Where do parts go #1?
https://www.facebook.com/groups/2402192033374289/permalink/2974428899483930/

Where do parts go #2?
https://www.facebook.com/groups/2402192033374289/permalink/2973748119552008/

Wing Pictures
https://www.facebook.com/media/set/?set=oa.2406491019611057&type=3&av=477460662790768&eav=AfZxWxajKQgIgEJ0e6OQX1uoLy9sUV8aj-z6srvv59Lht0BrBKM4C1jgWEUGurhegYo

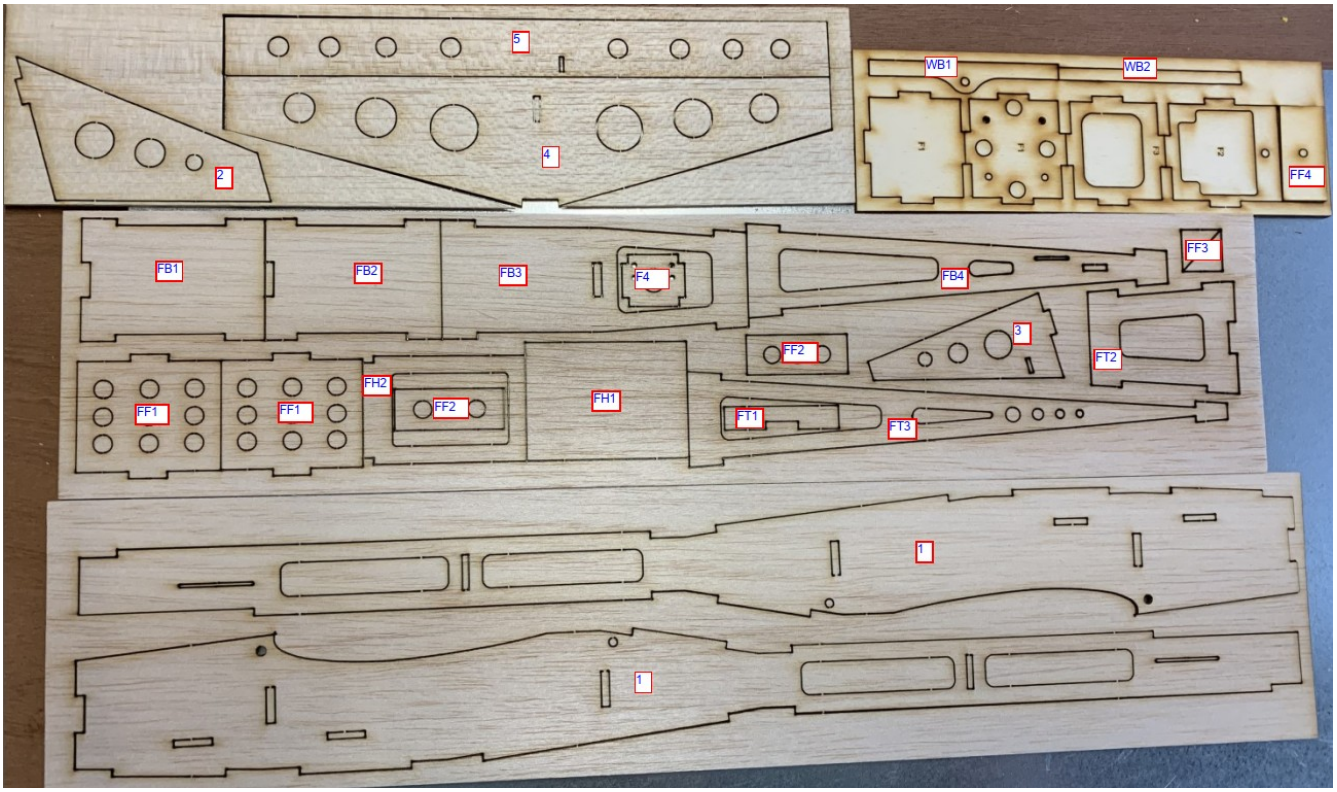
Build Pictures
https://www.facebook.com/groups/2402192033374289/permalink/2848752652051556/

https://www.facebook.com/groups/2402192033374289/permalink/3143323339261151/

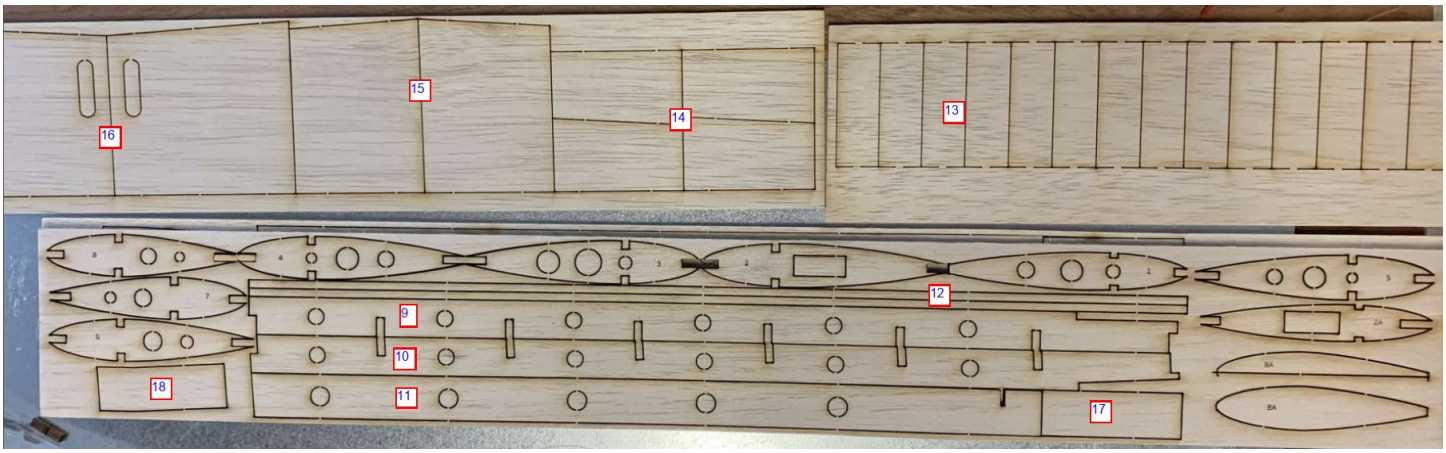
CG
https://www.facebook.com/groups/2402192033374289/permalink/2730041960589293/

FISHING LINE HINGES.... 🙂
These are our recommendations, based on our recent experience with mono-filament fishing line hinges.
Use a minimum 25lb test monofilament line. Nothing fancy. Usually the cheapest fishing line you can get. 1 spool should last a lifetime. We do and have used 50lb test line, but it is significantly stiffer. Resist the urge to use anything much lighter than 25lb test line as it likes to crumple when you try to slide the control surface to the component.
We recommend:
25lb test line, on elevator and ailerons 4 pieces, 1/2" from outboard edge, then equally spaced in between. On rudder, 3 pieces, 1/2" from each end and one in the middle.
If using 50lb test I use 3 and 3 and 2....
Align surfaces and mark with a pencil. Use a T pin or equivalent to make hole. once all slid in place use thin CA WITH A CAPILLARY tube and put the tiniest amount you can on each line/hinge. It wicks in very very quickly and good! 🙂
Sincerely,
Doug and Becky
WillyNillies.com
Ed's Hinge Jig instruction manual - WillyNillies.Info

Magnets I used 5mmx2mm
TRYMAG Magnets, 180Pcs Small Strong Neodymium Magnets Tiny Rare Earth Magnets Round Fridge Magnets for Whiteboard, Office, DIY, Science, Photo - Come with a Storage Case: Amazon.com: Industrial & Scientific



ITEM	DESCRIPTION
1	FUSELAGE SIDE
2	VERTICAL STABILIZER
3	RUDDER
4	HORIZONTAL STABILIZER
5	ELEVATOR
FB1	FUSELAGE BOTTOM IN-ORDER OF PLACEMENT FROM NOSE
FB2	FUSELAGE BOTTOM IN-ORDER OF PLACEMENT FROM NOSE
FB3	FUSELAGE BOTTOM IN-ORDER OF PLACEMENT FROM NOSE
FB4	FUSELAGE BOTTOM IN-ORDER OF PLACEMENT FROM NOSE
F1	BULKHEAD IN-ORDER OF PLACEMENT FROM NOSE. ONE WITH HOLES IS FOR ELECTRIC ENGINE. SOLID IS FOR GAS ENGINE
F2	BULKHEAD IN-ORDER OF PLACEMENT FROM NOSE
F3	BULKHEAD IN-ORDER OF PLACEMENT FROM NOSE
F4	BULKHEAD IN-ORDER OF PLACEMENT FROM NOSE
FT1	FUSELAGE TOP IN-ORDER OF PLACEMENT FROM NOSE
FT2	FUSELAGE TOP IN-ORDER OF PLACEMENT FROM NOSE
FT3	FUSELAGE TOP IN-ORDER OF PLACEMENT FROM NOSE
FF1	FUSELAGE FLOOR FOR BATTERY
FF2	FUSELAGE BATTERY BULKHEAD TO BE PLACED ON ENDS OF BATTERY TO HOLD IN POSITION
FF3	FUSELAGE SUPPORT FOR FF4
FF4	FUSELAGE WING ANCHOR PLATE
FH1	FUSELAGE HATCH COVER
FH2	FUSELAGE HATCH SUPPORT
WB1	WING LEADING EDGE BRACE
WB2	WING TRAILING EDGE BRACE



ITEM	DESCRIPTION
1	WING RIB IN ODER FROM CENTER TO WING TIP
2	WING RIB IN ODER FROM CENTER TO WING TIP
2A	WING RIB IN ODER FROM CENTER TO WING TIP THIS GOES ON THE INSIDE OF RIB 2 TO SUPPORT THE WING SHEETING
3	WING RIB IN ODER FROM CENTER TO WING TIP
4	WING RIB IN ODER FROM CENTER TO WING TIP
5	WING RIB IN ODER FROM CENTER TO WING TIP
6	WING RIB IN ODER FROM CENTER TO WING TIP
7	WING RIB IN ODER FROM CENTER TO WING TIP
8	WING RIB IN ODER FROM CENTER TO WING TIP
8A	WING RIB – THIS FORMS THE WING TIP. FULL RIB TO COVER RIB 8. HALF RIB TO EXTEND HORIZONTALLY. HALF RIB NOT REQUIRED IF FLAT WING TIP IS PREFERRED.
8A	WING RIB – THIS FORMS THE WING TIP. FULL RIB TO COVER RIB 8. HALF RIB TO EXTEND HORIZONTALLY. HALF RIB NOT REQUIRED IF FLAT WING TIP IS PREFERRED.
9	WING TRAILING EDGE FOR WING WITH LEADING EDGE SWEPT BACK AND TRAILING EDGE STRAIGHT WING LEADING EDGE FOR WING WITH LEADING EDGE STRAIGHT AND TRAILING EDGE SWEPT FORWARD
10	WING LEADING EDGE FOR WING WITH LEADING EDGE SWEPT BACK AND TRAILING EDGE STRAIGHT WING TRAILING EDGE FOR WING WITH LEADING EDGE STRAIGHT AND TRAILING EDGE SWEPT FORWARD
11	AILERON
12	WING SPARE – ONE TOP ONE BOTTOM
13	WING SPARE WEBBING
14	WING LEADING EDGE SHEETING
15	WING TOP TRAILING EDGE SHEETING
16	WING BOTTOM TRAILING EDGE SHEETING (HOLE FOR SERVO ARM) SWITCH TOP AND BOTTOM TRAILING EDGE SHEETING IF SERVO WILL BE ON TOP)
17	WING – FUSELAGE TO WING MOUNT – FOR STRAIGHT TRAILING EDGE WING CONFIGURATION
18	WING – FUSELAGE TO WING MOUNT – FOR FORWARD SWEPT TRAILING EDGE CONFIGURATION

WING BUILD

1. Sand all parts to remove flashing.
2. Dry fit all the ribs, Leading and Trailing Edge, and Spars (Items 1-8, 9, 10, and 12). Rib 1 and 8 can be left till last when gluing. Rib 2A should be on the inside of Rib 2 (this is to accommodate the wing sheeting).
3. Center the Servo and install the Servo Arm.
4. Install and mount/secure the Aileron Servo into Rib 2 and 2A so that the control horn is facing the wing tip..
5. Once happy with the fit. CA glue with Thin the ribs to the Leading and Trailing edge, and the Spar. Start with Rib 1 and 8 to secure the frame. Then move to the inner Ribs. Insure you glue the top and bottom. It is important to make this as straight as possible Ribs are perpendicular to the spar. Use a Triangle / Straight Edge to insure alignment if needed.
6. Glue with Wing Spar webbing between each rib. Care should be taken between Rib 1 and 2 as the Rib needs to be trimmed to account for the Sheeting and the extra Rib 2A.
7. Repeat this step for the other half of the Wing.

   CAUTION – INSURE YOU BUILD A LEFT AND RIGHT WING. BEFORE GLUING ENSURE THAT THEY MATCH UP PROPERLY.
8. Sand the top and bottom Spar (12) flush to Rib 1 and 8.
9. Glue on the 8A Rib (8A full rib) to the end Rib 8.
10. If desired, glue the 8A half Rib (8A half rib) onto the end of the wing in the middle of Rib 8 pointing horizontal.
11. Using a long flat razor. Trim off one side of the Rib 2 between the Spar and the trailing edge (See figure 1 & 2). This should be done on the bottom of the wing if the Aileron control will be on the bottom of the wing. Vice-Versa for the if you want the Aileron Control on the top of the wing. Trim Rib 2 flush with Rib 2A. This is to accommodate the sheeting that extends to protect the servo arm. Notice that Rib 2 will look like Rib 1 for that section only. (See figure 1 & 2)
12. Line up the sheeting (Item 13, 14, and 15) to ensure proper orientation and insure proper alignment with the servo arm to protrude on the bottom of the wing (it can also protrude on the top of the wing if desired).
13. Glue the Sheeting to the Wing.
14. If not there, cut a hole for the servo wires to extend into the fuselage. This should be done on the bottom of the wing. Feed the servo wires thru the hole. See Figure 5 and 6.
15. Sand the sheeting to properly follow the airfoil contour.
16. Glue the two halves of the wings together along with the Wing Braces.
17. Glue the Dowel Rod to the Leading-Edge Brace (WB1).
18. Line up the Trailing Wing Braces (WB2) on the trailing edges. For proper spacing to the Fuselage the bottom of the Wing Brace should line up with the bottom of the leading and trailing edge.
19. Glue the Leading-Edge Brace (WB1) to the leading edge (See Figure 7-10). This should be done after the fuselage is built and glued. Use Wax Paper protect the fuselage from glue (see figure 7 and 8). Install the Leading Edge Wing bracket into the fuselage bulk head. Fit the wing onto the fuselage to allow proper fit (see Figure 9 and 10). Use 5 minute epoxy so you have time to insure that the parts line up properly and can hold it in position till it drys. MAKE SURE THAT THE WING IN CENTERED AND PERPENDICULAR ON THE FUSELAGE.
20. Sand to ensure a smooth surface for the film covering.
21. Sand Bevels or Radius on the Aileron on the side where it will meet against the wing. This is to accommodate the proper deflection when in use.
22. Cover the Wing as desired.
23. Cover the Ailerons as desired.
24. Attach the Ailerons to the wing so that it hinges as desired. It is recommended to use the fishing line hinge for this.
25. Attach the control horn to the aileron and connect to the servo with the wire.

FUSELAGE BUILD

1) Sand all parts to remove flashing.
2) Determine if you want rudder control.
   i) NO - glue the Vertical Stabilizer and Rubber (Item 2 and 3) together.
   ii) YES - then cut the bottom tab off the rudder. Sand a bevel or radius on the edges of the Rubber (Item 3) that will mate with the Vertical Stabilizer (Item 2). This is to accommodate the proper deflection when in use.
3) Sand a bevel or radius on the edges of the Elevator (Item 5) that will mate with the Horizontal Stabilizer (Item 4). This is to accommodate the proper deflection when in use.
4) Install the locking nuts onto the F1 bulkhead if using electric motor. The Nuts should be on the inside of the fuselage.
5) Trim the front battery tray like Mr Kuehn did in figure 23. This really does help when you plug in the motor leads to the ESC.
6) Dry Fit all the parts together. Use painters tape to hold it together. See Figure 3 and 4.
   i) Insure you use the correct F1 bulkhead for your engine.
7) When satisfied with the alignment of the fuselage, glue the parts together. It is important to make this as straight as possible and the sides perpendicular to the top and bottom. Use a Triangle / Straight Edge if needed to insure alignment.

   NOTE – DO NOT GLUE THE HORIZONTAL STABILIZER AND VERTICAL STABILIZER TO THE FUSELAGE AT THIS POINT. THIS WILL BE DONE AFTER COVERING.
8) Install the Wing Mounting Plate (Item FF4). To install the Back Wing Mounting plate it needs to per perfectly aligned to the fuselage and the wing. See figures 11-16.
   a) Mark the center of the Wing and the center of the fuselage as seen in figure 11 and 12.
   b) Hold the Wing Mounting Plate to the trailing edge of the wing and install the wing on to the fuselage. Making sure the wing is aligned with the fuselage.
   c) Slightly lift the wing with the Wing Mounting Plate held in place and mark the location on the Wing Mounting Plate. See Figure 11 and 12.
   d) Remove the wing and position the mounting plate and drill a hole for the mounting screw insuring that it is located in the proper location. Figure 13.
   e) Place a piece of wax paper between the wing and the mounting plate and screw them together. Figure 14, 15, and 16
   f) Using Epoxy so you have time to align it, glue the mounting Bracket to the fuselage.
9) Attach the Hatch Cover to the Fuselage using magnets. See figure 17, 18, 19, and 20. The same technique can be used to align the magnets to the fuselage that was used to mount the Mounting bracket to the fuselage. Link above for 5mm x 2mm magnets I used.
10) Cover the Rudder, Vertical Stabilizer, Elevator, Horizontal Stabilizer as desired.
11) Cover the Fuselage as desired.
12) Attach the Elevator to the Horizontal Stabilizer and the Rudder to the Vertical Stabilizer so that it hinges as desired. It is recommended to use the fishing line hinge for this.
13) Run the control linkages for the Rudder and the Elevator thru the slots in the fuselage.
14) Line up the Horizontal Stabilizer on the Fuselage and glue in place. It is important to make this as straight as possible. Use a Triangle or Straight edge if needed to insure alignment. I would recommend removing a small amount of covering in that area and glue wood to wood with epoxy.
15) Line up the Vertical Stabilizer on the Fuselage and glue in place. It is important to make this as straight as possible. Use a Triangle or Straight edge if needed to insure alignment. I would recommend removing a small amount of covering in that area and glue wood to wood with epoxy.
16) Attach the Servos to the fuselage as desired. (i.e. Double sided tape, glue balsa block to mount Servo to)
17) Connect the linkage to the servo.
18) Mount the motor/engine to the front of the plane as desired. I had to extend the motor forward to get it to balance. I used metal spacers (larger nuts). See figure 21 and 22
19) Install the ESC under the battery floorboard running the wires from the bay under the wing to the motor.

20) IMPORTANT BALANCING AND BATTERY PLACEMENT.
    i) Attach the wing to the fuselage.
    ii) Insure all parts are installed on the plane (Motor, Prop, ESC, receiver, etc)
    iii) Position the Battery, ESC, and Receiver to optimize the CG of the plane. Mark the location of each component.
    iv) Firmly attached the ESC and Receiver as desired (i.e. Double sided tape, glue, etc.)
    v) Mark the placement of the Battery in the plane and install the Battery Bulkheads (Item FF2) to keep the Battery in place while flying. Velcro can also be used to secure it with just Sharpie markings on the fuselage side where the battery will go, or the Battery Bulkhead to properly locate the Battery.
    vi) I had to extend the motor forward to get it to balance. I used metal spacers (larger nuts). See figure 21 and 22

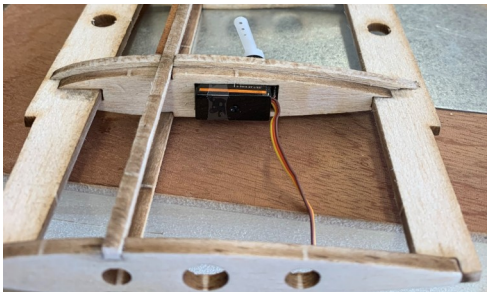


Figure 1 - Rib 2 before trim

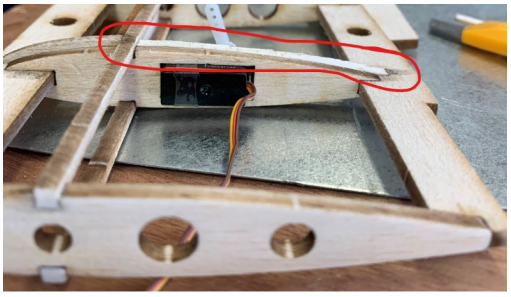


Figure 2 - Rib 2 after trim

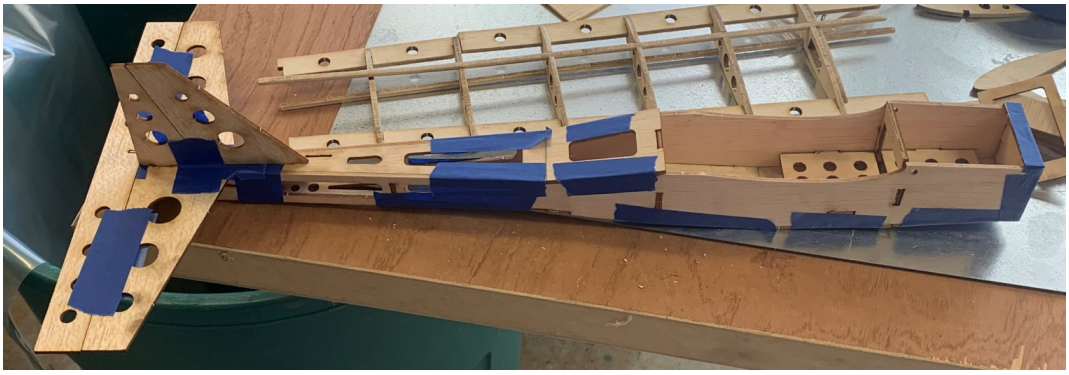


Figure 3 – Dry Fit Fuselage

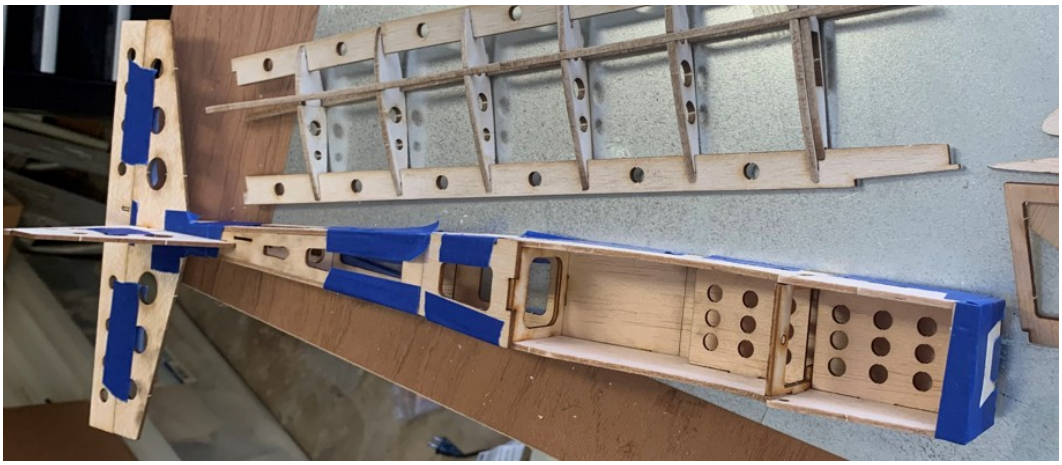


Figure 4 – Dry Fit Fuselage

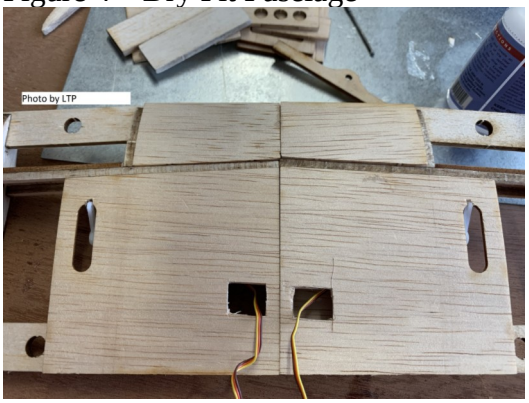


Figure 5 – Servo Wire Holes

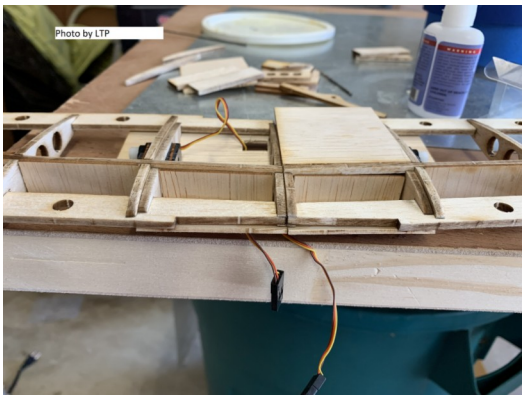
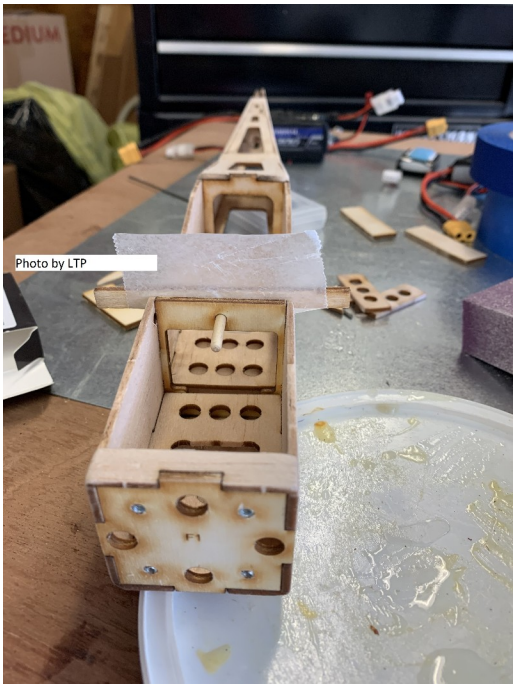


Figure 6 – Servo Wire Holes



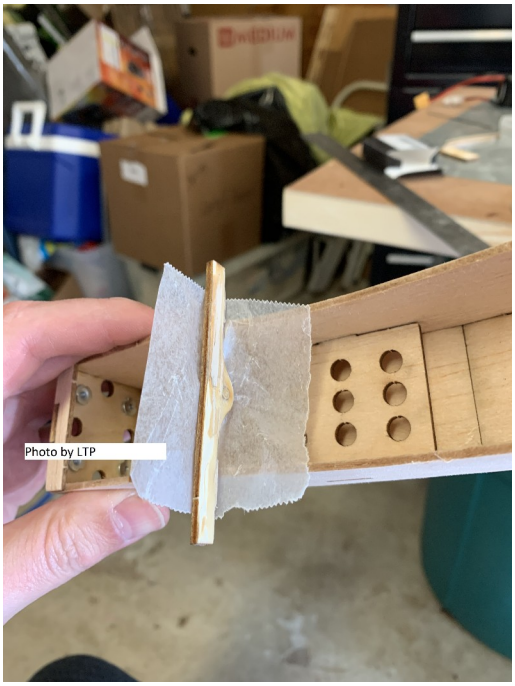


Figure 7 & 8 - Aligning Wing – Gluing Leading Edge Mount to wing

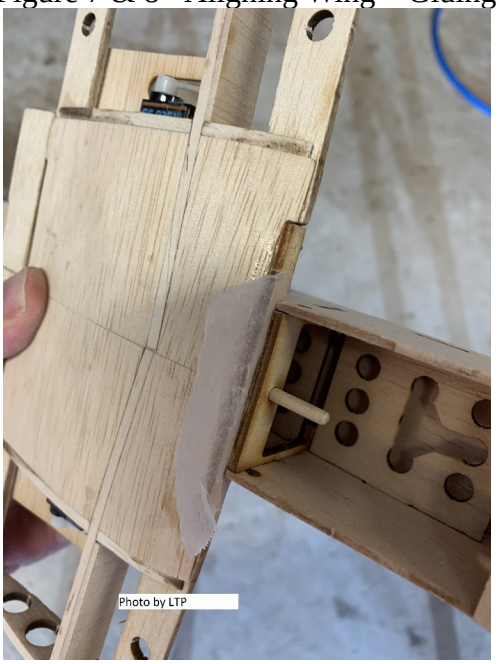
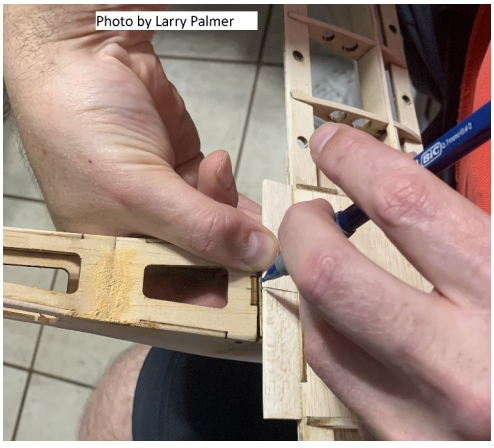


Figure 9 & 10 - Aligning Wing – Gluing Leading Edge Mount to wing



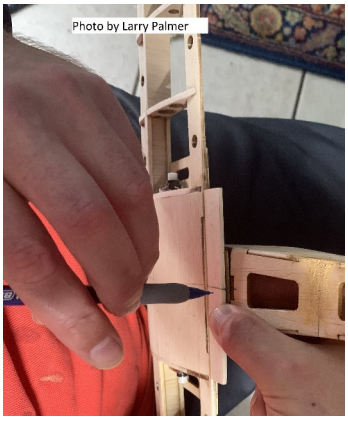


Figure 11 & 12

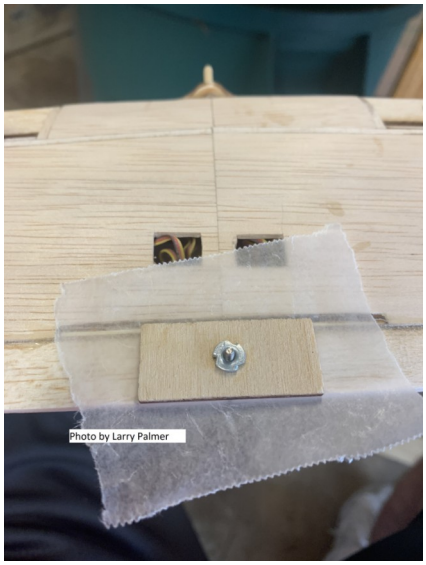


Figure 13, and 14

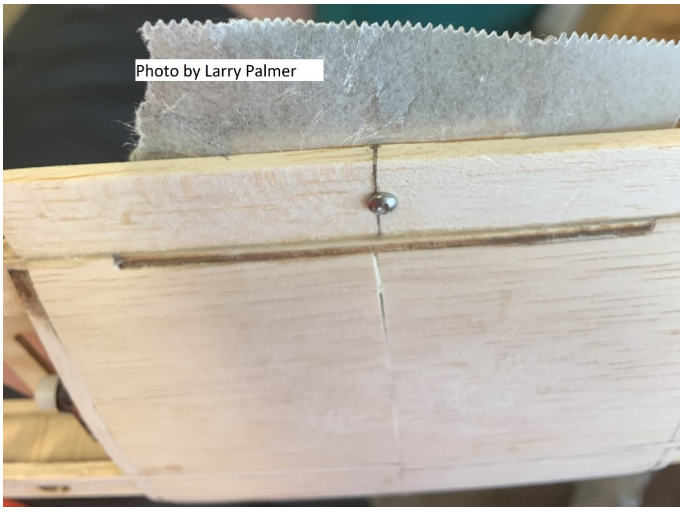


Figure 15 and 16

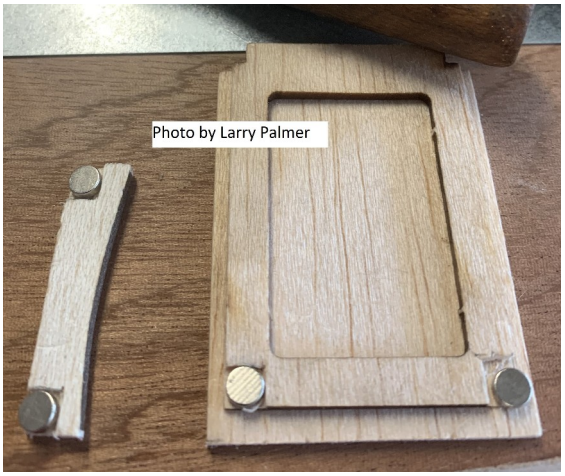


Figure 17 and 18

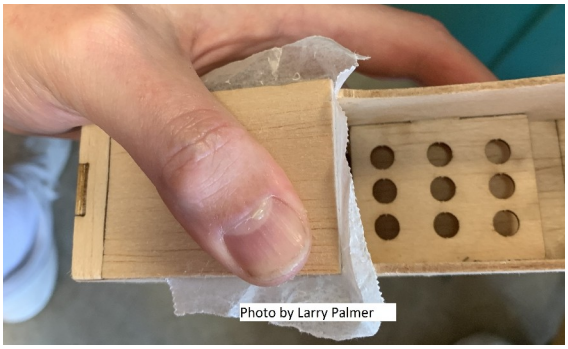
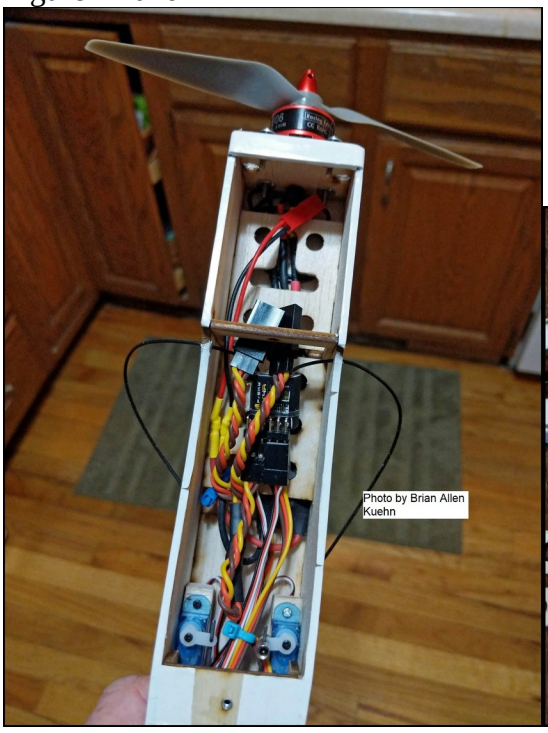


Figure 19 and 20



Figure 21 and 22



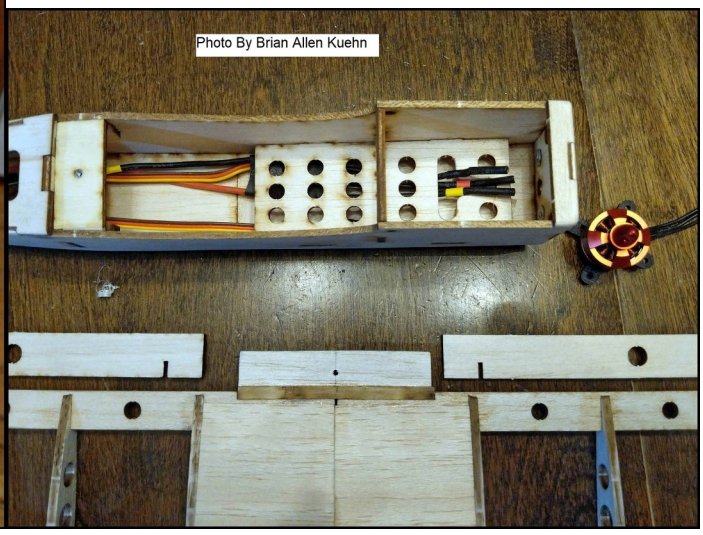


Figure 23 and 24