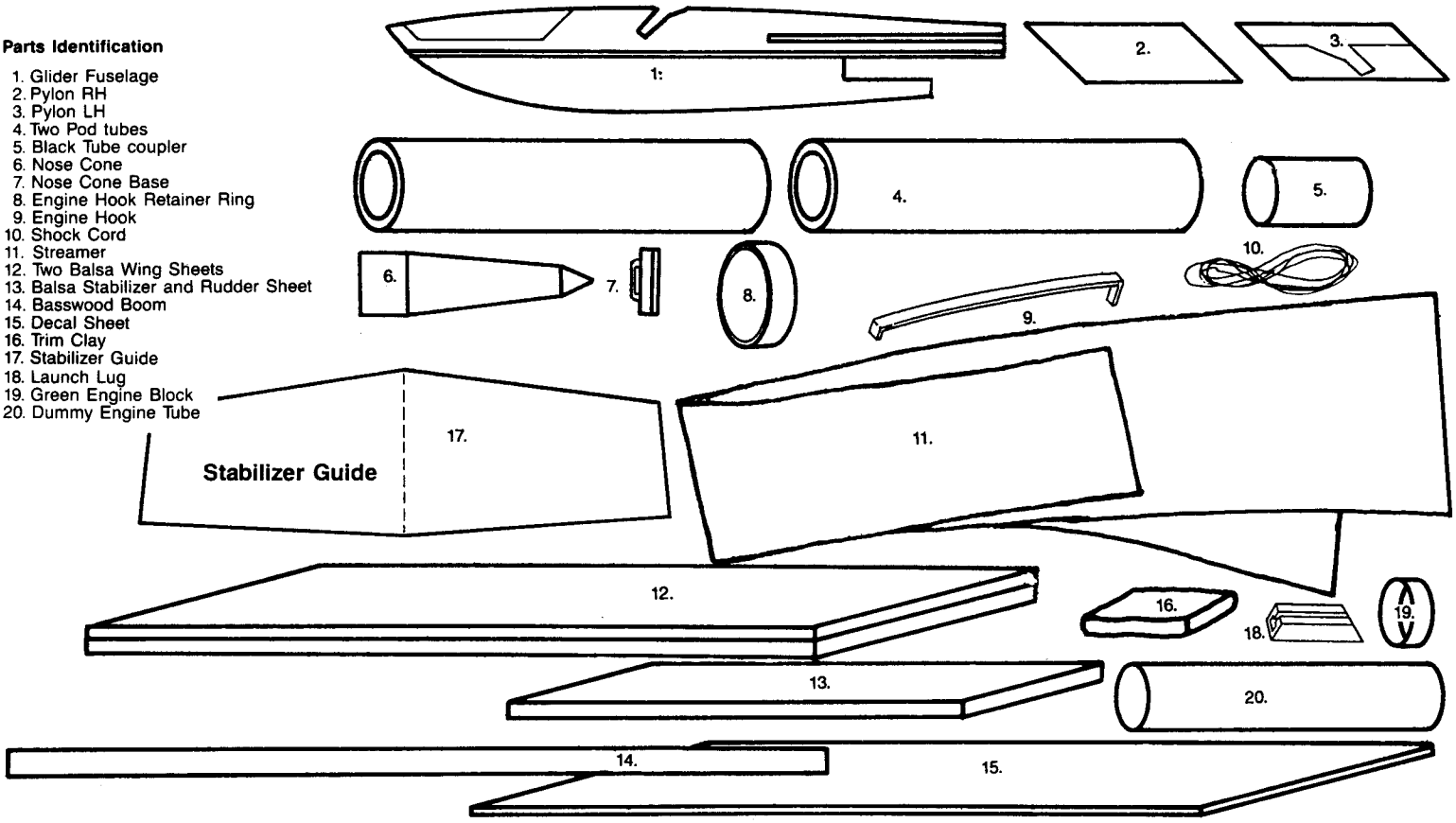
Parts Identification

1. Glider Fuselage
2. Pylon RH
3. Pylon LH
4. Two Pod tubes
5. Black Tube coupler
6. Nose Cone
7. Nose Cone Base
8. Engine Hook Retainer Ring
9. Engine Hook
10. Shock Cord
11. Streamer
12. Two Balsa Wing Sheets
13. Balsa Stabilizer and Rudder Sheet
14. Basswood Boom
15. Decal Sheet
16. Trim Clay
17. Stabilizer Guide
18. Launch Lug
19. Green Engine Block
20. Dummy Engine Tube

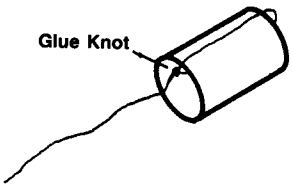


Glider Pod Assembly Instructions

STEP ONE.

A. Tie shock cord around black tube coupler.

B. Apply a small amount of cyanoacrylate glue to the knot.

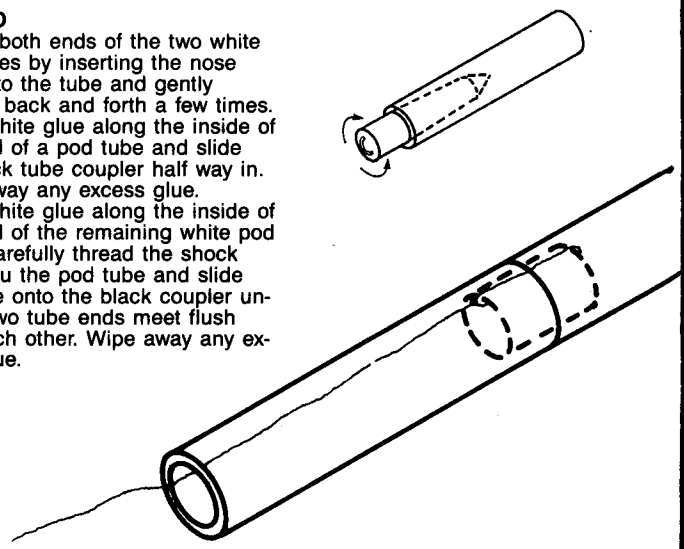


STEP TWO

A. Stretch both ends of the two white pod tubes by inserting the nose cone into the tube and gently twisting back and forth a few times.

B. Apply white glue along the inside of one end of a pod tube and slide the black tube coupler half way in. Wipe away any excess glue.

C. Apply white glue along the inside of one end of the remaining white pod tube. Carefully thread the shock cord thru the pod tube and slide the tube onto the black coupler until the two tube ends meet flush with each other. Wipe away any excess glue.

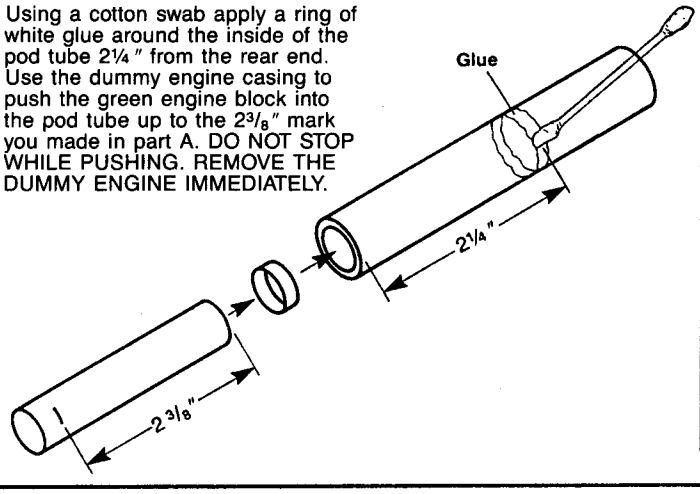


STEP FIVE.

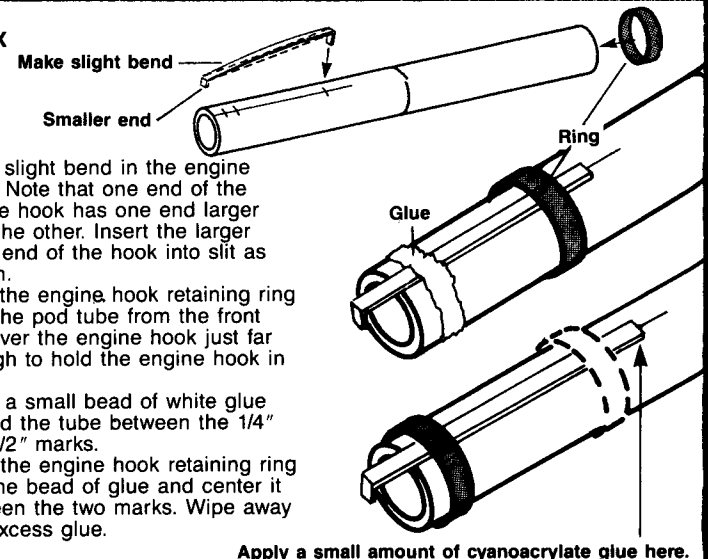
A. Mark the dummy engine casing 2 3/8" from one end.

B. Using a cotton swab apply a ring of white glue around the inside of the pod tube 2¼" from the rear end.

C. Use the dummy engine casing to push the green engine block into the pod tube up to the 2 3/8" mark you made in part A. DO NOT STOP WHILE PUSHING. REMOVE THE DUMMY ENGINE IMMEDIATELY.



STEP SIX



A. Put a slight bend in the engine hook. Note that one end of the engine hook has one end larger than the other. Insert the larger sized end of the hook into slit as shown.

B. Slide the engine hook retaining ring onto the pod tube from the front and over the engine hook just far enough to hold the engine hook in place.

C. Apply a small bead of white glue around the tube between the 1/4" and 1/2" marks.

D. Slide the engine hook retaining ring into the bead of glue and center it between the two marks. Wipe away any excess glue.

SAFETY INSTRUCTIONS

For the safe and reliable performance of your model rocket PLEASE NOTE:

1. Model rockets are not "toys" - that they are capable of causing personal injury to you and to others as well as property damage.
2. That you and you alone are responsible for the safe operation of your rocket.
3. That you must properly build and operate your rocket with a clear sense of that responsibility; that means taking no chances or risks which might endanger yourself or others.
4. Read and observe the rules of the Model Rocket Safety Code printed on this sheet.

HELPFUL HINTS

Before building this kit gather the necessary tools and materials and read all instructions thoroughly. In addition, keep the following points in mind.

1. Read and understand each step and study the drawings before beginning any part in that step.
2. Always test fit the parts before putting glue on them.

TOOLS REQUIRED

1. Modeling knife
2. 400 grit sandpaper
3. Pencil
4. Ruler
5. Cotton Swab

TAKE YOUR TIME BUILDING. CORRECT ALIGNMENT OF ALL THE PARTS IN THIS KIT IS CRITICAL FOR A GOOD FLIGHT.

Thermal Hawk Glider

Skill Level: Two-intermediate

Prod. No LS 140

GLUES REQUIRED

Proper glue joints are vital for the safe operation of your model rocket. Use these recommended glues or glues of similar qualities where indicated in these instructions.

White Glue - Aliphatic resin glues work best such as PACTRA TUBE O'PHATIC,™ or TITEBOND.™

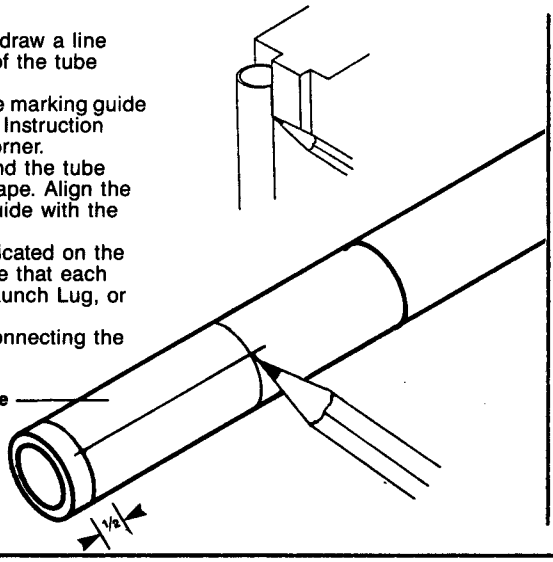
Cyanoacrylate - Medium or slow viscosity.

Liquid Solvent Plastic Cement - Solvent cements that chemically bond the plastic together such as PACTRA™ Liquid Cement (Stock No. 230), WELD-ON™ Acrylic plastic cement, MICRO-WELD.™

Recommended Engine: Use only B4-2. Your Thermal Hawk will not fly correctly with any engines of different impulse or delay.

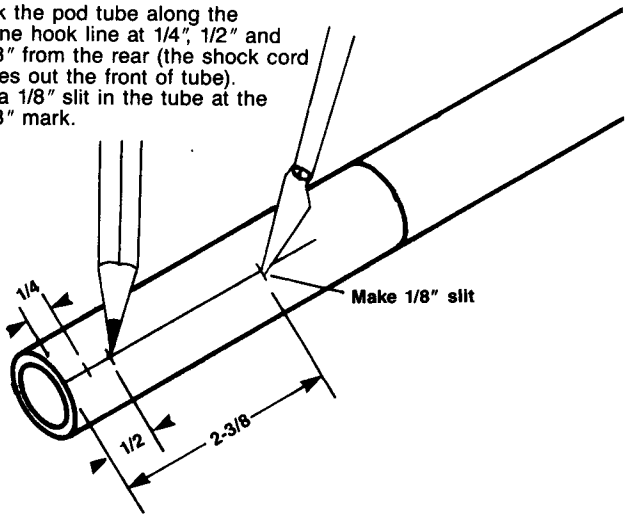
STEP THREE

A. Use a door frame to draw a line down the entire length of the tube assembly.
B. Cut out the paper tube marking guide located on other side of Instruction Sheet, top right hand corner.
C. Wrap the guide around the tube and hold in place with tape. Align the line marked Pylon on guide with the line you drew in part A.
D. Mark the tube as indicated on the guide with a pencil. Note that each line is marked Pylon, Launch Lug, or Engine Hook.
E. Draw straight lines connecting the marks.



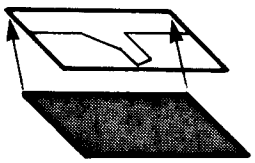
STEP FOUR

A. Mark the pod tube along the engine hook line at 1/4", 1/2" and 2-3/8" from the rear (the shock cord comes out the front of tube).
B. Cut a 1/8" slit in the tube at the 2-3/8" mark.

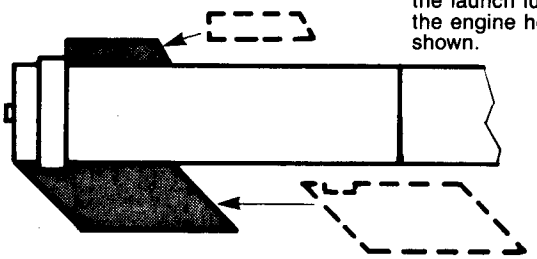


STEP SEVEN

A. Use liquid plastic cement to glue the two pylon halves together.
B. Use cyanoacrylate glue to glue the pylon to the pod tube on the line drawn down entire tube. The end of Pylon should be flush with the rear of tube and positioned so the Engine Hook Retainer Ring fits into the groove in Pylon. Check from front of tube to be sure pylon is aligned straight along tube.

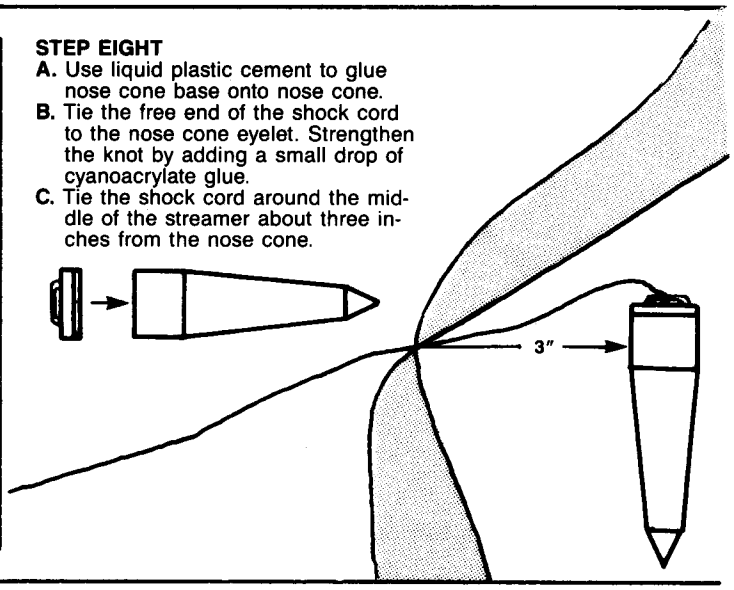


C. Apply cyanoacrylate glue to the launch lug and glue in place along the launch lug line just forward of the engine hook retaining ring as shown.



STEP EIGHT

A. Use liquid plastic cement to glue nose cone base onto nose cone.
B. Tie the free end of the shock cord to the nose cone eyelet. Strengthen the knot by adding a small drop of cyanoacrylate glue.
C. Tie the shock cord around the middle of the streamer about three inches from the nose cone.



GLIDER ASSEMBLY.

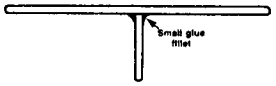
STEP ONE

A. With a sharp modeling knife carefully remove the rudder and stabilizer from the balsa sheet.

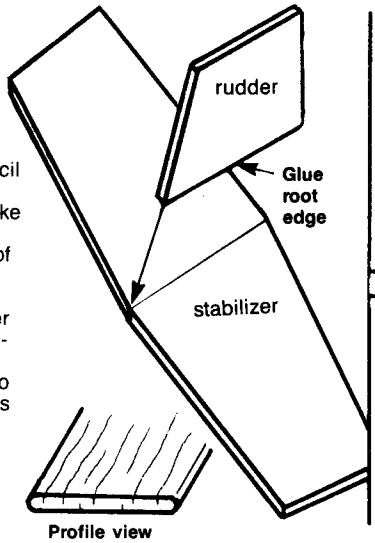
B. Center the stabilizer over the Center line template. Make a pencil mark at each of the places indicated. Flip stabilizer over and make the marks again. Use a ruler to draw a line connecting each set of marks.

C. Use 400 grit sandpaper to round edges on the stabilizer and rudder as shown. Leave root edge of rudder square.

D. Use cyanoacrylate or white glue to glue the rudder to the stabilizer as shown. Check for alignment.



End view



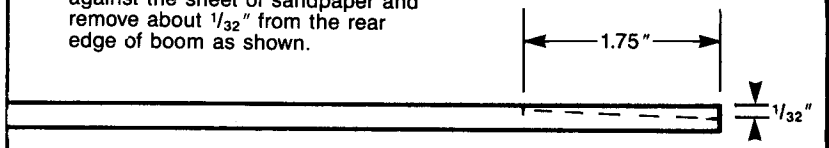
Profile view

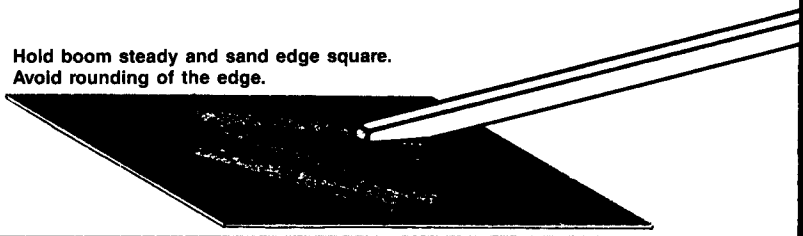
STEP TWO.

A. Make a pencil mark 1.75″ from one end of the basswood boom.

B. Place a sheet of 400 sandpaper on the tabletop.

C. Hold the boom in one hand and gently move it back and forth against the sheet of sandpaper and remove about 1/32″ from the rear edge of boom as shown.





STEP FOUR

A. Test fit the boom assembly into the fuselage and then remove it.

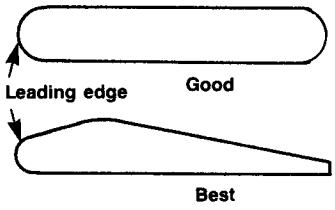
B. Apply cyanoacrylate glue to the inside edges of the boom slot in fuselage and slide the boom assembly into place. Quickly check the alignment before the glue sets.

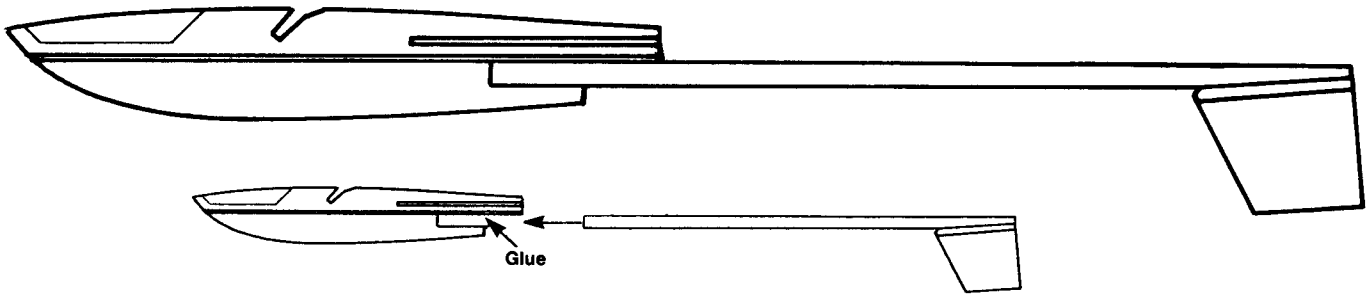
C. Add a small fillet of cyanoacrylate glue to the joint to strengthen it.

STEP FIVE

A. With a sharp modeling knife carefully remove the wings from the balsa sheets.

B. Use 400 grit sandpaper to sand an airfoil into the wings as shown.

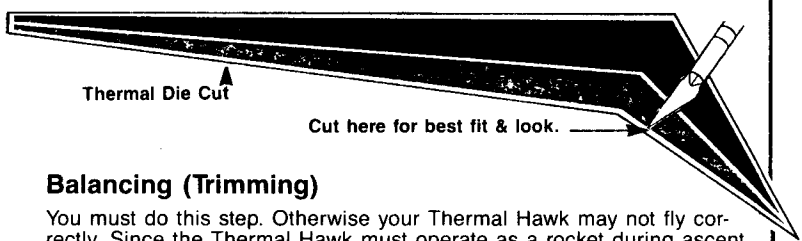




STEP EIGHT

Applying Decals

Let paint dry overnight before applying decals. Refer to the front panel of this package for proper placement. The decals included in this kit have been thermally pre-cut. For the best fit and look we recommend you use a sharp modeling knife and straight edge to cut the decals out closer to the printed image. Cut as close to the printed image as you can using the edge of the ink as your guide. You may need to trim the decal shorter to fit on the wing. Carefully remove each decal and position lightly and carefully. DO NOT PRESS HARD ON DECAL UNTIL YOU ARE SURE IT IS POSITIONED WHERE YOU WANT IT.



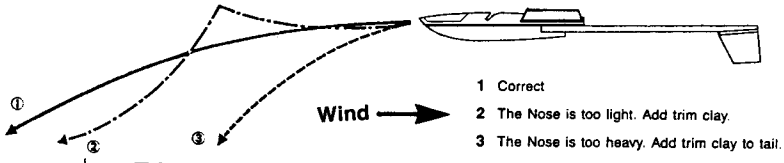
Balancing (Trimming)

You must do this step. Otherwise your Thermal Hawk may not fly correctly. Since the Thermal Hawk must operate as a rocket during ascent and as a glider during descent, it's very important to have the model balanced properly for both boost and glide phases of the flight.

Glide Trim

With the pod removed, hand launch the glider by grasping it under the wings and tossing it gently with an overhand motion into the wind with a flight path just slightly below horizontal. Do this several times because there is a knack to it that sometimes takes a few practice throws. If the glider pulls up into a stall, add weight to the nose with trim clay. If the glider dives into the ground, add trim clay to the tip of the tail. If the glider turns sharply to the left or right, add a small amount of trim clay to the opposite wing tip of the direction of turn.

When you have the Thermal Hawk trimmed for glide correctly, it should sail away from your hand in a gentle glide, turning just slightly to the right. If you do not trim the glider for a gentle right turn, it may turn downwind in an actual boosted flight.



Boost Trim

Install a B4-2 type rocket engine in the pod and attach the pod to the glider. The entire glider/pod should balance on or in front of leading edge of the wing.

Flying the Thermal Hawk Glider

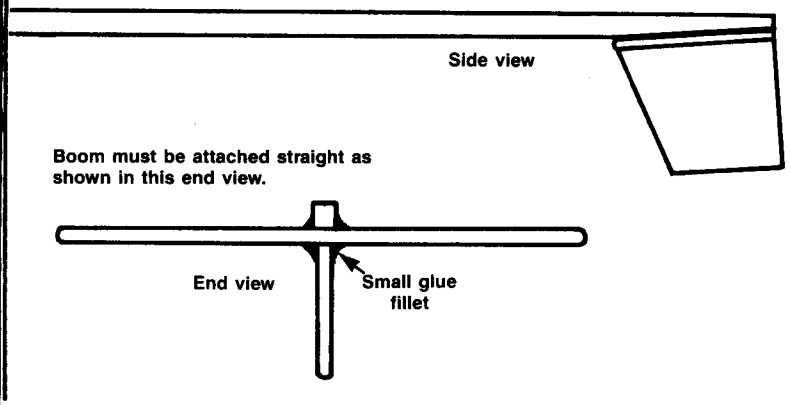
Test Fit the pod to glider.
Make certain that the pod fits LOOSELY onto the fuselage. The fit is correct if you can pick the entire glider/pod assembly up by the pod with the glider hanging and turn the pod over and the glider falls off. The pod can fit extremely loose and the model will still perform correctly during boost because the engine when thrusting pulls the glider into the air. If the pod fits too tightly sand down the sides of the fuselage until the pod fits loosely.

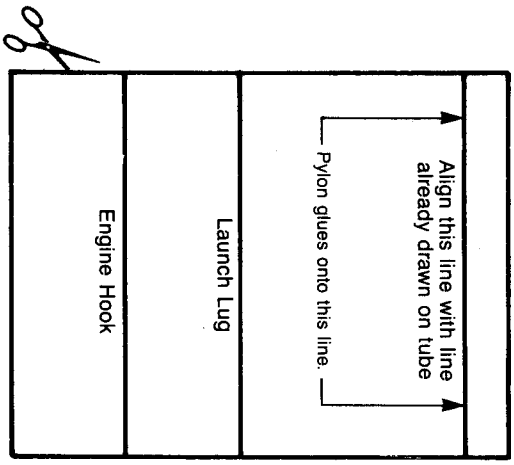
The mechanism that causes the pod to separate from the glider at apogee is the reaction force created by the sudden ejection charge that blows the nose cone off and streamer out of the pod. This reaction force thrusts the pod to the rear, disengaging the pod from the glider fuselage.

The Thermal Hawk is strong enough to survive most dives due to improper trim. It has been designed this way because a glider of this particular configuration without thick airfoiled wings is often very tricky to trim for glide. In addition, the glider may also be airspeed-sensitive so that if the pod separates while the model is in a dive, the glider will continue in the dive. If this occurs, check to see if you are using the correct short delay engine.

STEP THREE

A. Use cyanoacrylate or white glue to glue the rudder/stabilizer assembly to the boom as shown. Check alignment carefully.





Tube Marking Guide

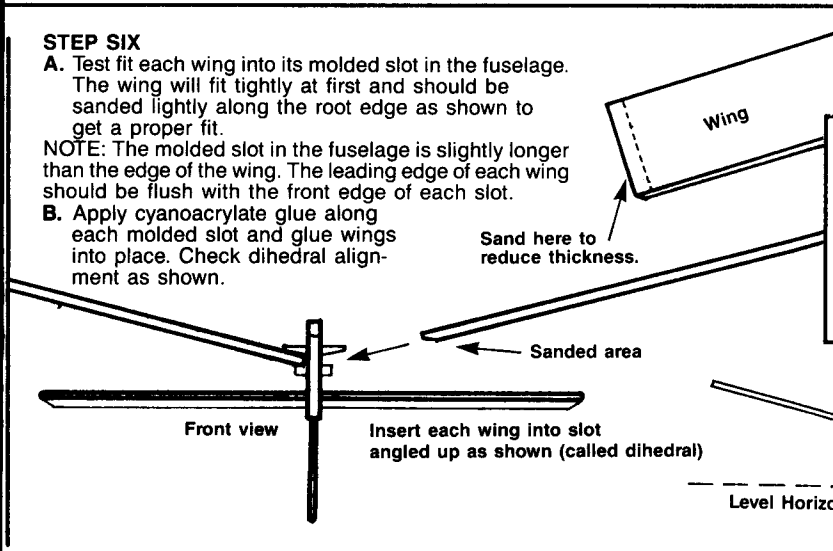
STEP SIX

A. Test fit each wing into its molded slot in the fuselage. The wing will fit tightly at first and should be sanded lightly along the root edge as shown to get a proper fit.

NOTE: The molded slot in the fuselage is slightly longer than the edge of the wing. The leading edge of each wing should be flush with the front edge of each slot.

B. Apply cyanoacrylate glue along each molded slot and glue wings into place. Check dihedral alignment as shown.

In order to get dihedral in the wings, sand the bottom of the wing along the root edge so the wing fits into the slot at an angle as shown.

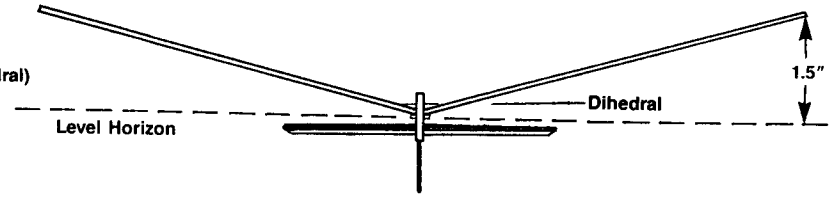


STEP SEVEN

Performance Options and Painting

Because paint and decals add weight to your glider, painting and decaling will affect your glider's performance. If you are only interested in sport flying and average flight times, proceed with painting and decaling your glider.

For optimum performance and competition flight times of your glider, we recommend that you do not paint the glider or use the decals.



Pre-flight preparation

A. Always inspect your rocket before each flight for any damage that may have occured from its previous flight or during storage.
B. Check the pod fit to be sure it is loose.
C. Remove the nose cone and streamer and install two pieces of wadding in the pod.
D. Fold the streamer in half and then roll it up tightly. The streamer should slide into the pod tube easily. Replace the nose cone.
E. Install the rocket engine and igniter according to the instructions included with it.

NOTE: The engine should fit snug into the pod. If the fit is loose, wrap masking tape around the engine until you get a snug fit.

Loading your Thermal Hawk Glider onto a Launcher

The thermal Hawk Glider can be flown from the MRC CONCEPT II Sounding Rocket Style Launcher or any other brand launcher with a 1/8" launch rod.

Because the engine pod is so far forward on the model, the Thermal Hawk will not slide all the way down the launch rail without the rear of the glider hitting the blast deflector plate causing the pod to continue sliding down while the glider falls off. You must create a "stand-off" approximately 12 inches up from the blast deflector plate. A piece of masking tape wrapped around or clothespin clamped to the tower will hold the pod high enough so the glider hangs from the pod.

Recomended Engines:
First Flight: B4-2

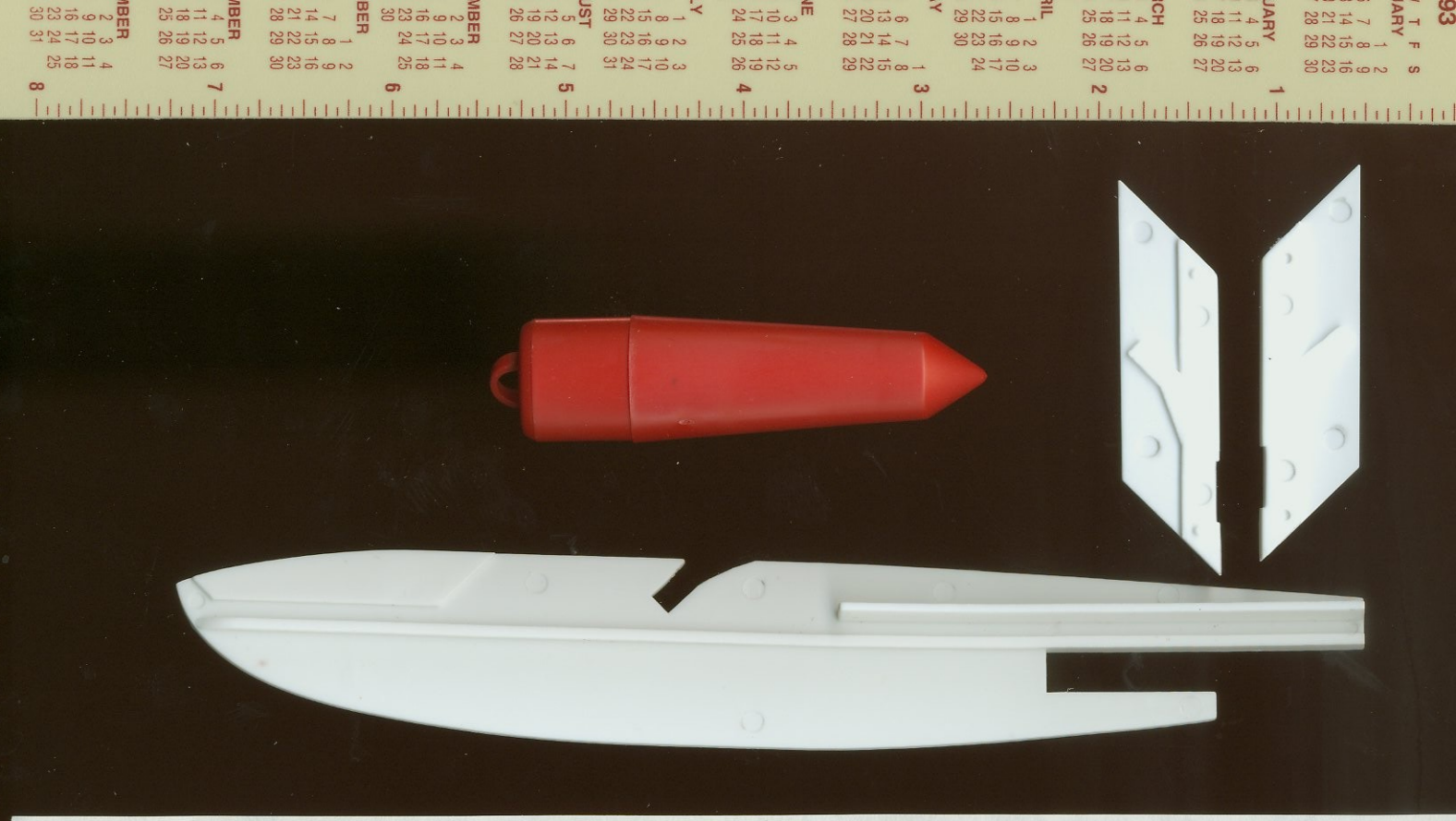
Do not fly the Thermal Hawk Glider on a windy day (breeze more than 3 or 5 MPH).

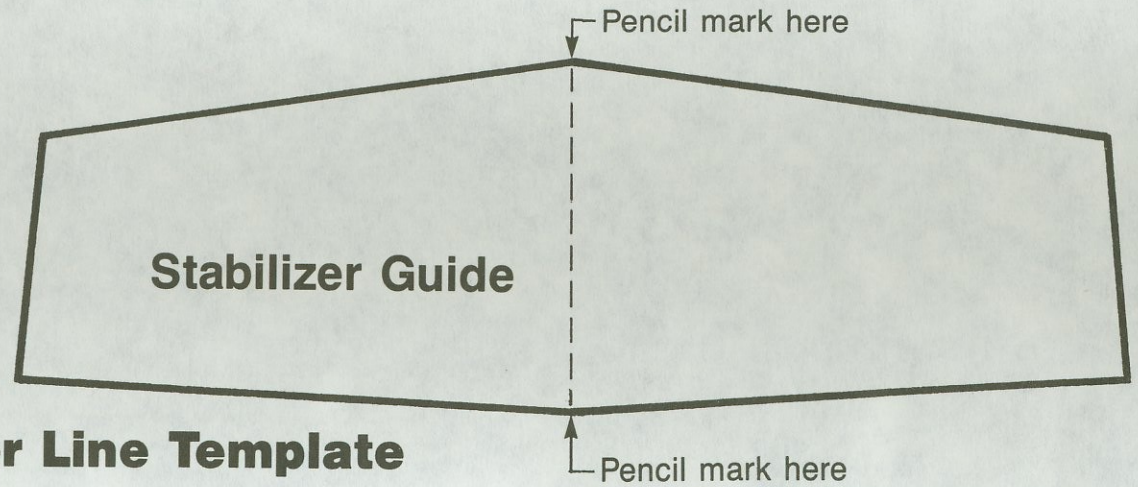
Do not be disappointed if the Thermal Hawk Glider does not fly perfectly on the first flight. Balancing and trimming the glider can be tricky and may take a few flights before you get it flying perfectly.

MRC™
Model Rectifier Corporation
200 Carter Drive
Edison, New Jersey 08817
© 1990 Model Rectifier Corporation

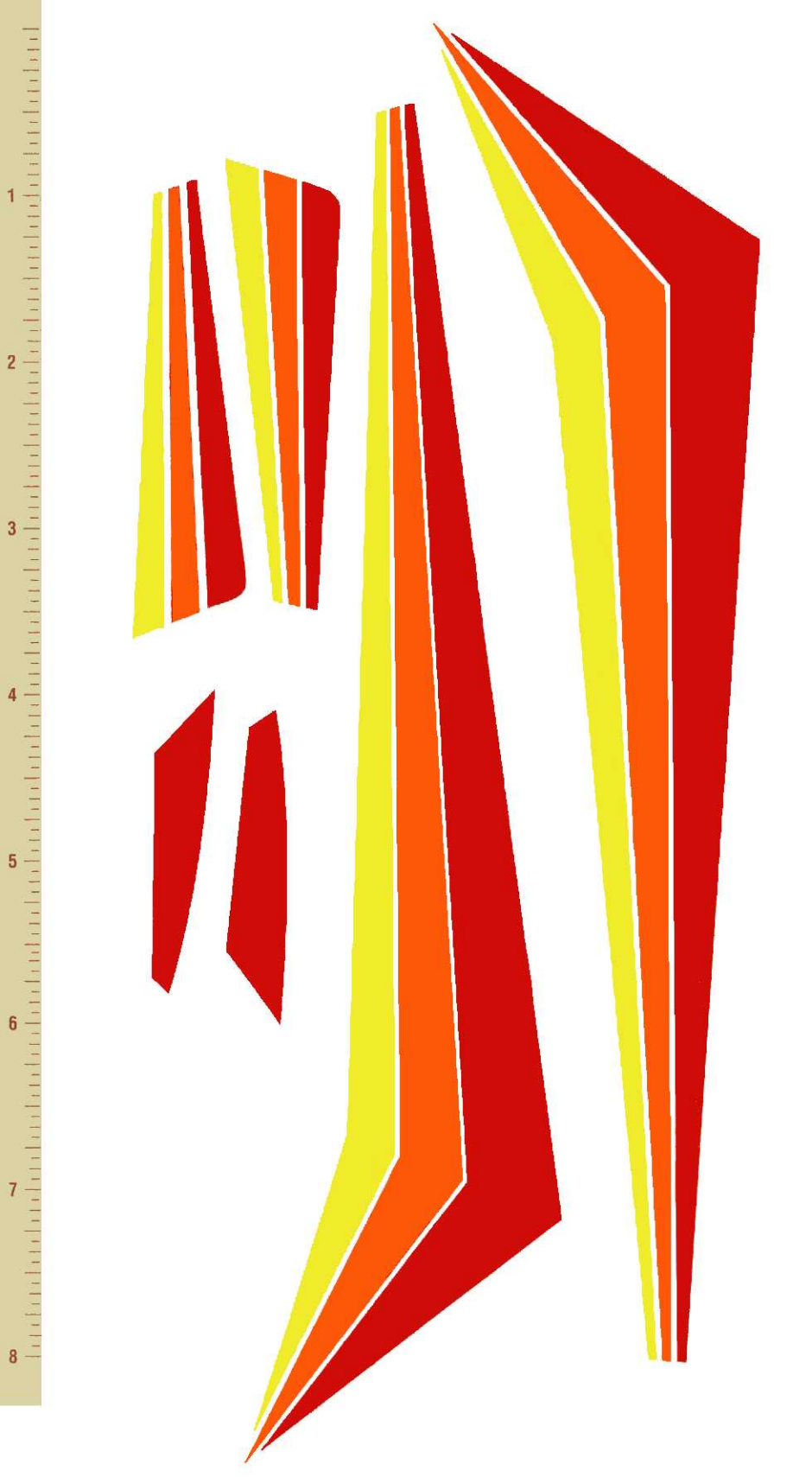
National Association of Rocketry MODEL ROCKET SAFETY CODE

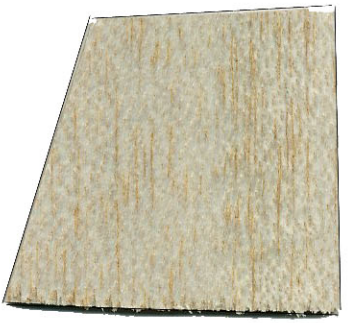
1. **Construction**—My model rockets will be made of lightweight materials such as paper, wood, rubber, and plastic, without any metal as structural parts.
2. **Engines**—I will use only pre-loaded factory-made NAR Certified model rocket engines in the manner recommended by the manufacturer. I will not alter or dismantle model rocket engines or their ingredients in any way or attempt to reload these engines.
3. **Recovery**—I will always use a recovery system in my rockets that will return them safely to the ground so that they may be flown again. I will use only flame-resistant recovery wadding in my rockets.
4. **Weight Limits**—My model rocket will weigh no more than 1500 grams (53 ozs.) at lift off, and the engines will contain no more than 125 grams (4.4 ozs.) of propellant. My model rockets will weigh no more than the engine manufacturer's recommended maximum lift-off weight for the engines used or will use the engines recommended by the manufacturer for my rocket.
5. **Stability**—I will check the stability of my model rockets before their first flight, except when launching models of already proven stability.
6. **Payloads**—My model rockets will never carry live animals or payloads that are intended to be flammable or explosive.
7. **Launch Area**—I will launch my model rockets outdoors in a cleared area, free of tall trees, power lines, and buildings. I will ensure that people in the vicinity are aware of the pending rocket launch and are in a position to see the rocket's lift-off before I begin my audible 5-second countdown.
8. **Launcher**—I will launch my model rockets from a rod or other device which provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so that the end of the rod is above eye level or will cap the end of the launch rod when approaching it. I will cap or disassemble my launch rod when not in use and will never store it in an upright position. The launch device will have a jet deflector to prevent the engine exhaust from hitting the ground directly. I will always clear the area around my launch device of brown grass, dry weeds, and other easy-to-burn materials.
9. **Ignition System**—The system I use to launch my model rockets will be remotely controlled and electrically operated and will contain a switch that will return to "off" when released. The system will contain a removable safety interlock in series with this firing switch. When launching, all persons will remain at least 15 feet away from any model rocket when igniting engines totalling 30 N-sec of total impulse or less and at least 30 feet when igniting engines totalling more than 30N-sec total impulse. I will use only electrical igniters which will ignite my rocket engine within one second of actuation of the launching switch.
10. **Launch Safety**—I will not let anyone approach a model rocket on a launcher until I have made sure that the safety interlock has been removed or the battery has been disconnected from my launcher. In the event of a misfire, I will wait one minute before allowing anyone to approach the launcher.
11. **Flying Conditions**—I will launch my model rocket only when the wind is less than 20 miles per hour, and under conditions where the model will not fly into clouds, fly near aircraft in flight, or be hazardous to people or property.
12. **Launch Area**—When conducting research activities with unproven designs or methods I will, when possible, determine their reliability through pre-launch tests. I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.
13. **Launch Angle**—I will not launch rockets so their flight path will carry them against targets. My launch device will be pointed within 30 degrees of vertical. I will never use model rocket engines to propel any device horizontally.
14. **Recovery Hazards**—If a model rocket becomes entangled in a power line or other dangerous place, I will not attempt to retrieve it.





Center Line Template





MRC Thermal Hawk Boost Glider

Refer to instructions for description of part numbers referenced below.

Part #1 - See jpg image
Part #2 - See MRC Thermal Hawk Glider 02.jpg
Part #3 - See MRC Thermal Hawk Glider 02.jpg
Part #4 - 4" BT-20
Part #5 - BT-20 tube coupler
Part #6 - See MRC Thermal Hawk Glider 02.jpg
Part #7 - See MRC Thermal Hawk Glider 02.jpg
Part #8 - BT-20+ (slides over BT-20 to hold engine hook)
Part #10 - 21" Kevlar
Part #11 - 22" X 1.25"
Part #12 - 3/32" balsa. See MRC Thermal Hawk Glider 01.jpg for pattern.
Part #13 - 1/16" balsa. See MRC Thermal Hawk Glider 02.jpg for pattern.
Part #14 - 11" X 1/4" X 1/8" basswood
Part #15 - See MRC Thermal Hawk Glider Decals.jpg.
Part #17 - See MRC Thermal Hawk Glider 02.jpg.
Part #18 - Plastic C rail.
Part #19 - Fit BT-20

Note: Lower fin unit length is 2.5". Single piece BT-50 23.5" in length can be used to clone this rocket. If you wish to maintain a payload section, one length of BT-50 @ 16.5" and another for the payload section @ 7".

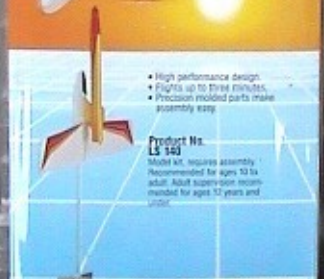
MRC

CONCEPT II

MODEL ROCKET KIT

THERMAL HAWK GLIDER

Rocket Powered Glider.



- High performance design.
- Flights up to three minutes.
- Precision molded parts make assembly easy.

Product No.
LS 140

Model kit, requires assembly. Recommended for ages 10 to adult. Adult supervision recommended for ages 12 years and under.