

## Assembly Manual – Mustang 3 Wing



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	15M wing	17M wing	19M wing		Mustang 3 19M
Wing Weight	115 lbs.	124 lbs.	127 lbs.		
Gross Weight	1060 lbs.	1060 lbs.	1060 lbs.		Stall 25 Min 30 Trim 37-40 Usable 47 Top 50 VNE 55
Wing Area	160 sq. ft.	187 sq. ft.	206 sq. ft.		<b>Mustang 3 17M</b>
Wing Span	31.5 feet	33.9 feet	33.9 feet		Stall 27 Min 32 Trim 40-45 Usable 50 Top 55 VNE 60
Aspect Ratio	6.2 : 1	6.1 : 1	5.8 : 1		<b>Mustang 3 15M</b>
Double Surface	35 %	35 %	35 %		Stall 30 Min 36 Trim 45-50 Usable 60 Top 65 VNE 65
Air Frame	6061/7075	6061/7075	6061/7075		
Sail Fabric	8 oz.	Dacron			
Ribs	16	18	18		

Light Sport Aircraft Wing

# MUSTANG 3

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# General Information

## Introduction

Congratulations on your purchase of the North Wing Mustang 3 light sport aircraft wing kit. The Mustang 3 Wing is a 2-place, weight-shift controlled light sport aircraft wing constructed of high quality aircraft-grade materials. The wing is available in 15M, 17M, and 19M sizes. The assembly process will provide a strong familiarity with your wing's components that will help you maintain and enjoy this trike wing for many years of fun flights.

## Tools Required

1/8" and 3/16" Hex Tools	Rubber Mallet
Inclinometer	Open-End Wrench Set
1/4" Drill Bit	3/8" Drill Bit
3/16" Drill Bit	1/2" Deburr Drill Bit (Counter Sink)
"F" Drill Bit (3/1000 oversize - included in kit)	9/16" Drill Bit

## Supplies Required

Silicone Spray	
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## Bolt Installation – “Snug-Tight” and Washer Advisory

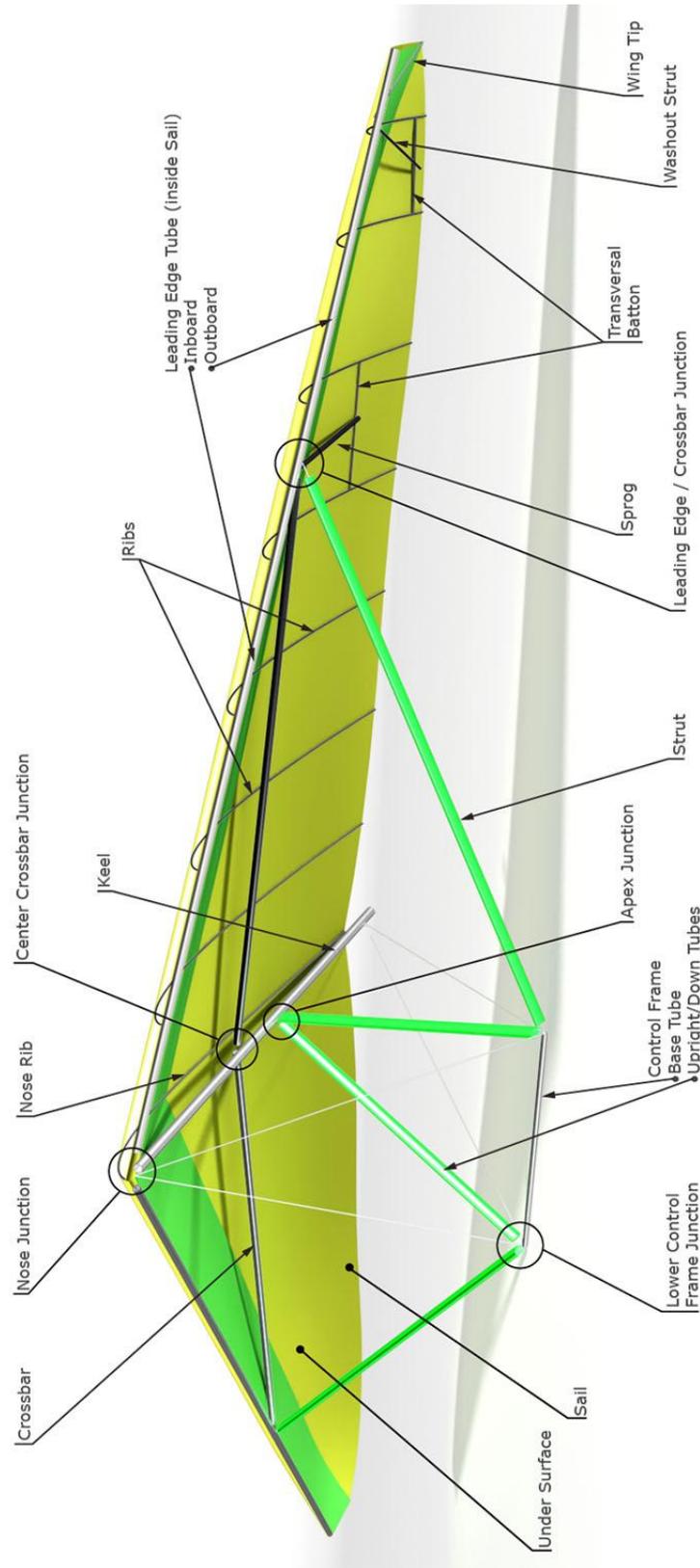
Unless otherwise noted, bolts should be installed with “snug-tight” torque, where the bolt is tightened to ensure the faces of the parts assembly are in firm contact, and the wrench has been turned to refusal.

**Note:** During wing assembly using various bolts and nuts, the type of washer used varies. Sometimes the washer required is “thin”, sometimes it is “thick”. A general advisory regarding optimal assembly with bolts on the wing is: **When the Nylock or Castle nut is being tightened to the final torque, the end of the bolt should be showing 2 or 3 rows of threads.** When using washers, there may be times when using a thin, or thick washer may help arrive at that goal of showing 2 or 3 rows of threads.

## Cadmium-electroplated Bolts Advisory

When installing bolts, it is best to try to minimize any scratches to the surface of the bolt, due to the health risks associated with disturbing the Cadmium plating. The Cadmium plating provides excellent corrosion resistance, so it is beneficial to not scratch the plating. To ensure the best insertion of a bolt through a hole, first carefully run the correct size drill bit through it (if 1/4" hole, use the slightly-oversized “F” bit). Next, rather than twisting a bolt through a tight hole, it is better to give it a moderate impact with a rubber hammer to get the bolt through the hole, as this will minimize the possibility of corrupting the bolt's electroplated Cadmium surface. Wash hands after handling these items.

# Mustang 3 Wing – main parts and assembly junctions



**MUSTANG SERIES**

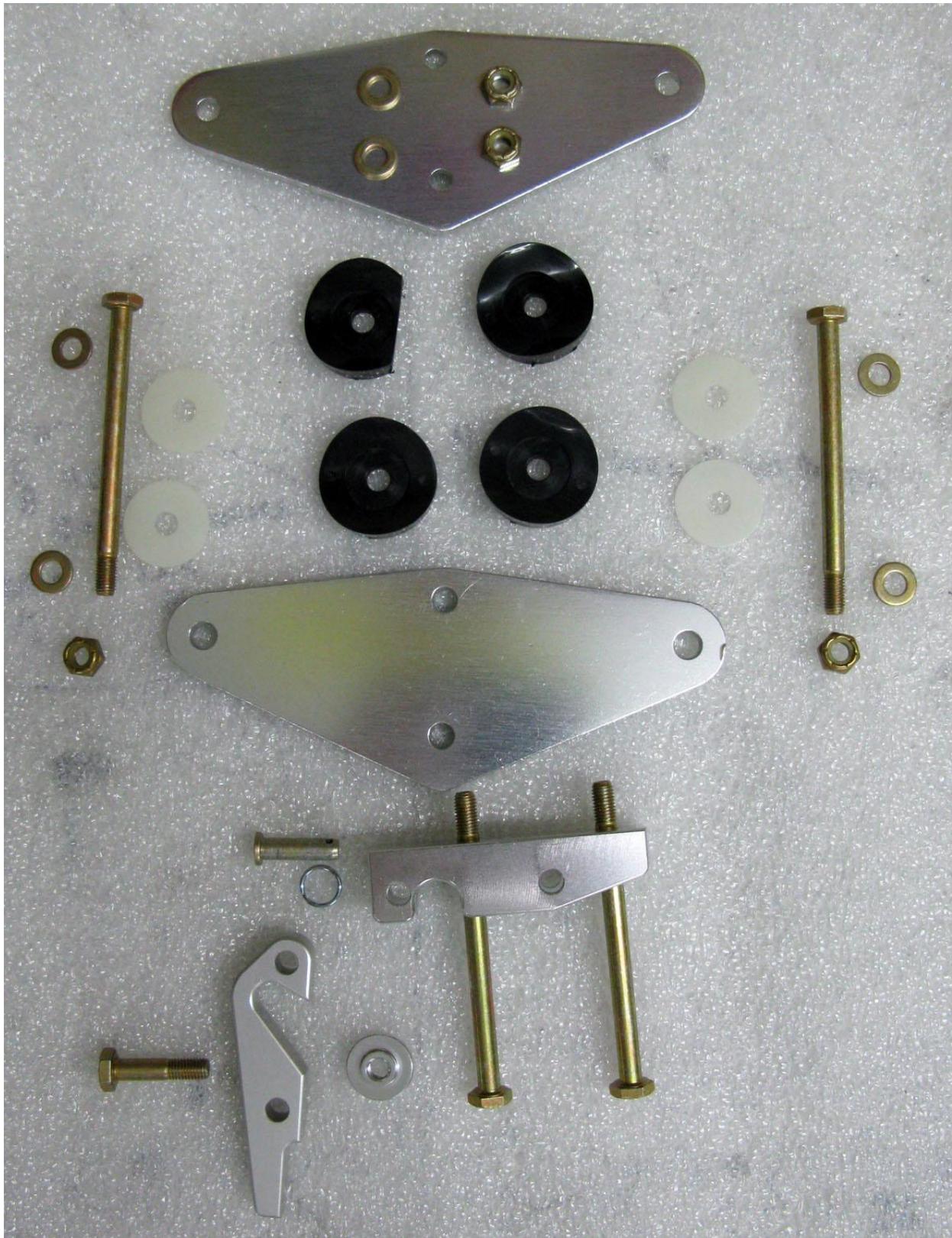
**NOORTH WING**

# Nose Plates Assembly

## Tools and Supplies Needed

¼" Drill Bit, "F" (3/1000 oversize) Drill Bit, ½" De-Burr Drill Bit, Open-End Wrench Set, Silicone Spray

Photo: Nose Plates



## Assembly Notes – Nose Plates to Keel and Leading Edges

Refer to the Schematic Diagram labeled “Nose Plate Wing Junctions” for this phase of wing assembly.

1. On the Keel tube, drill-out the two holes on the top of the keel with a ¼” drill bit. Optionally, use the “F” 3/1000 oversized bit to create a hole that is easier to pass the bolt through.

Next, drill the two holes on the bottom of the keel at the nose end. Finish these holes by gently de-burring the holes with a ½” De-Burr (countersink) drill bit. Be careful to only de-burr the holes, without excessive drilling that is unnecessary.

### Photo: Nose Catch Channel and lower Nose Plate Assembly

2. Prepare the Nose Catch Channel for attachment to the lower Nose Plate by attaching the Latch to the Channel with the ¾” Clevis Pin, and secure with 3/8” Safety Ring. Insert the AN4-7 bolt through hole in channel, and secure with castle nut and safety pin.

3. Insert the two AN4-32A bolts through the holes in the Nose Catch Channel, and through the two black Saddle Spacers. Insert Nose Plate Assembly through bottom of keel.

4. Add 2 black Saddle Spacers. Spacer with flat side is placed closest to nose of wing with flat-side facing forward, so Top Ribs can set on posts. Add Top Nose Plate, 2 thick washers, and tighten Nylock nuts to snug.



Photo: Attaching Top Nose Plate to Keel



### Photo – Attaching Leading Edges to Nose Plates

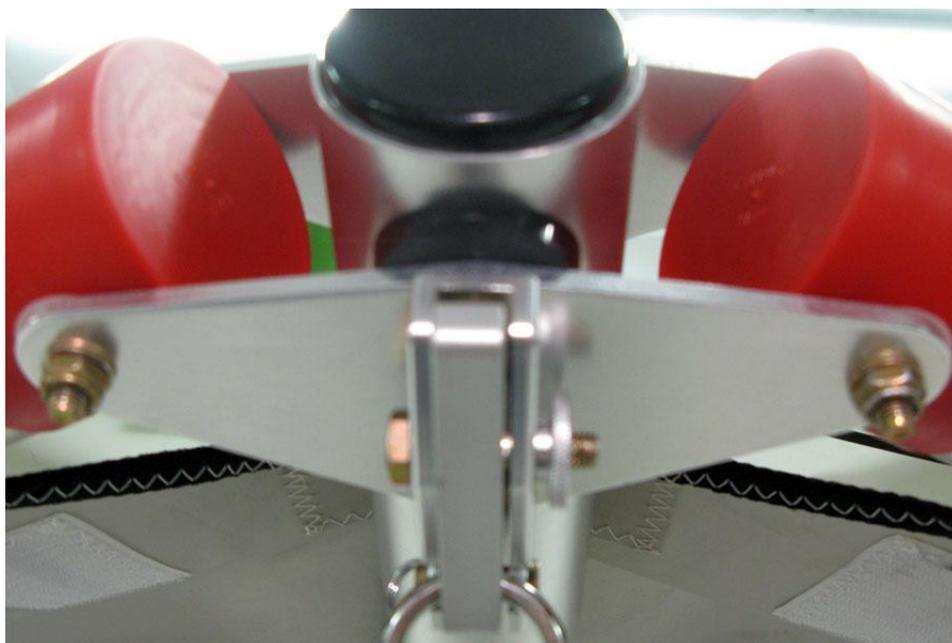
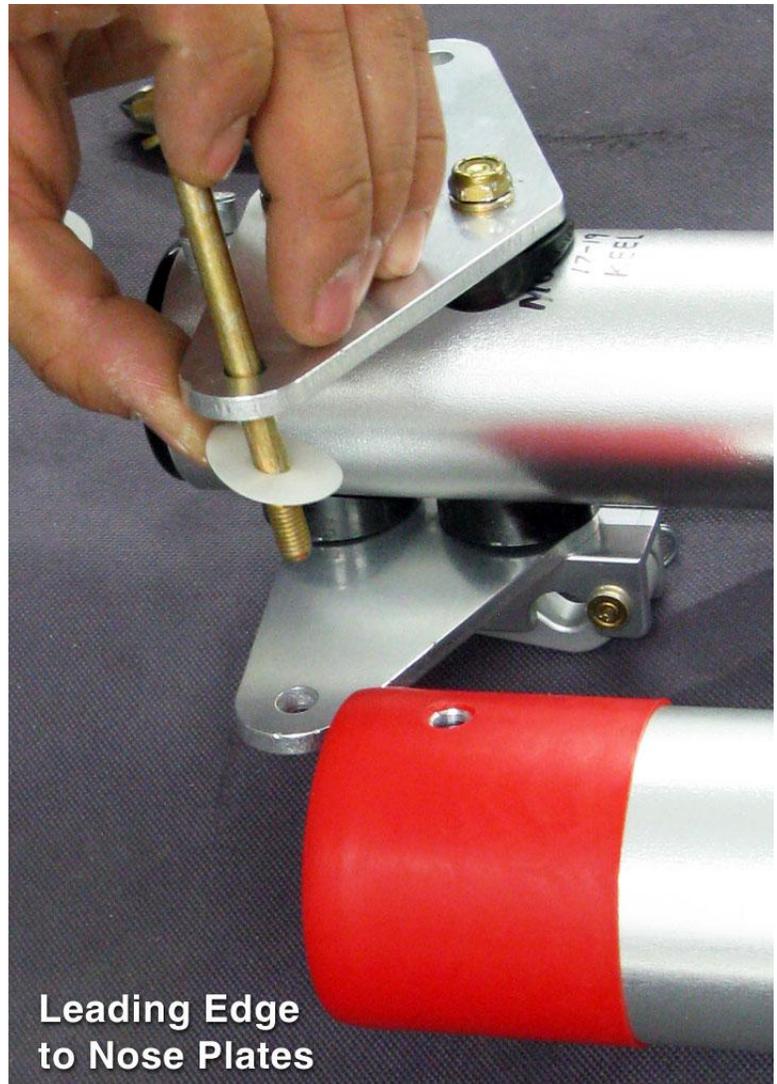
5. Drill out the pilot holes at the front of both Leading Edges (one hole on each tube).

6. Slide red plastic End Caps (2 3/8" diameter) over the front of both leading edge tubes. A small amount of Silicone Spray may be helpful for sliding caps over tubes.

7. Finish these holes by gently de-burring the holes with a 1/2" De-Burr (countersink) drill bit. Be careful to only de-burr the holes, without excessive drilling that is unnecessary.

8. Insert left leading edge tube between the nose plates. Insert both 1/4" bolts (with head of bolt at top of nose plate) with mylar washers, as depicted in the "Nose Plate Wing Junctions" schematic diagram.

9. Insert right leading edge tube between the nose plates. Insert both 1/4" bolts (with head of bolt at top of nose plate) with mylar washers.



# Cross Bar Center Plates Assembly

## Tools and Supplies Needed

¼” Drill Bit, “F” (3/1000 oversize) Drill Bit, ½” De-Burr Drill Bit, Open-End Wrench Set, Silicone Spray

## Assembly Notes – Cross Bar Center Plates Assembly

Refer to the Schematic Diagram labeled “Cross Bar Center Junctions” for this phase of wing assembly.

### Photo: Cross Bar ends drilled, capped, ready for plates

1. Drill out the two pilot holes at the “flush cut” end of cross bar (not the tapered end) with ¼” drill bit, or “F” bit for easier bolt clearance.

Drill the top holes first, then flip cross bar tube over and drill-out the bottom holes.

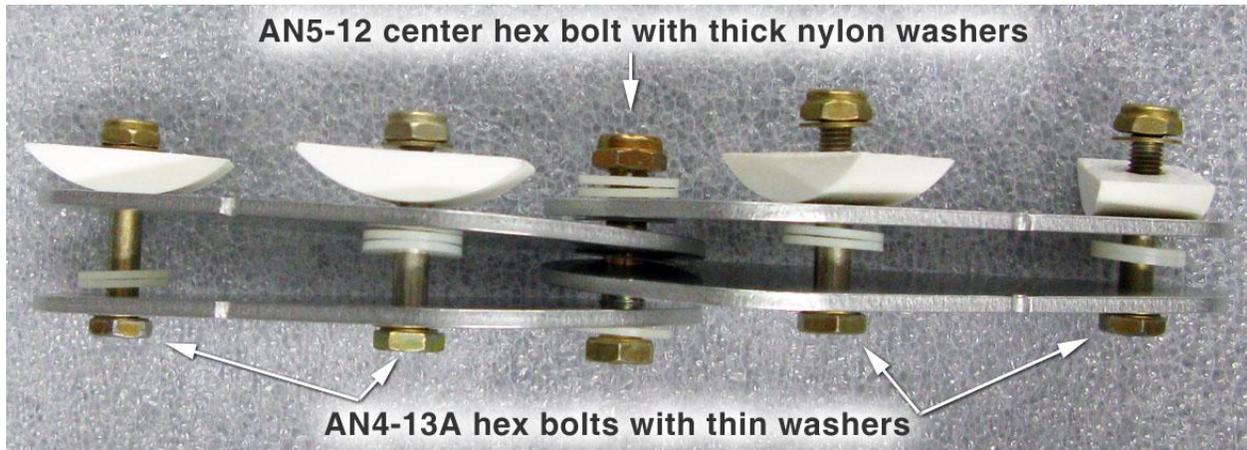
2. Attach the red plastic End Caps to the cross bar. Apply a small amount of Silicone Spray to make it easier to attach the caps.

3. Use the ½” de-burr bit to gently de-burr the four holes you have drilled, ensuring that you do not drill excessively.

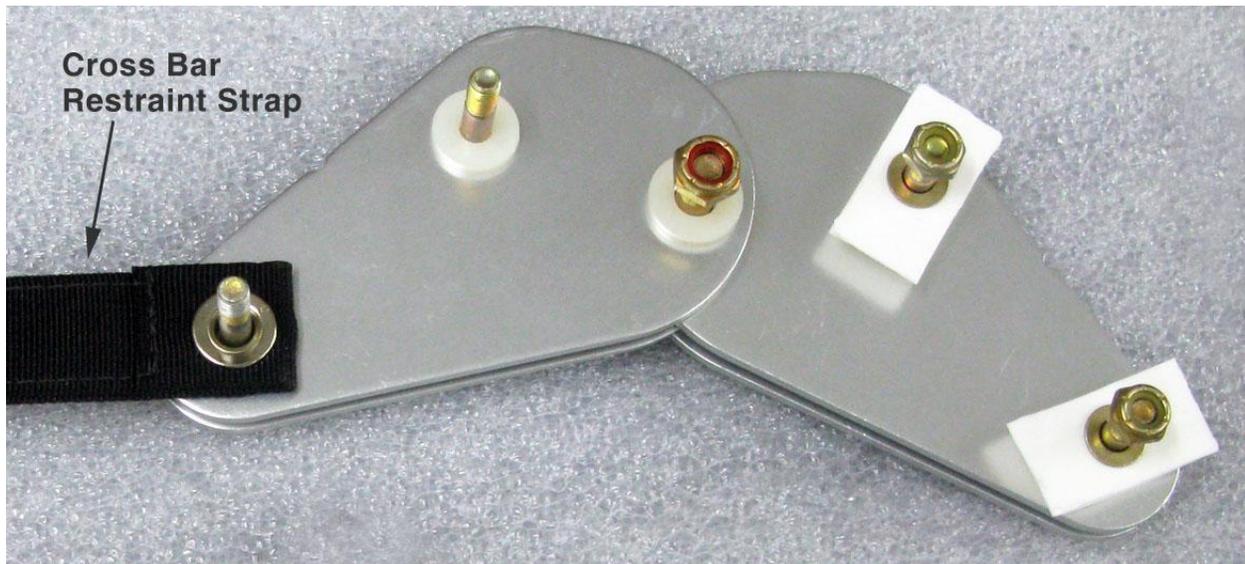


4. Prepare the center plates to be attached to cross bar tubes by using the Schematic Diagram labeled “Cross Bar Center Junctions” to arrange the layout of plates with bolts, half-spacers, washers, and Nylock nuts.

**Photo: Side View of Center Cross Bar Plates with bolts, washers, and thin Nylock nuts**

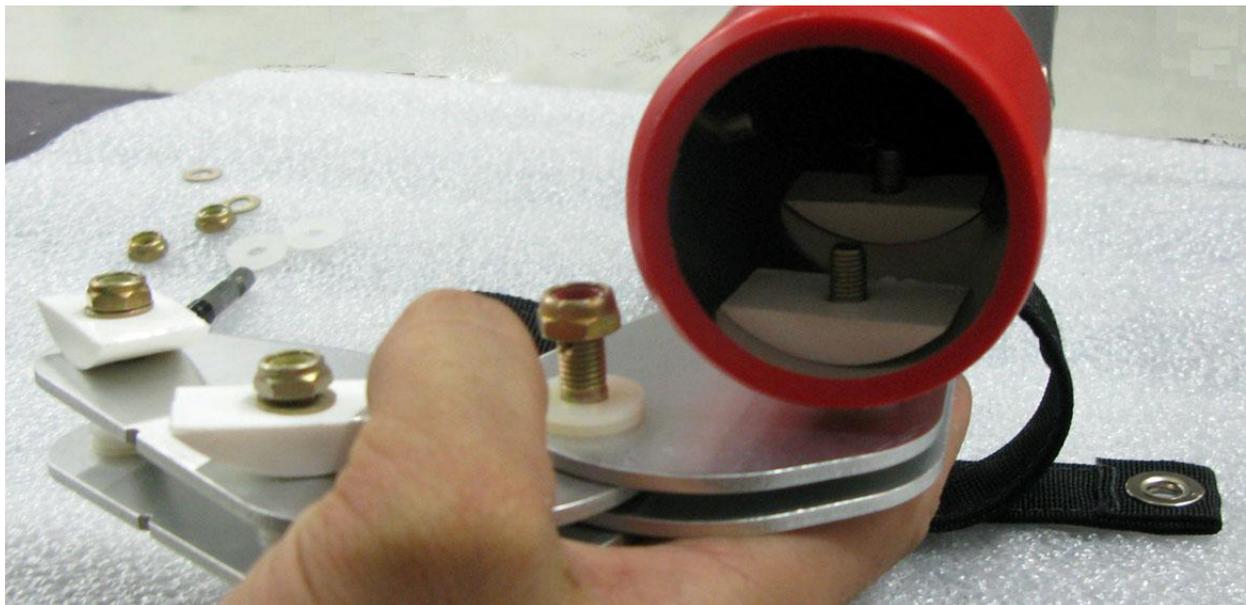


**Photo: Cross Bar Restraint Strap placed on rear bolt**



5. Place the Cross Bar Restraint Strap on the rear bolt of the plate assembly – the bolt located at the narrow end of the plate.
6. Attach the cross bar plates to the cross bar tube with Green tape on it - the right side cross bar tube. Place the white half spacers on the bolts and within the tube, and secure with thick washers and thin Nylock nuts, per the schematic diagram and parts list.

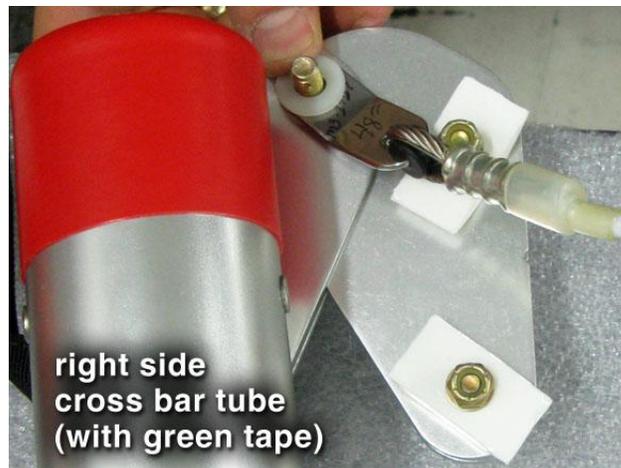
**Photo: Cross Bar Plates attached to right side Cross Bar tube**



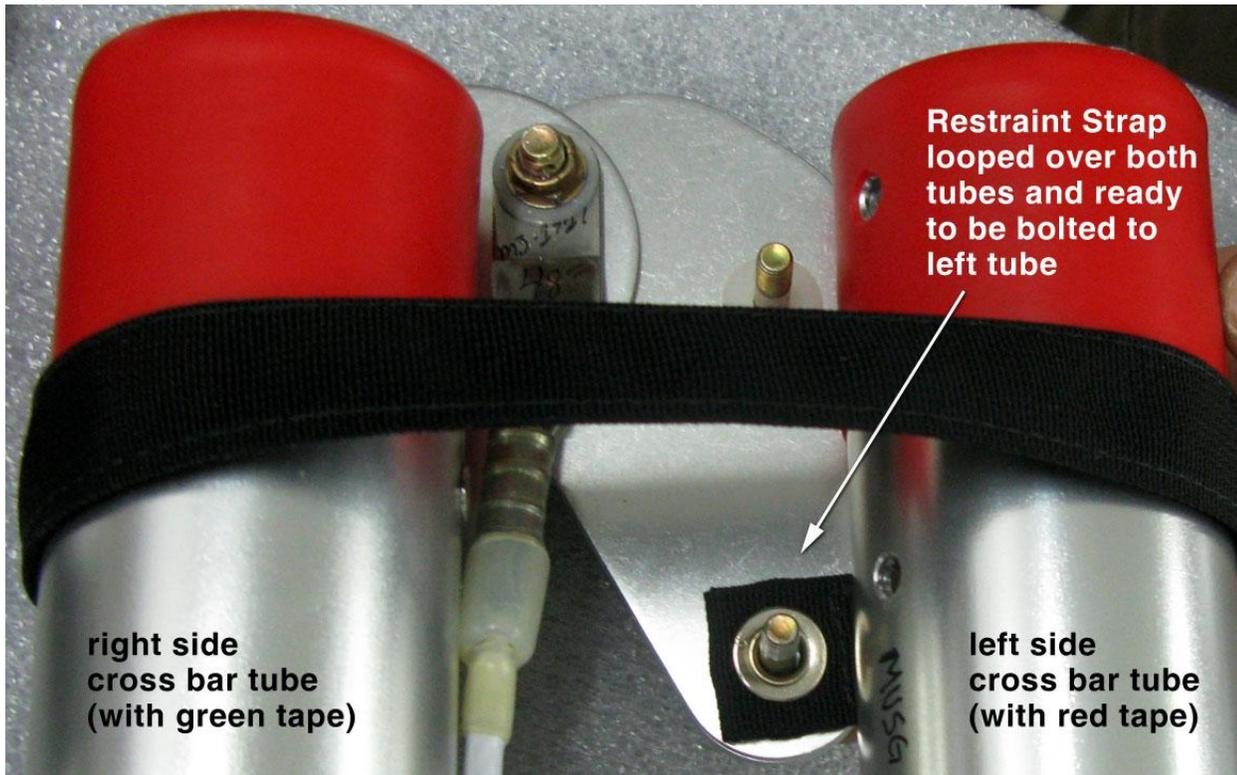
**Photo: Cross Bar Restraint Cable attached to bolt**

7. Attach the Cross Bar Restraint Cable to the center 5/16" diameter AN5-12 hex bolt, using a thick nylon washer on each side of the metal tang, and secure it with a thin Nylock nut and Safety Ring per the Schematic Diagram.

8. Take the Cross Bar Restraint Strap and pass it over both tubes, then under the left tube and place it on the rear bolt, as was done on the right tube. Refer to photo below.

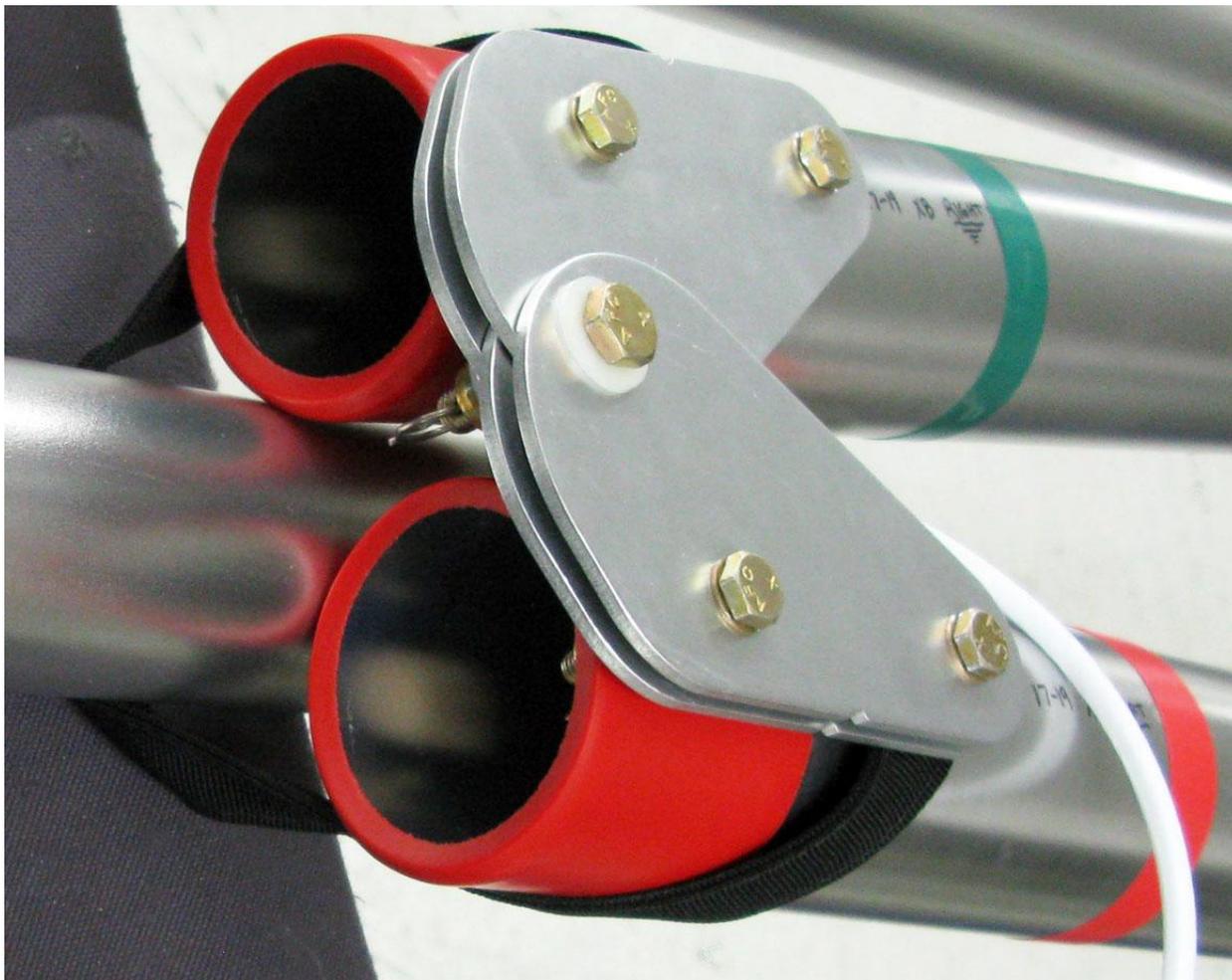


**Photo: Attaching the Cross Bar Restraint Strap to left Cross Bar tube**



9. Turn the Cross Bars assembly over, so plates are on top, and slide over the rear of the keel with the restraint strap under the keel. Slide the center plates assembly forward, up to the nose of the wing.

**Photo: Cross Bar Tubes over Keel with Restraint Strap in position**



## Cross Bar Restraint Cable – Rear Shackle Assembly

### Tools and Supplies Needed

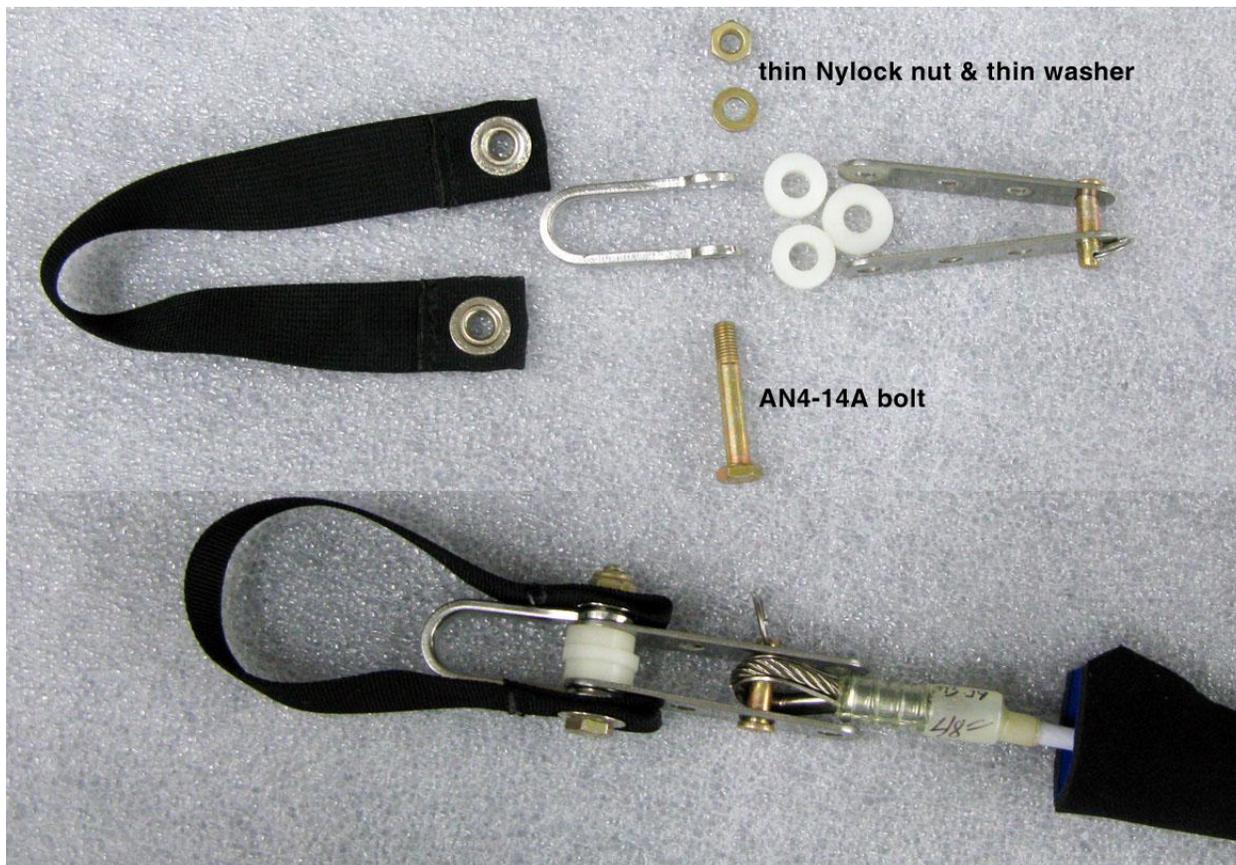
Open-End Wrench Set

### Assembly Notes – Cross Cross Bar Rear Shackle Assembly

Refer to the Schematic Diagram labeled “Rear Keel Junctions” for this phase of wing assembly.

1. Slide the narrow end of the Neoprene Sleeve over the rear of the Cross Bar Restraint Cable.
2. Attach the rear end of the Restraint Cable to the haul-back shackle assembly by placing the end of the cable between the 4-hole Adjustable Tangs, and insert the 7/8” Clevis Pin into the second-from-right-side holes, as shown in photo below. Secure the pin with a Safety Ring.
3. Insert the AN4-14A bolt through the Webbing Strap, through the side hole of the Bow Shackle, through the nylon washers, through the other side of the Bow Shackle and Webbing Strap, and secure with a thin washer and thin Nylock nut. Refer to the diagram and photo below.

**Photo: Cross Bar Restraint Cable – Rear Haul-Back Shackle parts and assembly**



# Lower Control Frame Junctions Assembly

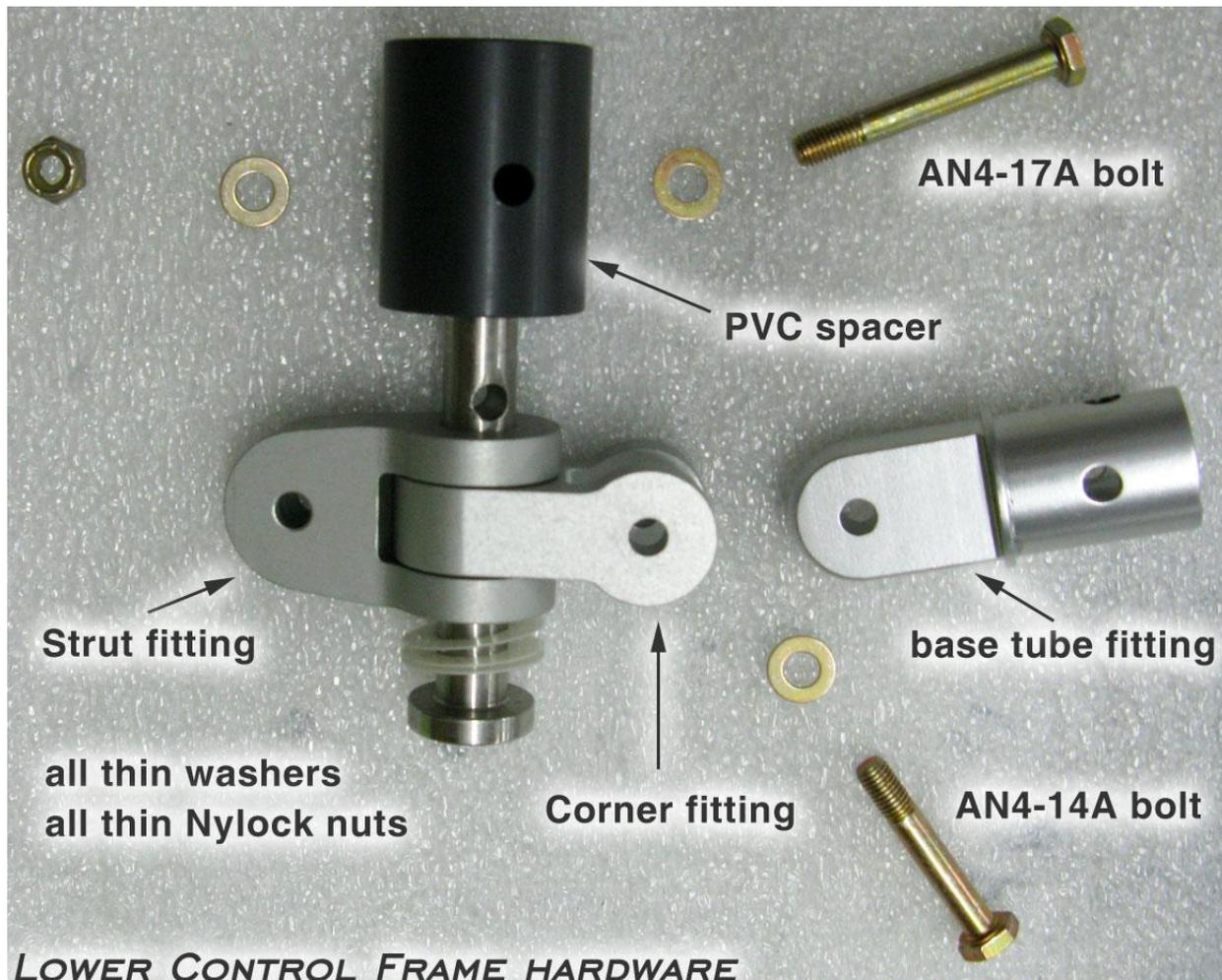
## Tools and Supplies Needed

Open-End Wrench Set

## Assembly Notes – Lower Control Frame Junctions

Refer to the Diagram labeled “Lower Control Frame Junctions” for this phase of wing assembly.

**Photo: Lower Control Frame parts**



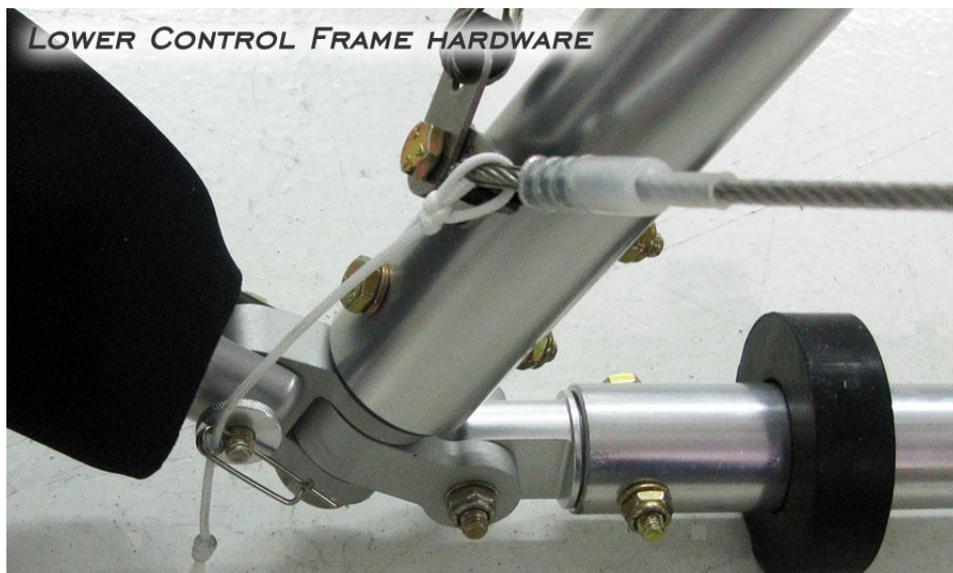
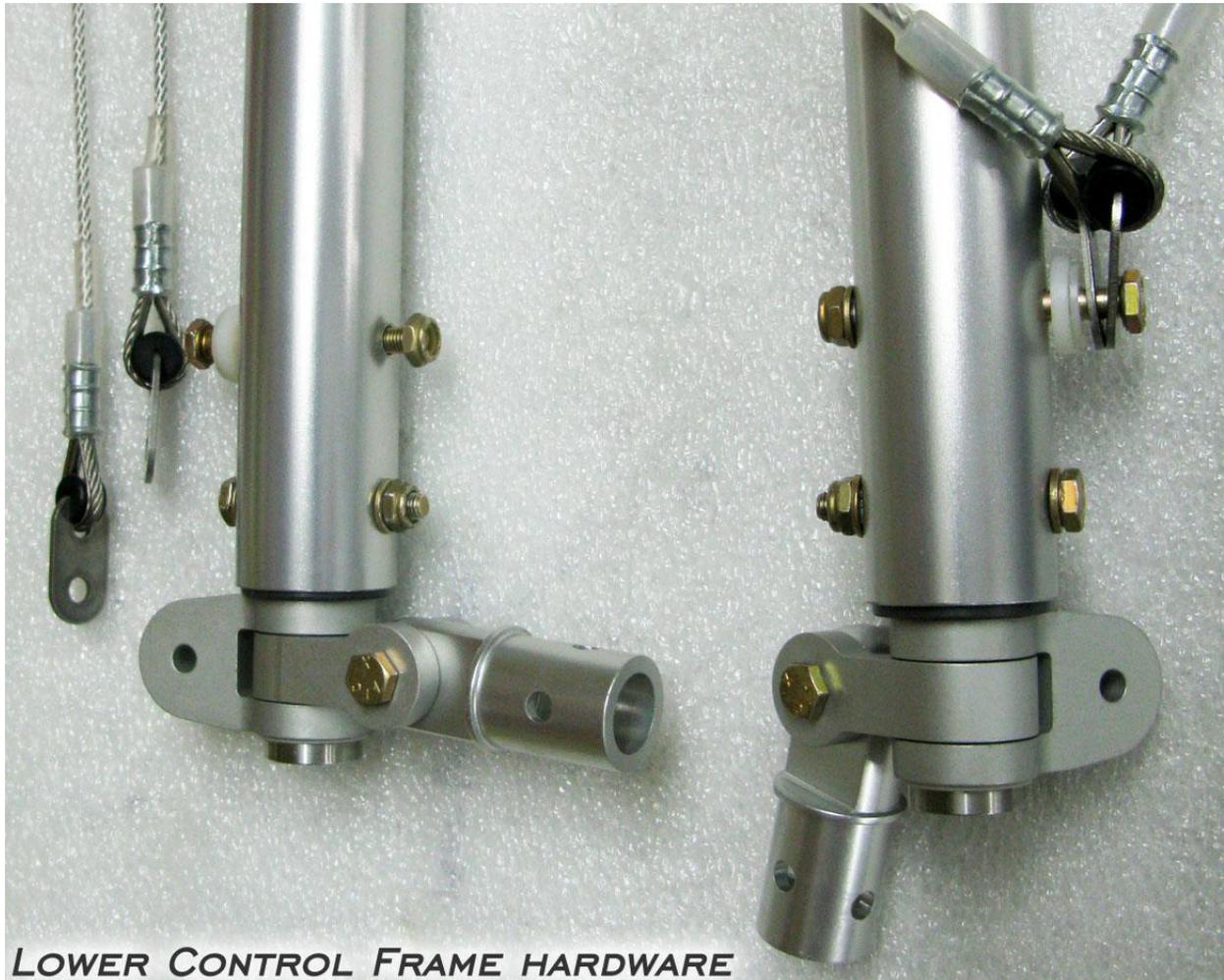
1. Insert the Stainless Steel Pin through a ½” Mylar washer, then through the Strut Fitting, then through another Mylar washer, then through the Corner Fitting, then through another Mylar washer, then through the top of the Strut Fitting, and into the PVC Spacer.

2. Secure the Control Frame Upright (“down tube”) to this assembly by sliding the down tube over the PVC spacer, and inserting the AN4-17A bolt through the down tube, PVC spacer, and the hole in the internal steel pin. Insert the bolt so the head of the bolt is on the outside of the down tube (on side with strut), use a thin washer on each side, and tighten to snug with a thin Nylock nut.

3. Attach the Base Tub Fitting to the Corner Fitting with a AN4-14A bolt, use a thin washer on each side, and secure with a thin Nylock nut. The head of the bolt should be toward the rear, toward the pilot. Slide a black Base Tube Skid on each end of the Base Tube. Connect the right side of the Base Tube to the Base Tube Fitting with the AN4-14A bolt, secure it with a thin metal washer and Nylock nut.

4. Insert the upper bolt through the hole in the down tube (with head of bolt on side with strut) as follows: Insert the bolt through the Rear Cable Tang, then through the Front Cable Tang, then through a thin Nylon washer, then through a thick Nylon washer then through the down tube, then through a thin metal washer, then tighten the thin Nylock nut to snug tightness.

**Photo: Lower Control Frame parts – partial assembly**



# Control Frame Apex Junction Assembly

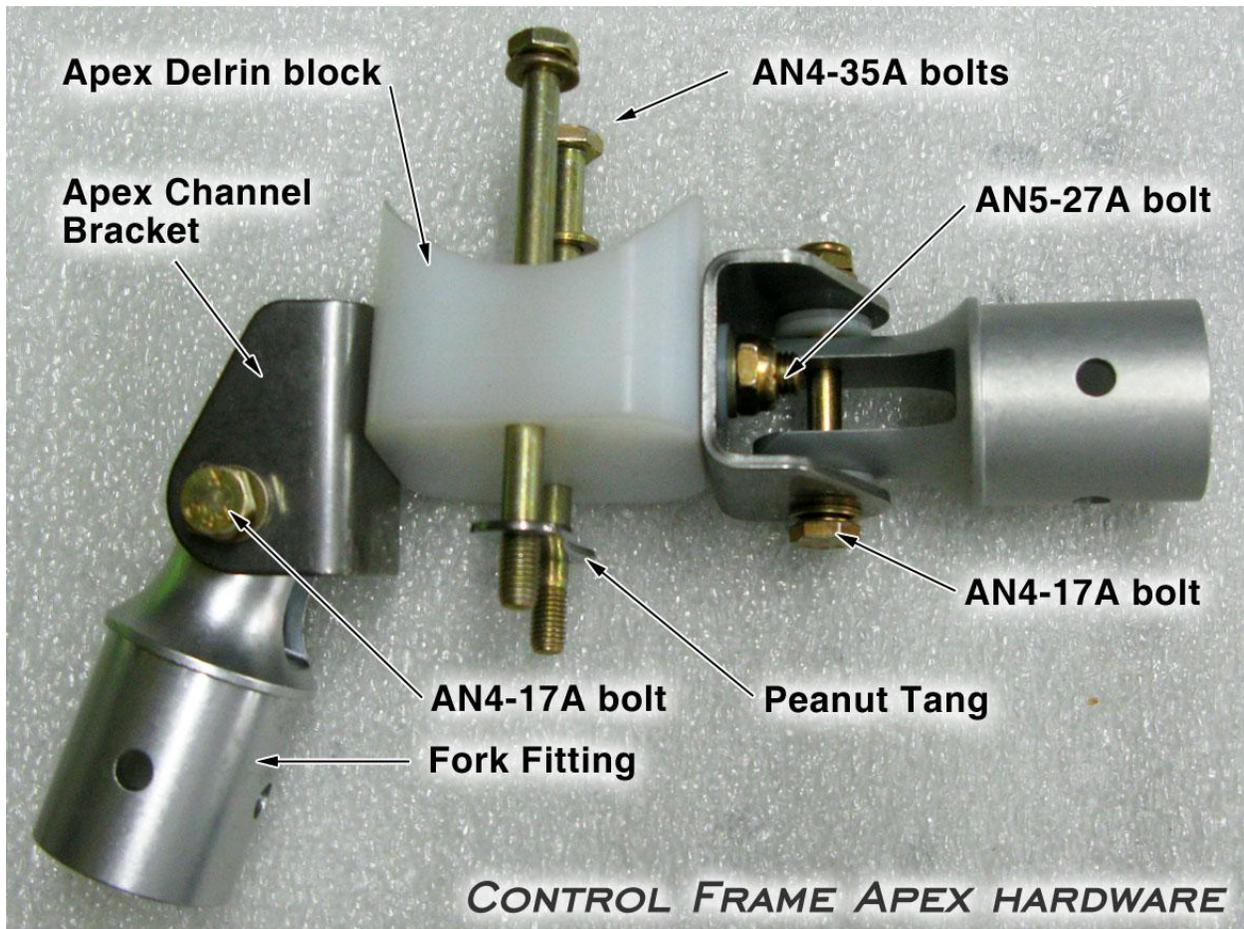
## Tools and Supplies Needed

Open-End Wrench Set, 1/4" Allen Wrench

## Assembly Notes – Control Frame Apex to Keel Junction

Refer to the Diagram labeled “Control Frame Apex to Keel Junction” for this phase of wing assembly

Photo: Control Frame Apex hardware

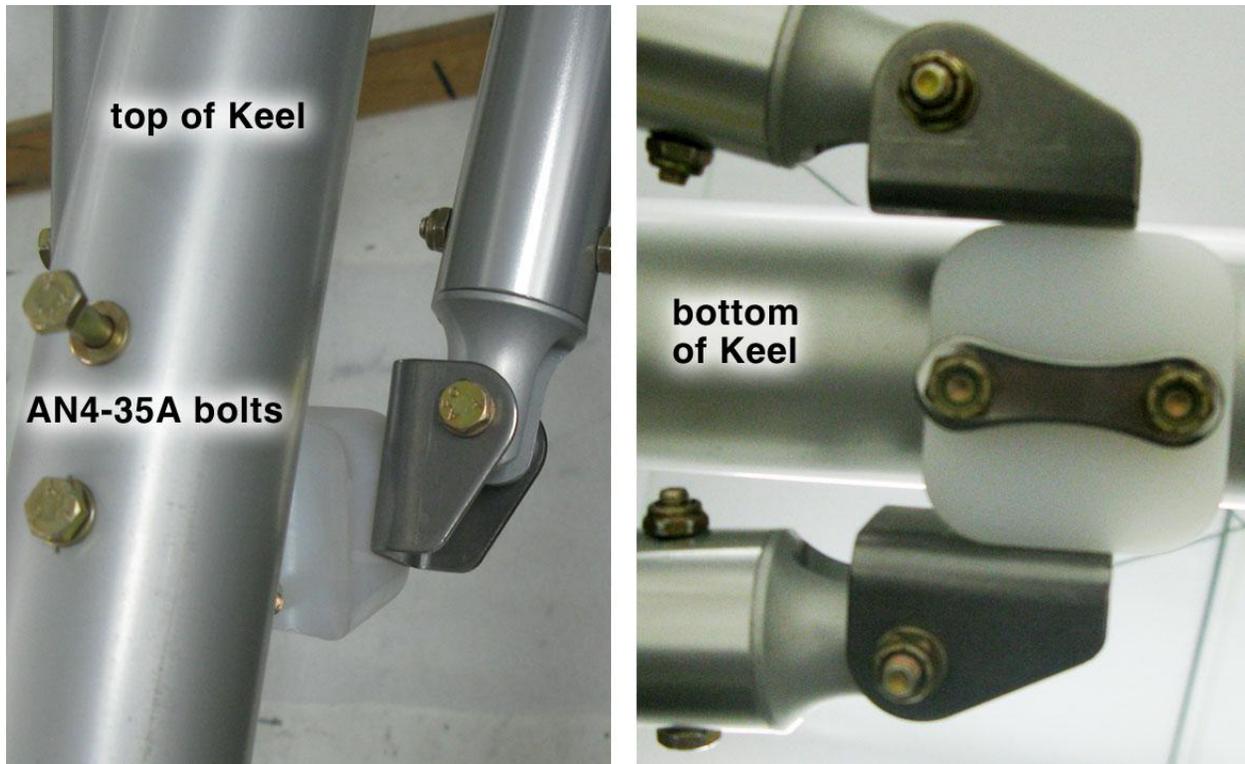


1. Attach the two Apex Channel Brackets to the white Apex Delrin Block as follows:  
Insert the 5/16" diameter AN5-27A bolt through a thick washer with 5/16" hole, then through a thick Nylon washer, then through the Apex Channel Bracket, then through the white Delrin block, then through the other Apex Channel Bracket, then through a thick Nylon washer, then through a thick metal washer, then secure it with a thin 5/16" Nylock nut.
2. Attach both Fork Fittings to the Apex Channel Brackets as follows:  
Insert the 1/4" diameter AN4-17A bolt through a thick metal washer, then through the Apex Channel Bracket, then through a thick Nylon washer, then through the Fork Fitting, then through a thick Nylon washer, then through the other side of the Apex Channel Bracket, then through a thick washer, then secure it with a thin Nylock nut.

3. Attach each Control Frame Upright to the Fork Fitting by sliding the upright over the fork fitting, then insert a AN4-16A bolt through the upright, through the fork fitting, and secure it with a thin Nylock nut. Insert the bolts so the head of the bolt is on the outside of the upright, when the wing is set up.

4. Attach the completed Control Frame Apex assembly to the Keel as follows:  
Insert the AN4-35A bolts through a thin washer, then down through the hole in the keel, then through the white Delrin block, then through the Peanut Tang, then through a thin washer, then secure it with a thin Nylock nut. Tighten the nuts to snug, but do not over-tighten the nuts.

**Photo: Attaching the Control Frame Apex assembly to the Keel**



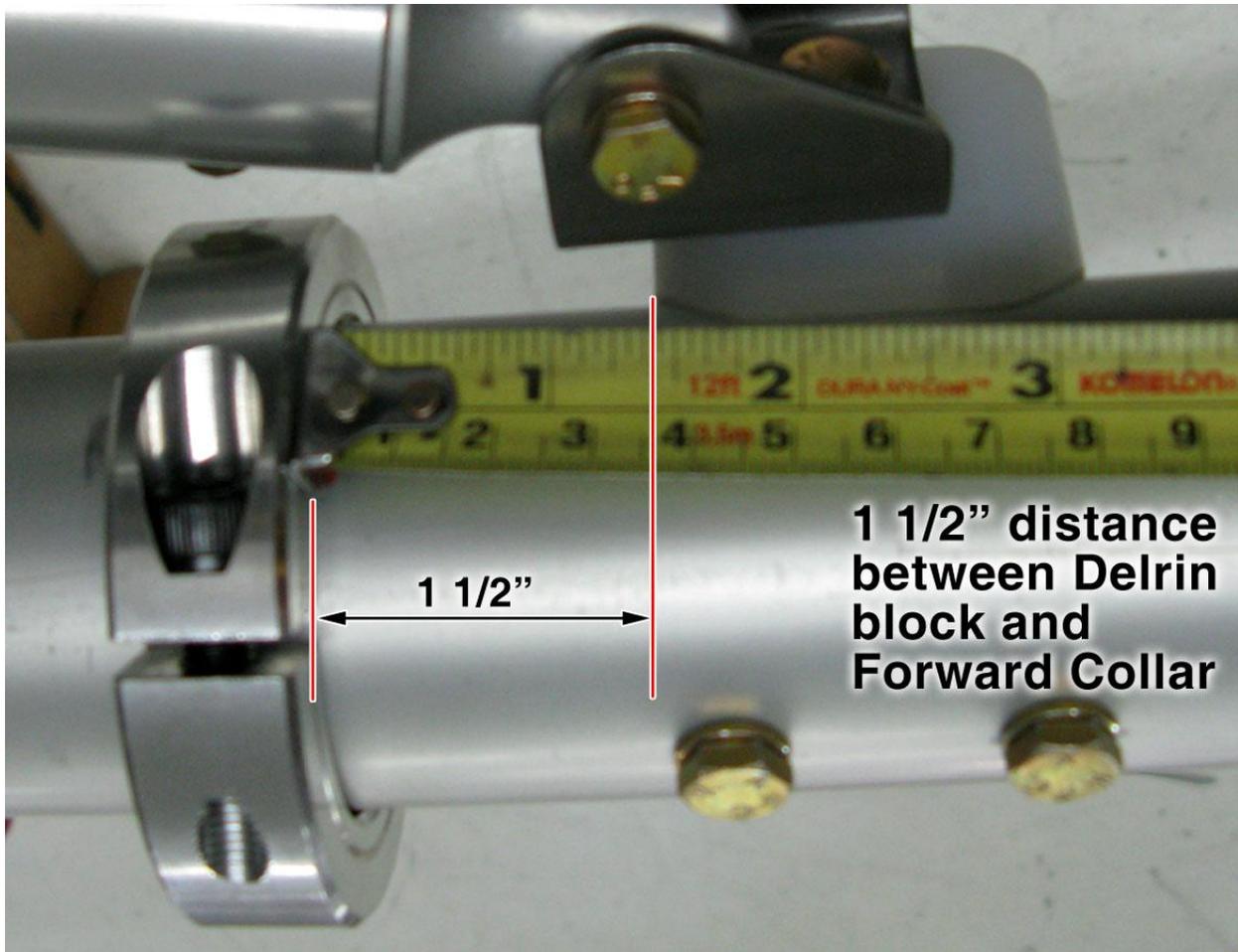
The Pivot Block that is attached to the mast of the trike connects to the keel and is held in place by the Forward Collar and Rear Collar.

5. Attach the Forward Collar to the Keel by placing each half of the collar over the keel, to the rear of the Control Frame Apex, and loosely tighten both bolts on the collar with a 1/4" Allen Wrench. Do not tighten the bolts too much, just enough to be able to slide the collar along the keel with minimal resistance.

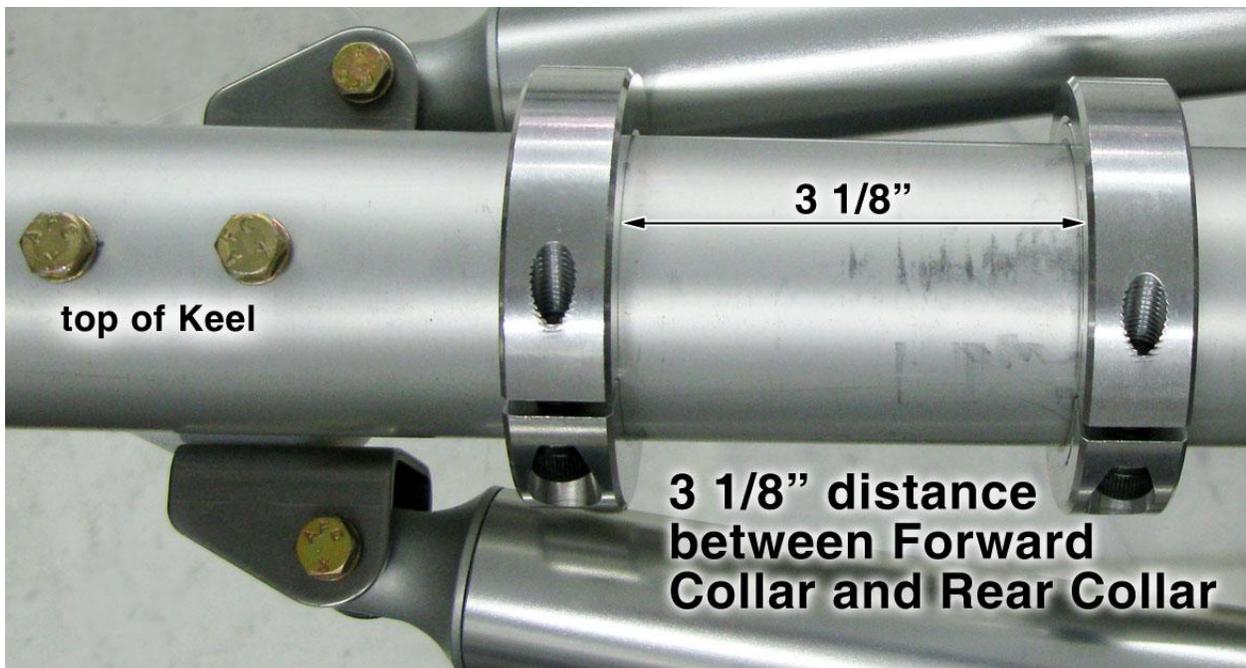
6. Locate the exact position for the Forward Collar by measuring a space between the white Delrin block and the side of the collar. This space between the white block and the side of the collar is 1 1/2". When you are certain you have the 1 1/2" space, tighten the bolts on the collar to snug, with approximately 20 lbs torque.

7. Attach the Rear Collar to the Keel by placing each half of the collar over the keel, to the rear of the Forward Collar, and loosely tighten both bolts on the collar with a 1/4" Allen Wrench. Measure a distance of 3 1/8" back from the side of the Forward Collar, then tighten the bolts on the rear collar collar to snug.

**Photo: Measuring distance to attach Forward Collar to the Keel**



**Photo: Measuring distance to attach Rear Collar to the Keel**



# Leading Edge to Cross Bar Junctions Assembly

## Tools and Supplies Needed

¼” Drill Bit, “F” (3/1000 oversize) Drill Bit, ½” De-Burr Drill Bit, Open-End Wrench Set

## Assembly Notes – Leading Edge to Cross Bar Junctions

Refer to the Diagram labeled “Leading Edge to Cross Bar Junctions” for this phase of wing assembly. These instructions show how to assemble the junction; **do these steps for both leading edge – cross bar junctions.**

**Photo: Drilling-out the pilot holes on Leading Edge tube at Cross Bar junction**

1. Slide the rear tube of the Leading Edge into the forward tube, until it stops. Rotate the aft leading edge tube so the pilot holes on top of forward leading edge are aligned with the pilot holes in the aft leading edge tube.

2. Insert a small Phillips screwdriver or some other small diameter rod into one of the top holes to pin it in place, then use the ¼” drill bit to drill-out the bottom hole. When this is completed, do the same to the other top and bottom hole – pin the top hole, then drill-out the bottom hole. Gently de-burr the holes with the ½” de-burr (or countersink) drill bit.

3. When the bottom holes have been drilled out, pin one of the bottom holes in place with a ¼” drill bit, then drill-out the corresponding top hole above it. When this is completed, do the same to the other top hole – first pin the bottom hole in place, then drill-out the top hole. Gently de-burr the holes with the ½” de-burr (or countersink) drill bit.

When the two holes have been drill-out and de-burred, the leading edge is now ready for the Leading Edge to Cross Bar junction assembly.

**Pin the top holes, and drill-out the bottom holes**



**Then Pin the bottom holes, and drill-out the top holes**

4. Place a thin washer over the AN4-27A Bolt, then insert it into the bottom side of the hole that is closest to the nose of the wing. Pass the bolt through the leading edge tubes, and place the small protective Mylar wrap on top of the bolt as it appears from below. Wrap the Mylar around the leading edge, toward the keel of the wing and then under the leading edge, and place it over the bolt again. Place a thin washer on top of the Mylar wrap, then secure it with a thin Nylock nut. This Mylar wrap protects the sail from abrasion caused by the head of the bolt. **Note: do not over-tighten the nut, to ensure that you do not tighten it too much and potentially deform the round shape of the leading edge tubes.**

Photo: Placing protective Mylar wrap around Leading Edge

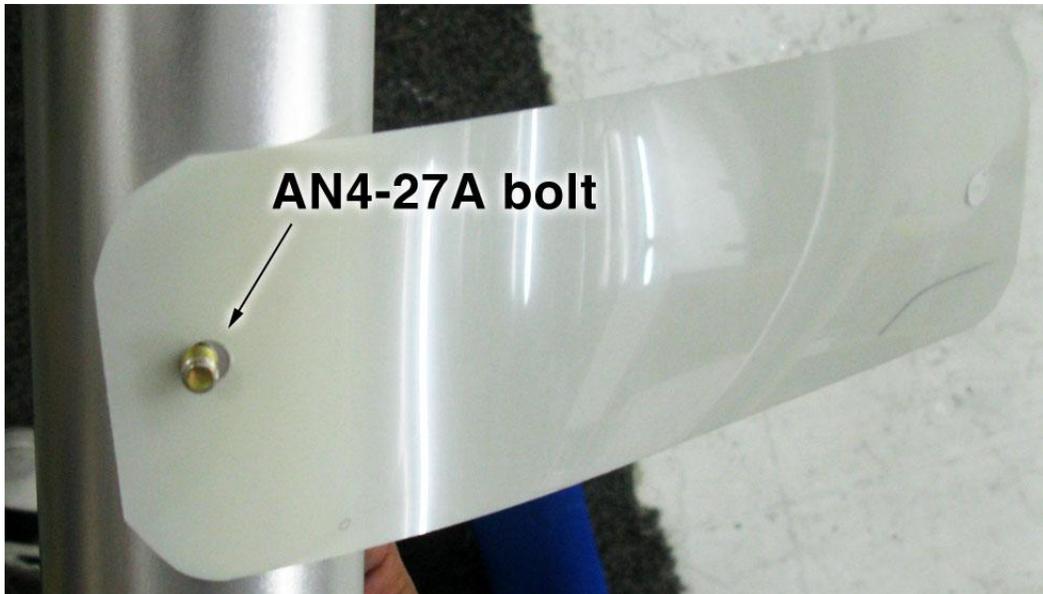
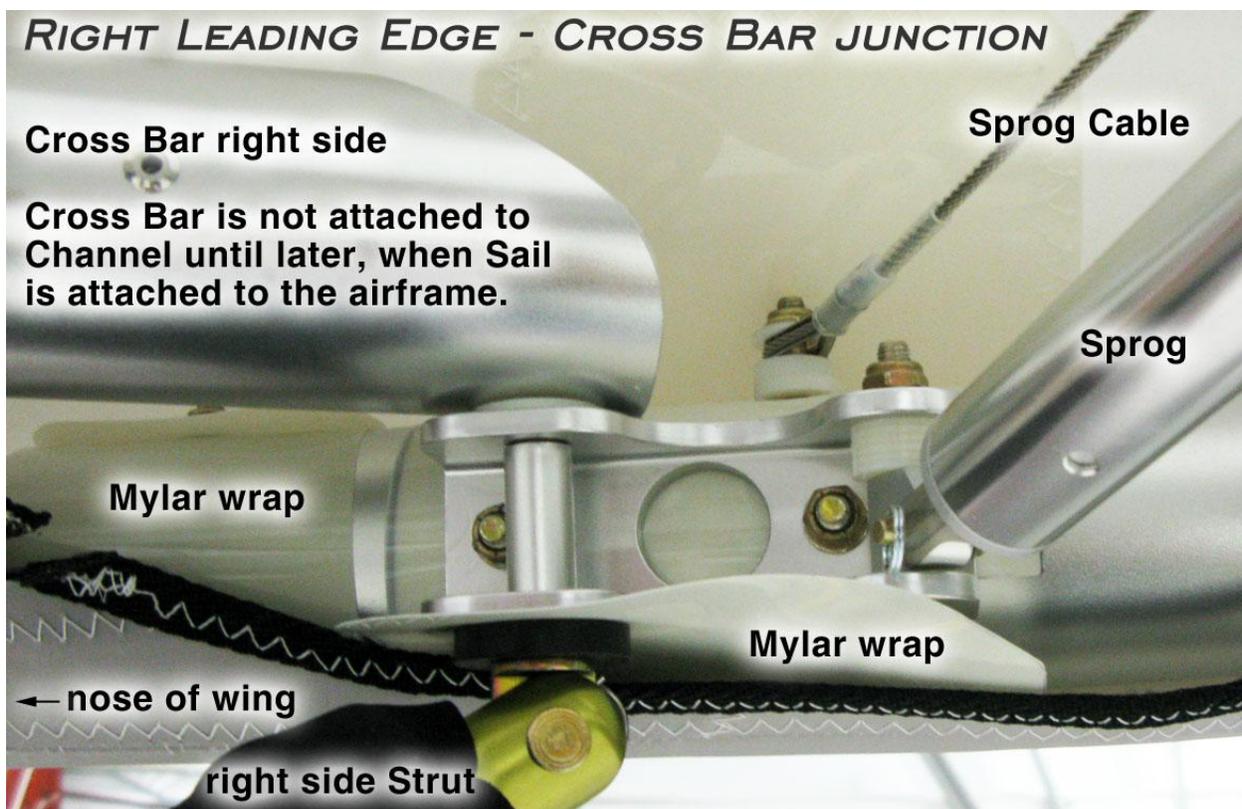


Photo: Leading Edge – Cross Bar Junction completed (after sail attached to frame)



5. Insert both AN4-31A bolts through the side of the Leading Edge, with the head of the bolts on the outer-facing side of the leading edge, and the bolt threads on the Keel side. Place the larger Mylar protective wrap over the two bolts when they pass through the leading edge, then place the Base Channel over the two bolts, with the 3/8" hole in the channel nearest to the nose of the wing. Place a thick metal washer over both bolts, then tighten the bolts to snug with a thin Nylock nut. **Note: do not over-tighten the nuts, to ensure that you do not tighten them too much and potentially deform the round shape of the leading edge tubes.**

**Photo: Side View and Top View of Mylar protective wrap at Leading Edge – Cross Bar junction**



6. Place a thin washer over the longer AN4-33A bolt, then insert it through the bottom of the leading edge. Hold the bolt head against the bottom of the leading edge, and add the Sprog washers and cable at the top as follows: add a 1/8" thick white Nylon washer (WN16) to the bolt, then add a 3/16" white Nylon washer (WN18), then wrap the Mylar over the bolt and washers, then add the Sprog Cable, then add a 1/16" white Nylon washer (WN14) on top of the Sprog Cable, then tighten a thin Nylock nut to snug to secure this bolt assembly. **Note: do not over-tighten the nut, to ensure that you do not tighten it too much and potentially deform the round shape of the leading edge tubes.**

**Photo: Wrapping Mylar over Leading Edge at Cross Bar junction**

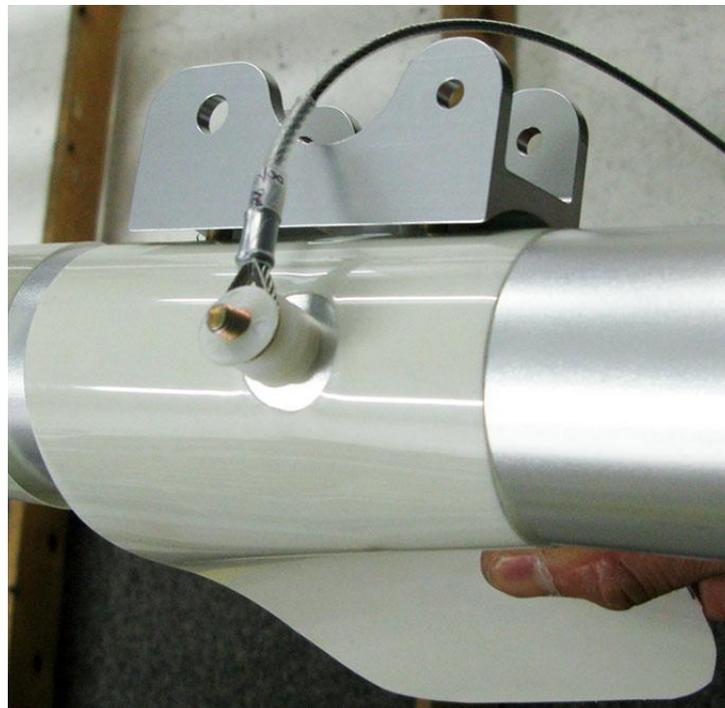
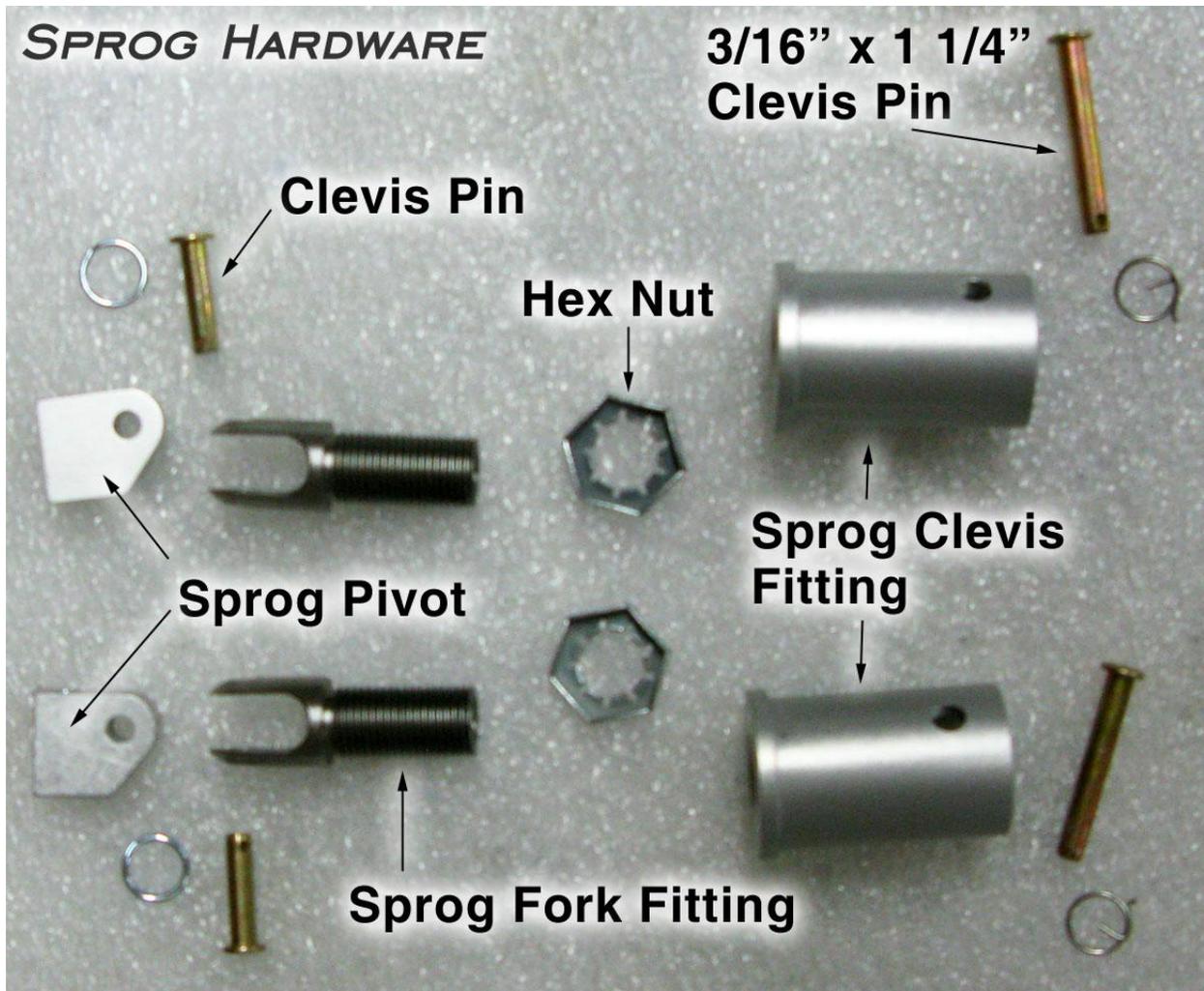


Photo: Sprog Hardware



7. Attach the Sprog to the Channel Bracket as follows:

- Screw the Hex Nut on to the Sprog Clevis.
- Screw the Sprog Fork Fitting into the Sprog Clevis Fitting.
- Insert the Sprog Clevis Fitting into the end of the Sprog, so the holes for the pin are aligned.
- Insert the 3/16" x 1 1/4" (2C41) through the Sprog, and add the 3/8" Safety Ring to secure it.
- Wrap the protective Mylar under the leading edge, and under the Channel Bracket.
- Insert the AN4-17A bolt into the Channel through the bottom, then through a WN14 white Nylon washer, then through the Sprog Pivot (note how hole in side of Sprog Pivot is on bottom-side of Sprog Pivot), then through two WN14 white Nylon washers, then through one WN18 thickest white Nylon washer, then through the Channel Bracket, then through a thin metal washer, then secure it by tightening a thin Nylock nut to snug.
- Attach the Sprog Fork Fitting to the Sprog Pivot with the Clevis Pin, and secure it with the Safety Ring.

8. Attach the other end of the Sprog Cable to the Sprog by placing a WN14 white Nylon washer over the bolt, then insert the bolt through Sprog Cable, then through a WN14 white Nylon washer, then through the top hole in the Sprog, then through a thin metal washer, then secure it with a thin Nylock Nut.

Photo: Sprog attached to Channel Bracket at Leading Edge – Cross Bar junction



9. Attach the hardware for connecting the Cross Bar to the Channel Bracket. The Cross Bar will not be attached to this assembly until later, when the sail is added to the airframe. For now, attach the hardware so it can be used later when needed to attach the Cross Bar.

- Insert the Eye Bolt through the ¼” thick Plastic Spacer, then through the hole in the Mylar, then through the bottom hole of the Channel Bracket, then through the Sleeve Spacer, then through the top hole of the Channel Bracket, then through a thick white Nylon washer.
- Add the Half Spacer, two Stainless Steel washers, Castle Nut and Safety Ring to this bolt assembly. After the Sail has been slid over the airframe later, these items will be removed to add the Cross Bar.

**Photo: Top View of Leading Edge – Cross Bar Junction**



# Attaching Sail to Airframe

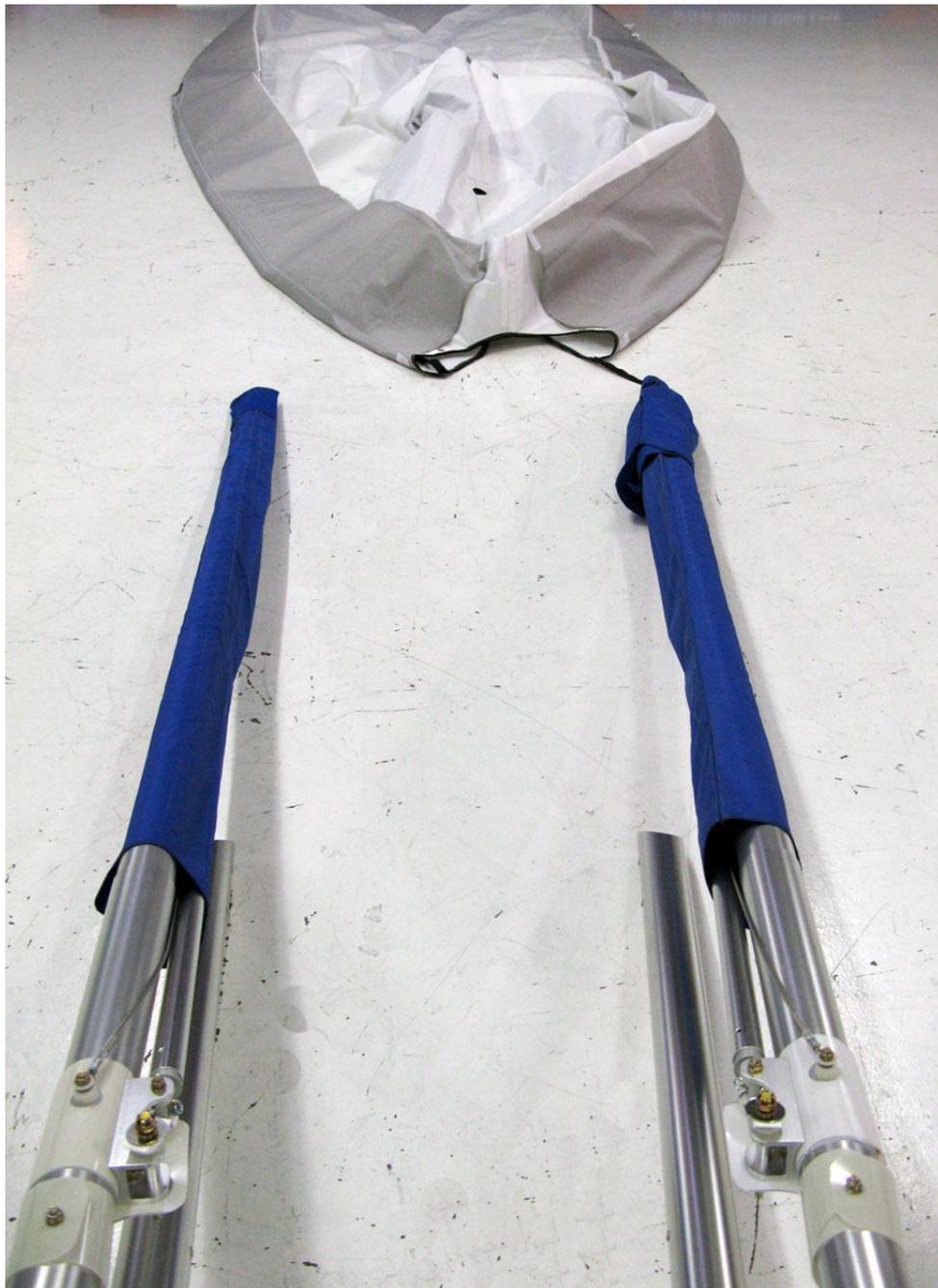
## Tools and Supplies Needed

Open-End Wrench Set, 9/16" Socket Wrench, Phillips screwdriver

## Assembly Notes – Attaching Sail to Airframe

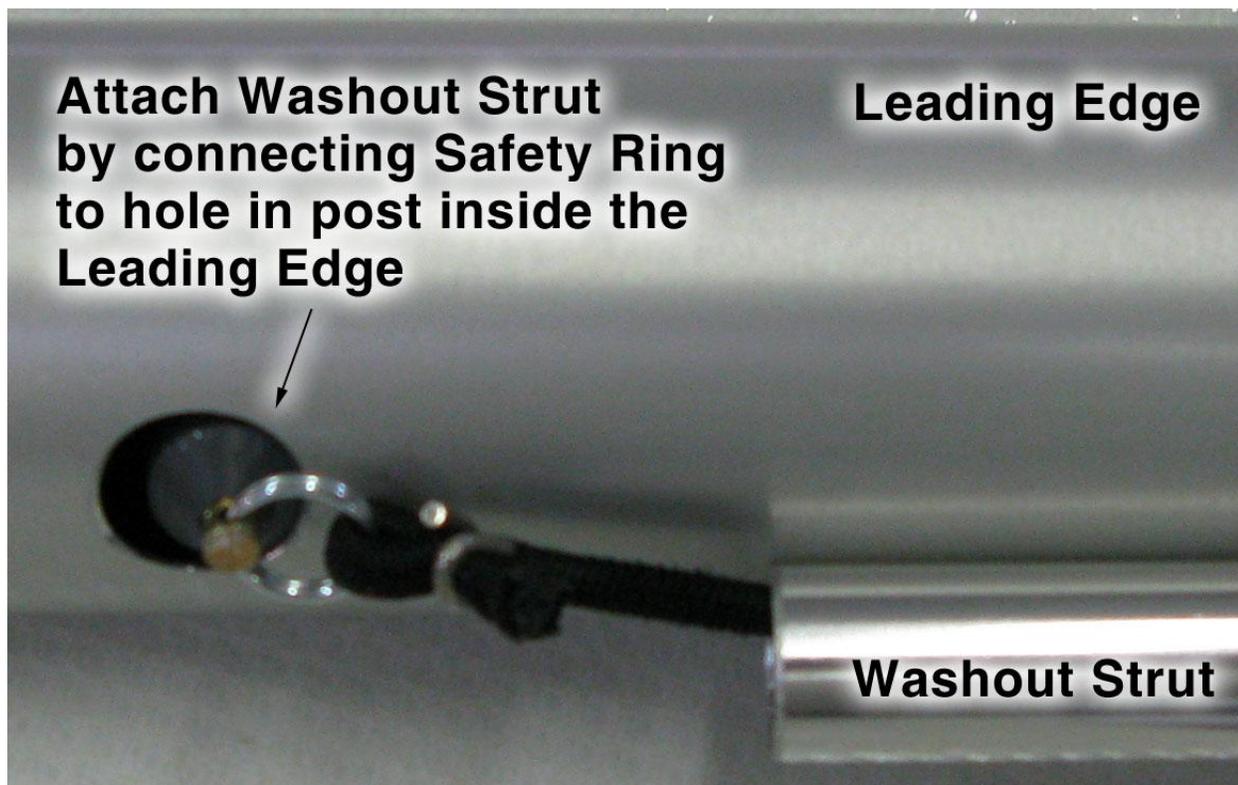
To prepare to attach the sail to the airframe, elevate the nose of the airframe on to a sawhorse or other item to hold it up off the floor. In the photo below, a fabric sock is used to keep the sprogs from catching on the sail as the leading edges are moved into the sail's leading edge pockets. Consider wrapping some masking tape or use rubber bands to keep the sprogs held close to the leading edges while you are sliding the sail on to the airframe.

**Photo: Airframe elevated and Sail ready to be attached to Airframe**



1. Insert both ends of the leading edges into the front of the sail at the nose of the wing, with each leading edge in its leading edge pocket. Start sliding the sail on to the frame, by sliding the sail over the leading edge on one side, then do the same for a few inches on the other side. Hold the keel down with gentle pressure while doing this, so the keel does not go into a leading edge pocket.
2. Continue this process until the sail is far enough down the leading edge so you can extend the Sprogs through the hole in the sail at the Leading Edge – Cross Bar junction. Unzip the Zipper on the sail to make it easier to pass the sprogs through.
3. Attach the Washout Strut to the Leading Edge by connecting the Safety Ring to the hole in the post inside the leading edge.

**Photo: Attaching the Washout Strut to the Leading Edge**



4. Attach the white Velcro Straps on the sail to the Washout Struts and Sprogs.

**Photo: Washout Strut and Sprog – white Velcro sail straps**



5. Pull the tip of the sail over the black cap at the end of the leading edges by pulling on the black strap, and be sure to set the yellow strap into the 1" wide slot at the end of the leading edge.

**Photo: Tip Sail Strap at end of Leading Edge**



6. Slide the Keel Pocket over the Keel, and slide the sail up so you can attach the hardware on the rear of the keel.

**Photo: Side View of Rear Keel hardware**

7. Assemble the Baily Block at the top of the rear of the keel. Refer to the "Keel – Rear" schematic diagram and parts list for this assembly.

Place a thick metal washer on each of the AN4-35A bolts, then insert them both into the top holes on the Baily Block. Place the bolts through both black Saddle Spacers, and through the keel.

Place a thick metal washer on the rear bolt, and secure it with a thin Nylock nut.

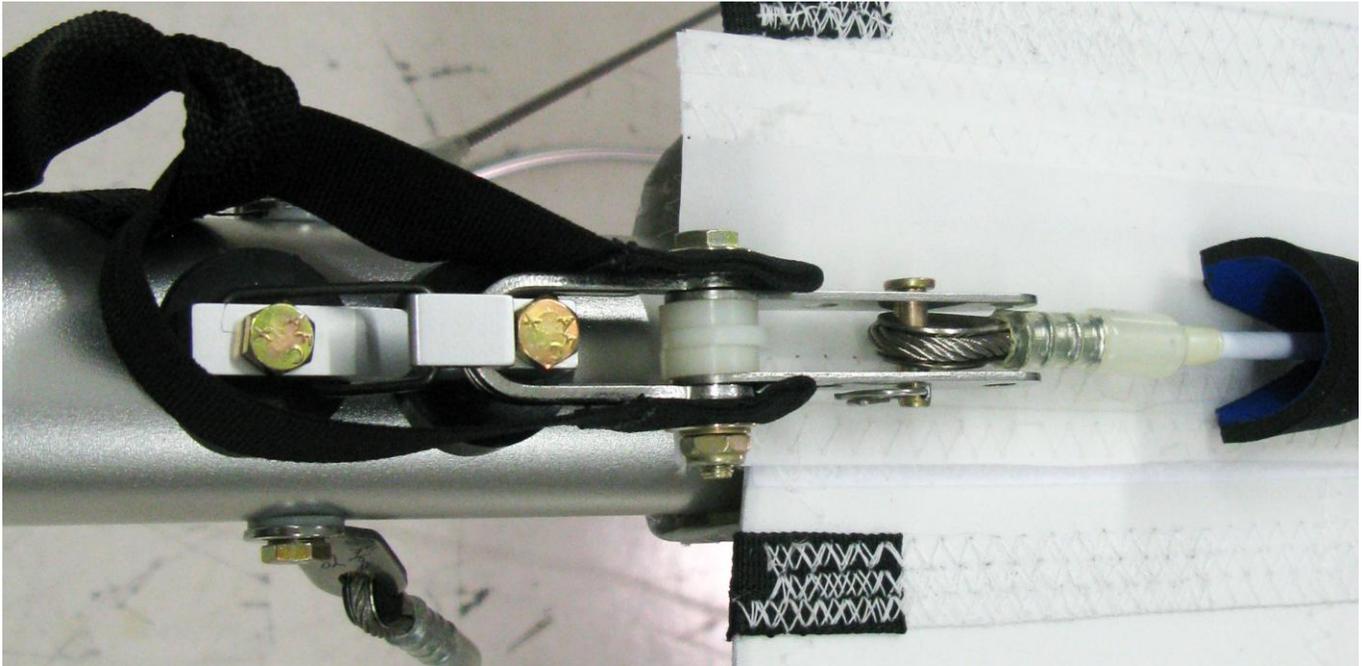
Place a thick white Nylon washer over the forward bolt, then place the Sail Strap Tang on the bolt. Add a thick metal washer and secure it with a thin Nylock nut.



8. Attach the rear Flying Wires to the keel by placing a thick washer on the AN4-27A bolt, then place the metal tang of the right-side rear flying wire on the bolt, then add a white WN14 Nylon washer, then insert this bolt assembly through the right side of the keel.

On the left side of the keel, add a WN14 white Nylon washer, then the metal tang of the left-side rear flying wire, then add a thick metal washer, then secure it with a thin Nylock nut.

**Photo: Top View of Rear Keel hardware**

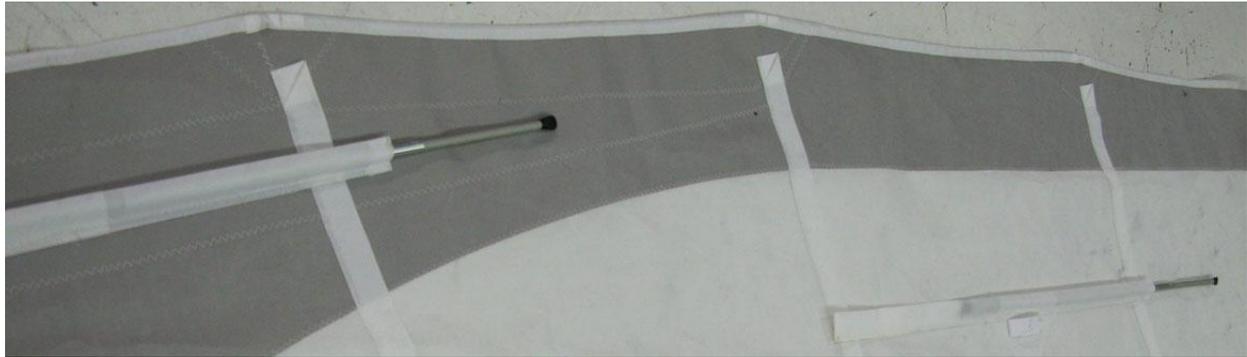


**Photo: Bottom View of Rear Keel hardware**



9. Insert the four Transverse Battens into the sail pockets, and secure them with the Velcro.

**Photo: Transverse Battens**



10. Attach the Cross Bar to each Leading Edge. Remove the top of Eye Bolt hardware that was previously placed on the Eye Bolt, so you can attach the Cross Bar to the Channel. Place a white Nylon washer on top of the Channel, then set the Cross Bar on the Eye Bolt, then a white Half Spacer, then two wide Stainless Steel washers, then the Castle Nut. After you use a 9/16" Socket Wrench to tighten the nut to snug, secure it with a Safety Pin. When you tighten the Castle Nut, it is helpful to place a Phillips screwdriver through the hole in the bottom of the Eye Bolt to anchor it in place.

**Photo: Using a Socket Wrench and Phillips Screwdriver to tighten nut on Cross Bar assembly**



**Photo: Raising the nose of the wing and extending the Base Tube**

11. Carefully raise the Keel at the nose of the wing, and extend the Base Tube to stand the wing up.

12. Spread the wings enough to open the area at the top of the Control Frame Apex, and wrap the Neoprene Covers around the top hardware assembly.

Rotate the cover as needed to get a nice protective fit around the Control Frame hardware, and use the Velcro on the cover to seal it in position.

13. Wrap the Cross Bar Covers around the Cross Bar and use the Velcro to close the ends of the cover together. Close the Zipper on the under-surface of the sail.



**Photo: Control Frame Apex – Neoprene Covers**



14. Connect the two Grommets at the nose of the wing with a large black Zip Tie.

**Photo: Cross Bar Covers, and Nose Grommets Zip-tied**



# Attach Struts and Final Wing Assembly

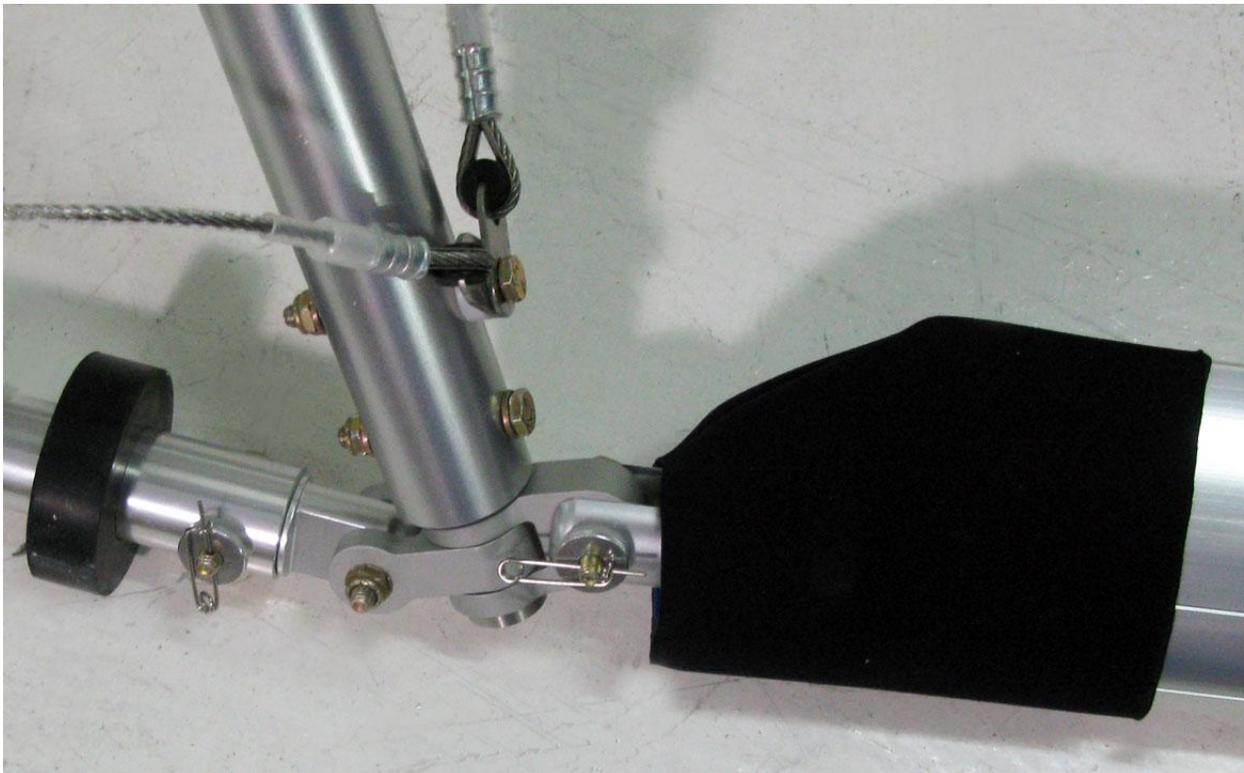
## Attach Struts to Base Tube and Cross Bar Junctions

Refer to the “Lower Control Frame Junctions” Schematic Diagram for this phase of wing assembly. Use these instructions to assemble and attach both Struts to the wing assembly.

**Note:** Be sure to orient all bolts through lower Control Frame fittings so the head of the bolt is facing the pilot and rear of wing, with the nuts and safety pins all toward the nose of the wing, to minimize sharp surfaces facing the pilot.

1. Prepare the Lower Strut Fitting at the base of each strut as follows:  
Place the AN960-616 thick washer on the AN6-16 bolt and insert it through the inner hole of the Pivot Fork Fitting. Add the NYW38 thick Nylon washer, insert it through the Lower Strut Fitting, through the AN960-616 thick washer, screw on the AN310-6 Castle Nut, and secure it with the Cotter Pin.
2. Insert the assembled Lower Strut Fitting into the lower end of the strut, and rotate it so you can insert the AN4-20A bolt through the strut. Insert the bolt through the strut, then add the AN960-416L thin washer and secure it with the thick AN365-428A Nylock Nut. Slide the Neoprene protective cover over the end of the strut, and rotate it as necessary to get a nice fit.
3. Attach the Strut to the HMK21 Down Tube Fitting by aligning the Pivot Fork Fitting with the Strut Down Tube Fitting, then insert the AN4-15 bolt through the Down Tube Fitting, and secure it with the AN310-4 Castle Nut and AN416-1 Safety Pin.

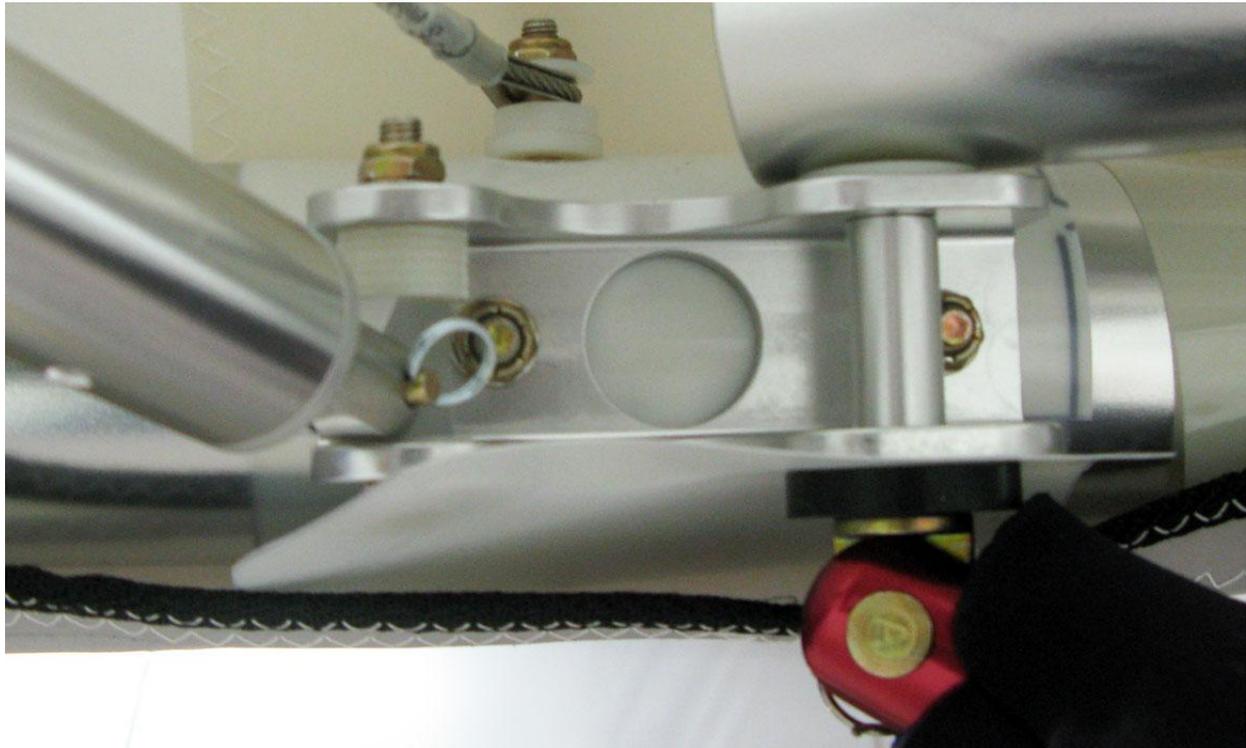
**Photo: Lower end of Strut attached to Base Tube Fitting**



4. Attach the upper end of the Strut to the Channel at the Leading Edge – Cross Bar junction as follows:

Insert the H1152 Fork Fitting into the upper end of the Strut. Slide the Neoprene protective cover over the end of the Strut, and rotate it as necessary to get a nice fit. Align the holes, and insert the AN4-20A bolt through the top of the Strut and through the Fork Fitting. Connect the Strut to the bottom of the Eye Bolt by inserting the MS20392-4C34 Clevis Pin through the Fork Fitting, through the hole in the Eye Bolt, and secure with the 193562 Safety Pin.

**Photo: Upper End of Strut attached to the Eye Bolt at Leading Edge – Cross Bar Junction**



**Insert Ribs and Drill Holes for Leading Edge Nose Grommet Screws**

By inserting the Ribs into the Sail Rib Pockets, and continuing assembly by tensioning the wing with the Cross Bar Restraint Cable (“Haul-back Cable”) secured to the Baily Block at the rear of the keel, the shape of the sail on the airframe becomes similar to conditions under flight loads.

This permits you to mark the hole locations to be drilled for the screws that connect the sail to the leading edges, through the grommets at the nose of the wing. Follow these instructions to prepare the wing for drilling these holes in the optimal location.

**Note: Rib Tension**

When the Ribs are inserted into the Rib Pockets and secured at the tips of the ribs, the inboard ribs (those closest to the keel) should have the tightest tension, the middle-range ribs should be neutral tension, and the 3 ribs closest to the wing tips should be loose tension, so as to not affect the Tip Camber shape.

1. Spread the wings apart to approximately  $\frac{3}{4}$  of flying position, to reduce sail tension while ribs are being inserted into the rib pockets.

2. Start at the Keel, and install all but the last three curved ribs. White ribs go to the right, black to the left.

Insert the ribs from Keel to tip with gentle pressure, moving the sail's trailing edge up or down as necessary to help the front of the ribs up over the Cross Bar and Leading Edge. Keep the rear tip close to the ground so the curved front glides smoothly in the pocket. DO NOT FORCE the ribs into place, especially the first two ribs (in particular when the sail is crispy new). To put the first ribs in, lift the keel off the ground about 20". Secure the Flip-Tips in the pockets, after you have adjusted the desired tension by screwing the Flip-Tip in or out to adjust tension.

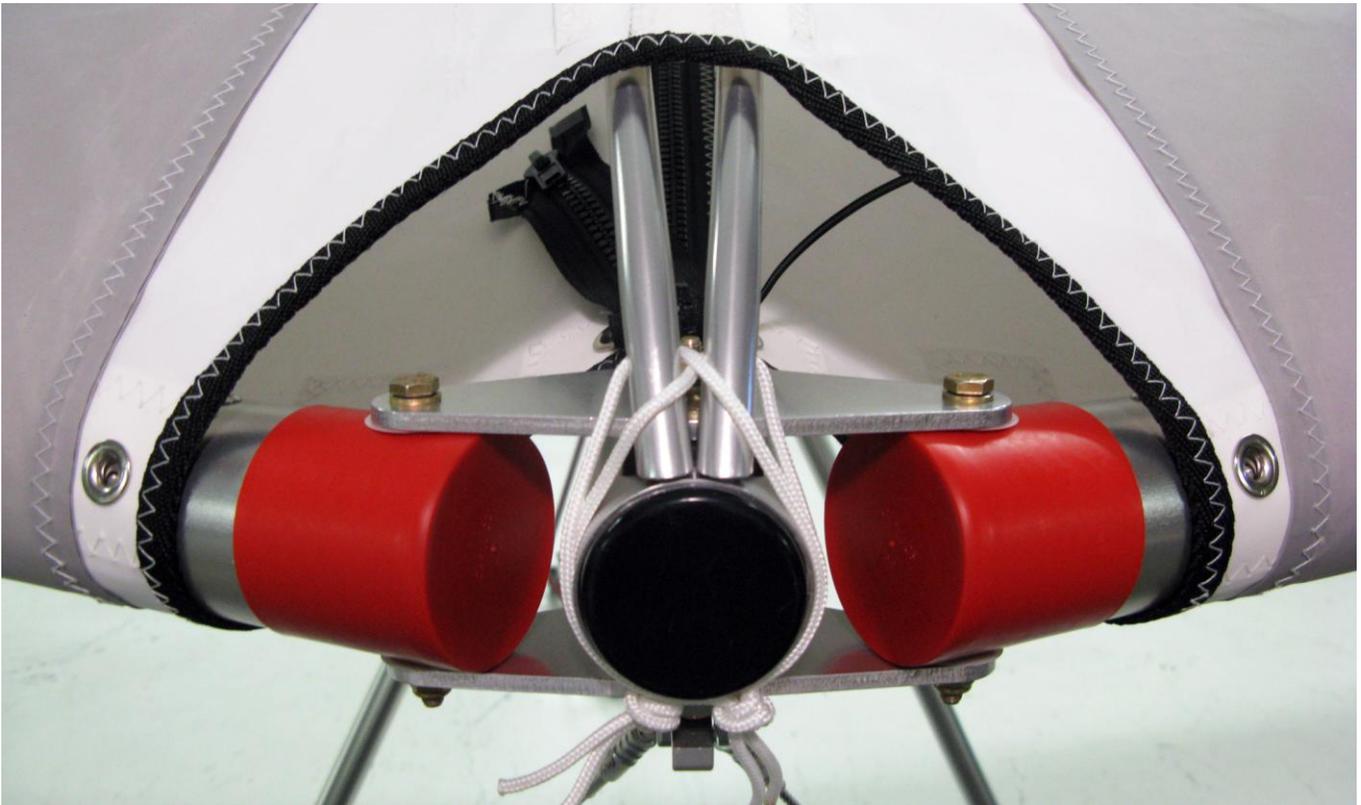
3. Rotate the Sprogs away from the Leading Edge and center them over the Transverse Battens, and secure them with Velcro Straps. Insert Washout Struts over posts in Leading Edges, and center them over the Transverse Battens.

4. Check wing tips to ensure the yellow strap is placed into the channel at the tip. Pull the Cross Bar Restraint Cable ("Haul-back Cable") back and place the Bow Shackle over the Baily Block Hook, to tension the Cross Bar.

5. Insert the last 3 ribs into each side of the sail. Place the Tip Struts on the metal hooks on the leading edges, and secure the ribs into the sail pockets.

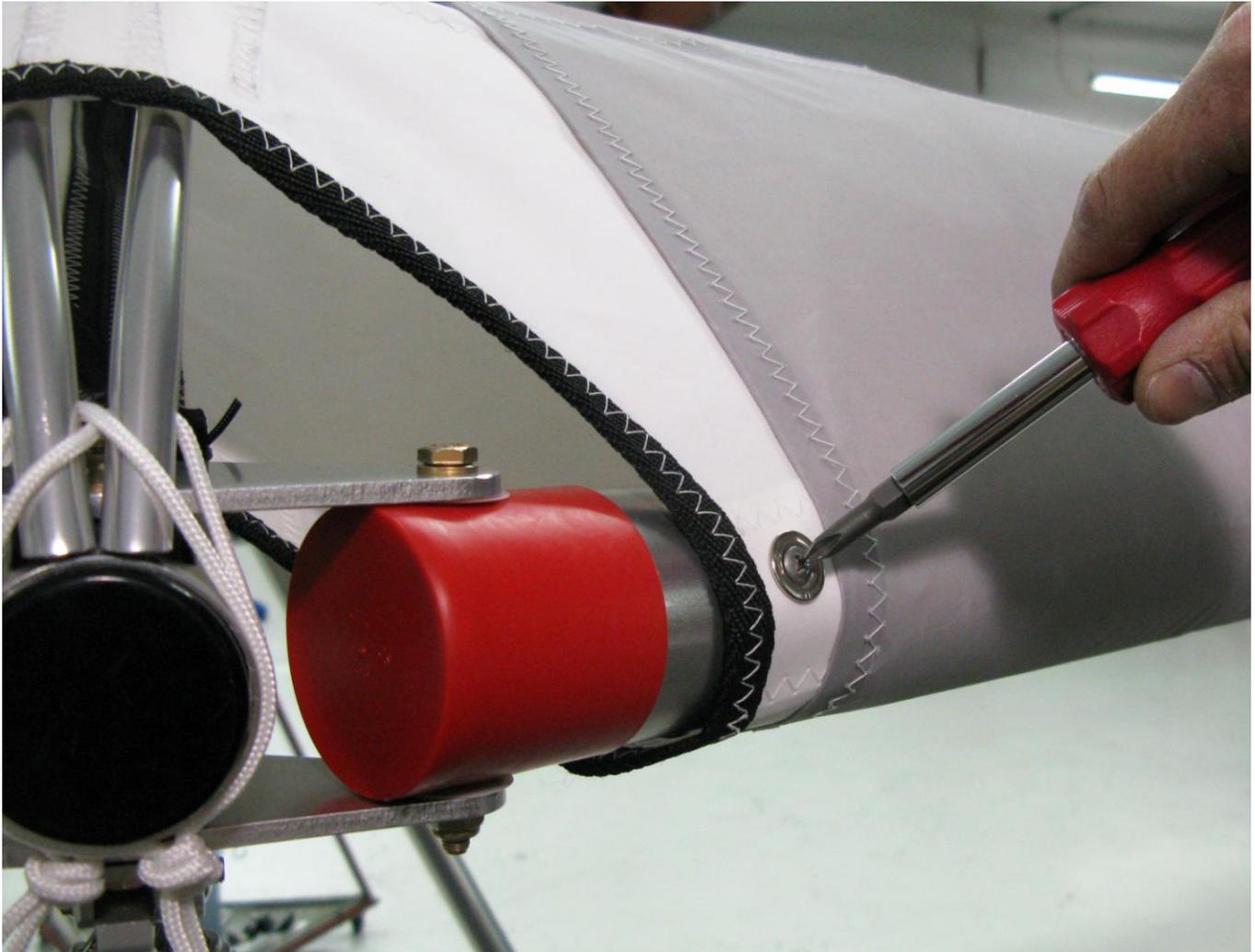
6. Set Nose Ribs over posts on the Nose Plate. Tie knots in the cords on the Nose Ribs, and wrap over the Keel as in the photo below:

**Photo: Nose Ribs mounted on posts on the Nose Plate**



7. Tie a string between both grommet holes in the sail on the leading edges at the nose, and use the string to pull the sail forward on the airframe to ensure it is in a good position to mark the holes to drill. When you are sure the sail is placed on the frame in a uniform fashion and it is not biased in any direction, use a small nail or punch to gently tap the leading edge in the center of the grommet hole, to mark the location for the screw hole to be drilled. Drill the hole with a 9/16" drill bit. Use a standard screwdriver, NOT a power drill, to screw in the screw into the grommet hole and leading edge.

**Photo: Placing Screws in Grommet Holes in Sail at Nose of Wing**



8. Attach front Flying Wires. Ensure that all the lower rigging is untangled first. Position the ring on the latch; install bolt, nut & safety pin.

**Photo: Front Flying Wires attached to Nose of Wing**



## Adjust Angle of Sprogs

To set the Sprogs at the correct angle for flight, in relation to the Keel, elevate the Keel so that when an Inclinometer is placed between the Collars on the Keel, the level is Zero Degrees. Secure the wing in this position so it does not move, so the Keel stays at an angle of 0 degrees.

Remove the 2C41 Clevis Pin and Safety Ring from the Sprog, and use the telescoping screw threads to turn the Sprog so that there is a positive angle of Eight Degrees Positive when the Inclinometer is placed along the side of the Sprog. Once you are sure of the 8 degree angle, re-insert the Clevis Pin and secure it with the Safety Ring.

**Photo: Using an Inclinometer to set the Keel Angle to Zero Degrees**



This completes the assembly of the Mustang 3 Wing. Add the Nose Cone to the front of the wing, and be sure to read the Mustang 3-15 Owner's Manual to learn more about Pre-Flight procedures for the wing, guidelines for safe operation, and maintenance items that will help you keep the wing in best condition.

**Photo: Trike Mast with Pivot Block – Mounted to Mustang 3 Wing**



# Schematic Diagrams and Parts Lists

## Nose Plate Wing Junctions

ITEM NO.	PART NUMBER	Description	QTY.
1	WN14	Washer - Nylon - Thick - 1/4	4
2	AN960-416L	Washer - Thin - 1/4	2
3	MS21083-N4	Lock Nut - Thin - 1/4	4
4	HDP24	Nose Plate	2
5	SAS4462	Saddle Spacer	4
6	H1117A	Nose Catch Channel	1
7	H116M	Nose Catch	1
8	MS20392-3C19	Clevis Pin	1
9	193562	Clevis Pin - Ring	1
10	MW14L	Washer - Mylar - 1/4	4
11	AN4-32A	Hex Bolt - AN4-32A - 1/4	4
12	AN4-7	Hex Bolt - AN4-7 - 1/4 - Shank	1
13	AN310-4	Castle Nut - 1/4	1
14	Model Specific	Leading Edge Tube	1
15	Model Specific	Tubing - Keel	1
16	AN416-1	Safety Pin	1

**NOORTH WING**

Title: Wing Junctions

Sheet Title: NOSE

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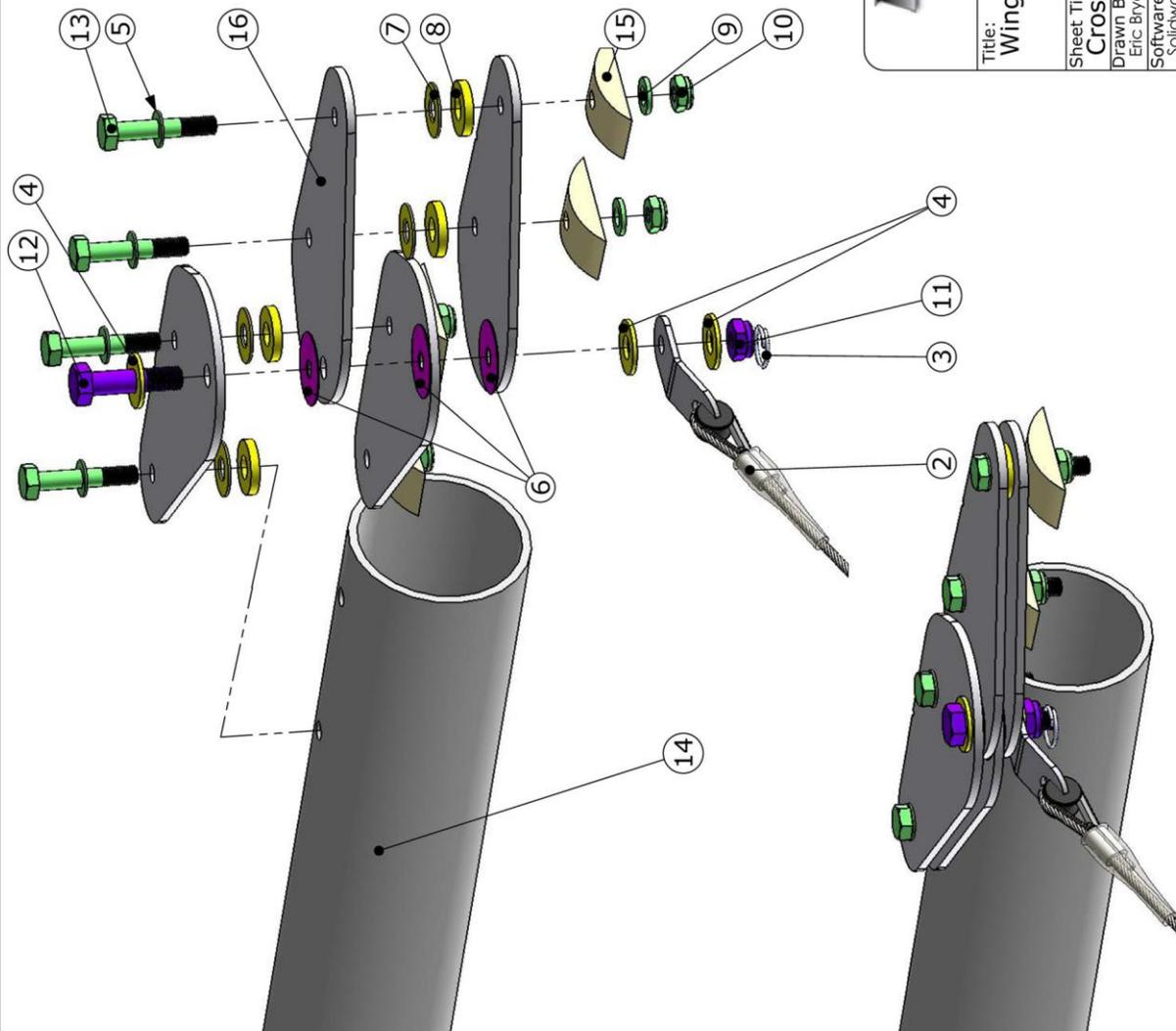
Software: Solidworks 2012

Scale: 1:2

Sheet No.: SHEET 5 OF 6

# Cross Bar Center Junctions

ITEM NO.	PART NUMBER	Description	QTY.
2	Model Specific	Cable - Cross Bar Restraint	1
3	193562	Safety Ring	1
4	WN17	Washer - Nylon - Thick - 5/16	3
5	AN960-416L	Washer - Thin - 1/4	4
6	MW14L	Washer - Mylar - 1/4	3
7	WN15	Washer - Nylon - Thin - 5/16	4
8	WN16	Washer - Nylon - Thicker - 5/16	4
9	AN960-416	Washer - Thick - 1/4	4
10	MS21083-N4	Lock Nut - Thin - 1/4	4
11	MS21083-N5	Lock Nut - Thin - 5/16	1
12	AN5-12	Hex Bolt - AN5-12 - 5/16 - Shank	1
13	AN4-13A	Hex Bolt - AN4-13A - 1/4	4
14	Model Specific	Cross Bar	1
15	HMS12	Half Spacer - 1/4 hole	4
16	HMK14TN	Center Plate	4



**NORTH WING**

Title: Wing Junctions

Sheet Title: Cross Bar - Outer

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# Leading Edge to Cross Bar Junctions

ITEM NO.	PART NUMBER	Description	QTY.
1	HMK23B	Leading Edge Cross Bar Junction - Base Channel	1
2	H1325	Sprog Pivot	1
3	H1327	Sprog Fork Fitting	1
4	H1326	Sprog Clevis Fitting	1
5	MS20392-3C19	Clevis Pin	1
6	193562	Clevis Pin - Ring	1
7	xx	0.500 OD Sleeve Spacer	1
8	AN46-27	Eye Bolt	1
9	AN416-1	Safety Pin	1
10	PS25	0.250 Plastic Spacer	1
11	WN18	Washer - Nylon - Thickest - 5/16	1
12	WN14	Washer - Nylon - Thick - 1/4	3
13	AN4-17A	Hex Bolt - AN4-17A - 1/4	1
14	MS21083-N4	Lock Nut - Thin - 1/4	4
15	90313A114	Washer - Stainless - Wide - 3/8	2
16	NYW38	Washer - Nylon - Thick - 3/8	1
17	AN960-416	Washer - Thick - 1/4	2
18	AN4-31A	Hex Bolt - AN4-31A - 1/4	2
19	Model Specific	Side Strut	1
20	Model Specific	Leading Edge Tube	1
21	Model Specific	Cross Bar	1
22	HMS12	Half Spacer - 0.375 Hole	1
23	H1152	Fork Fitting	1
24	2C41	Clevis Pin 3/16 x 1-1/4	1
25	AN4-20A	Hex Bolt - AN4-20A - 1/4	1
26	AN960-416L	Washer - Thin - 1/4	2
27	MS20392-4C34	5/16 Clevis Pin	1
28	193562	Safety Ring	2
29	AN310-6	Castle Nut - 3/8	1

NORTH WING

Title: Wing Junctions

Sheet Title: Leading Edge / Cross Bar

Drawn By: Eric Bryan

Date: Thursday, March 14, 2013 1:38:37 PM

Software: Solidworks 2012

Scale: 1:2

Sheet No.: SHEET 3 OF 6

# Lower Control Frame Junctions

ITEM NO.	PART NUMBER	Description	QTY
1	MS21083-N4	Lock Nut - Thin - 1/4	2
2	AN4-17A	Hex Bolt - AN4-17A - 1/4	1
3	Model Specific	Side Strut	1
4	Model Specific	Base Tube	1
5	HMK19	Down Tube Corner Fitting	1
6	HMK2255	Stainless Steel Pin	1
7	H1123A	Base Tube Fitting	1
8	Mylar_0.500	Washer - Mylar - 1/2	3
9	AN310-6	Castle Nut - 3/8	1
10	AN4-14A	Hex Bolt - AN4-14A - 1/4	1
11	Round SPT15 AirFoil SPMX	Control Frame - Upright	1
12	AN310-4	Castle Nut - 1/4	2
13	AN4-15	Hex Bolt - AN4-15 - 1/4 - Shank	2
14	AN416-1	Safety Pin	2
15	HMK21	Strut Down Tube Fitting	1
16	HMK22N	PVC Spacer	1
17	HMK17A	Pivot Fork Fitting	1
18	HMK18	Lower Strut Fitting	1
19	AN960-616	Washer - Thick - 3/8	2
20	AN6-13	Hex Bolt - AN6-13 - 3/8 - Shank	1
21	NYW38	Washer Nylon - Thick - 3/8	1
22	cofter pin	1/16 Cotter Pin	1
23	AN960-416L	Washer - Thin - 1/4	3
24	AN365-428A	Lock Nut - Thick - 1/4	1
25	AN4-20A	Hex Bolt - AN4-20A - 1/4	1

**Title:** Wing Junctions

**Sheet Title:** Lower Control Frame

**Drawn By:** Eric Bryon

**Date:** Thursday, March 14, 2013 1:38:37 PM

**Software:** Solidworks 2012

**Scale:** SCALE: 1:2

**Sheet No.:** SHEET 4 OF 6

Right Side - AN4-15A, Lock Nut & Thin Washer

# Control Frame Apex to Keel Junction

ITEM NO.	PART NUMBER	Description	QTY.
1	AN4-16A	Hex Bolt - AN4-16A - 1/4	2
2	AN5-32A	Hex Bolt - AN5-32A - 5/16	1
3	AN960-516	Washer - Thick - 5/16	2
4	WN17	Washer - Nylon 5/16 Hole - 1/16 Thick	2
5	WN16	Washer - Nylon 1/4 Hole - 1/8 Thick	4
6	AN960-416L	Washer - Thin - 1/4	4
7	AN4-17A	Hex Bolt - AN4-17A - 1/4	2
8	MS21083-N5	Lock Nut - Thin - 5/16	1
9	AN960-416	Washer - Thick - 1/4	4
10	MS21083-N4	Lock Nut - Thin - 1/4	6
11	AN4-40A	Hex Bolt - AN4-40A - 1/4	2
12	Round SPTIS Airfoil SPMX	Control Frame - Upright	2
13	H2111	Apex Block - Nylon	1
14	Model Specific	Tubing - Keel	1
15	H1129	Apex Stainless Steel Channel Bracket	2
16	H1152	Fork Fitting	2
17	2876	Peanut Tang	1

**NORTH WING**

Title: Wing Junctions

Sheet Title: Apex Junction - Keel

Drawn By: Eric Bryan

Date: Thursday, March 14, 2013 1:38:37 PM

Software: Solidworks 2012

Scale: 1:2

Sheet No.: SHEET 1 OF 6

# Rear Keel Junctions

ITEM NO.	PART NUMBER	Description	QTY.
2	Model Specific	Cable - Rear Lower	2
3	WN14	Washer - Nylon - Thick - 1/4	4
4	AN960-416L	Washer - Thin - 1/4	4
5	MS21083-N4	Lock Nut - Thin - 1/4	4
6	SAS4462	Saddle Spacer	2
7	Model Specific	Cross Bar Cable	1
8	MS20392-3C23	0.25-Clevis Pin	1
9	WN18	Washer - Nylon - Thickest - 5/16	2
10	AN4-14A	Hex Bolt - AN4-14A - 1/4	1
11	AN4-30A	Hex Bolt - AN4-30A - 1/4	1
12	AN960-416	Washer - Thick - 1/4	2
13	193562	Safety Ring	1
14	AN4-27A	Hex Bolt - AN4-27A - 1/4	1
15	AN4-35A	Hex Bolt - AN4-35A - 1/4	1
16	Model Specific	Tubing - Keel	1
17	HD222	Bally Block Hook	1
18	14027	0.250 Bow Shackle	1
19	RF192	Adjustable Tang - 4 Hole	2
20	HD223S	Spring Gate	1
21	xx	Webbing Strap	1
22	xx		2

**NORTH WING**

Title: Wing Junctions

Sheet Title: Keel Rear

Drawn By: Eric Bryan

Date: Thursday, March 14, 2013 1:38:37 PM

Software: Solidworks 2012

Scale: 1:2

Sheet No.: SHEET 6 OF 6