TACHYON

by Phil Charlesworth

The Tachyon is designed to be flown on Estes D12-5 motors. She was named after a fundamental physical particle which can only exist at speeds faster than the speed of light, which will give you an idea of how she performs! Expect very fast, straight, flights to about 1200 ft. Use a bright coloured streamer to avoid long searches.

She's been flown at SWARM, FOG and Black Knights, and had an outing to the UKRA meet at Heckington in 2003. The original Tachyon was retired in early 2005.

The design is based around common Estes parts with a few custom made pieces. All the parts can be obtained from **Apo11o**, who can be contacted via the "links" page on this website.

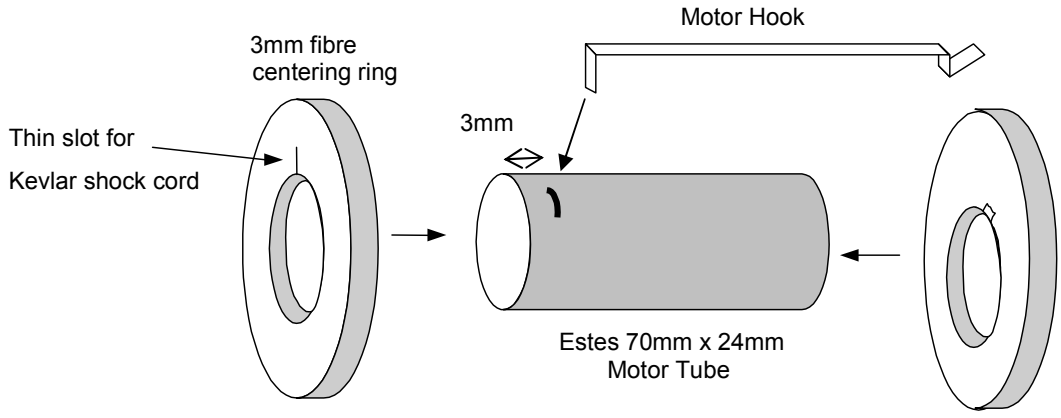
Anyone with basic rocket making skills should be able to construct the Tachyon. Read the instructions, and dry assemble the bits before using any glue. This will ensure that all the bits fit together before gluing them together.

STEP 1 – ASSEMBLE THE MOTOR MOUNT

The motor mount is a standard Estes 70mm by 24mm tube.

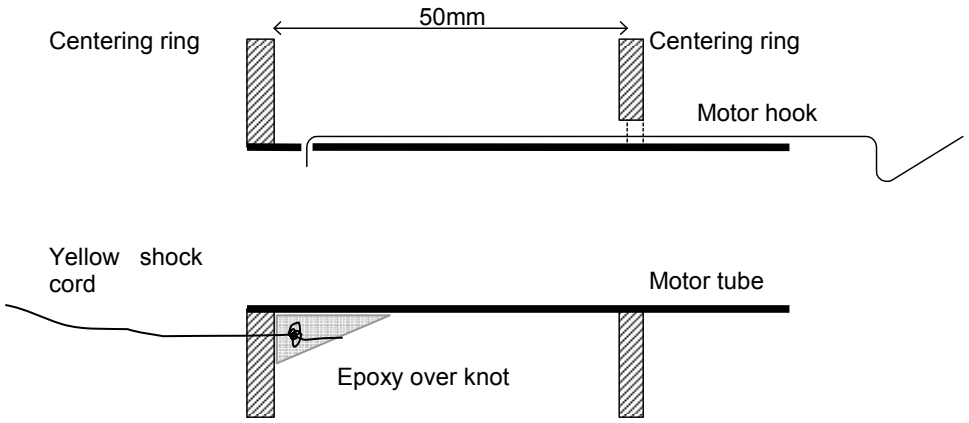
Cut a slot for the lug of the motor hook 3mm from one end of the motor tube. Insert the motor hook, and wrap a couple of turns of masking tape around the tube to hold it in place.

Cut a slot in one of the rings, just big enough to let the yellow shock cord pass between the ring and the motor tube.



Thread some of the 24 inch long Kevlar shock cord through the front centering ring. Put a ring of white glue around the front of the motor tube. Use white glue to attach the front centering ring level with the front of the tube. Tie off the yellow cord with a reasonably chunk knot, and put a blob of epoxy over the knot to fix it to the tube and centering ring.

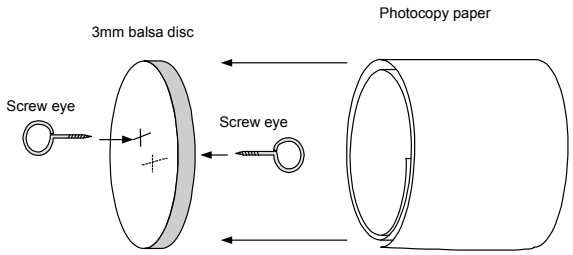
The rear ring should be glued with white glue at the rear of the motor tube. It will be necessary to cut a small notch in the ring to allow the motor hook to pass through the ring.



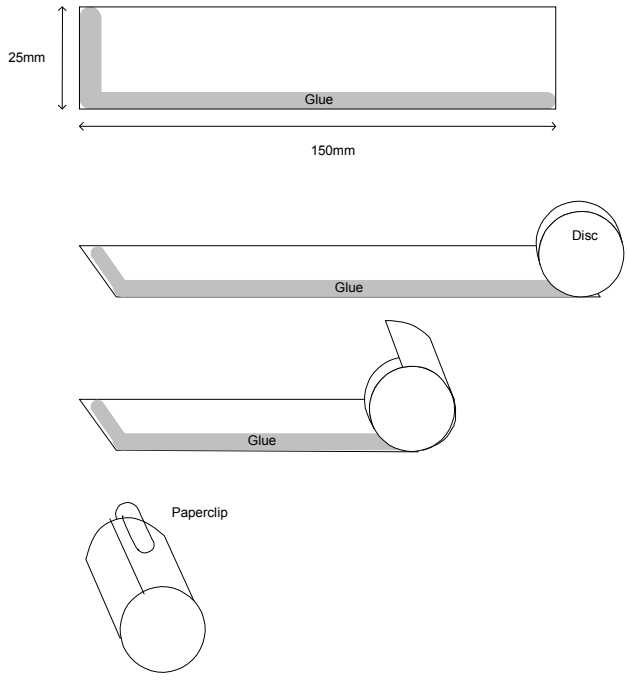
When everything was dry, two turns of masking tape can be wrapped around the middle of the ring to hold the motor hook in place.

STEP 2 – ASSEMBLE THE PISTON

The next stage is to assemble the piston. This is made from a 31mm diameter disc cut from the 3mm balsa. Screw eyes must be set in either side of the disc, as close to the centre as possible. This reduces any twist in the disc, which could cut into the paper. The assembly of the piston is shown in the next diagram.



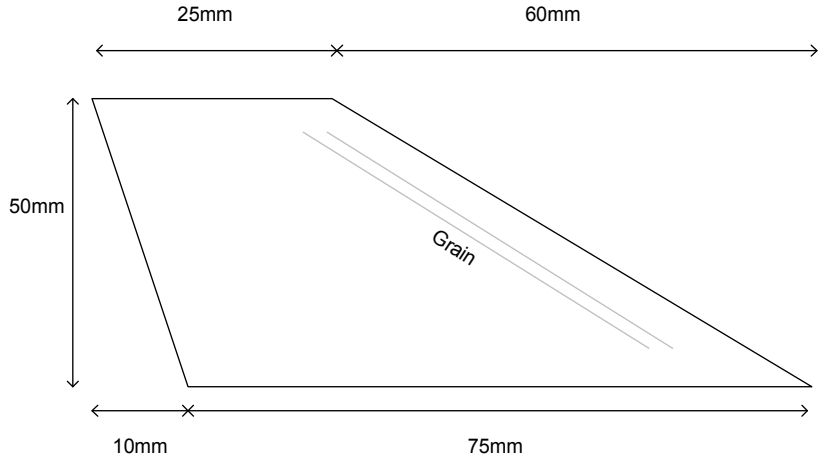
Run white glue along two sides of the paper, as shown in the diagram below. Roll the balsa disc along the paper until the piston takes shape. The whole piston can be held together with a paper clip while the glue dries.



When the white glue has dried, remove the clip and use two blobs of epoxy to bond the screw eyes to the balsa wood. This is important as it stops the screw eyes from tearing through the balsa under the ejection shock load.

STEP 3 – MAKE THE FINS

The fins are cut from 2mm "C" cut balsa. The fin dimensions are:



Using a sharp pencil and a ruler, mark out 4 fins on the balsa. **It is important that the grain of the wood runs along the leading edge of each fin** otherwise the fins will fail in flight.

Put the fins together as a block and sand them to the same shape.

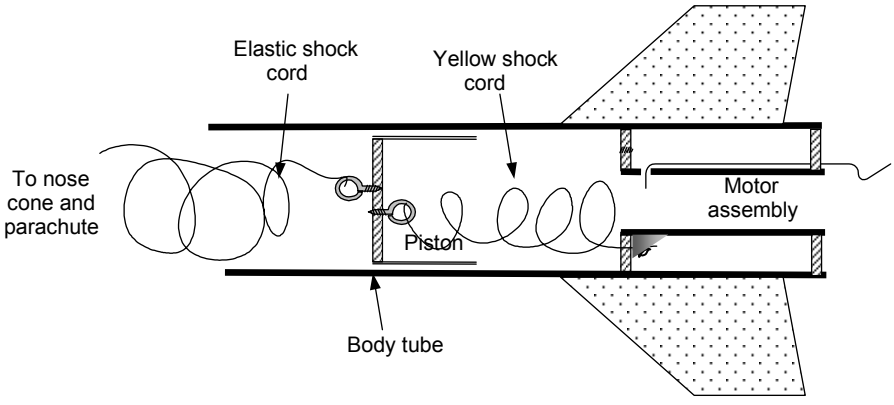
STEP 4 –ASSEMBLE THE ROCKET

The rocket can now be assembled. Firstly smear the inside of the tube with white glue at about 65mm from the base. The motor assembly is inserted from the back of the rocket. White glue is applied to the rim of the card ring before it is inserted. Leave this to set.

Glue each fin into place with white glue and leave it to dry before the next fin is fitted. When all fins are fitted apply a fillet of epoxy for strength.

Tie the Kevlar shock chord to the rear piston screw eye and put a small blob of epoxy on the knot. Tie about 24 inches of elastic to the front screw eye and tie the other end to the nose cone.

The final assembly of the rocket is shown below.



The standard 12 inch parachute can be used, alternatively use a streamer for closer recoveries. Both should be fixed to the nose cone.

PARTS LIST

70mm of 24mm body tube

400 mm of BT55 body tube

2 centering rings for 24mm tube in BT55

One PNC55 ogive nose cone

2mm balsa sheet for fins

3mm balsa sheet for piston

Stiff paper for piston

Motor hook

2 screw eyes

24 inches Kevlar shock chord

24 inches elastic shock chord

12 inch parachute or equivalent streamer