Simplex Zing and Cloudster Service Bulletin
June 2019

The following additional items have been added to all Cloudster plans purchased after June 25, 2019. Plans owners who purchased their plans prior to this date should print a copy of this bulletin and enclose it within their plans set.

Cloudster Drawings Revision:

The revised drawing of the rudder within the Cloudster drawings has five separate call outs for dimensions on the forward edge. All five are important and if you add them up the total is 44.5" inches which is the overall height of the rudder. The 12.5" dimension in that drawing is shown incorrectly as the distance between the middle cross support and the lower V support.

The following paragraph was added under the Tail Group/Empennage section of the Cloudster Plans.

You will note that there are two different drawings for the rudder and elevator. These are shown on drawing #10 and drawing #10-5. You can use either rudder and elevator combination. The revision on drawing #10-5 was not necessarily a safety issue, but a design preference/aesthetic by the original designer, Scott Land. Note that the elevator and rudder and larger and slightly strong with the revised version (#10-5). There is reinforcement for the rudder control horn in the revision not indicated on the original. Aside from possible strength advantages, the increased tail area will provide greater CG range, and greater stability within the known CG range, and more control at slower speeds. There are other differences between the two, but builders who chose the original rudder and elevator should have no known issues as that version is still adequate.

The following section was added to the Cloudster instructions.

Attaching the tail feathers to the fuselage

1. Fabricate the rudder and elevator hinges as shown on drawing #21. You can make the hinges from either ¾ x ¾ x .125" 6061 C-channel aluminum or ¾" 4130 steel strap (.065" thickness). If you use steel you'll need to paint the hinges and monitor them for rust throughout their life span.
    a. Be sure to file, sand, and buff all edges to avoid burrs. There cannot be any burrs or stress risers.

2. Fabricate the upper and lower stabilizer attachment brackets shown on drawing #11. Be sure to file, sand, and buff all edges to avoid burrs.

3. Fabricate the lower stabilizer wire attachment seen at the top of drawing #12. Be sure to file, sand, and buff all edges to avoid burrs.

4. Fabricate the strut wire/tail bracing attach tabs shown at the top of drawing #9. Note that it's likely easier to simply fabricate all of them for the tail feathers, wings, and rudder pedal attachments. All of these use this same dimension except for the diameter of the holes. See the note on drawing #9 for clarification about the hole diameters.

5. Fabricate the rudder control horn from drawing #21, and the elevator control horn from drawing #18 per the plans and temporarily attach as noted in the drawings.

    a. These are most easily cut out with a band saw, but you can use a good quality jig saw with the right blade.

    b. I like to use a vixen file on aluminum. Most builders have never seen one, but it can be ordered from Wicks.com. It cleanly removes aluminum material better than any file you have ever used!

6. Once the fuselage is built you can pre-fit the entire assembly to the fuselage per drawing #11.

    a. To help add clarity to the process look at drawing #1. Specifically look at the fuselage top view (2nd image from top). Look between stations 11 and 12. Recall that when you built the fuselage you should have added a 3/4" x 3/4" block that is 18 3/8" forward from the rear most position. This block is used to attach the horizontal stabilizer. Note that it is glued on top of the fuselage only.

    b. Now see drawing #11. Note that this drawing shows the vertical and horizontal stabilizer attachments and the angle aluminum used to attach them. See the specs in the bottom right corner of the drawing for the specs to make the angle attachments for BOTH the bottom rear attachment of the horizontal stab and also the top FRONT horizontal and vertical stabilizer attachment.

7. Lay the horizontal stabilizer on the top of the rear fuselage into position. Using the proper AN3 hardware, attach the horizontal stabilizer. Bolts will go through the front of the horizontal stabilizer down through the fuselage attachment block that is 18 3/8" from the rear. Those same two bolts go through the the front stabilizer attachment brackets that are made from two pieces of small aluminum angle cut (1"x3/4"x7/8" - per drawing #11). They are placed on top of the horizontal stab so that they sandwich the front of the vertical stabilizer. Then one AN3 bolt goes between those two angle pieces and the vertical stabilizer and sandwiches the vertical stab in the middle.

8. There are 4 more angle pieces used to attach the horizontal stabilizer and the vertical stabilizer at the rear of the fuselage. See the center of drawing #11.

    a. Note: There are not two angles on the underside at the "front" of the horizontal stab. This is because there is already a great connection with the top of the fuselage.
9. Be sure to cut the small access holes in the side of the rear of the fuselage as shown on drawing #1 so that you can remove the stabilizer(s) for transportation and initial setup.

10. Once you have attached the horizontal and vertical stabilizer, you'll need to add the tail bracing. Note that prior to adding the bracing wires, the assembly is fragile and harsh movements or bumping into it could potentially damage the attachment locations. BE CAREFUL!

11. Using a large drywall or carpenters square, make sure the vertical stabilizer is completely square (90 deg) from the horizontal stabilizer.

12. Temporarily clamp the horizontal stabilizer into place until the tail bracing wires are installed.

13. Install the previously fabricated brace wire attach tabs (sometimes called tangs) using AN3 hardware. Install them loosely and don't tighten them down. There are 4 installed on the vertical stabilizer (two in the front, and two in the back on either side). There are eight (8) on the horizontal stabilizer (four in the front and four in the back on the upper and lower surface).

14. Install the lower stabilizer wire attachment that you fabricated from drawing #12. This is attached to the rear bolt that is holding the tailspring to the underside of the fuselage. This one may be tightened fully at this step. We will use the lower/underside wire attachment tabs on the underside of the horizontal stabilizer to make any tightening adjustments.

15. Make up the eight (8) stabilizer brace wires from 3/32" aircraft cable and install them. There are four on the top and four on the bottom going between the wire attach tabs previously installed.

    a. To reduce cost ($$) and weight, we generally recommend that you omit turnbuckles on the brace wires.

16. Install each cable with a Nicopress and thimble. Remember that we said to install the tangs but don't tighten the bolts down completely.

17. Make up the other end in place by snugging the wires and squeezing the Nicopress collars. Then tighten down the bolts holding. If you do this carefully, the wires will fit perfectly with the proper preload.

18. If you need to adjust slightly then remove one end and twist the wire. Twisting in the direction of the lay of the cable will tighten the wire—twisting against the lay will loosen the wire.

19. Install the hinges to all surfaces and then install the rudder and elevator. Make sure both surfaces move freely with no binding.

20. The controls can partially be fitted and tested at this time if desired. See later instructions.

The following paragraph section was added to the Cloudster plans after June 2019. Instructions under 8.1 of the "Wing and Nose Ribs" were removed. That section was then renamed to "Main Wing Ribs."

Nose Ribs

It is now time to cut out the 26 plywood nose ribs in preparation for the wing assembly. We recommending waiting until after you have built the spars before you cut out the nose ribs. You will use the paper template shown on drawing #24 to create one from wood. You will then use that wood template to trace out and cut all of the actual plywood nose ribs.

These nose ribs are cut from plywood using your saw of choice. However, a scroll or band saw is the easiest method. Every effort must be made to keep these identical in shape. It may be easier to cut slightly outside of your template line and then sand to the line with your bench top belt or disk sander.

Please be aware that there is bound to be 'photo copy' error between the main rib template and the nose rib template. To help mitigate this error we recommend that you trace out the final full airfoil on your work bench or piece of cardboard. Use a completed main wing rib, exact dimensions from the end of the front spar, and then your nose rib template. Trace around the nose rib template and the main rib and then diagram the front spar in the middle using the dimensions from the end of your wing spar. What you're looking for is to make sure there is a smooth transition between the nose rib and the main rib with the front spar in the middle.

Measurements to note: The "back side" of the front spar should be 7" tall. This is shown on drawing #14 and drawing #15-A. With the 10 deg. angle required to be cut on the top of the front spar, this would mean that the nose rib would have to be slightly shorter than 7".

Drawing #24 shows a template for the nose rib. Unfortunately, it does not give a dimension for the height of the nose rib. The exact measurement is to be determined by you.

Recall that you cut a shallow 10 deg. angle on the front spar. You may or may not need to alter the top edge of the nose rib template to keep that transition smooth over the front spar and onto the main wing rib. Some builders have reported that the photo copy error has necessitated this alteration. Remember that we're dealing with slow ultralight aircraft, so any slight alteration in the airfoil shape would have no effect.

Make any small alterations needed to the top of the nose rib "template." It's important that you get the template right before cutting out the nose ribs. The final 26 nose ribs should smoothly transition over the front spar and onto the main rib.

Prior August 2017 Service Bulletin

The following additional items have been added to all plans purchased after August 10, 2017. Plans owners who purchased their plans prior to this date should print a copy of this bulletin and enclose it within their plans set.

Within the **Zing Plans**, the following changes have been made to the "**Wing and Nose Ribs**" construction section of the written instructions.

~~6.2 - Do not gusset the tip ribs and rib #7 aft of the rear spar on their inboard sides. These will be covered with 1/16" plywood.~~

Change to:

6.2 Do not gusset the inboard ribs (R) or the tip ribs (T) as these will be covered with 1/16" plywood on their outside surfaces.

6.2.1 Also do not gusset rib #5 and rib #11 aft of the rear spar. These ribs will be filled with ¼" plywood and then 1/16" plywood will be applied to the side facing the aileron. Also be sure when building ribs #5 and #11 that you clean up all excess glue that is squeezed out. This will ensure a tight fit of the ¼" plywood filler material when installed.

~~6.6 - Ribs #7 and the tip ribs require 1/16" plywood on the inboard surfaces starting at the backside of the rear spar. These can be installed during the wing assembly.~~

Change to:

6.6 - Ribs #5 and #11 require 1/16" plywood on the surfaces facing the aileron starting aft of the rear spar. This is done during wing assembly.

~~6.7 - Then there are ¼" plywood inserts that are required on the root ribs, tip ribs, aileron end ribs, and ribs #5 and #7. These ribs will require holes for the torque tube and aileron pivots.~~

Change to:

6.7 - There are ¼" plywood inserts that are required on the root ribs (R), both aileron end ribs, and ribs #5 and #11. These ribs will require holes for the torque tube and aileron pivots.

The following text was also added to future plans after August 2017:

Understanding Rib Numbering

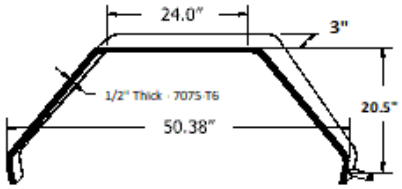
There can be some confusion with the drawings and how the ribs are numbered or identified as originally drawn by Scott Land in the late 1990's. In the drawings on page #22 it identifies there as being 11 main full ribs, when there are actually 13 full ribs, plus an additional 14th false rib (#4a). The root rib and the tip rib are not numbered, but instead are labeled as "R" for root, and "T" for tip. This thereby confuses the order as they likely should have been numbered in a logical order.

If you count the root rib (R) and the false rib #4a, then the 7th rib from the root would be filled with 1/4" plywood in the location aft of the rear spar to the trailing edge. This is identified in the drawings as #5. The false rib beside it is labeled as #4a, but it is really the 6th rib from the inboard rib. This rib is simply there as a support for the 1/6" plywood added to the top and bottom of the wing in that location adding box strength. To continue with this methodology, the plans identify rib #11 as also having the same type of 1/4" plywood insert. If again we were to count the false rib #4a, then this is really rib #13, and the tip rib is #14. This of course does not count any of the extra aileron false ribs.

We have chosen not to change the numbering to a more logical order as it would likely confuse owners of prior plan versions when future questions were raised. We hope that this explanation will suffice.

The following Zing Landing Gear Specs were added in July 2017

Updated Landing Gear Specifications



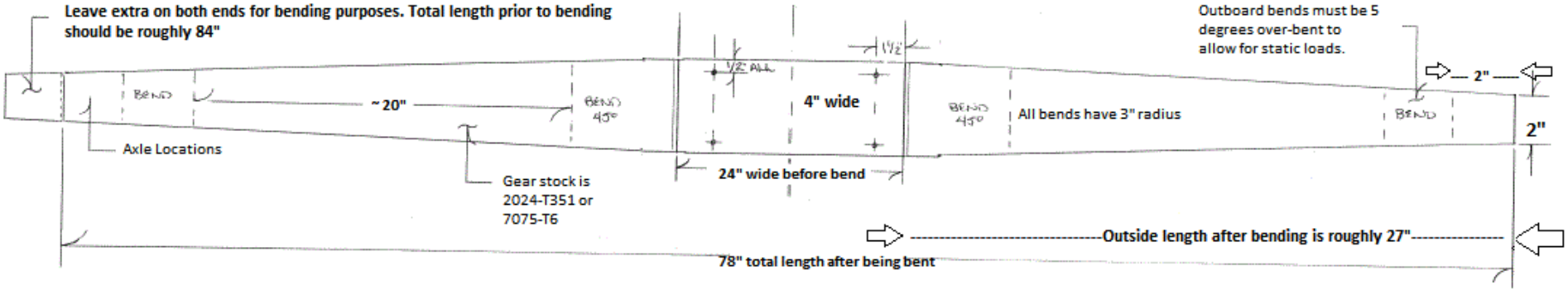
Landing gear is fabricated from either 2024-T351 or 7075-T6 aluminum

Aluminum slab is 1/2" thick

The center section is 4" deep by 24" wide before the bends on either side. Then both sides are tapered down to 2" at the ends.

Landing Gear Specifications for Simplex Zing Ultralight

Gross Weight 550 lbs.



We have found it is cheaper to buy a piece of metal that is 84" x 6" x 0.5" -- then cut out to size. A CNC shop can do this cheap.

April 2017

The following additional items have been added to all plans purchased after December 2016. Plans owners who purchased their plans prior to this date should print a copy of this bulletin and enclose it within their plans set.

Fuel Tank

All plans issued prior to January 2017 included a section about fuel tank selection and installation. These instructions were essentially the same instructions provided with the original Cloudster plans created in the late 1990's. More recent versions (late 2016) also included a section citing FAR 23.975. After careful review with both mechanical and aeronautical engineers we have determined that the prior instructions which prescribed the use of non-aircraft quality hardware and materials was ill advised. Please review your current set of plans and cross out all line instructions prescribing the use non-aircraft grade eye bolts or any use of bungee cords. At this time we are not prescribing one specific way to mount the fuel tank, nor are we recommending one particular fuel tank to use.

We anticipate that in the near future we will make a change and alter this section of the plans to include a precise detail of fuel tank selection and installation. In the mean time we recommend that the builder use caution and careful thinking to determine the best tank to install, and the most secure method of installation.

For builders who have already installed their fuel tank or are fortunate to have a flying airplane, we recommend review of this section and consider changes to your fuel tank installation as needed to ensure continued safe flight.

The fuel tank, no matter what size, shape, or material; must be connected in a secure and solid way with no chance of movement in both positive and negative "G" environments up to +4/-2 G's.

The support structure by which the tank is attached must be capable of supporting the fuel tank under both extremes. For a typical 5 gallon tank with an empty weight of 2 lbs along with the added weight of fuel (roughly 6 lbs per gallon), the +1 G weight of the tank is roughly 32 lbs. With a 150% safety margin added to the +4/-2 G's advertised maximum loading, the structure supporting the tank must be able to support 192 lbs of downward force (4 g's x 1.5) and 96 lbs of upward force (-2 g's x 1.5). Since some tanks weigh more than 2 lbs these forces should be averaged to 200 lbs downward force and 100 lbs upward force respectively. If your tank structure and corresponding mechanical attachment method cannot support these loads then changes must be made to ensure safe flight.

As a general reminder the Zing and Cloudster have not be tested in aerobatic flight. Nor has either design been spin tested. Though the structure is quite strong and well proven, we do not recommend aerobatic flight or intentional spins. Fortunately, the wings, tail surfaces, and fuselage are of the same general construction of other designs that have been proof tested well beyond +4/-2 G's without damage or failure. Thus at this time there is no incentive to perform destructive testing.

We also recommend a review of **FAR 23.975** along with direct application to your installation.

23.975 Fuel tank vents and carburetor vapor vents.

(a) Each fuel tank must be vented from the top part of the expansion space. In addition—

(1) Each vent outlet must be located and constructed in a manner that minimizes the possibility of its

being obstructed by ice or other foreign matter;

(2) Each vent must be constructed to prevent siphoning of fuel during normal operation;

(3) The venting capacity must allow the rapid relief of excessive differences of pressure between the interior and exterior of the tank;

(4) Airspaces of tanks with interconnected outlets must be interconnected;

(5) There may be no point in any vent line where moisture can accumulate with the airplane in either the ground or level flight attitudes, unless drainage is provided. Any drain valve installed must be accessible for drainage;

(6) No vent may terminate at a point where the discharge of fuel from the vent outlet will constitute a fire hazard or from which fumes may enter personnel compartments; and

(7) Vents must be arranged to prevent the loss of fuel, except fuel discharged because of thermal expansion, when the airplane is parked in any direction on a ramp having a one-percent slope.

The following section on the "Cowling" has been added to all plans

Cowling

First, you can skip this entirely as a cowling is not required. Second, you can skip fabricating one by simply buying a cowling from Simplex Aeroplanes. Third, you can't begin the cowling until you have chosen the motor you want. The motor also needs to be mounted and an initial weight and balance completed. The reason for this is that making a cowling means creating something that fits perfectly around the existing motor and its mount. If you need to move the engine forward or backward to gain a better CG then the cowling would need to be adjusted or possibly remade. It is much easier to simply have the weight and balance already correct, and then make the cowling. The cowling should weigh less than a 1 lb hopefully, so the additional weight on the nose will make hardly any difference on the center of gravity. If the motor is not mounted then skip this step and return at the end of construction!

We will detail how to make a cowling out of FIBERGLASS. You can also make one out of aluminum or thin plywood if you make an internal frame to hold it. However, experience has shown that a fiberglass version can be made easier and lighter than any other option. At this stage you want to make a template that shows a silhouette of the cowling profile, and get a good idea how long the cowling is to be. You want to make absolutely sure that you build a cowling that reaches to the back side of the prop flange. Leave about a 1" space between the back of the flange, and the cowling exterior.

1) Remove the engine and possibly the motor mount and set them aside.

2) You are going to build up the cowling mold out of 1" or 2" foam. Either blue or pink insulation foam from your favorite hardware store.

3) Attach the foam pieces together using T-88 epoxy, or whatever you have on hand. Just remember that some glues attack foam, while epoxy usually doesn't. Keep in mind that less joints are better as it is hard to sand if you have a glue line you must sand through.
    a) Don't permanently glue the foam to the firewall. Find a temporary means of attachment.

4) Fill the entire space for the cowling with foam, larger than the cowling you want to make.

5) Start shaping the foam to whatever shape looks good and practical. Make sure you leave enough all around so you can sand down to contour.

    a) There is a 'shurefoam' tool you can find at some hardware stores or through an easy Google search. This tool removes a lot of material and is used for rough shaping.
    b) When shaping foam, make sure that you are wearing a respirator (dust mask), and have adequate ventilation. Foam dust gets everywhere!
    c) The shape of the cowling is entirely up to you. It is not structural, its only function being to keep the wind out of the cockpit. Just remember to keep the lines the same on each side, and match the rear cockpit shape.

6) Once the rough shaping is finished, use finer and finer sandpaper, until the surface is as smooth as possible.
    a) One of the best (and cheapest) sanding tools is another piece of foam.
    b) Make sure that there are no dents or scratches in the cowling, as this will show up later.

7) Now coat the entire cowling with wax mold release, found at most nautical supply stores, and fiberglass stores. This will allow the lay ups of fiberglass to easily be pulled off the mold.

8) To lay up the fiberglass, use light or medium weight boat cloth found at any hardware store, West Marine, or even Walmart.
    a) You can use your preferred resin and hardware, but the basic "Bondo" brand polyester resin and hardener found next to the cloth is usually just fine.

9) Lay up at least three layers of glass on the entire cowling.
    a) IMPORTANT: Make sure that you extend the fiberglass onto the front of the fuselage at least 1" so that you can attach it with pk screws later.
    b) **Or** add two thin aluminum angle brackets on both sides of the firewall at the left and right edge that act as a securing point for the cowling.

10) Let cure for the time specified by the manufacturer of the resin.

11) To separate the mold from the fiberglass part, slide a butter knife between the foam and glass, and working your way around the part, apply pressure until it pops free.

12) Clean up the outer surface of the cowling with sandpaper, until it is smooth and free of dents and knicks.
    a) You can use small amounts of bondo, but they must be small as this adds weight, and bondo is not very flexible, so any part where bondo is added could eventually crack.
    b) Clearly its better if your finished cowling is sanded smooth with no fillers added.

13) Carefully measure the cutouts for the engine and prop, and draw them on the cowling.

14) Carefully cut away larger and larger sections of the cowling, until your motor and prop flange clear the cowling, with enough room left for vibration, without the cowling touching any part of the engine.

15) You can bolt the engine back into place, and test fit the cowling. Make any changes necessary, then attach the cowling to the airframe using PK screws.

The following information on the center section gap cover has been added to all plans

Center Section Gap Covering

This detail is very important! This aircraft will not fly correctly without the center section covered. Anyone familiar with the aerodynamics of parasol airplanes knows that there must be a smooth flow of air across the entire span of the wing without a break which would naturally occur in-between two wings if not covered. Too many people have made first flights of their parasol type airplane without the wing gap cover/center section cover. Then they complain that their plane lacks lift and feels mushy, only to learn later that with the covers installed the plane flies so much better!

1) Purchase 12" or 14" wide roof flashing (comes in a roll) from the hardware store. Alternatively use 6061 aluminum sheet metal (your choice of thickness). Measure and cut a piece to cover the gap between the wings. This piece should wrap around the leading edge D-cell and then go over the top of the wing to the trailing edge.
    a) You can cut this piece to the width you prefer, but it needs to overlap the wings by at least one inch on either side.

2) Purchase 1" wide Velcro from your local hardware or craft store. Purchase it by the roll so you have long lengths of it. The Velcro comes with both sides connected. Some already has an adhesive backing, others do not. We prefer the type with no adhesive as it's not nearly as strong as T-88 epoxy, which we will use later.

3) For the aluminum flashing attach two strips of 1" wide Velcro on both sides so that it will connect to the inboard ends of the two wings. Either attach this with T-88 epoxy, or if you use the existing adhesive backing, then also drill and secure small pop rivets every 6".

4) For the other half of the Velcro, attach this to the inboard top edge of the wing and around the inboard section of the D-Cell on the wings. You will remember from the wing construction that the inboard area has a continuous piece of plywood around the circumference of the airfoil which makes for a perfect place to mechanically attach. Since the wings are usually painted by this point, merely gluing this to the painted inboard edge is usually not sufficient as the paint can be pulled up and away from the fabric. For this reason you should also mechanically attach the Velcro with small wood screws.

5) If you are confident that there will never be a reason to remove this Velcro from the inboard ends of the wings then you can permanently attach the Velcro with these small screws.
    a) Go ahead and coat the small threads of the wood screws with a thin layer of T-88 epoxy so that they will never back out.....ever...

6) Paint the outside (top) of the flashing to match the wing color or some other color if that is part of your paint scheme.
    a) Alternatively, the flashing is already quite shinny and you could simply polish it to save weight from added paint. The choice is yours!

In the Zing Plans the following sections were originally included with most plans. Scratch these out as they came from the Cloudster plans and are not necessary.

~~Fuselage Stringers~~

~~Although the fuselage stringers add no structural strength, they give the airframe a "finished" look, in addition to providing a smooth transition from the cowling to the firewall. Many builders may want to place the stringers at different locations depending on their own tastes.~~

~~Glue two vertical stringers at the back edge of the aluminum channel motor mount. These will be 1" x ¼" and are shaped to support the curvature of the cowling. Then run the stringers back along the fuselage. Attach them with small corner blocks.~~

~~Pre-Assembly~~

~~With fuselage insides varnished, the seat bottom and back plywood sections may be cut, fit and installed. NOTE: Varnish the back sides of the seat back and bottoms except at glue locations. The seat bottom ply must have the control stick cut out prior to installation. This cut-out determines the control surface travel and Should be pre-set during the control systems installation.~~

~~The center section top may be covered with 1/16" Lexan or 1/16" plywood. Varnish the seat back and bottom and inspect the entire airframe for missed areas of varnish and touch up as required. Remove all hardware required for covering.~~

In the Cloudster Plans, the following sections and associated lines may be removed as they are no longer applicable.

~~Pre-Assembly:~~

~~4. The center section top may be covered with 1/16" Lexan or 1/16" plywood.~~

CLOUDSTER PLANS Materials List (revision)

Raw Wood Stock

Fuselage
Main carry throughs (top) 3/4" x 7" x 24*" (add notation: Maple, Fir, Birch, or laminated birch plywood)*

Plywood List

Fuselage Plywood
Front cabane sides ~~3mm x 24" x 24"~~ ...change to 3mm x 21" x 28"