

FIREBAT™

INSTRUCTION MANUAL



Wingspan: 31-1/4 in [794mm]
Wing Area: 343 sq in [22.1 dm²]
Weight: 24 oz. [680g]
Wing Loading: 10.1 oz./sq. ft. [30.8g dm²]
Fuselage Length: 31-3/4 in [800mm]
Motor: Speed 400, 7.2 volt

WARRANTY

Great Planes® Model Manufacturing Co. guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. **In no case shall Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.



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INTRODUCTION

Thank you for purchasing the Great Planes Firebat™ Electric ARF. The Firebat ARF is a lightweight, high performance *Park Flyer* that can be flown just about anywhere there is an open area clear of obstacles. Since the Firebat ARF is constructed mostly of molded plastic foam, it is durable and does not require the application of film coverings used on wood models. The performance of the Firebat ARF is very good with the included motor, but it can be improved dramatically with an optional high performance motor, battery, and electronic BEC speed control.

PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Although the Firebat ARF is a light-weight, electric-powered model, just the same as any R/C plane, it should

still be flown with care. Even while gliding with the motor off the Firebat ARF could possibly cause injury to yourself or spectators and damage property.

2. You must assemble the Firebat ARF **according to the instructions**. Modifications may reduce performance. In cases where the instructions differ from the photos, the written instructions are correct.

3. You must use an R/C radio system that is reliable and in good condition. You must properly install all components so that the model operates correctly on the ground and in the air.

4. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound.

We, as the kit manufacturer, provide you with a top quality kit and instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.

If you have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

In addition to joining an R/C club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the address or toll-free phone number below:

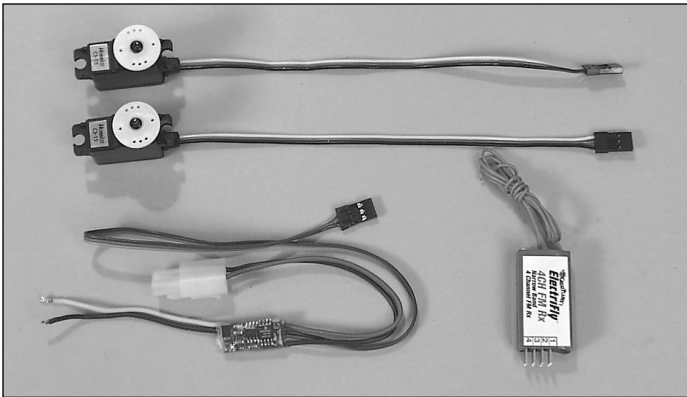


Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252
Tele. (800) 435-9262
Fax (765) 741-0057

Or via the Internet at: <http://www.modelaircraft.org>

ADDITIONAL ITEMS REQUIRED

Flight Equipment



The Firebat ARF requires a three-channel radio with two servos, a receiver and an electronic speed controller with BEC. A full-size receiver and standard servos can be used. You will also need a 10" [254mm] (or 12" [305mm]) servo extension wire.

Flight performance and maneuverability can be improved with dual aileron servos. You will need a mini servo for the canard (elevator) with at least 30 oz. in. of torque and two micro/mini servos for the ailerons with at least 15 oz. in. of torque. You will also need a mini or micro receiver, a speed controller and a 18" [457mm] (or 24" [610mm]) servo extension wire. This will require a four-channel radio system with mixing functions.

Servos:

(HCAM0110) CS-12, 35 oz in torque
(FUTM0033) S3101, 34.7 oz in torque
(HRCM3401) HS-81J, 36 oz in torque

For dual aileron servos:

(HCAM0100) CS-15, 15 oz in torque
(FUTM0041) S3106, 16.7 oz in torque
(HRCM0981) HS-55J, 15 oz in torque

Mini Receivers:

(GPML0040) 4-channel FM, high band
(GPML0041) 4-channel FM, low band
(FUTL0407) 4-channel AM, low band
(FUTL0408) 4-channel AM, high band
(HRCL1535) 4-channel FM

low band - channels 11-35
high band - channels 36-60

Receiver crystal:

(FUTL62**) for GPM low band
(FUTL63**) for GPM high band
(FUTL47**) for FUT low band
(FUTL48**) for FUT high band
(HRCL23**) for HRC

** desired channel

Speed Control:

(GPMM2010) C-10, 12 amp
(GPMM2020) C-20, 20 amp

Servo Extension Wire:

(1) 10" (or 12") extension wire with standard receiver
(1) 18" (or 24") extension wire with micro receiver

Additionally, an 8-cell (9.6 volt) 600 to 1200 mAh battery pack is required.

(GPMP0200) – 700 mAh NiCd
(GPMP0310) – 1100 mAh NiCd

Building Supplies

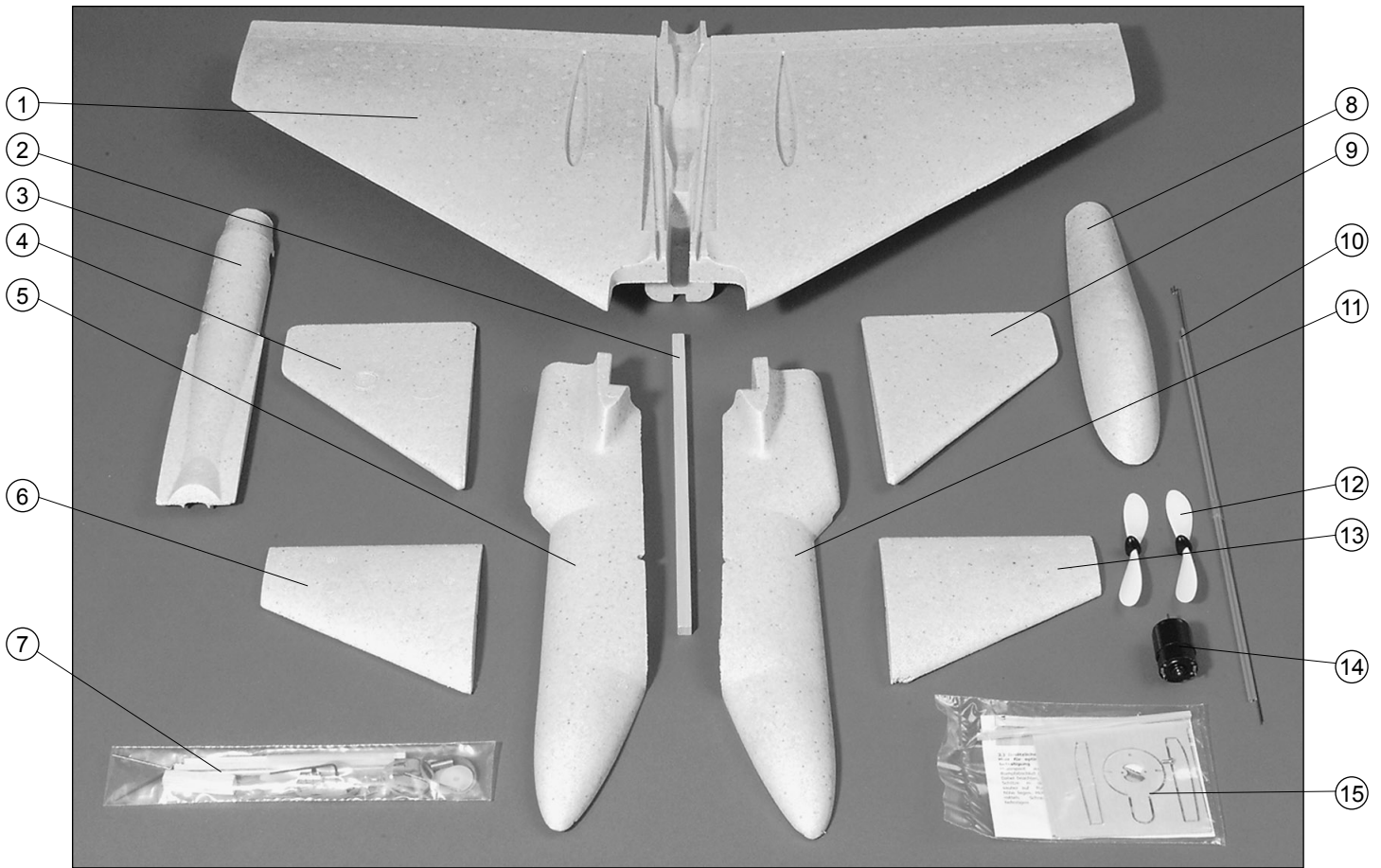
In addition to common household tools, here is the list of items used to build the Firebat ARF.

- 6-minute epoxy (GPMP6042)
- 1/2 oz. Thin CA+ (GPMP6001)
- Hobby knife (HCAR0105)
- #11 blades (HCAR0211)
- Drill and 1/16" drill bit
- Cellophane tape (for hinging ailerons)
- Double-sided foam tape (GPMQ4440) for mounting receiver and speed control
- Sandpaper and sanding block
- Small phillips screwdriver (#1)
- Flat blade screwdriver
- Small T-pins (HCAR5100) or craft pins

REPLACEMENT PARTS

If needed, replacement parts for your Firebat Electric ARF are available through your hobby supplier. See the photo and "**Parts List**" on page 4 for a reference of the parts listed below.

(GPMG0330) Motor
(GPMQ1700) Propellers
(GPMA2372) Canard Set
(GPMA2373) Canopy
(GPMA2374) Rear Hatch
(GPMA2375) Vertical Fin Set
(GPMA2376) Fuselage Set
(GPMA2377) Hardware Pack



PARTS LIST

Parts-Standard Version

Key #	Description	Qty
1	MAIN WING	1
2	BALSA KEEL	1
3	REAR HATCH.....	1
4	RIGHT VERTICAL FIN.....	1
5	RIGHT FUSELAGE.....	1
6	RIGHT CANARD.....	1
7	HARDWARE BAG.....	1
8	CANOPY.....	1
9	LEFT VERTICAL FIN.....	1
10	PUSHRODS.....	2

Key #	Description	Qty
11	LEFT FUSELAGE.....	1
12	PROPELLERS.....	2
13	LEFT CANARD.....	1
14	MOTOR.....	1
15	MOTOR MOUNT PARTS BAG	1

Parts-Deluxe Version (*not shown, includes all parts shown above plus the following items)

*	BATTERY	1
*	ELECTRONIC SPEED CONTROLLER (ESC)	1
*	3-4 HOUR WALL CHARGER	1

HARDWARE BAG CONTENTS

(3) 6" [152mm] HARDWOOD STICKS
 (1) 2" [50mm] BALSA BLOCK
 (1) 2" [50mm] NYLON BOLT
 (2) NYLON WASHERS
 (1) LONG NYLON CONTROL HORN
 (2) SHORT NYLON CONTROL HORNS
 (1) 5/8" [16mm] BRASS TUBE
 (1) 1-3/16" [30mm] BRASS TUBE
 (1) 6-1/4" [158mm] BRASS TUBE

(4) 2" [50mm] PUSHROD ENDS WITH Z-BENDS
 (1) METAL HOOK
 (1) 2 x 8mm SCREW
 (4) RUBBER BANDS
 (1) BAG (INCLUDES THE FOLLOWING)
 (3) WHEEL COLLARS
 (3) SET SCREWS
 (1) ALLEN WRENCH

Metric Conversions

1/64" = .4 mm	3/8" = 9.5 mm	12" = 304.8 mm
1/32" = .8 mm	1/2" = 12.7 mm	18" = 457.2 mm
1/16" = 1.6 mm	5/8" = 15.9 mm	21" = 533.4 mm
3/32" = 2.4 mm	3/4" = 19.0 mm	24" = 609.6 mm
1/8" = 3.2 mm	1" = 25.4 mm	30" = 762.0 mm
5/32" = 4.0 mm	2" = 50.8 mm	36" = 914.4 mm
3/16" = 4.8 mm	3" = 76.2 mm	
1/4" = 6.4 mm	6" = 152.4 mm	

IMPORTANT BUILDING NOTES

- Since the Firebat ARF is made mostly of foam, and since CA adhesives commonly used to build R/C model airplanes dissolve foam, CA should not be used when gluing foam parts. Therefore, 6-minute epoxy, which is compatible with foam, is used for most of the construction. Unless otherwise specified in the instructions, 6-minute epoxy is to be used for gluing all parts of the model together.
- For the strongest bond apply epoxy to **both** parts being joined.
- Before beginning construction, refer to the parts drawings and use a ballpoint pen to write the part number on all the wood parts.
- During shipping some minor “scuffing” of the foam parts may occur. This will not affect flight performance.

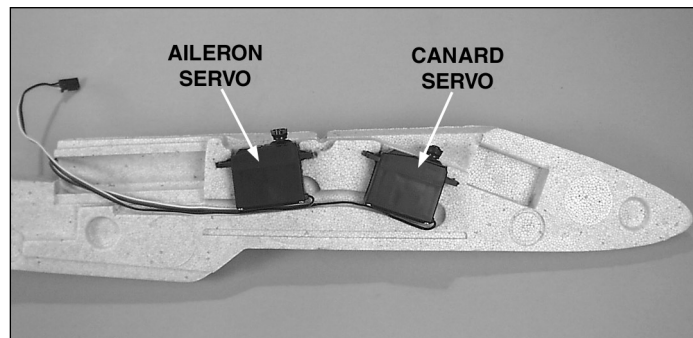
ASSEMBLY

Battery Charging

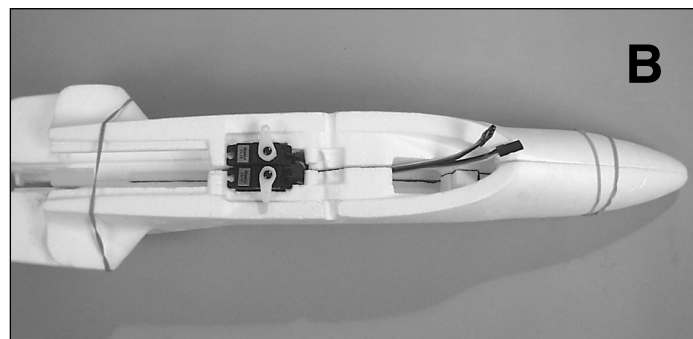
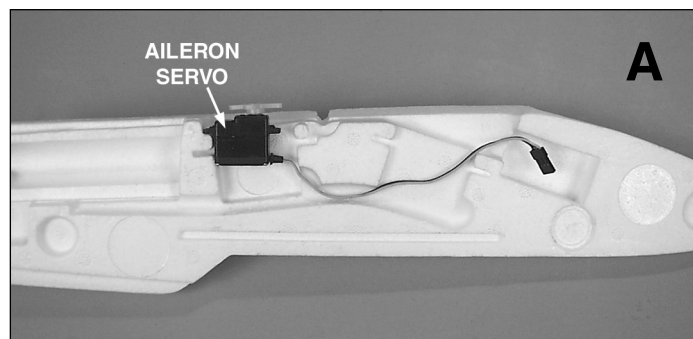
1. Now is a good time to charge the battery you will be using. The Firebat Electric ARF builds very quickly so you don't want do delay flying waiting for the battery to charge.
2. Make sure you have a fully run down battery before charging.
3. Plug the battery charger into a standard 110 volt AC wall outlet.
4. Connect the battery to the charger. Do not force the plug; make sure that the plug is properly aligned.
5. Charge battery for 3-4 hours. A normal battery pack will be warm when fully charged. **WARNING: DO NOT OVERCHARGE. IF THE BATTERY BECOMES HOT DURING CHARGING, DISCONNECT FROM THE CHARGER IMMEDIATELY AND ALLOW IT TO COOL BEFORE USE. FAILURE TO DO SO MAY CAUSE THE BATTERY TO LEAK OR EXPLODE, RESULTING IN POSSIBLE INJURY OR BODILY HARM.** Recharging a hot battery will also decrease performance and battery life.

Note: The charger has an output of 300 mA. To determine the charge time for other batteries, divide the battery capacity by the charger output to get the charge time (i.e., 1200 mAh divided by 300 mA = 4 hours). The Firebat Electric ARF is so much fun to fly you should also consider obtaining an additional battery or two and a field charger. Allow at least 20 minutes of cooling time for the motor and battery between flights.

Assemble the Fuselage

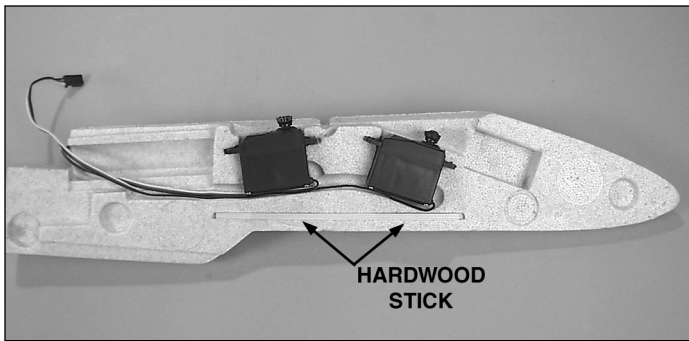


1. If you are using standard sized servos, position them in the two recesses in the left fuselage side as shown in the above photo. Be sure that the servo leads are in the pre-molded channels. The receiver will be installed behind the servos later.

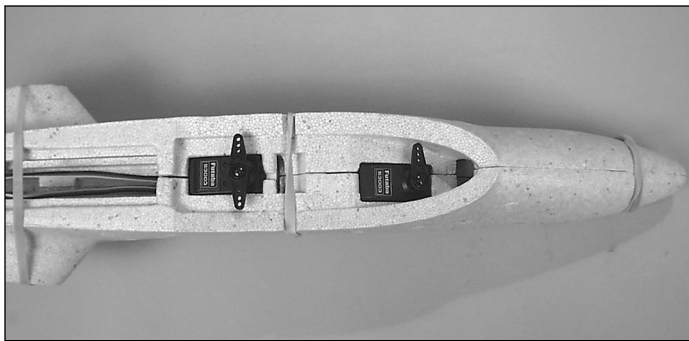


2. If you are using two mini or micro sized aileron servos and a mini/micro receiver, position one of the servos in the rear recess in the left fuselage side as shown in the above photo A. Mark the location of the servo on the fuselage with a fine-point felt-tip marker. Trim the fuselage side so the servo will be recessed flush with the inside edge of the fuselage side. Do the same for the right fuselage side. Be sure that the servo leads are in the pre-molded channels. Test fit the fuselage sides together to check the servo fit but do not glue the sides at this time. The mini/micro receiver will be installed in front of the servos later.

Note: When the sides are glued together the servos will be installed side by side.

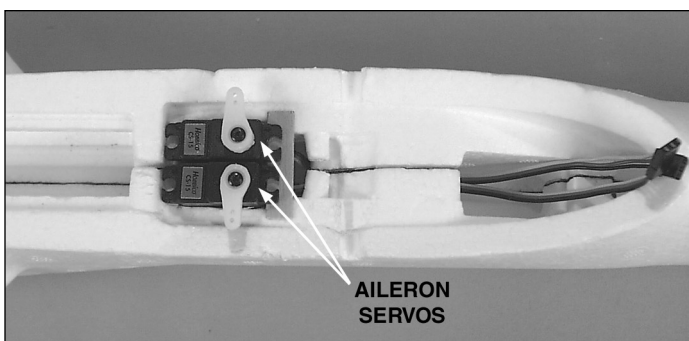


❑ 3. The 5/32" x 5/32" x 6" [4 x 4 x 152mm] hardwood stick will be glued into the molded channel below the servos in the next step.

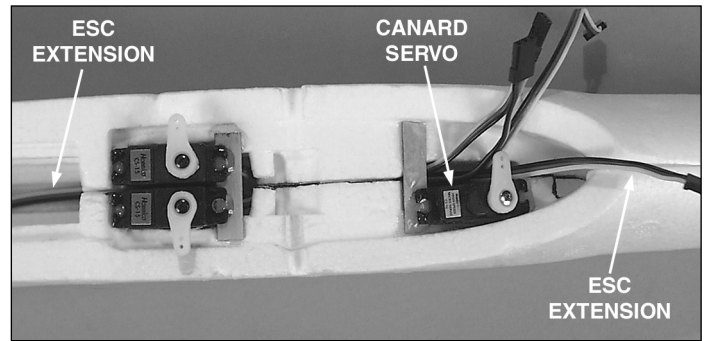


❑ 4. Glue the fuselage sides together with 6-minute epoxy. If you are using standard servos, be sure the servos are properly positioned in the recesses and the leads are in the channels. If you are using mini or micro servos, they will be installed later. Be sure the stick is in its channel. Use tape or rubber bands to hold the sides together until the epoxy cures.

Note: To save weight you do not need to apply epoxy to the entire mating surface. Make sure the edges and hardwood stick are securely glued. Do not use so much epoxy that it squeezes into the area of the servos and their leads.

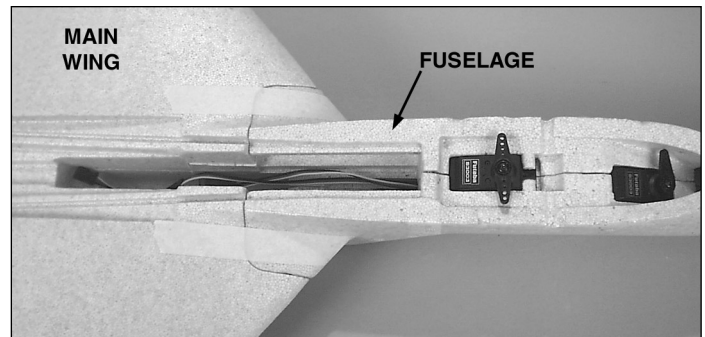


❑ 5. If you are using a single aileron servo, continue with **"Join the Wing and Fuselage."** If you are using two mini or micro servos for the ailerons, install them in the cutouts you made earlier, routing the leads in the channel below the servos. Cut a 1/4" x 1-1/2" [6.4 x 38mm] piece from some scrap 1/16" [1.6mm] ply (not included) and glue it to the fuselage at the front of the servos. The screws supplied with the servos or a dab of epoxy can be used to hold the servos in place. See page 9, step 12 for another photo. **Note:** If you want to hold the servos in place with screws, glue a piece of ply at the front and rear of the servos.

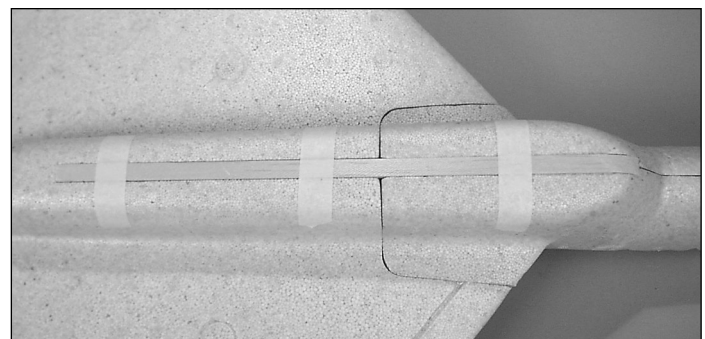


❑ 6. Install a servo lead extension that will connect the electronic speed control (ESC) to the receiver in the channel under the two aileron servos. This lead must be at least 18" long. Install the canard (elevator) servo in the cutout in front of the aileron servos. Use a piece of scrap ply at the front and rear of the servo.

Join the Wing & Fuselage

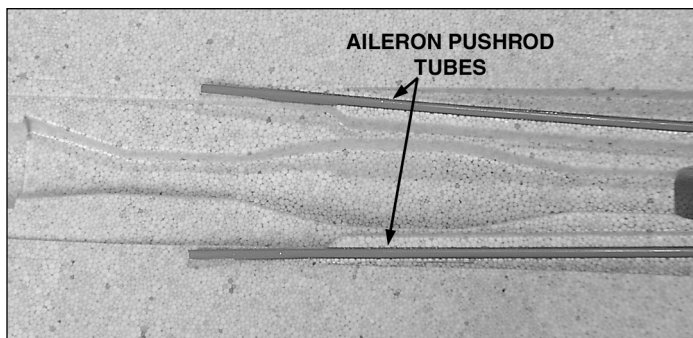
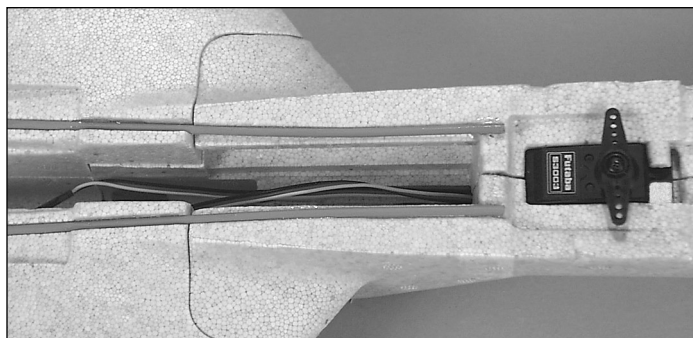


❑ 1. Use 6-minute epoxy to glue the fuselage and main wing together. Use tape to hold the parts together as the epoxy hardens, ensuring that gaps between the parts are kept to a minimum. Be careful not to get any epoxy in the servo plugs.



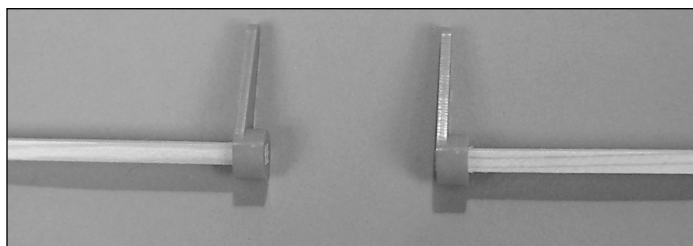
❑ 2. Check the fit of the 3/8" x 3/8" x 12-3/4" [9.5 x 9.5 x 324mm] balsa keel in its slot in the bottom of the fuselage. Round the front of the keel with sandpaper to match the contour of the fuselage. Glue the keel into position in the slot. Use tape to hold it in place until the epoxy cures.

Install the Ailerons

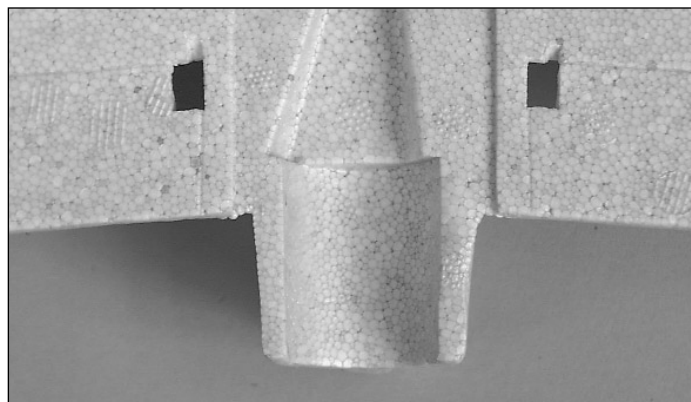


1. There are two molded slots in the fuselage for the aileron pushrod tubes. Lightly sand the tubes with medium grit sandpaper. Cut 1" [25.4mm] from the end of each tube. Save the cut off pieces for use later. Use epoxy to glue the tubes in the slots. Use tape to keep the tubes firmly seated in the slots until the epoxy hardens.

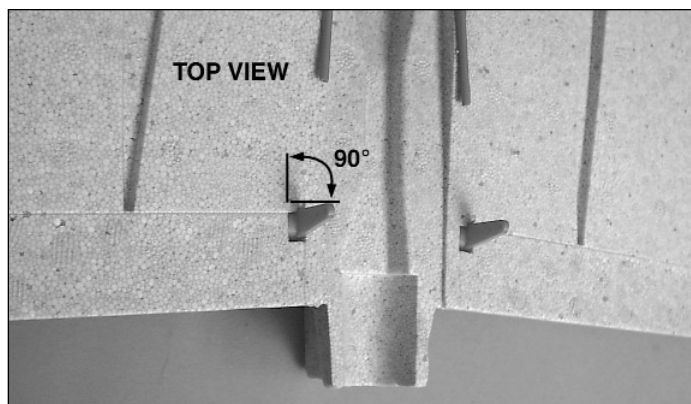
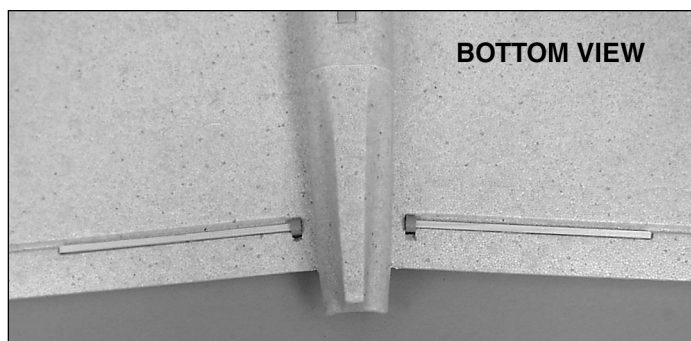
Note: To save weight, spot glue the tubes in the slots at five or six locations instead of filling the slots up completely with epoxy.



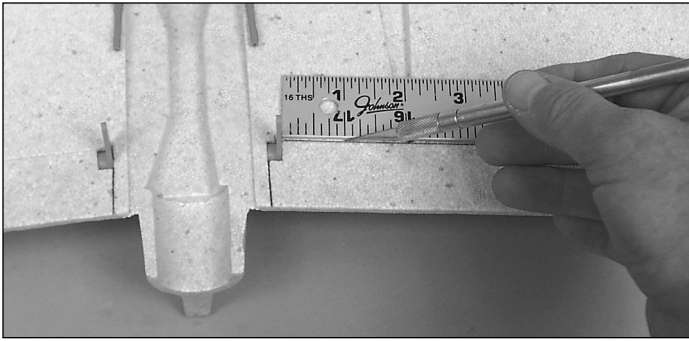
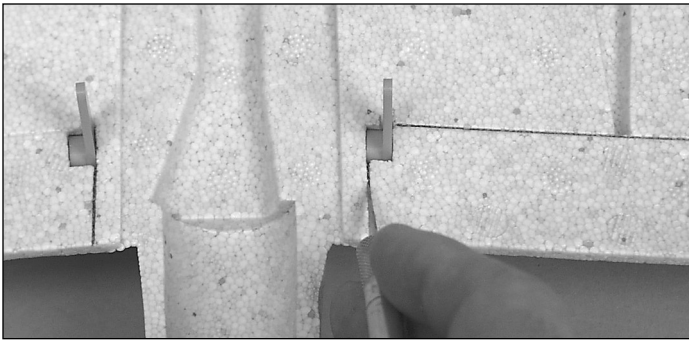
2. Make the aileron torque rods by pressing a nylon control horn on one end of each 5/32" x 5/32" x 6" [4 x 4 x 152mm] hardwood stick. If the control horns are loose, secure them with a drop of CA glue or some epoxy. Be sure to make a left and right torque rod as shown in the photo.



3. Make a hole in each aileron to allow the control horn to come through from below the aileron. The hardwood stick should seat squarely in the groove in the bottom of the aileron. Trim the hardwood stick to length if needed. The hardwood stick will seat better in the groove if the corner of the stick is rounded slightly with some sandpaper.



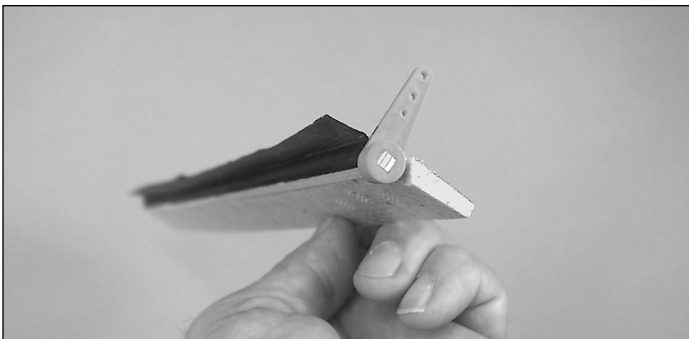
4. Glue the torque rods into place with 6-minute epoxy. Make sure the control horns are vertical as shown in the photo. Do not use a lot of epoxy and fill the groove. Use only enough to hold the torque rods in place.



❑ 5. Cut the ailerons from the wing along the molded in cut lines using a hobby knife with a fresh sharp blade. Using several strokes instead of one deep cut will make a cleaner cut. After they are cut apart, use some fine grit sandpaper to smooth the back of the wing and the front of each aileron.

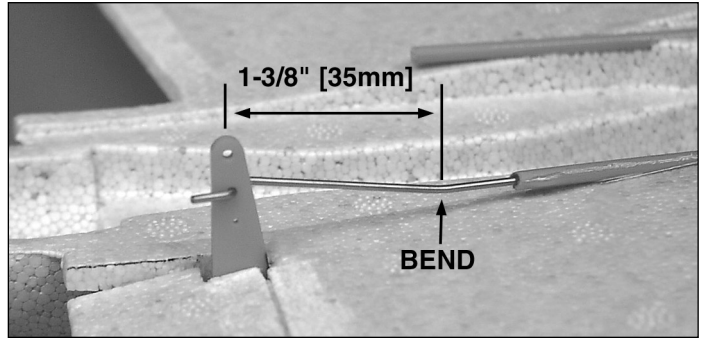
Note: The tips of the ailerons are easily damaged, so be careful when cutting the ailerons from the wing. If you damage the tips, or if the tips were damaged in shipping, you can round or taper the tips at an angle. If you taper one wing tip, make sure you taper the other the same way. This will not affect the flying qualities of the model. If a large section is broken, glue it together with some epoxy.

❑ 6. Enlarge the holes in both aileron control horns with a 1/16" [1.6mm] drill bit. Test fit the end of the aileron pushrod in each hole and enlarge the hole if needed. Use the Z-bend end of the pushrod. As long as you have the drill out, do the same for the elevator control horn as well.

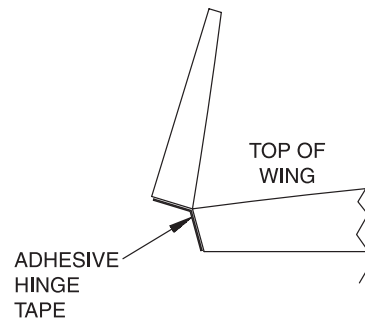


❑ 7. Cut a length of cellophane adhesive hinge tape the length of the aileron. Stick the tape to the right aileron along the leading edge so that it is even with the bottom of the aileron. Press the tape down firmly into place. Fold the tape back over itself so that it will be easier to place it on the wing. The tape in the above photo has been darkened so that it can

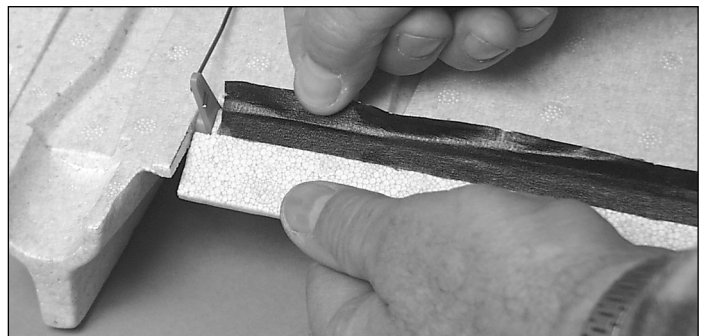
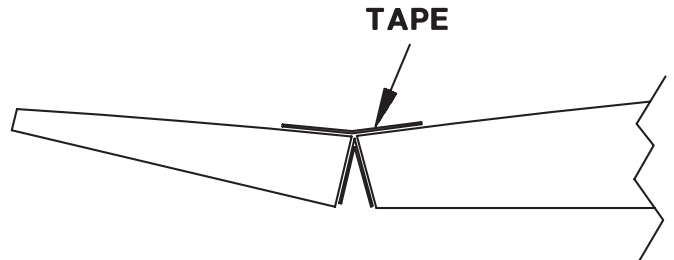
be easily seen. **Note:** The aileron will be attached to the wing in step 9.



❑ 8. Put a small bend 1-3/8" [35mm] from the end of a long aileron pushrod, on the end with the Z-bend. If the Z-bend does not have clean 90° bends, use a needle nose pliers to adjust the bends. Connect the Z-bend end of the pushrod to the top hole (middle hole if using two aileron servos), of the control horn and then insert the pushrod into the pushrod tube in the wing. **Note:** We are using two servos so, connect the Z-bend to the middle hole.



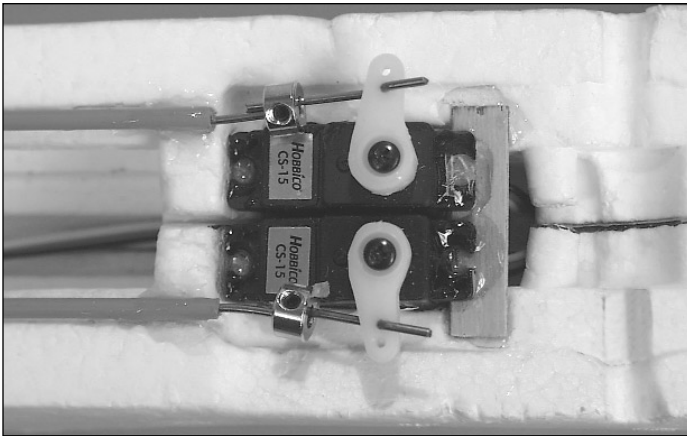
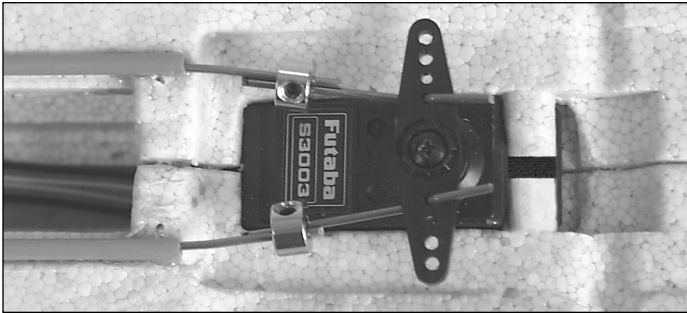
❑ 9. Position the aileron onto the wing. You will not be able to hold it in position for the entire length, so hold one section at a time. Press the tape firmly into place on the wing.



❑ 10. Cut another length of adhesive hinge tape the length of the aileron. Stick the tape to the top of the right

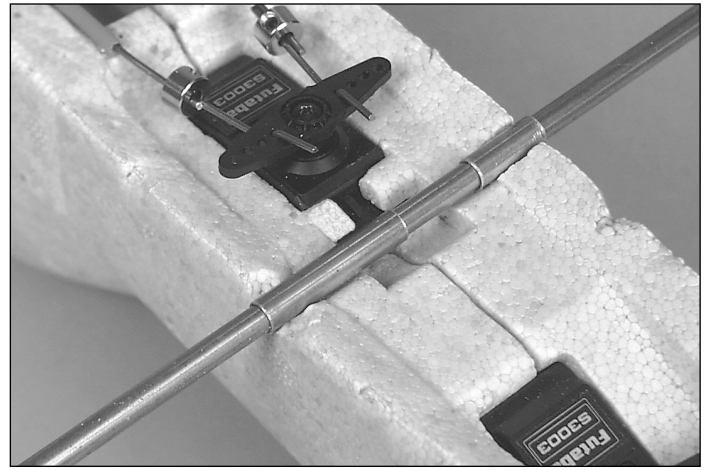
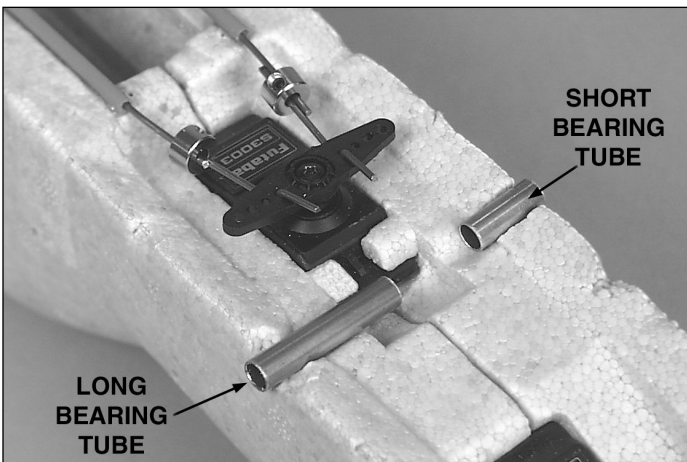
aileron, but not onto the top of the wing. Deflect the aileron down while holding it in position against the wing. One section at a time, press the tape onto the top of the wing.

□ 11. Return to step 7 and install the left aileron using the same procedure.



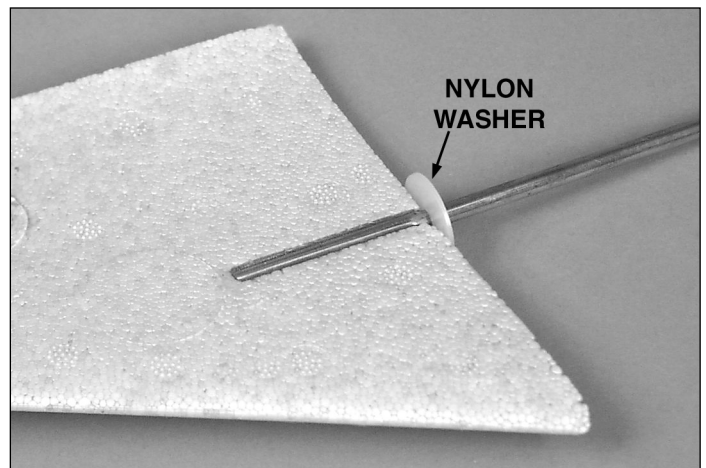
□ 12. To complete the aileron linkage installation, insert the Z-bend end of two short pushrod ends into the servo arm, from below the arm. For now, insert the ends in the inner most hole of the servo arm. Center the servo arm and secure the servo arm to the servo with its screw. Using two wheel collars and set screws join the short pushrod ends to the aileron pushrods. Center the servo arm as shown and hold each aileron centered as each set screw is tightened. **Note:** The bottom photo shows the installation of two mini-servos.

Assemble the Canards



□ 1. Glue the brass bearing tubes in place with 6-minute epoxy. The longer bearing tube is glued to the right side of the fuselage. The tubes should project about 1/32" [1 mm] past the sides of the fuselage. Use the long canard joiner tube to align the bearing tubes as the epoxy hardens. Be very careful not to get any epoxy on the joiner tube. **Hint:** Use a little vaseline on the tube.

Note: The bearing tubes must be glued firmly into place, as they will be subjected to high loads in flight.



□ 2. Glue the long brass canard joiner tube into the slot in the bottom of the left canard with 6-minute epoxy. After the epoxy hardens, slide a nylon washer onto the brass tube against the canard. Make sure the brass joiner tube is fully sealed in the slot in the canard.

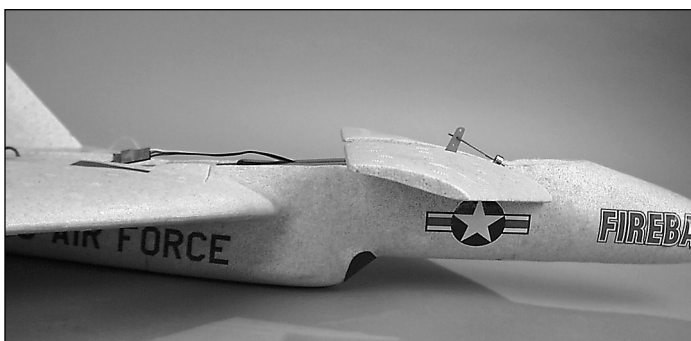
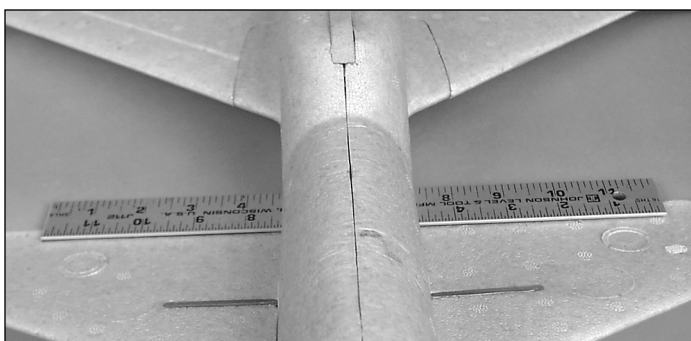


□ 3. Slide the long joiner tube through the short bearing tube on the left side of the fuselage. Install the 2 x 8mm screw

onto the elevator horn. Slide the canard (elevator) horn onto the joiner tube, oriented as shown in the photo. Continue to slide the joiner tube through the second bearing tube.



4. Slide the other nylon washer onto the joiner tube. When the right canard is glued into place, it will be aligned as shown in this photo and as shown in the photo for step 5 below. The rear edges of the canards should be in line with each other.

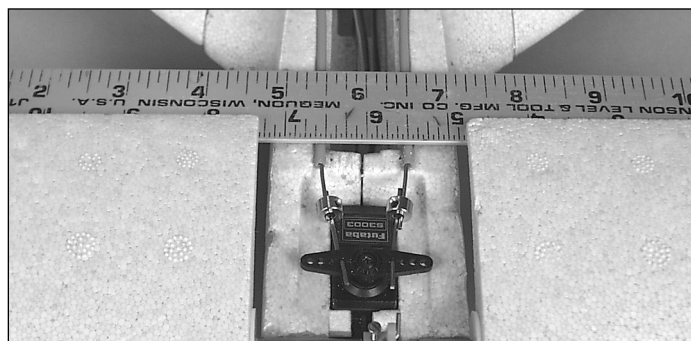


5. Glue the right canard to the joiner tube with 6-minute epoxy, making sure the nylon washer is still in place. Be careful not to get any epoxy into the bearing tube. A drop of light machine oil in the bearing tube will help prevent epoxy from entering the tube. Use a straightedge to keep both canards aligned as shown in the above two photos.

Note: For optimal flight performance it is very important that both canards be accurately aligned and move freely in the bearings.

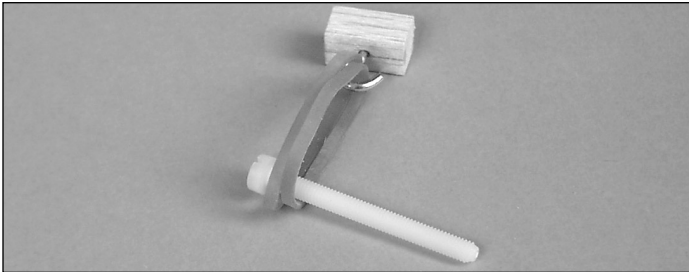


6. Connect one of the short pushrod wires with a Z-bend to the elevator horn in the second hole from the center. Connect another short pushrod wire to the servo arm, also in the second hole from the center. Insert the wire in the servo arm from below as shown in the photo. Use a wheel collar and set screw to join the two wires.

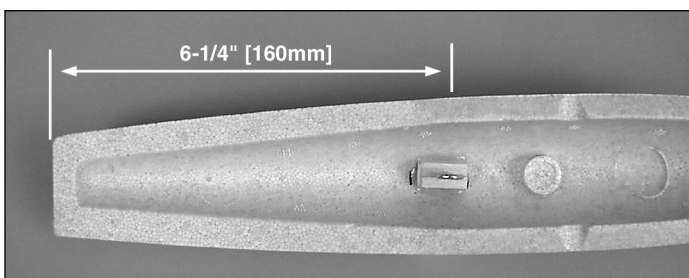


7. The canards are neutral when their trailing edges are 1mm above the canopy line. Use a straightedge to hold them in this position. With the servo arm centered and perpendicular to the servo and the control horn perpendicular to the pushrod, tighten the set screw in the wheel collar. Also tighten the screw in the control horn onto the joiner tube.

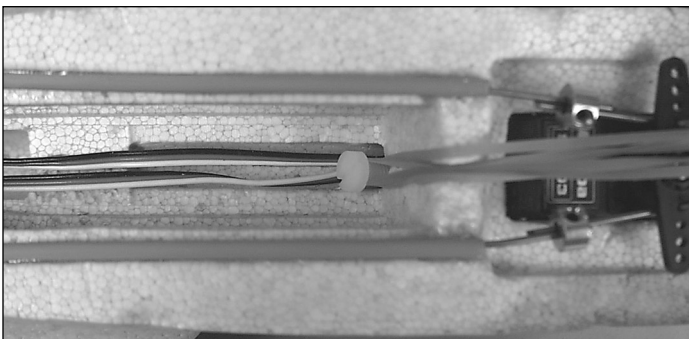
Install the Canopy



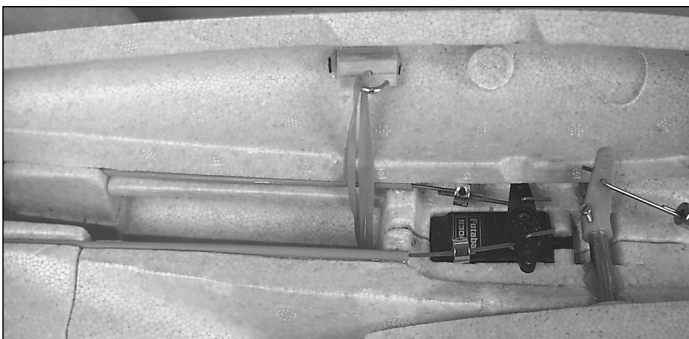
1. Cut a 3/4" [19mm] piece from the 3/8" x 3/8" [9.5 x 9.5mm] balsa stick. Screw the metal hook into the center of this piece. Use a drop of CA to harden the balsa. The rubber bands and nylon screw are used to hold the canopy to the model.



2. Position the hook assembly 6-1/4" [160mm] from the rear of the canopy. Glue it in place with 6-minute epoxy.

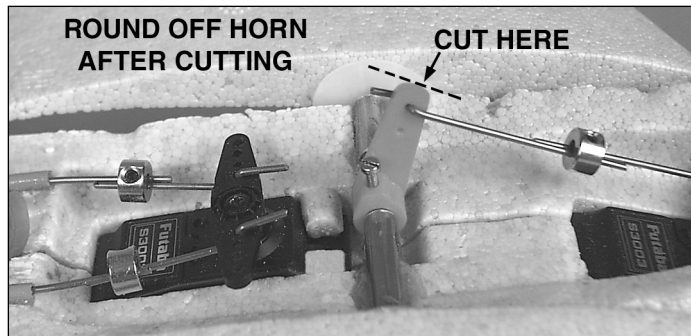


3. Hook both rubber bands over the nylon bolt. Slide the nylon bolt into the channel in the fuselage just aft of the aileron servo. Make sure the bolt is above the servo wires as shown.



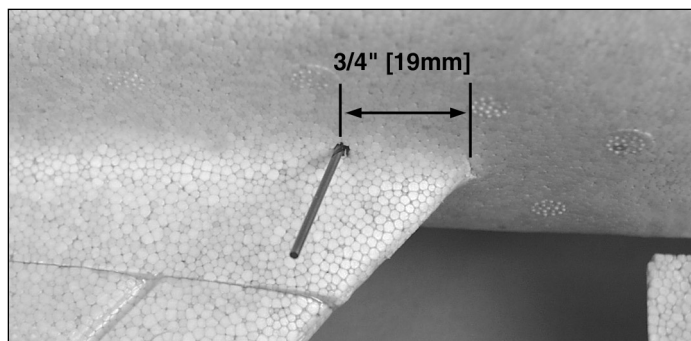
4. Attach the other end of the rubber bands to the hook on the canopy. The rubber bands will pull the canopy down onto the fuselage and back onto the hatch, which will be installed later. **Note:** If you installed two aileron servos, you

may need to trim the inside edge of the canopy slightly to clear the servos.

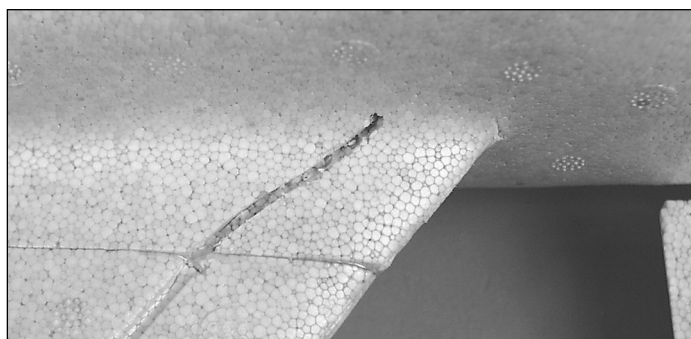


5. Remove the canopy and set it aside until later. If the elevator control horn contacts the top of the canopy, cut the top hole from the horn and round the corners.

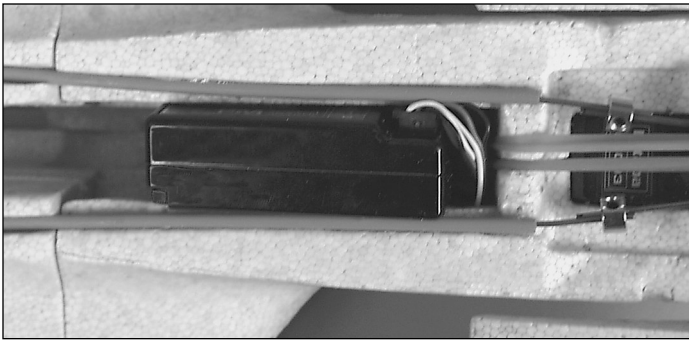
Install the Receiver



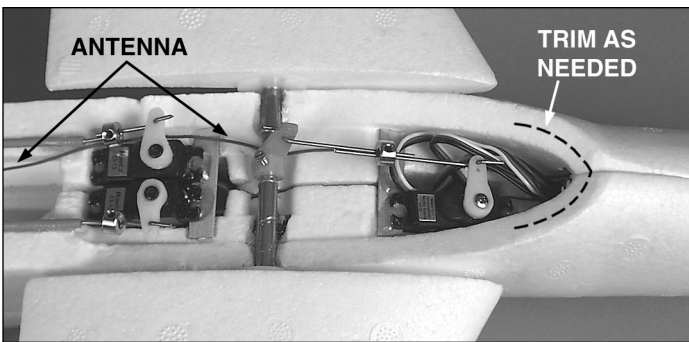
1. Drill a 1/16" [1.6mm] hole on the lower left side of the fuselage 3/4" [19mm] aft of the leading edge of the wing.



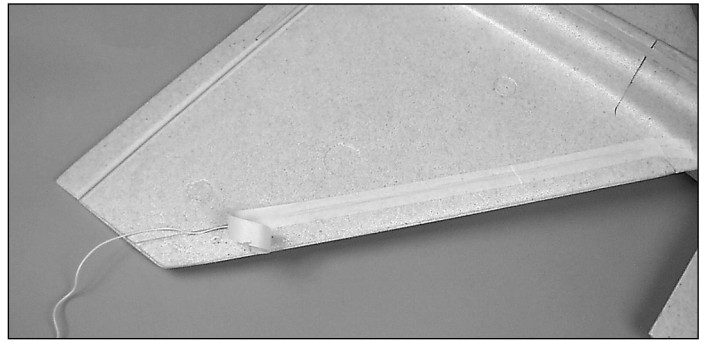
2. Cut a shallow channel in the wing fairing from the hole you just made to the antenna channel molded into the bottom of the left wing using a sharp knife.



❑ 3. If you are installing a small receiver forward of the servos go to step 4. Plug the servos and speed control into the receiver. Route the receiver antenna into the hole you made and pull it out of the hole as you install the receiver into the model. If the receiver is not a snug fit, pad it with some foam rubber. If it is a very tight fit, you can trim the foam slightly. Continue with step 5.



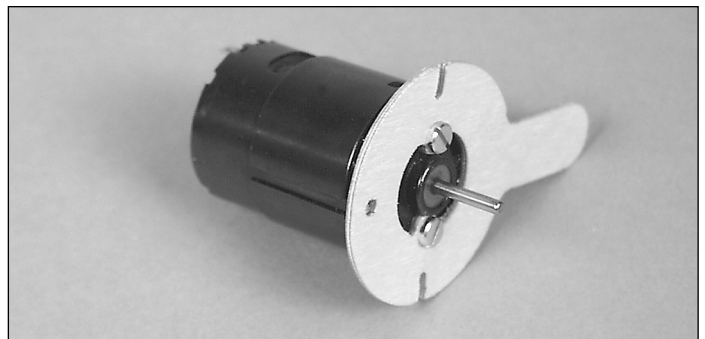
❑ 4. If you are installing a small receiver forward of the servos, plug the servos and speed control into the receiver. Remove the arm from the elevator servo and slide the receiver into the opening forward of the servo. If the opening is not big enough, trim some of the foam from the edges. The top photo shows the receiver partially inserted in the opening. When the receiver is in place, reinstall the arm on the elevator servo. Route the receiver antenna to the hole you made earlier in the side of the fuselage.



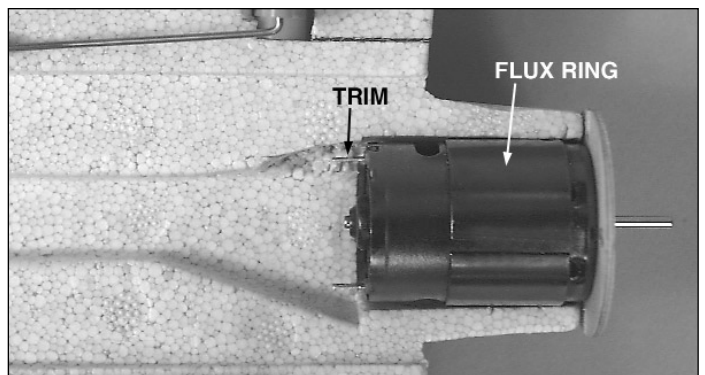
❑ 5. Secure the antenna in its channel with adhesive tape to cover it. Make sure that the full length of the antenna is extended and that none of it remains inside the fuselage.

Mount the Motor

The motor supplied with the Firebat ARF has capacitors internally installed in the motor and is shown being installed in the following steps. There are many other higher performance motors that can also be installed and we have included a couple of photos of these installations as well. One relatively low cost motor is the Kyosho® AP-29 (KYOG1929). These more powerful motors will not be able to use the supplied prop (try an APC 5.5 x 4.5, APCQ4905). In addition, they will require an adapter (GPMQ4600) to mount the proper propeller and will also require a larger capacity ESC.

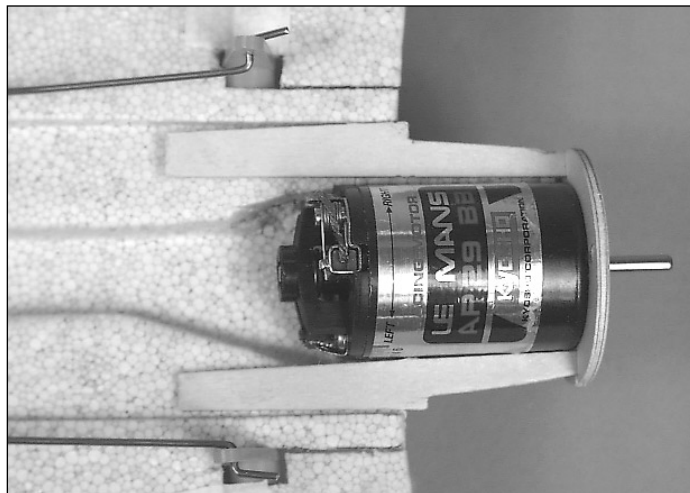


❑ 1. Mount the motor to the 1/16" [2mm] ply motor mount using the supplied 2.6 x 4mm screws.



❑ 2. Test fit the motor on the rear of the fuselage. Trim the foam around the motor terminals as needed so that the connectors from the speed control can be plugged onto the terminals.

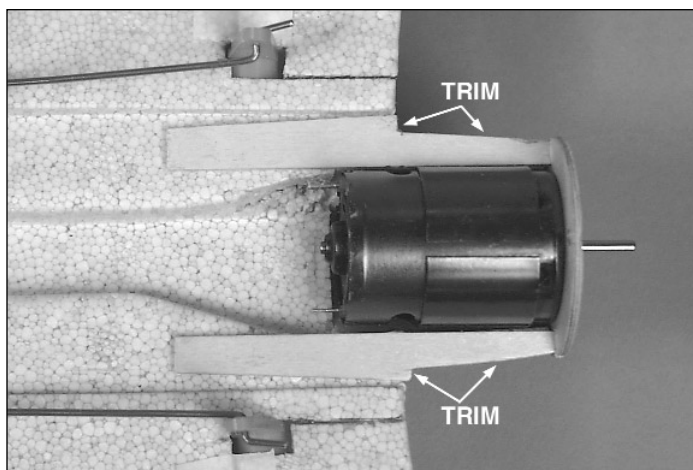
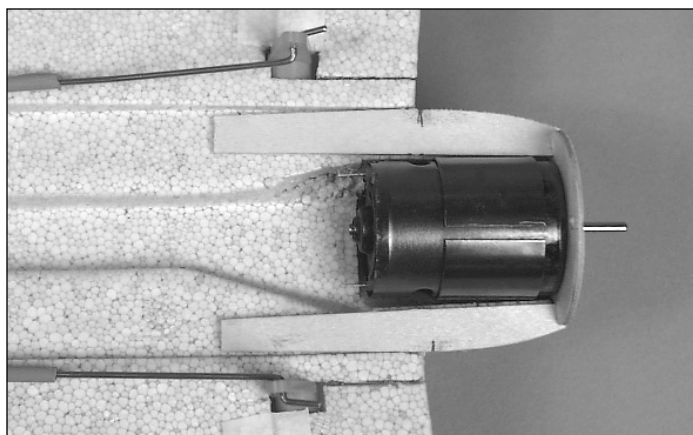
Note: The motor is supplied with a flux ring installed. This ring is present in the preceding photo and those that follow and should be removed for the first flights. This ring will increase flight time by reducing the current flow to the motor. There is also a slight reduction in power.



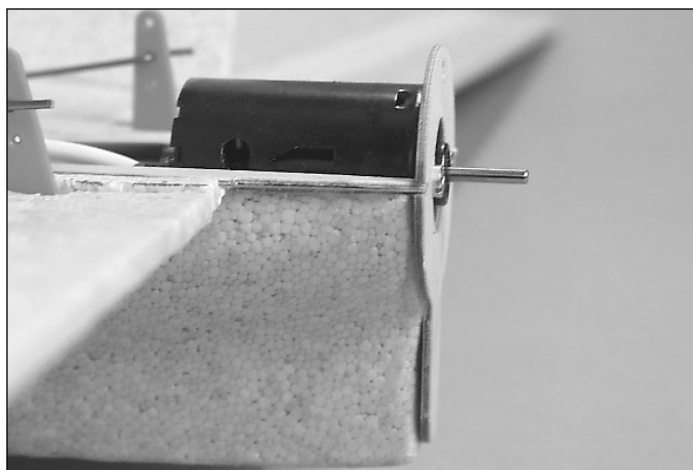
The photo above shows the installation of a Kyosho AP-29 motor. As the motor is longer than the supplied motor, some of the foam under the motor needs to be trimmed.



This photo shows the installation of a brushless motor and speed control. Some trimming of the fuselage may be needed, depending on the motor and speed controller.



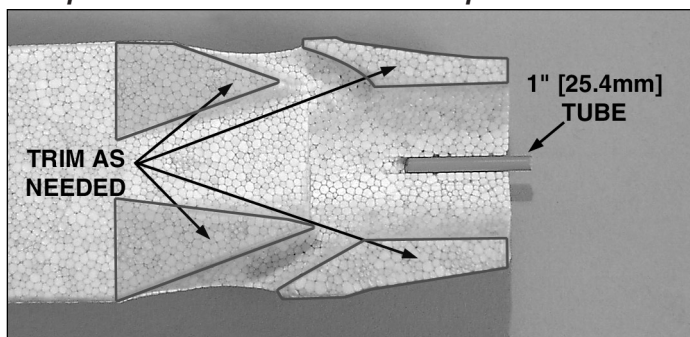
❑ 3. Fit the 1/16" [2mm] ply reinforcement plates to the rear of the fuselage. The plates are slightly oversize so that they may be fitted to a variety of motors. Trim the plates as needed to fit the shape of the fuselage.



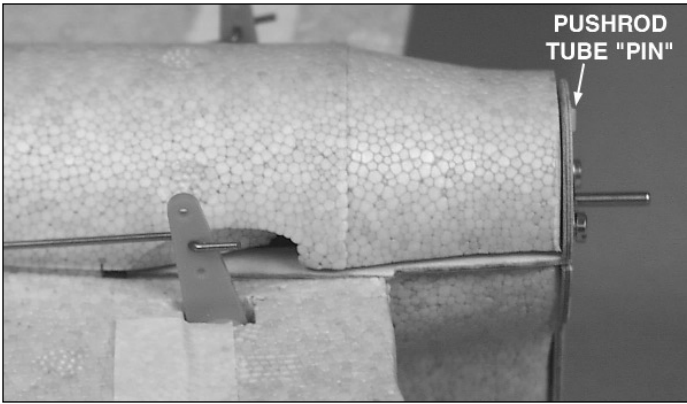
❑ 4. Glue the reinforcement plates and the motor mount, with the motor installed, into place with 6-minute epoxy.

Final Assembly

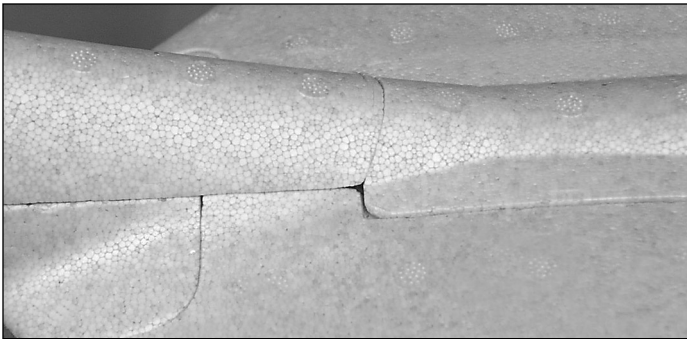
This photo used for the next two steps.



❑ 1. Find one of the 1" [25.4mm] pieces that you cut from the aileron pushrod and glue it to the groove in the rear hatch. If you can't find one, a tooth pick can be used.



❑ 2. Trim the rear of the hatch as needed to fit around the ply motor reinforcement plates so that the hatch will fit flat on the fuselage. You can see the area that was trimmed in the previous photo. You will need to shave off material the thickness of the ply. **Note:** Make sure the pushrod tube “pin” protrudes through the hole in the plywood motor mount as shown above.

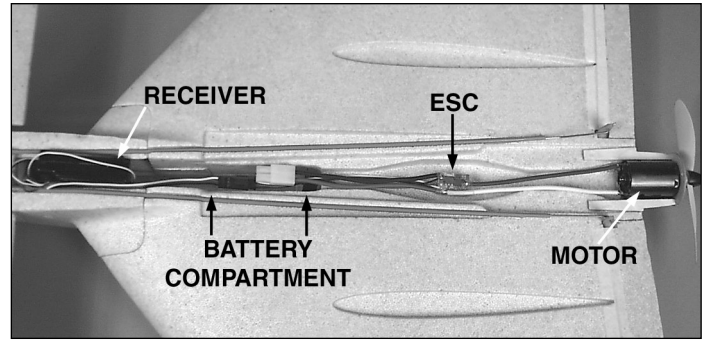


❑ 3. When the canopy is installed, it will hold the front of the hatch closed. For additional holding power, a Velcro type fastener (GPMQ4480, not included) can be added at the front of the hatch.



❑ 4. Connect the ESC to the motor. The positive terminal of the motor is marked with a “+” sign, as well as a spot of red paint on some motors. As the motor must rotate in reverse (pusher), the negative wire from the ESC is connected to the positive terminal of the motor. The negative wire is the darker of the two wires. The ESC has plugs on the wires which can be pressed onto the motor terminals, or the connectors can be cut off and the wires soldered directly to the motor terminals. Plug the ESC into the receiver. Depending

on where your receiver will be located, you may need an extension wire.

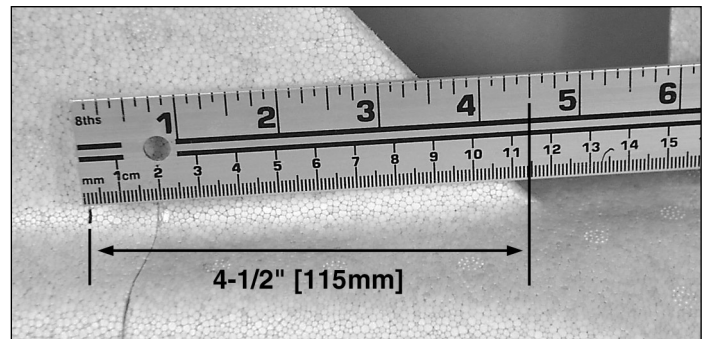


❑ 5. The completed motor/ESC installation, ready for the battery.

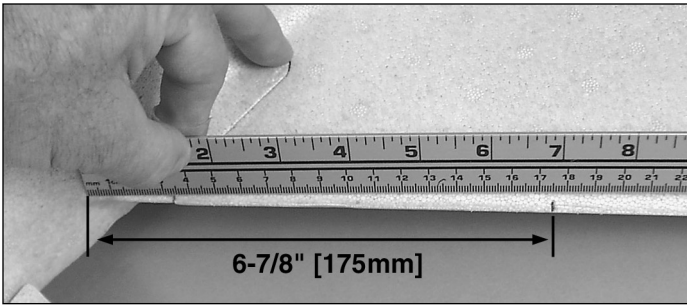
❑ 6. Remove the screws from the servos holding the control arms in place and remove the arms as well. Center the trims on the transmitter and move the throttle stick to idle, then turn on the transmitter. Connect a charged battery to the ESC and turn it on according to the instructions supplied with the ESC. With the controls in neutral, reinstall the servo control arms and screws.

❑ 7. Locate the prop. Check that the lettering on the prop will face aft when the prop is pressed onto the motor shaft. If it does not, remove the rubber spinner mount and reverse the direction of the prop, then press the rubber spinner mount back onto the prop. Press the prop onto the motor shaft 3/8" [9.5mm]. Make sure the prop is clear of any obstacles. With the radio on, slowly advance the throttle and make sure the prop turns in the proper direction. Remember that this is a pusher type prop. If the rotation direction is not correct, reverse the connectors on the motor. Disconnect the battery and turn the radio off when finished.

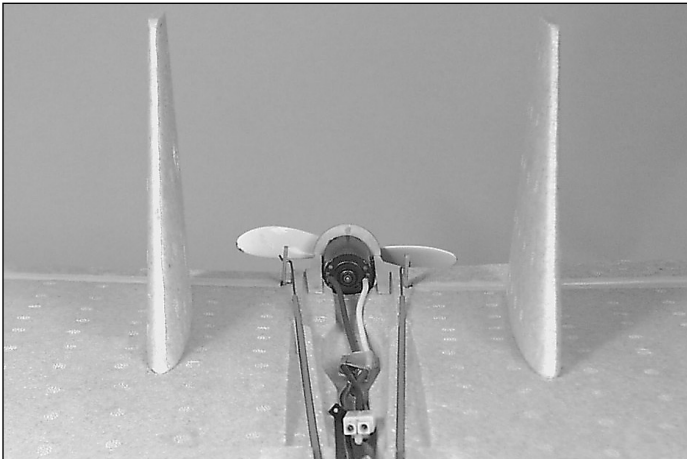
Note: Some electronic speed controllers must be cycled before they will turn on. Check the instructions that were supplied with your ESC.



❑ 8. The Firebat ARF is balanced 4-1/2" [115mm] aft of the leading edge of the wing, where it meets the fuselage. Make a mark on both sides of the fuselage on the bottom of the wing at this point.



❑ 9. Also place a mark on the leading edge of the wing 6-7/8" [175mm] from the fuselage, on both sides of the model. You can use any of these marked locations to balance the model. **Note:** The model will be balanced after the fins are installed.



❑ 10. Glue the fins to the top of the wing with 6-minute epoxy. They may be glued on vertically or angled outwards slightly, just be sure that both are at the same angle.

Note: Do not use an excessive amount of epoxy. Apply the epoxy to the edges of the molded pockets and then press the fins into place.

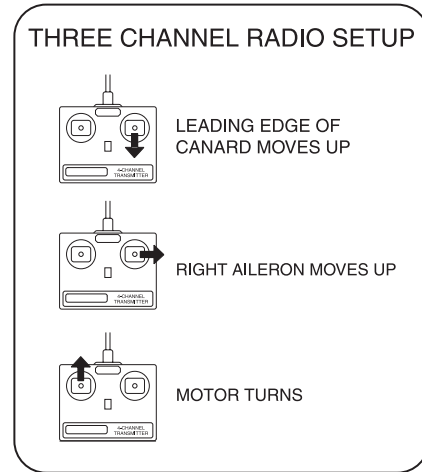
❑ 11. Apply the decals to the model as desired. Use the box cover as a guide in applying any decals. You can also use colored felt-tip permanent marking pens to paint areas of the model without adding any weight. Water based paints may be used as well.

PREPARE THE MODEL FOR FLYING

Set the Control Throws

Note: Unless you are specifically checking the operation of the motor, for safety remove the propeller from the model while setting it up on your workbench.

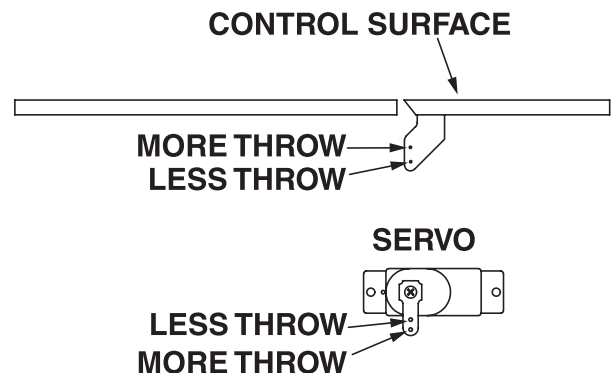
IMPORTANT: Whenever connecting the battery always hold onto the fuselage in case the motor accidentally receives power and the propeller turns.



Note: Keep in mind that the canard is on the front of the model, ahead of the C.G., not in the rear as is a normal elevator. Therefore, the canard TE must deflect down to obtain "up" elevator action.

❑ 1. Turn on the transmitter and connect the battery to the speed control in the model. Be certain the ailerons, canards and motor respond as shown in the chart. If required, use the reversing function in the transmitter to reverse any controls so they respond correctly.

❑ 2. Use the ATV function in the transmitter or adjust the position of the pushrods on the servo arms or the control horns on the canard (elevator) and ailerons to get the control surface throws indicated in the chart on page 16. The throws are measured at the widest part of the control surface.



To increase the control surface throw, move the pushrod to the hole that is closer-in on the control horn on the control surface, or move the pushrod to the hole that is farther out on the servo arm. To decrease the control surface throw, do the opposite.

Set up the Firebat ARF so it has the following control surface throws:

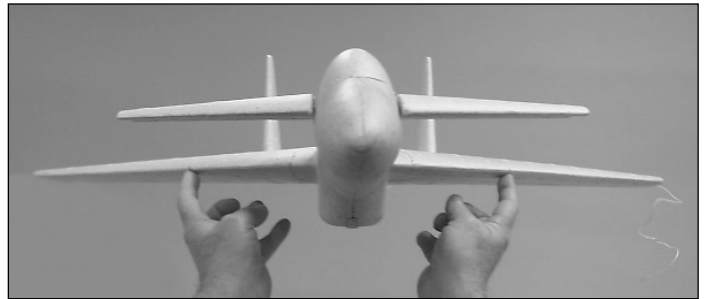
CANARD (ELEVATOR):

(High Rate) 9/16" [15mm] up and down
(Low Rate) 3/8" [10mm] up and down

AILERONS:

(High Rate) 3/8" [10mm] up and down
(Low Rate) 5/16" [8mm] up and down

Second to the C.G., the control throws have the greatest effect on the way a model flies. Set the throws as close to these settings as possible. If you have too much control throw the model may respond too quickly. If you do not have enough throw you may not be able to maneuver the model or have enough control to land it when the motor is off.



2. Lift the model, right side up, at the balance point you marked on the bottom of the wing. If the nose drops the model is nose-heavy and you must add weight to the tail. If the tail drops, the model is tail-heavy and you must add weight to the nose. In most cases you can relocate the receiver and battery to achieve the correct balance without adding additional weight. Our prototype models did not require any weight to balance.

3. If additional weight is required to balanced the model, use small pieces of Great Planes stick-on weight (GPMQ4485). If weight is required in the tail, it can be stuck to the top of the wing next to the motor. If weight is required in the nose, a slot can be cut in the nose where the weight can be inserted. The slot can then be covered with tape.

4. After placing weight on the model where necessary, recheck the C.G. to confirm that it is correct.

Balance the Model (C.G.)

IMPORTANT: The C.G. (center of gravity), or balance point has the greatest effect on how a model flies. Do not overlook this important procedure. Modelers who do so often find that the airplane is difficult to control, or out of control after it is too late. Preserve your model and insure that the first flight won't be the last by balancing the model according to the following instructions.

The C.G. (center of gravity) must be checked when the model is ready to fly with the propeller and battery installed.

1. Use a felt-tip pen or narrow strips of tape to mark the balance point on the bottom of the wing 4-1/2" [115mm] from the leading edge of the wing on both sides of the fuselage.

Identity Your Model

No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is required at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 19 and place it on or inside your model.

Charge the Transmitter Batteries

Be certain the transmitter batteries are fully charged. Follow the battery charging instructions that came with your radio control system to charge the batteries.

Ground Inspection

Before you fly you should perform one last overall inspection to make sure the model is truly ready to fly and that you haven't overlooked anything. If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to perform the inspection. Check to see that you have the radio installed correctly and that all the controls are connected properly. The motor must also be checked by confirming that the prop is rotating in the correct direction and the motor sounds like it is reaching full power. Make certain the ailerons and canards are secure, the pushrods are connected, the controls respond in the correct direction, radio components are securely mounted, and the C.G. is correct.

Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test with the motor running at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, do not fly! Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash. Be careful of the propeller when range checking.

Performance Tips

- Use fine sandpaper to remove imperfections along the edges of the propeller. For the best performance, use a Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700) to balance the propellers (this is a necessity on glow-powered engines, but less critical on small electric models).
- Using multiple battery packs for successive flights may cause the motor to become excessively hot, thus causing damage. Allow the motor to cool for at least 20 minutes between flights.

Motor Safety Precautions

Note: Failure to follow these safety precautions may result in severe injury to yourself and others.

Get help from an experienced pilot when learning to operate the motor.

Use safety glasses when running motors.

Do not run the motor in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.

Keep your face and body as well as all spectators away from the path of the propeller as you start and run the motor.

Keep items such as these away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects (pencils, screwdrivers) that may fall out of shirt or jacket pockets into the prop.

The electric motor and motor battery used in the Firebat ARF are very powerful and the spinning propeller has a lot of momentum; therefore, if you touch the propeller while it is spinning it may inflict severe injury. Respect the motor and propeller for the damage they are capable of and take whatever precautions are necessary to avoid injury. Always disconnect and remove the motor battery until you are ready to fly again and always make sure the switches are turned off before connecting the battery.

AMA SAFETY CODE (excerpts)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

GENERAL

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.
2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.
3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.
7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

RADIO CONTROL

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.
2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assisted by an experienced helper.
3. I will perform my initial turn after takeoff away from the pit, spectator and parking areas and I will not thereafter perform maneuvers, flights of any sort or landing approaches over a pit, spectator or parking area.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

FIND A SAFE PLACE TO FLY

Though the Firebat ARF is a "Park Flyer," the best place to fly any model is at an AMA chartered club field. Club fields are set up for R/C flying, making your outing safer and more enjoyable. We recommend that you join the AMA and a local club so you can have a safe place to fly and have insurance to cover you in case of a flying accident. The AMA address and telephone number are in the front of this manual.

If there is no club or R/C flying field in your area, find a suitable site that is clear of trees, telephone poles, buildings, towers, busy streets and other obstacles. Since you are not flying at a sanctioned AMA site, be aware that there may be others like yourself who could be flying nearby. If both of your models happen to be on the same frequency, interference will likely cause one or both of the models to crash. An acceptable minimum distance between flying models is five miles, so keep this in mind when searching for a flying site.

In addition to obstacles, it is important to be aware of people who may wander into the area once you begin flying. At AMA club flying sites it is a severe rule infraction to fly over others, and this is a good practice if flying elsewhere. R/C models tend to attract onlookers whose numbers can soon multiply, forming small, uncontrolled crowds. Onlookers pose two main problems. First is the danger of actually crashing your model into a person, causing injury. Second is the distraction from those who ask you questions while you are trying to concentrate on flying. To minimize or avoid this problem, have an assistant standing by who can spot people who wander into your flying site (so you can avoid flying over them) and who can perform "crowd control" if people start to gather.

FLYING

IMPORTANT: If you are an inexperienced modeler we strongly urge you to seek the assistance of a competent, experienced R/C pilot to check your model for airworthiness AND to teach you how to fly. No matter how stable or "forgiving" the Firebat ARF is, attempting to learn to fly on your own is dangerous and may result in destruction of your model or even injury to yourself and others. Therefore, find an instructor and fly only under his or her guidance and supervision until you have acquired the skills necessary for safe and fully controlled operation of your model.

Takeoff

We recommend flying the Firebat ARF when the wind is no greater than ten miles per hour. Less experienced flyers should fly the Firebat ARF only in calm (less than one mile per hour) conditions. Frequently, winds are calm in the early morning and early evening. Often these are the most enjoyable times to fly anyway!

Until you have the Firebat ARF properly trimmed for level flight, we recommend having an assistant hand-launch the model instead of launching it yourself.

Turn on the transmitter and plug the battery into the speed control. Turn on the receiver by following the instructions that came with your speed control.

IMPORTANT: Confirm that the transmitter operates the controls by moving the sticks and watching the surfaces respond. Occasionally, electric models have been launched with the transmitter turned off or the battery disconnected from the speed control!

When ready to launch, the assistant should hold the bottom of the fuselage under the wing, then raise the model high above his head and point it directly into the wind. With the pilot (that would be you!) standing behind the plane, fully advance the throttle to start the motor. As soon as the motor is at full power, the hand launcher should gently toss the plane into the air at a level or slightly nose-up attitude. Be certain the model is being launched into the wind and be immediately ready to make corrections to keep the airplane flying straight, level and into the wind.

When the model has gained adequate flying speed under its own power, gently pull the elevator stick back until the airplane starts a gradual climb, then, reduce the back stick pressure. Many beginners tend to pull too hard causing the model to stall, so be gentle on the elevator and don't panic. If you do pull too hard and you notice the model losing speed, release the elevator stick and allow the model to regain airspeed.

Continue a gradual climb and establish a gentle turn (away from yourself and any onlookers) until the airplane reaches an altitude of 75 to 100 feet.

The Firebat ARF is typical of all delta wing aircraft in that there is a great deal of drag when the flying speed is slow and the nose of the aircraft is at a high angle of attack. The Firebat ARF will climb much faster if you allow it to gain some speed first and climb at a shallow angle.

Flight

The main purpose of the first few flights is to learn how the model behaves and to adjust the trims for level flight. After the model has climbed to a safe altitude reduce the throttle

slightly to slow the model, yet maintain altitude. The Firebat ARF should fly well and maintain adequate airspeed at about 1/2 – 3/4 throttle.

Adjust the elevator trim so the model flies level at the throttle setting you are using. Adjust the aileron trim to level the wings. It may take a few minutes to get the trims adjusted, but this should be your first priority once at a comfortable altitude. Continue to fly around, executing turns and making mental notes (or having your assistant take notes for you) of what additional adjustments or C.G. changes may be required to fine tune the model so it flies the way you like.

Landing

Begin the landing approach by flying downwind at an altitude of approximately 40 feet [12 meters]. When the airplane is approximately 50 to 100 feet [15 to 30 meters] past you, gradually reduce power and make the “final” 180° turn directly into the wind, aligning the airplane with the runway or landing area. Do not dive the airplane, as it will pick up too much speed. Instead, allow the airplane to establish a gradual descent. Concentrate on keeping it heading into the wind toward the runway. When the plane reaches an altitude of about 3 feet [1 meter], reduce power some more and gently and slowly apply a little “up elevator” to level the plane, but be careful as too much up elevator will cause it to stall. While holding a slight amount of up elevator the airplane will slow and descend as it loses flying speed, thus touching down on the runway.

Until you are able to accurately judge how far the Firebat ARF can glide, it may be helpful to reserve some battery power to run the motor so the plane can be flown back to the runway. Be aware that after the speed controller has cut off the power, most speed controllers will allow you to reduce the throttle to idle and then advance the throttle to obtain a brief burst of power.

Best of luck and happy flying!

Make a copy of this identification tag and place it on or inside the model.

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number

