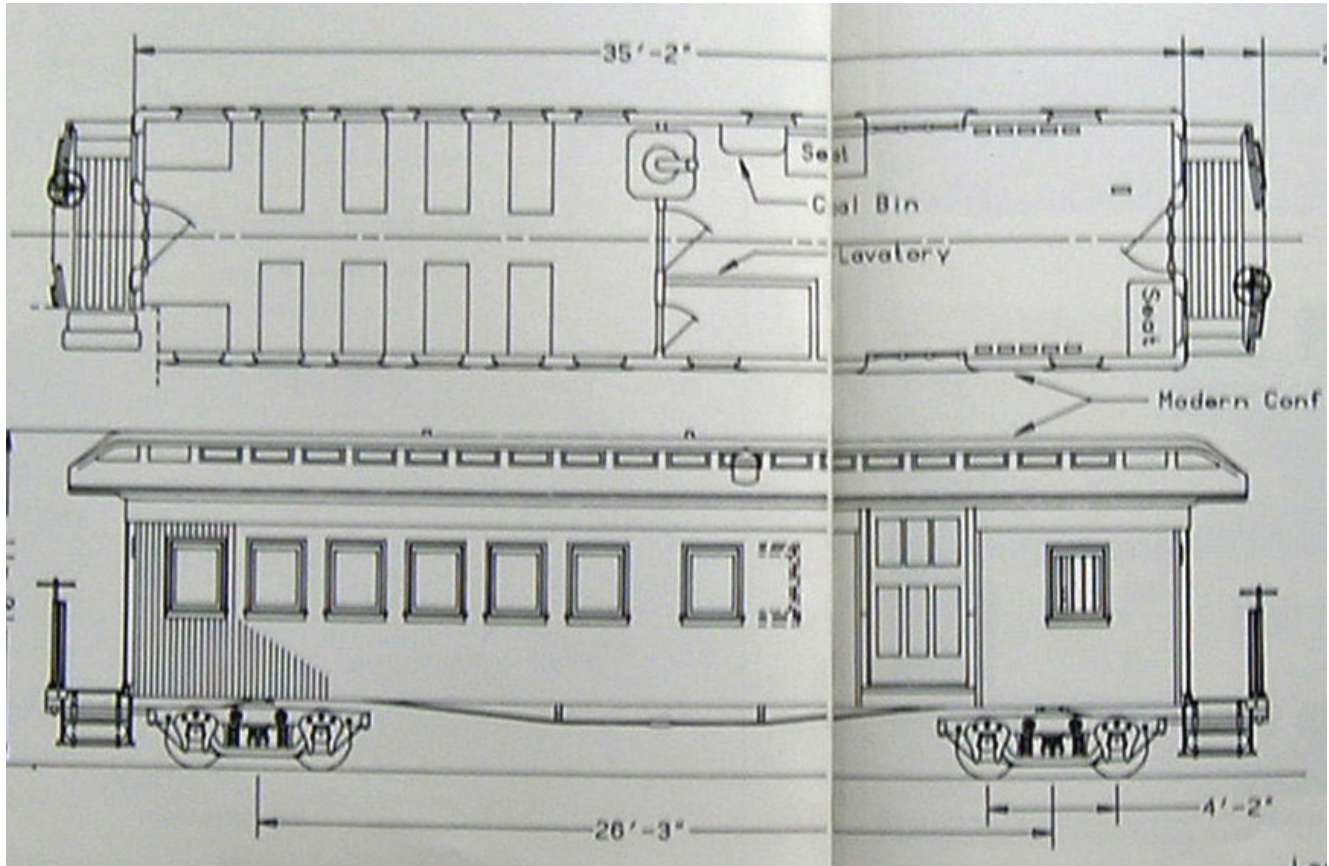


Construction Notes for the G.A.L. Combine sides Project.

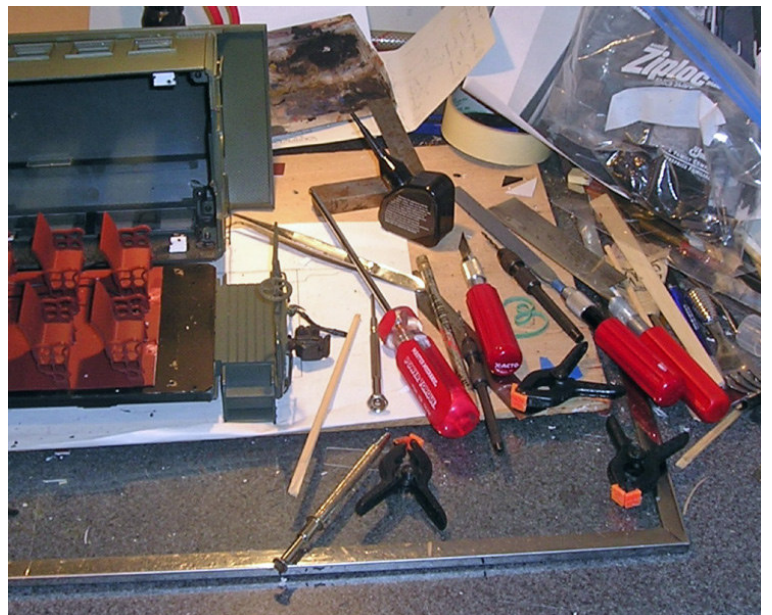
Plans

(Apologies for the quality of the plan! This is EBT #18. #16 was similar but longer and has a 4-panel door.)



Tools.

The usual tools for working with plastic kits are needed. I find an Xacto chisel blade useful, along with their small saw and miter. Small and medium files, plus some old, fine sandpaper for tidying up the edges. Small drills in a pin vise. An assortment of small screwdrivers, rulers, metal squares, weights and clips/clamps. 400 grit wet-and-dry or other sanding block is useful for cleaning up the parts. A metal ruler at least 18" long - preferably longer. A soldering iron unless you want to cut the wires to the lights - they are under the seats and have to be moved. Good plastic glue - I like the Testors "Model Master" liquid cement in the little bottle with the syringe-like metal applicator - makes it easy to control where you are putting it and how much.



Construction Notes for the G.A.L. Combine sides kit.

(Note that the coach itself doesn't glue with the styrene compatible glue!)

Two special tools are really helpful. A long reach Phillips screwdriver - mine has a shaft about about 6" long - to reach the screws. And a grabber - Micromark calls it a Gripster - <http://www.micromark.com/GRIPSTER-HOLDING-TOOL,6734.html>. It is like those 'automatic pencils' that you press on the end to get the lead to come out, but these have 4 or 5 small bent little metal grippers that will pick up a screw (or other small part you dropped where you shouldn't,) and allow you to put it in the hole and start it for the screwdriver.

Finally, a flat surface big enough for the coach ten times over - when it is dismantled you'll need to lay out the parts. I had the underframe, trucks, the old sides, roof, interior and the new sides all separately stored on shelves over my work area.



Before you get started.

You are going to need a template for the new side(s). It will be 22 9/32" long and 4 1/4" deep - you are making your new side from 3 pieces that have to be glued together accurately. I printed my drawing with Scaleprint (you'll see it underneath the parts on several photos.) Any rectangle will do, so tape together a few pieces of paper, tape it flat on the bench and draw the outline of the new side. **When you get the old sides off, check that your rectangle is exactly the same size.** The depth isn't critical, as the new sides are cut to size/height, but the length is very important. Your kit has to mate with the existing ends and frame, so it must be the correct length and must be square.

Dismantling the original coach

Lay an old towel or similar on your worktop and turn the coach over. [I didn't bother with the towel half the time - the coach rests on the vents and chimneys.] Remove the 8 screws around the perimeter of the floor just inside the outer frame rails. Then, with a flat blade, pry the coach sides away from the frame in the center - there is a groove in the bottom of the side that fits over the metal floor and over the ridge along the side of the frame. Hold the center open (that's the easy bit) and pry the sides over the ridge and floor at the ends. If you do both ends of one side, the frame will come out on one side, and then you can work on the other side. With care, the whole thing will pop out easily. [It's a strange design - the ends hold the sides firmly over the ridge, but there's no way to separate the ends from the sides until they are off the underframe!] There's a plug/socket for the lighting connection to the roof - just unplug it. [I had one where the wires were twisted together, so take it easy as you try to separate top from bottom.



The rest is easy. The roof is held on by 8 more screws around the periphery [see Grabber photo above] and there are 4 screws holding each end to the sides. Don't

Construction Notes for the G.A.L. Combine sides kit.

lose the screws - you will need them again.

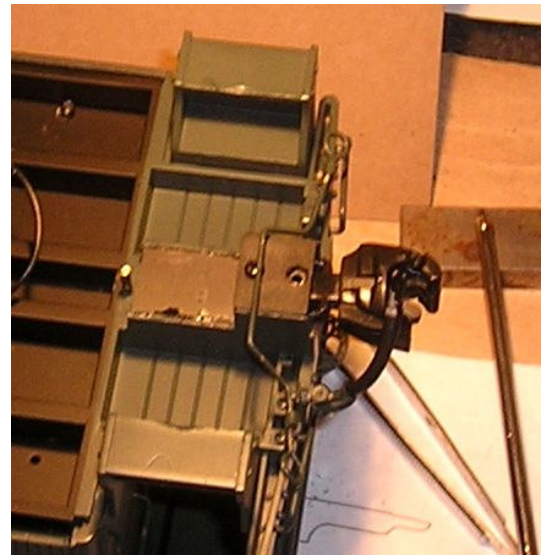
Note: The plastic underframe may be held onto the metal floor with very short screws around the perimeter, accessed from the top (Mine wasn't.) The seats are held in place by more short screws but these come up through the metal floor. The wires for the lights come through the floor and under the seats - which is a problem (addressed later/below.) The metal floor has screws holding the truck pivot supports - but one or two of us have removed the metal floor as the coach is quite heavy. If you decide to do that, you will need a new styrene floor to support the seats and for the baggage area and you'll have to figure out how to mount the truck pivots. Note that, without the screws bolting the floor to the underframe, the only thing holding the sides to the frame are the two bolts through the trucks - the pivots. If you use a styrene floor, you'll probably need to screw it to the underframe near the holes where the sides have tabs that are screwed up through the floor.

Flip the floor over and either un-solder the wires for the lights from the truck pickups then pull them out of the pickup mounts, or cut the wires. Unscrew the trucks from their pivots. (Don't lose the springs!) Unscrew the body support plastic parts from the top of the truck and throw them away (or keep them if your railroad is so uneven that the Fat Controller thinks they are needed.) You'll need some washers to fit over the truck pivots to support the trucks - the whole thing will wobble if you don't give it a bit wider surface to pivot on. I used some nylon ones about 3/4" OD and 1/2" ID from the hardware store. There's 4 screw heads on top of the truck that you have to avoid or use - just don't use a washer that only sits on two of them.

Note: if you decide to lower the coach by removing the body support piece, the coupler will have to be raised. Unscrew it and file down the mounting pad and side supports.

Note: The couplers on the original coaches were known to break off, as they are only held by the screw through the long plastic support. It is recommended that you fill the hole around the screw pad with epoxy, or take a scrap piece of plastic, drill a 1/4" hole in it, slip it over the peg and glue it in place.

I found it easiest to continue without the trucks fitted. They are quite heavy and make it difficult to manipulate the frame and body. The underframe/floor sits flat on the bench resting on its end platform steps and the queen posts for the truss rods.

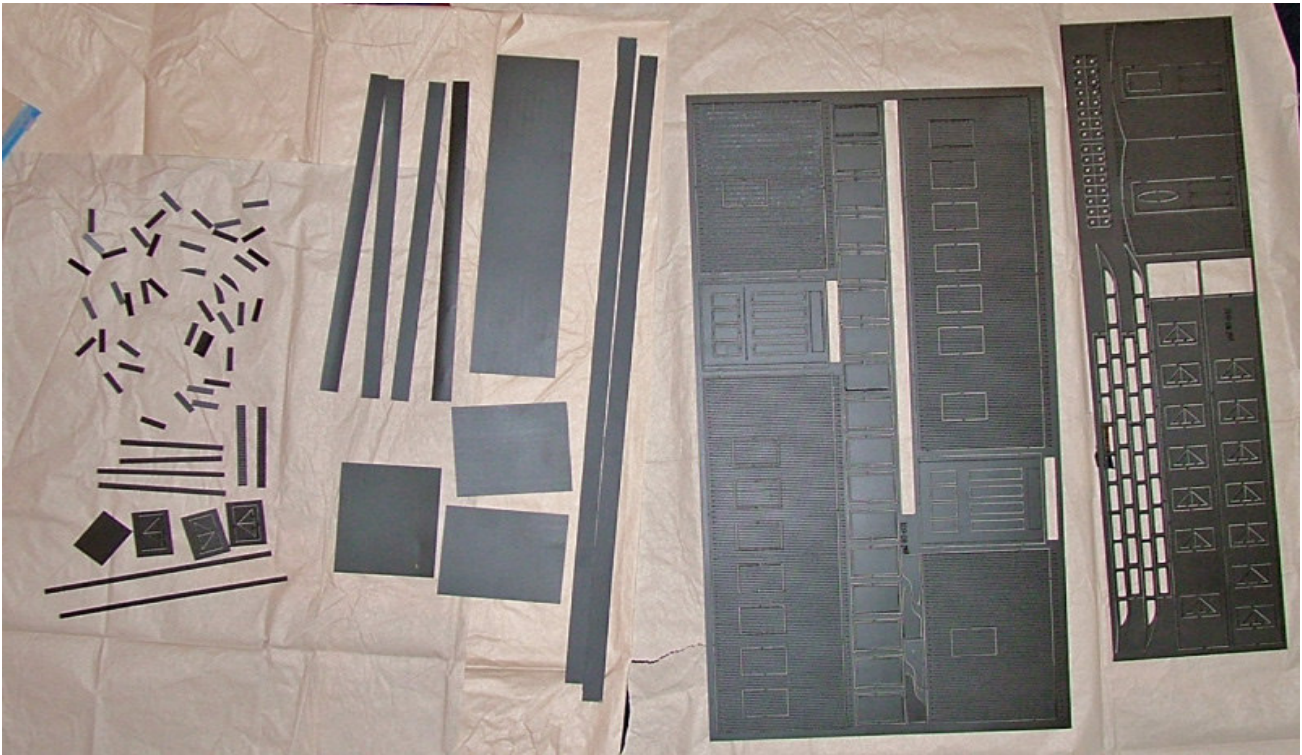


Talking about truss rods - this is an option but I recommend it. Accucraft makes their truss rods with threaded ends (though they are not opposite threads so you can't tighten and slacken the rods like the real thing.) They are very tight and sometimes bow the underframe/floor up in the center. The ridges on the original sides of the coach keep the thing flat, as does the weight of the body. We won't have ridges when we're done, so it would be better to flatten the underframe a little. The rods are held behind the cross beams molded into the underframe by the 90 degree bend in the end. Remove a few screws holding the metal floor to the underframe over the truss rod end and pop out one end of the rod(s). Unscrew it a couple of turns and put it back - repeat on the other rod.

Construction Notes for the G.A.L. Combine sides kit.

Preparing the Combine parts

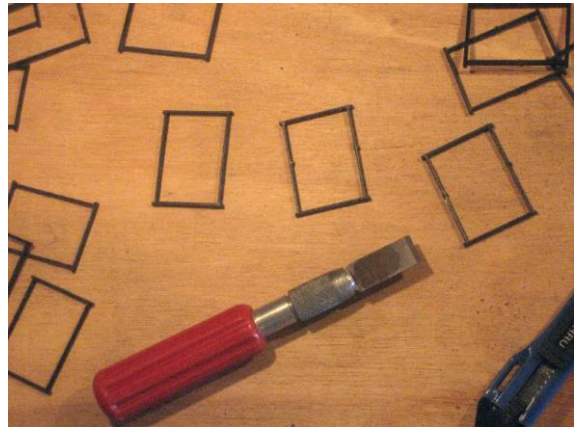
(This photo is the prototype kit – there are a few extra pieces that you won't get!)



Take the kit and remove the parts from the styrene sheets. I use a chisel blade in an Exacto #5, but a knife will work. Sand and file off the tabs where the parts were attached. In particular, do a neat job on the window surrounds as they are pretty visible when you're done. (There's a spare in case you break one.)

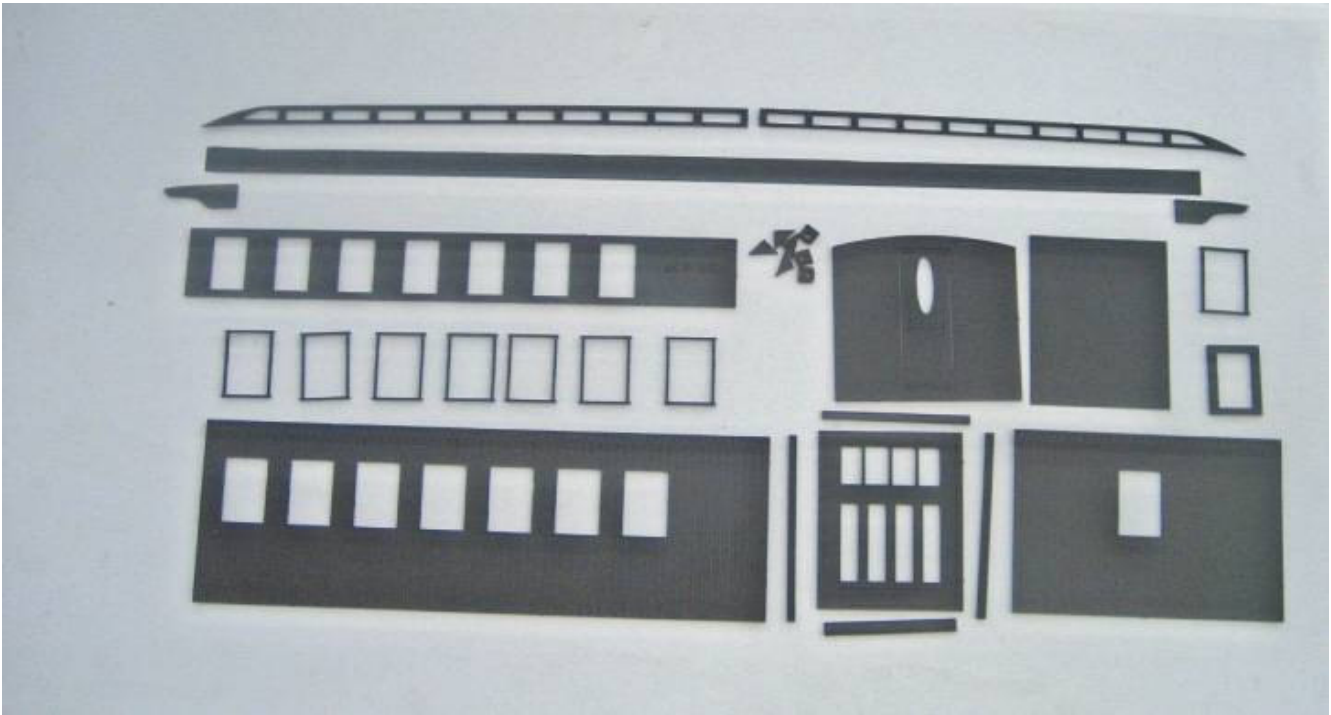
I used my 400 grit wet-and-dry sandpaper, wet, with a flat wooden block, to smooth the surface of the sides, doors and partition. It helps get rid of any microscopic styrene that may have bubbled above the surface.

I also ran my glue along the back (hidden side) of many of the joints after they had been glued and had dried. Many joints can't be reached until the first glue application has dried, and the second application fills the small gaps, if there are any.



Construction Notes for the G.A.L. Combine sides kit.

You should end up with roughly twice as many parts as shown in this photo:

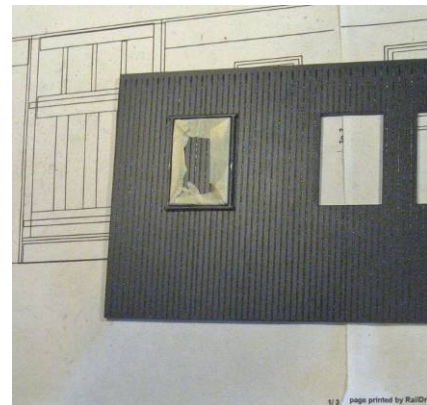


Window Frames

I glued the window frames next, while the sides are easy to handle. Make an alignment jig by gluing two pieces of the scrap that came out of the opening together, and wrap them when dry with some tape to make a snug fit in the window cutout. You'll find the jig makes it very easy to align and glue the frames in place.

Making the sides

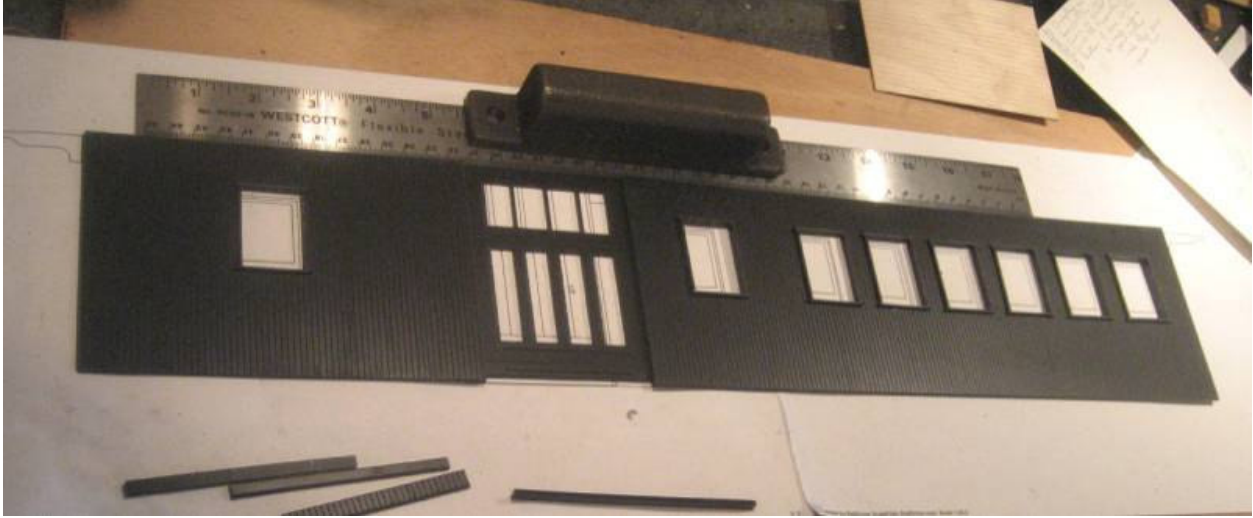
The door is going to sit on top of the floor behind the sides, which extend down to the bottom of the underframe, so the door isn't as deep as the sides. Cut and glue a thin (0.5mm) piece of styrene behind the panels in the door. Make sure it extends all the way down to the bottom of the door - you have to glue a tab onto the bottom and that needs a flat surface.



Note that the window sections are not mirror images - one has a window in the baggage compartment that is significantly further back than the other (LH) side. Not a problem unless you try to glue a side upside down.

There are two scribe lines down the sides of the front of the door - they are pretty much where the sides fit to overlap the door. There are 4 pieces of 2mm styrene that are 3mm wide to make the door frames, lintel and threshold.

Construction Notes for the G.A.L. Combine sides kit.

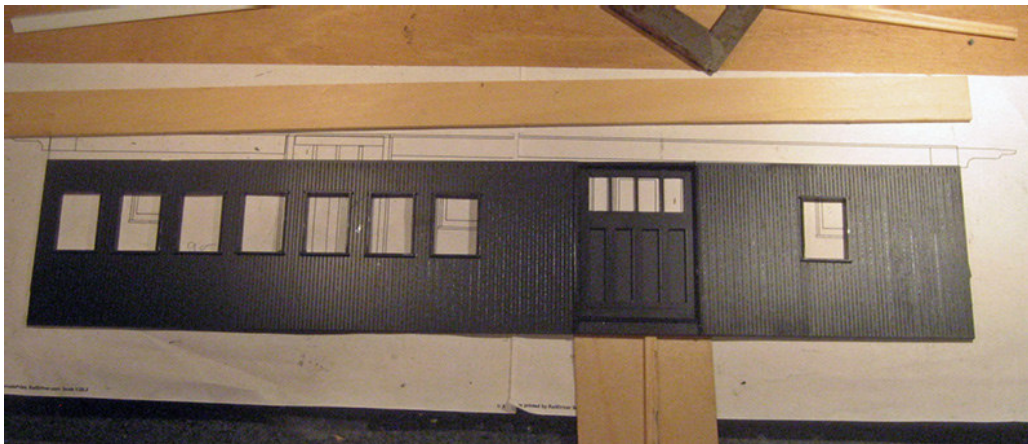


The door is flush with the top of the sides. Arrange the sides and the door on top of your template (that you checked against the original sides when you took them off - right?) Put a straight edge along the top line, and support the ends of the sides with some scrap styrene - the rectangles you popped out of the window work - so they rest on the door sides and all is flat and square. Glue the sides to the door, checking the length again before the glue dries.

Door Frames

With the new side flat on the bench, using the lengths of 2mm x 3mm strip, glue two strips at the door opening sides (and to the door below.) Cut and glue the top strip between the sides, and cut the sill and the scribed strip to fit at the bottom of the door. The scribed strip should be flush with the bottom of the sides, and the sill strip goes on top of it. Before you glue the sill, take the side to your underframe and check the fit - the door is resting on top of the floor and the sides are extending down the side of the underframe. You may have to trim/file the side frames of the door to clear the ridge on the underframe.

The sill strip should be lower than the door, against the ridge, on top of the scribed strip (as are the sides.) When you are comfortable that the fit works, place the side back on the bench and build a support for the scribed strip, as it has to be flush with the sides, as well as aligned with the bottom. I used a couple of scrap wood bits to lift it to the correct height.

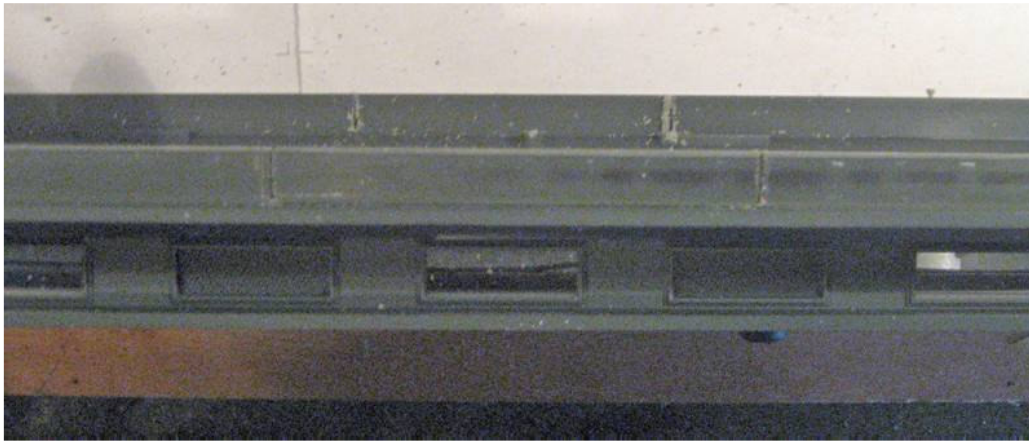


Construction Notes for the G.A.L. Combine sides kit.

Glue on the sill - be careful to make it upright, at right angles to the sides (this is tricky, as there is nothing to hold it at the right angle. You could put a thin piece of scrap along the inside top of the scribed side piece to give you a wider gluing surface.) Again, clamps and scrap will help keep it in place while it dries. When you pick the side up, run your glue along the joint(s) behind the side to strengthen it. Test it again on the underframe, and file to fit if necessary.

Letterboard

Cut the letterboard to clear the door frame. I put the new side down on the roof and marked where I thought the doors would fit into the letterboard. (Mark the end where the lighting wires come down from the roof, so they will be in the baggage compartment.) I then took the original side, put my new side on top of it, marked the door again, and tested the old side in the roof to make sure both marks were the same. (This also makes sure the side fits longitudinally, as the old side already has tabs - make sure they are aligned as you mark the roof.) A ruler will also work!



Cut the letterboard down to the roof but no more with a small saw. Make it slightly smaller than marked - you can always widen it but it won't be easy to make it narrower. I snapped out the strip by scoring along the edge of the roof with a sharp knife, and then I gripped the end in pliers and carefully bent it until it started to break. Repeat at the other end and the strip will pop out. File the rough bits down and check the fit.

Attach the sides to the roof

Now you have two sides, we need to make them fit to the roof. Put the roof flat on the bench, upside down. Take the two ends and place them upright in the roof against the end, exactly where they were. Mark the baggage end versus the passenger end, as the tabs may not end up totally symmetrical. The new sides will fit between the ends and in the slots in the roof - except where the door is set back and interferes with the raised rib that holds the wall in place. Mark where it interferes and cut that piece of rib down to the roof level. [See photo - green ring.] The sides should now fit snugly down into the slots in the roof. File the cutout you made for the door if necessary.

Construction Notes for the G.A.L. Combine sides kit.



Now put one side down while you fit the other into the roof. (Use one of the original sides instead to support the ends by screwing it back to the ends.) Take 4 of the tabs with larger holes and, using the screws you removed, screw them into the roof. Screw 4 more to the tabs on the ends. They should fit against the inside of your new side, just like the tabs on the original coach side. The one next to the door will need to be trimmed as the door is behind the side. [See photo – yellow ring.] Another 4 tabs are attached to the tabs on the end with the larger screws, which go through the end tabs and into your new tabs. (The original has two screws coming up and two going down – I screwed all mine from the bottom up, as shown in the photo upside down. If the screws don't seem to grip the tabs, flip them over as the holes are tapered. If necessary, glue a thin piece of 0.5mm in the hole.)



Once you've got them all where you want them, file and otherwise make them fit and glue them in place. Note that the bottom of the side needs to be leaning ever so slightly outwards so that it is flush with the end at the bottom. [See photo pink ring – exaggerated.] That lets the side clear the ridge on the side of the underframe. If the slight lean bothers you, then file/sand off some of the ridge along the side of the underframe and off the metal floor (or replace the floor. Use the end and press it into the underframe end platform slots to figure out where the side is going to fit.)

Glue the triangular gussets on to the tabs to reinforce them. I had a couple fall off, and some I had to break off and refit as I put the gusset where it obstructed the screw. (In the second photo of the end tabs, you can see the side is leaning inwards instead of outwards – that one had to be 'adjusted' when I tested the fit.) This



Construction Notes for the G.A.L. Combine sides kit.

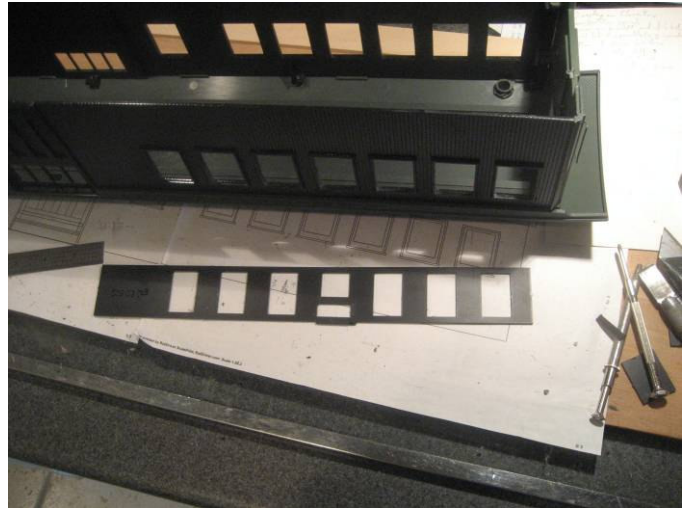
is the really fiddly bit, but take your time, let the glue dry, and you will get a good joint. In fact, the side is held in the slot molded into the roof, so those tabs are fairly easy, (until you accidentally knock the roof and it falls outwards, tearing off all your just-glued tabs! Yes, clamps or elastic bands are good.) Here's how it looks when you flip it over and place the assembly over the underframe:



Windows and Partition

The window strips should be cleaned as needed and test fitted behind the sides. I painted mine before gluing them - they can even be painted a different color. I also cut one window so it was open (widen the open part so it is flush with the wall.)

The partition fits between the 6th and 7th windows on each side - though the 7th window is quite a long way back on one side. You don't really want to glue it in place, as it will make future disassembly more difficult. I marked where it fit on the window strip and glued some scrap to hold it in place. I spray painted it with some brown primer to match the rest of the interior. When you are comfortable with the location, mark the seating/floor where the partition will fit, as you need to get rid of some seats.



Seats and lights

The seats are also held in place by the screw through the voltage regulator in the center. Take it out and remove the (floppy) seat unit. Cut the seat floor close to your partition mark, and figure out what you are going to do with the interior. The EBT #18 had only 4 pairs of seats, with a space behind them and the stove splitting the partition (see floor plan.) Two smaller seats were placed behind the door. I don't recommend the two small seats or the stove, unless you are a diehard EBT fan. Note that one pair of tabs from the sides is almost under the front seats, so it is easier to attach the body

Construction Notes for the G.A.L. Combine sides kit.

while there are no seats! On that subject, there are two more tabs further back - look for the holes in the metal floor. The tabs will also interfere with the seats if you put them (seats) in the wrong place.

The seats are difficult to remove from their plastic sub-floor; they are firmly glued in place. If you want to change the spacing, I suggest cutting the sub-floor around the seat frame. Make up a new sub-floor from a sheet of styrene and glue them in place. A quick spray of brown will blend it all in.

I have cut seats to make them narrower to fit by the passenger end door, as shown in the floor plan, but they interfere so much with the tabs that I left them out of the prototype. The door in the passenger end opens and causes more trouble. I suspect they'll have to be glued to the side walls to avoid the interference. If you want to put the stove in the partition then maybe cutting the stove in half will keep the more rigid partition. Or leave the stove in the corner by the door.



Finally, on my first coach conversion, I painted all the seat arms black with a small brush - a very tedious process but it improves the view through the windows. I also ran a brush with a darker brown along the center of the floor between the seats, but that isn't so obvious. Now is the time to consider whether you are adding passengers, and if so, to paint and glue them to their seats. (And anything else you want to do to the interior.)

Attach the seats to the metal floor with the short screws and re-rig the wiring for the lights. You will probably have to make new holes in the sub-floor for the mounting screws and the wires to pass through to the truck. Accucraft runs the wires under the seats where they are almost invisible. The voltage regulator, with its little grey plastic insulation pad, can be refitted in the center hole in the metal floor, inside the baggage compartment now. If you un-soldered the wires from the trucks, you can just poke them through the holes in the floor and leave them until final assembly.

Construction Notes for the G.A.L. Combine sides kit.



Note: you probably noticed when you unpacked the coach that the wheels don't rotate very easily. The main problem is the wheel wipers picking up power for the lights. A much better solution (my opinion) is to remove the wipers and fit a 9v battery and on/off switch or similar in the coach. I used a standard non-rechargeable type, as I don't use lights very often. If you do, I'd suggest a 4 x AA pack with a recharge socket under the floor in the baggage area.

Painting

Unscrew the sides out of the roof and reinforce any tabs that fall off or break off, but don't unscrew the ends yet. Put the box of sides and ends carefully over the underframe (it's not well supported without the roof, so handle it carefully.) The ends should drop into the slots behind the end platforms, and the sides should drop over the sides of the underframe until the doors sit on top of the metal floor. Adjust the tabs holding the ends to make it all fit - mine didn't so I had to cut off a tab and re-glue it.

At this point, before attaching the tabs to screw to the floor, I did the final paint job and glued in the windows. Floquil Pullman Green is a good match for the Accucraft green, which saves repainting the ends and platforms. My trucks were C&S green, so they got a coat of engine black and some grime. I painted the wheels grimy black by spinning them against a lightly held brush. Using masking tape, remember to paint the letterboards (if you sanded off the lettering, as I did,) and the opening for the baggage door that you chopped. Don't forget the clerestory parts - they aren't in my photo as I didn't use them on this prototype.

Construction Notes for the G.A.L. Combine sides kit.



Clear styrene (not supplied) was glued behind the window and door frames to represent glass.

Clerestory Insert

A two-part insert is supplied for the clerestory sides - it fits over the original windows. (The EBT variants had 21 windows, hence the strip.) Here's a photo of a test fit:



Many of these cars had screening in front of the windows, so the easiest option for the windows is to paint some strips of cardboard or styrene black and glue it behind the supplied strip. Real screening can be fixed using an old stocking/sock or similar (or a new one if you don't have a lady friend around!) With the original windows behind, you might still get a better result by gluing the material to cardboard or styrene so the interior lights don't shine through.

You may have to file the center vertical joint to make it snug, and also the top of the curved ends. (The philosophy is to make parts too big, as you can always sand them down.) If you don't like the etching around the windows, the strips can be reversed and they will fit more easily, due to the slight camber on the edges where the laser cut.

Construction Notes for the G.A.L. Combine sides kit.

Final Assembly

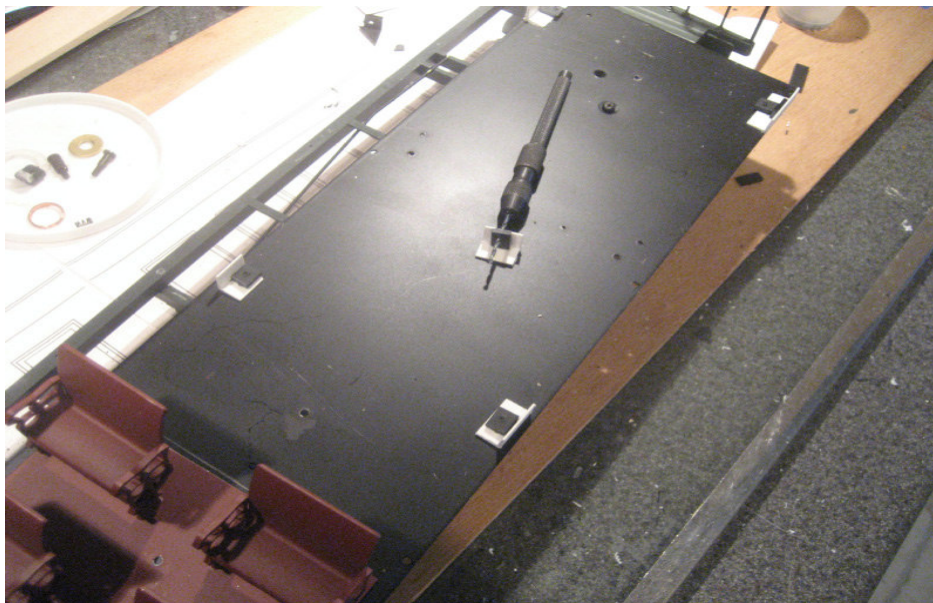
The last task is to make and attach tabs to the sides to screw to the floor. Like the roof and side/end tabs, they need to be robust and they are crucial to making the combine look good, as they hold the sides straight along the underframe. (The roof has slots for the sides, so it is more robust and less easy to damage.)

There are tabs supplied in the kit, and plenty of triangular gussets to reinforce them. I personally prefer a pre-shaped "L", and I have two suggestions. The Plastruct range has a 3/8" L shaped strip, which I used on this prototype (you'll see the white L shape on some photos.)

I also bought 4' of clear plastic 'corner protector' at the hardware store for less than \$1/ft (it will do about a dozen coaches.) The Plastruct can be glued with the styrene/plastic cement, but the larger 'corner protector' material is not styrene and needs ACC (Cyanoacrylate, super glue) or similar. I tested it with ACC and got a substantial joint, so I'll be using it in future.

The sequence is to attach the tabs to the floor, then drop the box of sides/ends (without the roof) over the underframe and glue the tabs to the sides. There are 4 holes each side, where you removed the original side's screws, and a set of tabs with small holes in them. Three tabs go all the way to the edge of the underframe, but one is next to the baggage door, which is recessed, so that tab is narrower. Screw the tabs to the floor from the underside (put the sides/ends box aside for a moment.) Make the tabs a fit against the sides without gluing anything, then glue them all and clamp or squeeze the sides/ends box to hold it square while the glue sets.

My photos show the white L tabs I made up from the thin Plastruct angle. The 3/8" isn't quite wide enough, and they don't make a wider 1/2" one (as far as I could ascertain,) I used some of the kit tabs as additional plastic to take the screws, by making the hole in the L and the tab with a small drill then gluing them together with the drill or a pin through the hole. The hole needs to be placed so the L is just at the edge of the underframe. If anything, make them too short - i.e. not quite at the edge - as it is fairly easy to shim them with a thin piece of styrene - not so easy to re-drill after the fact.



Construction Notes for the G.A.L. Combine sides kit.

Once the tabs are glued and you are satisfied with the fit, you should carefully unscrew the sides from the floor and see if you can lift the body off around the seats. It can be a tricky fit. If not, re-arrange your seats; moving the tabs is a lot more difficult (but not impossible - just re-drill the holes in the metal floor, but make sure you clear the plastic underframe.)

That's just about it. Time to put the trucks back on the underframe and re-connect the wires, if necessary. With the roof upside down again, re-fasten the sides in the slots with the screws. Turn it over carefully and re-seat it back on the underframe on those tabs you just installed. Then, using both hands to keep sides/roof and underframe together, flip it over again so you can insert the screws through the floor into the tabs. (Note - those trucks unbalance it, so be careful.) Test the lights, add decals, and you're done.



Construction Notes for the G.A.L. Combine sides kit.

EBT #16

The 'generic' combine is based on East Broad Top's #16 and #18. The former is in Allaire State Park, in storage without trucks, but FEBT has made some trucks and negotiated a 99-year lease, so some day it will (hopefully) return to Orbisonia. #18 was bought at auction from the failed railroad in CO, and is now back home. Both need a significant rebuild to make them operational, but we have plenty of prototype information. There's even a scratch-built model of #18 in CO, done by Kevin Strong after he helped pack #18 for the trip home.

[http://www.mylargescale.com/Community/ForumArchives/tabid/100/Default.aspx?ARCHIVE=true&TOPIC_ID=20913]



We chose #16 as it is 1' longer than #18, and the Accucraft coach is even longer than that. We stretched the side so the proportions are the same - every part of the side (e.g. windows) is a few % wider on this kit. (There are no photos that I know of for #17, so you can easily pick that one to model and be absolutely correct!)

There are lots of detail differences on the EBT coaches; many are shown in Kevin's model. Steps for the end platforms, end windows, poling pockets, and bars on the baggage windows are some obvious ones. The roof needs different chimneys and vents in other locations. The amount you add is entirely up to you.

My major change is the roofline. The EBT coaches have straight roofs, as they were originally simple curved roofs without a clerestory. I've had some success holding the end of the Accucraft roof in a toaster oven at 350 deg to soften it, then pressing it down over a "former" - a piece of 2x1 pine that was cut to the curve of the roof behind the droopy ends. (I doubt you will get a good roofline without a former like this?) The clerestory portion will deform slightly as you bend the ends up, but that will be

Construction Notes for the G.A.L. Combine sides kit.

covered when you put fake tarpaper over it later. Repeated heating and careful shaping seem to work.

The EBT combines have a trim strip above a much deeper letterboard. When the roof has cooled, I cut the letterboard off using my small table saw leaving a 1/6" edge as the trim. I then add a deeper letterboard made from wood, at the same time re-working the sides to make them exactly upright. Here's how my #3 came out – I plan to straighten more of the roof on #16 – stay tuned.