

KIS4 Cruiser

BUILDERS MANUAL

S/N 4052

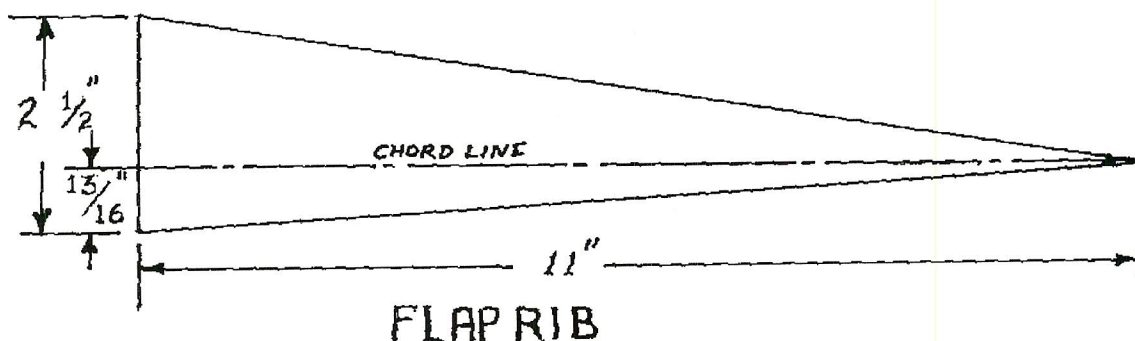
FLAP ASSEMBLY

FOUR PLACE FLAP ASSY 4PFLAP

FLAP ASSEMBLY

Identify the major portions of the flap parts from your kit, and prepare them by removing all peel ply and other debris.

The primary flap components are the top (C20TR & C20TL) and bottom skins (C20BR & C20BL) for each side, and the rib patterns marked on one of the drawings supplied with the kit or use the dimensions shown below. Since the flap is hinged from the bottom, the top skin will have the curved surface on the front section, and the bottom panel will be flat. The left and right flaps are mirror images of each other - exactly alike - but reversed. Sketches and original instructions will be for the right flap, with the left flap identical but reversed.



FLAP RIB

BUILD UP THE LOWER SKIN ASSEMBLY

Prepare a flat surface to build the flap on, since a twist in this component would lead to severe flight performance degradation. Trim the length of the lower flap skin to 91.0 inches, and the front edge of the skin to set the width of this panel at 14 inches.

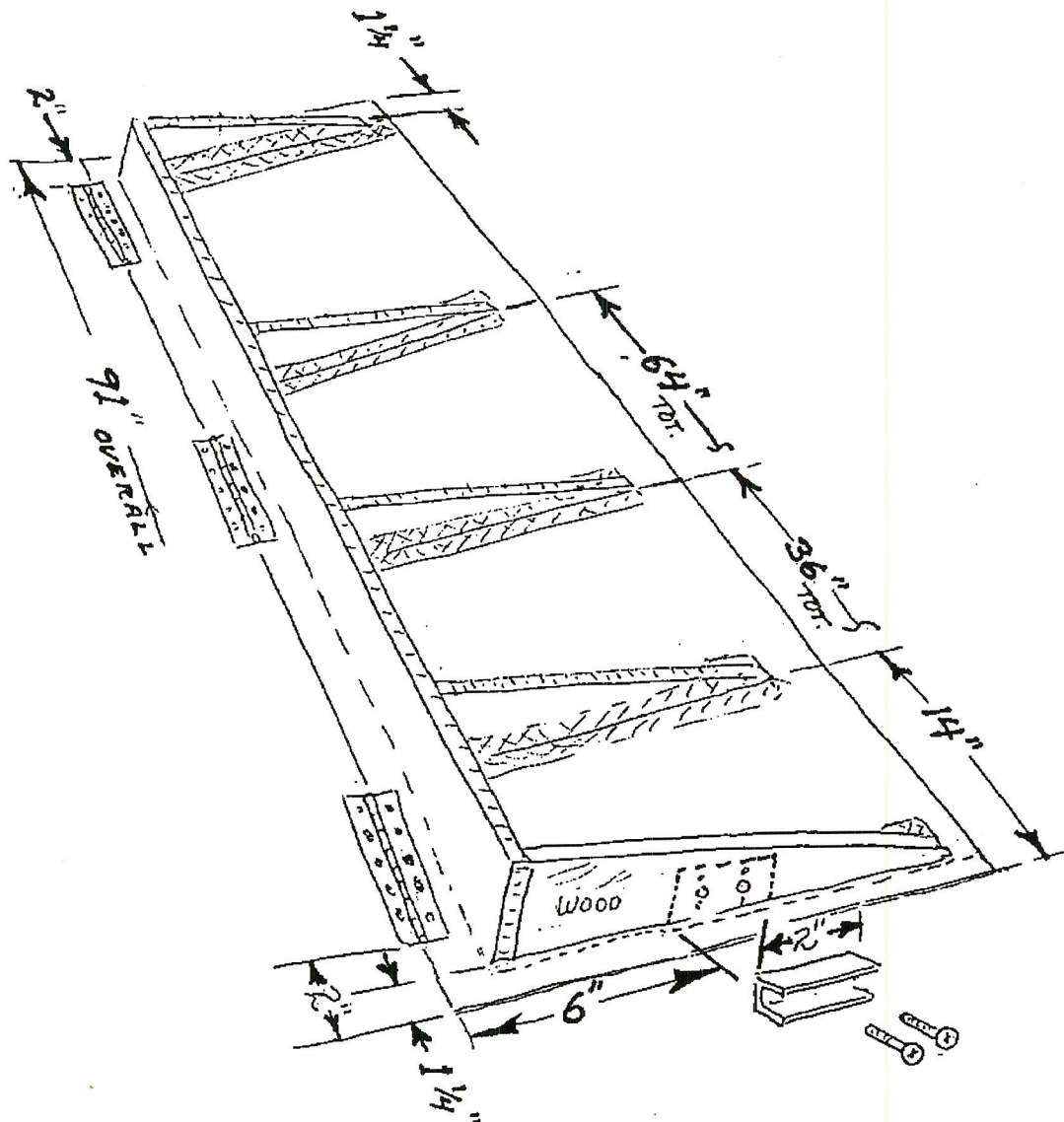
"Tack the lower flap skin in place on the prepared flat surface with a few dabs of Bondo or 5 minute MICRO at the corners where it can be pried away with a thin sharp knife.

Cut out four ribs from the pre prep panel and one from the 1/4 inch plywood. The wood rib will mount the the flap actuator track, so it will be fitted with two nut plates (K1000-03) before close-out of the assembly.

SPAR

The spar for the flap should be cut from a section of the Pre-prep sandwich panel. Cut it 89 inches long and 3.1 inches wide, which should be slightly oversize in width, which will be trimmed on the upper surface later to the angle and height of the ribs. If your panel is not long enough splice together several

pieces and butt glue with five minute epoxy. Make these joints on a flat surface with waxed paper or plastic. These joints will be reinforced with BID tape in a later operation when glassing the assembly.



LOWER ASSY

Set the spar such that the front face is 12.75 inches forward of the trailing edge. Use several ribs to hold in alignment. Tack spar in place with a few dabs of 5 minute epoxy. Allow to cure

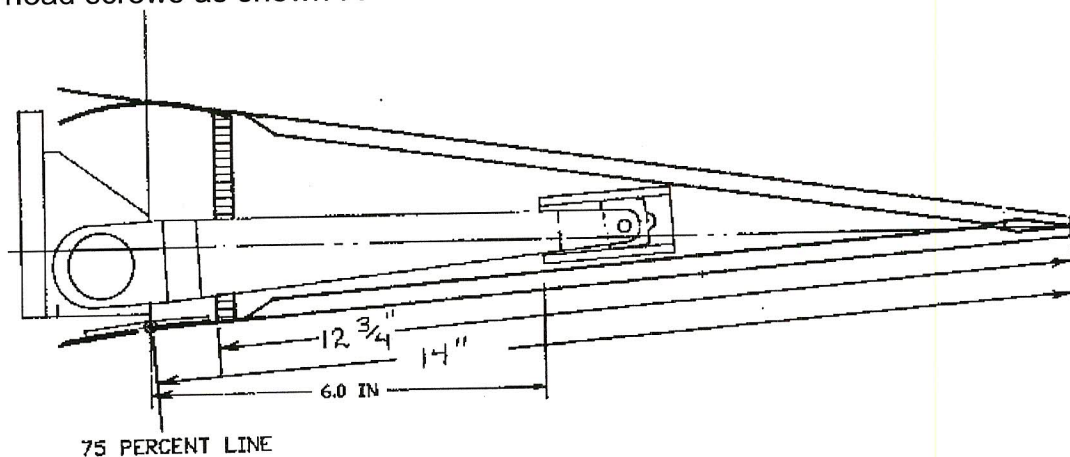
Mix up a small amount of dry MICRO paste, and lay a tiny fillet along each inside corner prior to laminating these joints with BID. Laminate the inner surface of the spar with 2 plies of 1 inch wide prewetted BID tape. Do not allow this to cure before the ribs are placed.

Place the wood rib in the inboard position, 1.25 inch in from the edge. Place a pre preg rib 1.25 inch in from the other end, and the other ribs in the locations shown on the attached figure. "Tack" the ribs in place to the skin and to the spar.

Again mix up a small amount of dry MICRO paste, and lay a tiny fillet along each inside corner prior to laminating these joints with BID. Laminate both sides of each rib (Except the outside surface of each end rib - these will be tied in after the top skin is in place). Laminate with 1 inch wide 2 ply BID tape except for the wood rib which should be glassed in its entirety with two ply material on its inner surface. Tape any uncovered inner side joint of the spar material with the same 1 inch wide 2 ply BID tape. "Green trim" any lamination edges that overhang the spar or the ribs.

FLAP ACTUATOR TRACK

Fabricate a flap actuator track section from the supplied 1 inch by 1/8 inch "U" aluminum extrusion, using the dimensions and configuration in the attached drawing. Cut each piece 2 inches long and drill mounting holes for 2 #10-32 flat head screws as shown.



See figure for location of the track section and the two nut plates, (K1000-03) and install the nut plates at this time using the flap track as a fixture. The bottom edge of the flap track should be aligned with the bottom edge of the rib, with about 1/16th inch clearance to allow minor adjustments, and the front edge located 6 inches aft of the hinge line. Identify this track section to this rib with the orientation noted between the two parts. When satisfied set aside track and fill bolt holes in the rib with clay for the upcoming glass work.

PREPARE AND BOND TOP SKIN

Select the proper upper skin to be used for this flap, and remove any plastic, peel ply, or any other debris noted. Trim the upper skin as required to assure proper size and fit up to the lower assembly. Do not trim the leading edge radius at this time.

Test fit the upper skin matching the trailing edges, and observing for any potential gaps or interference in fitting the skin. This is also a good time to check fit the flap to the wing prior to bonding the lower skin. Remove from table and temporarily tape together the skins and fit to the wing to be assured that you will have a good fit up.

Adjust if required by sanding spar and ribs. Correct any fit up errors noted, and clean all the loose material and prepare by cleaning and roughening surfaces in any bond areas. Re-attach to the flat table. Mark the location of the ribs and spar on the inside of the lower skin and sand a one inch wide area along these lines.

If you are satisfied with the fit of the upper skin, drill two small holes through both skins near the trailing edge to use for pinning together for the bonding operation

Crush the exposed edge of the core material in the top edges of the spar and the ribs, down about 1/8 inches.

Mix a thick paste of MICRO/FLOX and lay a protruding triangular "bead" (at least 1/8 inch above the edges) along all of the bonding edges except the trailing edge.

Along the trailing edge lay a triangular 1/4 inch bead of FLOX./MICRO (heavy on the FLOX.).

On the upper skin, in the area where the edges of the lower assembly will bond, wet out with resin all areas marked for bonding. A wetted 1 inch wide 1 ply BID in this joint area will help assure a structural bond.

Set the top skin in place, pinning the location using the holes drilled earlier near the trailing edge, and weight it down along the length over each of the ribs, spars and trailing edge. Clean away any extruded bonding material and allow to cure.

2
Trailing edge
or all SPARS

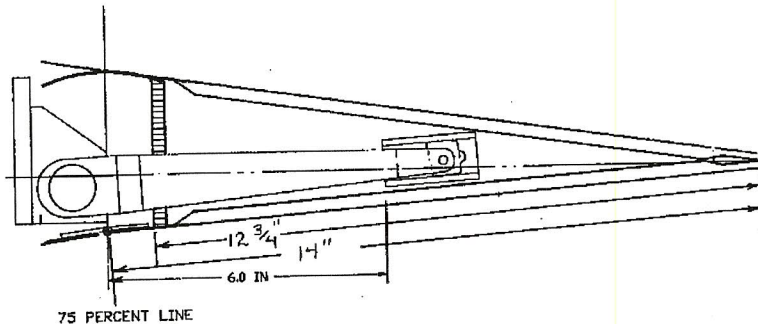
Make a small inside corner fillet with the FLOX/MICRO on any of the new inside corner joints cleaning away any excess material extruded from the joint, and adding material as required.

When the bond has cured, laminate 3 ply BID on both of the end ribs overlapping the inner surface of both skins. "Green trim" the edges, and clean open the holes in the inboard rib where the nut plates are located.

Using the "Pre-Lam" technique, laminate 3 layers of BID on the front face of the spar overlapping to both the top and bottom skins. Apply a 10 inch by 3 inch 3 ply pad in the areas of the three 8 inch hinge sections overlapping the spar by at least 1 inch. (reference locations in drawing, and reference the wing assembly for hinge location)

MOUNT TRACK

The relationship of the flap actuator track to the actuator arm is shown in the figure above

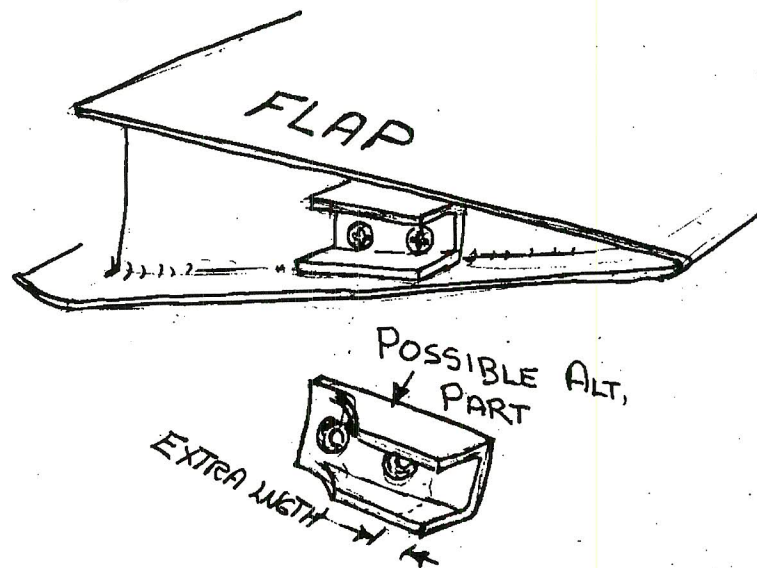


Install the flap track using the supplied flat head 10-32 screws (MS - 24694-556). Tighten screws, but do not bond in place until the location has been verified in final assembly, at which time the tracks may be final adjusted and shimmed to assure proper synchronization between the flaps on both sides, prior to final bonding in place.

How do you FINAL Bond in place

FLAP ACTUATOR TRACK

With Bill Grote's plan, which we are treating a bit like a second demonstrator, we found that the flap actuator arm placed the plastic slider very near the aft end of the track. This was at least partly due to the low placement of the support bearing (see above). However, if this problem is evident with your assembly, the actuator track can be removed from the flap, and a new one fabricated with a bit more length for assurance. The forward flanges may need to be cut back as shown in the sketch to avoid interference with the actuator arm



MOUNT HINGES -

Locate the hinges as shown on the drawing, and locally trim the flap edges about 1/16th inch to fit the hinge bead slightly into the flap surface. This will aid in keeping a minimum gap and a smooth surface at the wing/flap interface. We suggest using countersunk flat head screws and self locking nuts. Using nut plates on one or both sides (flap side or wing side) may speed assembly or disassembly, but is optional. Again reference the wing assembly for final location of bolts.