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Balsa USA ¼ Scale Fokker Landing Gear Short Kit

Version 2

If you read nothing else, read this. Do not install the 4x40 blind nuts until after you have glued the rear spar to the clamp block. You will split the clamp block otherwise.

Not being the most proficient of pilots, my BUSA DVII's landing gear, built to the plan specification, took a real beating. Therefore, in 2008, I made it one of my winter projects come up with a shock absorbing landing gear for the DVII. I posted my solution on www.rescalebuilder.com and was encouraged to offer this upgrade to others, hence the kit that you have purchased. Thank you for purchasing this upgrade. Comments or suggestions for improvement are always welcome. By the way, if you haven't been on rescalebuilder.com you really should check it out. An incredible resource.



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This is version 2 of the kit. My motivation to redesign was to make it a bit more scale as I have some better docs, to reduce the size of the parts so that I can reduce shipping costs, particularly overseas, and improve maintainability. The biggest change was we now have a built up spar with a center clamp block with a 2-piece axle, and a much closer to scale profile.

In 2017 the Dr1 was released, and in 2021 we are releasing the same kit for the BUSA ¼ scale Dr1 and DVIII. Each are available in 2 versions, a scale width and a kit width. Other than the size of the parts the kits are the same. The DVII kit width was very close to my docs so there is not a separate scale width kit. These instructions are for all of the kits.

One of my design criteria was to allow for 3/4 inch or more of vertical travel at the wheels. This required a somewhat thicker (1/4 inch) sub-wing than the stock BUSA part. This upgrade is also heavier than stock BUSA part. This does not seem to affect the flying capability in any way, but you should be aware of it. For what it is worth my current DVII is 20 pounds with a NGH38 spinning a 20X8 prop. Somewhat over powered but I enjoy the way it flies. I saw no appreciable difference in the air between the stock gear and the upgraded gear, but what a difference on landing!

Another change is that I now have parts for either the Williams Brothers 6 5/8" WW1 wheels. the Dubro 7" or the 7 ½" Proctor wheels. If you are using a different wheel that is thicker or thinner let me know and I will see if we can adjust the brass axle to accommodate.

These instructions also have a somewhat different order of assembly than before around the sub wing spar and center block. I find that this method yields a more accurate spar.

I clearly have no control over how you complete the kit and your flying skills, therefore this kit is sold with no guarantee or warranty, expressed or implied, of any kind.

If after purchasing the kit you decide that this weight increase is intolerable, or you are uncomfortable with the lack of guarantee, you may return the complete and un-started kit within 30 days for a full refund less shipping and handling.

Thanks again for purchasing this upgrade. I hope that it gives you as much pleasure as mine has given me.

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This is a short kit. To complete it you will need the following material in addition to normal modeling tools and supplies.

Sheeting material used on the prototype is 3/32 balsa. I have since built gear with 1/64th ply, 1/8th Lite Ply, and 1/8th balsa. In my opinion, the 3/32 & 1/8 balsa are the best all around solution, the 1/64th looked great but didn't hold up as well, I did not like the 1/8th Lite ply at all. These instructions use 3/32 except for the top of the endcaps where I used 1/8th to give a little wiggle room whilst sanding. Jeremy, who built the Dr1 prototype used 3/32 balsa and then applied 1/64th ply on top of that.

	Sheeting Material (2ea)	Endcap Sheeting (2ea)	Sub Leading Edge .125" Stock	Endcap Sub Leading Edge .125" Stock	Leading Edge .5" Stock	Endcap Leading Edge .5" Stock	Forward End Cap Spar Thick (4ea)	Center End Cap Spar .125 Thick (4ea)	Aft End Cap Spar (4ea)
DVII	15.5 X 7	3.5 X 7	15.5 X 1.25	3.5 X 1.25	15.5 X 1.25	3.5 X 1.25	1.0625 X 1.125	1.0625 X .3	1.0625 X .75
Dr1 Scale	14.25 X 7	3.5 X 7	14.25 X 1.25	3.5 X 1.25	14.25 X 1.25	3.5 X 1.25	1.0625 X 1.125	1.0625 X .3	1.0625 X .75
Dr1 Kit	14.75 X 7	3.5 X 7	14.75 X 1.25	3.5 X 1.25	14.75 X 1.25	3.5 X 1.25	1.0625 X 1.125	1.0625 X .3	1.0625 X .75
DVIII Scale	14.5 X 7	3.5 X 7	14.5 X 1.25	3.5 X 1.25	14.5 X 1.25	3.5 X 1.25	1.0625 X 1.3175	1.0625 X .3125	1.0625 X .875
DVIII Kit	16.5 X 7	3.5 X 7	16.5 X 1.25	3.5 X 1.25	16.5 X 1.25	3.5 X 1.25	1.0625 X 1.3175	1.0625 X .3125	1.0625 X .875

- 1) Kit material to shroud the landing gear wires.
- 2) Kit 5/32nd landing gear wire
 - a. There is a drawing on the plan to bend your own
 - b. Wires available on planes-mart.com



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Sub Wing Kit Parts



Common Parts Pack





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Axles



If you have ordered parts for the Williams Brothers Wheels, there will also be a pair or 1/4" brass tubes



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Parts supplied by the modeler. Sizes differ between the various kits, see the chart above.

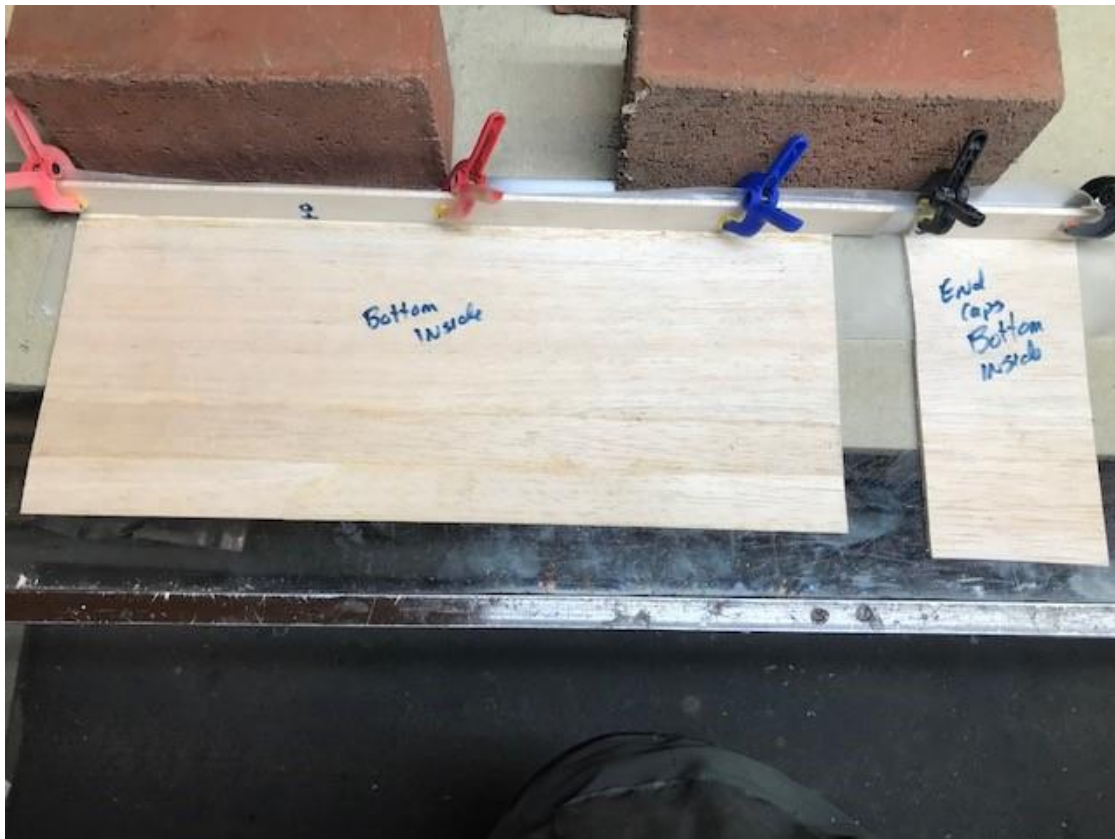




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Sub Wing Construction

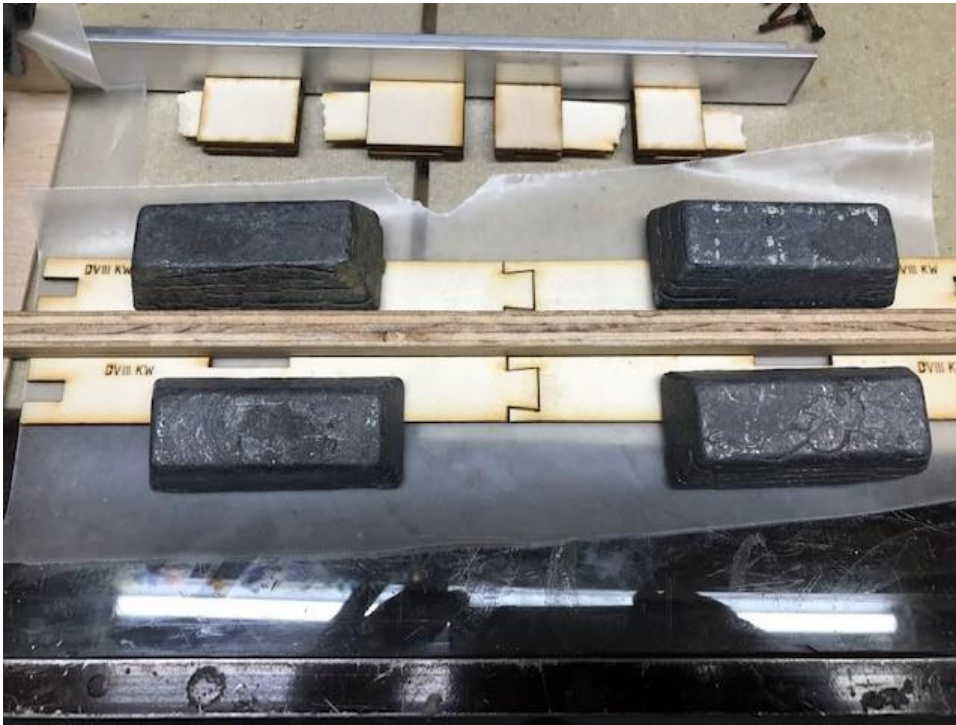
- Pin, clamp, or otherwise hold the bottom sheeting to your board.
- Glue the leading edge sheeting support to the front edge of the bottom sheeting. The support goes on top of the bottom sheeting.
- I choose to build the endcaps at the same time but separate from the sub wing. Both endcaps will come from this sheeting, I find that I am less likely to build 2 right hand endcaps this way.





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- Glue the front and rear spar sections together. I also glue up the endcap “spars” at this time.



- Glue 4x40 washers in the bottom of the clamp block





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- Glue one of the root ribs in place making sure it is square to the leading edge and let it cure/dry.





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- Dry fit the other root rib, spar sections, a couple of ribs and center block to the bottom sheeting.
- It is important that the center clamp block is square to the leading edge. **Take your time here, you don't want toe in on one side and toe out on the other.**
- Using a transfer punch, music wire or other long skinny thingy mark the location of the clamp block holes on the bottom sheeting.



- Take off all of the dry fit parts and drill 3/16th holes at the marks.





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- The next step is to glue the spar & center clamp block to the bottom sheeting.
- I like to put the 4x40 bolts in from the bottom of the clamp block. They should key on the 3/16th holes.
- Make sure you get good glue coverage on the aft edge of the center clamp block and front face of the aft spar. **If this joint isn't solid the center clamp block can split.**
- Also note that the front of the clamp block is not as wide on the top. This piece needs to move, don't get glue into this space.





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- Here I am using ribs to help locate the spar. They are not glued in at this point.





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- Install & glue the remaining root rib. Make sure it is square to the leading edge.



- Install & glue the spar caps





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- Insert axles into the clamp block and install the 4x40 clamp bolt blind nuts. Make sure that the glue is dried/cured between the aft spar and clamp block before doing this.



- Remove the axles and install the 4 sub wing ribs





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- Sand the leading edge sheeting support and trailing edge sheeting to follow the rib profile
- Sand the bottom sheeting & leading edge back to the root rib



- On the root ribs, mark the location of the landing gear holes





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- Install the top sheeting taking care not to get glue in the landing gear holes.
- Sand the top sheeting back to the root ribs and leading edge, taking care not to sand away your reference marks for the gear legs.



- Be careful when sanding back to the root rib. It is very easy to over sand the trailing edge. Here I am fixing that because I do not read my own directions! I just added some balsa to the side of the root rib and sanded back....twice! Grrrr.
- The trailing edge has not yet been sanded back. That will happen after the end caps are built.



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End Caps

I like to build the endcaps on a single piece of bottom sheeting. Not that I have ever done it, but it helps to make sure you build a right and a left endcap.

- Take the leading edge/bottom sheeting assembly and glue two outer ribs on either side.





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- Once that dries/cures attach the spars and inner rib using the 4x40 endcap hardware and some 4x40 nuts. I like to use blind nuts installed backwards for this sort of thing.
- Square everything up and glue in place.





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- Separate the parts and sand the sheeting and leading edge back as needed.

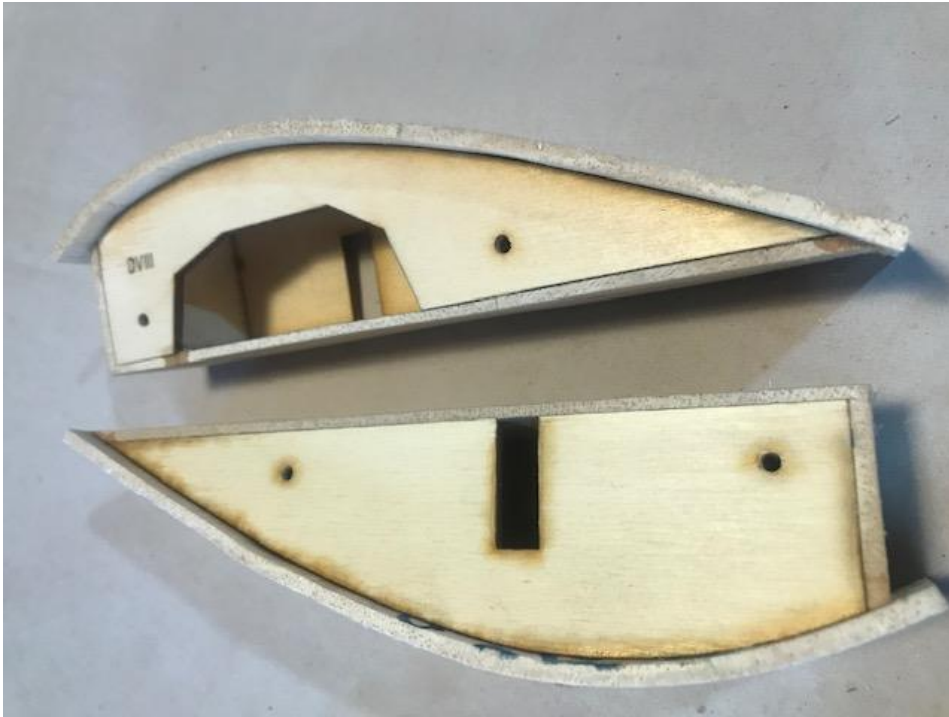




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- Add the top sheeting to the endcaps and sand back the excess.



- Glue the 1/2" leading edge onto the endcaps and sub wing.
- Note the orientation marks that I added when cutting the material. It is a lot easier to plane & sand consistently if the grain is all in one direction.

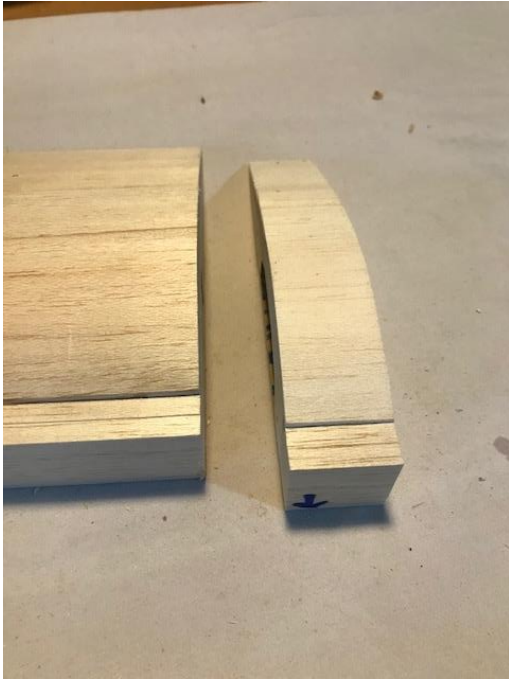




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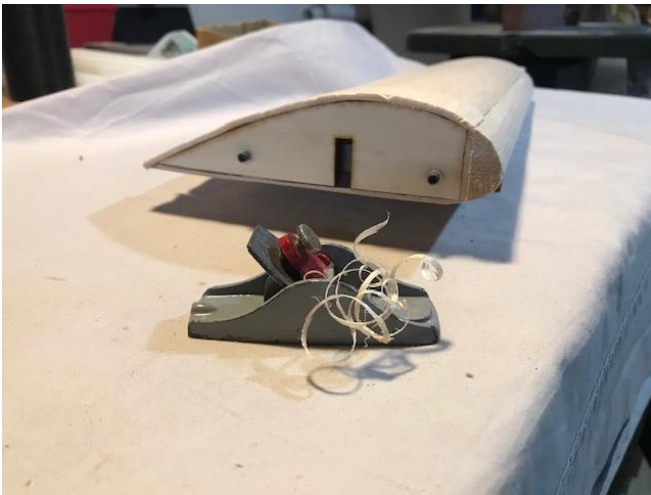
- Trim the leading edges back to the sub wing and endcaps. Again, we want to be careful around the trailing edge to make sure that we end up with minimal gap.



- Reinstall the end caps and shape the leading edge.
- My method is a 2 step operation. First, I extend the top and bottom rib line with a plane, then mark a line where I want the apex to be. Then I do the rough shaping with the plane and finish shaping with a sanding block.



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- The last step is to open up the gear leg holes. Draw a line in from your marks about ½". Use a pin to find the holes, then open them up. I find it helps in you open them up on approximately the same angle as the gear legs





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Landing gear legs

- The landing gear wire is made from the kit material. If you no longer have the kit material, there is a drawing on the plan so that you can bend your own.
- Trim the landing gear wire to the length shown on the plan sheet.
 - If you are doing a scale width gear for the Dr1 or DVIII adjust the angles per the plan.
- Cut some shallow grooves in the last ½“ of the landing gear legs





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- Place the fuse on your work bench such that the datum line of the fuse is parallel to the work bench.



- Dry fit the landing gear wire to the sub wing and mount the gear to the fuse making sure that everything lines up nicely and that the bottom of the sub wing is parallel to the datum line of the fuse. In flight we want the bottom of the sub wing at 0 degrees the fuse.
- When you are happy with the fit and alignment take it all apart
- Mix up some 30 minute or longer epoxy and glue the landing gear wire into the sub wing. I like HySol EA9460 for this.
- Immediately mount the gear to the and make sure that the bottom of the sub wing is parallel to the datum line of the fuse. The mounting holes for the wire a 1/64th oversize to allow for minor variations in fuse construction
- Walk away from the airplane and let the epoxy cure
- Once cured install the BUSA kit supplied landing gear leg shrouds



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Final Assembly

- Install the #10 bungee mounts to the root rib. You may get 10x24 or 10x32 bolts for this depending on what I can get



- Install the axles ensuring that they bottom out in the center block





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- Tighten the 4x40 clamp screws to hold axle in place



- Install the bungee cord.
 - I use a fair amount of tension on the bungee when installing but you may want to adjust this tension depending on your final airframe weight and flying style.





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- Install the end cap



- Slide the brass axle bearing over the music wire axle aligning the large hole with the flat ground into the axle





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- Slide the ¼" wheel collar on and align the grub screw with the large hole in the brass axle bearing and the flat on the axle. This is important to get right. I have learned that simply tightening the grub screw against the brass axle bearing is NOT sufficient to hold the wheel on in the event of a less than graceful landing. Again one of those don't ask me how I know!





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Using Dubro 7" wheels

- Drill out the wheel hubs to ¼"

Using Dubro 7" or Proctor 7 ½" wheels

- Install the wheel
- Install a nylon washer
- Install the cotter pin through the outer holes in the brass axle bearing, bend and trim





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Using the Williams Bros. 6 5/8" wheels

- Install the 9/64" brass bushing
- Install the wheel
- Install a nylon washer
- Install the cotter pin through the outer holes in the brass axle bearing, bend and trim





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Congratulations you have finished construction! Sand and finish as desired. The one I made for Udet's candy cane scheme is covered in Solartex and painted with Warbird Colors.



Maintenance

- Pull the end caps every so often and inspect the bungees. I got 2 or 3 years out of mine.
- Part of my preflight is to load the gear by pressing on the wing looking for normal deflection.
- If you bend an axle, just get a piece of 7/32 music wire and cut based on the plans.

You can order replacement parts from the website. If something you need is not listed just drop me an e-mail.