



Instructions for Radio Stack Mounting in Fiberglass Panels

In order to mount the radio stack successfully, several criteria come together to make it straight and functional. The immobility of the radio trays during construction, attachment of the panel aluminum surrounding the radio stack, the attachment of the angle rails to the fiberglass, the attachment of the radio trays to the angle rails, and the attachment of the flat stock aluminum to the rear of the radio trays. These are what need to be kept in mind at all times.

The information to follow is “one way to do it”. Limitations in facilities and tools or different ideas to reach the ultimate goal may yield an altered style of construction. With the same fiberglass and similar radio stacks, different methods have been used or a different order of actions were followed. As long as the above mentioned criteria are kept in mind, the mounting should be successful.

It is also best to not settle for something you’re not comfortable with. The radio stack itself provides more than just housing for your avionics. It completes the “skeleton” of the panel where wires will be run; small items will be mounted to; be the start point for many wiring breakouts; and will probably be the focal point of the front of the panel.

First, start out with the radios. They will be stacked, spaced, and taped to avoid movement.

Install all of the connectors and hardware that relate to each radio tray. This will ensure that the radio will sit into the tray exactly how it will once it’s fully wired. Stack the radios on top of each other to get an idea of the spacing needs. Using two short 2x2 pieces of wood to stack the radios on will help for getting the tape around later. Because of cam-lock differences in size and position, you’ll need to space the radios for clearances so these locks can move freely and won’t scrape the adjacent radios. Also, the trays for the radios sometimes are not square and sit slightly uneven. Using layers of blue tape running from front to back are a good way of spacing; and they can remain on the trays after construction is complete. If other spacers are used; once they are removed, a tray may move slightly, making your stack uneven.

Once the radios have the proper spacing, stack them on the two pieces of 2x2 and place a small, light, weight onto the top to keep them from moving. Align the sides and the faces of the radios so that all is straight and even. Wrap the stack with tape wherever applicable to make sure that the trays will be immobile. Be sure you don’t wrap the cam-lock with tape on the bottom radio (if applicable, usually it’s the transponder) and keep the mounting holes in mind before you apply the tape, so you can either stay clear of them or know where to cut them out once you’ve taped. This stack will be going in and out often so make sure that the tape is tight.

Cut the tape on the top and the bottom tray where the tape crosses any opening so that the radios don’t pull on it going in and out. Next, cut out the mounting holes that you’ll be using. It is recommended that all holes in the front of the tray are used and then one per side at the rear, unless it is large like a GNS530 or GMX200. With the radios stacked and the radios still installed, verify that the panel aluminum you’ll be using still



fits around the entire stack with enough room for powder coating and that the bottom radio cam-lock will not be obstructed. Remove all radios and verify that none of the tape has been pulled or shows signs of movement.

Next, attach the panel radio stack aluminum piece to the panel.

Drill out, and cleco as you go, all of the mounting holes. Nutplates will need to be attached to the center, top and bottom, holes but the sides will remain open, as these will be used to attach the rails. There will also be a few mounting points securing the radio stack to the fiberglass that will be hidden under this panel aluminum, but they will all be used in conjunction to secure the whole.

With the aluminum still attached, mark the opening for the radio stack. Remove everything from the fiberglass and cut out the radio stack hole, making sure that you are at least 1/16" outside the line. Round out the corners.

Next, cut the aluminum rails for the stack. It will be up to you on how long they will be; either spanning the entire panel height or just the radio stack; spanning the full height is recommended.

Once cut, verify that they fit flush and all mounting holes that you'll be using will be reached. If they do not fit flush, a thin flox pad onto the fiberglass can be used to fill in any ripples. The corners of the fiberglass may also need to be opened up to conform to the ends of the rails. Mark the rails to denote their position. That will come in handy later.

The next step involves marking and drilling the mounting holes on the rails that go through the fiberglass panel, securing the stack to the panel. This part entails the radio stack, the rails, and the aluminum panel piece that goes around the stack.

Install the radios into the trays. With the radio stack up on the two pieces of 2x2 wood, put the panel aluminum piece around the stack, clamp the rails to the side of the radio stack (loosely, do not make the trays bow), and cleco clamp the rails to the back of the panel aluminum so that they are secured. Loosen, move, and tighten the clamps and rails so that the radio stack is positioned in the panel aluminum with an equal space on the left side and the right side, at the top and the bottom of each side, and all of the screws are covered that will be used. The radio face plates should not touch the panel aluminum on any side. If they do, there is a good possibility of seating problems in the tray once wired and installed. Using an ultra fine sharpie, mark the mounting holes in the rail through the panel aluminum.

Disassemble and drill out marked holes using a 9/16" bit. Cleco the panel aluminum and the rails to the fiberglass and do a test fit with the radios still installed in the trays. The stack should be able to come in from the back, fit snugly but not too tight side by side, and should move freely up and down in the panel aluminum hole. Verify that your marks are still on the rails, labeling which side they belong to.



Next, you'll be making the holes in the rails through the radio trays that secure the radio stack to the rails. This entails all parts. This will also require materials to stack that will bring the radio stack up to its mounting height off of the table. Materials will be whatever you have from large to small; books, wood scraps, metal scraps to cardboard, business cards, paper. Ultimately, the radios will need to be removed without moving the panel or the radio stack after positioning, so you can mark the holes in the rails through the trays.

Attach the panel aluminum to the fiberglass with the upper and lower center nutplated holes and by clecos in the sides. Stand the panel up and secure its movement. With the radios installed into the trays, build a stand that will bring the radio stack into the panel hole. Books, 2x4s, or plywood scraps stacked would work for the initial and then use business cards, folded paper, etc. to increase in fine increments. Be sure to allow the bottom radio's cam-lock clearance from the stand. You'll want space on all sides of the stack. If the ratio of top to bottom space is larger than the side to side space, match the top space to the sides and have the bottom line contain the excess space. Also, be sure to allow for the cam-lock clearance on the bottom.

Once you have everything positioned and secured, carefully remove the radios and mark the holes. Each hole at the front of the trays should be used. Pay attention to the trays as you are removing the radios. If you see anything move, replace the radios, re-secure the equipment, and do over.

Disassemble everything and verify that the rails are still marked as to which side is which. Drill out the marked holes with a 9/16" bit. You can put these rails up to the radio stack for a visual to verify that all is still aligned. Attach nutplates to all of the holes of each rail.

Re-attach the panel aluminum, rails, and the radio trays to the fiberglass. Install the radios and check fit. If the panel aluminum is off on one side or the other, you can file so that the space is the same or re-do the rails entirely. After powder coating the metal, you lose about 0.070" on the metal surface.

If all is aligned, it is recommended that you remove the panel aluminum and stack and reattach just the stack to the fiberglass. Drill two holes per side somewhere along the fiberglass that will penetrate the rails, and remain under the metal, to be used to keep the radio stack attached to the panel if you ever need to remove the panel aluminum. Countersink the fiberglass and attach nutplates to the rails. If you needed to take the rails off of the stack to attach the nutplates, you can take the tape off of the trays that were holding it together.

Next, aluminum flat stock is attached to the rear of the trays, both for securing the trays and to mount small items like trim relays, encoder, ground terminal strip, etc. The pieces need to be cut to fit the dimensions that work the best for your installation. Too long and they will interfere with panel mounting or other obstructions, too short and you will limit yourself on mounting options for small accessories and have to mount them somewhere else where real estate is limited.



Cut the flat stock pieces and prep for install; round the corners, angle portions for clearances, etc. Secure the bottom of the radio stack with something that will allow the flat stock to extend beyond the trays if needed. Clamp the aluminum to the trays.

Remove the radios from the trays and mark the holes you will be using for mounting. Also, make marks for where the screwdriver holes will be. Each tray has either a larger hole in the tray or large sections where you can put a hole that will allow access from the opposite side.

Un-clamp the flat stock, drill the holes, and do a preliminary attachment with just machine nuts. Install the radios and verify that the fit remained the same. At this point, turn the panel facing away from you and plan your accessory and wire standoff attachments. Plan how and where you are going to run the wires, and remember the wire bundle may get quite larger. Plan where you can put accessories, both to be out of the way from instruments and other panel equipment and to remain serviceable later.

Remove the flat stock and drill all holes. Attach nutplates to the flat stock for the mounting screws. Attach all accessories in a manner that will allow you to remove any item without removing the entire piece of flat stock (if possible). Remove the tape that held together the radio stack.

Reassemble and verify everything fits where it should, isn't in the way of anything else, can be accessed after the panel is installed, and is practical when accounting for the wiring.

Now, it is time to lay down your wiring...enjoy!