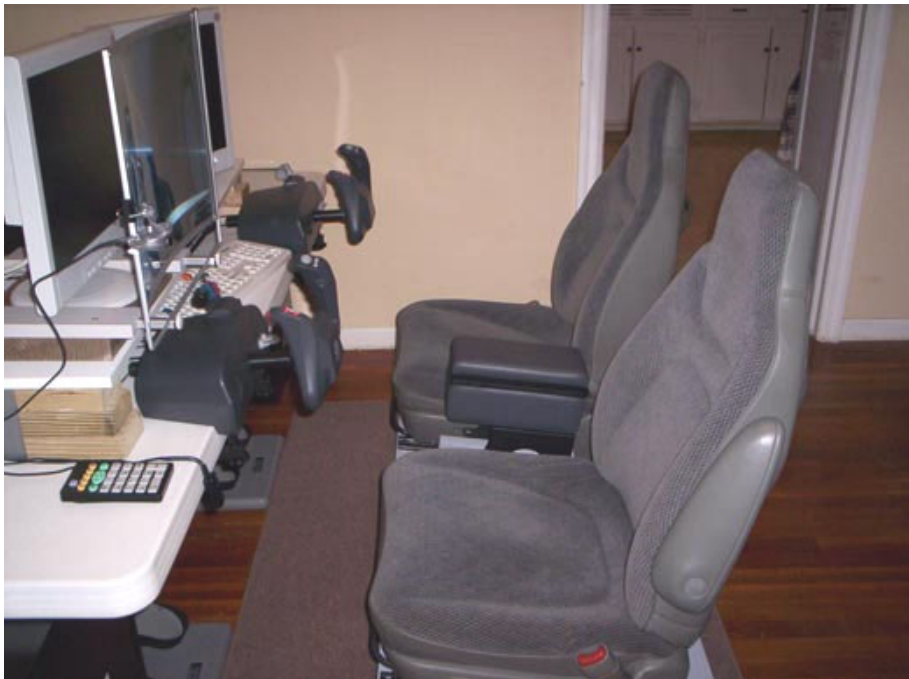




***Do It Yourself
Dual Seats
for flight simulators***



Safety

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Roger Dodger Aviation, LLC
www.DIYflightsims.com

Dual Seat Platform and Armrest

Enhance your flight simulator experience with dual seats!

Share your flight simulator experience with your spouse or amazed friends!

Get that copilot you always wanted!

Get rid of that office chair - take your flight simulator experience to the next level!

Use these easy plans to build a sturdy platform that attaches securely to standard mini-van seats from a Dodge Caravan. The seats slide forward and back independently and the seats recline. Supreme comfort for those long hauls!

Total cost – about \$100 in materials! Great Value!



Seat Platform Materials

- 2 Dodge Caravan front seats
- 10 lug nuts that came with the Caravan seats
- 10 3/8" flat washers
- 1 24" x 48" plywood sheet, 3/8" thick
- 1 2x4 board, 96" long
- 1 2x8 board, 96" long
- 1 box 2 1/2" deck screws

Optional Center Armrest Materials

- 1 padded storage console & armrest, gray, JC Whitney item # ZX135862T \$39.99
- 1 2x4 board
- 1 2x8 leftover board from Seat Platform project
- 8 10X metal screws, 2" long
- 6 1/4" full thread hex bolts, 3" long
- 6 1/4" – 20 hex nuts
- 6 1/4" lock washers
- 6 1/4" fender washers, 1" diameter
- 6 1/4" fender washers, 2" diameter

Replace the wing nuts on the padded storage console & armrest:

- 4 1/4" – 20 hex nuts
- 4 1/4" flat washers
- 4 1/4" lock washers

Tools Required

- Drill
- 1/8" Drill Bit
- 1/4" Drill Bit
- 1/2" Drill Bit
- Ratchet wrench,
- 5/16" socket
- 7/16" socket
- 15mm socket
- Tape measure and straightedge
- Miter box saw
- Pencil
- Screwdrivers

Tools Recommended

Chop saw or Circular saw with straightedge saw guide.

Drill guide (to help drill straight holes).

Jig saw

Bar clamp

Electric screwdriver

Paint (gray primer)

Paintbrush



Regarding Tools

If you have access to the recommended tools, by all means use them. Straight cuts and straight pilot holes will help create a more polished and professional appearance.

Buy the Van Seats

The van seats are from a Dodge Caravan mini-van. We chose this type of seat because the Dodge Caravan is a very popular vehicle and there are tens of thousands of these vans on the roads today. This increases the chance that many Dodge Caravan seats will be available for you to choose from when you visit the local auto salvage yard. Another important consideration is manual controls for the seat sliders and the reclining seat back. These seats also have built-in armrests, which is important because this design does not assume a cockpit enclosure.

Other types of seats may work however the Roger Dodger Seat Platform Plans are specifically designed for use with Dodge Caravan seats. The Seat Platform sits at the same angle as the factory seat mounts in the van. In other words, feel free to experiment with other types of seats, but you may have to make several modifications.

DIY Dual Seats



When choosing your seats, first examine the seat rails for excessive rust and check the general condition of the seats. Avoid seats with mysterious stains, tears or discoloration. Verify that the seats have all manual adjustments, and that the seat slider and recliner lever works smoothly.

The seats are attached to the seat rails and the rails are bolted to sturdy steel mounts, which are bolted to the floor of the vehicle. Theoretically, you may be able to remove the entire seat mount, but you would have to jack up the vehicle and get under it to remove the bolts. That is usually dangerous in a salvage yard because most of the vehicles do not rest on concrete.

It is much easier to remove the bolts that attach the seat rails to the steel mounts. Each seat rail is attached to the mounts with five 15mm nuts. On some models, there is a sliding drawer under the passenger seat. You can remove this with a screwdriver. Slide the seat all the way forward to remove the rear lug nuts, then slide the seats all the way back to remove the front lug nuts. Save the lug nuts for later, then remove and carry home your new cockpit seats. My seats cost \$40 total....cheap!

My seats had been rained on and were wet when I purchased them, but they were otherwise in good condition. I cleaned the seats with foam shampoo that was designed for use on cloth car seats and allowed the seats to completely dry out next to a dehumidifier. The seats are in good condition now; there is no mold or smell.

Seat Platform Instructions

Cut one 2x4 board in half to create two 48" length boards.

Attach the rear 48" board. It is flush with the rear of the 24" x 48" plywood sheet, see Figure 1.

Drill straight pilot holes with the drill guide and 1/8" drill bit. For this project, use the 1/8" drill bit for all deck screw pilot holes. I like to use a drill guide to help me keep the holes straight. Attach the 48" board with 2 1/2" deck screws as shown in Figure 1.

The front 48" board is offset 1 1/2" from the front edge of the 24" x 48" plywood sheet (this is an important structural consideration). Drill straight pilot holes with the drill guide and attach the 48" board with 2 1/2" deck screws as shown in Figure 1.

CAUTION: avoid placing a lot of weight on the Seat Platform for now

Get the Seats Ready

Both seats have plastic side fairings that cover the sliding seat rails. These must be removed for now, but will be re-installed later. Save all screws and fasteners.

First, remove the recliner lever. Each fairing is attached with two screws on the side, one plastic fastener in the front and a hidden screw on the back of the seat beneath a flap of carpet. Remove all screws and carefully pry out the plastic fastener with a flat blade screwdriver. Repeat for all side fairings.

DIY Dual Seats

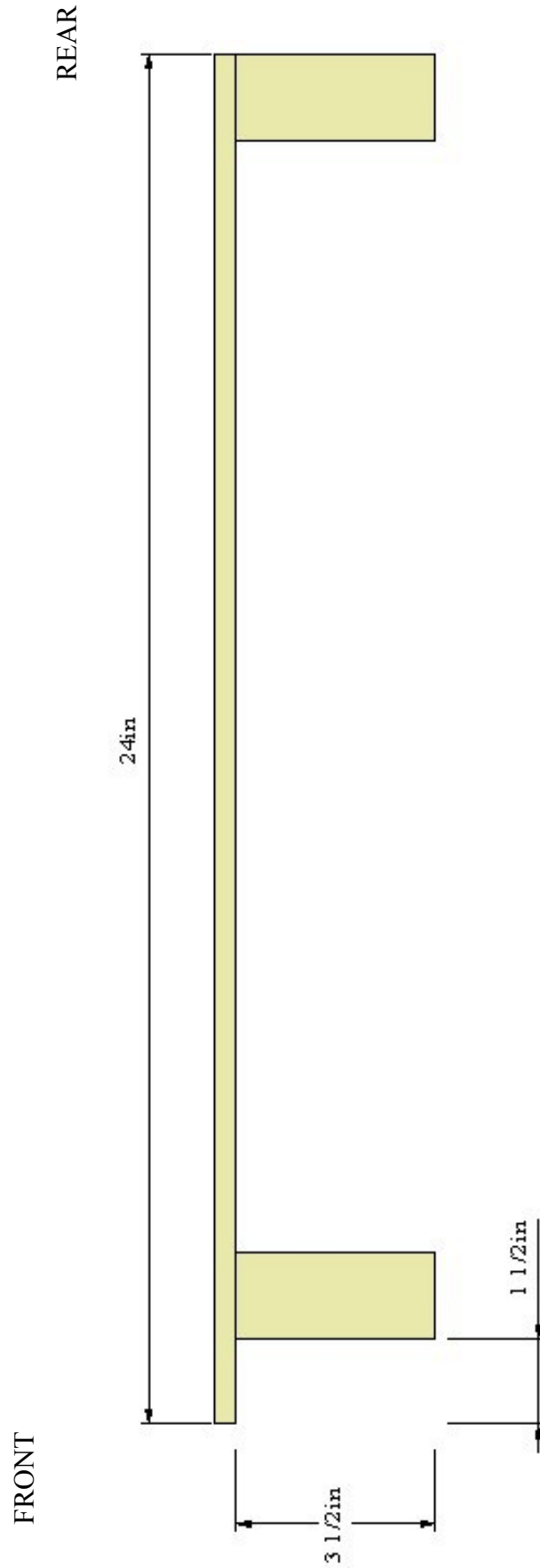


Figure 1: Seat Platform, Side View

Seat Lug Holes

Each van seat has five lugs that will fit in five holes in the Seat Platform. It's very important that the holes are drilled in the proper locations, see Figure 2. The holes are $\frac{1}{2}$ " in diameter, which makes them a little larger than the seat lugs so there is some room for measurement variations.

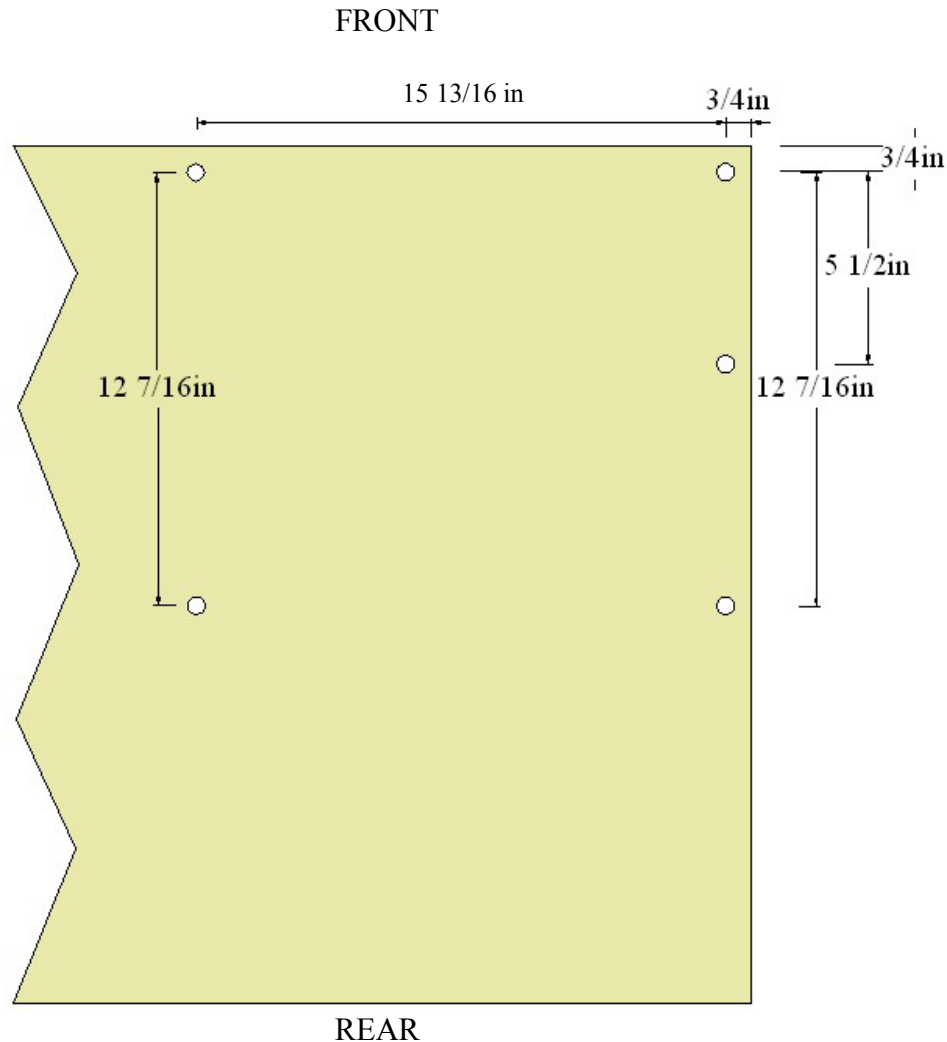


Figure 2: Seat Platform, Right Side, Top View

Step 1

To drill the holes first draw a line $\frac{3}{4}$ " from the front edge of the seat platform. Extend this line across the width of the Seat Platform. Next draw a line $\frac{3}{4}$ " from the right edge of the Seat Platform. Draw it all the way from the front to the rear of the platform. Repeat for the left edge.

DIY Dual Seats

The intersections of these lines define the center of the front lug holes on the outboard corners, but do NOT drill the holes yet. Use the front lug holes as the starting points for your measurements for the remaining lug holes on the outside edges. Note in Figure 2 that the locations of the remaining holes are measured from the center of the front lug hole, NOT from the edge of the platform (this increases the likelihood that the seat will fit the holes).

Step 2

Working back from the center of the front lug hole, measure $5 \frac{1}{2}$ " to the rear along the existing $\frac{3}{4}$ " line. This is the center of the second hole. Repeat the measurement on the opposite side.

Step 3

Again starting from the center of the front lug hole, measure $12 \frac{7}{16}$ " (twelve and seven-sixteenths) to the rear along the existing $\frac{3}{4}$ " line. This is the center of the third hole. Measure this along both edges, and extend your measurement line across the entire width of the platform. This will help with Step 4.

Step 4

Next measure along the front edge of the platform for the remaining front lug holes. Start at the center point of the front corner lug hole and measure $15 \frac{3}{16}$ " across the front of the platform along the existing line $\frac{3}{4}$ " from the front edge.

* Remember, measure from the center of the front corner lug hole, not from the edge!

We recommend that you extend your measurement line across the length of the platform from front to back. This extended line will intersect with the line you drew in Step 3 to define the location of the last lug hole. Repeat for the opposite side, see Figure 3.

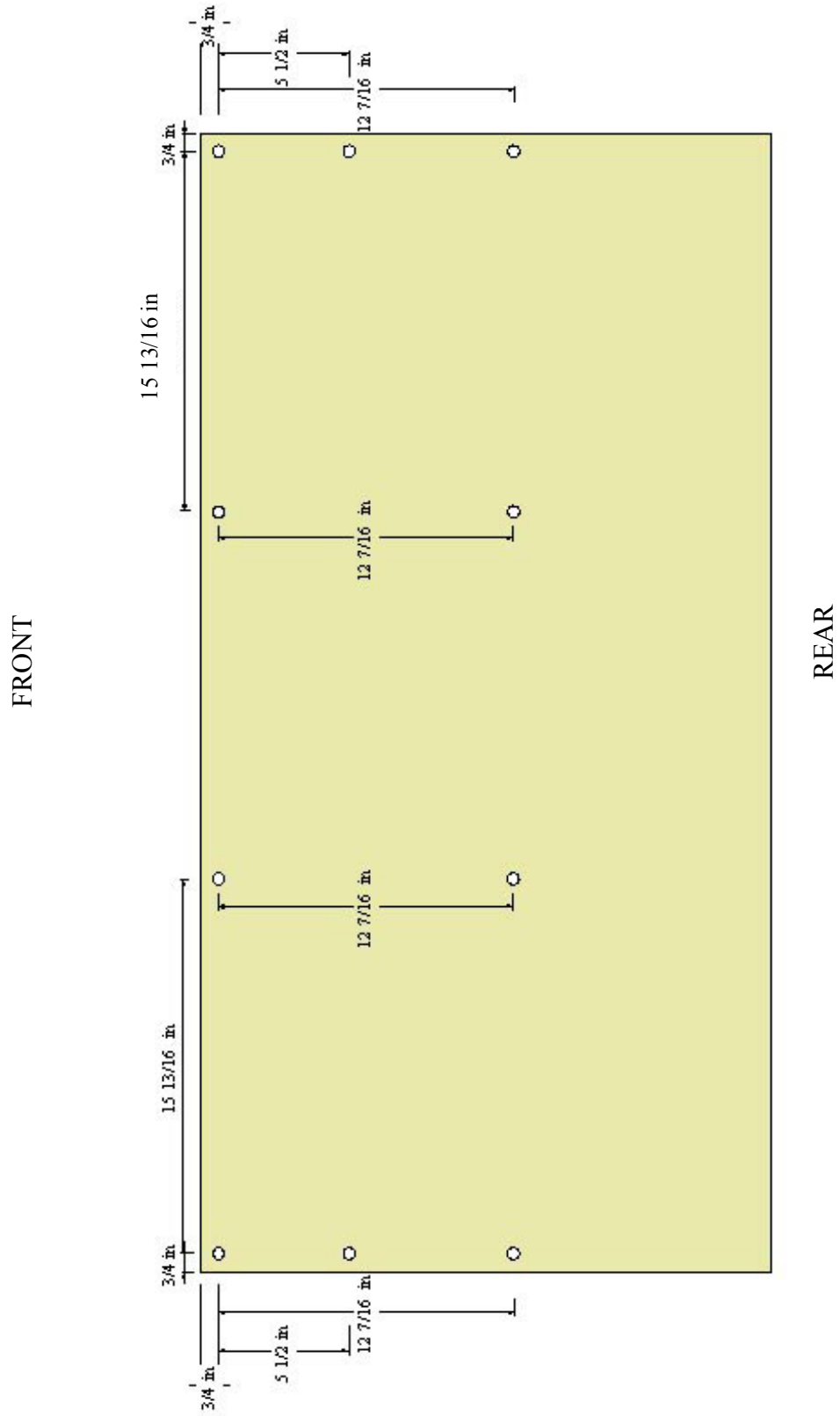


Figure 3: Seat Platform, Top View

Step 5

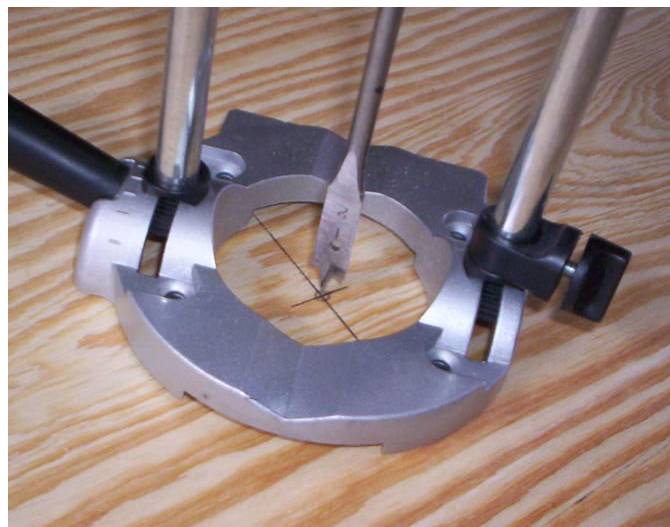
Before drilling any holes, double-check your measurements with the actual seats. Pick up the seats and place them on the platform.

CAUTION: avoid placing a lot of weight on the Seat Platform for now
Both seats have built-in armrests. These should go on the outside. The seat lugs should line up with your measurements on the platform.



Step 6

Drill all lug holes using a 1/2" drill bit.



DIY Dual Seats

Place the seats on the Seat Platform to test the fit, but don't sit in them yet! The Seat Platform cannot support a lot of weight until the support wedges are installed.

Screw on the front lug nuts to verify that there is adequate clearance from the front support board.



Support Wedges

The support wedges serve two purposes. First, they provide structural support to the Seat Platform and second, they tilt the seats to the same angle that exists in the Dodge Caravan. The manufacturer designed these seats to sit at this exact angle to ensure comfort and proper operation of the seat rails.

The seat wedges are cut from the 2x8 board, see Figure 4.

Start by cutting the board into four pieces 19 1/2" in length.

Measure 6 1/2" down from the top on one side and mark it with a pencil. Measure 3 3/4" down from the top on the other side, mark it, and draw a line to connect the two pencil marks. Cut from the bottom corner to the 3 3/4" pencil mark to complete the bottom 19 11/16" side.

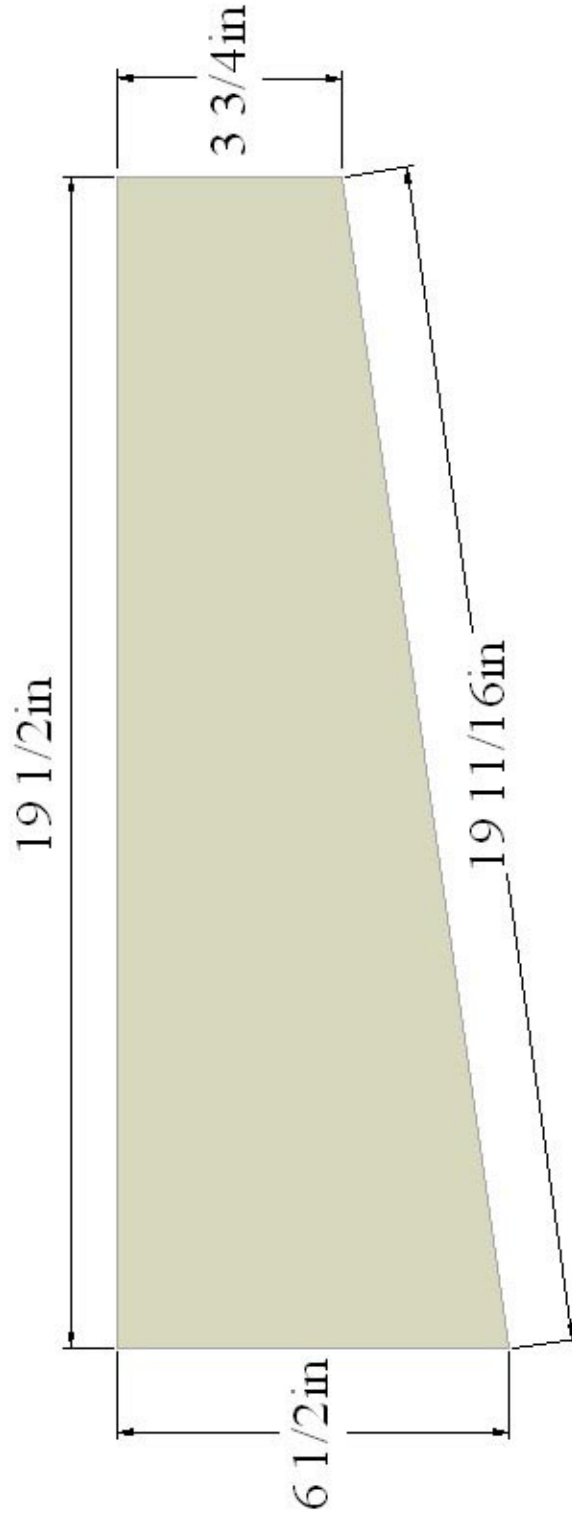


Figure 4: Support Wedge, Side View

DIY Dual Seats



The wedges should fit nicely into the existing seat platform as shown in Figure 5. Test fit the wedges. Some sanding or trimming may be necessary if the wedges are too long.

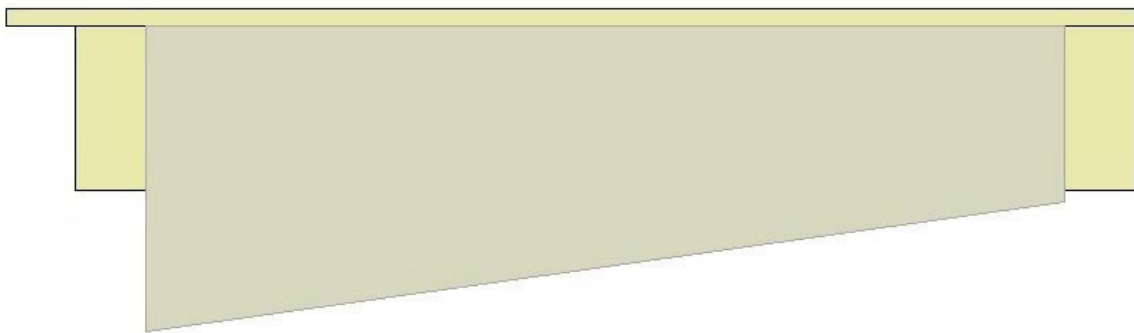


Figure 5: Completed Seat Platform, Side View

Attach the Support Wedges

Start with the two outboard support wedges. They should be attached 1 ½” from the outside edge of the Seat Platform.

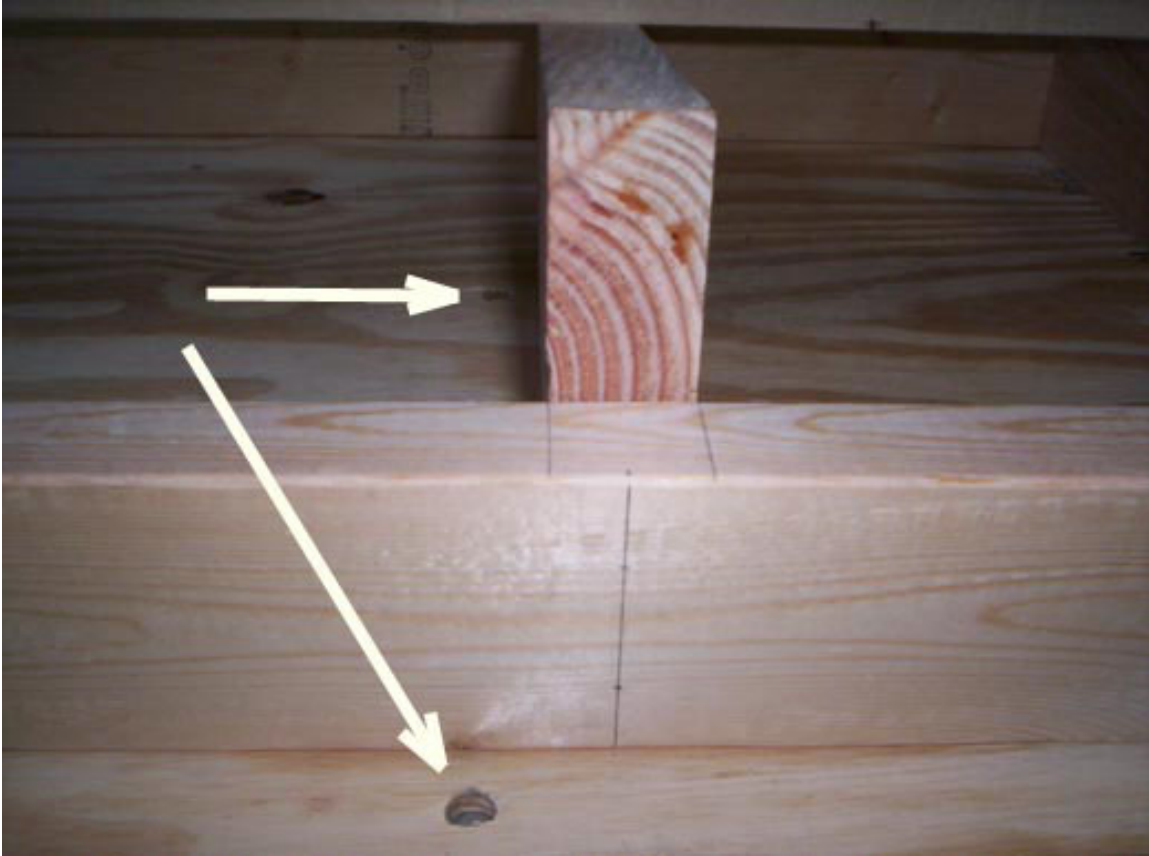
TIP: place a scrap 2x4 board on the outside of the wedge to help keep it exactly 1 ½” from the edge. This will allow adequate clearance from the seat lug nuts.



Drill straight pilot holes and attach both outside wedges to the Seat Platform using 2 ½” deck screws. Attach with two screws in the front, two in the back and five along the top.

DIY Dual Seats

Next, attach the inboard support wedges. Turn the platform upside-down. The outside of the support wedge is 14 1/4" from the outside edge of the Seat Platform. It can be less than this, but definitely no more. The main idea is to provide enough clearance between the inboard support wedge and the seat lug nuts.



This picture shows adequate clearance from the lug holes.

DIY Dual Seats



TIP: use a scrap 2x4 to keep the inboard wedges aligned with the outside wedges. Place the scrap 2x4 across the support wedges to keep them aligned. Drill straight pilot holes in the front and back and screw in the 2 ½" deck screws.

Next, turn the Seat Platform right-side-up. Screw in five more deck screws to attach the plywood platform to the inboard support wedge. Repeat for the opposite side.



Next, test fit the seats again.

A 3/8" flat washer must be on each seat lug between the seat rail and the plywood platform. The seat rails will not work properly without these washers.

Tip: use tape to hold the washers to the seat rail while attaching the seats to the plywood platform.

Place the seats on the Seat Platform and attach with the lug nuts. **Now you can sit in the seats!!** Test the seat adjustments. Slide the seat full forward and back. If you elect to add the optional Center Armrest, this will help with the seat adjustment because it gives the pilot something sturdy to hold on to while sliding the seat.

Re-attach the recliner lever to the seat and test the reclining action.

Note how sturdy the platform is!

DIY Dual Seats



Now you can sit in the seats! Do it! You know you want to!



Here is a close up picture of the seat lugs along the outside of the platform.
The seat rail is also clearly visible.

DIY Dual Seats



NOTE: If you plan to build the optional Center Armrest, skip ahead to that section. If not, then we recommend painting the seat platform for a more refined appearance.

Remove the seats and paint the Seat Platform gray primer.
Allow it to dry overnight.



The plastic inboard seat fairings need to be trimmed in order for them to fit properly. These are the plastic seat fairings that attach to the inboard side of the seats only!

Note: Do not trim the outboard seat fairings!

The amount to trim is illustrated in the above picture. I trimmed along the top of the blue tape with a jig saw.

DIY Dual Seats

Next, attach the inboard plastic seat fairings to the seats. It's not necessary to re-attach the rear screw underneath the carpet flap. Attach the recliner lever. Do not attach the outboard seat fairings yet.

Attach the seats to the Seat Platform. Remember, a 3/8" washer must be on each seat lug between the seat rail and the plywood platform. The seat rails will not work properly without these washers.

TIP: use transparent tape to hold the washers to the seat rail while attaching the seats to the plywood platform.

After the seats are bolted to the Seat Platform, verify they are working properly. Next, attach outboard plastic side fairings. The outboard side fairings will cover the outside edge of the seat platform and give it a professional appearance.



Congratulations! You are now the proud owner of professional and comfortable dual seats for your flight simulator adventures.

Load up your flight simulator and take off!

Center Armrest Instructions

These are instructions for building a Center Armrest for the Roger Dodger Seat Platform. This armrest provides a sturdy base for getting in and out of the seats. It is also a sturdy structure to hold on to while sliding the seats forward and back. The base of the armrest provides some clearance from the seat recliner lever.



Optional Center Armrest Materials

- 1 padded storage console & armrest, gray, JC Whitney item # ZX135862T \$39.99
- 1 2x4 board, 8' long
- 1 2x8 leftover board from Seat Platform project
- 8 10X metal screws, 2" long
- 6 ¼" full thread hex bolts, 3" long
- 6 ¼" – 20 hex nuts
- 6 ¼" lock washers
- 6 ¼" fender washers, 1" diameter
- 6 ¼" fender washers, 2" diameter

Replace the wing nuts on the padded storage console & armrest:

- 4 ¼" – 20 hex nuts
- 4 ¼" flat washers
- 4 ¼" lock washers

DIY Dual Seats

Tools Required

Drill

1/8" Drill Bit

1/4" Drill Bit

Ratchet wrench,

5/16" socket

7/16" socket

Tape measure and straightedge

Miter box saw

Pencil

Screwdrivers

Tools Recommended

Chop saw or Circular saw with saw guide.

Drill guide (to help drill straight holes).

Jig saw

Bar clamp

Electric screwdriver

Paint (gray primer)

Paintbrush



JC Whitney item # ZX135862T \$39.99

Armrest Base

The armrest base provides a secure foundation for the padded storage console & armrest and allows it to be fastened to the Seat Platform.

Step 1

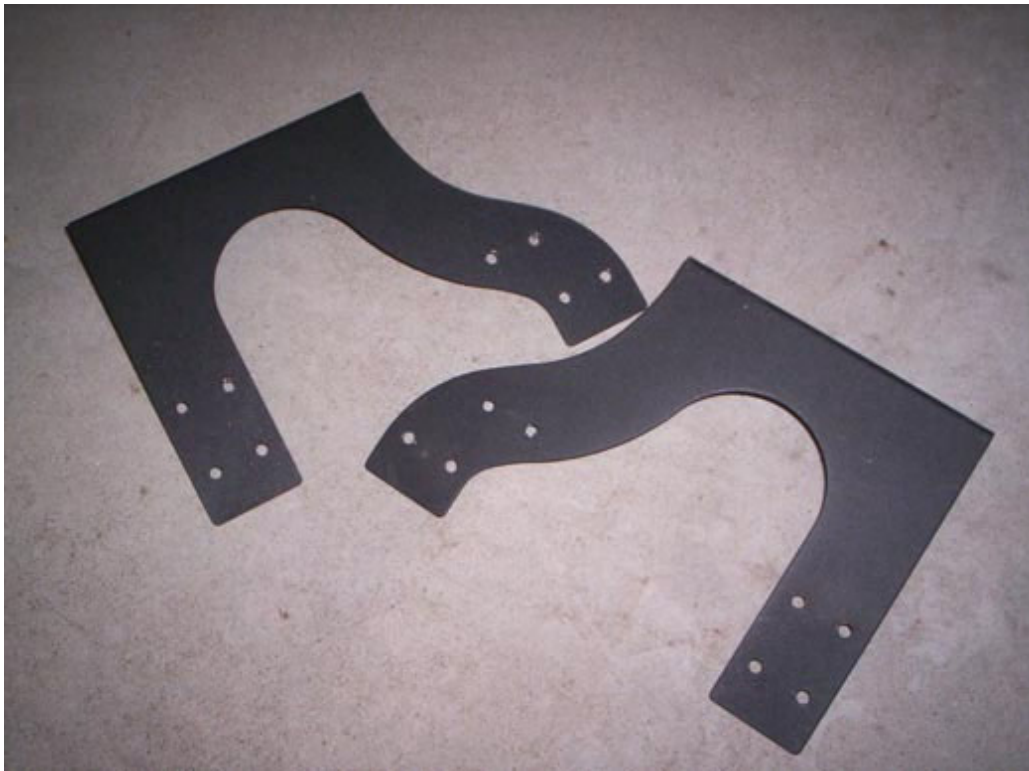
Cut the 2x4 board into 3 short boards, each 12” long. Attach these 3 short boards together using deck screws. Note: do not place deck screws where they would block the screw holes for the padded storage console & armrest.



Step 2

Remove the metal brackets from the padded storage console & armrest. Note that little wing nuts are used to attach these parts. We strongly recommend replacing these with nuts, washers and lock washers.

The metal brackets of the padded storage console & armrest include two holes on each side to bolt it to the base. This is not adequate to secure it to the base. Drill 6 additional holes as shown on each armrest bracket as shown. Use the 1/4" drill bit.



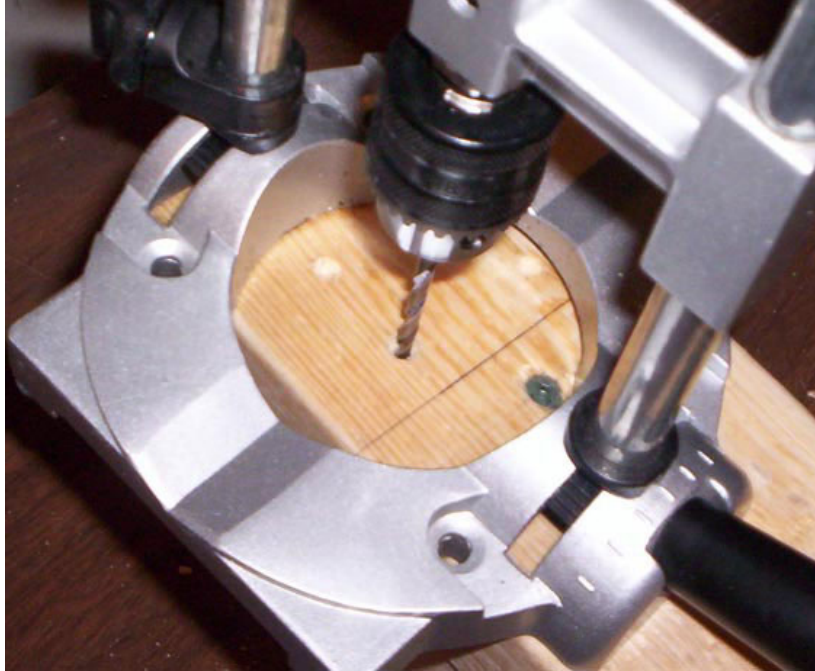
Step 3

The metal brackets of the padded storage console & armrest will straddle the 2x4 block from Step 1. Place the metal brackets along the side of the 2x4 block. The front edge of the front bracket leg should be $\frac{1}{2}$ " from the front of the 2x4 block. Trace around the legs with the pencil.

TIP: I prefer to drill the pilot holes exactly in the center of the holes in the metal brackets. I start with an oversized drill bit, and drill just a little bit into the surface of the wood to create a shallow "cone" in the wood. The center of this cone is the center of the hole in the metal bracket. Now use a $\frac{1}{8}$ " drill bit to drill the pilot holes for the 10X 2" metal screws.



Drill pilot holes into the 2x4 block for the machine screws.



Step 4

Cut the 2x8 board into a 12" length. This will be the base that attaches to the Seat Platform.



Center the 2x4 block under the 2x8 board and drill a 1/8" pilot hole through the bottom of the 2x8 plate into the bottom of the 2x4 block. Attach the 2x8 board to the 2x4 block with a deck screw to help secure it. Drill the remaining 5 pilot holes with the 1/8" bit.

Remove the deck screw and separate the two pieces for now.

Step 5

Next you will drill ¼” bolt holes into the 2x8 board and the Seat Platform.

Start by marking measurement lines ¾” from the sides of the 2x8 board. Three bolts on each side will be aligned on this line. That gives adequate clearance from the 2x4 block that will be attached later.

Next, mark measurement lines 1” from the front and rear of the 2x8 board. The intersections of these lines are the center points for the corner bolt holes. Drill one front bolt hole with a ¼” bit. Use a drill guide to make the hole straight. Drill just one hole for now.

Mark a measurement line 6” from the front of the 2x8 board. Draw the line across the width of the board. This defines the location of the center bolt holes.

Next, place the 2x8 board on the Seat Platform. The front of the 2x8 board should be 3 ½” from the front edge of the Seat Platform and centered.

Use the 2x8 board as a template for drilling the holes into the Seat Platform. One hole is already drilled through the 2x8. Hold the 2x8 board securely and in the proper location and drill through the existing hole into the Seat Platform.



DIY Dual Seats

Attach with a ¼” full thread hex bolt as shown in the picture. This helps keep the board in the proper location.

Next, drill the remaining 5 bolt holes through the 2x8 board into the Seat Platform. For now, remove the 2x8 board from the Seat Platform.

All holes are drilled now.

Step 6

Attach the 2x4 block to the 2x8 board using all six deck screws. Paint the Seat Platform and armrest.

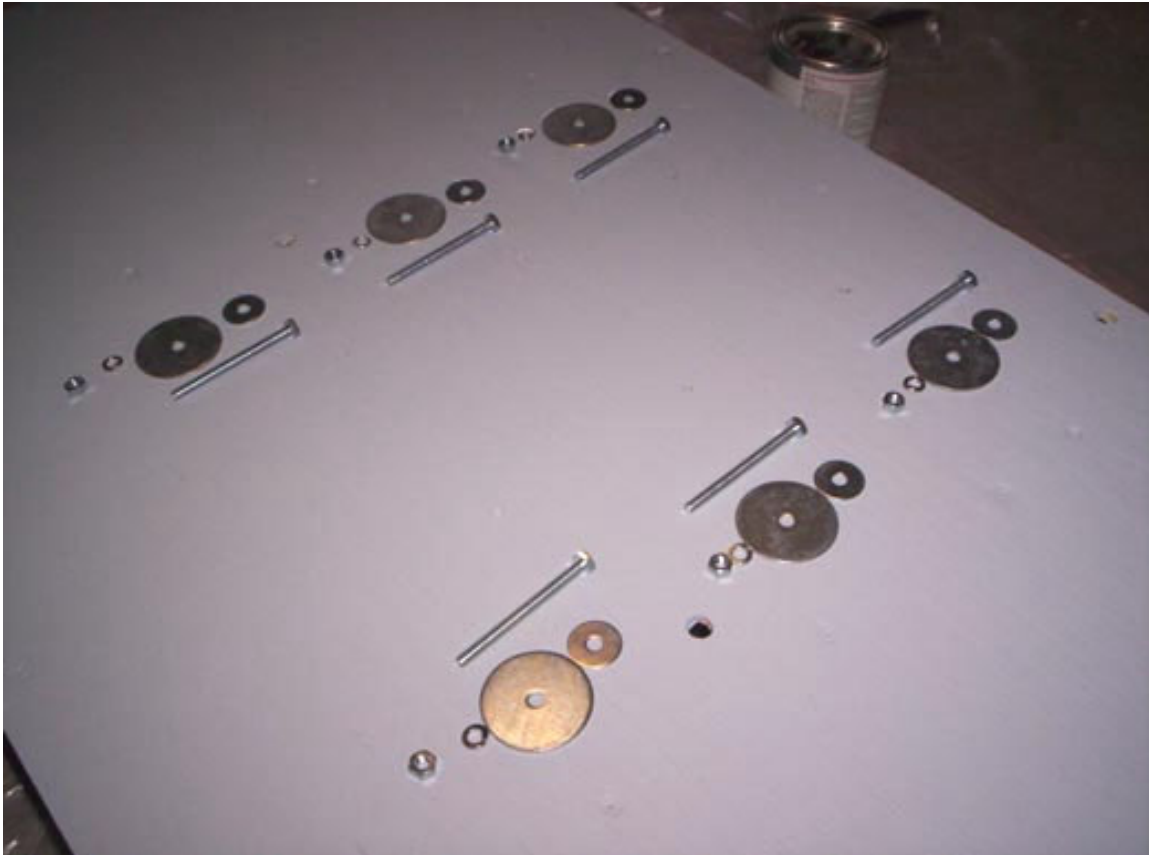
We recommend painting the seat platform and armrest base for a more refined appearance. Paint the seat platform and armrest base with gray primer and allow them to dry overnight.



Step 6

Attach the armrest base to the Seat Platform using

- 6 1/4" full thread hex bolts, 3" long
- 6 1/4" – 20 hex nuts
- 6 1/4" lock washers
- 6 1/4" fender washers, 1" diameter
- 6 1/4" fender washers, 2" diameter



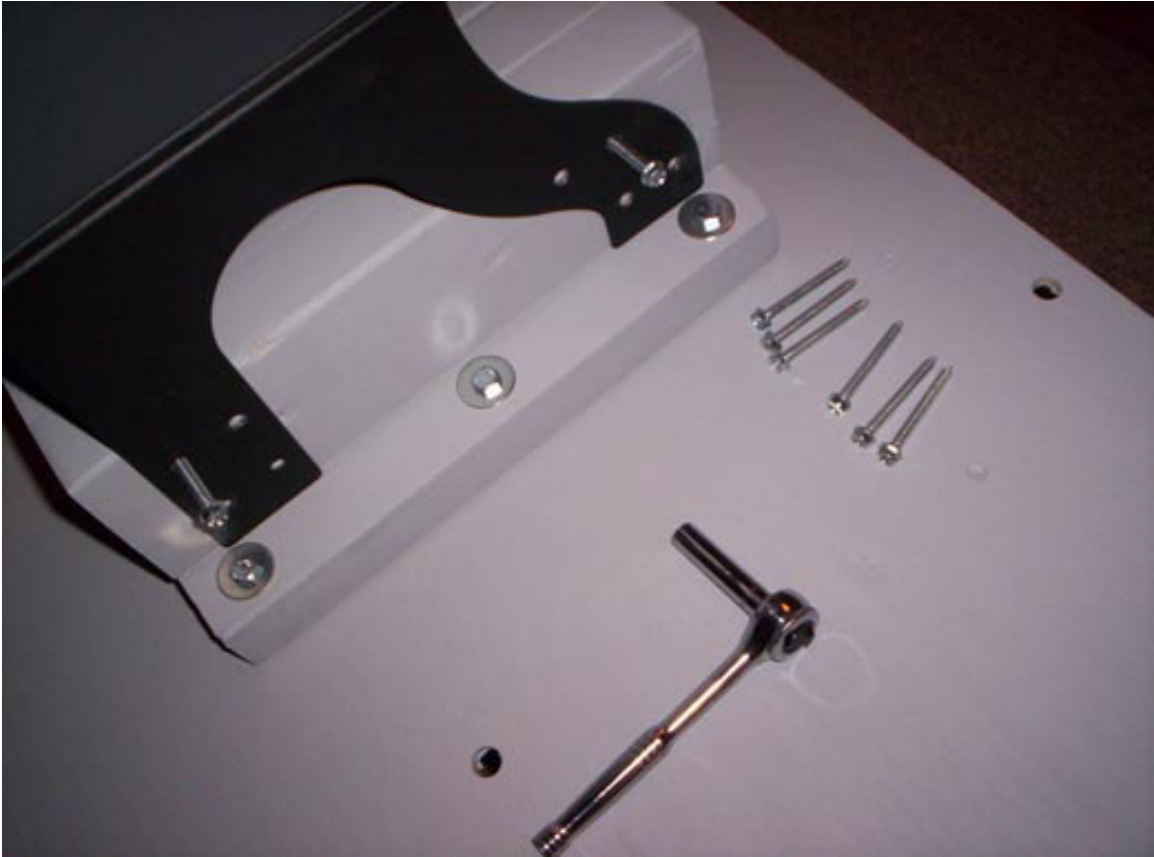
Attach the metal brackets to the padded storage console & armrest.

Replace the wing nuts on the padded storage console & armrest:

- 4 1/4" – 20 hex nuts
- 4 1/4" flat washers
- 4 1/4" lock washers

Adjust the distance between the brackets so that it will straddle the 2x4 block.

DIY Dual Seats



Attach the padded storage console & armrest bracket to the 2x4 block with the 10X 2" metal screws.



The plastic inboard seat fairings need to be trimmed in order for them to fit properly. These are the plastic seat fairings that attach to the inboard side of the seats only!

Note: Do not trim the outboard seat fairings!

The amount to trim is illustrated in the above picture. I trimmed along the top of the blue tape with a jig saw.

Next, attach the inboard plastic seat fairings to the seats. It's not necessary to re-attach the rear screw underneath the carpet flap. Attach the recliner lever. Do not attach the outboard seat fairings yet.

Attach the seats to the Seat Platform. Remember, a 3/8" washer must be on each seat lug between the seat rail and the plywood platform. The seat rails will not work properly without these washers.

TIP: use transparent tape to hold the washers to the seat rail while attaching the seats to the plywood platform.

After the seats are bolted to the Seat Platform, verify they are working properly. Next, attach outboard plastic side fairings. The outboard side fairings will cover the outside edge of the seat platform and give it a professional appearance.

DIY Dual Seats



The center armrest makes it easy to slide the seats forward,
and helps with those white knuckle flights!

Congratulations! You are now the proud owner of professional
and comfortable dual seats for your flight simulator adventures.

Load up your flight simulator and take off!