

VEHICLE DATA SHEET

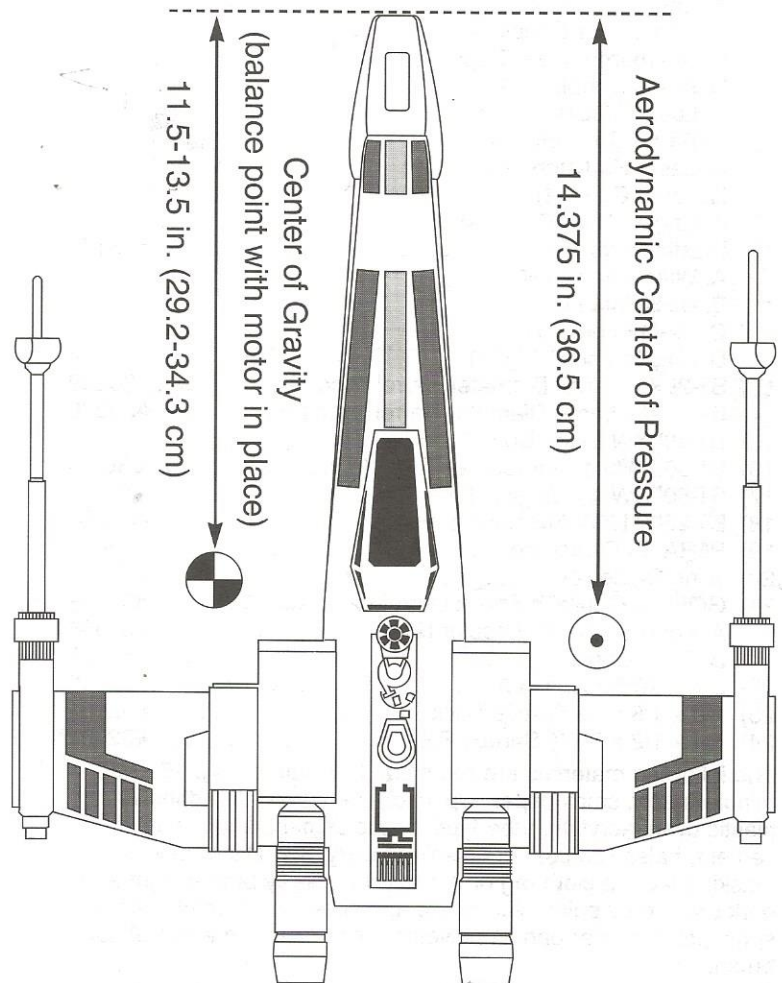
PHYSICAL DATA

Length:	20 in.	(50.8 cm)
Diameter:	3.25 in.	(8.3 cm)
Wingspan:	18 in.	(45.7 cm)
Weight (w/o motor):	30 oz.	(855 grams)
Recovery System:	36 in. (90 cm)	Parachute

PREDICTED ALTITUDE

Estimated Drag Coefficient: 0.90

Motor	Max Altitude		Coast Time
	(ft.)	(m)	(sec.)
F62-4	615	188	5.0
G70-5	800	244	5.6



BEFORE YOU START:

Thank you for purchasing a North Coast Rocketry™ model kit. We hope that you will spend many enjoyable hours constructing and flying your **Star Wars X-wing Fighter** rocket. We have carefully designed and tested this kit to be reliable, realistic, challenging, and high flying. Only the highest quality materials go into a North Coast Rocketry™ kit, assuring high performance results. Please read these directions to become familiar with them before starting construction. The sequence is important. Be sure to test fit all parts before gluing.

To aid in building your kit, remove this parts layout from the rest of the instruction booklet.

Check the kit for completeness. The kit should contain the following parts:

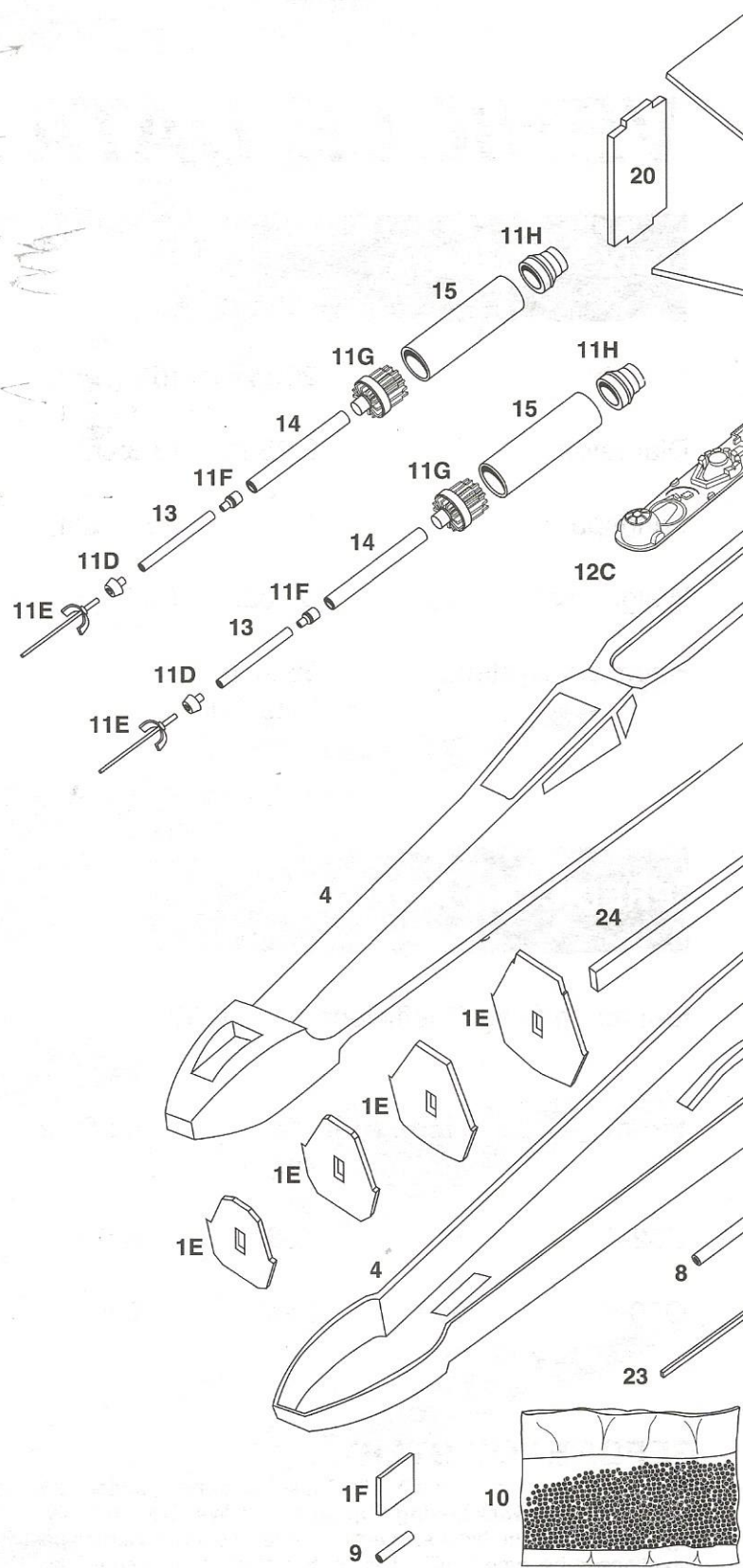
- 1) Laser Cut Wood Set #32177
 - A. Bulk Head Rings (2)
 - B. Bulk Heads (2)
 - C. Centering Rings (3)
 - D. Wing Panels (4)
 - E. Fuselage Formers (4)
 - F. Launch Lug Stand Off (1)
 - G. Wing Joiners (6)
 - H. Plywood Spacers (2)
- 2) Ion Engine Vac-Forms (2) #32834
- 3) Afterburner Vac-Forms (2) #32835
- 4) Fuselage Vac-Form Set #32837
- 5) X-wing Fighter Decal Sheet #37739
- 6) MT-12LXW Motor Tube #30230
- 7) MR-1 Motor Retainer #37937
- 8) LL-XW-1/4 Launch Lug (8-1/4" [21 cm]) #38174
- 9) LL-1-1/4 Launch Lug (1" [2.5 cm]) #38179
- 10) Nose Weight Pellets #87306
- 11) Plastic Parts Trees (2) #33174
 - A. Engine Inlets (4)
 - B. Afterburner Couplers (4)
 - C. Afterburner Rear Caps (4)
 - D. Probe Couplers (4)
 - E. Laser Probes (4)
 - F. Barrel Couplers (4)
 - G. Laser Radiators (4)
 - H. Laser Caps (4)
 - J. Engine Rear Caps (4)
- 12) Plastic Parts Set #33176
 - A. Wing Saddles (4)
 - B. Backplate (1)
 - C. R2-D2 Form (1)
 - D. Engine Lock Ring (1)
- 13) BT-2LXW Small Diameter Barrel Tube (4) #30299
- 14) BT-3LXW Large Diameter Barrel Tube (4) #30300
- 15) BT-30LXW Laser Body Tube (4) #30350
- 16) BT-50J White Afterburner Tube (4) #30362-6
- 17) BT-60LXW Ion Engine Tube (4) #30419
- 18) BT-2500 LXW Fuselage Tube #31396
- 19) PARA 36 Parachute #35824
- 20) Wing Brace (2) #37874
- 21) GOR - 2 Gorilla™ Shock Cord Mount Kit #87253
 - A. Loop Sleeve Connector (2) #38394
 - B. Steel Cable #38395
- 22) 3/4 X 90 Shock Cord #87256
- 23) 1/8 x 1/8 x 18 Spruce Stick #32081
- 24) 1/4 x 1/2 x 9-3/4 Spruce Rib #32082

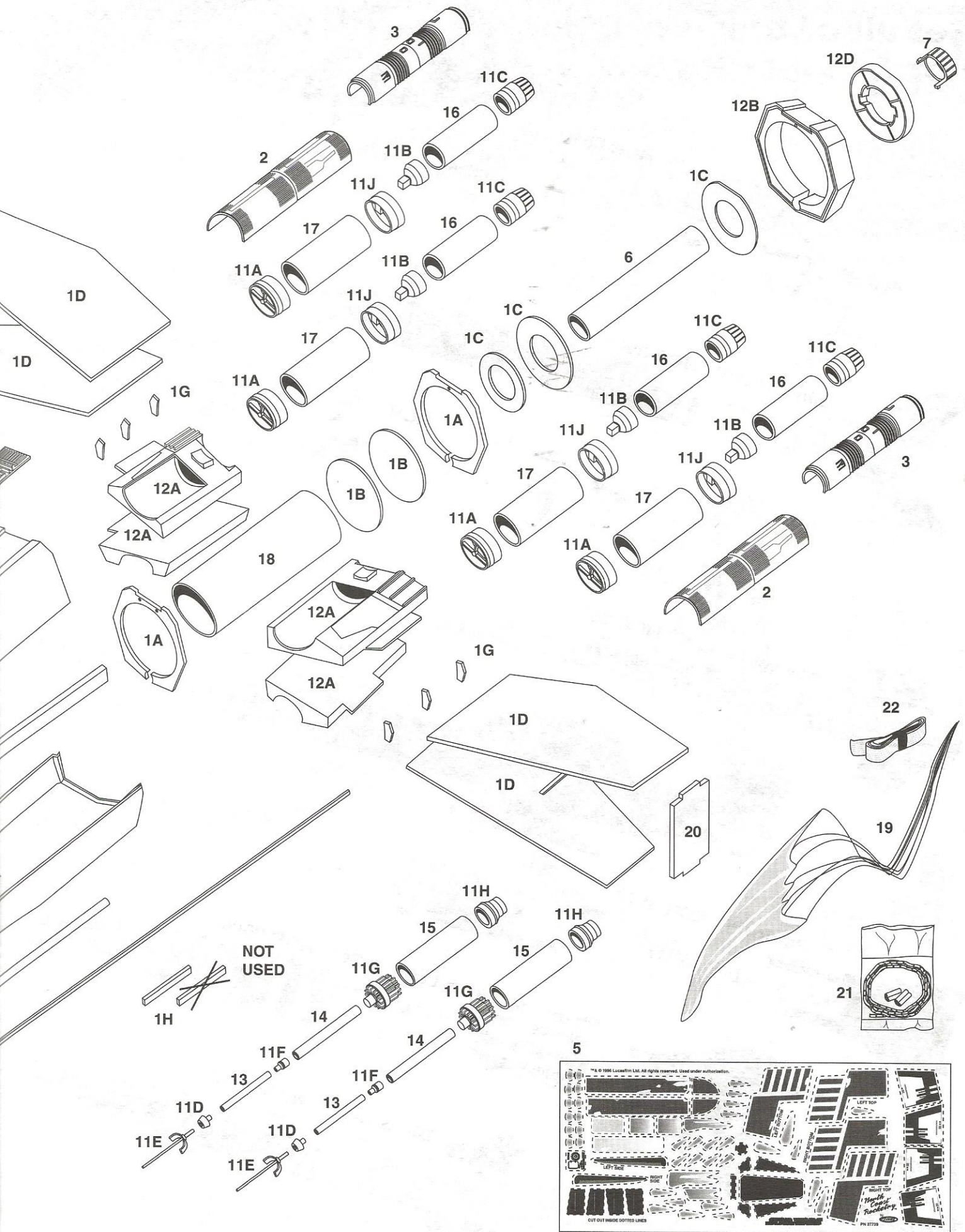
The following materials are required: 5 minute epoxy, 15 or 30 minute epoxy, small paper cup, thick cyanoacrylate adhesive, plastic cyanoacrylate, tube-type plastic cement, liquid plastic cement, balsa fillercoat or finishing epoxy, 3/4" (19 mm) wide masking tape, a cloth rag or paper towel, spray primer, light and dark gray spray paint, blue, white and silver bottle paint, clear coat spray paint, rubber bands, polyester body filler and a camel hair brush.

The following tools are needed for construction: pencil, modeling knife or razor blade, #11 knife blade or equivalent, ruler, pliers or crimping tool, sanding block, and sandpaper, grades: #100, #220, #320, & #400.

This kit is recommended for **adults** (18 and older) **only**. Launch system, batteries, motors, launch supplies, adhesives, paint, tools, and finishing supplies are not included. Please be **extremely** careful using cyanoacrylate adhesive and epoxy; avoid getting in your eyes or on skin. Safety glasses are recommended. Use adhesives and paint only in areas with adequate ventilation.

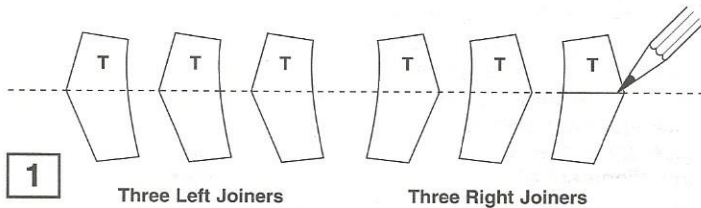
Do not modify the design of the rocket! Changes to the rocket design may affect stability and safety.





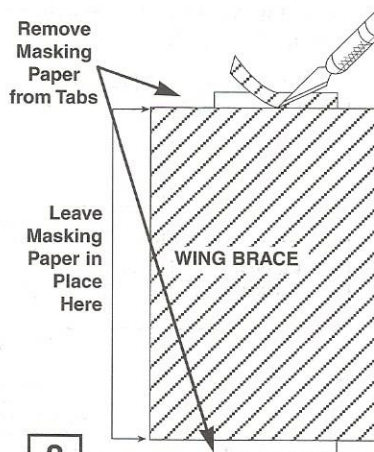
ASSEMBLY INSTRUCTIONS

- Remove and identify all laser cut plywood parts in the plastic bag using the parts layout. Using #220 sandpaper, lightly sand all of the exposed laser cut edges. Please remember that plywood is a natural wood product and as such we cannot control factors such as warping once the kit has left the factory. If your plywood pieces are warped, place them under a stack of books to flatten them.
- Using a sharp knife, cut the bulkheads free from the bulkhead rings. Trim away any excess retaining material so that the rings will fit around the BT-2500 fuselage tube (2.5" [6.4 cm] in diameter and 6" [15.2 cm] long) and that the bulk heads will fit into the fuselage tube.
- Lay each bulkhead ring on the Wing Layout at right, then mark with top, bottom, and wing center lines. Mark the ring with two small cable holes near the top as "forward" and the ring with one small cable hole "aft".
- Place the BT-2500 fuselage tube on the Wing Layout. Mark the tube with top, bottom, and wing lines. Extend all lines the length of the tube and label each line as to its orientation.
- Locate the wing joiners. Note that they are not symmetrical. Place each wing joiner on the template below then mark the alignment line and the top with a "T".

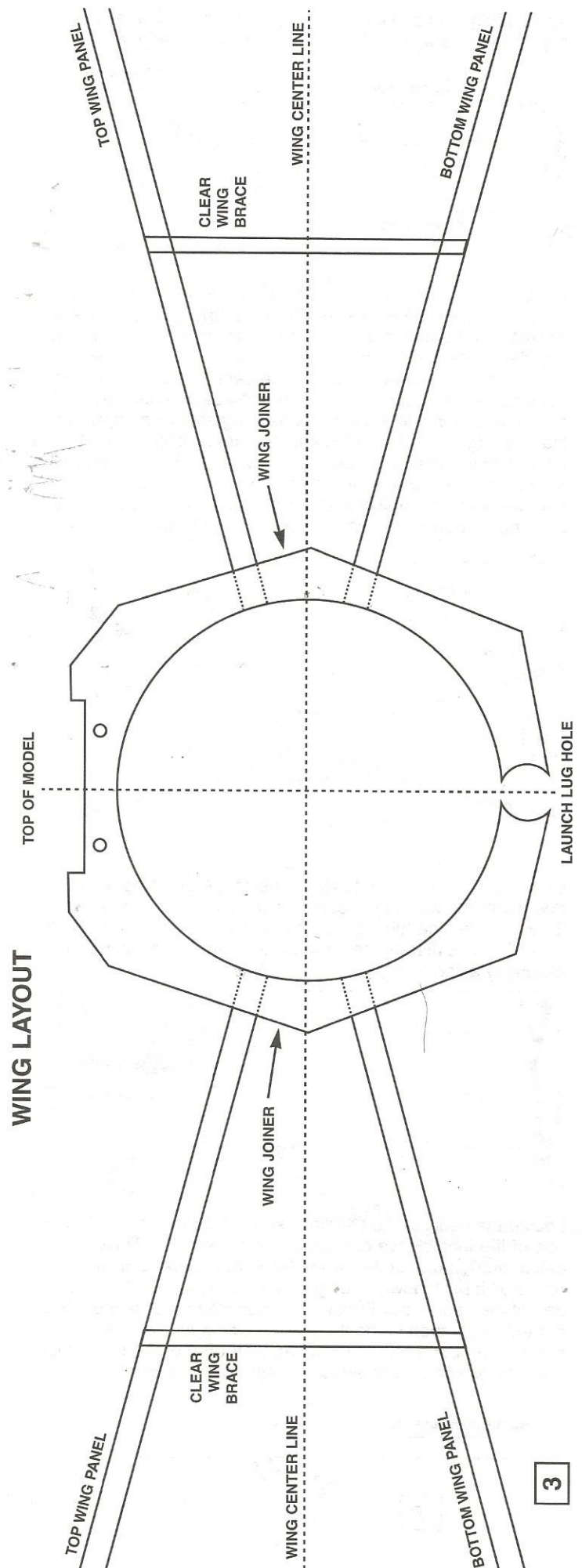


- Locate the four wing panels and clear the slots. Fine sand the top and bottom wing surfaces with #220, #320 and #400 sandpaper for a smooth finish.
- Mask off the root edge (see illustration 4) of the each panel. Seal the panels using finishing epoxy, balsa fillercoat, or primer paint. Apply a coat of sealer, allow to dry, and sand smooth with #220, #320, and #400 sandpaper, alternating sanding and sealing until all of the grain is filled. Set aside to dry, then remove tape from the root edges.

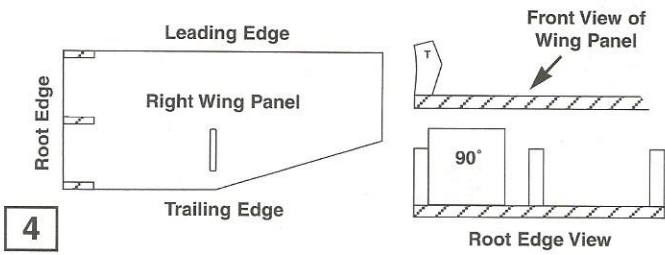
- Locate the clear plastic wing braces. (They are covered with a brown protective masking paper.). Cut the masking paper even with each tab (be careful not to cut too deep). Remove the masking paper from the **tabs**. Leave the remaining masking paper in place until the model is completed to prevent painting the clear plastic.



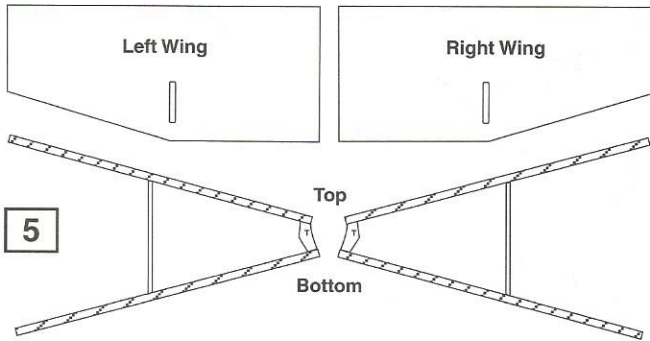
- Locate two wing panels and three wing joiners. Mark the wing panel root edge midway between the leading and trailing edges as a midpoint to locate the center wing joiner. Using CA or epoxy, glue the wing joiners in place at the leading edge, midpoint, and trailing edge as shown in illustrations 4 & 5. Make sure the "T" is up for all three joiners, they



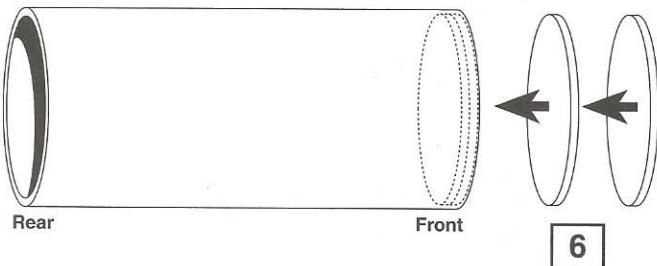
stand straight up and they are 90° to the wing. (Use the launch lug stand off as a square to check alignment.) Let dry.



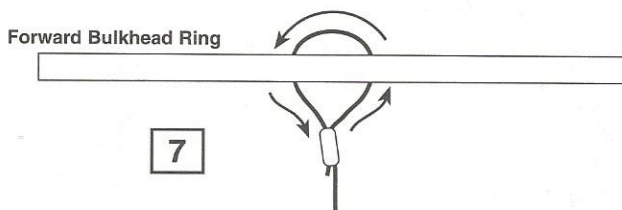
- 4
- Once the wing joiners are dry, position the clear plastic wing brace in the slot on the panel. **Do not apply glue yet.** Test-fit another wing panel to the assembly making sure that the leading (flat) edges both face forward. Remove the wing brace and apply epoxy to one tab, reinsert, then apply epoxy to the other tab and the wing joiners. Being sure to keep the leading and trailing edges in line, hold the panels together and apply the leading edges to a flat surface to be sure all edges are aligned. Let set, check alignment against the Wing Layout (illustration 3), then set aside to dry. Assemble the other wing in the same manner. **Make sure you make a mirror image assembly,** so that you end up with a left wing and a right wing.



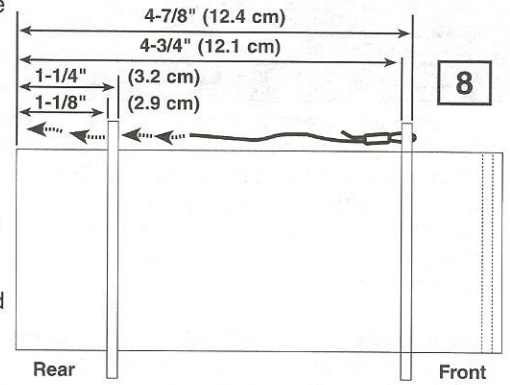
- 5
- Glue the two bulkheads together, using CA or epoxy. When dry, epoxy the bulkhead assembly flush into one end of the BT-2500 fuselage tube. Do not let any epoxy drip inside the tube as it will block the engine mount later. Set the tube/bulkhead assembly aside to dry.



- 6
- Locate the cable in the Gorilla™ shock cord mount kit. Thread one of the loop/sleeve connectors onto the cable. Thread the cable through one of the two holes in the **forward** bulkhead ring. Pull it back down through the other hole, and thread the end of the cable back through the loop/sleeve connector. Pull out the slack, then crimp the loop sleeve connector using a crimping tool or a pair of pliers. Apply a drop of CA to the joint. The final assembly should look similar to the diagram.

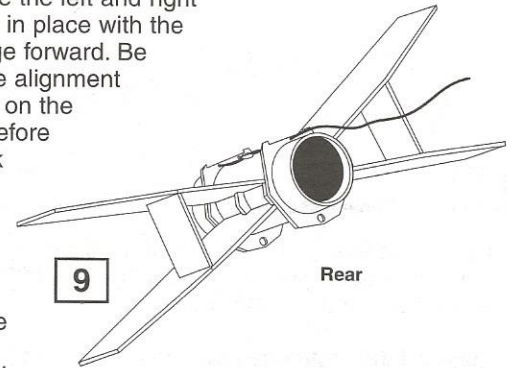


- Mark the fuselage tube at 1-1/8" (2.9 cm), 1-1/4" (3.2 cm), 4-3/4" (12.1 cm) and 4-7/8" (12.4 cm) from the open end. Extend the marks all the way around the tube. (The bulkhead rings will be glued between these marks.) Slide the forward bulkhead ring onto the fuselage tube and position it between the 4-3/4" (12.1 cm) and 4-7/8" (12.4 cm) marks. BE SURE THE GORILLA CABLE POINTS TOWARD THE REAR (OPEN END) OF THE TUBE. Slide the aft ring onto the tube between the 1-1/8" (2.9 cm) and 1-1/4" (3.2 cm) marks. Align both bulkhead rings so that the top, bottom, and wing lines match the lines on the tube. The large hole (for the launch lug) on both rings should be aligned.

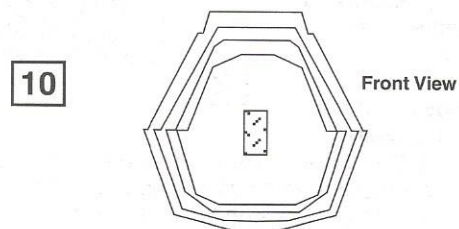
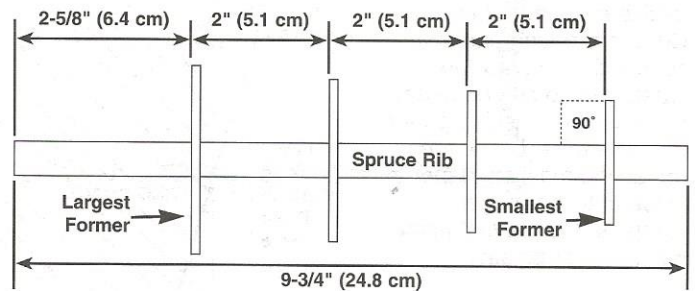


- Test fit the wing assemblies between the bulkhead rings, ensuring there are no gaps. Insert the launch lug to align the rings. Remove the wing assemblies and the launch lug and epoxy the bulkhead rings in place. Let dry. Thread the free end of the Gorilla™ cable through the corresponding hole in the rear bulkhead ring.

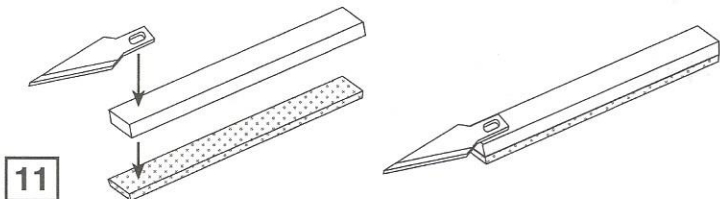
- Using epoxy, glue the left and right wing assemblies in place with the flat (leading) edge forward. Be sure to check the alignment against the lines on the fuselage tube. Before glue dries, check the alignment of the wings against the Wing Layout from the previous page. Carefully fillet the wing assemblies and the bulkhead rings with epoxy.



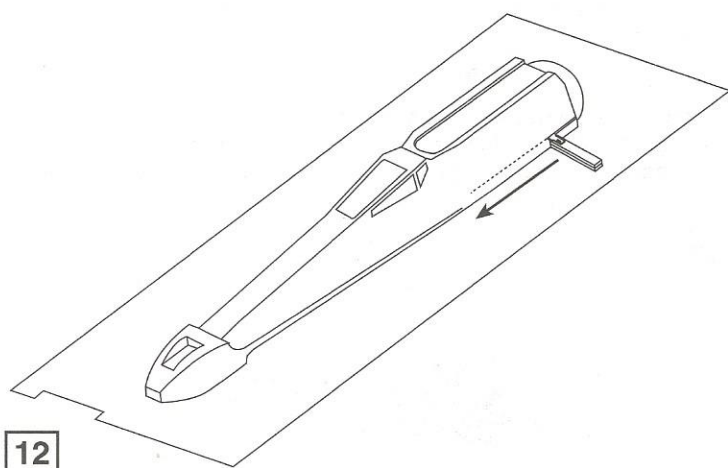
- Locate the four fuselage formers and the 1/4" (6 mm) x 1/2" (13 mm) x 9-3/4" (24.8 cm) spruce rib. Use the diagram below to mark as shown. Arrange the formers on the spruce rib from largest to smallest. Epoxy the formers in place. Fillet all but the smallest former joints. Set aside to dry. Make sure the formers are 90° to the rib.



- Cutting vac-formed plastic parts requires patience. Locate one of the plywood spacers. Cut a 1/4" (6 mm) x 2" (5.1 cm) plastic spacer from the corner of the fuselage vac-form sheet. Glue the two spacers together. Glue a No. 11 blade on top of the spacers as indicated in the illustration below. (The spacers will bring the blade to the correct cutting height for making horizontal cuts.)



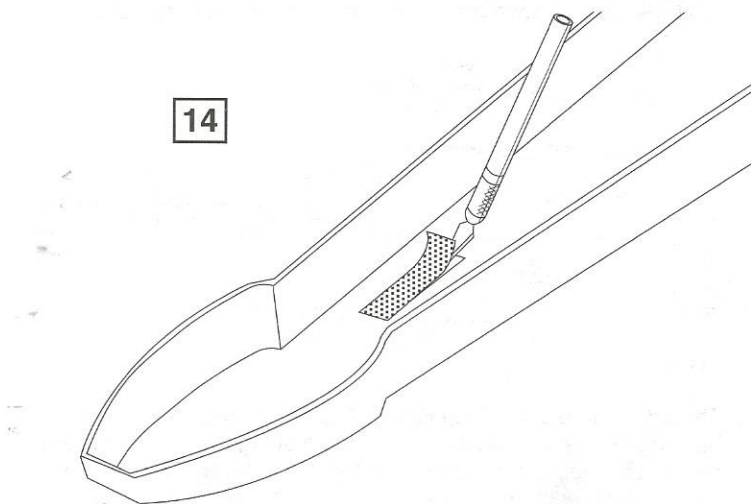
- Applying light pressure, make repeated passes with the cutting tool to cut through the plastic. Be sure to keep the blade in the same cut line each time; too much pressure will cause the blade to move and not cut cleanly.



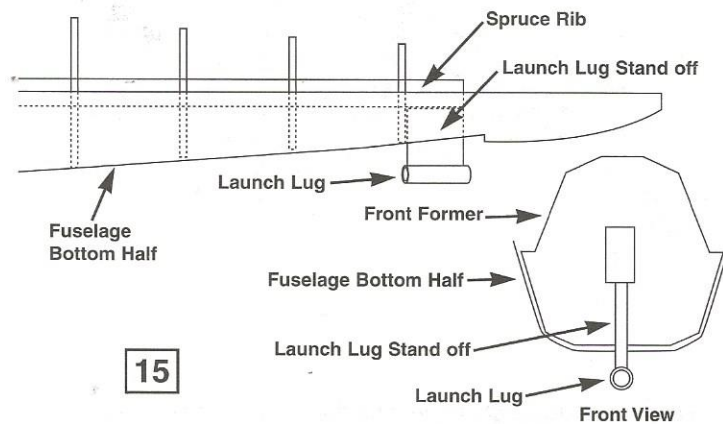
- Using the cutting tool, remove the top fuselage and bottom fuselage halves from the vac-form sheet. **NOTE:** The fuselage top has a flat space for fitting the R2-D2 detail, and the bottom half has indentations for the launch lug and launch lug stand off. Be sure to cut the aft end of the form away as indicated. **Do not discard the excess plastic.**

- Roughen the inside of the bottom fuselage half with #100 grit sandpaper. Carefully cut out the indented area for the launch lug stand off at the front of the fuselage half. Slide the former/rib assembly (see illustration 10) into the fuselage half all the way

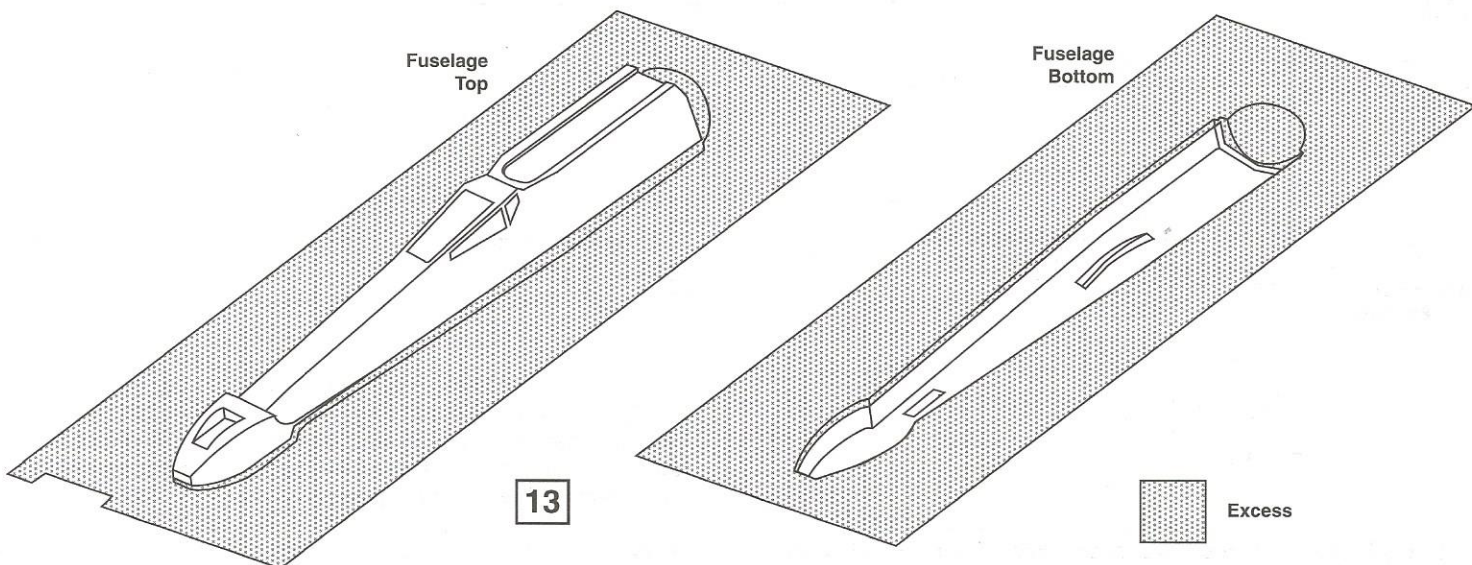
- forward. Test-fit the launch lug stand off up through the slot to the spruce stick. Trim the slot as necessary to achieve a good fit.



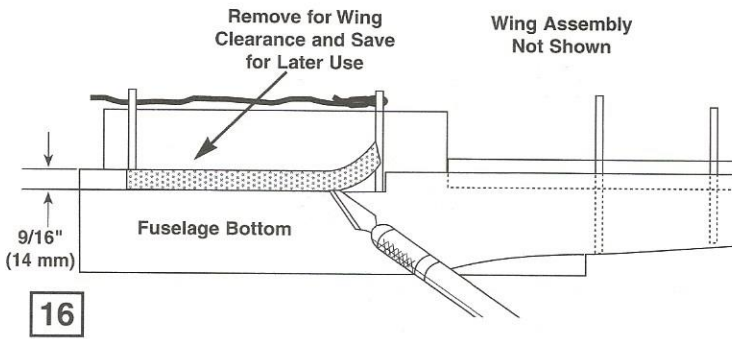
- Epoxy the launch lug stand off to the former/rib assembly and let dry. Slide the former/rib assembly back into the fuselage half and epoxy into place. Once dry, epoxy the short launch lug to the stand off and fillet the joint.



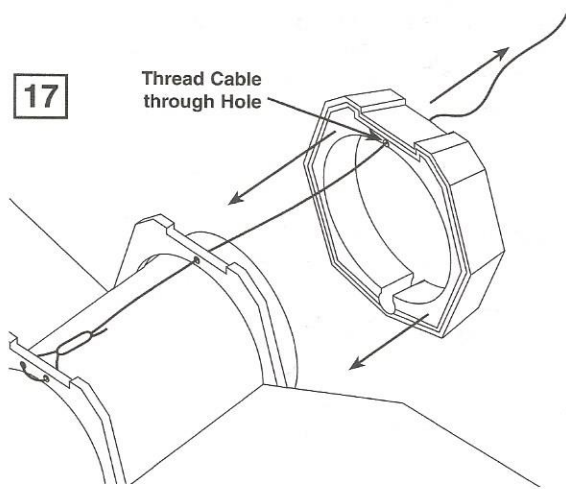
- Place the fuselage tube/wing assembly (see illustration 16) into the fuselage bottom and slide it forward until the bulkhead touches the spruce rib. Mark the fuselage where the wings intersect the side. Remove the fuselage tube/wing assembly. Measure down 9/16" (14 mm) from the top of the vac-form



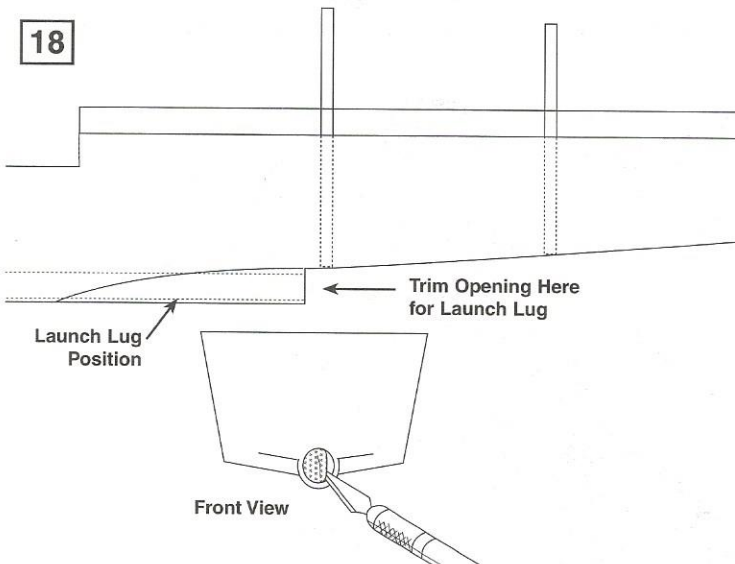
between the two marks you just made and draw a line connecting them. Cut out this section of the fuselage to allow the wings to fit. Be sure to save the cut out shapes for final assembly.



- 16**
- Thread the free end of the Gorilla™ cable through the plastic back plate. Test fit onto the end of the fuselage tube assembly to make sure the launch lug aligns with the hole. **NOTE:** You may need to trim flash from the hole to achieve a good fit. Using epoxy, glue the back plate in place, flush with the end of the tube.



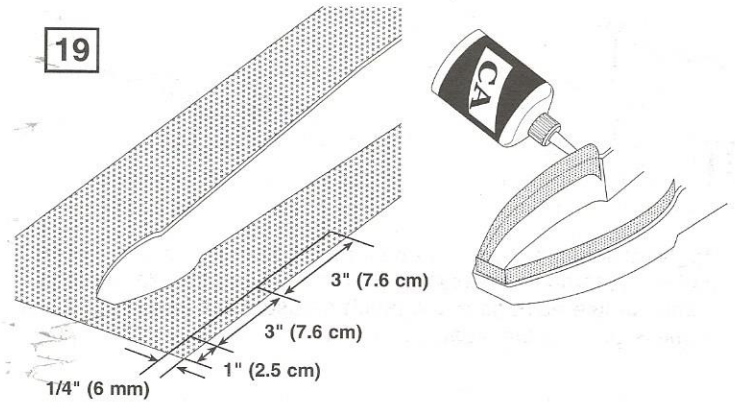
- 17**
- Locate the rear launch lug indentation. Trim the plastic away so that the long launch lug will protrude through. Slide the long launch lug into the bulkhead rings until it is flush with the launch lug indentation. Test fit the fuselage tube/wing assembly into the bottom fuselage half and ensure that the lug fits properly and is aligned with the forward launch lug. Glue the launch lug in place.



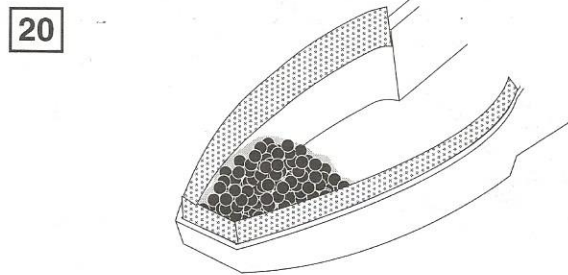
- 18**
- Apply a liberal amount of 30 minute epoxy to the contact areas on the bottom halves of the bulkhead rings, launch lug, and rear

of the spruce rib where it will touch the bulkhead, then slide the fuselage tube/wing assembly into place. Be sure to slide the assembly all the way forward so that the bulkhead is in contact with the spruce rib. Let dry.

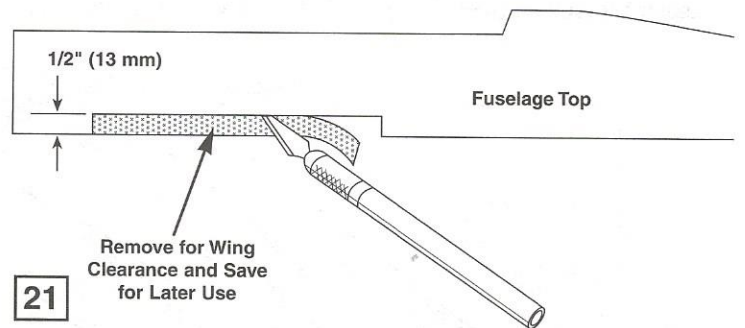
- Cut two 1/4" (6 mm) x 3" (7.6 cm) and one 1/4" (6 mm) x 1" (2.5 cm) pieces from the excess plastic. Apply these "contact tabs" to the bottom fuselage half with plastic cement or CA as shown.



- 19**
- Pour the nose weight pellets into a small paper cup and mix thoroughly with 30 minute epoxy. Pour the mixture into nose of the bottom fuselage as far forward as possible. Let the epoxy set.

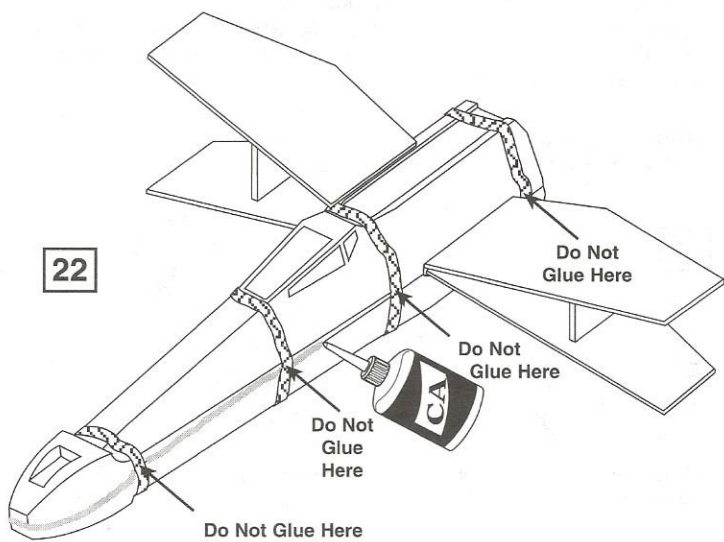


- 20**
- Roughen the inside of the top fuselage half with #100 grit sandpaper. Lay the fuselage top onto the bottom fuselage assembly, taking care to line up the nose and aft ends. Mark the top half where the wings intersect the sides. Remove the top fuselage. Measure up 1/2" (13 mm) from the edge and draw a straight line between the two marks. Cut out the sides of the top fuselage half to allow the wings to fit. Be sure to save the cut out shapes for final assembly.



- 21**
- Apply a liberal amount of 30 minute epoxy to the edges of all the formers and bulkhead rings. Place the fuselage top onto the bottom fuselage assembly and align the parts. Secure the top to the bottom with four or five rubber bands, turn the assembly top half down, and let the epoxy set.

- After the epoxy has set, apply liquid plastic cement or plastic CA to the seam where the top and bottom fuselage meet. Let dry.



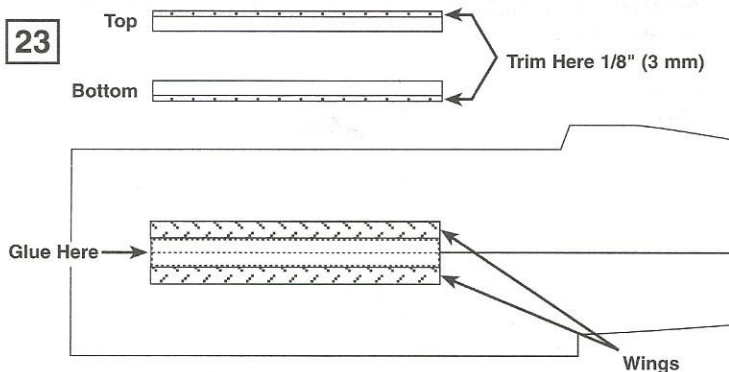
- Because vac-formed models have seams, they need to be filled and smoothed. The two putties we recommend are 3M Accyl-Blue (Usually found at auto body supply shops - one tube will last a long time!) and Squadron Green Putty (usually found in hobby shops.) For large gaps, Bondo or polyester filler also works well.

When working with putty or filler, use as little as possible. Excess putty in a seam creates extra work in sanding it away, as well as the possibility of a "sinkhole" (where the putty collapses the skin of the plastic and eats it away.) Use masking tape along seams to minimize excess putty from adhering to the work area.

Use multiple layers when building up low areas, rather than one thick layer of putty. Doing so will reduce shrinkage, cracking, and the risk of sinkholes.

Let the putty dry overnight before attempting to sand it away. Wet-or-dry sandpaper, used wet, works best. Start with #220 grit and work your way through #320 to #400. Then polish the area with #600. Fill the joint with putty and sand until a perfect joint is achieved. Be sure to fill the area between the launch lug and the fuselage plastic.

- Locate the pieces that you cut out for wing clearance. Trim 1/8" (3 mm) from the top and bottom of the pieces as indicated and test fit between the wing panels. Glue the pieces to the wing joiners to seal off the area between the wing panels. Fill and sand the area as needed.

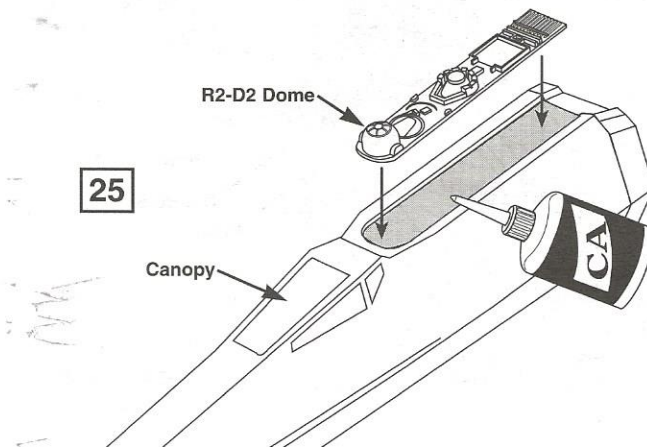


- Remove all of the plastic parts from the part trees. It may be necessary to trim or sand flash from the plastic pieces to achieve a good fit.
- Place the other loop/sleeve connector on the free end of the Gorilla™ cable. Make a 1" (2.5 cm.) loop in the cable and thread the free end of the cable back through the loop/sleeve connector. Crimp the loop/sleeve connector, and add a drop of CA.

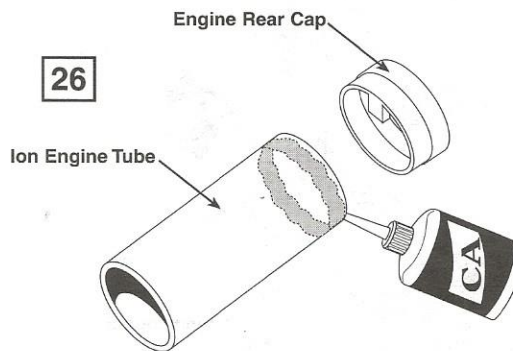
Cover the connector with a piece of masking tape to prevent the recovery system from snagging.



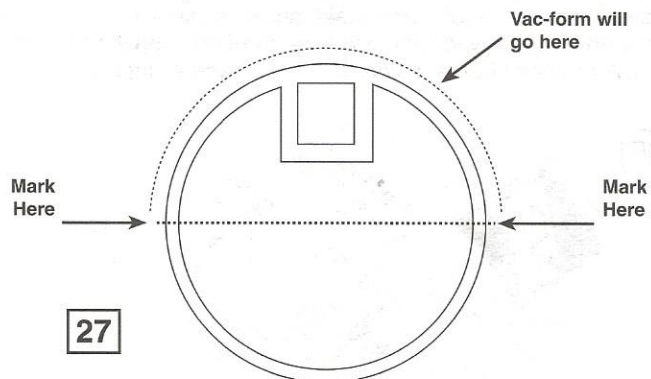
- Locate the R2-D2 form from the plastic parts set. Remove any excess plastic from the bottom and sand the part flat. Test fit to the top side of the fuselage, just aft of the canopy. Make sure the R2-D2 dome is closest to the canopy. Using CA or liquid plastic cement, glue the R2-D2 form to the fuselage. Let dry.



- Locate and test fit the four engine rear caps into the four Ion Engine tubes (approximately 1.6" [4.6 cm] in diameter and 3" [7.6 cm] long). Apply a thin film of thick (slow) CA inside one end of each tube and insert the rear cap. Wipe away any excess adhesive immediately. This is now the aft end of the tube.



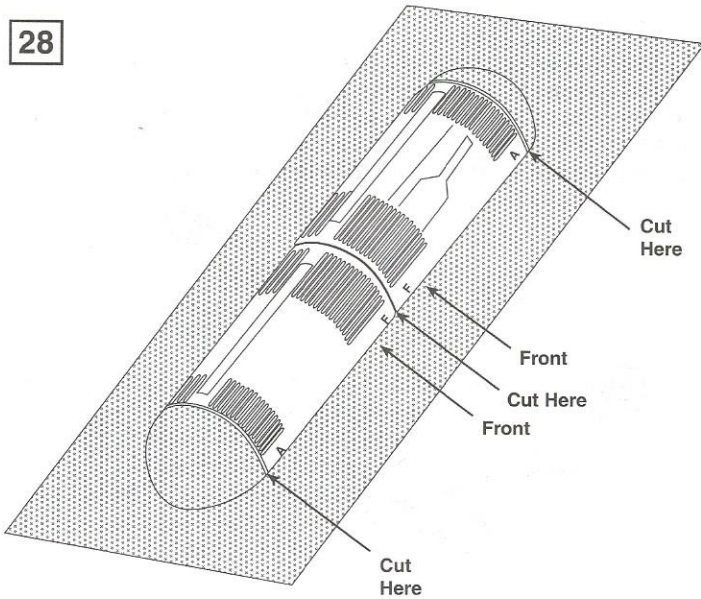
- Using the marking guide below, mark the Ion Engine tubes on each side where indicated. Extend the marks the length of the tubes.



- Locate the Ion Engine vac-forms. Mark the forward and aft directions as shown. Use the cutting tool to cut the vac-forms from the sheet. Place one of the Ion Engine tubes inside the

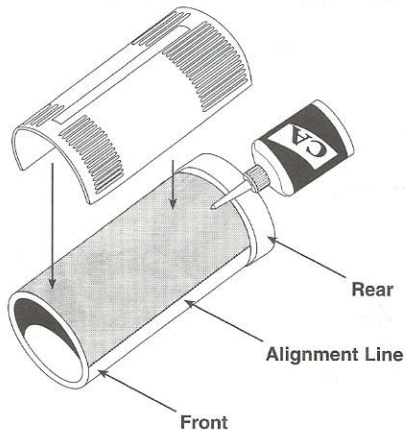
vac-form as support, lightly cut away the ends, then score the center. Separate the two pieces as indicated.

28



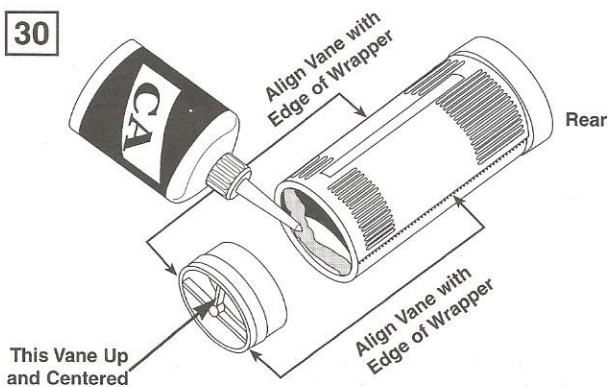
- Test fit the vac-forms onto the tubes. Be sure to note the direction of the wraps (the rear cap is to the aft). Apply a thin layer of CA or epoxy to the surfaces of the engine tubes and hold the vac-forms in place until the glue sets. If necessary, sand the ends flush with #220 sandpaper.

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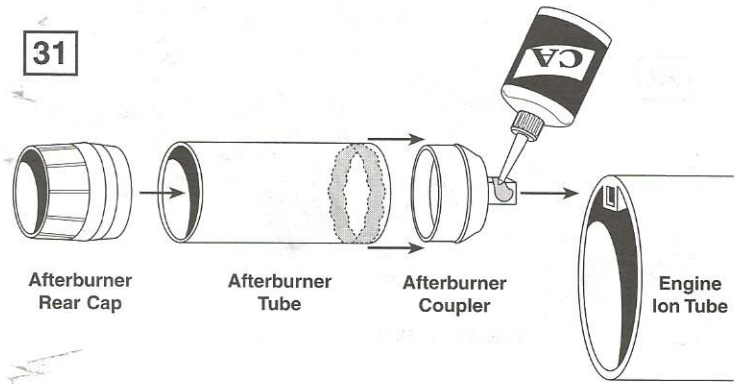
- Test fit one of the engine inlets to the front end of the tube. Be sure the inlet faces forward. Align the cross vanes with the alignment lines on the tube and make sure the middle vane points to the center of the vac-form. Remove the inlet, apply a light coat of CA or epoxy to the inside of the tube and re-insert.

30



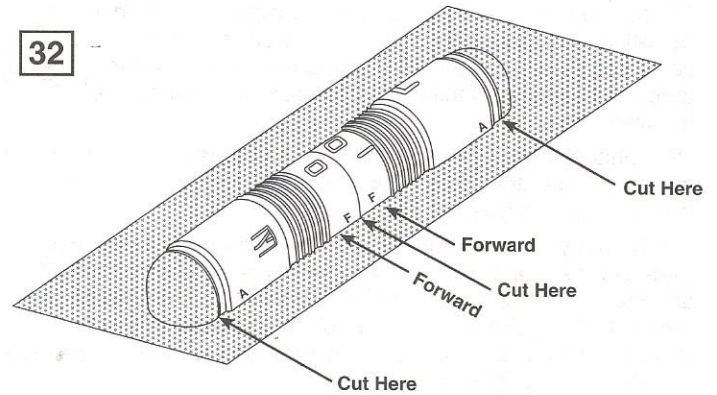
- Locate the four afterburner couplers and four afterburner tubes (approximately 1" [2.5 cm] in diameter and 2-3/4" [7 cm] long). Test fit the coupler into the rear of the Ion Engine tube. Remove, add a small amount of CA or liquid cement and re-insert the afterburner coupler. Test fit the afterburner tube onto the afterburner coupler. Remove the tube, smear a small amount of CA or epoxy in the tube and re-fit. Let dry.

31



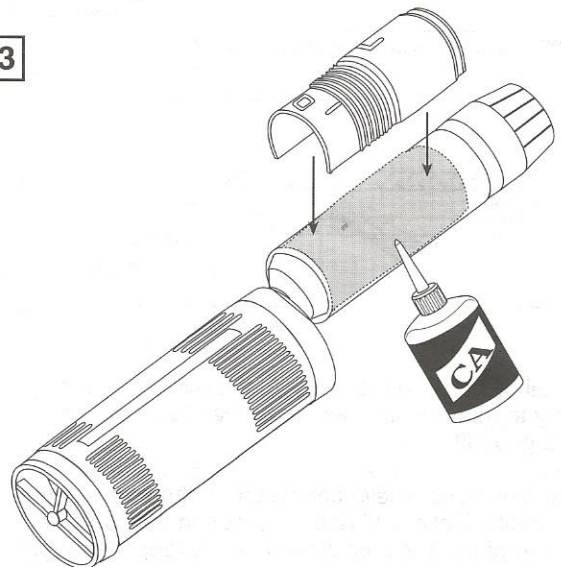
- Glue the afterburner rear caps in place using CA or epoxy.
- Locate the two afterburner vac-forms. Mark the forward and aft directions of the vac-forms as shown. Use the cutting tool to cut the vac-forms from the sheet. Score the center then separate the two pieces.

32



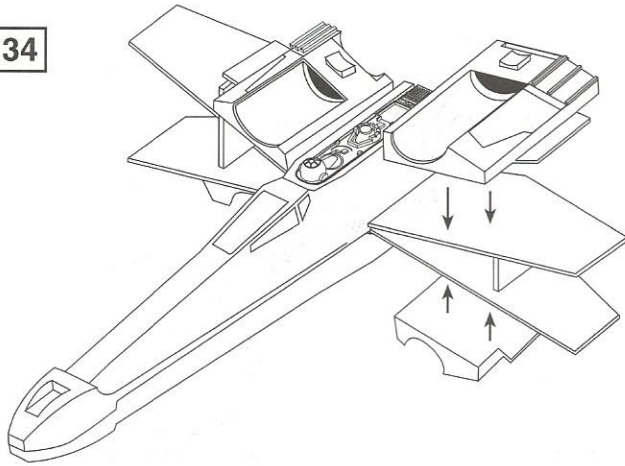
- Test fit the afterburner vac-forms on the afterburner tubes. Be sure to note the direction of the wraps (the rear cap is on the aft end of the tube). Center the forms on the top of the tubes. Mark the position of the forms on the tubes. Apply a thin layer of CA or epoxy to the surface of the tubes and hold the vac-forms in place until the glue sets.

33



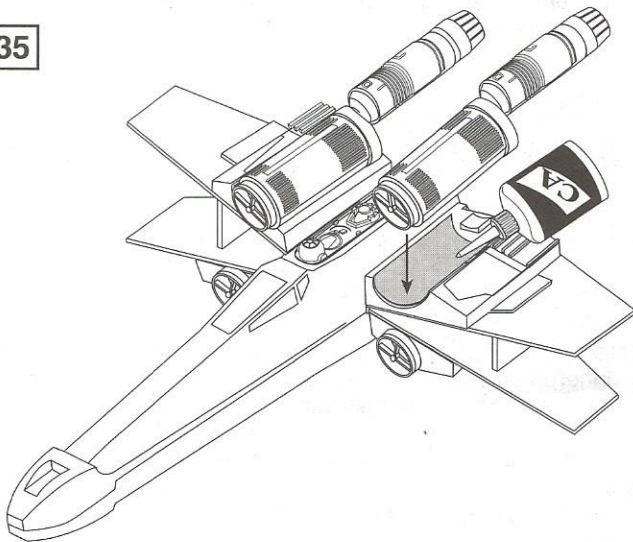
- Epoxy or CA the wing saddles to the wings and fuselage as shown below. Let dry.

34



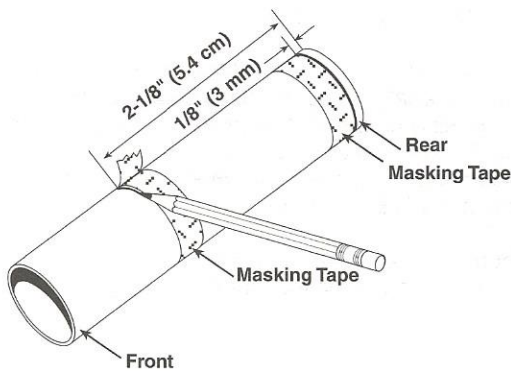
- Epoxy or CA the Ion Engine/afterburner assemblies to the wing saddles as shown. Let dry.

35



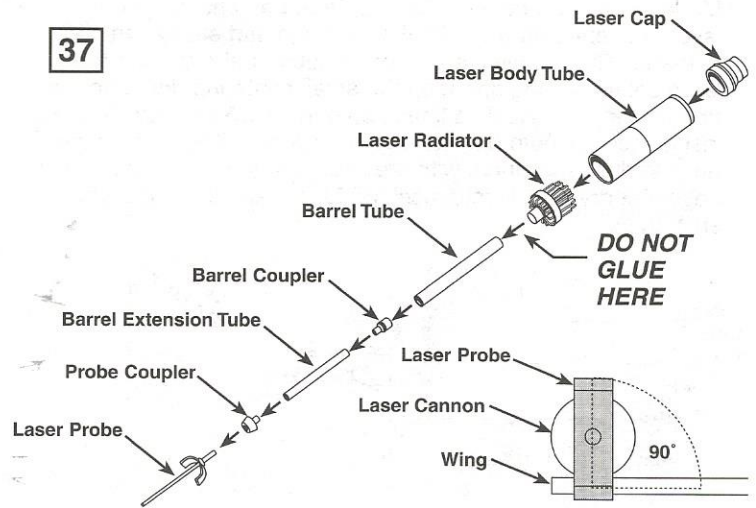
- Locate the four laser body tubes (approximately 3/4" [19 mm] diameter and 4" [10.2 cm] long). Mark each tube 1/8" (3 mm) and 2-1/8" (5.4 cm) from one end and extend the marks around the circumference of the tube (this can be done by applying masking tape around the tube at each mark, drawing a line around the tube with a pencil, then removing the tape.)

36

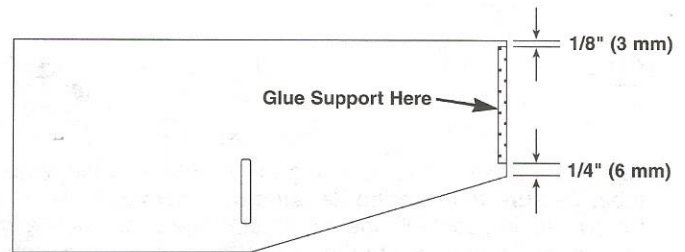


- Test fit and glue parts for the laser cannons together as shown in illustration 37. **NOTE:** To minimize the risk of damaging the laser cannons in flight, we recommend that you **do not glue** the barrel tube to the laser radiator so that the laser cannons can be removed and then re-installed for display. For reference, the laser probe should be rotated 90° to the wing.

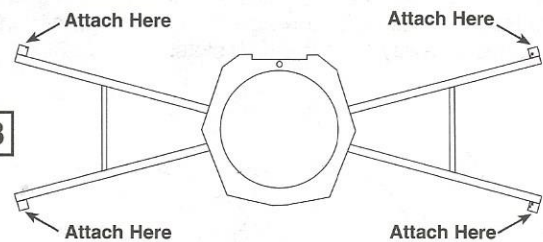
37



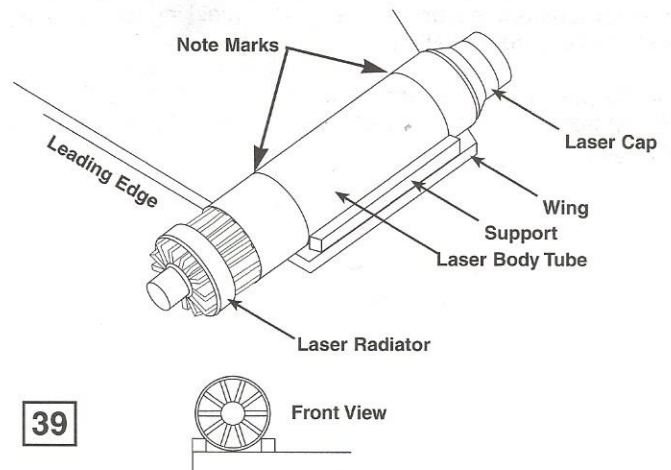
- Locate the 1/8" (3 mm) x 1/8" (3 mm) x 18" (45.7 cm) spruce stick and cut eight 2" (5.1 cm) long pieces to use as supports for the laser body tubes. Mark the top of the two upper wings and **bottom** of the two lower wings as illustrated. Using CA or epoxy, glue the outer supports in place.



38

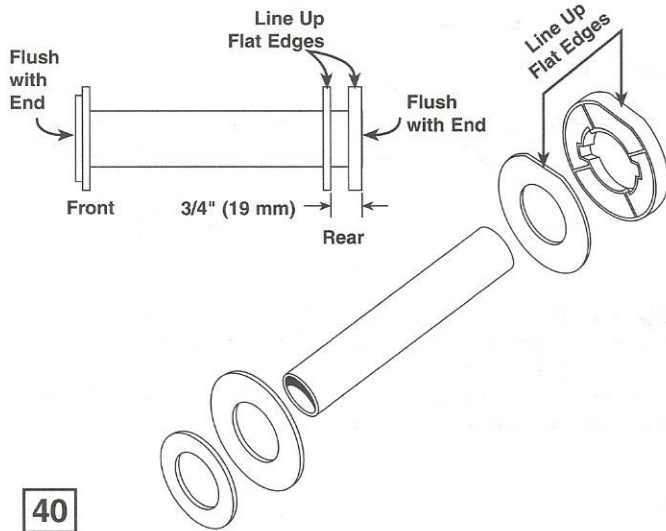


- Locate the marks on the laser body tube. Test fit the tube to the support/wing joint and align the support between the two marks. The laser radiator should point **forward**. Note the contact areas, remove the tube, apply CA or epoxy to the contact areas and re-position the tube. Set aside to dry. Repeat the process for the other three laser body tube assemblies. Let dry. Using CA or epoxy, glue the remaining spruce strips to the other side of the wing/laser body tube between the marks on the tube. Fillet all joints with epoxy or CA.



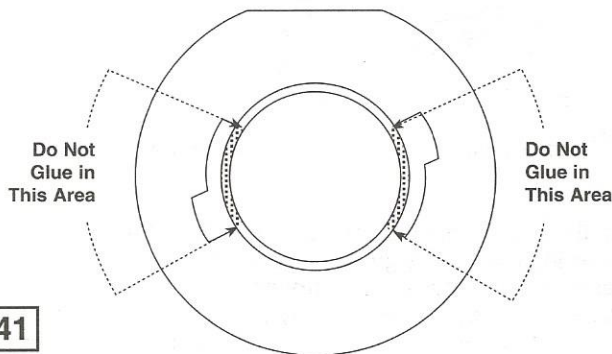
39

- Mark the motor tube 3/4" (19 mm) from one end. Locate the laser cut centering ring with the flat edge and epoxy it in place at mark. (This is now the rear of the tube). Let dry. Slide the large centering ring and then the small centering ring onto the front of the tube. Apply a liberal amount of CA or epoxy to the inside faces of both rings and press together. Then epoxy the rings to the motor tube, with the smaller ring flush to the forward edge. Let dry. Test fit into fuselage tube. Sand the rings for a smooth fit.



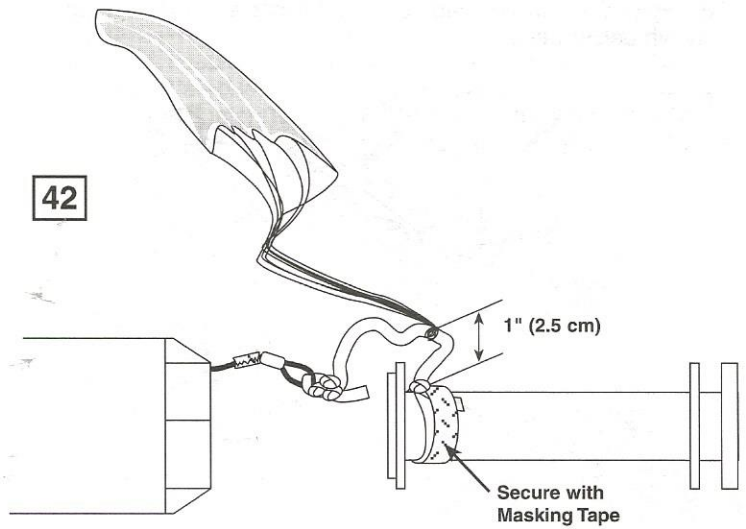
40

- Test fit the plastic motor lock ring to the aft end of the motor tube. **Be sure to align the flat side of the rings.** Note where the plastic ring contacts the motor tube. Remove, apply a small amount of CA or epoxy to the contact areas **ONLY** and replace the ring so that it is flush with the end of the tube. Immediately wipe any adhesive away from the lock slots.



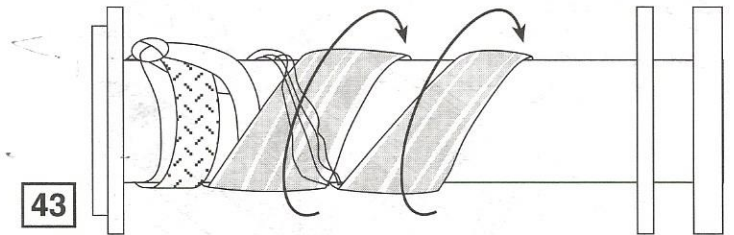
41

- Tie one end of the shock cord to the Gorilla™ cable loop with a triple knot. Tie the free end of the shock cord to the front end of the motor tube and secure with a band of masking tape to stop the shock cord from rotating.
- Loop the parachute lines around the shock cord about 1" (2.5 cm) from the end that is attached to the motor tube. Pull the lines tight.



42

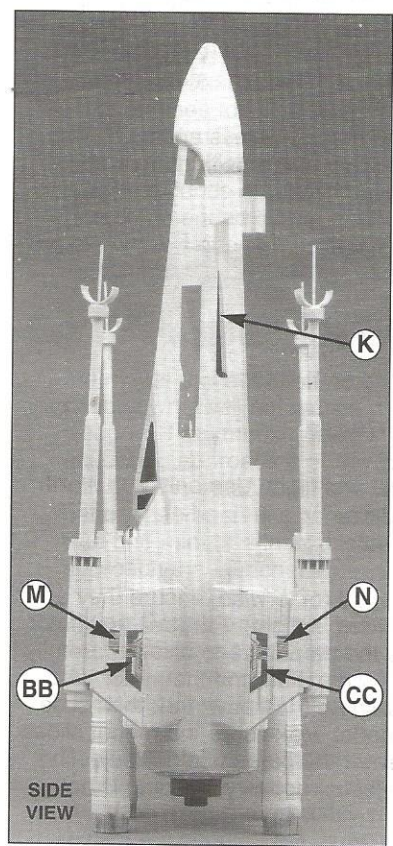
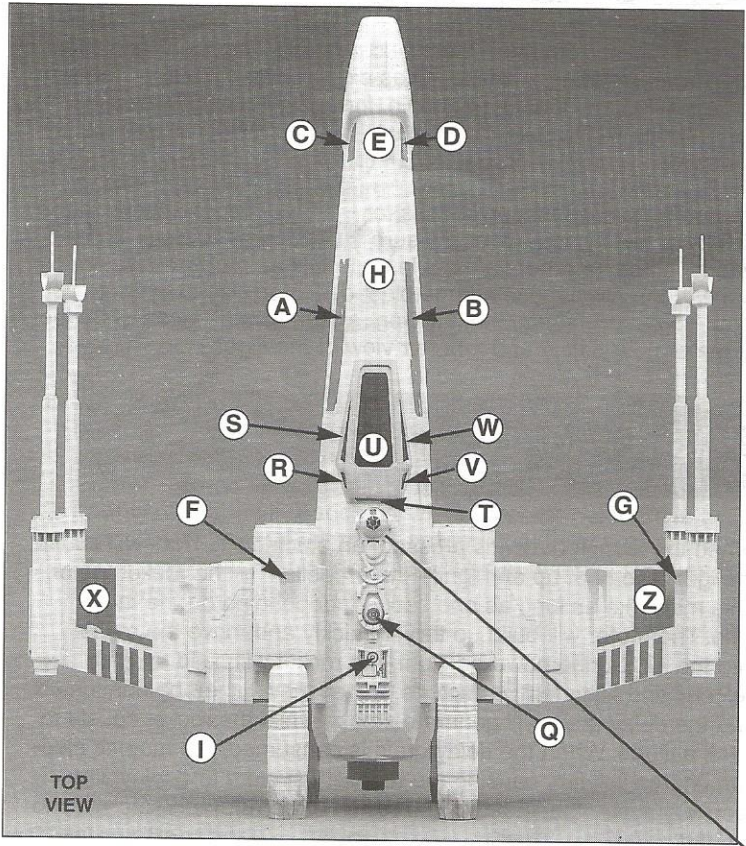
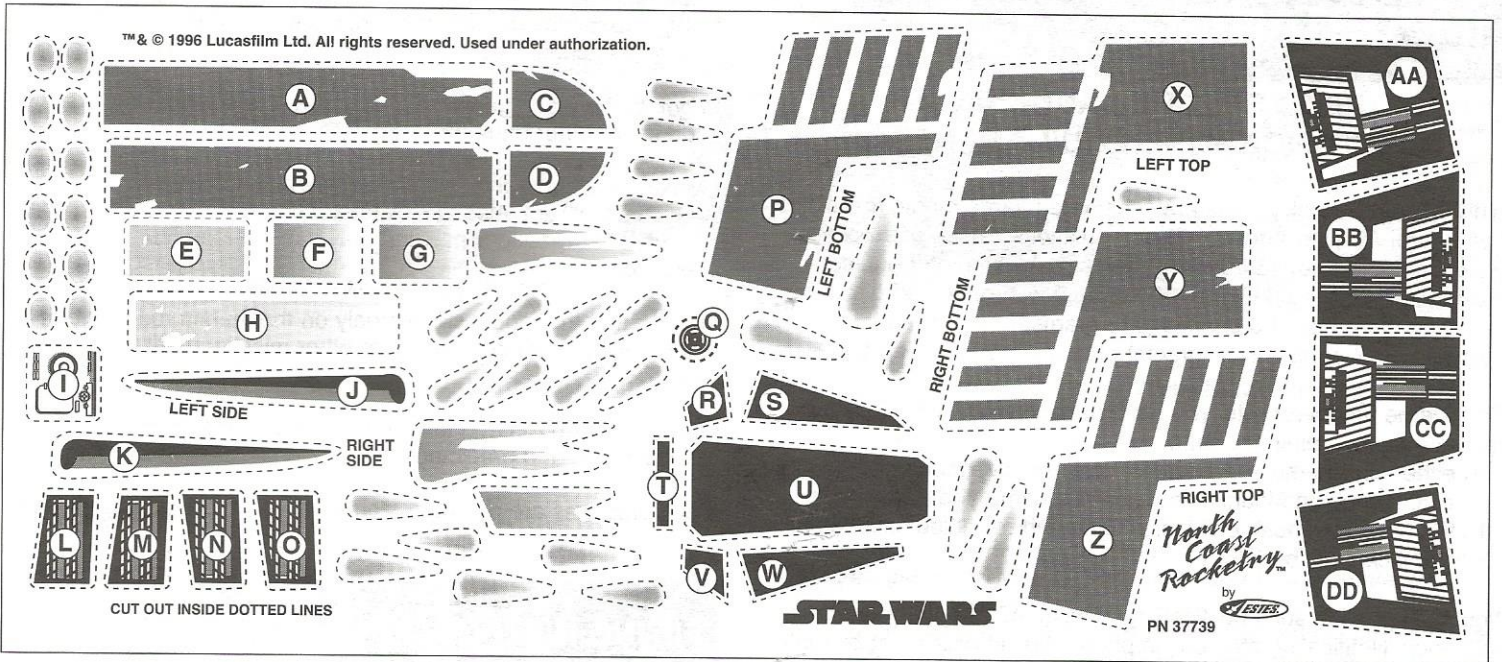
- Carefully wrap the parachute and shock cord around the motor tube and insert the unit into the aft end of the fuselage. Make sure the unit slides easily with no obstructions. If fit is too tight, repack and re-insert.



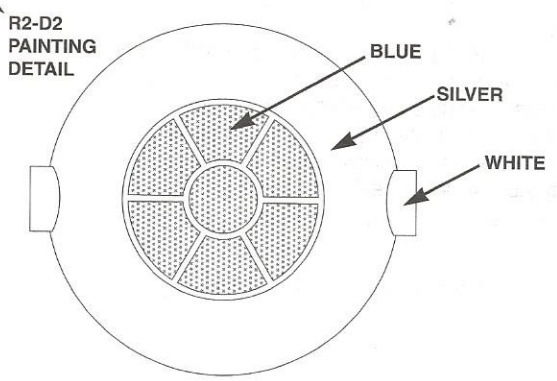
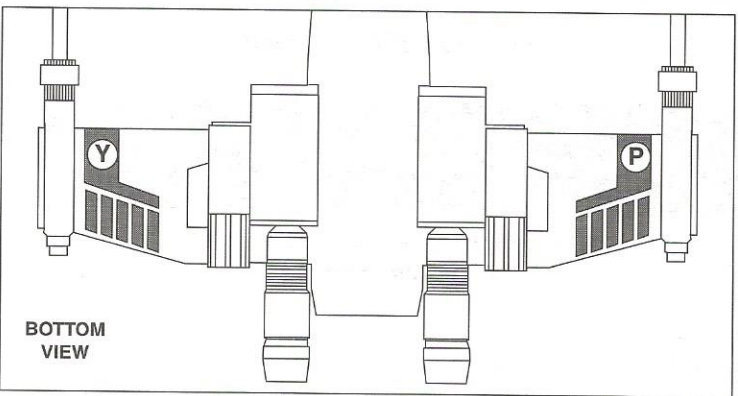
43

- Before painting, lightly wipe model with a damp cloth to remove any fingerprints and dust. Allow to dry completely overnight. For best results, prime the model with a gray primer. The uniform gray color will allow you to see minor imperfections that might otherwise go undetected. Carefully inspect puttied areas for pits and scratches. You may need to make small applications of putty to correct any problems. Continue until a smooth surface is achieved.
- Paint the X-wing with a base coat of gray primer and let dry completely. Next, paint the entire X-wing light gray. Let dry completely.
- Mask off and paint the canopy area dark gray. Let dry.
- Mask around the dome of R2-D2 and paint with bottle paints as indicated. Let dry completely.
- Carefully cut out each decal from the decal sheet. Leave as little extra material around the decals as possible. To apply, remove the backing paper, stick in place, and rub over the decal with your finger or a burnishing tool. Follow the illustration for correct placement. Spray the entire model with clear spray paint to protect the finish. Let dry.
- When the model is completely dry, twist the red motor retainer into place on the plastic motor lock ring.

DECAL PLACEMENT



For the lettered decals, carefully remove one decal at a time from the backing sheet and apply where shown on diagram. Place all other decals (battle scars) wherever you like!



IMPORTANT!

READ BEFORE LAUNCHING! NOTIFICATION REQUIREMENTS

North Coast Rocketry™ kits are considered "large model rockets" by Federal Aviation Agency (FAA) regulations. These are rockets weighing more than 16 ounces (453 grams) with motor but less than 52.9 ounces (3.3 lbs or 1500 grams) with motor, and/or requiring more than 4.0 ounces (113 grams) of propellant but no more than 4.4 ounces (125 grams) of propellant for operation.

To fly large model rockets, you must notify the Air Traffic Control facility over your airspace with:

- (a) either your name and address, or, in the event of a group or club launch, the launch coordinator's name and address;
- (b) the estimated number, size, weight, and expected altitudes of the rockets to be flown;

You must provide such notification between 48 and 24 hours prior to launch. Notification may be via phone, fax, in person, or by mail (if you can guarantee delivery within the required time period).

If your launch site is within five miles (8 km) of an airport, you must provide the same information to the airport manager.

Rockets weighing 16 ounces (453 grams) or less and using 4.0 ounces (113 grams) or less of propellant are exempt from the notification requirements.

PREPPING INSTRUCTIONS:

Suggested motors:

North Coast Rocketry™ F62-4, G70-5

An F62-4 is recommended for the first flight. Use only with North Coast Rocketry™ approved products.

Prep the X-wing fighter for flight:

Remove the laser cannons if desired (otherwise, ensure they are firmly in place, or you may lose them in flight). Remove the motor mount from the model and allow the parachute to billow. Carefully re-pack the parachute and gently wrap it around the motor tube. Lay the shock cord on top of the chute (do not wrap!), then slide the whole mount back into the model. Make sure the mount slides freely, with no obstruction to prevent the parachute from ejecting. Because the motor mount rear ejects, recovery wadding is not needed for this kit.

Motor Preparation:

Install the igniter into the motor per the manufacturer's instructions. Remove the motor retainer. Slide the motor into the motor tube until the exposed edge is snug against the motor tube. Twist the motor retainer in place. It is critical that the motor be firmly retained! If the motor is loose, it will blow out at ejection and the recovery system will not work properly.

Pre-Launch Checkout:

Before every flight, perform a complete preflight checkout of your model:

- Check to make sure that the wings are not damaged and are firmly attached.
- Look at the fuselage to make sure that there are no breaks, dents, or other damage.
- Make certain that the shock cord is firmly attached to the Gorilla™ mount. Also, check to see that there are no burns, frays, or damaged areas that may cause the shock cord to fail at ejection.
- Check that the model slides freely on the launch rod and that there is no binding, sticking, or other misalignment of the launch lugs.
- Check other parts and the overall rocket to insure that the flight will be safe and predictable.

If any problems are detected, correct them before attempting to fly.

FLYING INSTRUCTIONS:

Fly your rocket from the largest field possible on a clear and calm day. You should find a field that has dimensions at least 1.5 times the expected altitude. For example, for a flight of 1000 feet (305 meters), the field should be at least 1500 feet (457 meters) on each side.

Do not fly near trees, power lines, or tall buildings. Do not fly in the vicinity of low flying aircraft. Be sure that the area is clear of dry weeds, grass, or other flammable materials as rocket exhaust may ignite them. Always use a large blast deflector. Use at least a five foot (1.5 meter) launch rod. Fly from a minimum distance of 30 feet (9 meters) for safety and a better view of the flight.

FLIGHT PROFILE:

When the launch button is pressed, an electrical current will cause the igniter to heat up and ignite the propellant in the rocket motor. This may take as long as one second, depending on the motor type. The motor will build up thrust quickly and move the rocket into the air. During powered flight, the rocket will build up both velocity and altitude. The motor's propellant will then be consumed and the delay grain will generate smoke while the rocket coasts to peak altitude. When the delay grain is consumed, the motor's ejection charge will fire, causing the recovery system to deploy. The recovery system then allows the rocket to be returned safely to the ground.

Fly Safely and Have Fun!

IMPORTANT NOTE:

Always follow the NAR Safety Code and all local regulations and ordinances when flying rockets.

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National Association of Rocketry

MODEL ROCKETRY SAFETY CODE

Always follow this code when flying North Coast Rocketry™ products

1. **Construction**--My model rocket will be made of lightweight materials such as paper, wood, rubber, and plastic suitable for the power used and the performance of my model rocket. I will not use any metal for the nose cone, body, or fins of a model rocket.
2. **Engines**--I will use only commercially-made NAR certified model rocket engines in the manner recommended by the manufacturer. I will not alter the model rocket engine, its parts, or its ingredients in any way.
3. **Recovery**--I will always use a recovery system in my rocket that will return it safely to the ground so it may be flown again. I will use only flame-resistant recovery wadding if required.
4. **Weight Limits**--My model rocket will weigh no more than 1500 grams (53 oz.) at lift-off, and its rocket engines will produce no more than 320 Newton-seconds (4.45 Newtons equal 1.0 pound) of total impulse. My model rocket will weigh no more than the engine manufacturer's recommended maximum lift-off weight for the engines used, or I will use engines recommended by the manufacturer for my model rocket.
5. **Stability**--I will check the stability of my model rocket before its first flight, except when launching a model rocket of already proven stability.
6. **Payloads**--Except for insects, my model rocket will never carry live animals or a payload that is intended to be flammable, explosive, or harmful.
7. **Launch Area**--I will launch my model rockets outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass. My launch site will be at least as large as that recommended in the following table.

LAUNCH SITE DIMENSIONS

Installed Total Impulse (Newtons-Seconds)	Equivalent Engine Type	Minimum Site Dimension	
		(feet)	(meters)
0.00 -- 1.25	1/4A & 1/2A	50	15
1.26 -- 2.50	A	100	30
2.51 -- 5.00	B	200	60
5.01 -- 10.00	C	400	120
10.01 -- 20.00	D	500	150
20.01 -- 40.00	E	1000	300
40.01 -- 80.00	F	1000	300
80.01 --160.00	G	1000	300
160.01 --320.00	2G's	1500	450

8. **Launcher**--I will launch my model rocket from a stable launching device that provides rigid guidance until the model 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 I will cap the end of the launch rod when approaching it. I will cap or disassemble my launch rod when not in use and I will never store it in an upright position. My launcher will have a jet deflector device 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 rocket will be remotely controlled and electrically operated. It will contain a launching switch that will return to "off" when released. The system will contain a removable safety interlock in series with the launch switch. All persons will remain at least 15 feet (5 meters) from the model rocket when I am igniting model rocket engines totalling 30 Newton-seconds or less of total impulse and at least 30 feet (9 meters) from the model rocket when I am igniting model rocket engines totalling more than 30 Newton-seconds of total impulse. I will use only electrical igniters recommended by the engine manufacturer that will ignite model rocket engine(s) within one second of actuation of the launching switch.
10. **Launch Safety**--I will ensure that people in the launch area are aware of the pending model rocket launch and can see the model rocket's liftoff before I begin my audible five-second countdown. I will not launch a model rocket using it as a weapon. If my model rocket suffers a misfire, I will not allow anyone to approach it or the launcher until I have made certain that the safety interlock has been removed or that the battery has been disconnected from the ignition system. I will wait one minute after a misfire 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 (30 kilometers) an hour. I will not launch my model rocket so it flies into clouds, near aircraft in flight, or in a manner that is hazardous to people or property.
12. **Pre-Launch Test**--When conducting research activities with unproven model rocket designs or methods I will, when possible, determine the reliability of my model rocket by pre-launch tests. I will conduct the launching of an unproven design in complete isolation from persons not participating in the actual launching.
13. **Launch Angle**--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.

Note: "G" engines may be sold and used by adults (18 and over) only.

**North
Coast
Rocketry™**

By



**FULL ONE YEAR
WARRANTY**

Your North Coast Rocketry™ product is warranted against defects in materials or workmanship for one year from the date of the original purchase. Any North Coast Rocketry™ product, except computer software, which, because of a manufacturing mistake, malfunctions or proves to be defective within the one-year warranty period will be repaired or replaced, at the option of North Coast Rocketry™ and at no charge to you, provided it is returned to North Coast Rocketry™ with the proof of purchase.

This warranty does not cover incidental or consequential damage to persons or property caused by the use, abuse, misuse, failure to comply with operating instructions or improper storage of the warranted product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

For repair or replacement under this warranty, please return the defective part of your North Coast Rocketry™ product with proof of purchase to:

North Coast Rocketry™ by Estes®, Customer Service Department,
1295 H Street, Penrose, CO 81240