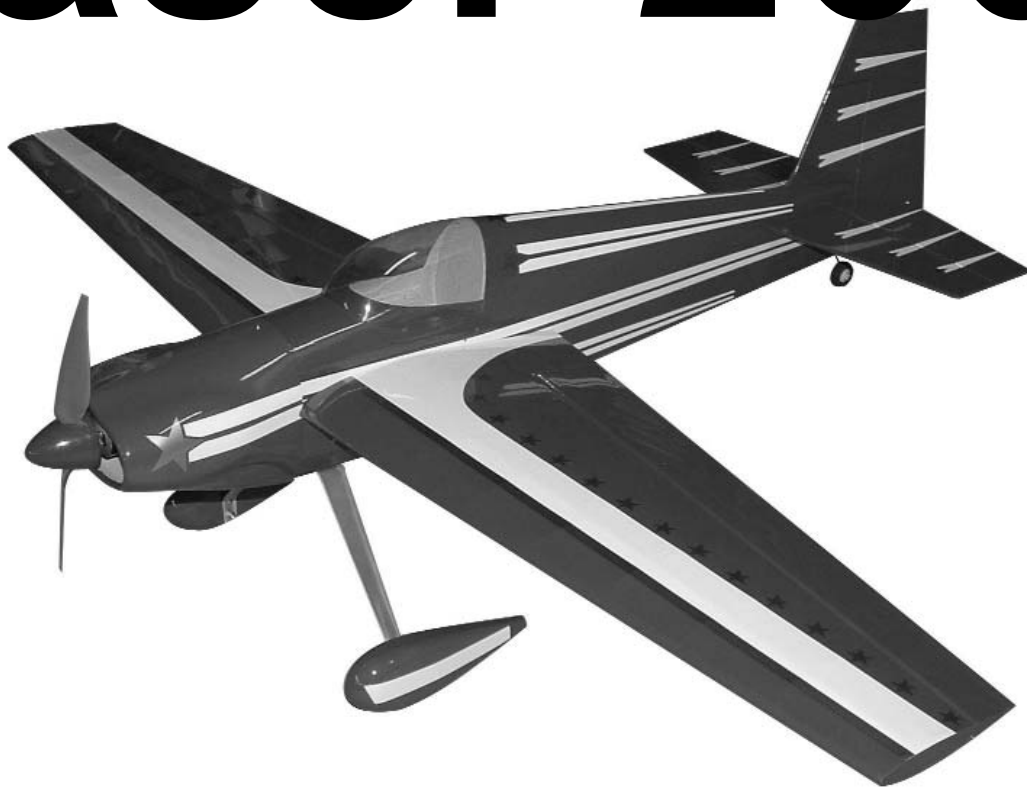


Laser 200



WARNING

A radio-controlled model is not a toy and is not intended for persons under 16 years old. Keep this kit out of the reach of younger children, as it contains parts that could be dangerous. A radio-controlled model is capable of causing serious bodily injury and property damage. It is the buyer's responsibility to assemble this aircraft correctly and to properly install the motor, radio, and all other equipment. Test and fly the finished model only in the presence and with the assistance of another experienced R/C flyer. The model must always be operated and flown using great care and common sense, as well as in accordance with the Safety Code of the Academy of Model Aeronautics (5151 Memorial Drive, Muncie, IN 47302, 1-800-435-9262). We suggest you join the AMA and become properly insured prior to flying this model. Also, consult with the AMA or your local hobby dealer to find an experienced instructor in your area. Per the Federal Communications Commission, you are required to use only those radio frequencies specified "for Model Aircraft."

LIMITED WARRANTY

Carl Goldberg Products, Ltd. has inspected and certified the components of this aircraft. The company urges the buyer to perform his own inspection, prior to assembly, and to immediately request a replacement of any parts he believes to be defective for their intended use. The company warrants replacement of any such components, provided the buyer requests such replacement within a period of 30 days from the date of purchase and provided the defective part is returned, if so requested by the company.

No other warranty, expressed or implied, is made by the company with respect to this kit. The buyer acknowledges and understands that it is his responsibility to carefully assemble the finished flying model airplane and to fly it safely. The buyer hereby assumes full responsibility for the risk and all liability for personal or property damage or injury arising out of the buyer's use of the components of this kit.

CARL GOLDBERG PRODUCTS, LTD.

USING THIS INSTRUCTION MANUAL

Before you begin assembling your **Laser 200 ARF**, take some time to read through this entire instruction book. It is designed to take you step-by-step through the process and to give you added information on motor and radio selection and set-up, balancing your aircraft, and flying your model. The time you spend will speed the assembly process and help you avoid problems.

PREPARING FOR ASSEMBLY

You will need a work area of approximately 24 x 48" which has been covered to protect it from adhesive, as well as cuts and other damage. Many people cover their work area with a sheet of dry wall (sheet rock) and/or waxed paper to prevent CA Glue and Epoxy from ruining the work surface.

CONSTRUCTION TIPS

IMPORTANT: ALWAYS READ A FEW STEPS AHEAD. This will alert you to coming instructions and will help you plan accordingly.

Using the Parts Identification section, familiarize yourself with the various items included in your kit box.

Do not hesitate to ask questions. Your local hobby dealer and area flyers will most likely be happy to help, as they want you to have a successful flying experience.

ADHESIVES & GLUING TECHNIQUES

CA adhesives are specially formulated to firmly glue the plywood, hardwood, and balsa used in your model and to withstand the vibration and stresses of high performance flight. However, there are times, such as when you are installing the stabilizer and fin on the fuselage and want more set-up time for careful alignment and positioning, then you should use epoxy. Occasionally, you also will want to use thin CA, which "wicks" into the surrounding areas. Aliphatic resin glue or similar water-based glues can also be used, but they will add to the assembly time because they dry so much more slowly than CA glue. Remember, when ever using any CA, you must be careful to read instructions thoroughly, as you will have only seconds for positioning of parts. Be sure to trial fit parts together before gluing. Also, never use watery THIN type CA glue for gluing plywood and hardwood parts. Thin CA's do not adequately bond these areas.

CAUTION

Some people may experience an allergic reaction when exposed to fumes from CA glue or epoxy. As with paints, thinners, and solvents, it is always important to use glues only where there is adequate ventilation to carry fumes away. A fan is recommended. Also, special care must be taken when using CA, as it will bond skin as well as other surfaces. Before using any CA, carefully read all label precautions. When using CA, protective eye-wear and care in keeping the glue away from the face is highly recommended. If CA does happen to get into the eye, hold lid open and flush with water only. Seek immediate medical attention.

COVERING

The **Laser 200 ARF** is covered in a polyester film chosen for its beauty, toughness, and ease of application and repair. It is not uncommon for ARF's to develop a few wrinkles in transit. If this is true of your model, the situation is easily corrected. Before you begin putting the pieces together, run around the edge of the seams first then over the surface of each section with an iron (either specially designed for airplane use or the more cumbersome household iron). Apply the heat (set at about 300° F), following along with a soft cloth and pressing down on the covering as you go around. This will more firmly set the covering adhesive into the wood and keep your aircraft covering tight and smooth in the future. Once you have ironed the seams stay away from them with the heat or the covering will slide when you try to shrink the middle. If this happens the wrinkles will not come out of the covering.

One of the great advantages of polyester film is that it can be applied over itself without causing gas bubbles. This allows you to repair your aircraft, as well as to customize it in a number of ways. If, due to a flight mishap, you get a hole or similar covering damage, simply trim away the ragged edges and then apply a patch, following the directions that come with your covering, which is available at your hobby dealer.

The Laser 200 covering can be closely matched using

Oracover Deep Red #871

Oracover White #870

Oracover Gold #879

Important Information:

This is a 3D airplane and you must use throttle control to avoid over speeding the plane and inducing flutter in the large control surfaces.

ITEMS NEEDED TO COMPLETE THIS AIRCRAFT

- 1 4 CHANNEL RADIO WITH 4 MICRO SERVO. (WE USED 4 CHANNEL **FUTABA** RADIO WITH S3110 SERVO AND **FUTABA** RECEIVER)
- 1 6" SERVO "Y" HARNESS
- 2 6" SERVO EXTENSIONS
- 1 ELECTRONIC SPEED CONTROL
- 1 (1500mah three cell Li-Po battery).
- 1 BRUSHLESS MOTOR (We used a Rimfire 35-30-950 and a AXI 2217-16 motor)
- 1 PROP ADAPTER
- 1 ELECTRIC PROPELLER (We used an 11-4.7 prop)
- 1 ULTRA SET CA ACCELERATOR
- 1 ULTRA SET 1 OZ. BOTTLE CA MEDIUM GLUE
- 1 ULTRA SET 1/2 OZ. BOTTLE CA THIN GLUE
- 1 ULTRA SET 5 MINUET EPOXY
- 1 1/4" FOAM RUBBER
- 1 SHEET METAL SCREWS FOR MOTOR(MIGHT BE REQUIRED FOR SOME MOTOR INSTALLATIONS)

TOOLS AND SUPPLIES FOR ASSEMBLY.

- MODELING OR UTILITY KNIFE
- WORK SURFACE (24" X48")
- SMALL STANDARD & PHILLIPS SCREW-DRIVERS
- MASKING TAPE
- NEEDLE NOSE PLIERS
- 24" RULER
- FLEXIBLE STRAIGHT-EDGE
- 30-60-90° x 6" TRIANGLE
- SOFT PENCIL
- A FEW STRAIGHT OR "T" PINS
- WIRE CUTTER (DYKES)
- OPTIONAL HEAT GUN/COVERING IRON
- ACID BRUSH
- 5 FT. LENGTH OF STRING

Caution:

Before starting, carefully go over all high stress areas (Wing bolt mounting blocks, Firewall,etc.) with an epoxy or wood glue to confirm all areas are well glued.
Warnings about Lithium

Polymer batteries

NEVER charge Lithium Polymer batteries with a charger designed for NiCd, NiMH, or any other type of battery chemistry. Use ONLY the chargers listed under REQUIRES or equivalent substitutes.

Do not allow Li-Po cells to overheat at any time. Cells which reach greater than 140° Fahrenheit (60C) will usually become damaged and could catch fire.

Do not charge or discharge Li-Po cells on or near combustible materials including paper, plastic, carpets, vinyl, leather, wood, inside an R/C model or full size automobile.

Do not expose Li-Po cells to water or moisture at any time.

Do not store batteries near an open flame or heater.

Do not assemble Li-Po cells or pre-assembled packs together with other Li-Po cells or packs.

Do not allow a Li-Po battery to be left unattended during charging or discharging.

Always store Li-Po batteries in a secure location away from children.

Always remove a Li-Po battery if model is involved in any kind of crash. Carefully inspect the battery and connectors for even the smallest damage.

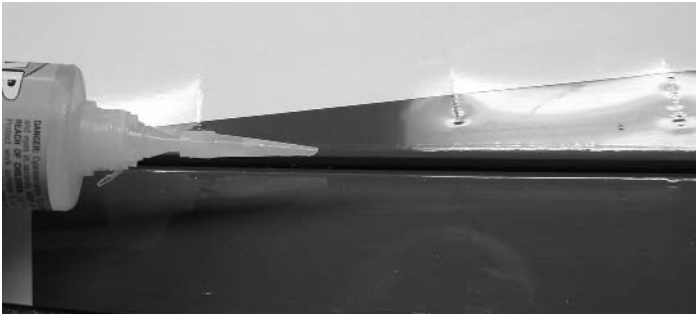
CAUTION, cells may be hot!

Do not allow the electrolyte to get into eyes or on skin. Wash affected areas immediately if they come into contact with electrolyte.

Installing Ailerons

1. Collect the following parts:

- (1) Wing
- (2) Ailerons (Left & Right)
- (6) Mini CA hinges

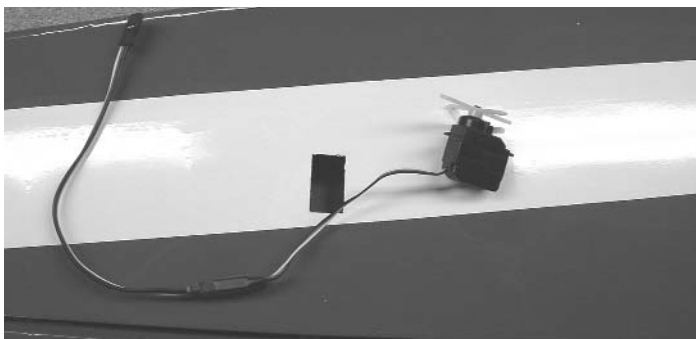


2. Locate the pre-cut aileron hinge slots in both sides of the wing. Using a hobby knife (#11 blade), slide the blade into each slot to make sure it is cleanly cut.
 - Repeat this process with the ailerons, making sure all hinge slots are clean.
3. Insert the mini CA hinges half way into the wing and the ailerons. (Use a pin inserted into the middle of the hinge to help keep the hinge in the middle.)
 - Make sure that the aileron is tight against the wing and even with the wing tip.
 - Using Ultra Set thin CA glue, place one drop on all hinges top and bottom.
 - Repeat for the second wing half.

Installing Aileron Servos

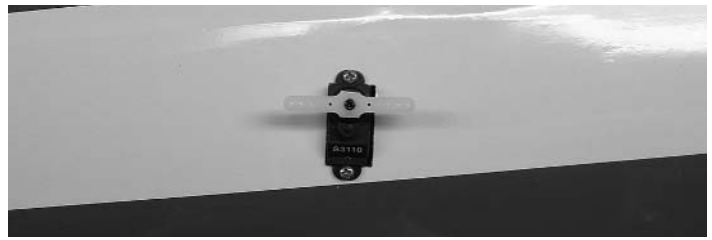
1. Gather the following items:

- (2) 6" Extension wires
- (2) Wing
- (2) Servos
- (1) Electrical tape



2. Plug one 6" extension wire into one servo.

IMPORTANT! To ensure that any connections located inside the wing will not come loose, either when the wires are pulled, or during flying, always tape them securely together with electrical tape.



3. Insert the servo wire plug into the servo hole in the bottom of the wing.

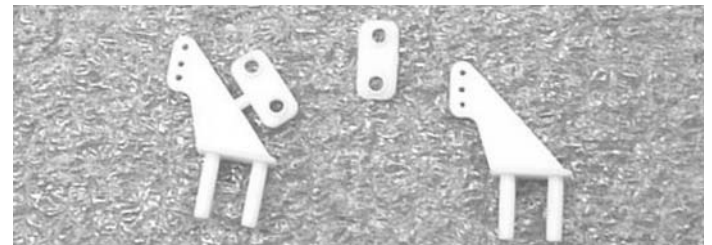


- thread the servo wire through the wing and out the center hole in the wing tube.
 - Mount the servo to the wing.
4. Repeat for the other wing half.

Aileron Control Horns

1. Gather the following items:

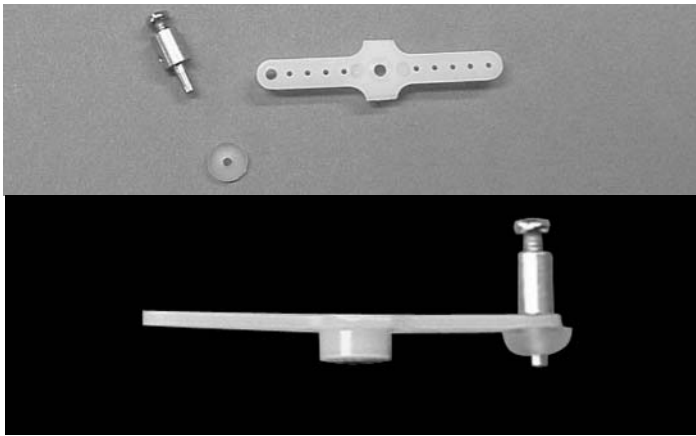
- (2) Small Control Horns
- (2) Wing
- (2) Short pushrods
- (2) EZ Connectors With Hardware
- (2) Swivel Keeper



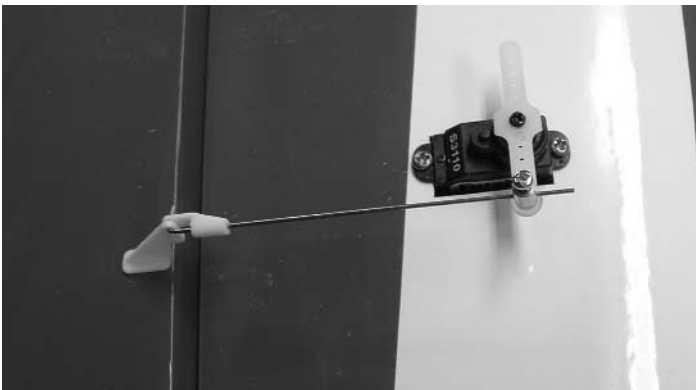
2. Cut the back plate off the side of the control horn.



3. Locate the pre-drilled control horn holes in the aileron.
 - Place glue on the control horn pins and insert them in the holes.
 - Install the back plate on the control horn pins on top of the aileron. Use glue to hold in place.



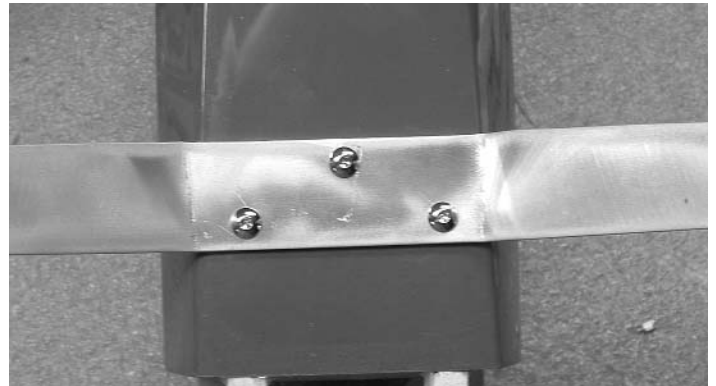
4. Mount the EZ connector hardware on the aileron servo arm.



5. Find the small aileron pushrod wire.
 Make a 90° bend (or a "z" bend, if preferred) 1/4" from the end of the wire
 Insert the wire into the control horn.
 Secure the wire with a nylon swivel keeper.
6. Insert the other end of the push rod through the EZ connector.
 Mount your servo arm on top of your servo.
7. Repeat for the other servo in the other wing.

Main Landing Gear

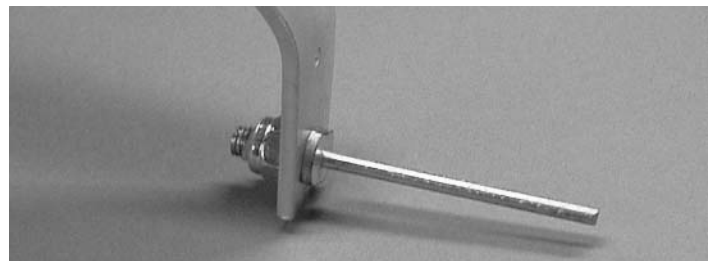
1. * COLLECT THE FOLLOWING PARTS:
 (1) Fuselage
 (1) Main Landing gear
 (3) 4-40 x 1/2 Button Head Bolts
 (2) 1/8" Axle with Locking nut



2. Mount the the main landing gear on to the bottom of the fuselage using the 4-40 x 1/2" bolts.

Note: The flat side of the landing gear goes to the front.

Caution: Use thread lock on the bolts



2. Install both axles on the landing gear.

Installing stabilizer

1. * COLLECT THE FOLLOWING PARTS:
 (1) Fuselage
 (1) Stabilizer
 (2) Elevator
 (1) Wire Elevator Joiner



2. Mount both wings to the fuselage by inserting the fiberglass rod into the fuselage and sliding both wings up tight to the fuselage.
 Bolt the wing to the fuselage.

Elevator Installation

- Collect the following parts:
 - (1) Fuselage With Stabilizer
 - (2) Elevator
 - (6) Mini CA Hinges



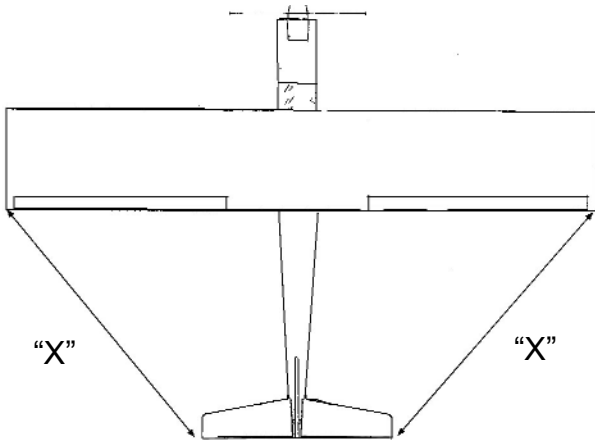
- Insert 3 hinges half way into the elevator.
 - Using a toothpick, insert a small drop of Ultra Set epoxy into the elevator joiner hole on the end of the elevator.
 - Place the the wire elevator joiner in the elevator.
 - Slide the elevator hinges into the stabilizer.
- Make sure the elevator is pushed up tight against the stabilizer and the end of the elevator is even with the end of the stabilizer.
 - Using Ultra Set thin CA, glue the elevator in place.



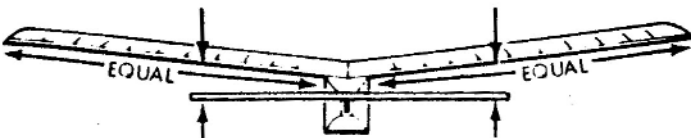
- Repeat steps 2 and 3 for the second half of the elevator.



- Place the the wire elevator joiner in the stabilizer slot and slide it towards the rear of the slot.
 - Slide the stabilizer into the slot.
 - Make sure the stabilizer is pushed up tight against the front of the slot.



- Measure from the end of the wing to the tip of the stab. This measurement should be the same for both sides.
 - Mark the stabilizer where it rest on the fuselage
 - Remove the covering where the stab will be glued to the fuselage.

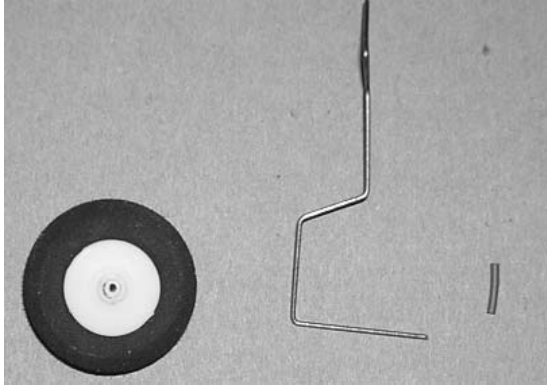


- Look down the length of the fuselage and check that the stabilizer is parallel to the wing. If it is not then shim the low side till they are parallel.
- When satisfied then glue the stabilizer in place using Ultra Set 5 minute epoxy. Make sure the stabilizer remains both perpendicular and parallel to the wing and fuselage while the epoxy dries.

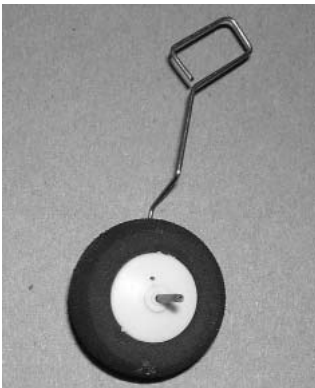
Fin & Rudder Installation

1. Collect the following parts:

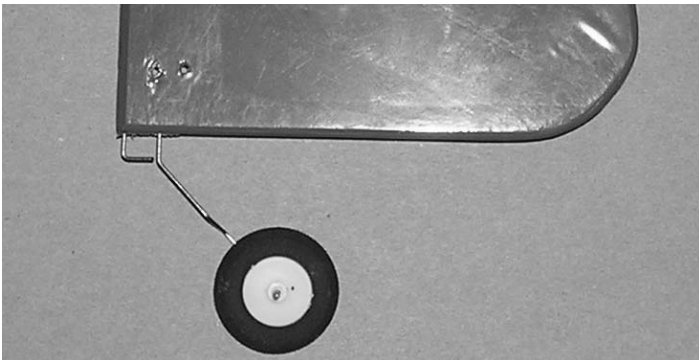
- (1) Fuselage With Stabilizer
- (2) Fin & Rudder
- (2) Mini CA Hinges
- (1) Nylon Control Horn
- (1) Long Pushrod Wire
- (1) Tail Wheel Wire



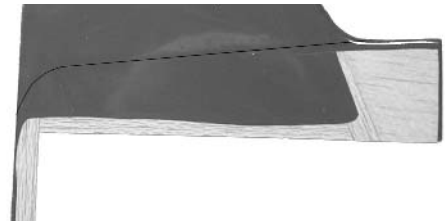
2. Find the tail wheel wire, wheel and the small plastic tubing keeper.



3. Place the wheel in the wire and insert the tubing on the end of the wire.



- Insert the tail wheel wire into the bottom of the rudder.
- Glue in place.



4. Slide the fin into the slot on the top of the fuselage.
- Mark the location of the fuselage on the fin.
 - Being very careful, remove the covering off the fin where the wood is only.



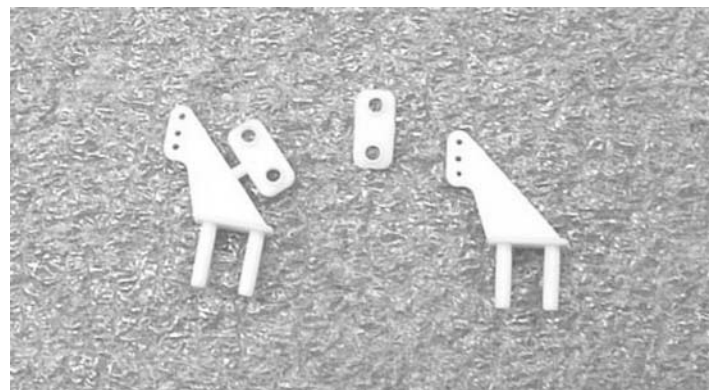
5. Glue the fin into the fuselage using Ultra Set epoxy.



6. Place 3 hinges in the rudder half way.
- Mount the rudder to the fin.

Pushrod Installation

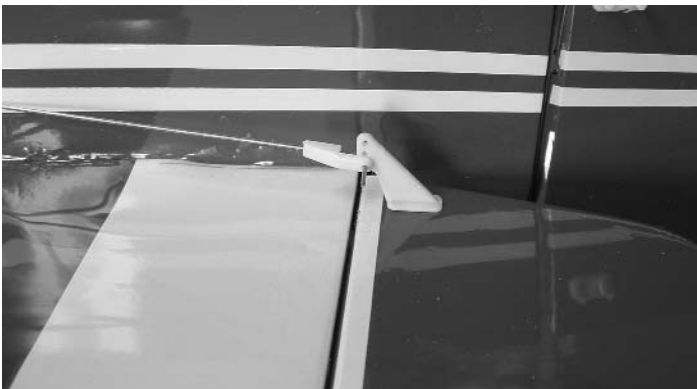
1. Collect the following parts:
- (2) Nylon Control Horn
 - (2) 20" Long Pushrod Wire



2. .Remove the back plate off the control horns.



3. With the fuselage upside down place a drop of glue on the control horn and insert the elevator control horn in the left side elevator holes.
- Insert the back plate onto the control horn pins sticking out the top of the elevator.
- Place a drop of glue on the pins to hold the back plate in place.



4. Insert the pushrod into the tube in the fuselage.
- Make a 1/4" bend at the end of the pushrod and place it in the control horn.
- Place a swivel keeper on the end of the pushrod.

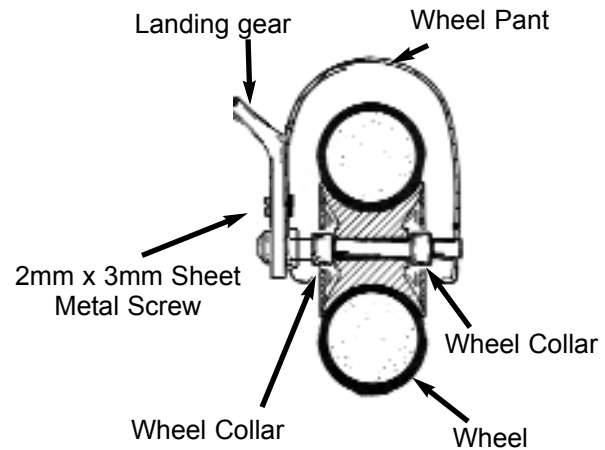


5. Repeat steps 2 through 4 for the rudder pushrod and control horn.

Wheel Pants

1. Collect the following parts:
 - (2) Wheel Pants
 - (4) Wheel Collars with set screws
 - (2) 2mm x 3mm Sheet Metal Screw
 - (2) Wheels

Cut-A-Way of wheel pants shown right side up



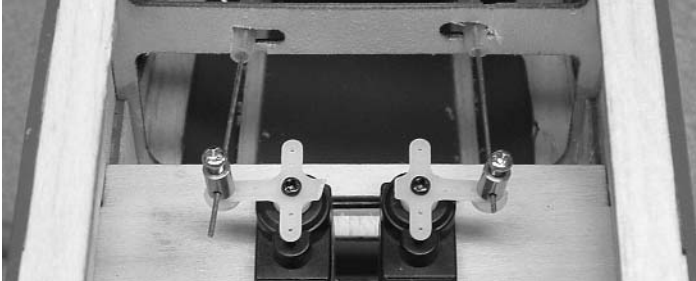
2. Install the wheel pants as shown above.



3. Install the tail wheel.

Radio Installation

- Collect the following parts:
 - (1) Fuselage
 - (2) Micro Servos with Hardware (Not Included)
 - (1) Micro Receiver (Not Included)
 - (1) Servo "Y" Harness (Not Included)
 - (2) Mini- Pushrod Connectors



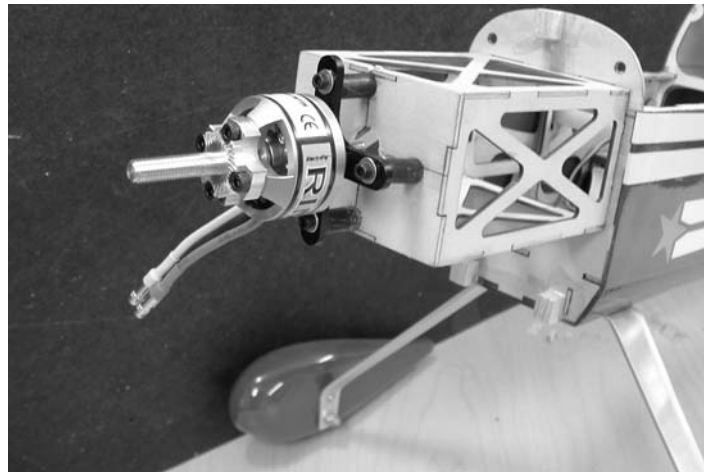
- Mount the elevator and rudder servo as shown above.
 - Attach the EZ connectors to the servo arms the same way you did the aileron servos.
 - Insert the pushrod wires through the EZ connectors and mount the two servo arms to the top of the servos.
 - Cut off the excess pushrod wire.
- Plug the elevator and rudder servos into your receiver.
 - Attach the "Y" harness to the receiver and plug in your aileron servos.
 - Plug in the speed control.
 - Cut foam and wrap around the receiver.
- Put the receiver wrapped in foam in front of the servos.

Installing Motor & ESC

- Collect the following parts:
 - (1) Fuselage
 - (1) Motor (Not Included)
 - (1) Electronic Speed Control (Not Included)
 - (1) Screw for motor installation (Not Included)

Note:

Read the instructions that come with your motor and speed control for proper wiring. Your Motor and Speed Control might be different than shown.



- Mount your motor using the center lines on the firewall. It may be necessary to space the motor out. We used 1/4" carbon fiber rods cut to the proper length.
- Put about 4 washers under the mount on the left side to provide 3 to 4 degrees of right thrust.

Caution:

Do not install the propeller at this time. Electric motors can start turning at any time during radio installation. This can cause damage to the plane or bodily harm.

Note:

We flew the 45" Laser 200 ARF with a Rimfire 35-30-950 and a AXI 2217-16 motor. These motors worked well and the vertical was unlimited. We used an 11-4.7 prop and 1500mah three cell Li-Po battery.

Caution:

Too much speed will cause flutter on the control surfaces which can cause structural failure in the airframe.

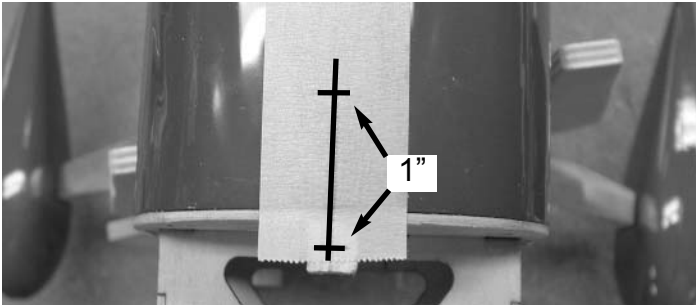
WE DO NOT WARRANTY FOR FLUTTER.



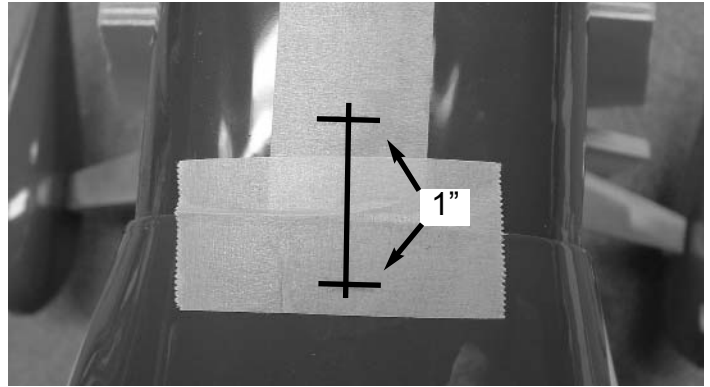
- The battery and speed control can be mounted in the nose of the plane.

Mounting Cowl

1. Collect the following parts:
 - (1) Fuselage
 - (1) Cowl
 - (3) #2 x 3/8 screws



2. Place masking tape over each of the cowl mounting blocks.
 - Make a mark in the middle of the mounting block.
 - Draw a 1" long straight line back from the block.
 - Make another mark at the 1." length.
3. Repeat this for the remaining blocks.



4. Slide the cowl over the motor and onto the fuselage.
 - Center the motor and tape the cowl in place.
 - Draw a 1" long straight line back down over the cowl and make a mark.
 - Drill a 1/16" hole and screw in place.
3. Repeat this for the remaining blocks.

Decal Locations

1. Using glass cleaner and a soft cloth, clean the model surface thoroughly before applying decal's.
 - Cut the decal sheets apart in sections, as needed.
 - Peel the backing off the decal and apply the decal to the location desired.

Control Set Up

Turn on your transmitter and plug in the receiver battery. Center all the control surfaces (rudder, elevator & aileron). If required by your speed control this is the time to program it for your use.

Control Travel

Aileron up / down 1/2"
Elevator up / down 3/4"
Rudder right / left 1"

You will want to adjust these throws to suit your flying abilities. The throws given are starting throws.

Balancing

Balance the Laser 200 at 2-5/8 back from the leading edge of the wing next to the fuselage.

Glow Engine Conversion

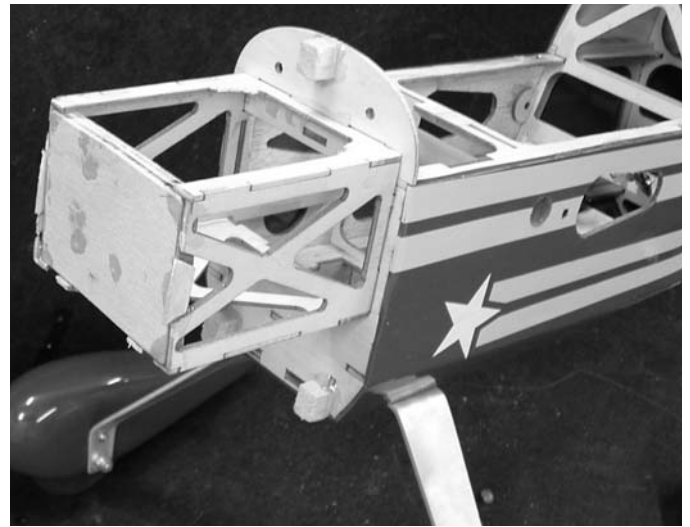
You may wish to convert the Laser to a glow engine. We recommend no larger than a .015 which will give very good performance. You will need to install a thicker firewall, up-grade the servos from micro to mini, and reinforce the motor box. None of the material need for the conversion is included in the kit.



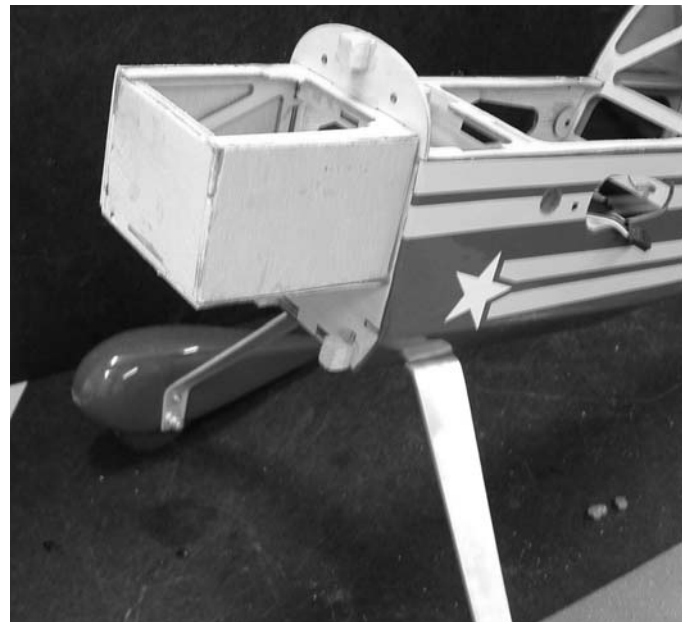
1. You will need a motor mount and mounting bolts for the your motor.



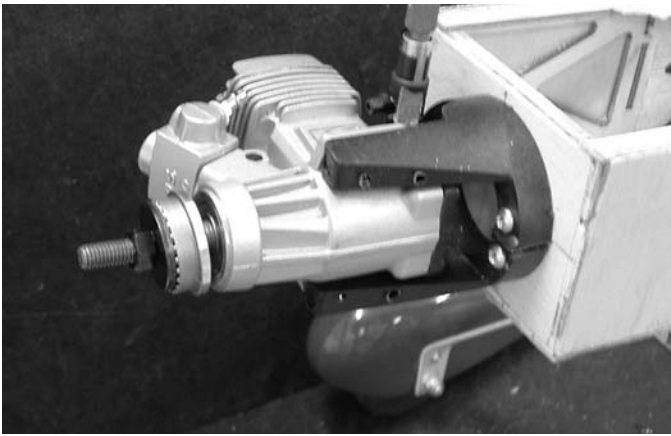
2. Mount you motor to the mounts and measure from the surface of the table to the front of the thrust washer (surface the prop will mount on).
3. Measure from firewall to the front of the cowl. This should be approximately 2-1/4". Using your measurement from the motor, adjust the length of the motor box. Our motor measured 3" from table to prop hub so we cut 5/8" off the motor box length (1/8" clearance from front of cowl).
- Cut the motor box off to the proper length cutting a 2 degree angle for right thrust. (approximately 1/16" shorter on the right side).



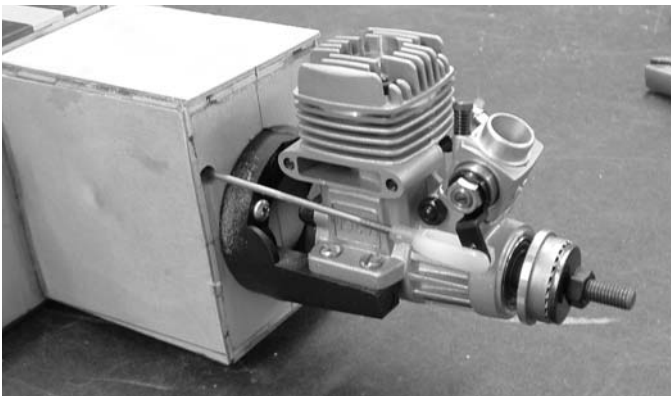
4. Epoxy the 1/4" firewall in place between the original motor box sides and bottom.
- The cross braces on the top of the motor box can be removed.



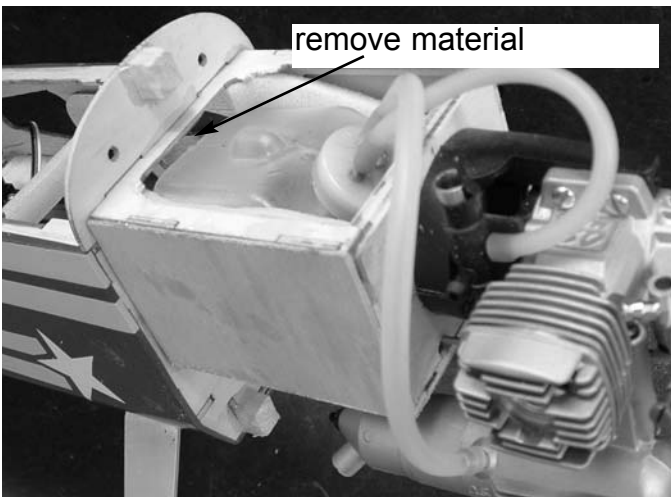
5. Sheet the bottom and both sides of the motor box with 1/16" plywood.



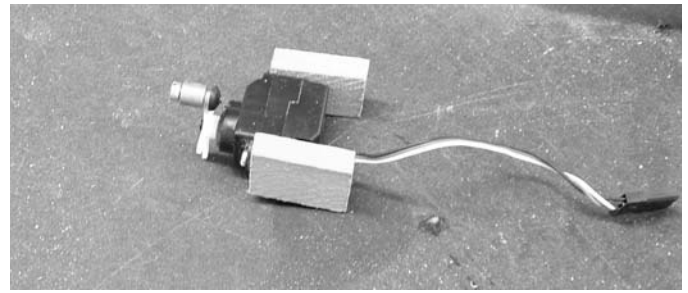
6. Mark the firewall center with vertical and horizontal lines. Offset the vertical line 1/8" to the left to compensate for the right thrust.



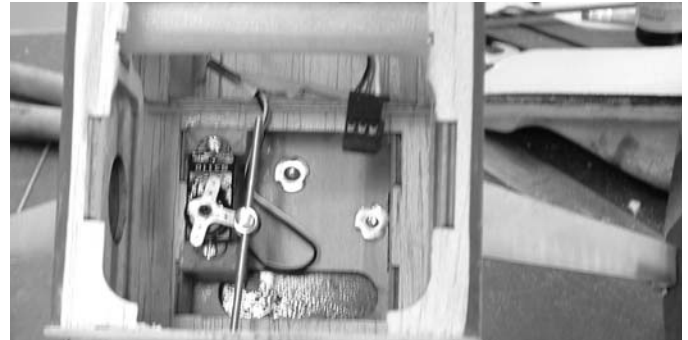
7. Drill a 3/16" hole in the firewall in line with your throttle output arm and flush with the bottom floor.
 Install a 2-56 pushrod with clevis to the motor.



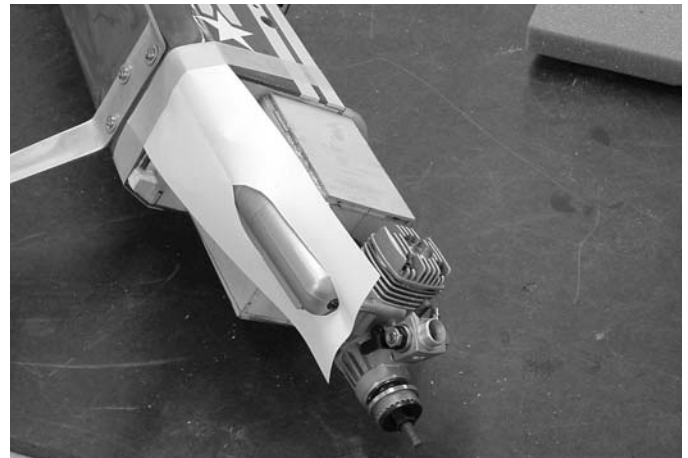
8. The fuel tank can now be fitted in the nose of the plane. Use foam rubber to hold in position. Some material on the F1 former will need to be removed on the bottom side of the bulkhead.



9. Cut two blocks of wood 1/4" thick by 3/4" x 1" and mount the throttle servo to them. Install an e-z connector on the output arm.



10. Glue the throttle servo in place and attach the throttle pushrod to the e-z connector.



11. Bolt the muffer in place and cut a scrap piece of paper to fit around it.
 Tape the paper to the bottom of the fuselage.



12. Fit the cowl in place and transfer the muffler location to the cowl.
- Make the cutout starting small and increasing till large enough.
- Use the same method to locate the needle valve and glow plug access hole.



13. The switch can be mounted in the fuselage on a plate or can be mounted in the turtle deck.
 - If necessary to achieve the proper balance the battery can be mounted on a shelf in the turtle deck.
14. Up grade the servos from micro to mini. It may be necessary to reinforce the mounts.



This completes the glow fuel conversions.

Balance the model in the same place as the electric. We used the same spinner as the electric version (Carl Goldberg 1-3/4") Props from 8-3 to 9-5 will work on the .15, just make sure you motor will turn the prop you choose at the proper RPM.

Important Information:

This is a 3D airplane and you must use throttle control to avoid over speeding the plane and inducing flutter in the large control surfaces.