

# Flyin' Miata

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## Frame Rail Reinforcement & Butterfly Brace Kit



This installation can be done fairly easily, although it will take a bit of time. Tools required will be a drill with a 5/16" bit, a screwdriver, and sockets / wrenches. We recommend you wear gloves when handling these pieces as they have sharp edges.

Start by lifting the car off the ground. You'll be crawling around underneath and drilling upwards, so give yourself enough room for this. Remove the seats from the car by removing the four bolts on the seat rails. Move the seats fore and aft to access all four. When pulling the seats out of the car, unplug any electrical connections underneath. Undo the screws holding the sill protector in place and set it aside. Undo the bolt holding the lower end of the seatbelt to the car and flip it out of the way. There's a small plastic button holding the carpet down between the two front seat rail bolts. This can be popped out using a fork or a pair of screwdrivers. You can now pull up the carpet up.



Underneath the car, unbolt the two brackets holding the fuel and brake lines to the right side frame rail. These brackets can be popped off the lines by prying lightly with a screwdriver. Also remove the fore and aft fuel line clips that are floating as it makes it easier to manipulate the lines during installation.



Press the new frame rails into place. The cutout should be at the front on the inside edge on both sides. They may need some tapping with a hammer- a particularly mangled stock rail will likely have to be "massaged" back into shape in order for the new part to fit. For best alignment, line up the front of the rail as far forward as it can go and still be on the flat horizontal surface. Determine this position by watching both the outboard square edge and the inboard cutout edge. This alignment is critical- if you're more than 1/2" or so too far rearward, the rearmost bolt hole will go



into the bulkhead! Do the same steps to square both rails up equally before drilling any holes in the floor pan. It is very important to get both sides square so that if you're adding the Butterfly section (available as a package or separately) it will bolt directly up.

On '94 - '97 cars, the ECU is mounted to the bulkhead behind the passenger seat. Be very careful with the ECU and wires; make sure that you do NOT damage anything with the drill bit. Remove the ECU if necessary.



Put on some form of eye protection and drill up through the floorpan with a 5/16" bit using the holes in the frame rail for location. If your carpet won't stay up out of the way, use something like a 2x4 on edge to keep from drilling through the carpet. Hit the hole with a bit of rubberized undercoat or similar rustproofing. Drop one of the bolts through the hole along with a washer and bolt the rail into place with a washer under the locking nut. The short bolts should be used on the inside (towards the center of the car) of the passenger side rail. This is for additional clearance for the fuel lines. Once the bolt is in place, drill the next hole, etc.. This ensures good alignment. Tighten these bolts nice and tight - you may see the floor start to deform slightly. Be careful when drilling beside the fuel and brake lines. They can be gently pulled out of the way while drilling. Note- if you're installing the butterfly brace, leave the inboard nuts off for now.

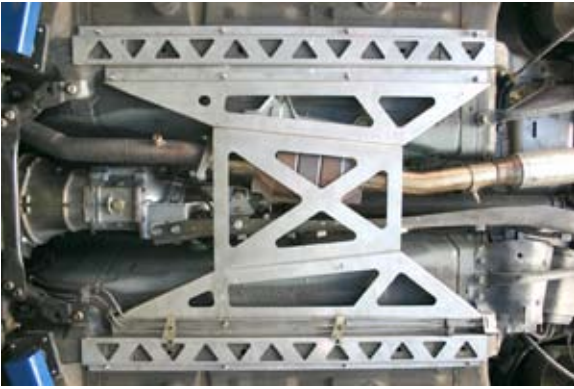


The brackets for the fuel lines need to be bent for re-installation (when the job is complete) as shown in the photos. Slip the brackets over the studs in the right hand frame rail and tighten down the supplied nuts (not shown in the pictures). The fore and aft floating brackets can be attached per the photos below as a buffer between the rail and the fuel lines.

If you're not installing the butterfly section, you can now vacuum any shavings out of the interior of the



car before putting the carpet back down. Reinstall the bolt for the seatbelt, the seats and also the side sills. You're done. If you're installing the butterfly section, read on!



The butterfly brace can be installed at the same time as the frame rail kit, or at a later time. If the frame rails are already installed, you will need to re-access the top of the bolts used to hold the rails to the car and remove their lower nuts. The seats and carpets will therefore have to be removed and the car raised so you can work underneath.

The “wings” of the butterfly should be bolted in using the same inner bolts that attach the rails to the car. Keep everything loose until you have all the pieces in place! The wings are installed with the flat section on the bottom as shown in the pictures. The wide end of the center section is going toward the front of the car. We find it is easier to loosely attach the center section to the wings prior to installation due to the narrow fit for tightening these bolts. You will likely call us names when you go to tighten them as the bolts are a bit tricky to access.. Also, the center section is a tight fit and it may need some “persuasion” to raise it to its final position.



The center section should be installed as high as possible to maximize ground clearance, but low enough to clear the exhaust pieces. Remember that your exhaust parts are on rubber hangers and they will move around! Once you've determined the correct height, tighten up all the bolts. You can raise a sagging exhaust system by installing new hangers or using a hose clamp around the existing hangers to tighten them up.

When all else is finished, verify that the placement of your fuel & brake lines are above the plane of the lowest hanging hard parts of the car in the surrounding areas- you need to make sure they're protected from road debris. Now you can reinstall the seats & carpet, and go test your new stiffer car!