

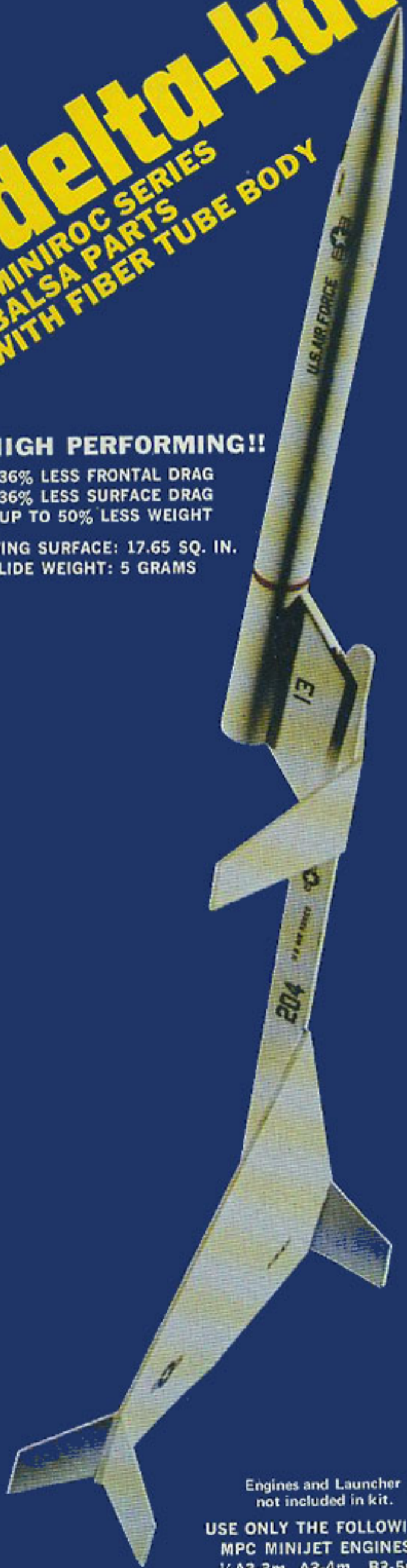
# Delta-Katt<sup>T.M.</sup>

MINIROC SERIES  
BALSA PARTS  
WITH FIBER TUBE BODY

## HIGH PERFORMING!!

- 36% LESS FRONTAL DRAG
- 36% LESS SURFACE DRAG
- UP TO 50% LESS WEIGHT

WING SURFACE: 17.65 SQ. IN.  
GLIDE WEIGHT: 5 GRAMS



Engines and Launcher  
not included in kit.

USE ONLY THE FOLLOWING  
MPC MINIJET ENGINES:  
½A3-3m A3-4m B3-5m

3-0930-250



**MODEL PRODUCTS  
OF GENERAL MILLS FUN GROUP INC.  
126 GROESBECK HIGHWAY  
MOUNT CLEMENS, MICH. 48043**

# DELTA KATT

## **READ AND FOLLOW ALL INSTRUCTIONS. AN ADULT SHOULD SUPERVISE EACH FLYING MODEL ROCKET LAUNCHING.**

A flying model rocket is a scientifically-designed educational model . . . NOT A TOY! It is capable of attaining speeds up to 400 miles per hour. If mis-used, it could be dangerous. It should be treated with care and respect. It should be used only as instructed.

Build this kit only according to instructions. Do not alter the design in any way because changes could make it unsafe in flight. This model rocket kit was designed to fly straight and high if built according to instructions.

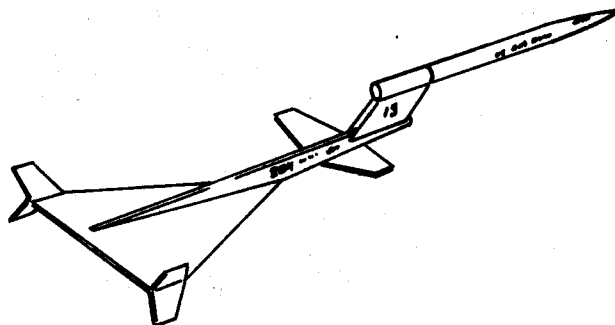
Solid propellant model rocket engines are specifically designed for the sole purpose of propelling model rocket vehicles. They are scientifically designed, produced on computer-controlled automatic machinery, and subjected to rigid statistical quality control tests. It is very important that caution be exercised in their use. All instructions must be read thoroughly first and followed completely. Model rocket engines are not toys and are designed and intended for propelling model rockets. Their mis-use must be completely avoided.

Model rocketry has grown into a full-scale national and international activity and has proven itself to be as safe as other hobbies when common sense safety codes such as the NAR-HIAA Safety Code are followed. Model rocketry will continue to grow every time you fly your model rocket safely.

**NOTE:** The kit was designed to use ONLY the new MPC MINIJET model rocket engines that are smaller and lighter than other makes of model rocket engines of similar power. Other model rocket engines will not fit your MPC MINIROC. Use only those MPC MINIJET model rocket engine types recommended for this model rocket.

## **IF AT FIRST YOU DON'T SUCCEED: TRY READING THE INSTRUCTIONS!**

Before you begin building, **READ THE INSTRUCTIONS!** Even if you think you are an experienced model builder, you may have trouble correctly assembling this new MINIROC kit if you don't follow instructions. We've checked these instructions with both novice and expert model rocketeers, and the assembly sequence has been designed for the most rapid assembly possible.



The Delta-Katt was specifically designed by G. Harry Stine for the MPC MINIJET model rocket engines. The Delta-Katt is easy to build and easy to fly, a boost-glider that is suitable for beginners and for seasoned contest fliers as well.

Technically, the Delta-Katt is a front engine canard B/G. The model rocket engine is housed in a separable pop-pod which is attached to the nose of the glider portion. The MINIJET model rocket engine carries the glider and pod aloft from a standard MPC Lunar-Lectric launch pad using electric ignition. When the MINIJET ejection charge goes off, the balsa nose of the pop pod is ejected and the streamer comes out of the pod body. The reaction force from this ejection forces the pod to the rear, disengaging it from the glider. The pod then descends to a gentle landing with its recovery streamer deployed.

The glider stays aloft for a graceful gliding flight. The Delta-Katt has its sharply-swept delta wing on the rear and its horizontal stabilizer on the front. This is called "canard configuration." The front stab is set at a 5-degree incidence with respect to the wing; this provides the Delta-Katt with a stable glide. The dihedral angle of the front stab adds to the roll and yaw stability of the glider.

The delta wing was chosen for the Delta-Katt because it does not have a critical angle of attack for stalling. This makes the Delta-Katt easier to balance for gliding flight. The wing has an area of 17.65 square-inches.

Special rudders are installed on the tip of each wing. These rudders are angled outwards to provide stability in roll.

## **RECOMMENDED TOOLS FOR BUILDING MINIROCS.**

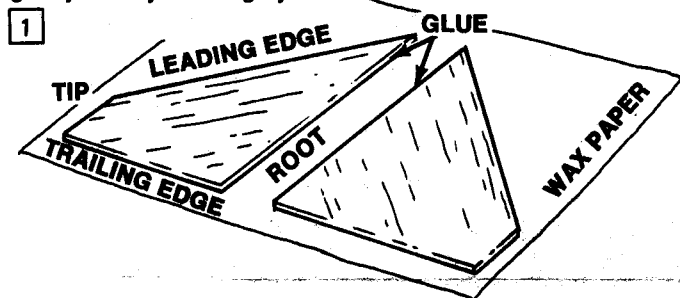
1. Sharp modeling knife. (Watch your fingers!)
2. Glue (Such as White glue, Tite-Bond glue, or Ambroid model airplane glue are the three types that work best. Other types don't seem to hold well at rocket flight speeds.)
3. Sharp pencil.
4. No. 220 or No. 320 fine-grit sandpaper
5. Cotton applicators (Q-tips or equivalent)
6. Paint in desired colors (Such as Krylon spray paint, Palmer Rocket-Glare, or Floquil Poly-S)
7. Balsa filler coat and sanding sealer (Such as Pactra brand. Available at your hobby shop.)
8. Small ruler.
9. Paper Clip

**DOUBLE GLUE JOINTS:** To make a glue joint that is stronger than the balsawood, make a "double glue joint" with white glue or model airplane glue (NOT glue for plastic models) as follows:

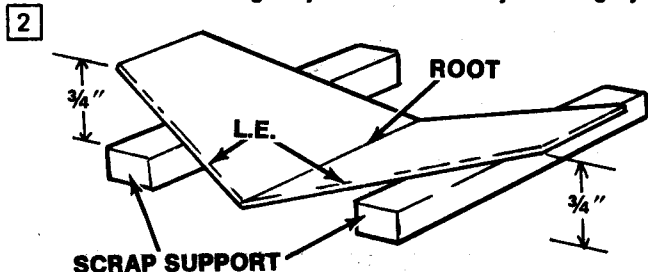
1. Apply glue to both surfaces to be joined.
2. Let it dry.
3. AGAIN, apply glue to both surfaces.
4. Join them together.
5. Let them dry thoroughly.

### NOW BEGIN ASSEMBLY:

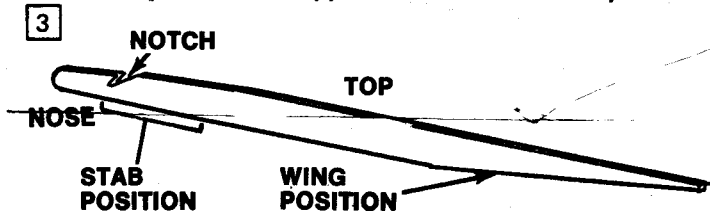
Separate the large delta wings from the die-cut balsa sheet. Sand their edges so that they are the same shape. Using a piece of waxed paper so that the wing does not get glued down to your work bench, glue the wing roots together. The Delta-Katt wings are flat; they have no dihedral angle. Let the glue joint dry thoroughly.



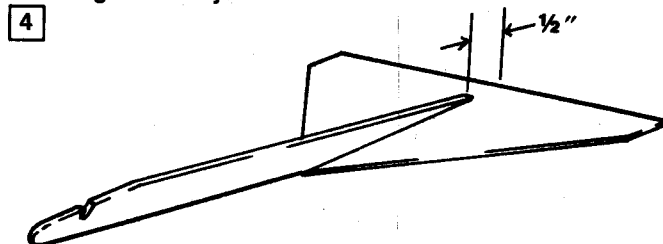
Separate the two pieces of the front stabilizer from the balsa sheet. Bevel the root edges with sandpaper. Glue stab panels together at the root with each tip elevated  $\frac{3}{4}$ " to give dihedral angle. Glue the stab parts together on the waxed paper sheet to insure that you don't glue them to your work bench. Use a double-glue joint and let it dry thoroughly.



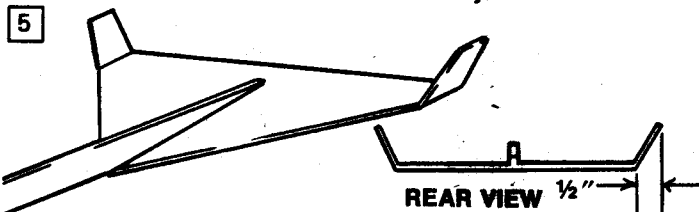
Cut the glider body from the  $\frac{1}{8}$ " x  $\frac{1}{2}$ " x 10" body stick using the template provided. Do this carefully. Apply a double glue joint to the angled area underneath and to the area under the notch where the stab will be glued. (NOTE: The bottom of the body is the side opposite the notched side.)



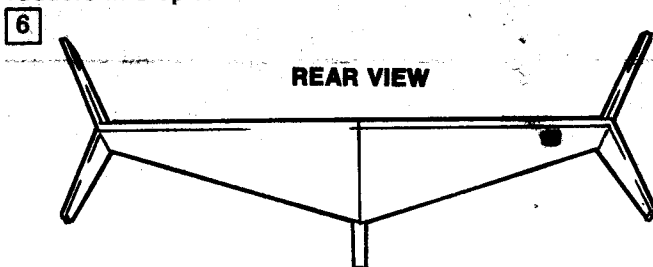
With the wings still flat on the waxed paper sheet, glue the glider body to the top of the wing. The trailing edge of the wing should be  $\frac{1}{2}$ " behind the rear end of the glider body. Make sure that the glider body is lined up along the center line of the wing. Let it dry.



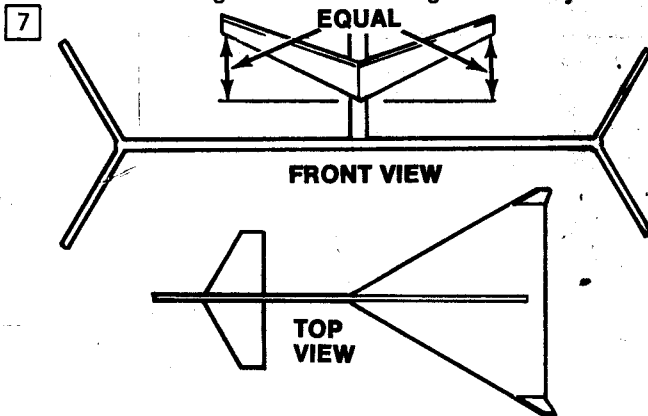
Glue the two top rudders to the top of the wing tips. Line them up fore-and-aft with the wing tips. They should each be canted outwards about  $\frac{1}{2}$ ". Let them dry.



Turn the glider over and glue the bottom rudders onto the bottom surface of the wing tips in the same manner as the rudders in Step 5.



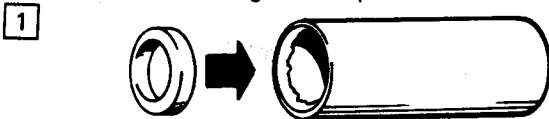
Glue the front stab to the bottom of the front end of the glider body. The trailing edge of the stab should be exactly  $2\frac{1}{2}$ " forward of the root leading edge of the wing. Make sure that the stab is lined up fore-and-aft. When you look at the glider from the front, both sides of the stab should have the same dihedral angle with the fuselage. Let it dry thoroughly.



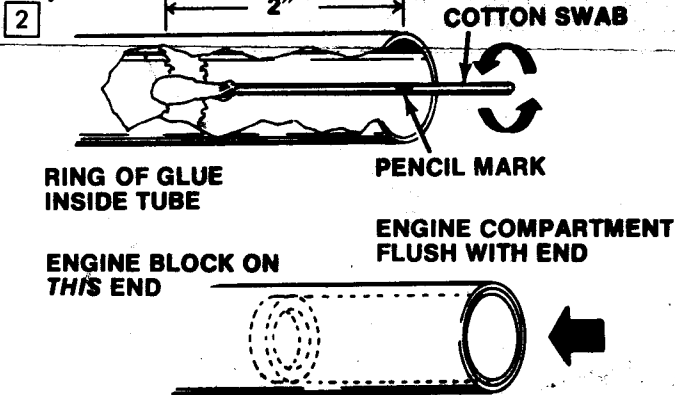
Once all glue is dry, you may wish to sand your Delta-Katt glider smooth, round the leading edges of the wing, stab, and rudders, and taper their trailing edges to a point; this will improve the gliding performance of the Delta-Katt. However, Delta-Katt has been designed so that super-streamlining isn't necessary if you intend to use Delta-Katt for sport flying; just fly it with the square edges on the surfaces. Increased glide times can be obtained by filling, sanding, and painting the Delta-Katt using model airplane dope. Be sure to choose a color that you can see against the sky and on the ground again after the glider lands.

#### POWER POD ASSEMBLY:

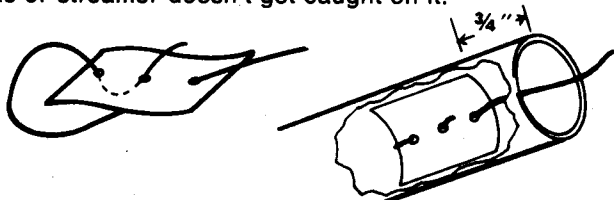
Put a thin ring of glue around one end of the engine compartment. Insert the O-shaped engine block so that it is flush with the end of the engine compartment.



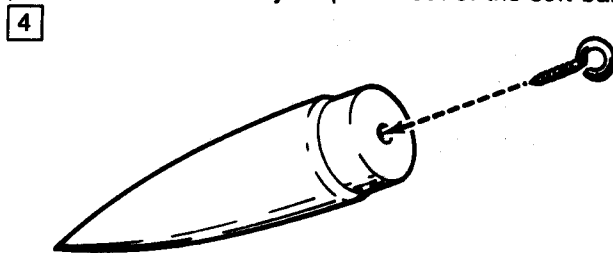
With the pencil, make a mark on a cotton applicator (Q-tip) 2 inches from the end. Place glue on the cotton. Insert Q-tip into one end of the body tube up to the pencil mark and apply the glue around the *inside* of the body tube 2 inches from the end. Remove Q-tip. Insert engine tube into body tube with the engine block going in first. Push the engine compartment into the body tube until the end is flush with the end of the body tube.



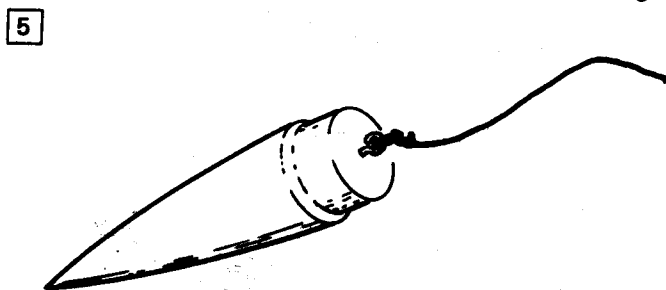
Lace the shock cord through the paper shock mount as shown in the drawing. Place glue on one side of the shock mount. Insert shock mount into end of body tube opposite from the end with the engine compartment installed. Push shock mount into tube until it is at least  $\frac{3}{4}$ " from the end of the tube. Press down against inside surface of tube. Hold in place with paper clip until glue dries. (If you don't install the shock mount far enough into the body tube, it will interfere with putting on the nose cone when you get ready to launch.) Make sure that it is flush against the tube so that the parachute or streamer doesn't get caught on it.



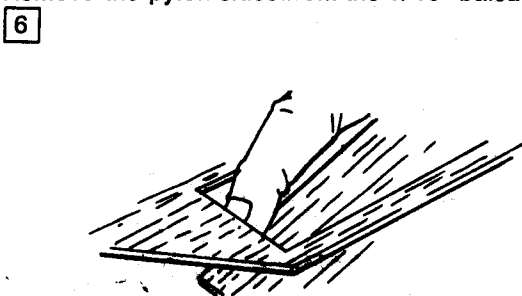
Screw the screw eye into the center of the base of the balsa nose. Then remove the screw eye and squirt the hole full of glue. Re-insert the screw eye into the hole. It is now glued in place and cannot easily be pulled out of the soft balsa wood.



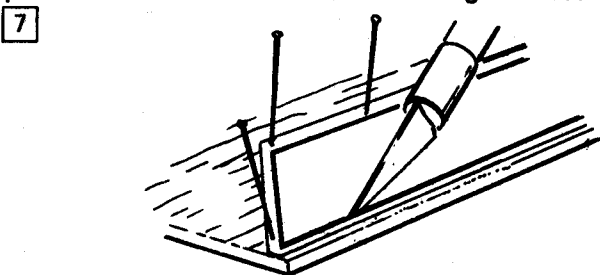
Tie the free end of the shock cord to the screw eye in the base of the nose. Use two or three knots. Make them tight.



Remove the pylon sides from the  $\frac{1}{16}$ " balsa sheet.

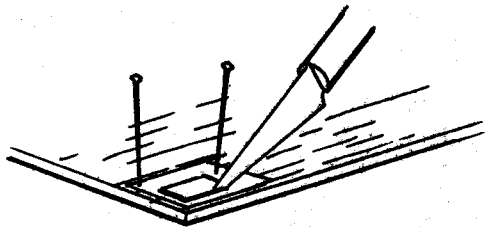


Cut the pylon core from the  $\frac{1}{8}$ " balsa using the template provided. Be sure the notch is cut straight across the wood.



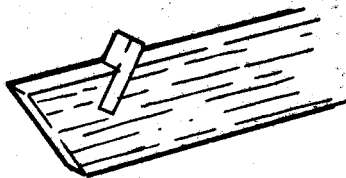
Cut the PIN from the 1/16" sheet of balsa using the template provided.

8



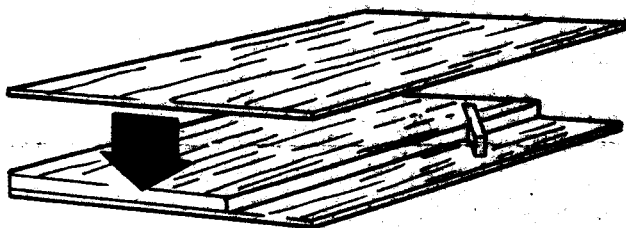
Glue the PIN into the pylon core slot.

9



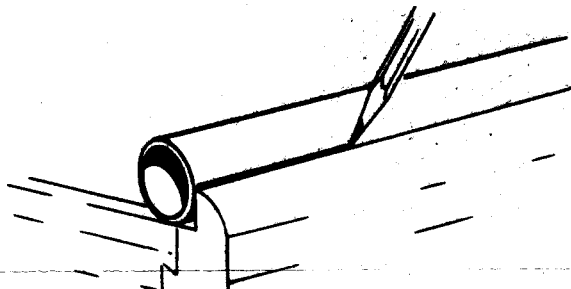
Glue the two sides to the pylon core. Let dry.

10



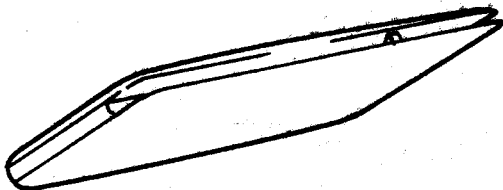
Mark the location of the pylon on the side of the pod body.

11



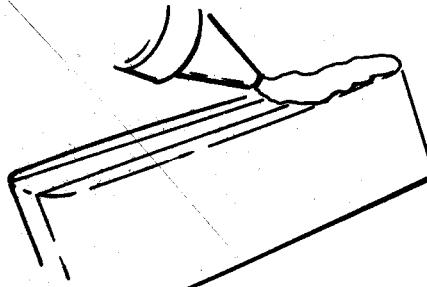
Sand the pylon to an airfoil shape. Round the front beveled edge. Taper the rear edge. DO NOT round or taper the edge that will be glued to the pod body.

12



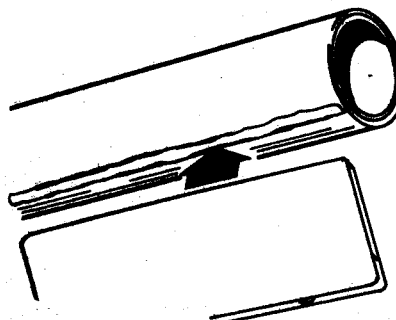
Put a layer of glue on the side of the pylon that will be glued to the pod body. Let dry.

13



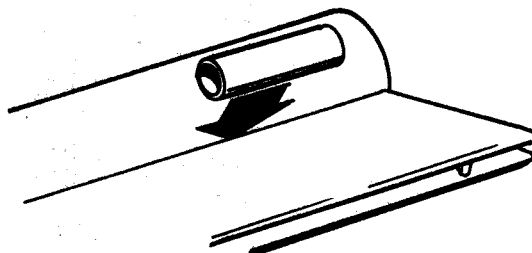
Glue the pylon to the pod body, making sure that it is lined up fore-and-aft with the pod body and that it sticks straight out from the pod body. Set it aside to dry thoroughly.

14



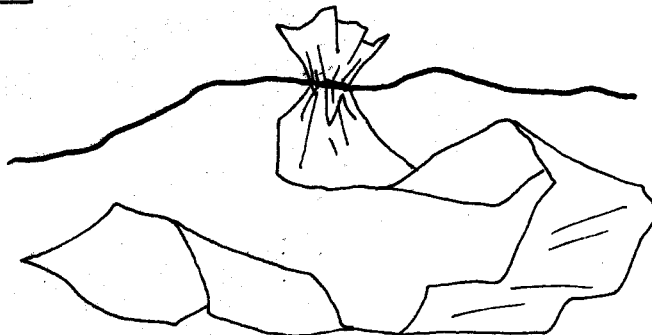
Glue the launch lug to the left hand side of the pylon where it joins the pod body. Make sure it is lined up fore-and-aft.

15



Assemble the streamer by tying an overhand knot halfway along the shock cord, slipping the streamer about 1/2" into the knot, and pulling the knot tight around the streamer. Roll up, store in body, and put nose on. DO NOT GLUE NOSE ON!

16



The decals that came with your MINIROC are intended to "dress up" your model to make it look like its larger brothers at Wallops Station or Cape Kennedy. The black-and-white "roll patterns" that wrap around the body are scientifically designed (just like the real ones on big rockets) to permit photographic analysis of the rolling or spinning of the rocket in flight; they are usually applied at the front of the body tube. Most NASA rockets carry the U.S. flag, plus the words "United States." Only U.S. Air Force rockets carry the familiar "star-and-bar" airplane wing insignia. Numbers are also included on the decal which meet the standards of the National Association of Rocketry and permit you to put your NAR Competition License Number on your model in accordance with the rules. Follow the instructions on the back of the decal sheet for applying the decals to your model.

### PRE-FLIGHT CHECKS: (YOU MUST DO THESE!)

**Trimming:** With the pod OFF, hand-launch the glider by putting your index finger directly behind the center joint at the wing trailing edge and putting your thumb and third finger on the leading edge of opposite sides of the wing. Toss the glider gently with an overhand motion into a flight path just below the horizontal. Do this several times because there is a knack to it that does not come easily. If the glider pulls up into a stall, add a little weight to the nose using a pinch of modeling clay. If the model dives into the ground consistently, add trim weight to the trailing edge of the wing on the center. If the glider turns left or right, add weight to the wing tip of the high wing, the wing that is on the outside of the turn. When you have the Delta-Katt trimmed for a good glide, it should sail away from your hand in a gentle glide, turning slightly. If you do not set the Delta-Katt for a gentle turn, it may turn downwind in flight high in the air... and you will never see it again because it turns into a long-distance flier under those circumstances.

### FITTING THE POP POD:

The power pod should fit loosely on the front of the glider with the pylon pin engaged in the notch in the glider body. It should fit LOOSELY. The pod must be able to go to the rear easily to be disengaged. The pod should almost FALL OFF the glider to the rear.

The power pod must seat correctly on the glider body. The Delta-Katt has been designed so that the pop pod is in line with the wing, not with the front stab or the body. This makes it look rather wierd with the power pod on.

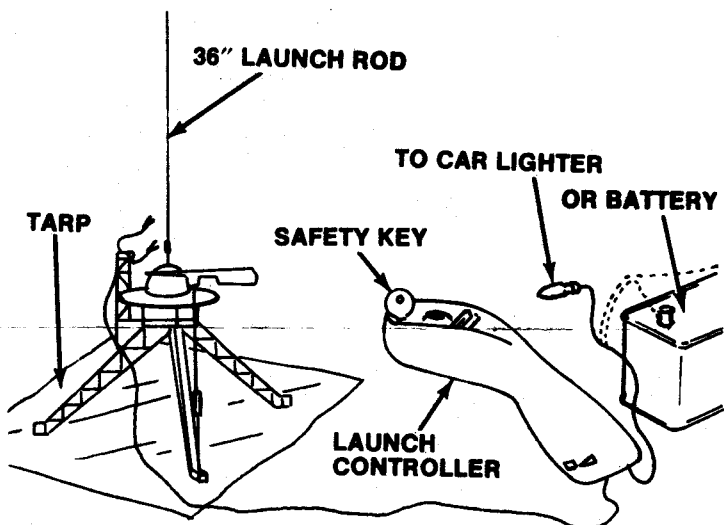
**Boost Phase Trim:** The Delta-Katt requires no special trimming for the powered boost-phase of the flight. Its center of gravity (C.G.) is just about at the rear end of the pop pod. This puts the C.G. right over the front stab. Thus, the front stab has little effect on the flight during boost.

**AN ADULT SHALL SUPERVISE EACH  
FLYING MODEL ROCKET LAUNCH**

### FLYING THE DELTA-KATT:

All MPC MINIROC model rockets are designed to be launched from regular model rocket launch pads such as the MPC Lunar-Lectric or similar launching system. **IMPORTANT:** All MINIROCS must be launched from a 1/8" diameter *straight* launch rod at least 36 inches long!

All MPC MINIROC model rockets must be launched with electrical ignition. Fuses of any sort are highly dangerous, can cause engine malfunction, create a fire hazard around the launch pad after launch, and are illegal to use in most states and localities. They don't use fuses at Cape Kennedy, do they? Your hobby store has an approved electrical ignition system with the proper safety interlocks such as the MPC LUNAR-LECTRIC handcontroller with its safety key and ready light. You plug the MPC LUNAR-LECTRIC into the cigarette lighter outlet of your father's automobile to get the current you need to electrically ignite your MINIJET engine. You can also get one of the following portable batteries which are recommended for electrical ignition of model rocket engines.



### RECOMMENDED PORTABLE BATTERIES FOR MODEL ROCKET IGNITION

EVEREADY #731 OR #732 LANTERN  
 BRIGHT STAR #158 LANTERN  
 BURGESS TW-1 OR TW-2 LANTERN  
 MALLORY 1918 LANTERN  
 MARATHON 986 OR 732 LANTERN  
 RAY-O-VAC 918 OR 926 LANTERN  
 RCA VS317 OR VS342 LANTERN  
 EVEREADY #1461 OR #1463 HOT SHOT  
 BRIGHT STAR #146 OR #187 HOT SHOT  
 BURGESS S461 OR 2G8H HOT SHOT  
 MALLORY M-907 HOT SHOT  
 MARATHON 640 OR 642 HOT SHOT  
 RCA VS039 HOT SHOT  
 WARD 7MW OR 2335 HOT SHOT

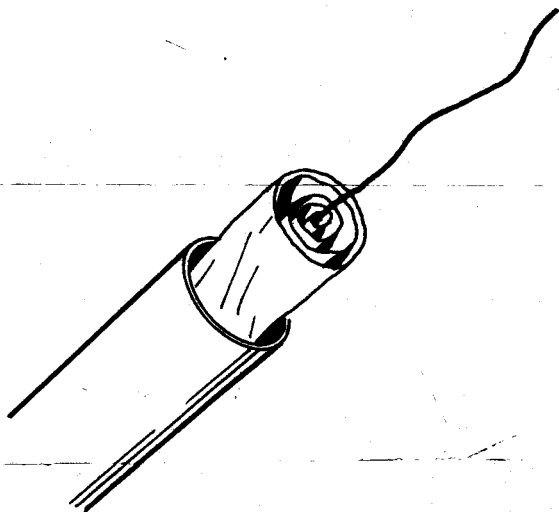
Choose a clear level area at least 500 feet on a side for your launch area. Clear the area under the launch pad of dry grass or other inflammable materials. If possible, set your launch pad on a tarpaulin or piece of canvas (it will also keep the knees of your pants clean!). Your launch site should be clear of trees, power lines, and high buildings. It should be away from airports, highways, and freeways.

For your first flights with your MINIROC, use the 1/2A3-3m or 1/2A3-5m MINIJET model rocket engine. After you *know* that your MINIROC flies well with these low-power engines, double the power by using the A3-4m or A3-6m MINIJETs. The powerful B3-5m and B3-7m MINIJETs will put nearly all MINIROCS completely out of sight into the sky overhead; if you use these powerful engines on your first flight, you will probably lose your MINIROC model. Although MPC would like to sell you another MINIROC kit, we also know the disappointment of losing a good MINIROC on the very first flight after hours of work have been put into building it right.

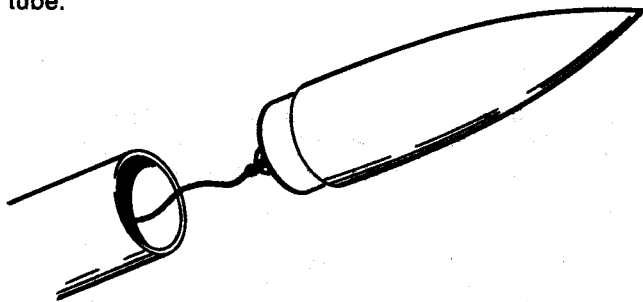
Install the MINIJET model rocket engine by wrapping cellophane or paper tape around it until it slides into the engine compartment with a TIGHT SLIP FIT. It should extend no more than 1/4" from the end of the engine compartment. You should not be able to pull it out with your fingers; if you can, it is too loose, so put on another layer of tape. If the engine is NOT snug in the model, it will eject itself instead of ejecting the recovery device, and your MINIROC will plummet to the ground and be destroyed.

Remove the nose cone, shock cord, and recovery device from the body tube. Check to make sure that the shock cord is in good condition, especially after you have flown your MINIROC several times. Roll up one-half of a square of wadding separated from the fiberglass wadding supply that comes with each MINIJET engine pack. Stuff the wadding roll down into the body tube, but *don't jam* it down because it has to come out when the engine's ejection charge activates in flight. Push it down with a pencil.

Roll up the streamer into a tight cylinder so that it slides *easily* down into the body tube. Make sure it does not catch on the shock mount. Stuff the shock cord in on top of it.



Install the nose cone on the front of the body tube. If it is too tight, sand it down until it slides on and off easily. If it is too loose, build up the shoulder with one or two layers of tape. Make sure that shroud lines, shock cord, etc. are not jammed between the nose cone shoulder and the front of the body tube.



Install the electric igniter into the engine nozzle according to the instruction that come with each MINIJET engine pack. Most ignition failures occur because the modeller does not install the igniter AS FAR AS IT WILL GO onto the nozzle and because he does not press the tape down onto the nozzle AS TIGHTLY AS POSSIBLE. Experienced model rocketeers always check these little points and rarely suffer from mis-fires.

From here on, follow the procedure detailed in the COUNT DOWN CARD that comes with your MINIROC kit and which lists all safety precautions and a step-by-step count-down procedure for safely flying your Delta-Katt. One additional check is necessary: Wrap tape around the launch rod about 9" up from the exhaust deflector. This will support the launch lug of the power pod and hold the model up the launch rod since it will not sit down on the launch pad normally. Experienced model rocketeers slide the pop pod on the rod all by itself, hook everything up, and then mount the glider portion on the pylon pin.

**TO KEEP THE ELECTRICAL IGNITION LEADS FROM ENTANGLING THEMSELVES WITH THE GLIDER, TAPE THEM TO THE LAUNCH ROD UNDER THE POWER POD. THIS WILL ALSO KEEP THEIR WEIGHT FROM PULLING THE IGNITER OUT OF THE MODEL.**

GOOD LUCK! GOOD FLYING! LET US HEAR FROM YOU IF YOU LIKE YOUR MINIROC OR IF YOU HAVE TROUBLES. WE TRY TO ANSWER EVERY LETTER WE GET. WE GET LOTS OF THEM, SO GIVE US A COUPLE OF WEEKS TO DO IT, PLEASE!

### **ARE YOU A MEMBER OF THE MPC ROSTER OF CHAMPIONS?**

If you have won an event in a contest sanctioned by the National Association of Rocketry under national rules using an MPC model rocket propelled by an MPC model rocket engine, you may be eligible for this exclusive association of winners. Write us for full details and application form.

# DELTA KATT TEMPLATE

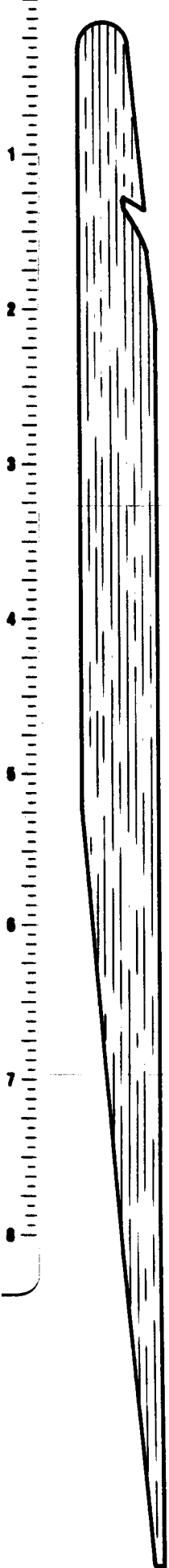
To cut the parts from the balsa wood accurately, first cut the drawings from the template along the black lines. Pin or tape these shapes to the balsa you're cutting and cut alongside the black lines. Be sure to hold your modeling knife straight. To help you get a good straight line use a ruler or some similar object to cut along.

## GLIDER BODY

## PIN



## PYLON CORE







4963 8964

USAF 0075609

USAF

U.S. AIR FORCE

U.S. AIR FORCE

RESCUE



RESCUE

U S AIR FORCE  
U S AIR FORCE

