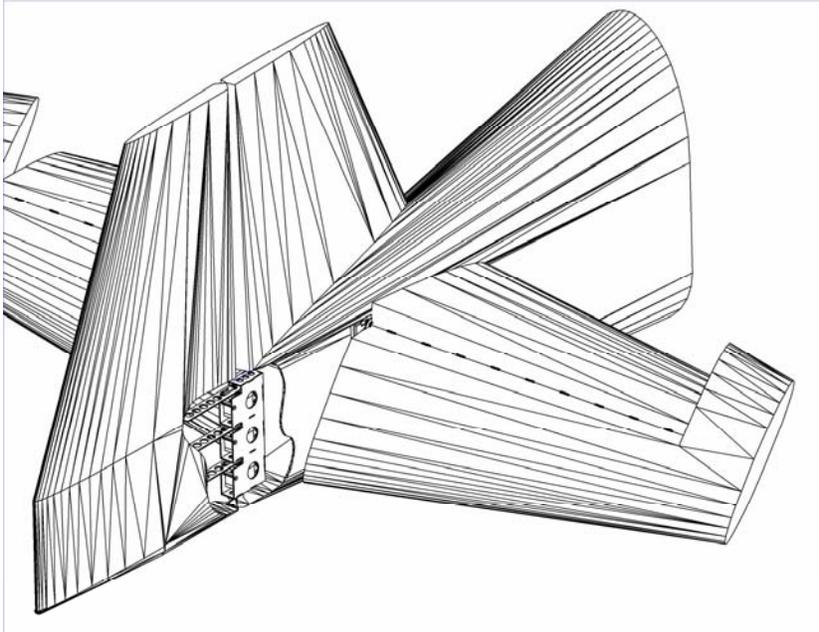




## TRIPLE SERVO MOUNTING BOX INSTRUCTIONS

Thank you for purchasing the patent pending, DuRant Direct Drive triple servo mount. This system is the ultimate in aircraft control. 100% servo torque is transmitted to the control surface - with zero travel, power, or precision loss due to linkage slop. Control travel is absolutely linear. Servo bearing and control hinge wear are greatly reduced. Fewer parts means less weight and greater reliability.



## REQUIREMENTS

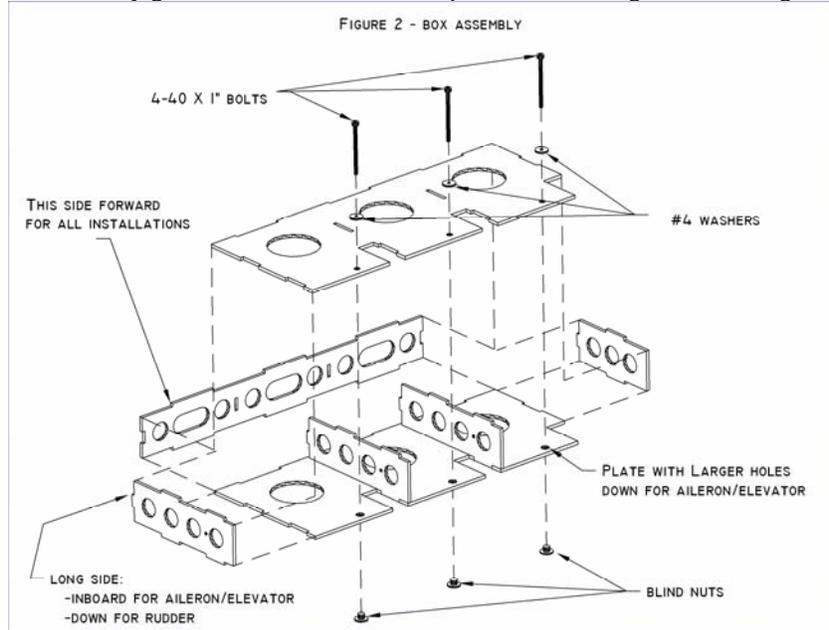
To begin, you will need the following:

- 1) Programmable servos, OR JR Matchbox (or equivalent)
- 2) Removable style hinges, such as Dubro ¼ scale hinges part number 257.
- 3) Length of .047" piano wire.
- 4) Hanger 9 HD ½ servo arms. (Futaba - part number HAN3575, or JR - part number HAN3574)
- 5) Servos. This mount is designed for standard size servos not greater than .76" in width for mount #3, .82" wide for mount #3W, or 1.01" wide for mount #3XW. Any standard servos will work - but we highly recommend quality servos, as your final control precision is only limited by the quality of your servos. Direct Drive especially optimizes the extreme precision of digital servos.
- 6) CA glue and basic modeling tools.

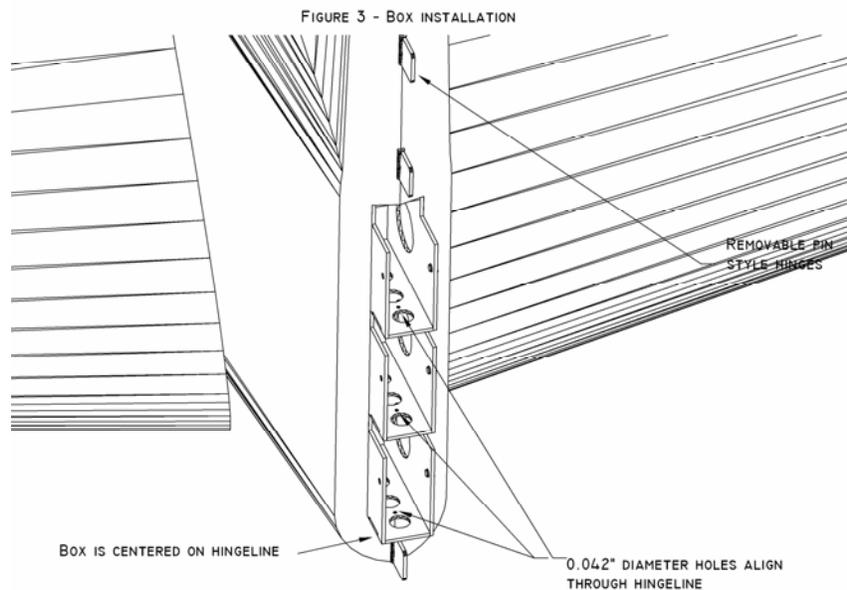
## ASSEMBLY AND INSTALLATION

- o Determine a location to install the mount. Follow these guidelines:
  - 1) It is preferable to mount the mount as far inboard as possible. This keeps total mass close to the aircraft center and usually provides a thicker airfoil section with which to work.
  - 2) If control surface stiffness is a factor, mount the mount near the center of the surface.
  - 3) You may be limited by aircraft structure, available space, or cosmetics. In this case anywhere it will fit will work just fine.
  - 4) In a built-up wing, it is structurally desirable to mount the mount against a wing rib.

- Determine the mount orientation prior to assembling. The side with the oval cutouts always goes forward. The long side normally goes inboard or down. The plate with the larger bolt holes goes down.

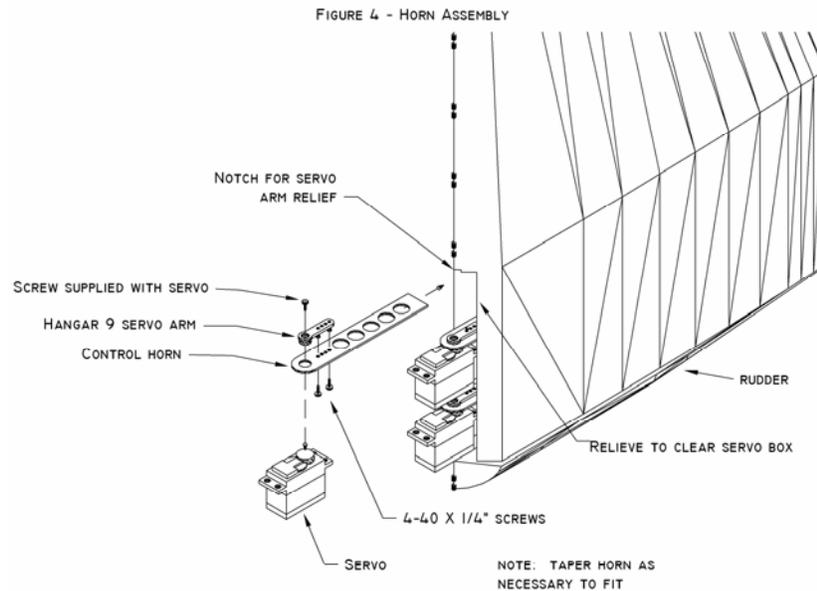


- Install the supplied 4-40 blind nuts in the lower plate (the plate with the larger holes to accept them). Cut small squares of .56oz glass cloth or tissue to fit over the back of the nuts. Add a drop of thin CA to bond the tissue and nuts permanently to the plate. Be careful not to get the glue in the threads, or you will have to clear the threads with a 4-40 tap.
- Assemble the mount using thin CA or equivalent glue, referencing figure 2. Add a fillet of glue around the inside of all joints.
- Install your control surface to the wing or tail using removable hinges. Be sure to leave a space where the mount will be placed. When satisfied with the fit and travel, remove the control surface.



- Place the mount against the airframe in the location where it will be mounted. Be sure it is perfectly centered on the hinge line. Use a fine tipped marker to trace the shape of the mount onto the airframe.

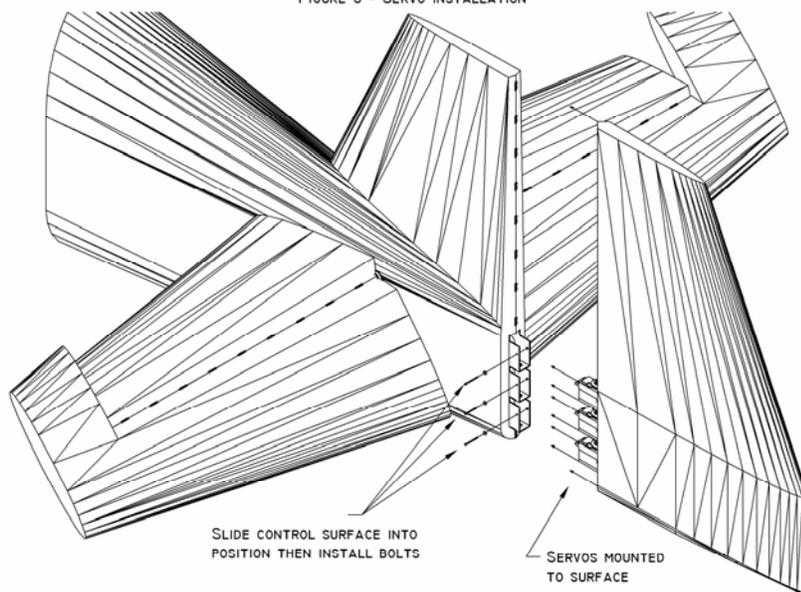
- Remove the mount and carefully cut an opening into the airframe along your tracing. The hole must be deep enough to allow the mount to enter up to the small holes (.047" diameter) located on the long sides. Reference figure 3. Also make a pathway for your servo wire at this time.
  - Note: In foam wings, you can cut a hole in the foam using a hot wire. To do this, shape a length of piano wire to the dimensions of the mount, and mark it so you can tell the desired depth to cut. The wire can be placed in a soldering gun to heat it, or simply heated over a flame. When hot, insert the wire to the proper depth – slice to the other side of the opening, and then remove. Do this all in one rapid, smooth motion.
- Install the mount using glue appropriate for the structure. That is, if you have a foam-cored wing, be sure to use foam safe glue! Accomplish this step while the wing is properly supported to prevent warping.



- Carefully make a cutout in the control surface to make room for the mount. Reference figure 4. Make the relief just large enough to clear the mount throughout the full range of motion.
- Make 1/16" slots in the control surface where the horns will be installed. The horns must align with the center of the rectangular cutouts in the mount when the surface is installed.
- Install Hangar 9 servo arms (not supplied) onto the horns using two 4-40 X 1/4" bolts each. Use a drop of thin CA where each arm contacts the horn to lock the assembly together.
- Taper the control horns to fit into the slots you just cut in the control surface. It is preferable, but not essential, to have the horns contact both outer skins of the surface. The servo screw holes must be centered on the hinge line. You will have to notch the control surface about 1/8" for the outer servo arm.
- Glue the horns into place in the control surface using slower drying glue. Ensure that each is exactly centered on the hinge line by running a .047" wire through the servo screw holes and the adjacent hinges.
- Cut three pieces of scrap balsa sheet (1/16" to 1/8" thick) into rectangles to fill the relief cut into the control surface between the horns. These will act as sheer webs to stiffen the control surface in this area. Set them into the surface enough to clear the mount when the surface is reinstalled.
- Install the control surface on the airframe. Check for clearance throughout the full range of travel. The maximum travel possible will be between 50 and 60 degrees in each direction. Trim any areas that need more clearance. You will need about 1/32" to allow room for covering. Construction is now complete.

## SERVO INSTALLATION PROCEDURE

FIGURE 5 - SERVO INSTALLATION



- Run your servo leads to the servos through the oval cutouts in the front of the mount.
- Turn on your transmitter and receiver. Ensure that all trims and sub-trims are set to zero. Reset the matchbox/servo programming to neutral. Set travel limits in your transmitter to the maximum possible and equal in both directions.
- Mount the servos on the servo arms as close to centered as possible (install the lower/inner first), then install the set screws that came with the servos. It is normal for them to be cocked just a little at this point in the operation.
- Turn off your radio. Slide the servo/control surface assembly into place. Gently tuck the servo wires into the oval mount holes as you slide the servos into the mount to ensure they do not get crimped.
- Install your hinge pins, the 4-40 X 1" servo bolts and washers supplied. Just snug – do not over-tighten.

## RADIO SETUP

- Turn the transmitter and receiver back on. For the steps below, it is helpful to set up one servo completely while the others are unplugged. Then plug in the second servo and set it to match the first. Then unplug the second servo and plug in the third. Set the third to the first, then re-plug the second.
- Center the control surface by:
  - 1) Matchbox, etc., set the control surface to center using the matchbox.
  - 2) If using programmable servos, program the center points of each servo.
- It is normal for the servos to hum when they are supporting the weight of the control surface. You should, however, be able to very gently position the control surface to a point where there is no humming. The centering step is CRITICAL. If not done properly the servos will fight each other and burn out.
- Next you will set each end point for the maximum available travel without binding. In accomplishing this step, you may find that the total travel is limited by the mechanical stop of one of the servos (this condition is indicated when the servo stops moving, even though the transmitter stick has more throw left). If this happens, reduce the endpoint travel for the limiting servo until the "dead spot" is gone, then set the other servos to match. Set endpoints by:
  - 1) If using a matchbox, etc., set the endpoints using the matchbox.
  - 2) If using programmable servos, program each servo's endpoints to match.

Note: do not forget to lock the programming into your matchbox by setting the dial to "0" before switching receiver power off. Otherwise, all your work will be lost!

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