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BASIC RUDDER ONLY INSTALLATION

When installing an Ace R/O Pulse package (Baby, Standard, or Stomper) or a similar system in your airplane, several things must be done. 1) The actuator must be mounted in the airplane. 2) The action of the actuator must be transmitted to the rudder. This may be done one of two ways: (a) A torque rod system delivers the rotary motion of the actuator to the rear of the plane and then the torque is converted to left-right movement of the rudder by a yoke. (b) A pushrod system converts the rotary motion of the actuator to a push-pull motion which is carried by a rod to the rudder where the push-pull is converted to left and right movement by means of a control horn. 3) The on-off switch must be mounted. 4) Provision to charge the batteries must be made. 5) A vertical whip antenna of about 24" of small diameter music wire placed perpendicular to the wing-fuselage plane and soldered to the receiver antenna lead must be mounted. 6) The batteries and receiver must be secured.

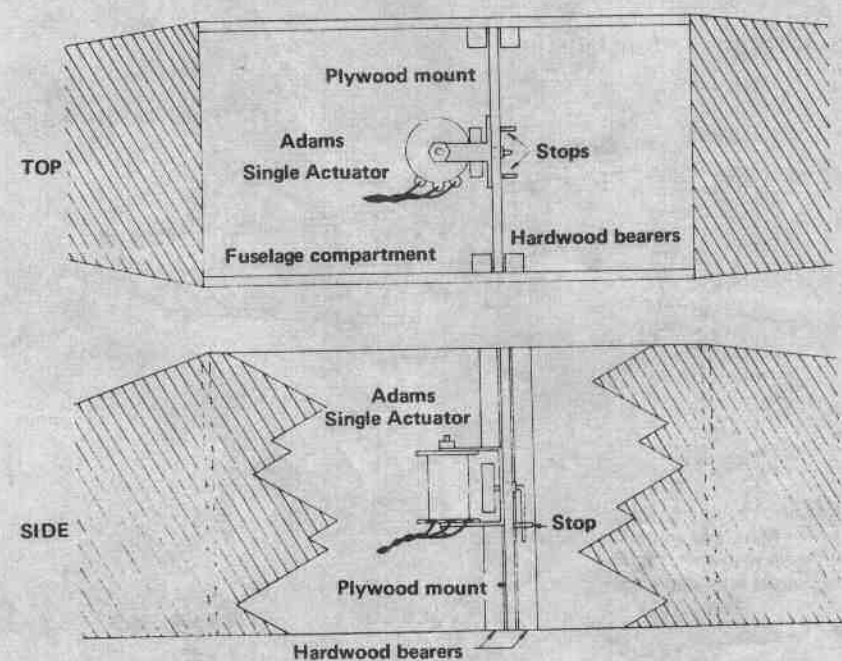
In order to allow you to make the most advantageous and dependable arrangement, the following procedures are specific examples of typical torque rod and pushrod installations with some suggestions for various methods of mounting the equipment. These installations are made in planes that are of straight forward design and have access to the fuselage compartment by removal of the wing; if your ship differs from this, variations will have to be made, but the basic concepts will be the same.

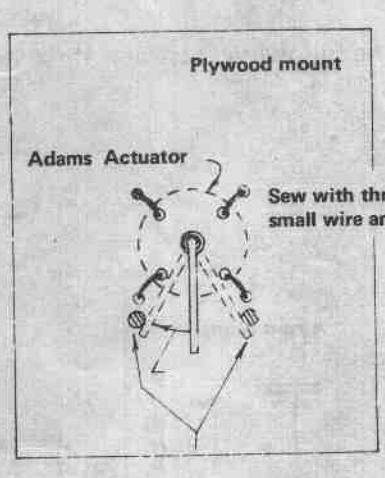
TYPICAL R/O INSTALLATION USING A TORQUE ROD

A torque rod must be used with a Baby and can be used with the Standard and Stomper.

I. ACTUATOR MOUNTING

So it can be easily removed, the actuator is usually mounted in the middle of or to the rear of the fuselage compartment on a 3/32" plywood plate that can slide in and out of the airplane by means of hardwood bearers.

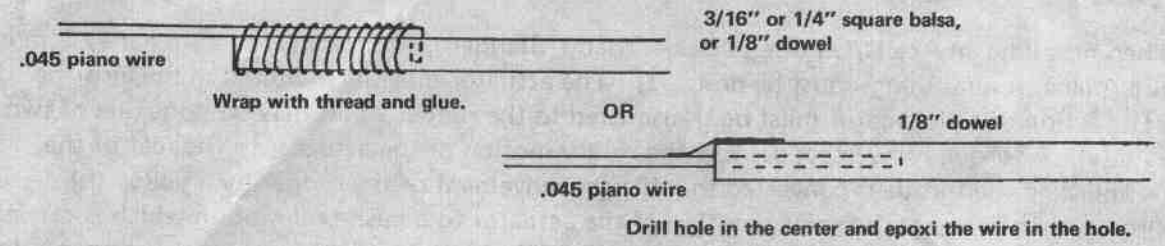




Stops to limit the throw of the actuator to 35° on either side. Make out of small dowel and glue in hole drilled into the plywood mount. A round toothpick works well.

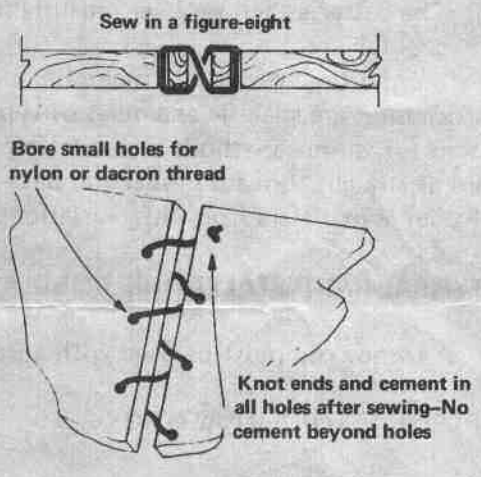
II. HOOKING THE RUDDER TO THE ACTUATOR

Motion of the actuator is carried to the rudder by means of a torque rod. At the rudder the torque is converted to right-left movement by a yoke fastened to the rudder. The rod should be light and rigid; construction can be of small dowel or square balsa stock with .045 piano wire on the ends. The piano wire is fastened to the dowel or balsa by wrapping with heavy thread and glueing:



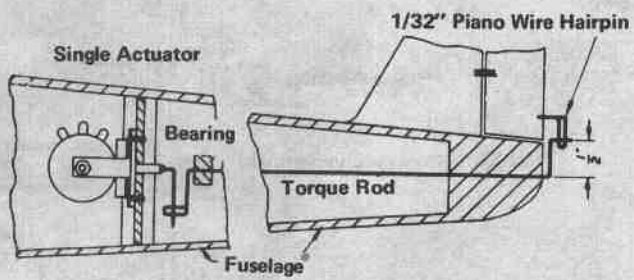
In smaller aircraft, the torque rod may simply be a piece of .045 music wire if the length is around 6-10".

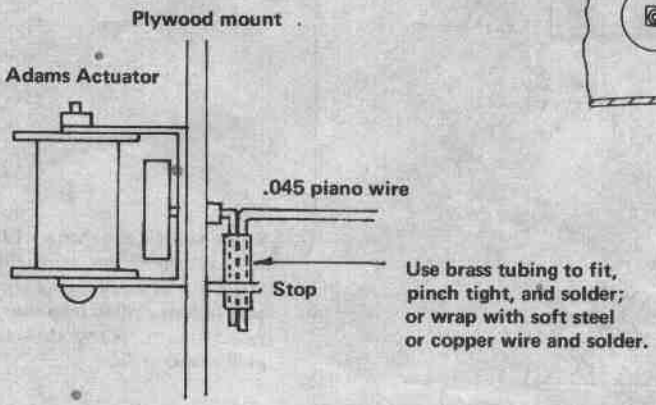
NO bind or friction can occur in the system--the rudder must be hinged completely free, (see example) and the hook up between the actuator must work without friction. The actuator is designed to operate the rudder, not work at overcoming extraneous problems with the linkages.

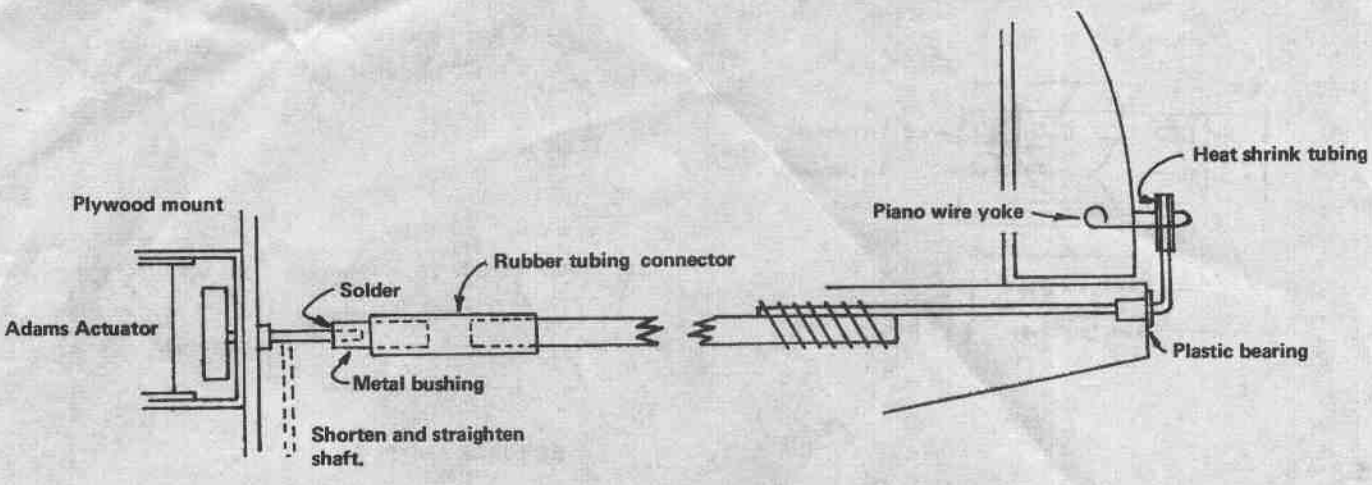


Avoid any metal to metal contact to prevent the possibility of electrical noise. This may be done by covering the music wire with heat shrink tubing wherever contact is made.

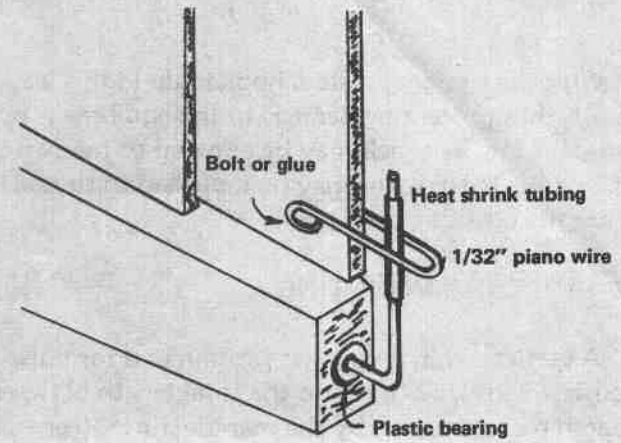
The following illustrates three methods of torque rod installation.





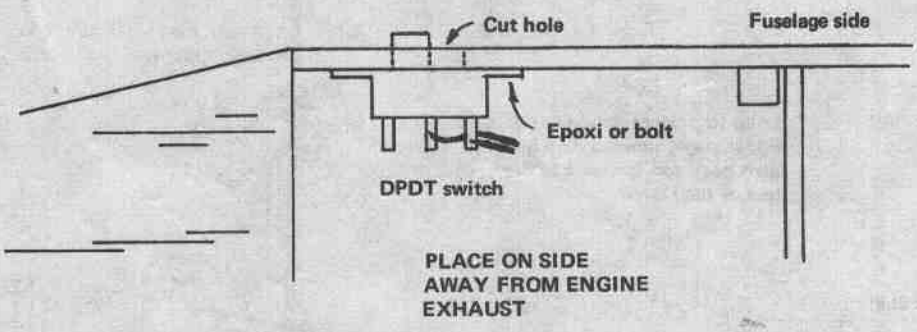


The torque rod is connected to the rudder by means of a yoke. A piece of small diameter music wire bent in a hairpin type U and fastened to the rudder by glue, or a bolt and nut, serves as an excellent yoke. A bolt and nut allows the amount of rudder throw to be adjustable by moving the yoke up and down. (See illustration) Make sure there is no bind when the torque rod rotates to the extreme limits. An alternate method would be to bend the torque rod itself into a hairpin U and have a straight piece of wire extending from the rudder.



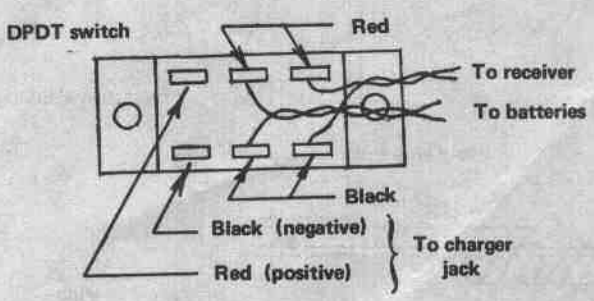
III. MOUNTING THE SWITCH

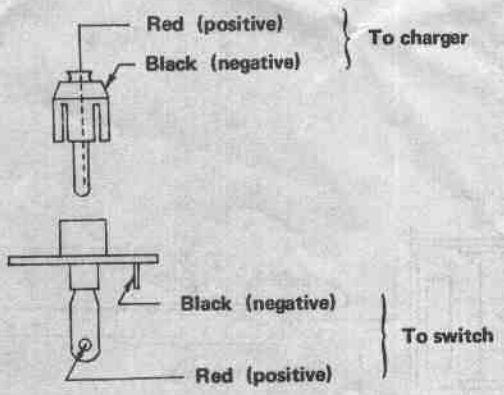
A hole is cut in the fuselage side to allow the switch slide to pass through to the outside of the plane. It may be epoxied or bolted in; if bolted, use washers or a plastic plate on the outside to prevent the bolts from pulling through the balsa.



IV. CHARGING PROVISION

No charging plug or jack is provided in the Ace R/O package because your charger probably would have a different plug than the jack we would provide. Obtain the proper jack and wire it to the DPDT switch as shown, making sure to have positive to positive and negative to negative.



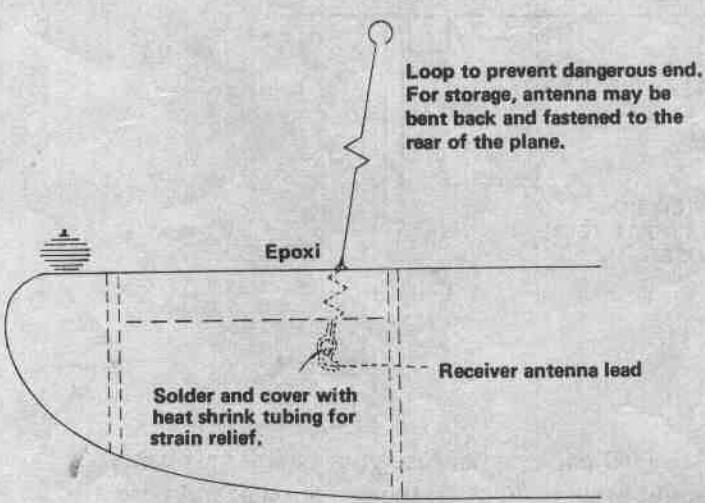


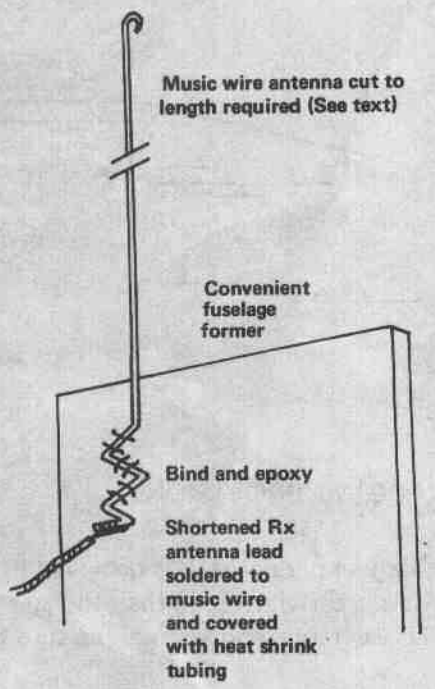
RCA JACK AND PLUG WIRING

With the charging system hooked up in this way, a charge can be obtained only when the system is off, thus preventing damage to the equipment by charging the batteries with the receiver and actuator on. The jack may be epoxied to the switch making it necessary to remove the wing to charge the batteries or may be mounted to the side or bottom of the fuselage so access can be had from the outside of the plane.

V. ANTENNA MOUNTING

A vertical whip antenna is recommend for pulse proportional flying. This is simply a piece of thin music wire (1/32") cut so the total length between the tip of the antenna and the receiver is the length recommended by the manufacturer (generally 24-36"). It is mounted on the fuselage in such a way to be perpendicular to the wing and fuselage. In order to prevent electrical interference, mount it as far away from the control linkages as possible, generally just in front of the wing. Make the lead from the receiver to the music wire as short as feasible and still be able to move the receiver around as necessary.





VI. SECURING THE BATTERIES AND RECEIVER

The batteries and receiver are simply wrapped separately in foam rubber and stuffed in an area so the center of gravity is at the proper place as shown on the plane plans. Always place the batteries in front of the receiver so that in hard landing the batteries won't fly forward and crush the receiver.

PUSH ROD INSTALLATION

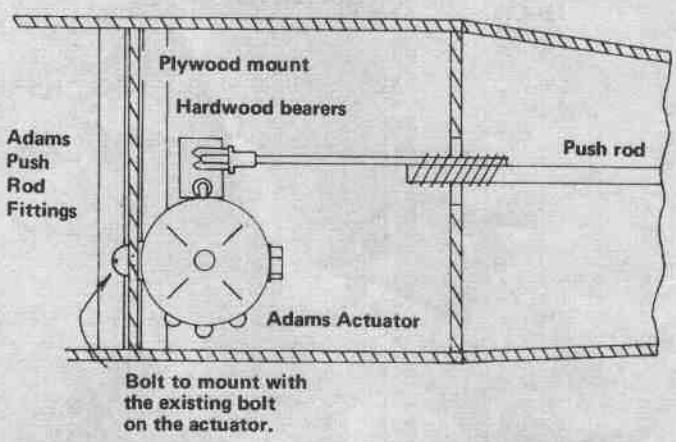
This method requires more torque and is generally advised to be used with dual magnet actuators only.

I. MOUNTING THE ACTUATOR

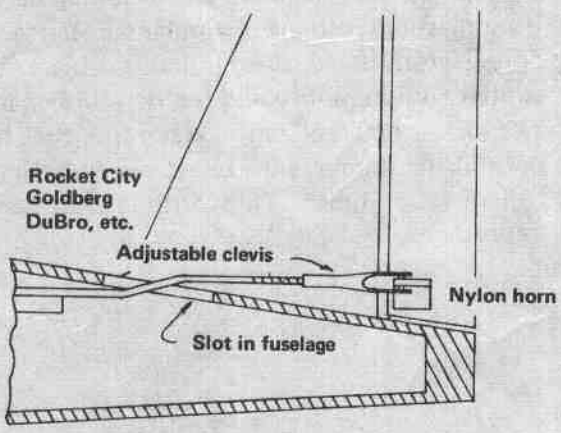
The actuator can be mounted the same as with the torque rod installation except the axis is different. See illustration. Fasten the actuator to the plate by using the existing nut and bolt on the actuator.

II. CONNECTING THE RUDDER TO THE ACTUATOR

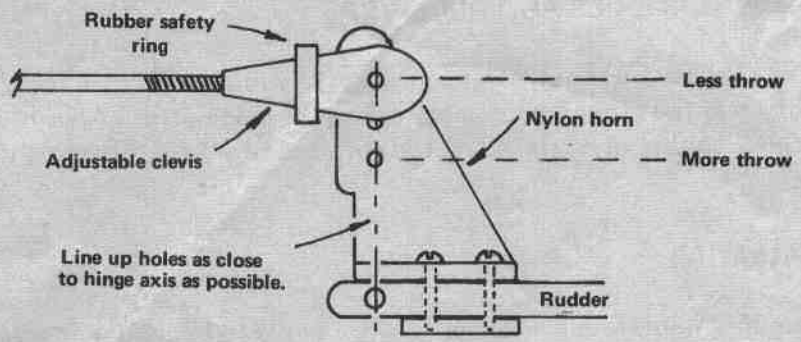
With a push rod the motion of the actuator is carried to the rudder by a push-pull action. The control horn on the rudder converts the push-pull to left and right movement. Use the same construction for the push rod as for a torque rod and again make sure the linkage is absolutely free, touching only the actuator and the control horn. Keep the push rod as straight as possible with bends only in necessary places.



MAY BE VERTICAL OR HORIZONTAL



Mount the control horn close to the bottom of the rudder so the push rod lies as close to the fuselage as possible. Line the holes in the horn up as close as possible to the hinge axis of the rudder. It is advised that an adjustable clevis be used to connect the push rod to the control horn. This allows mechanical trim for obtaining the proper neutral and left-right extremes. Make sure there is no bind between the pushrod and the control horn.

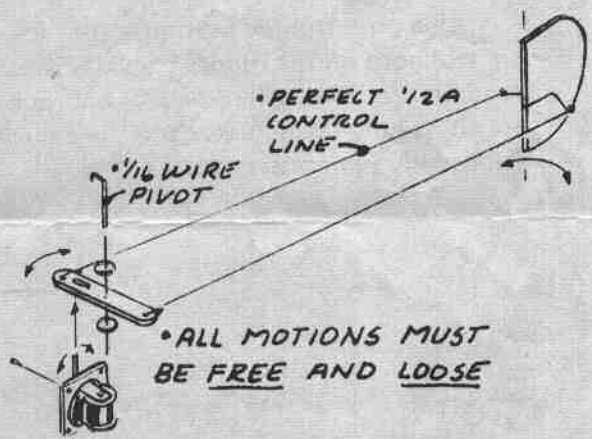


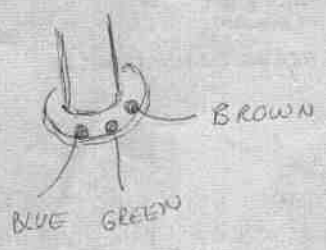
Have a hinge close to the point of control horn attachment.

Mount the switch, make provision for charging, mount the antenna, and secure the batteries just as you would with a torque rod installation.

INSTALLATION IDEA FOR MINI PLANES

This sketch shows a bellcrank type of hookup used in the Mini planes by Chris Soenksen. (.010 and .020) This has little inertia and is free and easy to move and yet gives enough control action for the smaller rudder. The bellcrank arm may be made from plastic, synthane or similar substance. Use only dacron thread, since nylon is subject to stretch with humidity and temperature changes. The lock is of 1/16" wire. Make sure that the horn of the rudder is the exact same width as the bellcrank arm holes. This width is of extreme importance.





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