

Installation of a Busman RTMR

Introduction

Many of us like to install aftermarket accessories and off-road lights, and soon we realize the rats-nest of wiring that materializes in our engine bay. God forbid you would have to troubleshoot, because none of the wiring you did makes sense! Well fear not, there is a solution. Rather, several solutions. But today we'll be focusing on one.

The first is a premade switch + box combo, prewired, ready to go by SPOD. This has everything you need, but it is rather expensive. What many of us opt for is building the relay box ourselves and wiring everything yourself, saving lots of money while doing so.

Now, wiring a busman box isn't exactly difficult – but it does require a lot of material that adds up quick, especially for something you're only building once. Fear not! You can purchase a fully assembled relay box that's water sealed for a great price, and it's backed with lifetime warranty. I found this dude on eBay: <https://goo.gl/LRnrFT> (shortened to keep this document concise and organized). Many reviews of his stuff can be found on various forums and YouTube. From personal experience everything is really well made, and I doubt I could do a better job even if I tried.

This guide will not include the installation of the switch panel or the wiring to the engine bay of the switch panel, as there is a in-depth guide that shows how to do this and includes detailed images of what you should be looking for. We're going to continue from after this bit, due to him constructing his own RTMR and we're building our own.

Link to his Tacoma switch panel + RTMR install: <http://www.bodenzord.com/archives/1129>

Skipped the first 5 pages in which he builds the relay box, but this would help you understand how it all works or if you're interested in building it he covers all the details. We only need the 6th page in which he mounts and puts together the relay box.

Some points I want to make on his install before continuing ours:

1) **DISREGARD IF NOT MAKING WIRING HARNESES AND JUST USING CRIMP CONNECTORS** - He has 1 blank switch, and the relay powers 5 total accessories – he uses one of the lines on his wire harness as a ground, but I recommend wiring it as a 6th switch anyway if you plan on using it. Wire the ground separately in this case, and if you make harnesses (shown later) – use a 2-way harness to plug the switch power into the fuse section of the box, and 5 of the 6 switch wires to the relay box – leave the 6th wire wrapped in tape for future accessories (you would just add 1 relay to it and be well on your way, saving you the wiring on the interior). This will however mean the switches are always powered.

2) He had the ability of purchasing a premade mounting plate. This is something we will be skipping as I am not aware of anyone who sells them openly on the forums for our generation. We are also a lot tighter on space in that area for mounting the relay box, but it *just* fits.

3) the switch panel will not fit if you use the method he used. Tacoma's seem to have a lot more space. I had to solder a wire through each terminal, as terminal connectors stuck out too far and would not have worked. Oh, I thought. They HAVE to make something lower profile. So I found flag terminals. Yeah.. you guessed it. No go. If you can figure out a way, let us know. The best way I know is soldering a wire with heat shrink between each run, and covering with liquid electrical tape.

A lot of these steps are redundant and therefore shorter than the ones you can find in the Tacoma install link. I just modified them for our trucks, if you're at a loss as to what to do take a peek there or reach out.

Preparations

A lot of the stuff we are using for preparations are optional and can be disregarded – the point of this is to wire it to not only be functional but look nice, but if you just want to use what you have you can get on with it.

- Sheet Metal (optional) | this is needed to fabricate a bracket. The RTMR on the eBay link comes with one and you are free to use that one, but I wanted one on which I can install the busbars for ground and future accessories if need be. The one that comes with it is only big enough for the relay box, and you would have to be creative in mounting anything else. Or you can just ground everything to the battery. If you're a rebel like that.
- Waterproof connectors (optional) | these are needed to make an easy connect/disconnection point from the relay to the switch panel (a 6 pin and a 2 pin) and from our fused/relay based accessories (10 2 pins), you can add them as you go or all at once. E-TINGS on amazon is what I used.
- 16-gauge wire (18 works too) – 100ft should work nice, preferred both red and black but if you'd rather use heat shrink to signify between positive and ground feel free to do so. I'm very lenient. Actually, too lenient. It's your truck, I guess. Noob.
- Nuts and bolts | the RTMR comes with 4 to mount it to our plate/the bracket it comes with. These are only needed if you're installing the busbars as well for ground, as we'd need to mount those. You would need 10-24 bolts and matching nuts to screw these in.
- 2 100-amp busbars with 5 screw-ins (by blue sea systems) w/ cover (optional if you're just grounding to battery you don't need these.)
- An ANL fuse holder if you want to wire this to the bracket. If you're okay with the inline fuse it comes with, great. Saves you wiring. And a much smaller bracket.
- 25' 6 conductor cable (optional) – if you want to run 6 different wires from your switches down to the engine bay, you can go that route. Or you can get this cable of 18 gauge with 6 conductors that you can use as a signal wire instead. Essentially, you're routing one wire. So much easier. <https://goo.gl/UAvMK5>



Installation

1. Use a piece of cardboard or Bristol board to fab your bracket. The best location for the RTMR is near the battery, as this will save you lots of wiring work and well, it's where the rest of the electrical stuff is. At this point it is assumed you have done up to the following using the Tacoma guide – cut and wired your switch panel past the firewall, and you have 6 separate wires sitting there for the switches. 8 if you're going to wire the LED indicators to the fuse box (the +/- wires for the independent LED lights)
2. Once you figure out a bracket size / shape you're happy with, move on with cutting your sheet metal to spec. I had a Dremel tool and that's what I used, you can use various things to cut thin sheet metal. Snippers, a jigsaw, etc. I'm not a metal worker. I'm a student on a budget so here we are. Below #3 is an image of how mine looked before the relay hole and after (the fuse holder isn't wired, I was just checking the fit of it since it's the widest thing on the item list.)
3. Figure out where you're going to put your relay box, and cut a hole for it. Cut a hole as big as the wiring section of the box, not the area with the screws. Just enough to get the wires through the bottom when we finalize. Leave ½" of space on each side of it if you're going the busbar route.



4. At this point finish cleaning up your bracket. Fix the metal edges, dull them out so you don't cut someone when they're looking at your final product after you're done. Or yourself. Ask me. 4 different cuts. My hands look like this so hers can look like that. All that jazz. Test the fit quickly and mark holes for where it will mount to the car. Drill these holes as well. The factory hole sizes on the V8 are M8x1.25x1". You can use something smaller as the hole isn't very deep.
5. **OPTIONAL STEP** – If you plan on using the waterproof connectors and you already have accessories wired, start by disconnecting them from wherever they are now and cutting the ends off, and wiring the connectors. They look intimidating, but they are not. Use a Molex crimper (it works fine, you don't have to get the specific one for these connectors but put the little rubber plug at the end of the wire first, and crimp. Look at YouTube videos of how to do this. Once crimped, you just push them into the connector.

Keep the left and right sides consistent so that we don't have issues later. It's up to you what you prefer for the accessories versus the relay box – I'm using male side on accessories, and female on the relay box. Once you wire them up, they look way better than they did with the old school crimp connectors to your battery. Do the same for the 6 wires for the switch signal from the engine bay and use the 6-pin connector, and add a 2 pin to the power/negative for the switch LEDs. Welcome to the high club, champ.



6. Test fit your RTMR at this point. If it fits well, and you're good to go, it's time to start wrapping up the mounting of it and getting to wiring. I painted my bracket, as I very well recommend you do so as well. Painting is the same as painting any other metal, but since this is a quick noob to noob guide, sand the metal using 800 grits, wipe it down, and then sand using 2000 grit. Spray a primer if your paint requires it, if not get right to the painting. 1 light coat, 2 medium coats, and any further coats would be medium coats. 10 minutes between each coat (depending on paint) maximum 1 hour for all coats together (depending on paint, check the can.) Let it dry for 24 hours before moving forward. (Figure 1.2 – after test fit and painting)
7. Mount the RTMR using the supplied screws by marking and drilling holes for them into the metal. Once this is done, mount the busbars beside it on the left and right, with the metal pins facing DOWN from the top of the bracket – in line with the wiring, so at the top you should only see bolts when you look at your bracket after mounting. (Figure 1.3)
8. Like how we did with the accessories, we're now going to do our female adapters. Mount the ground wire to the busbar (1 per point) and 1 power wire into a connection point. You may want to shorten these based on where you're wiring them. In total 5 for relays, 5 for fuses so 10 harnesses with female ends should be made like this. Test fit an accessory. Do the same for the 5 signal wires coming from the relay box for the switches. Leave 1 blank. Cover it with tape or if you have left over rubber nibs from your harness. Wire both busbars together with 1 wire (8 gauge is

fine), and then wire your ground to one of the connection points on the busbars from the RMTR. Run this wire to the battery. (Figure 1.4)



Figure 1.2

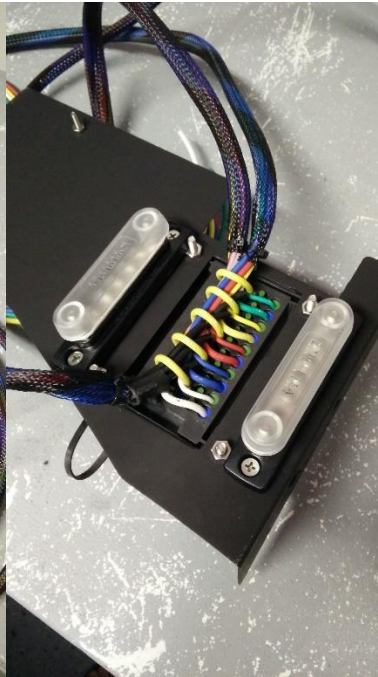


Figure 1.3

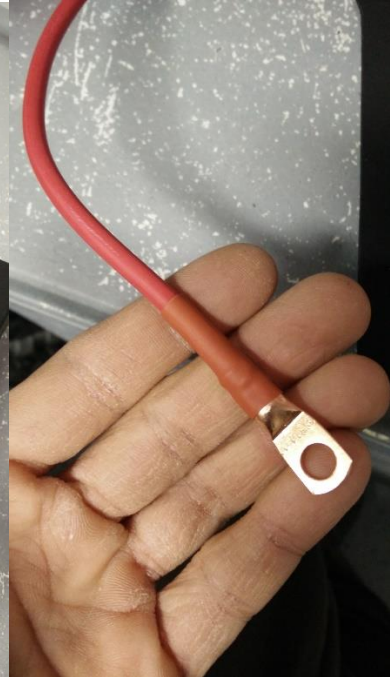


Figure 1.4

9. If you're using a fuse holder, it's time to add that in as well. If you're sticking with the in-line fuse it came with, wire it and move to step 10. Otherwise, keep reading. Mount your fuse holder with your fuse, and the power wire coming from the RTMR (8 gauge). You may have to cut it, but don't toss the cut piece – use it on the other end from the fuse holder to the battery.
10. Finally, it's time to mount. You can mount your bracket to your car, with the RTMR / busman already attached, and route the wires to where they need to go before final mounting. After mounting the busbar, check and make sure everything is secure before tightening down. Connect the positive to the battery, and the negative to the battery, and proceed with testing your installation.

DISCLAIMER – I am by no means an expert on vehicles, this is a reference guide only and I am not responsible for anything you do to your vehicle. Thank you for reading!