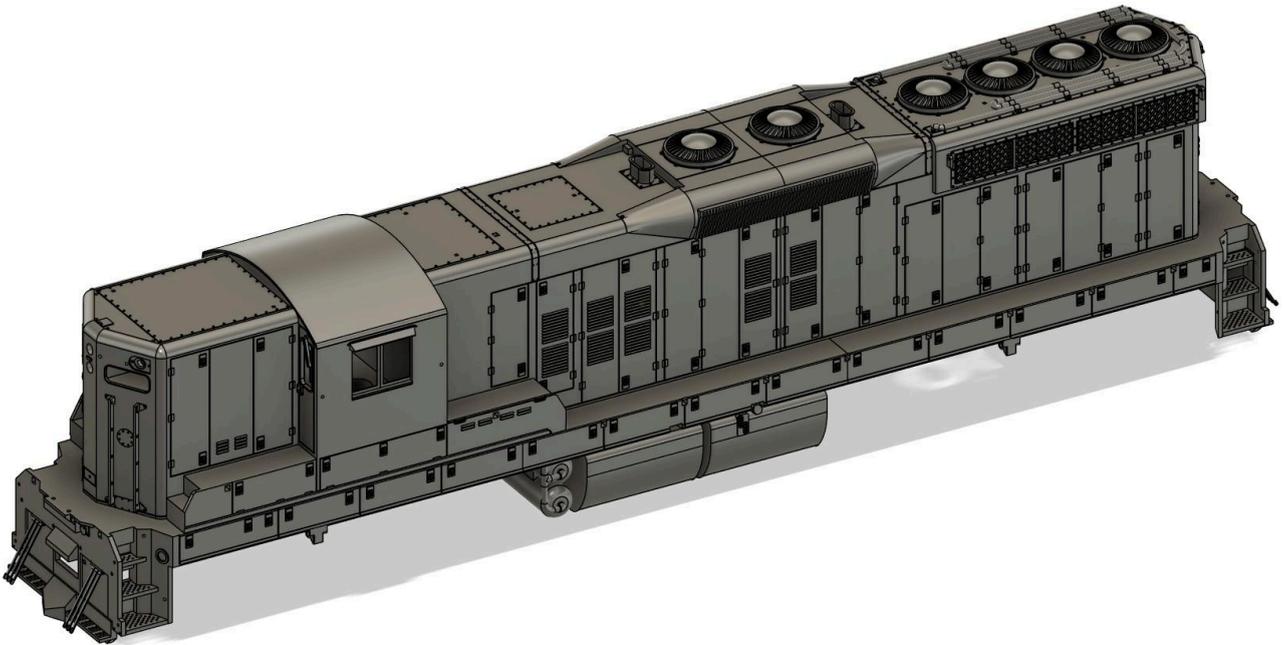




# 1:29 Scale EMD SD7/9

## Assembly Guide

Version: 1.0



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**Date:**

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## 1. Getting Started

Please verify you have the latest version of this document!

Thank you for choosing my model! This is a 1:29 scale model of the EMD SD7/9. The majority of this model is made with 3D printing, however, there are numerous pieces that you will need to source in order to complete the model.

### 1.1. Hardware List

Optional?	Supplier	Part Number	Description	Qty.
No	USA Trains	R22-422	SD40 Replacement Motor Truck	2
No	USA Trains	R22-438	SD40 End Truck Mounting Bracket	2
No	USA Trains	R22-431	SD40 TRUCK MOUNT BLOCK	2
No	USA Trains	R22-424	SD40 TRUCK SIDE FRAME (2) COLOR?	2

No	USA Trains	R22-142	GP7/9 LED BASE/LED GLASS (4) COLOR?	1
No	USA Trains	R22-130	GP7/9/38 BRASS LIFT RINGS (14) COLOR?	1
No	USA Trains	R22-125	GP7/9 FOLDING END STEP (2) COLOR?	1
No	USA Trains	R22-11A	WIRE HARNESS	2
No	USA Trains	R22-476	GP9/GP30/GP38 SINGLE AIR HOSE	2
No	USA Trains	R22-126	GP7/9 COUPLER LIFT BAR/4 EYELETS	2
Yes	USA Trains	R22-139	GP7/9 FRONT HEADLIGHT CIRCUIT BOARD (676-X005)	1
Yes	USA Trains	R22-140	GP7/9 REAR HEADLIGHT CIRCUIT BOARD (676-X005)	1
Yes	USA Trains	R22-109	GP/9 LENS COVER	2
Yes	USA Trains	R22-127	GP7/9 NUMBER BOARD LIGHT BULB	4
Yes	USA Trains	R1407-X004	GP7/9/30/PA MAIN CIRCUIT BROAD SWITCH PANEL (UPGRADE)	1
No	Amazon or Other		Brass Heat-Set Inserts; Size: M3 x 5mm diameter (nominal) x 6mm long (total length). Shorter can be used	40
No	Amazon or Other		M3x8 Pan Head Screw	50
No	Amazon or Other		6mm x 2mm magnets	10
No	Hardware Store		¼" x 20-3/8" (517mm) steel rods. Aluminum could be used. Steel recommended for added weight.	2
No	Hardware Store		⅛" x 2" (50.8mm) steel rods	4
No	Harbor Freight or Other		Spring from <a href="#">Harbor Freight Assortment</a> . Only 2 springs needed. The size listed in the kit is: Compression ⅜" x ⅝". I can't vouch for other brand springs with this size.	1
No	K&S Metals		3/64 x 12" Brass rod 4pc pack	2
Yes	Kadee	907	Kadee #907 Coupler set	1
No	Varies		Adhesive for gluing frame and Long Hood pieces	1

			together. Dependent on chosen filament material. (I used JB Weld Plastic Bonder for PETG)	
No	Varies		Super glue and/or Super glue Gel. To be used for gluing on detail parts	1

## 1.2. Printing

- All of the printing for this model was done using Bambu Slicer on a Bambu Lab A1 printer. Please take into consideration that when using another printer or slicer, you may have different results for quality and tolerances.
- I highly recommend using my print profile (the .3mf file) to print all of the pieces. You will need Bambu Slicer or Orca Slicer (or other skin of Orca Slicer) to open the .3mf file. If you still prefer a different slicer, please at least open up the .3mf file to see the print settings, print orientation, and support placement.
- A smooth buildplate is recommended for all prints. I used a G10 (garolite) buildplate. Smaller pieces will most likely need an adhesion promoter such as hairspray, glue stick, or Nano Polymer from Vision Miner (what I used).
- The majority of the pieces can be printed with a 0.4mm nozzle. However there are small detail pieces that must use a smaller 0.2mm nozzle in order to print correctly. In the .3mf file, I have labeled the build plates where a 0.2mm nozzle is needed.
- If using a Bambu Lab printer, I recommend the Bambu preset of “0.16mm High Quality” and “0.08mm High Quality” for all 0.4mm & 0.2mm nozzles, respectively. You can go lower on the layer height if you choose, but stick with the “High Quality” presets because they run at a slower speed. The others will result in loss of quality and accurate fitment of parts.
- I chose Bambu Lab PETG HF for my prints (If you are going to use the same, remember to pre-dry your filament using a filament dryer as this stuff is very sensitive to moisture). Other filament types can be used, but be aware of the environment the model will be used in.
- A couple detail components are meant to be printed with a flexible filament. I used black TPU (unknown brand).

## 1.3. Print List

Component	Notes	Print Quantity
Frame A	Version with swing coupler still in development	1
Frame B		1

Frame C	Version with swing coupler still in development	1
Truck Mounting Plate		2
Truck Mounting Washer		2
Truck Slider Plate		2
Truck Slider Bushing		2
Truck Slider Spring Cup		2
Sideframe LH END A	Long Hood End; Side A	1
Sideframe LH END B	Long Hood End; Side B	1
Sideframe CAB END A	Cab End; Side A	1
Sideframe CAB END B	Cab End; Side B	1
Side Frame Bearing Journal	Optional Speedometer Journal in development	8
Main Tank		1
Aux Tank	Optional to print, depending on your model	1
Air Tanks		1
Cab		1
Cab Roof		1
Short Hood		1
Long Hood Half 1	CHOOSE ONE: with or without Dynamic Brake Blister	1
Long Hood Half 1 wDynamic	CHOOSE ONE: with or without Dynamic Brake Blister	1
Long Hood Half 2	CHOOSE ONE: with or without Dynamic Brake Blister	1
Long Hood Half 1 wDynamic	CHOOSE ONE: with or without Dynamic Brake Blister	1
Radiator		1
Number Board	Will require design work to add your custom number	1
Radiator Piping		1
Pilot Step		2

Exhaust Stack		2
Tank Pipe L		1
Tank Pipe R		1
Dynamic Grill	Not needed if no dynamic brake blister	2
Stanchion		28
Hand Rail Tee Connector		4
Hand Brake		1
Ladder Rail L	L and R are very similar, but not the same	4
Ladder Rail R	L and R are very similar, but not the same	4
MU Socket		2
Side Window Frame		2
Bottom Step A		2
Middle Step A		2
Top Step A		2
Bottom Step B		2
Middle Step B		2
Top Step B		2
Radiator Lift Ring		4
Window Wiper		4
Dual Headlight		2
Door Handle		2
3 Bell Horn		1
Side Window Visor	Optional	2
Radiator Grill		4
Fan Housing	4 if no Dynamic, 6 for Dynamic	4 or 6
Fan Blade	4 if no Dynamic, 6 for Dynamic	4 or 6
Fan Blade Washer	4 if no Dynamic, 6 for Dynamic	4 or 6
Air Hose Set	Print w/ TPU	4
Hand Rail Pilot Jig	Hand Rails on very ends of the pilots	1

SD9 Grab Iron Jig Bottom		1
SD9 Grab Iron Jig Top	This is a cover to aid in bending	1
Pilot Short Rail Jig	Short hand rail that connects using tee connector	1
Hand Rail Short Hood L Jig		1
Hand Rail Short Hood R Jig		1
Hand Rail Long Hood Cab End Jig		1
Hand Rail Long Hood L Pilot End Jig		1
Hand Rail Long Hood R Pilot End Jig		1

## 2. Assembly

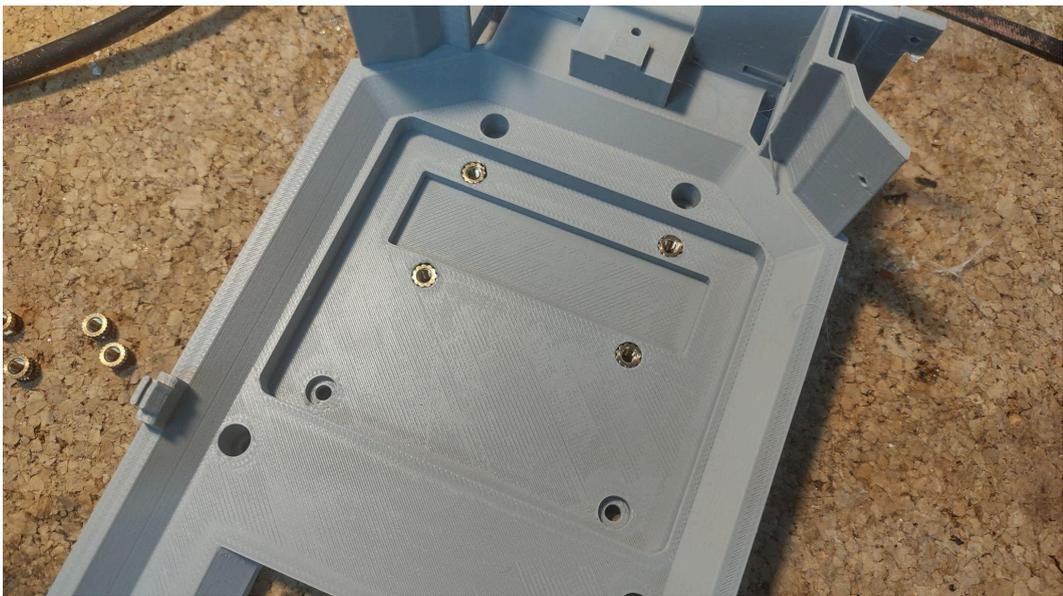
With pieces printed and cleaned up, please follow the steps needed to build your model.

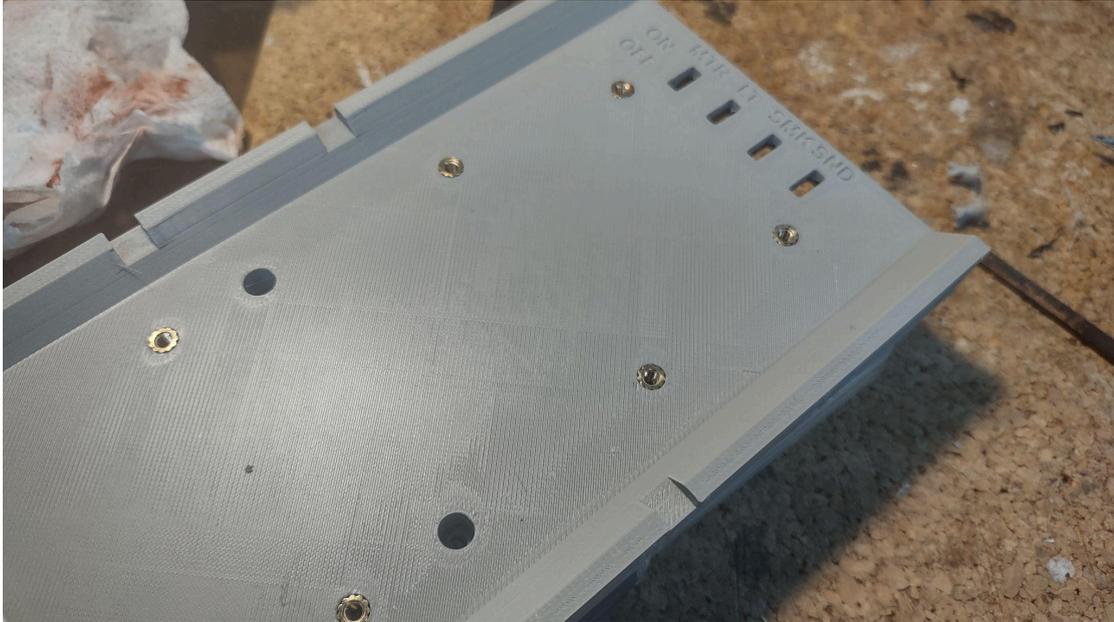
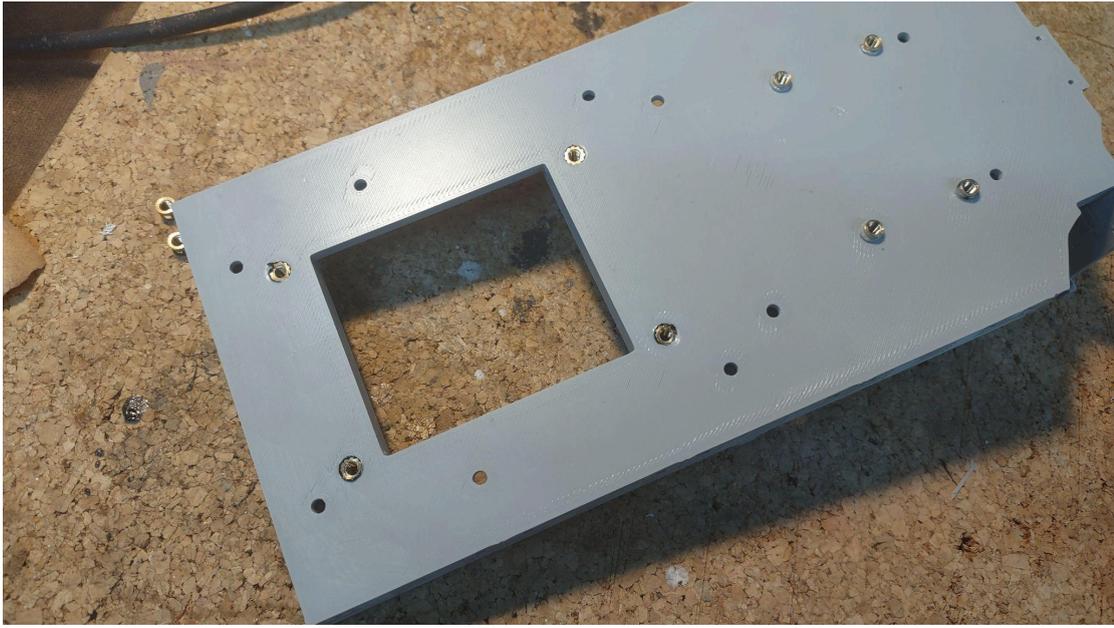
### 2.1. Chassis

1. Cut two  $\frac{1}{4}$ " steel rods to a length of  $20\text{-}\frac{3}{8}$ " (517mm)
2. Test fit the rods in Frame A, B, and C. Make sure that Frame B is facing the right way (all louvered doors are on the same side).
3. You can choose to use adhesive to glue the frame pieces together now, or later after body pieces have been test fitted (recommended). I used packing tape as a temporary way to hold them together.

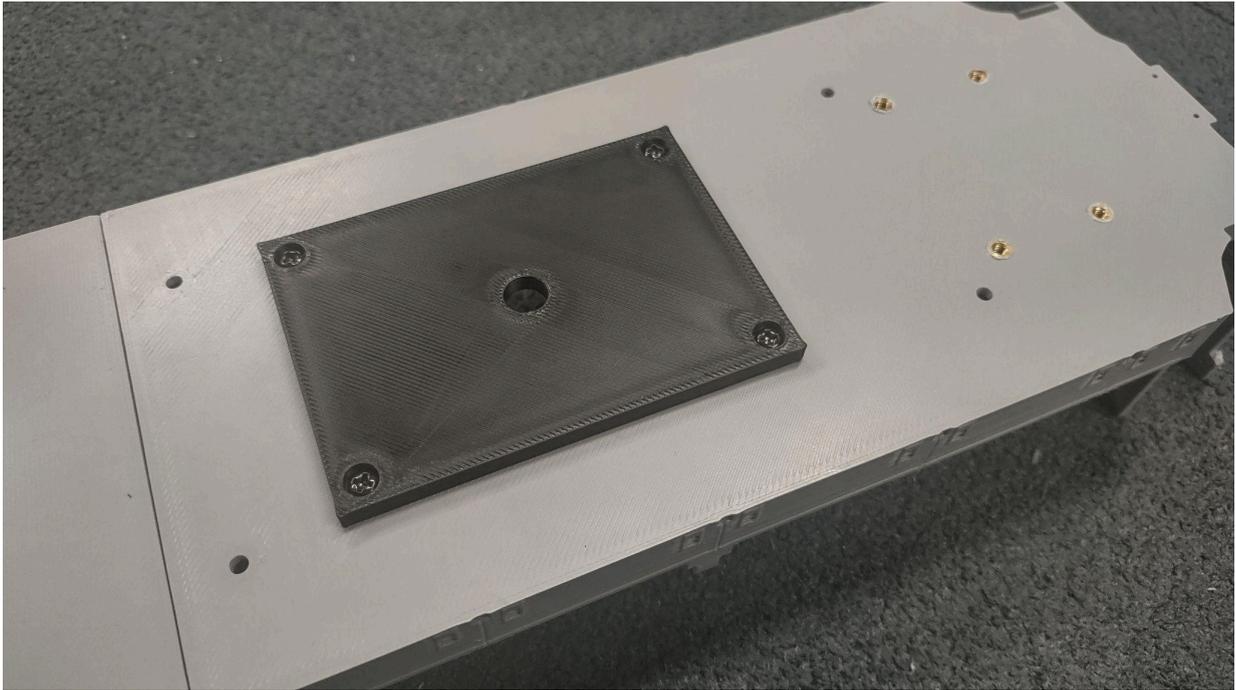


4. Install the melt-in threaded inserts as shown in pictures below. This model was designed to use M3 threaded inserts. All brands should have the same outside diameter for an M3 (about 5mm). Generally you'll find them between 4 and 6mm long. All of the holes are meant to accommodate the 6mm long inserts, but a shorter 4mm should work too. I purchased special soldering iron tips to install these inserts, but they can also be installed (carefully) with a regular soldering tip. NOTE: Be aware that the 4 threaded inserts closest to the pilots on Frame A and Frame C have 4mm through-holes. If a 6mm long insert is used, it will poke out the other side (as shown).

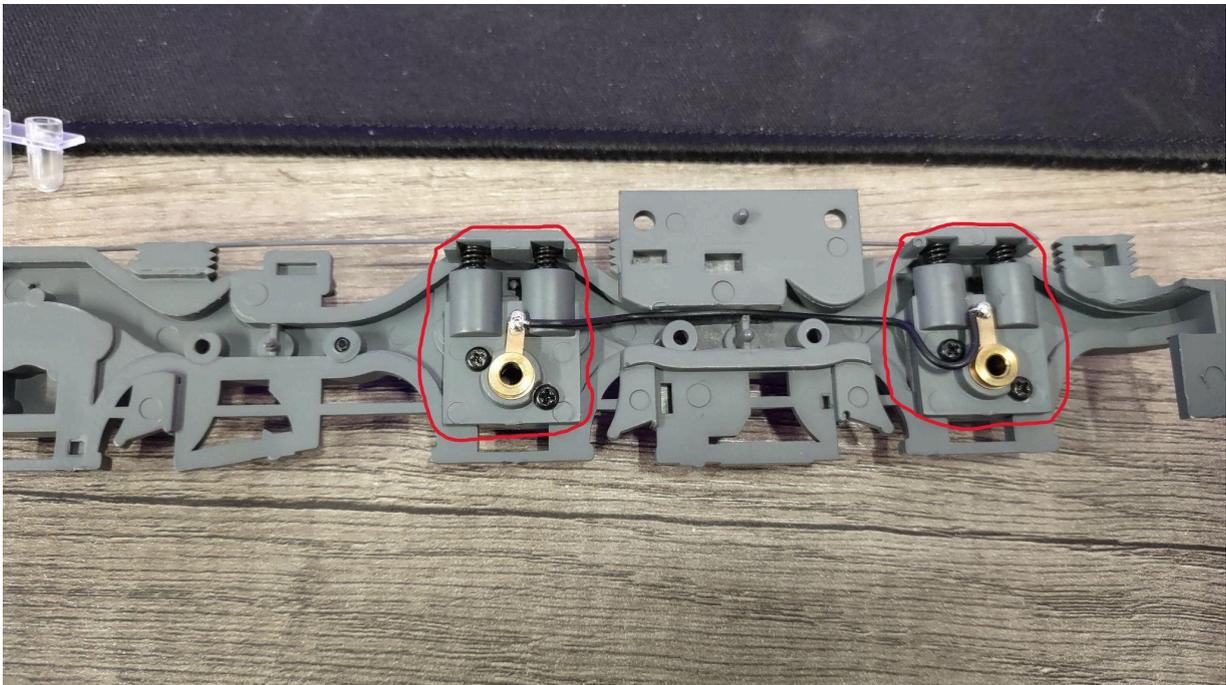


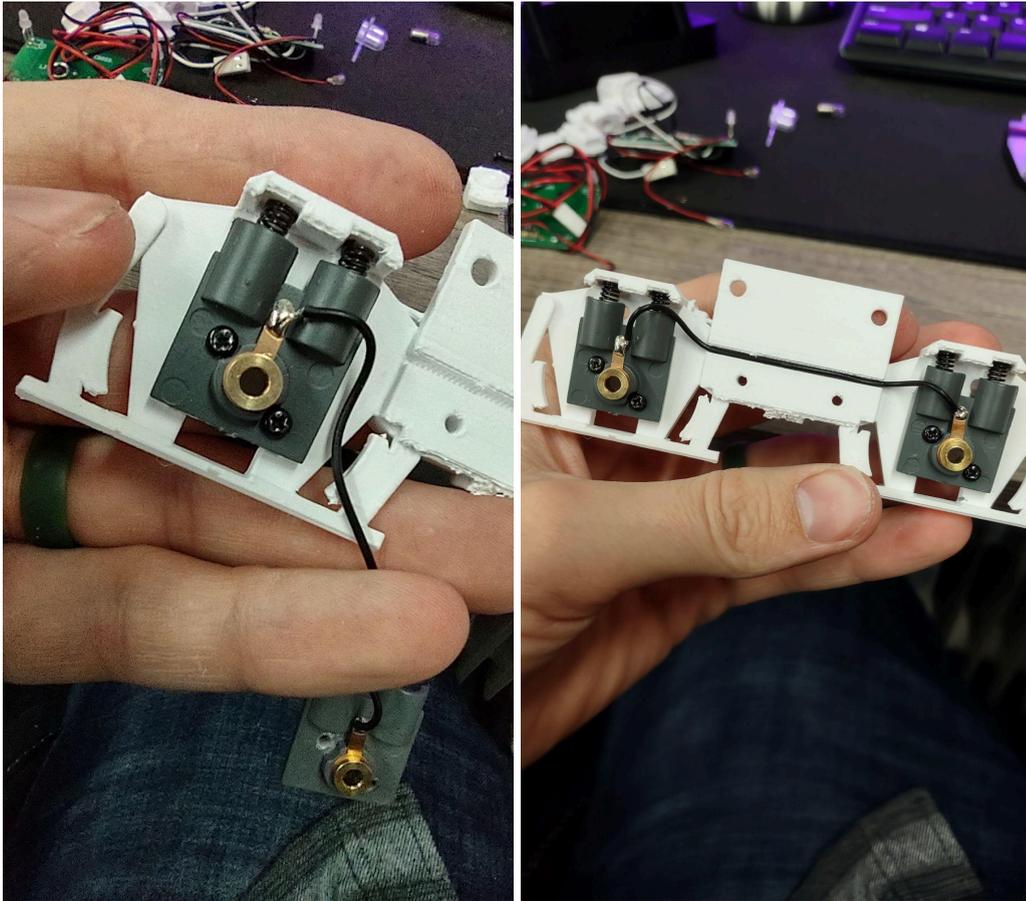


5. Use M3x8mm screws to install Truck Mounting plates.

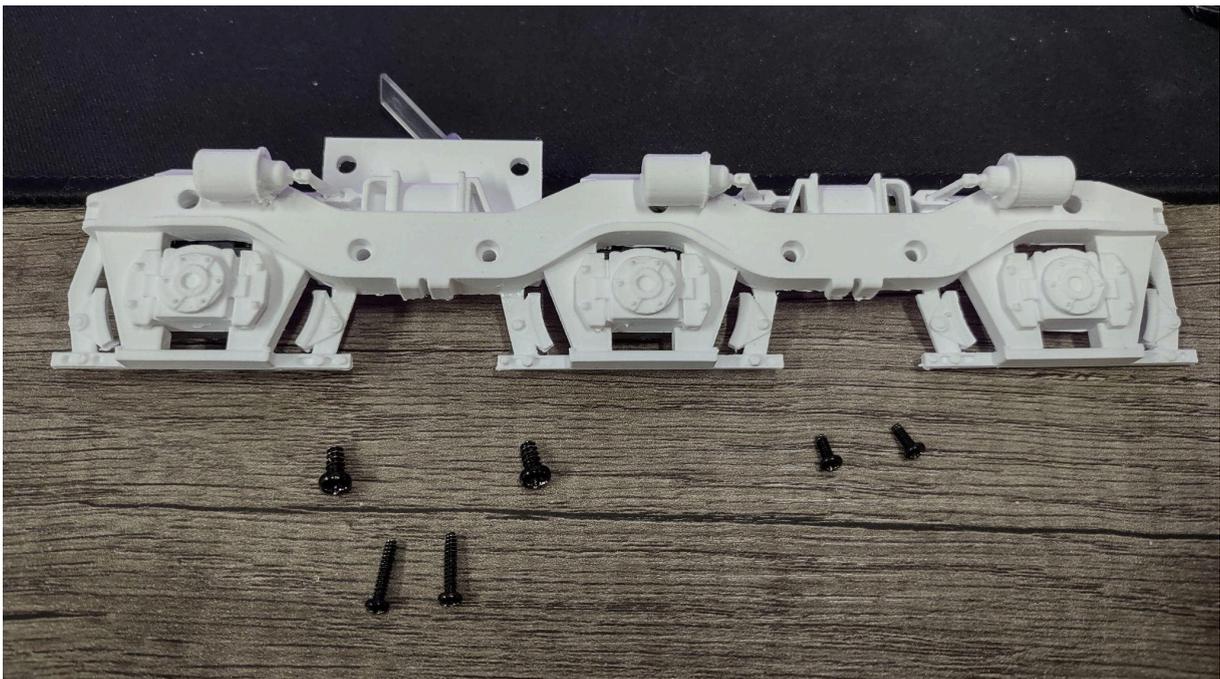


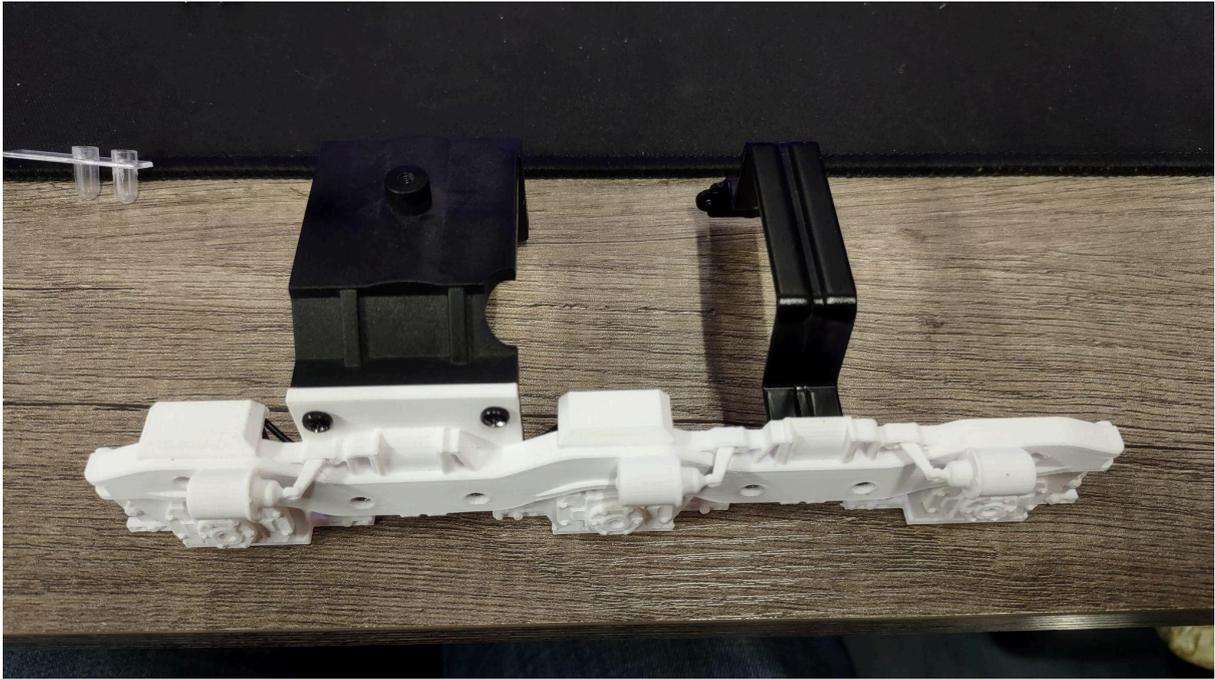
6. Remove bearing journals and springs from the USAT SD40 sideframes. Install them on the new SD7/9 sideframes with the new journals. Make sure they can move up and down freely. Route wires through the notch as shown.





7. Use the screws from the SD40 sideframes to attach one sideframe to the two USAT truck brackets. Make sure the notches on the Truck Mount Block R22-431 are facing toward the center axle.





8. Put the motor blocks in the side frame assembly, then install the second sideframe to complete the trucks.
9. Gather all of the truck sliding components: Truck Slider Plate, Truck Slider Bushing, Truck Slider Spring Cup, M3x8mm screw, and Spring. In order for the truck slider to work well, it must be able to slide freely. Use sandpaper to smooth out the surfaces where the bushing and spring cup will be sliding in the slot of the Truck Slider Plate.



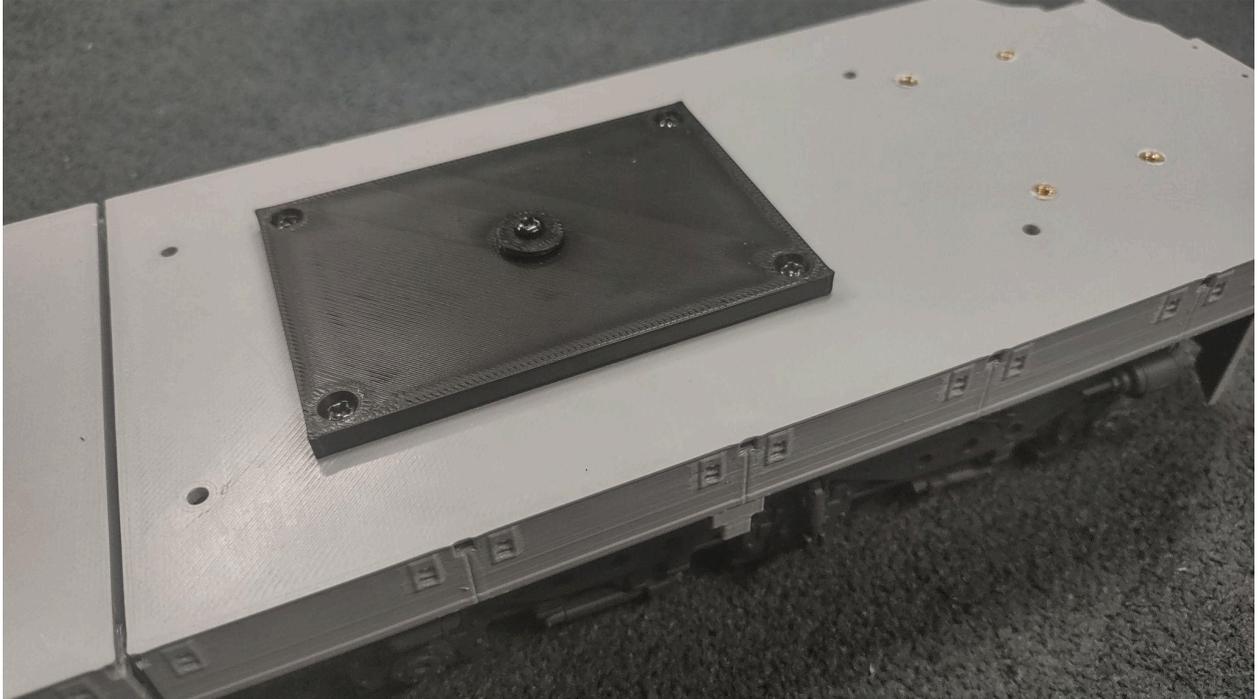


10. Assemble the truck slider components in this order: Screw, Truck Slider Bushing, Truck Slider Plate, Truck Slider Spring Cup, Spring. Screw this assembly to the floating axle on the motor block as shown. Tighten firmly but do not over-tighten! Ensure that the plate can slide easily back and forth. You may need to slide it a few dozen times to wear it in.

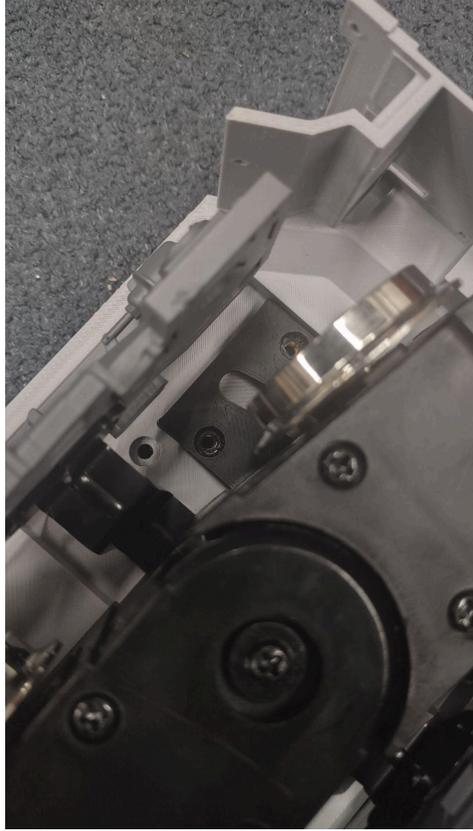


11. Install the trucks to the frame, but make sure the "Cab End" truck and "Long Hood End" truck are on the right ends (the

brake cylinders will hit the frame if they are reversed). The main pivot of the motor block will go into the hole of the Truck Mounting Plate. Use a M3x8mm screw, along with the Truck Mounting Washer. Tighten firmly but do not over-tighten!

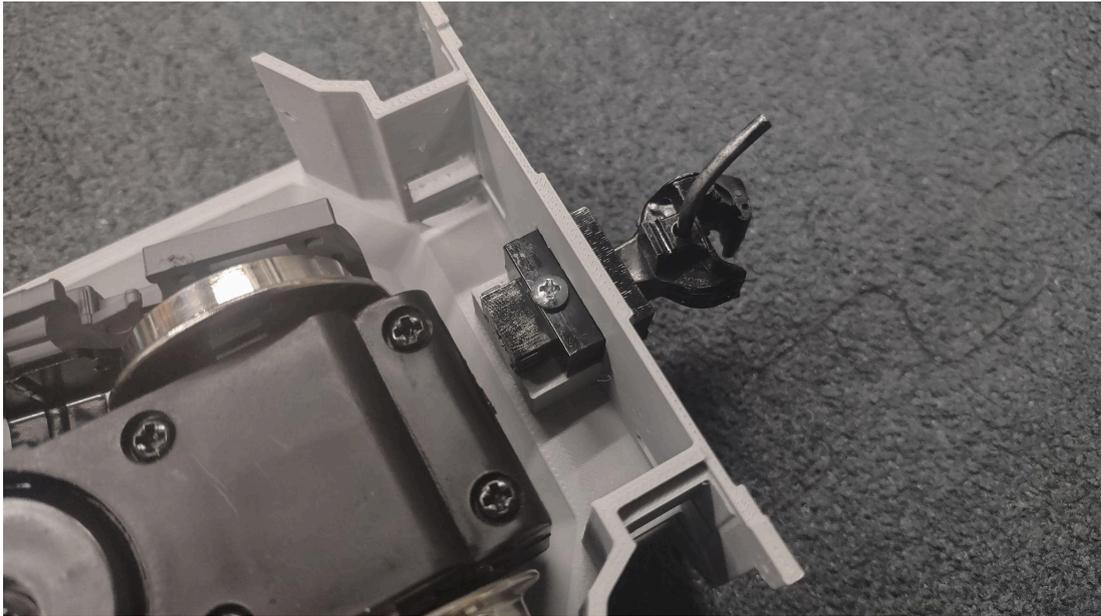


12. Install the slider plate to the frame with 4 M3x8mm screws. This can be tricky so have patience. Verify truck can pivot freely.



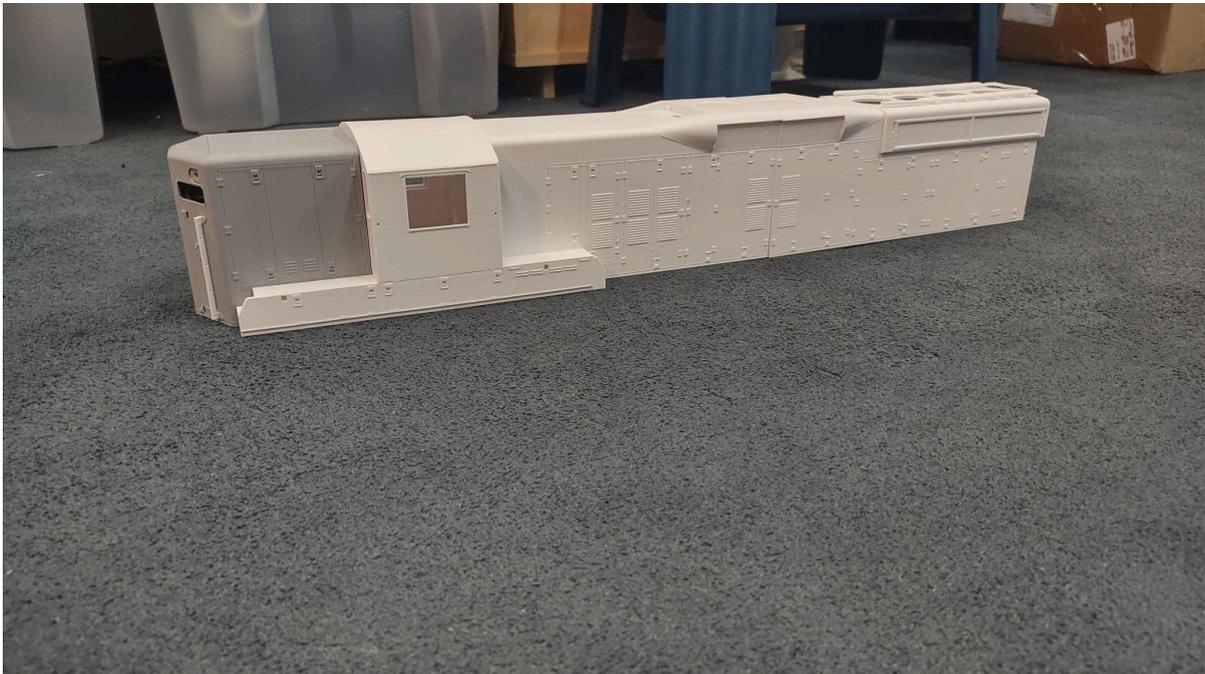
13. If using Kadee couplers, assemble a set of #907s. Cut the end of the box off as shown. Use the supplied long screw to install couplers to the frame.





## 2.2. Body

1. Assemble all pieces of the body for a test fitment. Be sure to cut out the X's on the Long Hood pieces.



2. Cut four  $\frac{1}{8}$ " steel rods to a length of 2" (50.8mm). Use these as locating pins between the two halves of the Long Hood. You can glue these halves together now, or wait until after all pieces have been test-fitted (recommended).

3. Install threaded inserts into the holes on the bottom of the Short Hood, Cab, and Long Hood pieces.
4. Use M3x8mm screws to attach body sections to the frame. The cab must be placed first. Make sure the large hole in the center of the cab is placed over the Truck Mounting Washer. For future reference: Trucks can be removed without disassembling the body.
5. Test the fitment of the Radiator on the Long Hood. Make sure it sits flush. Do the same with the Cab Roof.
6. Install magnets into the Radiator, Long Hood, Cab, and Cab Roof. Be aware of magnet polarity! It is easy to install a magnet backwards. Magnets may need to be pressed in or super glued depending on your printer/settings.



7. Main, Aux, and Air Tanks can be installed at any time, using M3x8mm screws.

### 2.3. Detail Parts

1. DETAIL PARTS SECTION COMING SOON!

### **3. Finishing and Miscellaneous**

This section is still in development as I'm still building my model.