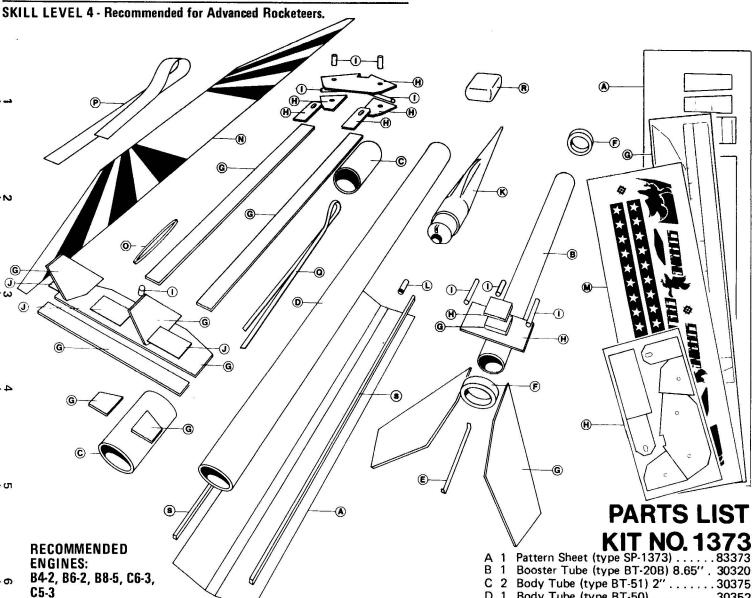




BEFORE YOU START

Read each step and study the accompanying drawings before doing any of the work called for in that step. Make sure you have all parts and materials. Check off each step as you complete it. Always testfit parts together before applying glue. It will sometimes be necessary to sand edges of rings, tubes, etc. to obtain a proper fit. If you are in doubt about the relative size or location of some parts, refer back to this exploded view drawing for clarification. Adequate glue joints are very important for a flying model rocket. Follow the instructions carefully in this regard.





First Flight B4-2

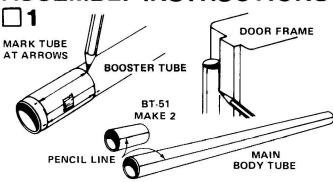
ESTES INDUSTRIES PENROSE, CO 81240 USA In addition to the parts included in this kit you will need: Scissors, pencil, ruler, fine or extra-fine grit sandpaper, sanding sealer, masking tape, clear cellophane tape, a medium size modeling paint brush, modeling knife with sharp blade, gloss white and black enamel spray paint, tube type plastic cement, and household white glue or resin glue (Elmer's, Titebond, or similar). Other types of glue are not recommended.

TOOLS AND

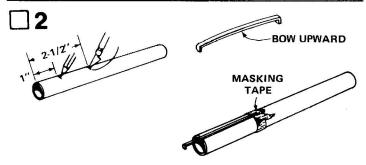
MATERIALS

| / | | ∨ KIT NO. 1373 |
|---|-----|---|
| Α | 1 | Pattern Sheet (type SP-1373) 83373 |
| В | 1 | Booster Tube (type BT-20B) 8.65", 30320 |
| C | 2 | Body Tube (type BT-51) 2" 30375 |
| D | 1 | Body Tube (type BT-50) 30352 |
| Ε | 1 | Engine Hook (type EH-2) |
| F | 2 | Centering Rings (type AR-2050) 30164 |
| G | 1 | Balsa Die-Cut Sheet (type BF-1373) .32387 |
| Η | 1 | Plywood Die-Cut Sheet 32275 |
| ŀ | 1 | Wood Dowel (type WD-1C) 85906 |
| J | 1 | Tape Hinge (type TH-1) 45117 |
| Κ | 1 | Plastic Nose Cone (type PNC-50SP) . 71001 |
| L | 2 | Launch Lug (type LL-2AM) 38176 |
| M | 1 | Decal Sheet (type KD-1373) 37516 |
| Ν | 1 | Plastic Wing Sheet |
| 0 | 1 | Rubber Band |
| P | 1 | Streamer (type RS-20) |
| Q | 1 | Shock Cord (type SC-1B) 85734 |
| R | 937 | Clay Weight (type M129) 85263 |
| S | 2 | Balsa Strip |

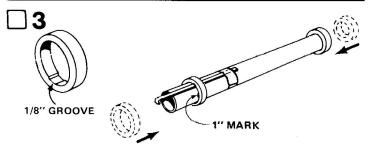
ASSEMBLY INSTRUCTIONS



Cut out the tube marking guide from the pattern sheet (part A) and wrap the guide around the booster tube (part B). Match up the alignment marks and tape the guide together. Mark the booster tube at each of the arrow points. Label the engine hook line with an "E". Remove the guide. Draw straight lines connecting each pair of marks. A door frame inside edge can be used for a guide as shown. Extend each line 4" along the tube. Using the same method, draw a line along each of the two BT-51 body tubes (part C) and the main body tube (part D). Extend the lines on these body tubes the entire length of each tube.



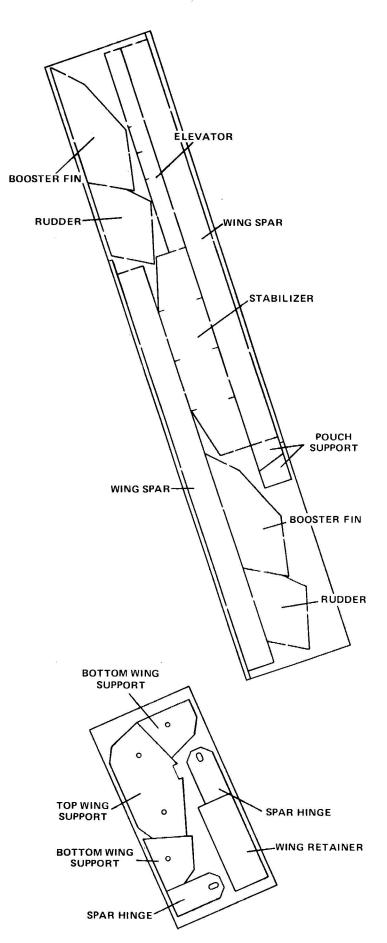
Mark the booster tube 1" and 2-1/2" from the rear of the tube on the engine hook line. Cut a 1/8" long slit at the 2-1/2" mark. Gently bend the engine hook (part E) so that it bows upward slightly in the middle. (Study the drawing—Don't bend the wrong way.) Insert one end of the hook into the slit of the booster tube. Wrap several layers of masking tape around the booster tube and the end of the engine hook.

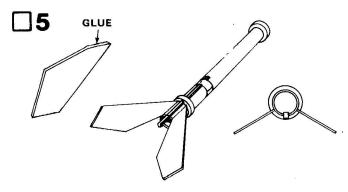


Sand the inside edges of the two centering rings (part F) to remove any burrs. The rings should slide easily onto the body tube. Cut a shallow groove 1/8" wide in one of the rings as shown so that it will fit over the engine hook. Slip the ring over the engine hook and the rear of the booster tube up past the 1" mark. Make sure the engine hook runs straight along the tube and the rear of the ring is at the 1" mark. Glue the ring into place by applying glue around the tube on both sides of the ring. Smear a small amount of glue around the front of the booster tube and slide the other ring over the tube so that the ends are even.

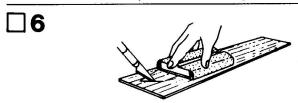


Fine-sand the balsa die-cut sheet (part G). Free the die-cut parts from the sheet using a sharp knife. Lightly sand the edges of each piece so that they are smooth. Keep all edges flat. Refer to illustrations for identification of parts. Save the scrap balsa for later use.

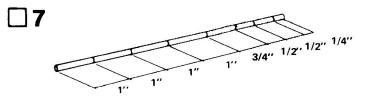




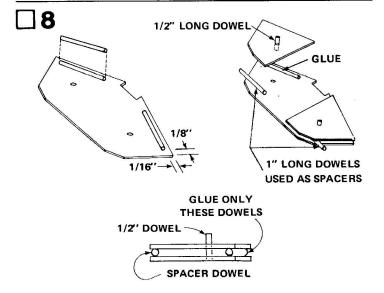
Rub a line of glue into the root edges of the two booster fins (the larger fins) and allow the glue to dry. Apply glue to the fins again and position the fins on the booster's guide lines so that the front of the fins are against the rear of the centering ring. Adjust the fins so that they project straight away from the booster tube. Do not set the assembly on the fins while the glue is wet.



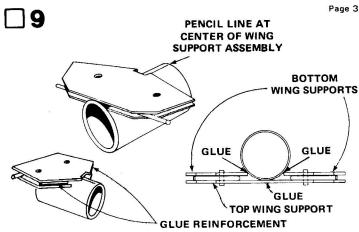
Fine-sand the plywood die-cut sheet (part H). Free the edges of the parts with a sharp knife, then carefully remove the pieces. Lightly sand the edges of the parts so that they are smooth. Keep all edges flat. Refer to illustration for identification of parts. Save the scrap plywood for later use.



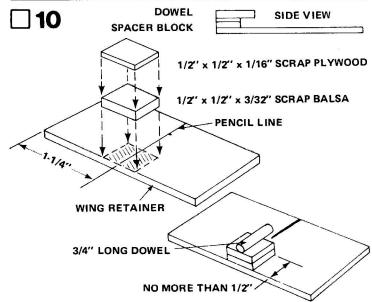
Cut the wooden dowel (part I) into four pieces 1" long, one piece 3/4" long, two pieces 1/2" long, and one piece 1/4" long. The dowel is best cut by cutting around the dowel and then bending the dowel until it snaps.



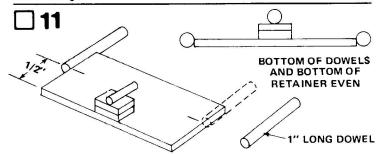
Locate the top wing support. Glue two 1" long dowels to the support as shown. The ends of the dowels are 1/8" from the ends of the support and the front edge of the dowels are 1/16" in from the front edge of the support. Locate the two bottom wing supports. Press the two 1/2" long dowels (wing support pins) halfway into the holes in the bottom wing supports. NOTE: DO NOT GLUE THESE DOWELS IN PLACE. Apply a line of glue to the two dowels previously glued to the top support. Press the bottom supports into position, making sure that the 1/2" long dowels extend straight down into the holes in the top support. Place the two extra 1" long dowels between the rear edges of the supports to serve as spacers (DO NOT GLUE THESE DOWELS INTO PLACE).



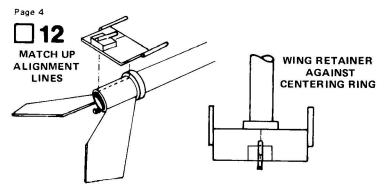
One of the BT-51 body tubes (part C) is glued into the assembly. The rear edge of the tube and wing support are even. The line on the body tube is centered on the top wing support. The body tube is also centered in the opening between the bottom wing supports. Apply a line of glue to the body tube along the pencil line and attach tube to the top wing support. Apply a line of glue along each side of the tube where it joins against the bottom wing supports. Apply a glue reinforcement to the front dowel-support joints. Wipe away excess glue. After the glue is COMPLETELY DRY, the spacer dowels may be removed from the assembly.



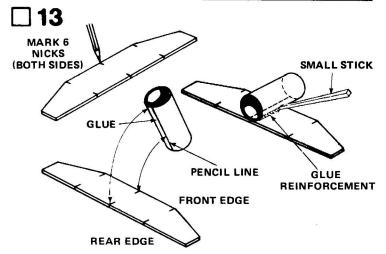
Locate the wing retainer (plywood). Measure in 1-1/4" from one side and draw a line on the retainer. This marks the center line of the part. Cut a 1/2" x 1/2" block from the scrap balsa and a 1/2" x 1/2" block from the scrap plywood. Glue these two blocks together to form a 5/32" thick spacer. Glue the spacer to the retainer even with rear edge of retainer and centered on the pencil line. Glue the 3/4" long dowel on top of the spacer block. The rear of the dowel is even with the rear of the spacer block and the dowel is centered over the pencil line. Allow the glue to dry for 10 minutes, then apply a film of glue over all the glue joints for added strength.



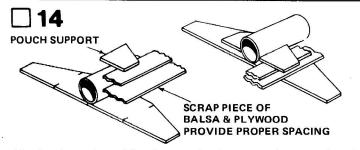
Mark the retainer on both sides 1/2" from the rear edge. Glue one 1" long dowel to each side of the retainer. The rear of the dowels are on the 1/2" marks and the bottoms of the dowels are even with the bottom of the retainer. Allow the glue to dry, then apply glue reinforcements to the joints.



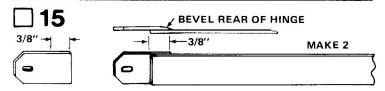
Glue the wing retainer to the booster tube as shown. Be sure the alignment lines of each piece match up and that the wing retainer is up against the centering ring. Set the unit aside to dry.



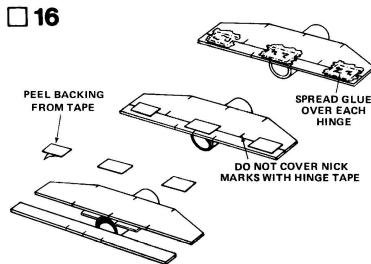
Locate the stabilizer (balsa). There are six die-cut nick marks along the edges of the part. Mark these nicks (on both sides of stabilizer) with a pencil to provide better visibility. Glue the remaining BT-51 body tube to the stabilizer. The pencil line on the tube must be lined up with the center nick marks on the stabilizer. The rear edge of tube and stabilizer must be even. After the glue has dried, apply a glue reinforcement to both sides of the glue joint. Use a small scrap of balsa to apply the glue.



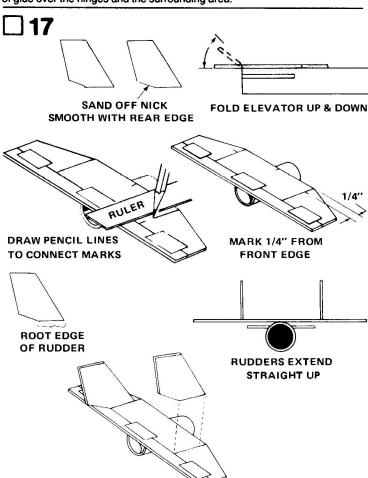
After the glue on the stabilizer has set, glue the two pouch supports into place as shown. Use a scrap piece of plywood and balsa under each support to provide the proper 5/32" spacing for each unit. Do not allow the spacers to become glued in place. Allow the units to dry completely before removing the spacers. Apply a glue reinforcement to both support-body tube joints.



Mark each of the wing spars 3/8" from the rear as shown. Sand the rear of each spar hinge to a bevel as shown. Glue a spar hinge to a spar at the mark. Repeat for the other spar hinge and spar. Press the units against a flat surface to make sure they are in line as shown. After the glue has dried, apply a thin film of glue over the joints for added strength.

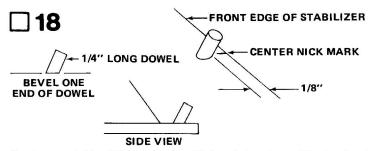


Once the glue on the pouch supports has dried, remove the spacing material and install the elevator. Cut three 1" strips from the tape hinge (part J). Mark the three nicks on the elevator with a pencil. Attach the elevator to the stabilizer as shown with one hinge in the middle and one hinge on each end. Rub a thin layer of glue over the hinges and the surrounding area.

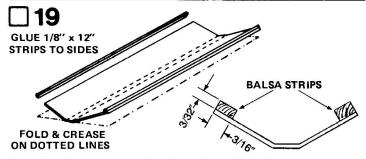


Sand off nick on lower rear edge of the rudders so that the edge is smooth and flat. Fold the elevator up and down several times to insure that the hinge works properly. Draw pencil lines connecting the two outside pairs of nicks on the stabilizer. Place a mark on each line 1/4" from the front edge of the stabilizer. The two balsa rudders are now glued in place. Apply a line of glue to the root edge of each rudder and allow glue to partially dry. Apply a second line of glue to each root edge and attach the rudders. The front edge of each rudder is on the 1/4" mark and the inside edge of each rudder is on the pencil line. CAUTION: Make sure you do not get any glue on the elevator. Make sure that the rudders extend straight up from the stabilizer and set the assembly aside to dry. After the glue has dried, apply a glue reinforcement to the rudder-stabilizer joints.

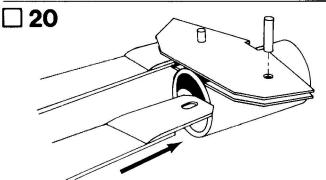
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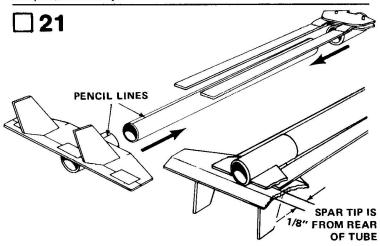
Sand one end of the 1/4" long dowel so it is beveled as shown. Glue the dowel to the center of the stabilizer, 1/8" from the front edge. The dowel must point slightly forward. A rubber band will be hooked over the dowel later to provide tension for activating the elevator. After the glue has dried, use a toothpick to apply an additional glue reinforcement around the dowel. It is very important to have a good glue joint, but don't get too much glue on the dowel or the rubber band could slip off.



Carefully cut out the pouch from the pattern sheet. Using a straight edge, crease the pouch inwards on the dotted lines. Glue a 3/32" x 3/16" x 12" balsa strip (part S) to each side of the pouch as shown.

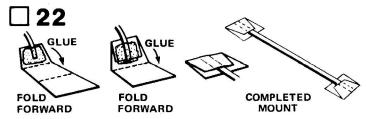


Remove the wing support pins. Insert the wing spars, hinge sides up, and replace the pins. Check to make sure the wing spars open easily. NOTE: The pins are <u>not</u> glued into place. They are only press fitted. This allows removal of the spars, if necessary.

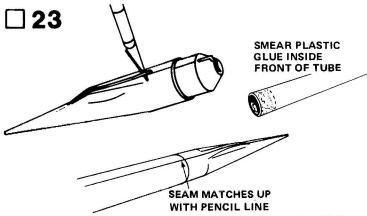


Slide the wing unit and the stabilizer unit onto the main body tube as shown. Position the <u>stabilizer</u> so that the tube ends are even and the lines on each tube match up. Apply a small drop of glue to the top front of the BT-51 tube to hold it in place. Aligning the lines of the wing support tube and the main body tube,

position the unit so that the wing spars are 1/8" from the rear of the main body tube when the wings are in a folded position. Apply a small drop of glue to the top rear of this wing unit/main body tube joint. Sight down the tube to be sure the wing unit and the stabilizer unit are in line with each other. NOTE: The two units are held in place by only a small drop of glue on each so that they will slide down the main body tube in the event of a crash, causing less damage to the model.

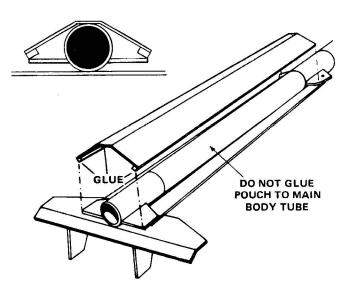


Cut out the two shock cord mounts from the pattern sheet. Cut the shock cord (part Q) to a 6" length. Fold a mount on dotted lines, then unfold and apply glue to Section 1. Lay the end of the shock cord into the glue. Fold over and apply glue to the back of Section 1 and the exposed portion of Section 2. Fold again to complete mount. Hold with your fingers until the glue sets. Repeat this process for the other shock cord mount on the opposite end of the 6" shock cord.

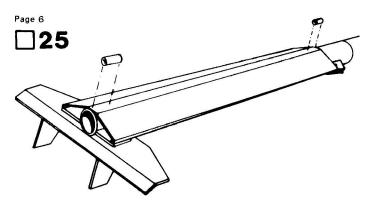


Trim any excess plastic from around the sides of the nose cone (part K). Smear TUBE-TYPE PLASTIC CEMENT around the inside front of the main body tube. Allow the glue to dry. Apply glue to the inside of the body tube again. Slide the nose cone into the body tube so that the top seam of the nose cone and the line of the body tube match up. Wipe off any excess cement.

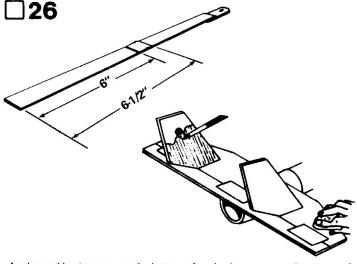
□ 24



Glue the pouch to the bottom of the glider. Glue the center to the BT-51s. Glue the sides to the pouch supports and the wing supports. DO NOT glue the pouch to the main body tube.

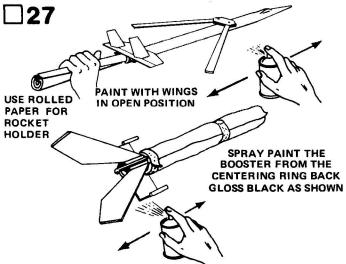


Glue the launch lugs (part L) to the bottom of the pouch, one on each end. Adjust the launch lugs so that they are in line with each other and run straight along the tube. A launch rod, if available, may be used to align the launch lugs.



Apply masking tape across the <u>bottom</u> of each wing spar covering an area from 6" to 6-1/2" from the wing tips. The shock cord mounts will be glued to these areas and should not be sealed or painted. Apply several coats of sanding sealer to all of the wood surfaces. Lightly sand the pieces after each coat. Continue sanding and sealing until the grain pores are filled and smooth.

PAINTING AND DETAILING

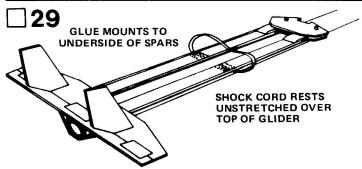


After the sanding sealer is completely dry, paint the entire model gloss white. Follow instructions on the spray can for best results. We recommend spray enamel. Do not paint the model with lacquer paint. Shake can before spraying. Hold the can straight up and spray in long, smooth "strokes". Spray the model with several light, dry mist coats of paint to avoid "runs". Shake can periodically. To obtain a gloss, final coat should be applied slightly heavier. Let this coat dry overnight. Be sure paint is completely dry before applying decals. After masking with paper and tape as shown, paint the rear of the booster gloss black.

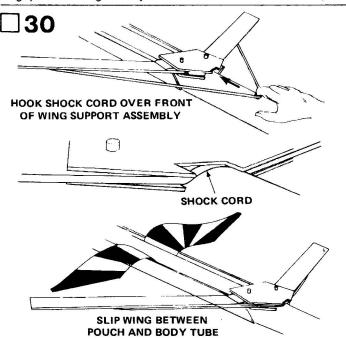
DECAL PLACEMENT



When all paint is dry, apply the decals (part M) in the positions shown. (A) Cut only one decal at a time from sheet. (B) Submerge decal in lukewarm water until decal slides on backing paper (usually 15 to 30 seconds). (C) Gently slide decal from backing paper onto model. (D) Move decal into exact position and carefully blot away excess water with a soft cloth. (E) If the decal "sticks" before you have it in position, apply water over the decal with a brush. This will permit the decal to be moved. (F) Smooth out all wrinkles and air bubbles before the decal dries. We recommend that the completed model be sprayed with Testor's "Gloss-Kote" to protect the decals and retain the shine.

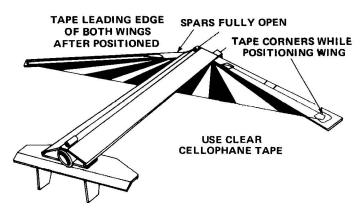


Remove the masking tape from the wing spars. Glue the shock cord mounts to the unpainted sections. Be sure that the ends of the shock cord extend from the front of the wing spars and that the shock cord rests over the top of the body tube. Smear a layer of glue over the mounts and the unpainted section of the wing spar. Allow the glue to dry with the shock cord in an unstretched position.

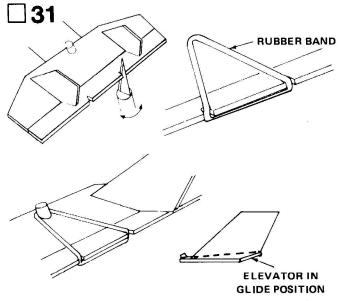


DO NOT PROCEED WITH THIS STEP UNTIL THE GLUE ON THE SHOCK CORD MOUNTS HAS BEEN ALLOWED TO DRY FOR $\overline{\text{AT LEAST}}$ ONE HOUR.

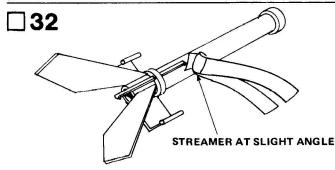
Pull the shock cord forward, forcing the wing spars to the full open position. Hook the shock cord over the front of the wing support assembly. Check the hinge assembly. Fold each wing spar back part way and let go. The spars should snap instantly to a full open position. If they do not, remove the pins and



check for dried glue, wood splinters or foreign material that may interfere with proper operation. Once you are satisfied with the operation of the hinge, the wing may be attached. Cut out one of the wings from the plastic sheet (part N). The second wing may be kept for a spare. Insert one end of the wing between the pouch and body tube and pull half way through. Center the wing on the model and tape the outside corners of the wing to the spars. Check to make sure that (1) the wing is centered on the model, (2) the wing material is tight, and (3) the spars are fully opened. Once you are satisfied with the fit, run a piece of tape along the entire length of both leading edges of the wing. Press the tape firmly down onto the wing and spars.



Locate the rubber band (part O). Enlarge the two outside nicks in the rear of the elevator by gently twisting a knife blade back and forth. Note: Do not make the nicks deeper, only wider, so they will accept the rubber band. Insert the rubber band into the slots and hook the end of the rubber band over the dowel at the front of the stabilizer. The rubber band "activates" the elevator, pulling it up into glide position.



Fold the streamer (part P) in half and cut in two. Only one half of the streamer is used in this kit. Fold the half streamer in two and tape to the booster just above the engine hook and at a slight angle as shown. By placing the streamer at a slight angle, it may be spiral wrapped around the tube, facilitating flight preparation.

LAUNCHING COMPONENTS

To launch your rocket you will need the following items:

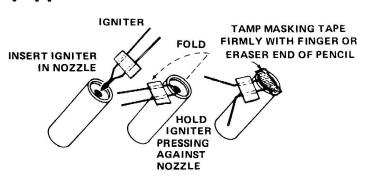
- -An Estes model rocket launching system
- —Estes B4-2, B6-2, B8-5, C5-3, or C6-3 model rocket engines. Use a B4-2 engine for your first flight.

Be sure to follow the HIAA-NAR* Model Rocket Safety Code when carrying out your model rocket activities.

*HIAA - Hobby Industry Association of America

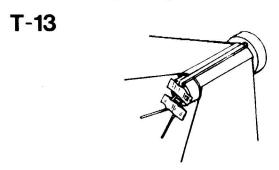
NAR - National Association of Rocketry

COUNTDOWN CHECKLIST T-14



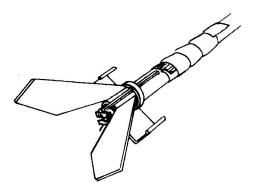
Select an engine and install an igniter as directed in the engine instructions. The engines recommended for use with this rocket are the B4-2, B6-2, B8-5, C5-3, and C6-3 made by Estes.

Use a B4-2 engine for your first flight.

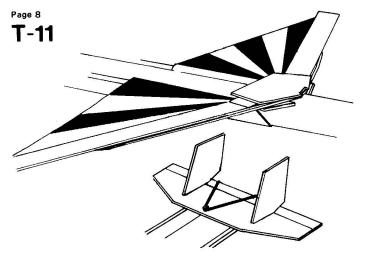


Install the engine into the booster. Be sure the engine hook latches securely over the end of the engine. Use a B4-2 engine for the first flight.

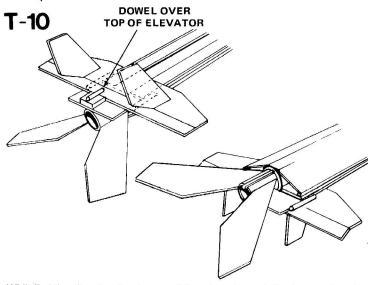
T-12



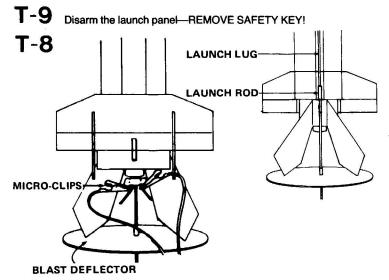
Wrap the streamer around the booster tube as shown. Install the booster part way into the main body tube.



Hook the rubber band over the dowel at the front of the stabilizer. Hook the shock cord onto the wing support as shown. NOTE: The rubber band and shock cord should be unlatched when not flying so thay they do not become over stretched. Fold the wing spars rearwards while pushing the wing material into the pouch.



While holding the elevator down and the wings in, push the booster into the main body tube the rest of the way. Make sure that the elevator is locked in the down position and that the wings are held securely in place. Tuck any of the wing which may be sticking out into the pouch the rest of the way with a dull object.



Slide launch rod through rocket launch lugs and place rocket on launch pad. Make sure the rocket slides freely on the launch rod. Clean the micro-clips and attach them to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector. Attach clips as close to protective tape on igniter as possible.

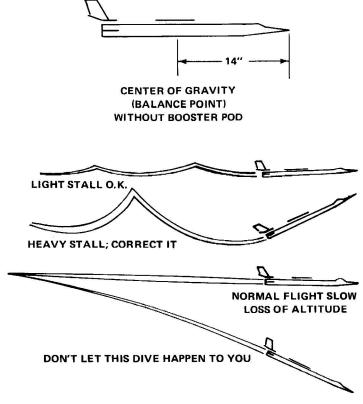
T-7 Clear the launch area. Alert recovery crew and trackers. Check for low flying aircraft and unauthorized persons in the recovery area.

T-6 Arm the launch panel—INSERT SAFETY KEY!

-5-4-3-2-1-LAUNCH!!

Repeat Countdown Checklist for each flight.

ADJUSTMENT HINTS



Observe the glide carefully. If no stall is present, lightly sand the lower edges of the rudders to allow more elevator movement (a little at a time until you are satisfied with the glide). If a heavy stall is present, add shims to the rudders to limit the elevator movement. If the model turns too sharply: 1) Check glider center of gravity, 2) Be sure that the wing trailing edges are at right angles to the body tube when in the glide position, 3) Make sure that the wing snaps firmly into the glide position, 4) Make sure that the model is balanced spanwise (from side to side). Add a small amount of clay to the light wing 3/4" from the tip until the wings balance. If the model dives, sand the lower edges of the rudders to allow more elevator movement.

MISFIRE PROCEDURE

Disarm the launch panel. Wait one minute before approaching the rocket on the launch pad. Remove the rocket, clean the igniter residue from the nozzle of the engine, and carefully install a new igniter. Repeat the Countdown Checklist.

Failure of the rocket engine to function properly is nearly always caused by a failure to install the igniter correctly. This failure permits the igniter to heat and burn into two pieces without igniting the engine.

