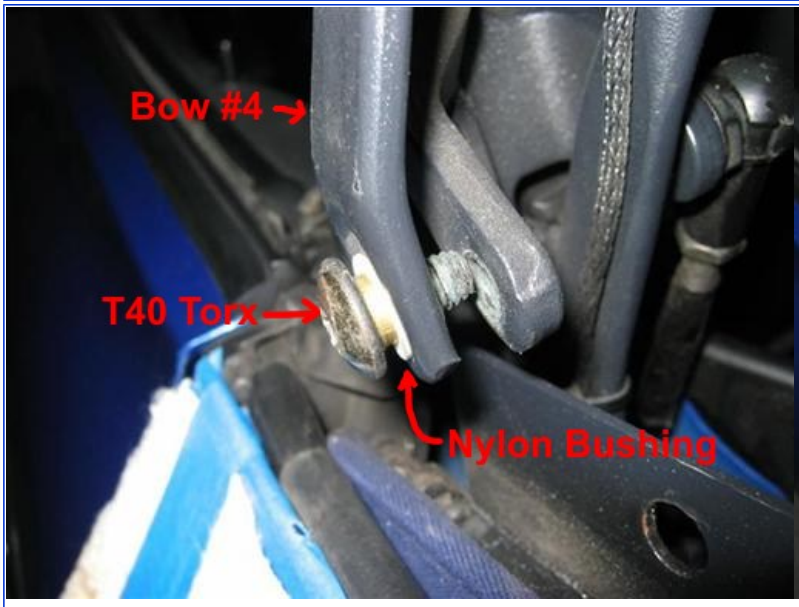

The next rivets are located on on bow #4, and are holding the wide strap to the bow. There are 2 per side with one being on the front of the bow and one in the rear on each side. Drill all 4 out.

The final 4 rivets are located on the back of the main bow (#3), and hold a stretchy strap that attaches to the top. Drill out the 2 rivets per side.

By now, you should have drilled out 10 total rivets. Do not touch the two straps that go between bow #1 and #4. Those straps will not be removed.

Step 10: Slide the wide straps off of bow #4.

Bow #4 is attached to the top frame assembly with a T40 torx-head screw and a nylon bushing. Doing one side at a time, remove the T40 torx screw attaching bow #4 to the assembly. The screw has a small amount of blue thread locker on it, so it should take a good bit of force to break it loose. A T40 torx socket is ideal for this, but a torxdriver will work as well, as long as you can get enough torque on it. The screw may remain stuck in the bushing in the bow after you have the screw loose. This is not a problem, as you are just going to slide the wide strap down over the end of the bow and off. Slide the strap off. Re-attach bow #4 to the top frame assembly, being sure that the nylon bushing is back in place. Repeat on the other side. With both of the wide straps slid off of bow #4, the top is completely detached from the top frame.




Step 11: Remove the top from the top well.

At this point, the top is only held in the car by the butyl rubber sealant between it and the inside of the top well. I replaced my sealing frame, so I removed both the top and the sealing frame as one unit. If you are not replacing the sealing frame, I strongly suggest you remove the rubber seal from the sealing frame to prevent damage to it, prior to pulling the top out.

This is by far the hardest part so far. The butyl sealant is extremely sticky, and about the consistency of Silly Putty. Even without the sealant, the amount of space to work with between the top well and the sealant frame is very small. To make matters worse, the sealing frame is wider at the bottom than the opening at the top of the top well. When I removed mine, I ended up breaking the sealing frame in half as I pulled the top out. I don't really see how I could have done it differently. At any rate, take your time with this step and be prepared to fight. Having a buddy around to help may make it easier. Essentially, you just want to lift the top/sealing frame out of the top well without damaging the body. This step is one of the biggest reasons for needing all those towels around the back of the car.


Step 12: Clean off the butyl sealant residue from inside the top well.

To be clear, butyl sealant is truly nasty stuff. This one step took me about as long as every other step to this point in total. To remove the sealant, I used a plastic scraper to force the bulk of it into slightly more manageable balls, which I pulled off with my fingers. With most of the sealant removed, there was still quite a bit of it left. One source suggested using Xylene (synthetic adhesive solvent) to clean the remainder off. I chose to use a small glob of the butyl that I had already removed to "pick up" the remaining sealant. I did this by pressing the glob against the remnants still stuck to the body and then pulling the glob back up. Since the sealant sticks more strongly to itself than it does to the body, it will lift off the sealant. This is by no means the "easy way". Do whatever you have to to get the butyl cleaned off without damaging your paint, interior, or self.




Step 13: Clean the adhesive residue from the top frame bows.

Depending upon how much adhesive is left on your bows from when you peeled off the fabric strips, you may need to clean some adhesive residue off the bows. Since my fabric strips disintegrated, I had to clean 3 entire strips worth of adhesive off. Xylene attacks that adhesive pretty well, so it will get nice and soft. This doesn't make it all that easy to remove, but it does make it possible. The adhesive used on the bows is (somehow) even more nasty than the butyl sealant. Extremely sticky, even after you hit it with some xylene. Cover up your interior during this step to prevent any solvent drips, if you choose/need to use any.


Step 14: Install the new sealing frame.

The BMW TIS recommends applying the new butyl sealant tape to the outside of the sealing frame, directly above the foam strip, prior to installing it in the top well. I tried to do it this way and very quickly realized that it is almost impossible to do it this way. As soon as the butyl tape touches something, it sticks. Since the sealing frame is larger than the top of the top well, and needs to be wiggled past the gutter boxes at the front of the top well, I quickly ended up with chunks of butyl tape stuck to the body in the wrong place and me unable to get the sealing frame in place.

My solution was to apply the butyl tape directly to the body, in the same place that it would be on the sealing frame (just above the bolt holes). I left several strips of the waxed paper backing attached to the tape as well, as this would allow me to get the sealing frame in place without it sticking to anything, and then remove the paper backing once the frame was in place.

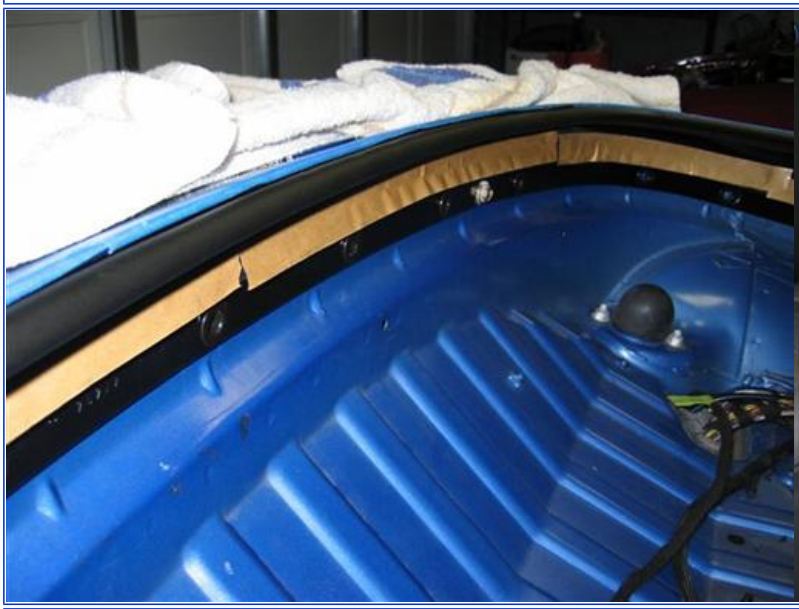
You need to apply a strip of sealant tape around the inside of the top well, about a ¼" above the bolt holes, in the place that the sealing frame has the foam strip, which is just shy of the entire outside of the top well. You also need to double up the sealant tape in the corners. I added a second (~14") strip in the corners, also covered by a strip of the waxed paper backing.




With all the butyl tape applied to the top well, slip the sealing frame into the top well. Since it is larger than the top of the top well, I had to bend it around to fit in. My new sealing frame was pretty flexible, so this wasn't a problem. Once the sealing frame is in place, remove the wax paper backing from behind the sealing frame. This is not terribly easy to do, but is still far easier than installing the frame with the butyl tape already on it. Once all the paper backing has been removed, ensure that the sealing frame holes line up correctly to the holes in the top well (all 19 of them), and press the sealing frame in place. There is a little room for vertical alignment of the sealing frame, so get it aligned so that the rubber seal on the sealing frame sits where it needs to in relationship to the top of the top well. You can use a picture of your old sealing frame from prior to being removed as a reference. Put the 4 sealing frame bolts in finger-tight. Do not torque them down yet.


Step 15: Install the new top in the top well.

Just like the sealing frame and the top well, you need to apply a strip of butyl tape to the sealing frame to seal between the tack strip on the new top and the sealing frame. Use the same method from step 14 and apply the butyl tape, doubled up in the corners, to the sealing frame with strips of waxed paper on top. This time, align the bottom of the butyl strip with the bottom of the foam strip on the sealing frame, so that the majority of the butyl tape is above the foam strip, and none is below it.




Dropping in the new top is much easier than dropping in the sealing frame was. The metal tack strip on the new top is smaller than the opening in the top well, so it will drop in with some wiggling. Since the seal on the new sealing frame is in place, be very careful not to damage it with the metal tack strip. This step is significantly easier if you have someone holding up each side. I got one side dropped in place and then wiggled the other side around to get it in place. I don't think both sides of the tack strip can go in at once, so one side at a time is the way to go.

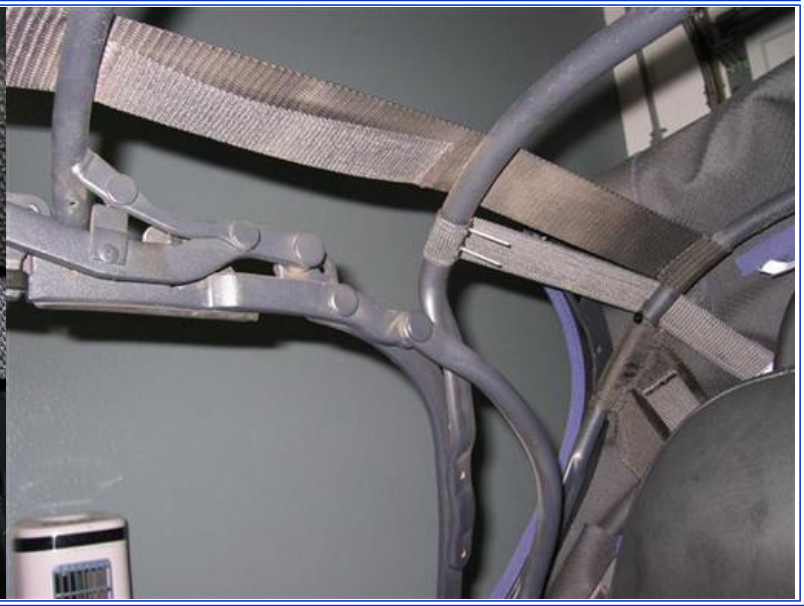
Once the tack strip is in place and aligned, reach down and remove the waxed paper strips covering the butyl tape. You will have a bit more room to work with when removing the paper strips than you did when doing the same thing with the sealing frame. Once all the paper strips have been removed, ensure the tack strip is still aligned. This took a good bit of work, when I did it. BMW suggests putting the center screw in finger-tight to help align the tack strip. Since that is the only round hold in the tack strip, it should force the other holes into alignment. Once all the holes line up, put all the screws in the tack strip finger-tight.

Step 16: Install the wide straps onto bow #4.

Unscrew the large T40 torx screw holding bow #4 to the folding top assembly on one side, and slide the wide strap up on the bow. Reattach the bow to the top assembly with the T40 torx screw and repeat the process on the other side. Rivet the strap to the bow in the front and rear, using the pre-made holes in the strap.


Step 17: Attach the long, elastic straps to bow #3.

Stretch the strap over top of bows #4 and #3, curving it under bow #3 to line up with the holes at the rear of bow #3. Rivet the strap to the bow through the pre-made holes in the strap.

Step 18: Attach the top to bow #2.

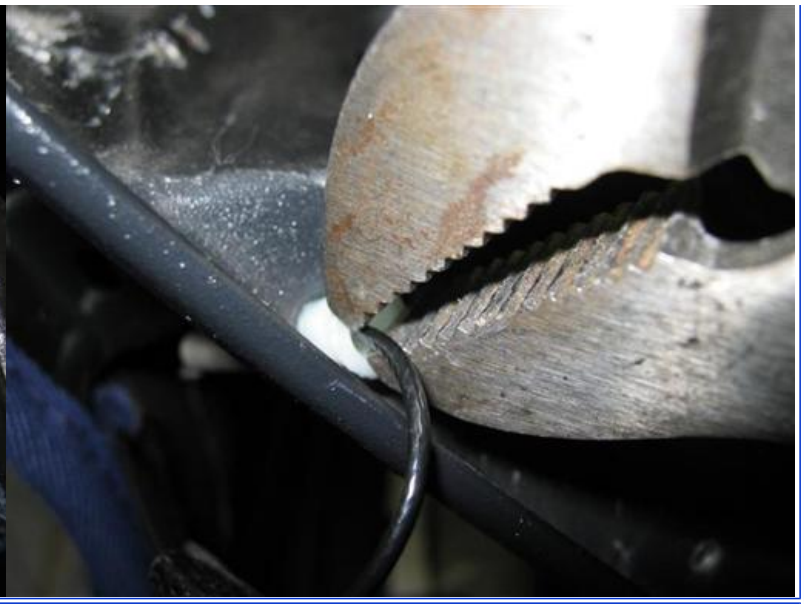
Pull the top up onto the top frame and align the tabs on either side with the rivet holes in the ends of bow #3. Rivet the tabs to bow #2 through the pre-made holes in the fabric tabs.

Step 19: Attach the curved top bracket to the top frame.

Using two of the short T25 torx screws, attach the curved top brackets to the top frame.

Step 20: Attach the tension cables and tension cable covers.

Drop the top frame, so that the tension cables will be loose, like when you removed them in step 7. Pass the tension cables through the top frame in the correct hole, and press the nylon grommet into place in that hole. I used the jaws of a pair of pliers to do this, but it wasn't very easy. Attach the tension cable to the top frame, using the Phillips-head screw that the previous tension cable used.

Ensure that the tension cable is routed properly, and attach the rear-most screw of the tension cable guide to the top frame. Then, fold the plastic tension cable cover over the tension cable, and screw it into place with two more Phillips-head screws. This may be difficult on the second side, as the canvas is very tight when new.

Step 21: Attach the front of the top to the top frame.

Drop the top frame all the way. With the top folded down, clean up the underside of bow #1, if needed, and attach a strip of double-sided tape to where the fabric flap will attach. The BMW TIS suggests that you fold the fabric over onto the double-sided tape to hold it in place while you screw it down. I found that the tape was not able to hold the stiff fabric. What I ended up doing was putting all of the Phillips-head screws through the metal top retainer strip and putting all the screws through the pre-made holes in the top. This was with the fabric NOT folded over bow #1. Once I had all the screw through the retainer strip and the fabric, I folded the fabric over bow #1 and lined up the screws with the holes in bow #1 and tightened them. The net result is the same as following BMW's instructions, but didn't rely on the tape's initial hold strength.


Step 22: Raise the top and align bow #4.

All the perimeter attachments between the top and top frame have now been made. Raise the top all the way up, but do not "close" the top. Meaning, don't pull the last hinge all the way down. With the top up, check the alignment of the fabric seam to bow #4. BMW says that the stitching of that seam should be directly over the highest point of bow #4 when the top is "closed", but not latched. I found that to be highly unlikely, because that seam will only line up correctly once the top is completely closed and latched, due to the fact that the new fabric is very tight, and has yet to relax. Just make sure the seam looks right over bow #4 when the top is "closed".




Step 23: Tighten down the tack strip and sealing frame.

With the top up and "closed", ensure that the sealing frame is still aligned with the body correctly. Once it is aligned, tighten down all 4 of the sealing frame screws. Then tighten down all 15 of the tack strip screws, starting in the middle.

Step 24: Close and latch the top.

This is easier said than done. The canvas is very tight when new, and will be very difficult to get latched. I had to have help in doing this, so I had a buddy lean on the top while I pulled down on the inside, center handle and worked the latch. We did the other side the same way. I found that all the seams lined up perfectly once I had the top latched down.

Step 25: Attach the fabric strips and plastic covers to the bows.

While inside the car, attach the 3 fabric strips to their respective bows with the attached double-sided strips. Be sure to get the strips attached evenly and that the double-sided tape is smoothed all the way. Then, snap the plastic bow covers on over the bows. Since bow #3 has a larger diameter than #2 or #4, make sure you put the right cover back on the right bow. You should be able to eyeball it.

Step 26: Attach the seal frames.

Unlatch and open the top, but do not drop it. Attach both the straight and curved seal frames to the top frame. Ensure that all the shims that were on the frames are still there. The straight frame will use 3 of the short T25 torx screws per side and the curved frame will use 4 of the long T25 torx screws. Ensure you have the frames aligned exactly how they were when you took them off by noting the witness marks on around the screw holes where the screws originally sat. This will help prevent leaks around the seal.

Step 27: Attach the seals to the seal frames.

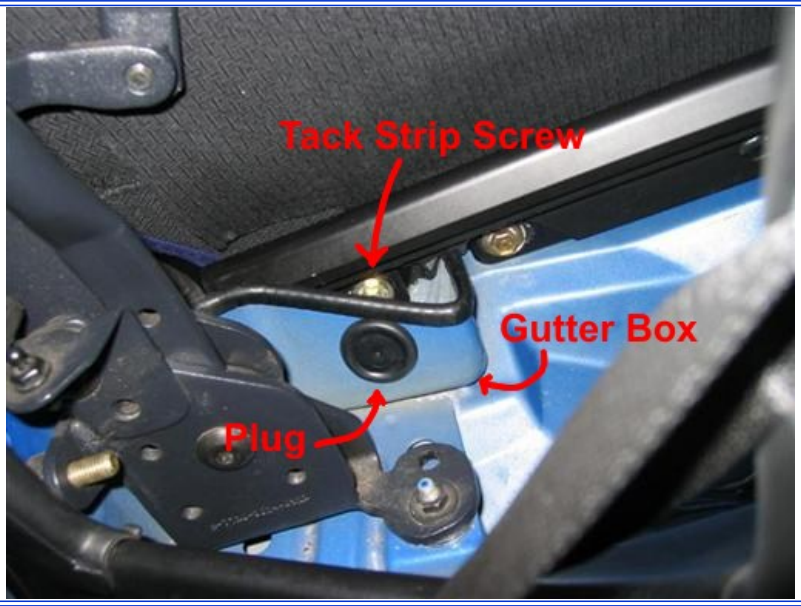
This is easier to do with the top "open", as you will have better access to the seal frame. Note that the part of the seal that curves back on itself goes up against the top. Check the short, center seal that is already attached, if you need a reference.

Align the seal so that the holes in the back of it match up with the posts coming out of the seal frame. Press the seal upwards against the seal frame to get the folded portion up against the top and to push the top channel of the seal into the seal frame. Once you have the top channel in the seal frame and the post inside the hole in the back of the seal, you can start feeding the bottom channel of the seal into the seal frame. You will have to work this with your fingers by compressing the seal upwards while pressing in towards the seal frame. You can check your progress with a flashlight by gently pulling back the seal flap at the bottom of the seal. Do this with all 4 of the seals.

Once all 4 seals are in place, close and latch the top. Check the seals visually to make sure there are no gaps. If there are, open the top back up and realign the seal.

Step 28: Install the gutter plugs in the top well.

Pop the black plastic gutter plugs back into their respective holes in the top well.



Step 29: Install the top well carpet.

Snake the top well carpet back into the top well. It will take some work, but get the carpet aligned with the section just behind the subwoofer, where the 3 screw holes are. Once that is aligned, you can spread out to make sure the carpet gets tucked under all the surrounding trim and tucked into the channel in the tack strip. With the carpet in place, press the 4 blind plugs into the holes in the carpet and into the body.

Install and tighten the 3 screws the go in directly behind the subwoofer. Carefully reinstall the 3 screw covers. Each cover is different, so ensure that you have the right one for each screw.

Step 30: Install foam trim pieces and plastic caps.

Drop the top completely down and press the foam trim pieces back into place, ensuring that they fit over the bolt threads in the front. Reinstall the plastic caps that cover the end of the sealing frame seal.