HANGAR 9®

Alpha .60 ARF

ASSEMBLY MANUAL

Specifications

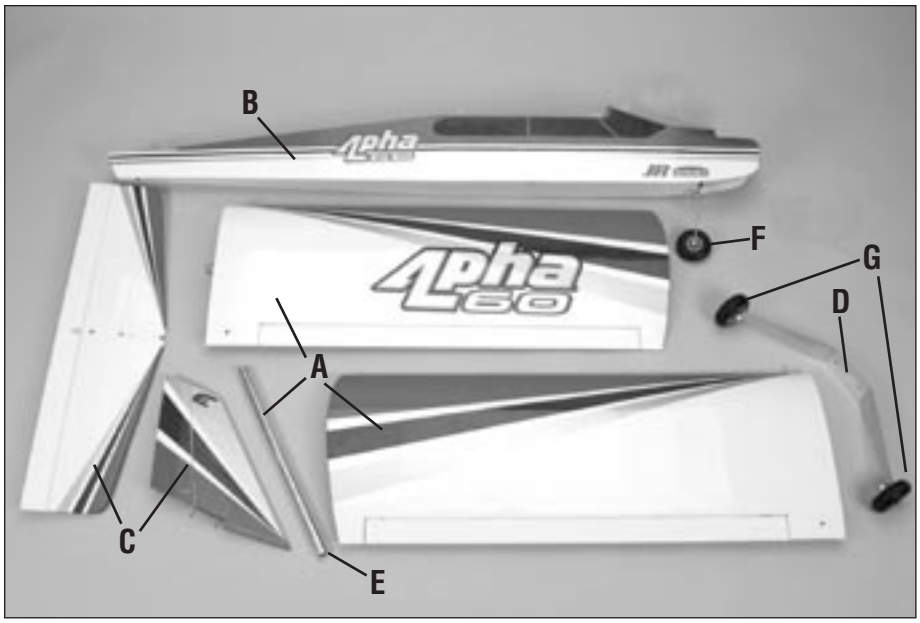
Wingspan: ..... 71.5 in (1816mm)
Length: ..... 54 in (1371mm)
Wing Area: ..... 965.2 sq in (66.27 sq dm)
Weight: ..... 7.0–8.0 lb (3.2 kg–3.6 kg)
Engine: ..... .61 2-stroke
Radio: ..... 4-channel w/4 servos

Table of Contents

Covering Colors

- True Red HANU866
- Deep Blue HANU873
- White HANU870
- Silver HANU881

Contents of Kit



Large Parts:

A. Wing Set w/Alum. Tube	HAN2601
B. Fuselage	HAN2602
C. Tail Set	HAN2603
D. Landing Gear Set	HAN2604
E. Wing Tube	HAN2605
F. $2^3/_4$" Wheels	HAN305
G. 3" Wheels	HAN306

Items Not Shown:

Engine Mount	HAM90M
Pushrod Set	HAN2607
Fuel Tank (assembled)	HAN2606

Note: Wheels are shown installed.

Required Radio and Engine

Radio Equipment

- 4-channel radio system (minimum)
- 4 standard servos (JRPS537 recommended or equivalent)
- 6" Servo Extension (JRPA095)

Recommended JR® Systems

- Quattro
- XF421EX
- XF631
- XP662
- X-378
- XP6102

JR XF421EX

JR XF631

Recommended Engine

- .61 2-stroke

Evolution .61NT
EVOE0610

Field Equipment Required

- Propeller (EVOE0610P recommended)
- Fuel (10%–15% nitro content)
- Glow Plug Wrench (HAN2510)
- Glow Plug Igniter with Charger (HAN7101)
- Glow Plug (HAN3001/3006)
- Manual Fuel Pump (HAN118)
- #64 Rubber Bands (ARC64)
- Start-Up Field Pack (HANSTART)

Optional Field Equipment

- 4-Way Wrench (DUB701)
- Fieldmate (HAN117)
- Cleaner & towels
- Extra Glow Plugs (HAN3001/3006)
- Blue Block After Run Oil (EVOX1000)
- Power Panel (HAN106)
- 12V 7Ah Sealed Battery (HAN102)
- PowerPro 12V Starter (HAN161)

Additional Required Tools and Adhesives

Tools

- Adjustable wrench
- Drill
- Drill bit: 5/64", 3/32”
- Hobby Knife (XAC3126)
- Phillips screwdriver (small)

Adhesives

- 30-Minute Epoxy (HAN8002)
- Thick CA (cyanoacrylate) Glue (PAAPT02)
- CA Remover/Debonder (PAAPT16)
- Masking Tape (MMM20901)

Other Required Items

- $2^1/_2$" spinner (white) (EVOE0610S recommended)
- Epoxy Brushes (DUB345)
- Felt-Tipped Pen (PAR10400)
- File
- Measuring device (e.g. ruler, tape measure)
- Mixing Sticks for Epoxy (DUB346)
- Paper towels
- Rubbing alcohol
- Wax paper

Warning

An RC aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio and engine.

Before Starting Assembly

Before beginning the assembly of the Alpha™, remove each part from its bag for inspection. Closely inspect the fuselage, wing panels, rudder, and stabilizer for damage. If you find any damaged or missing parts, contact the place of purchase.

If you find any wrinkles in the covering, use a heat gun or covering iron to remove them. Use caution while working around areas where the colors overlap to prevent separating the colors.

Using the Manual

This manual is divided into sections to help make assembly easier to understand and to provide breaks between each major section. In addition, check boxes have been placed next to each step to keep track of each step completed. Steps with multiple boxes indicate the step will require repeating, such as for a right or left wing panel, two servos, etc. Remember to take your time and follow the directions.

Warranty Information

Horizon Hobby, Inc. guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any parts damage by use or modification. In no case shall Horizon Hobby's liability exceed the original cost of the purchased kit. Further, Horizon Hobby reserves the right to change or modify this warranty without notice.

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

Once assembly of the model has been started, you must contact Horizon Hobby, Inc. directly regarding any warranty question that you have. Please do not contact your local hobby shop regarding warranty issues, even if that is where you purchased it. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance.

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.

Horizon Hobby
4105 Fieldstone Road
Champaign, Illinois 61822
(877) 504-0233
www.horizonhobby.com

Section 1: Joining the Wing Halves

Required Parts

- Right wing panels
- Left wing panel
- Wing joiner tube

Required Tools and Adhesives

- Hobby knife

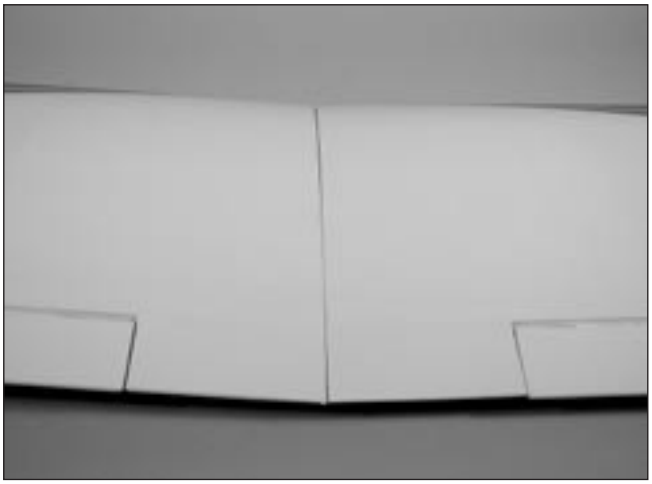
Skip to Section 2 if you plan on joining the wings together permanently.

☐ **Step 1**

Locate the wing joiner tube. Slide the tube into one of the wing panels.

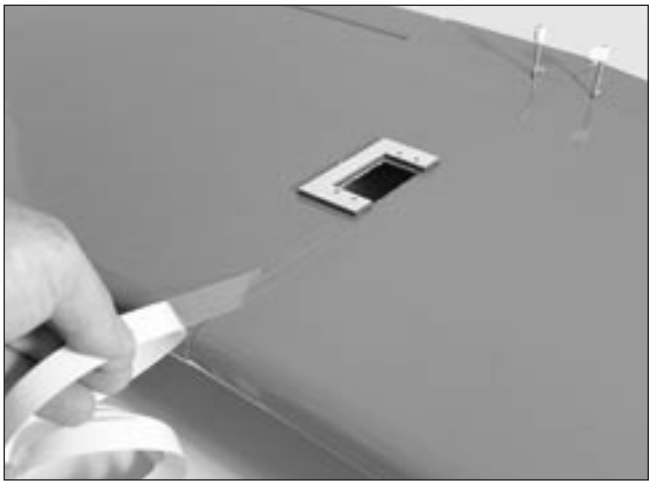
☐ **Step 2**

Slide the remaining wing panel onto the tube tightly against the first panel.



☐ **Step 3**

Apply the clear tape to the joint, starting at the front of the servo tray. Wrap the tape around the leading edge, then onto the top of the wing. Continue around the trailing edge of the wing, back to the servo tray. Trim the excess tape using a hobby knife.



Section 2: Gluing the Panels Together (Optional)

Required Parts

- Right wing panels
- Left wing panel
- Wing joiner tube

Required Tools and Adhesives

- Masking tape
- 30-minute epoxy
- Epoxy brush
- Mixing stick
- Rubbing alcohol
- Paper towels
- Hobby knife

The two wing panels can be glued together if you choose to do so. Read through the steps and wait to mix the epoxy until the steps are fully understood.

☐ **Step 1**

Locate the wing joiner tube. Slide the tube into one of the wing panels.

☐ **Step 2**

Mix 1/2 ounce of 30-minute epoxy. Apply the epoxy to the exposed wood at the root rib.

☐ **Step 3**

Slide the remaining wing panel onto the tube tightly against the first panel. Use masking tape on the top and bottom of the wing to hold the panels tightly together until the epoxy cures.

Hint: Use a paper towel moistened with rubbing alcohol to clean up any epoxy before it has a chance to cure.

Section 3: Fuel Tank Assembly

Required Parts

- Clunk (fuel pickup)
- Fuel pickup tubing
- Rubber stopper
- Metal tubes (short and long)
- Metal caps (2)
- Fuel tank
- 3mm x 20mm screw

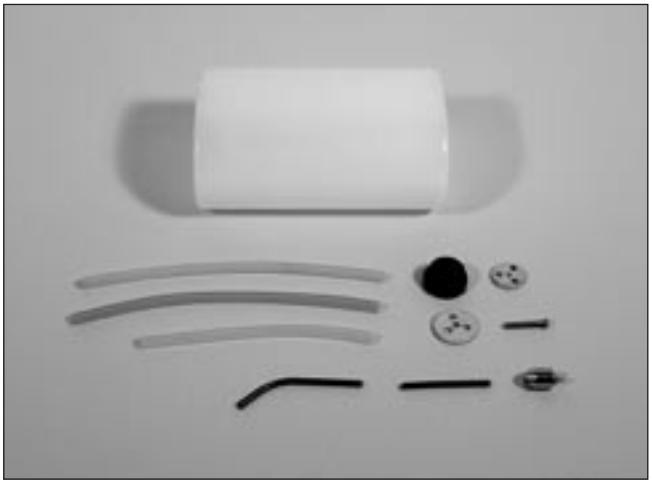
Required Tools and Adhesives

- Phillips screwdriver (small)
- Hobby knife

The stopper provided with your model has three holes that are not bored completely through the stopper. The holes are for the fuel pickup, fill, and vent lines. For these instructions only, two holes will be used: one for the fuel pickup and one for the fuel vent. Only open the third hole if you are going to use a separate fill line.

☐ **Step 1**

Locate the fuel tank parts.



☐ **Step 2**

Locate the rubber stopper. Insert the short metal tube into one of the holes in the stopper so that an equal amount of tube extends from each side of the stopper. This tube will be the fuel tank pickup that provides fuel to the engine.

☐ **Step 3**

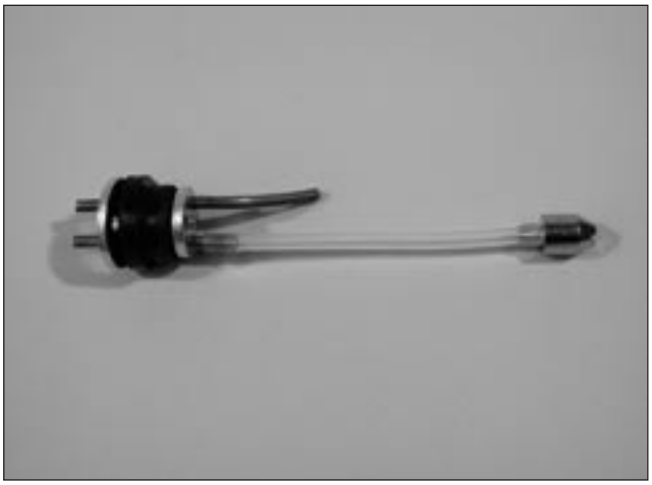
Slide the smaller cap over the tube on the smaller end of the rubber stopper. This end will be inserted into the fuel tank. The larger cap is placed on the side of the rubber stopper that makes the cap. Loosely install the 3mm x 20mm screw through the center of the stopper.

☐ **Step 4**

Locate the vent tube. It is the one that has a slight bend. Slide the longer end of the vent tube into the remaining hole in the stopper from the tank (small cap) side. The bend must be on the back of the stopper, so it ends up inside the fuel tank.

☐ **Step 5**

Locate the clear piece of silicone fuel tubing and the fuel tank clunk. Install the clunk onto one end of the silicone tubing. Slide the silicone tubing (end opposite the clunk) onto the fuel tank pickup tube (straight tube) in the stopper.



☐ **Step 6**

Carefully insert the stopper assembly into the fuel tank. Note the position of the vent tube; it must point towards the top of the fuel tank to function properly. (The stopper is located towards the top of the tank.)

Check to make sure the clunk can move freely inside the tank. You must be able to turn the tank to any attitude, and the clunk will fall to the lowest point (all directions except for having the stopper facing down). If it does not, remove the stopper and shorten the line by 1/16 inch and check again. Take your time during this step, as it is important that the clunk operates properly. Having the line too short will keep the engine from drawing all the fuel from the tank.

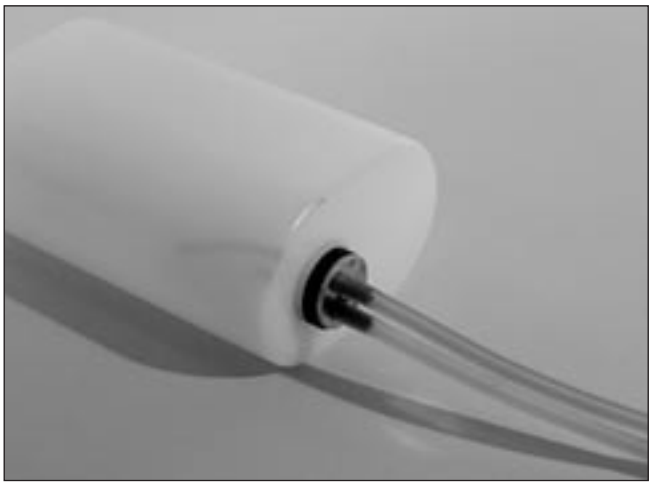
Section 3: Fuel Tank Assembly

☐ **Step 7**

Tighten the 3mm x 20mm screw carefully—do not overtighten, as this can cause the the fuel tank to split open. This allows the rubber stopper to form a seal by being slightly compressed, thus sealing the fuel tank opening.

☐ **Step 8**

Install the vent and pickup tubes. Use the red tube on the vent, and the green tube on the pickup. This will be helpful later when installing the lines to the engine.



Section 4: Fuel Tank Installation

Required Parts

- Fuselage
- Fuel tank assembly

Required Tools and Adhesives

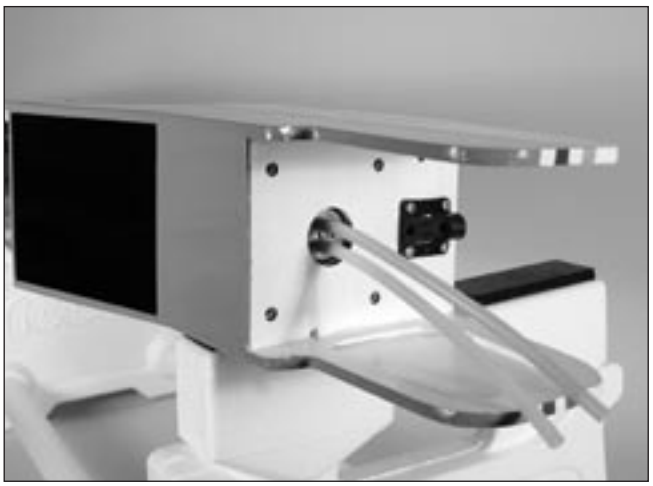
- None

☐ **Step 1**

Slide the fuel tank into the fuselage. Make sure the stopper faces the top of the fuselage.

☐ **Step 2**

Guide the fuel lines through the large hole in the firewall. Push the fuel tank as far forward as possible.



Section 5: Radio Installation

Required Parts

- Fuselage
- Radio tray (plywood)
- #6 x 5/8" sheet metal screw
- Foam radio protector

Required Tools and Adhesives

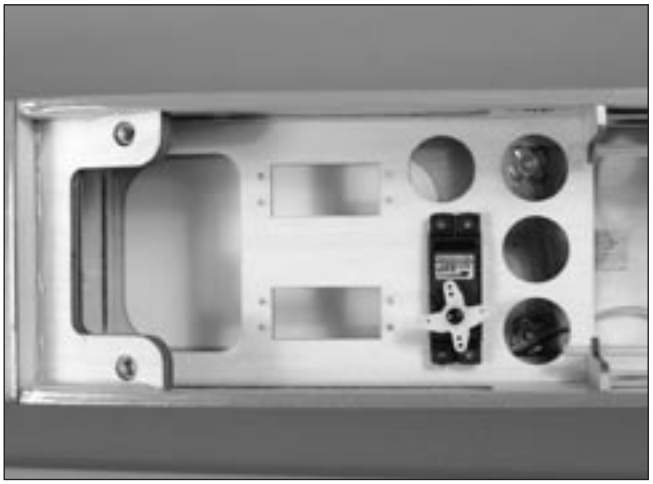
- Standard servo (4)
- Receiver
- Switch harness
- Phillips screwdriver (small)
- Drill
- Servo hardware
- Radio battery pack
- 6" servo extension
- Drill bit: 5/64"

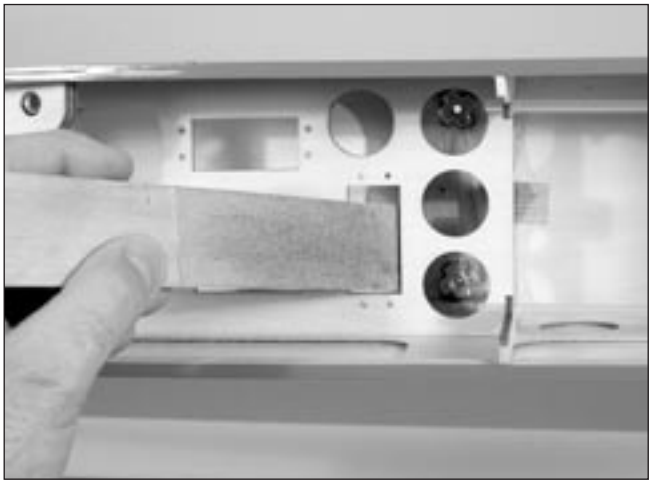
☐ Step 1

Install the rubber grommets and eyelets supplied with your servos. Use the instructions provided with the radio system for this procedure.

☐ Step 2

Test fit a servo into one of the openings in the fuselage. Use a small sander to make the opening bigger if the servo does not fit. Check and fit all three servos.

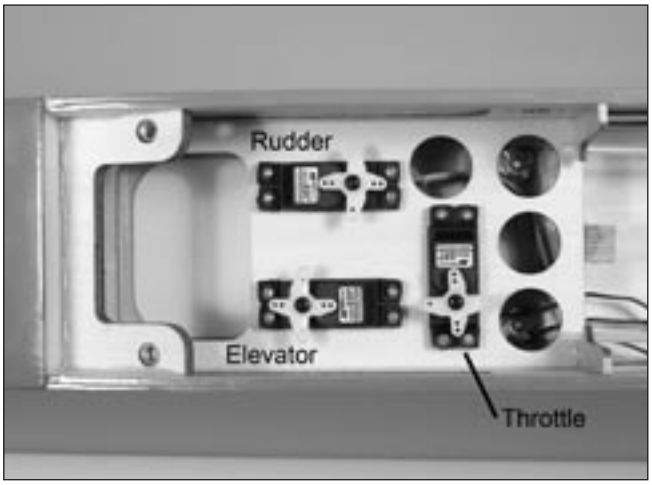




Section 5: Radio Installation

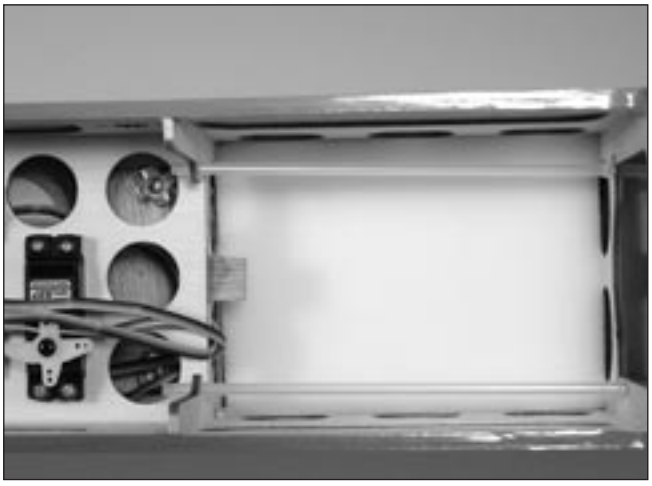
☐ Step 3

Position the three servos as shown. Use the screws provided with the servos to secure them in position.



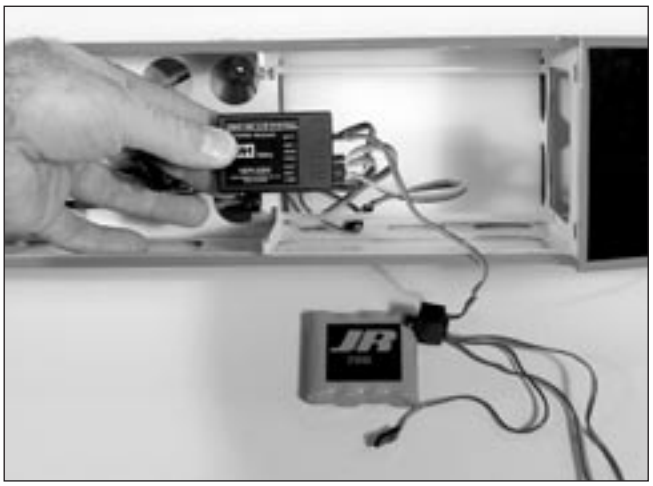
☐ Step 4

Cut one of the flat foam pieces to a length of $5^1/_2$". Place the foam piece inside the fuselage as shown.



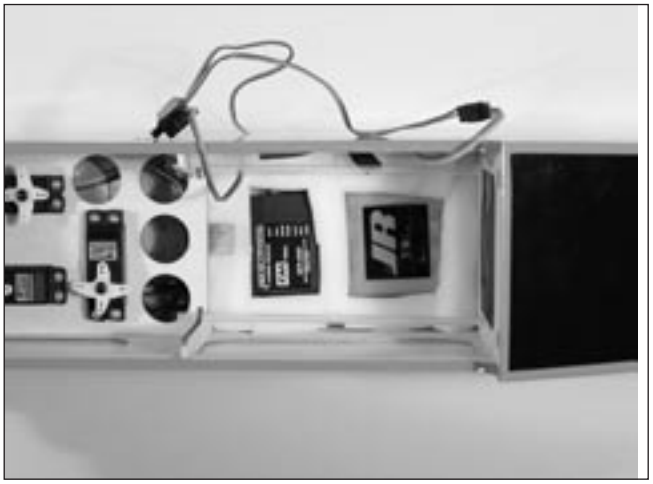
☐ Step 5

Plug the servos, receiver and aileron extension into the receiver. Use the radio instructions to make sure the servos are plugged into the correct channels. Use the photo in Step 3 that labels the elevator, rudder and throttle servos.



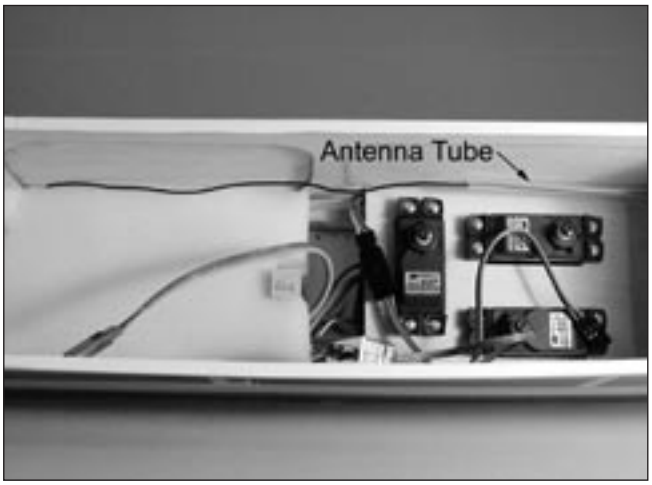
☐ Step 6

Cut pieces of the remaining foam to fit at the front and rear of the radio area. Place the receiver and receiver battery onto the foam as shown. Position the servo wires so they are neat and not cluttering the area around the receiver and receiver battery. Use the remaining foam to insulate the receiver and receiver battery from the sides of the fuselage and from each other.



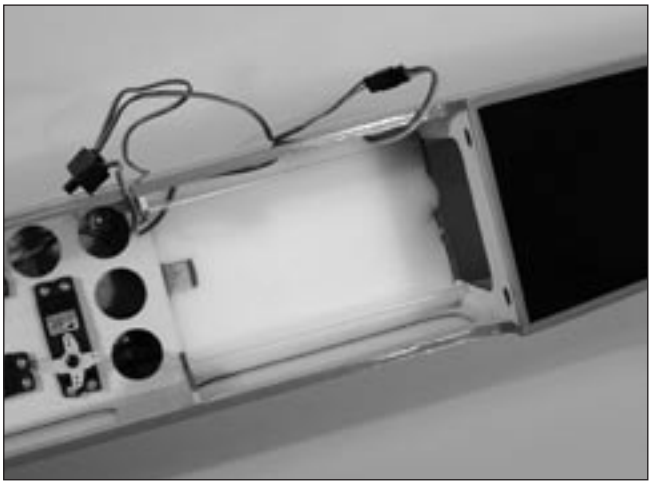
☐ **Step 7**

Route the receiver antenna wire through the antenna tube located on the right side of the fuselage. This routes the antenna to the rear of the fuselage.



☐ **Step 8**

Check to make sure the aileron servo lead and receiver antenna wire are accessible. Place the remaining flat radio foam piece over the receiver battery and receiver.

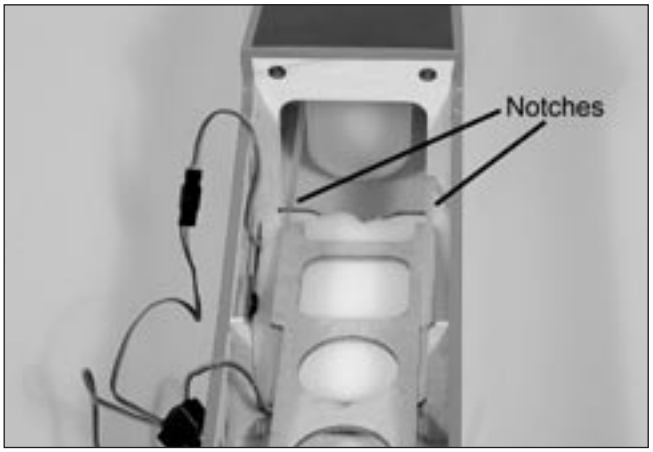


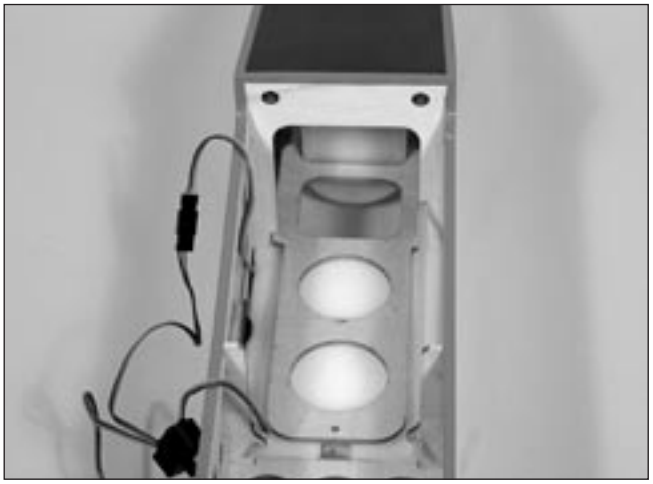
DO NOT cut the antenna wire, as this will significantly reduce the range and operation of your radio system.

To make the installation of the receiver antenna easier, use a small piece of music wire. Slide the wire into the antenna tube from the back of the fuselage. Attach the receiver antenna to the wire and pull it through the tube.

☐ **Step 9**

Slide the plywood radio tray into the notches in the former. Push the tray forward, against the fuel tank.





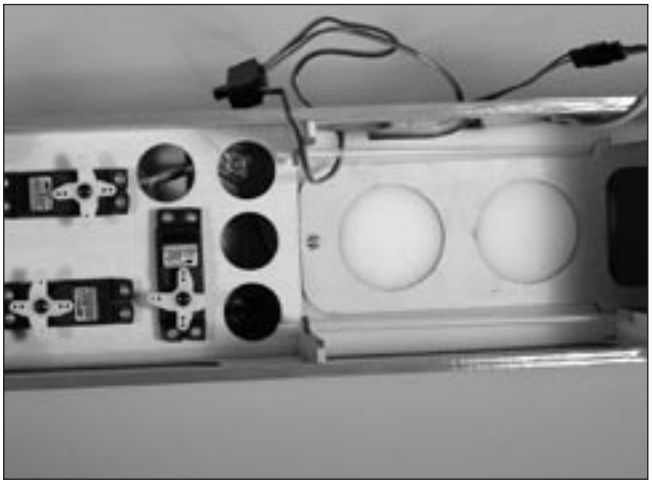
Section 5: Radio Installation

☐ **Step 10**

Drill a 5/64" hole in the tray support using the hole in the aft end of the tray as a guide.

☐ **Step 11**

Secure the tray using a #6 x 5/8" sheet metal screw.



☐ **Step 13**

Remove the switch plate from the radio switch. Attach the switch to the fuselage side using the switch hardware.

Section 6: Tail Installation

Required Parts

- Fuselage
- Stabilizer/elevator
- Rudder/fin

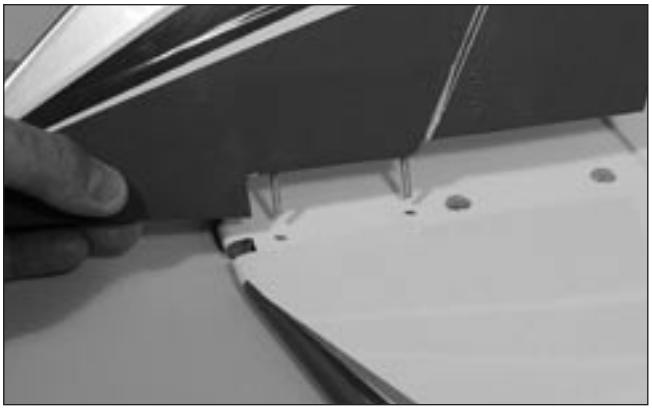
Required Tools and Adhesives

- Wing nut (2)
- 4-40 x 3/4" screw (2)
- Phillips screwdriver
- #4 washer (4)
- Threadlock (included)

Skip to Section 7 if you plan on joining the tail to the fuselage permanently.

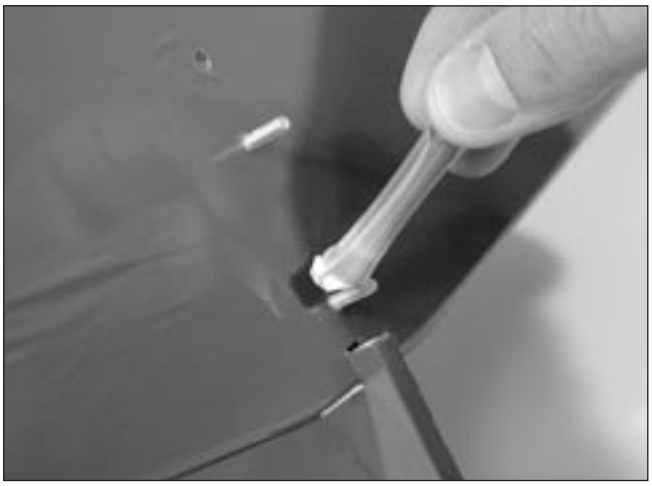
☐ **Step 1**

Slide the fin bolts into the holes in the stabilizer. Make sure the trim is facing towards the fin. Push the fin tight against the stabilizer.



☐ **Step 2**

Apply a small drop of threadlock onto each of the fin bolts.

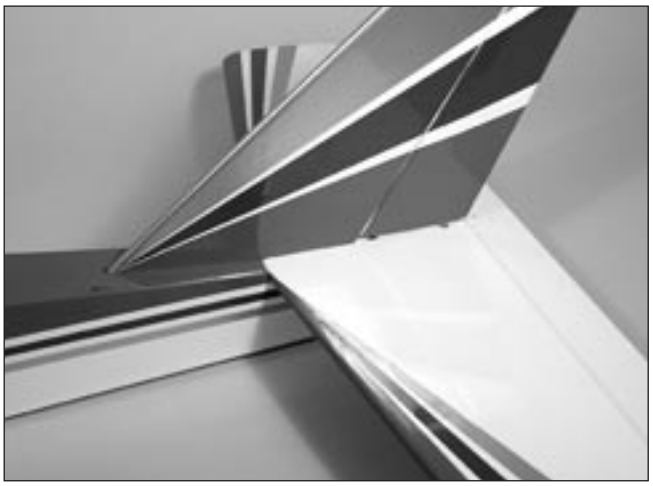


☐ **Step 3**

Slide a 3mm washer onto the fin bolts. Thread the wing nuts onto the bolts. Tighten the nuts against the stabilizer. Do not crush the wood when tightening the nuts.

☐ **Step 4**

Place the stabilizer in position on the fuselage. The fin will fit into the slot in the fuselage when installed correctly.



Section 6: Tail Installation

☐ **Step 5**

Slide a #4 washer onto a 4-40 x 3/4" screw. Apply a drop of threadlock to the screw. Prepare two screws using this method.

☐ **Step 6**

Secure the stabilizer using the two screws prepared in the previous step.

Section 7: Tail Installation (Glue Attachment Option)

Required Parts

- Fuselage
- Stabilizer/elevator
- Rudder/fin

Required Tools and Adhesives

- Wing nut (2)
- 4-40 x 3/4" screw (2)
- Phillips screwdriver
- Threadlock
- 30-minute epoxy
- #4 washer (4)
- Felt-tipped pen

The tail can be glued together, then glued to the fuselage if you choose to do so. Read through the steps and wait to mix the epoxy until the steps are fully understood.

☐ **Step 1**

Slide the fin bolts into the holes in the stabilizer. Make sure the trim is facing towards the fin. Push the fin tight against the stabilizer.

☐ **Step 2**

Use a felt-tipped pen to trace the outline of the fit onto the stabilizer.

☐ **Step 3**

Use a hobby knife with a new blade to remove the covering inside the lines drawn in the last step. Also remove the covering from the bottom of the fin where it rests against the stabilizer.

DO NOT cut into the underlying wood. Let the knife “float” across the covering. Cutting into the wood will weaken the stabilizer and may cause it to fail in flight.

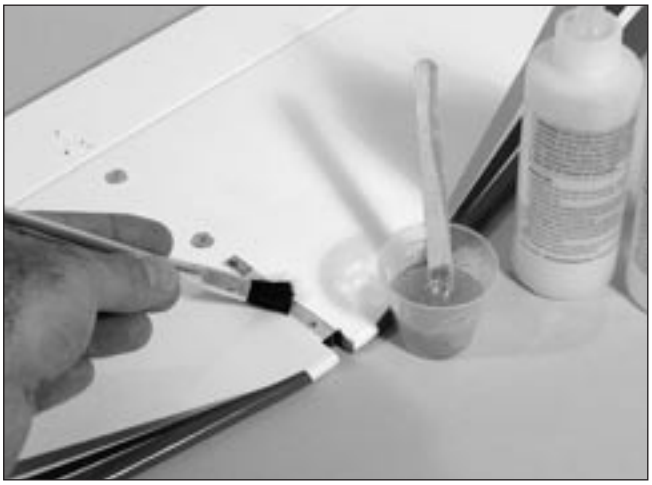
You can use a soldering iron instead of a hobby knife to remove the covering. Doing so will eliminate accidentally cutting into the stabilizer.

Section 7: Tail Installation (Glue Attachment Option)

Note: Read through and understand Steps 4 through 7 before mixing any epoxy.

☐ **Step 4**

Mix a small amount of 30-minute epoxy and apply it to the exposed wood on the stabilizer.

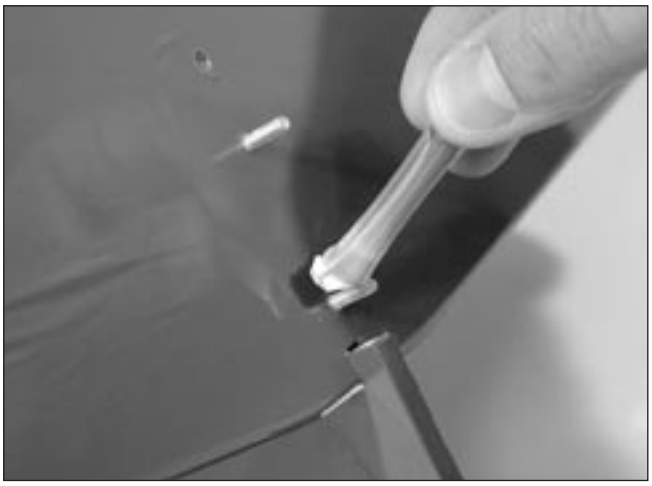


☐ **Step 5**

Re-install the fin onto the stabilizer.

☐ **Step 6**

Apply a small drop of threadlock onto each of the fin bolts.

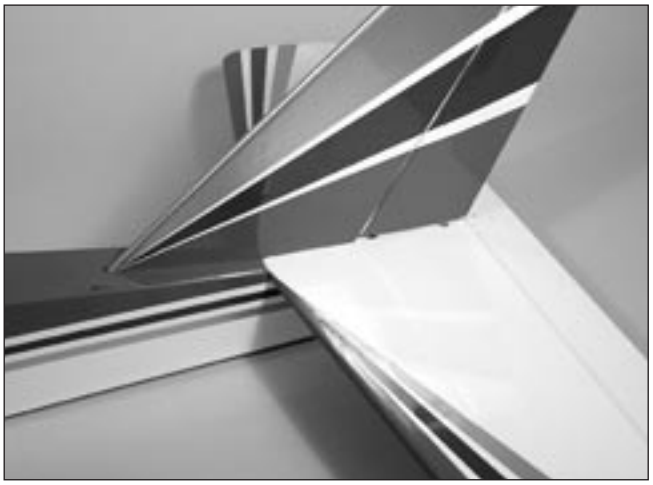


☐ **Step 7**

Slide a 3mm washer onto the fin bolts. Thread the wing nuts onto the bolts. Tighten the nuts against the stabilizer. Do not crush the wood when tightening the nuts.

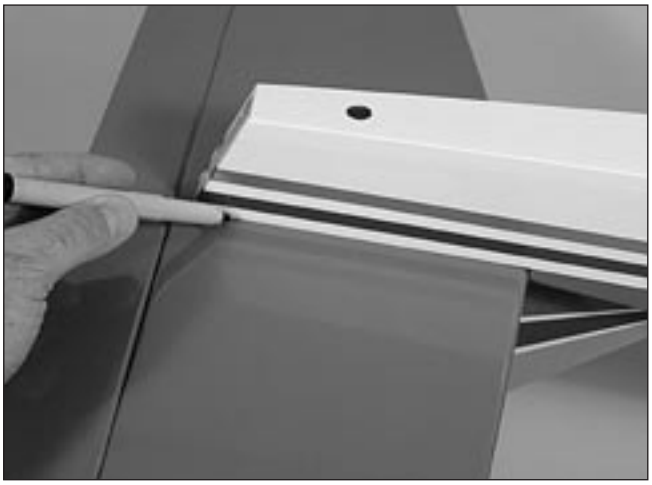
☐ **Step 8**

Place the stabilizer in position on the fuselage. The fin will fit into the slot in the fuselage when installed correctly.



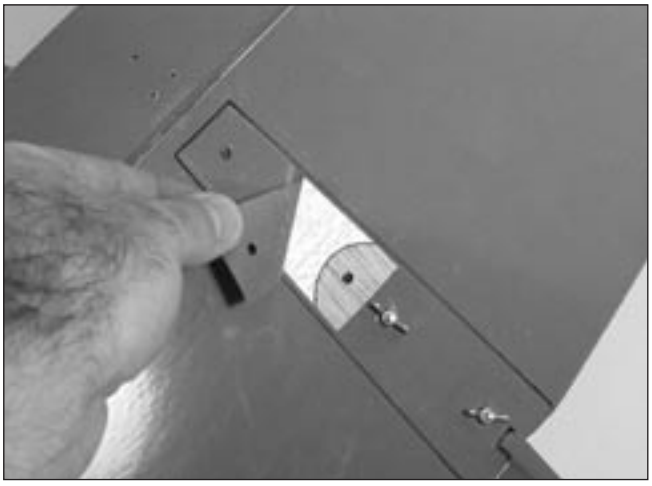
☐ **Step 9**

Trace the outline of the fuselage onto the bottom of the stabilizer using a felt-tipped pen.



☐ **Step 10**

Remove the covering from the bottom of the stabilizer using a hobby knife or soldering iron.



Note: Remove the covering from the rear of the stabilizer up to the bolt as shown.

Note: Read through and understand Steps 11 through 14 before mixing any epoxy.

☐ **Step 11**

Mix 1/2 ounce of 30-minute epoxy. Apply the epoxy to the exposed wood on the bottom of the stabilizer.

☐ **Step 12**

Place the stabilizer/fin assembly back onto the fuselage. Slide a #4 washer onto a 4-40 x 3/4" screw. Apply a drop of threadlock to the screw. Prepare two screws using this method.

Section 7: Tail Installation (Glue Attachment Option)

☐ **Step 13**

Secure the stabilizer using the two screws prepared in the previous step.

☐ **Step 14**

Remove any excess epoxy from the fuselage and stabilizer using a paper towel soaked with rubbing alcohol.

Section 8: Landing Gear Installation

Required Parts

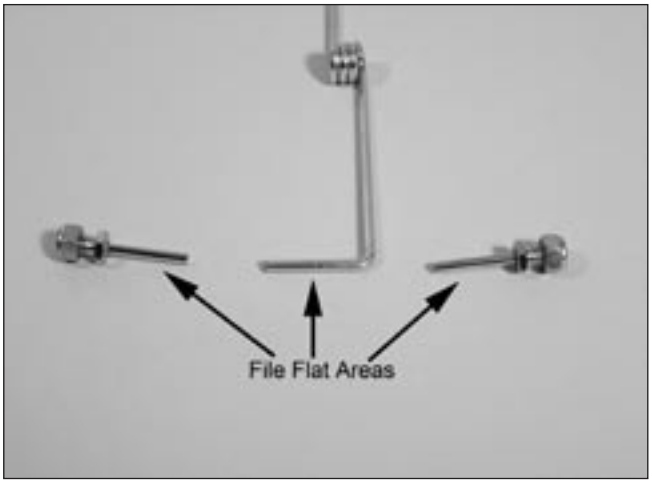
- Main landing gear
- Steering arm
- 3mm x 5mm screw (4)
- 3mm x 10mm screw
- $2^3/_4$" wheel
- 4mm x 18mm screw (2)
- Nose gear wire
- Main axle (2)
- 5/32" wheel collar (4)
- 3/32" x $17^3/_4$" wire
- 3" wheel (1)

Required Tools and Adhesives

- Phillips screwdriver
- Threadlock

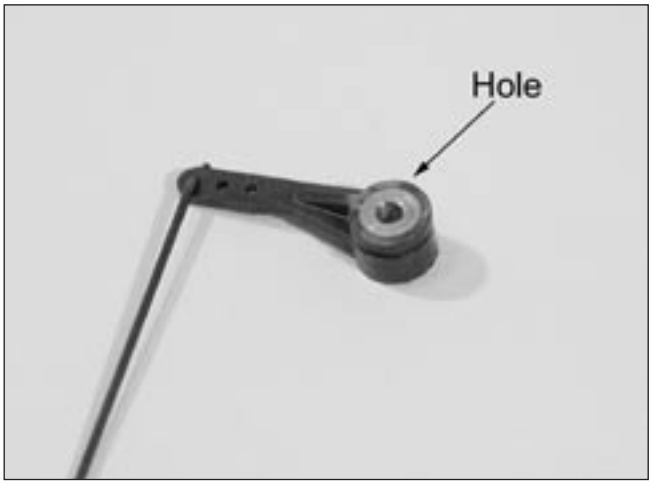
☐ Step 1

Use a file to make a flat area on both main gear and nose gear. This gives the screws an area for the wheel collars to tighten down onto. It will also keep them from rotating and falling off the landing gear.



☐ Step 2

Install the 3/32" x $17^3/_4$" wire into the outer hole in the steering arm. The Z-bend will be installed from the top of the arm as shown in the photo. The hole in the steering arm will face away from the wire.



☐ **Step 3**

Slide the wire into the steering pushrod tube. Position the steering arm in the nose gear mount.

☐ **Step 4**

Slide the nose gear wire into the nose gear mount and steering arm. Note that there is a flat area on the nose gear. This faces the front of the plane.

☐ **Step 5**

Apply a drop of threadlock on the 3mm x 8mm screw. Install the screw into the hole in the front of the steering arm. Tighten the screw onto the flat on the nose gear wire.

☐ **Step 6**

Position the main landing gear on the fuselage. The straight edge of the main landing gear faces towards the front of the fuselage. Secure the main gear using two 4mm x 18mm screws. Remember to use threadlock to prevent the screws from loosening during flight,

Section 8: Landing Gear Installation

☐☐ **Step 8**

Attach the main axles to the main landing gear using the nuts provided with the axles.

☐☐☐ **Step 9**

Install a 3" wheel onto the main landing gear. Secure the wheel using a 3mm x 5mm screw and a 5/32" wheel collar. Check to make sure the wheel can spin freely on the axle.

☐ **Step 10**

Repeat Step 9 for the remaining 3" main wheel and the $2^{3}/_{4}$" nose wheel. The nose wheel will require wheel collars on both sides of the wheel as shown.

Section 9: Engine Installation

Required Parts

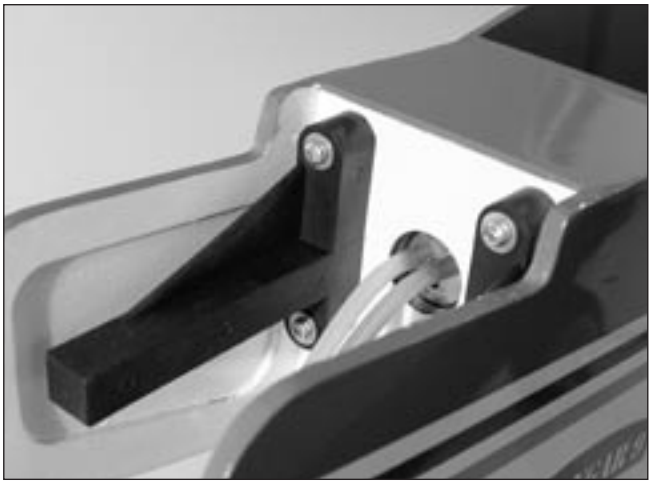
- 8-32 x 1 1/2" bolt (4)
- 8-32 x 1" bolt (4)
- 8-32 locknut (4)
- #8 washer (8)
- Engine mount

Required Tools and Adhesives

- Phillips screwdriver
- Threadlock
- 2 1/2" spinner (white)
- Ruler

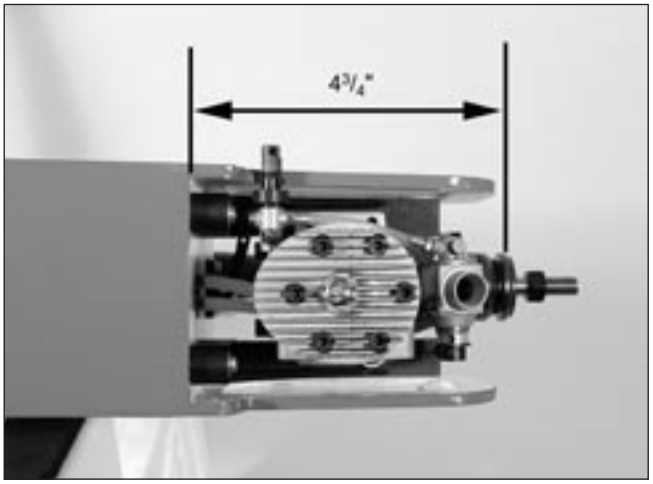
☐ **Step 1**

Position the engine mount on the firewall. Use four 8-32 x 1" screws and four #8 washers to attach the mount to the firewall. Make sure to use threadlock on the screws to prevent them from loosening during flight.



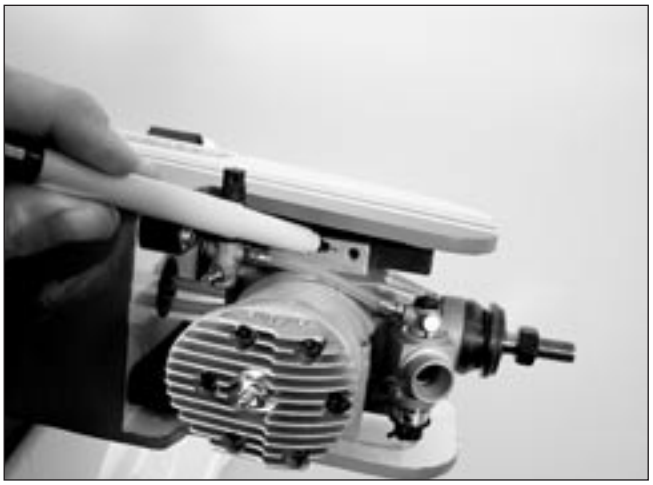
☐ **Step 2**

Slide the engine into position onto the mount as shown. Position the engine on the mount so the drive washer is 4 3/4" in front of the firewall.



☐ **Step 3**

Use a felt-tipped marker to mark the locations for the engine mounting bolts.



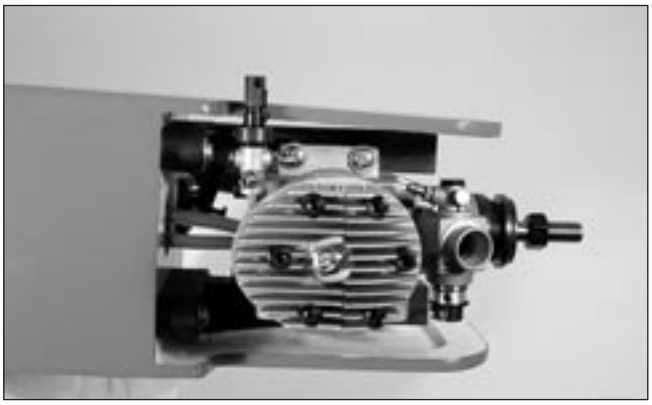
☐ **Step 4**

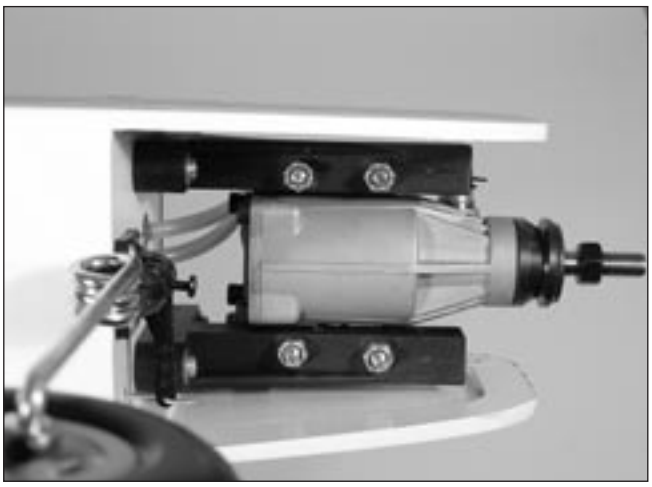
Drill four 3/16" holes at the locations marked in the previous step. It is suggested to use a drill press for the best results.

Section 9: Engine Installation

☐ **Step 5**

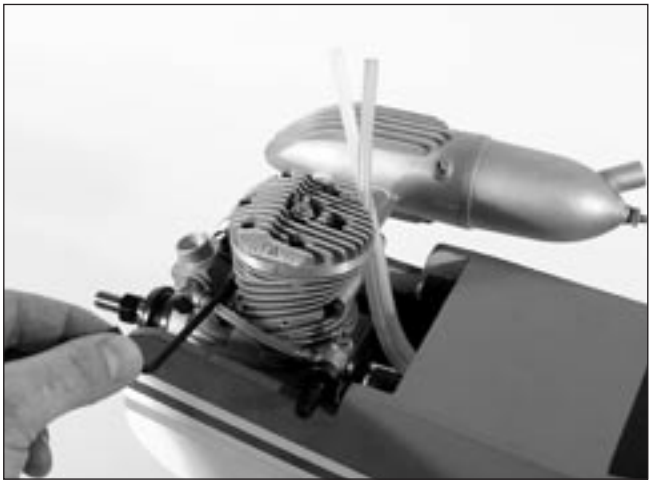
Install four 8-32 x $1^1/_2$" screws, 8-32 locknuts and #8 washers.Tighten the four screws evenly to secure the position of the engine.





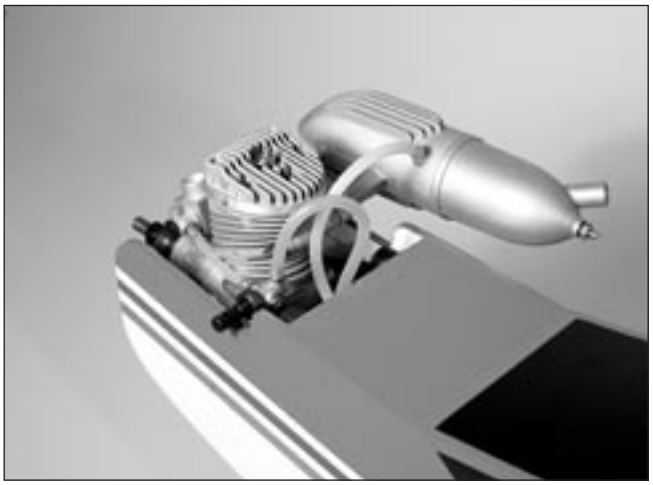
☐ **Step 6**

Use the hardware and instructions provided with the engine to attach the muffler.



☐ **Step 7**

Connect the fuel lines to the engine. The red line (vent) goes to the muffler, the green line (pickup) to the carburetor.



☐ **Step 8**

Use the instructions provided with your engine to install the propeller and spinner.

Section 10: Control Linkage Installation

Required Parts

- Nylon clevis (5)
- Nylon wire keeper (5)
- Nylon control horn (2)
- 2mm x 18mm bolt (6)
- Nylon connector keeper
- 3/32" x 15 3/4" throttle pushrod
- 3/32" x 29 3/4" rudder pushrod
- 3/32" x 32" elevator pushrod
- 3/32" x 5" aileron pushrod (2)
- Clevis retainer (5)
- Brass wire connector
- 3mm x 5mm screw

Required Tools and Adhesives

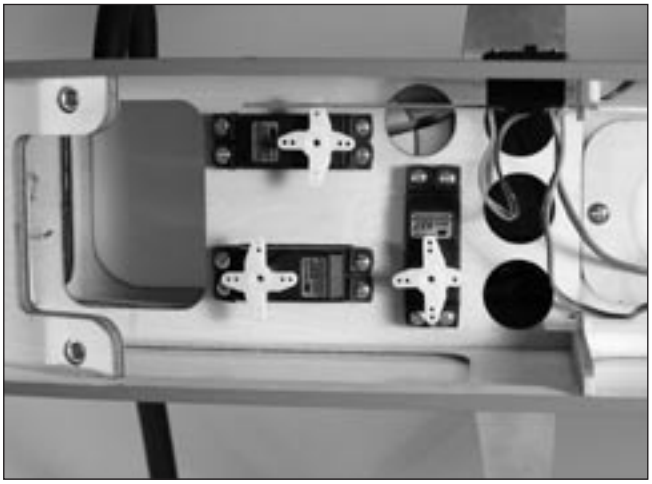
- Phillips screwdriver
- Drill
- Threadlock
- Drill bit: 5/64", 3/32"

☐ **Step 1**

Use the instructions included with your radio and charge both the transmitter and receiver batteries before starting this section. Once the batteries are fully charged, turn on both the transmitter and receiver. Check that the trim levers are centered. Move the transmitter sticks and verify the radio is working properly.

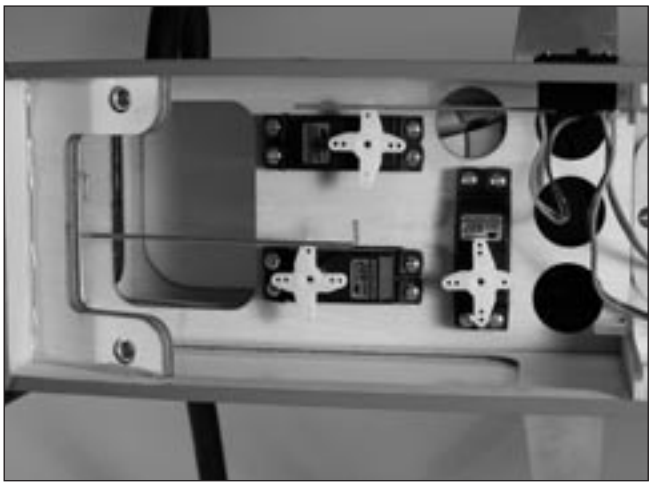
☐ **Step 2**

Install the servo arms on the servos. The radio should be on and the trim levers centered. Also have the throttle stick and trim centered when installing the arm on the throttle servo.



☐ **Step 3**

Locate the 3/32" x 32" elevator pushrod wire inside the fuselage.



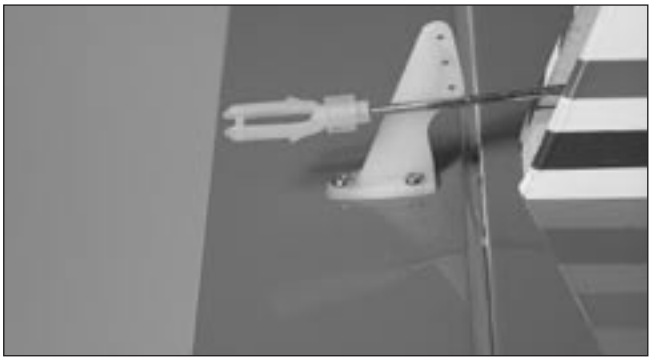
☐ **Step 4**

Install the elevator control horn using three 2mm x 18mm bolts.

Section 10: Control Linkage Installation

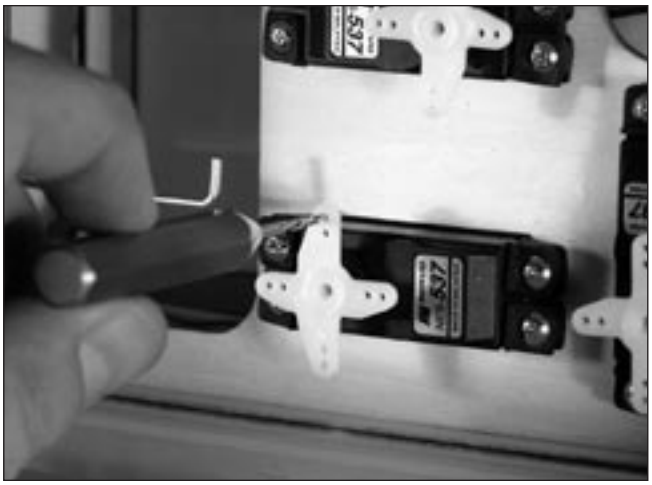
☐ **Step 5**

Place a clevis retainer onto a clevis. Thread the clevis 12 turns onto the elevator pushrod wire.



☐ **Step 6**

Drill the outer hole in the elevator servo arm using a 5/64" drill bit.



☐ **Step 7**

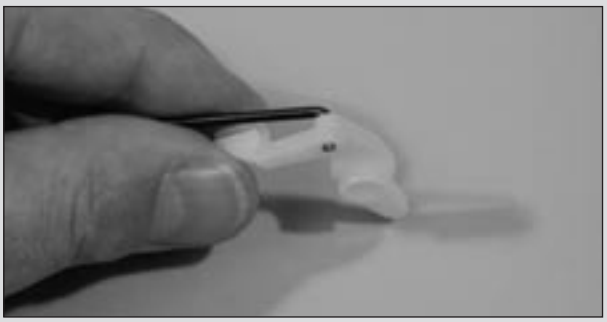
Secure the elevator pushrod wire to the servo arm using a nylon wire keeper.

Using the nylon wire keepers is simple, and they provide an excellent way to attach pushrod wires to servo arms.

The first step is to have a 90-degree bend in the pushrod wire. For the Alpha™ trainer, there 90-degree bends have already been made.

Install the bend into the servo arm. In most cases a hole will need to be drilled in the servo arm that the wire can fit through.

Place the nylon wire keeper onto the end of the pushrod wire that passes through the servo arm.



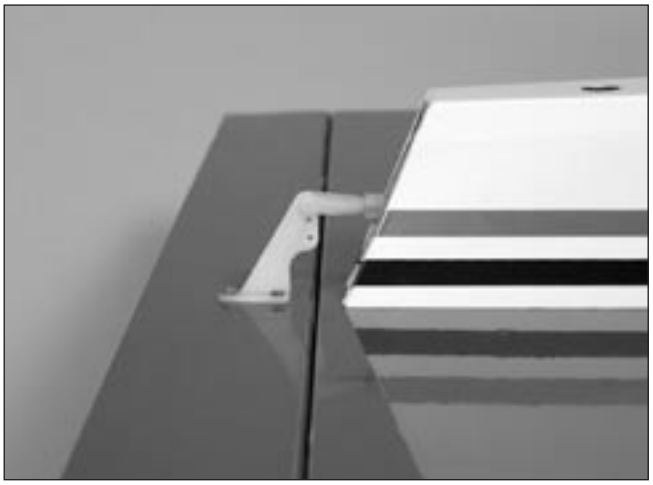
There is a notch in the keeper that runs parallel to the main pushrod wire. This allows you to snap the keeper onto the pushrod wire. It may take small pliers to get the keeper to snap onto the wire.

☐ **Step 8**

Install the screw to secure the servo arm on the servo.

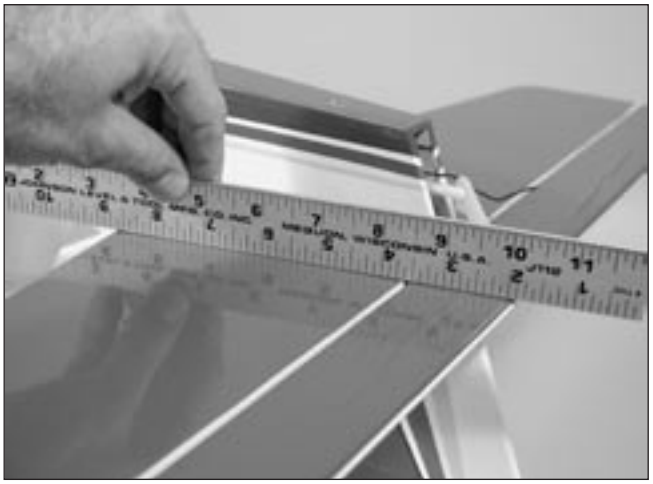
☐ **Step 9**

With the radio on, attach the clevis to the outside hole on the elevator control horn.



☐ **Step 10**

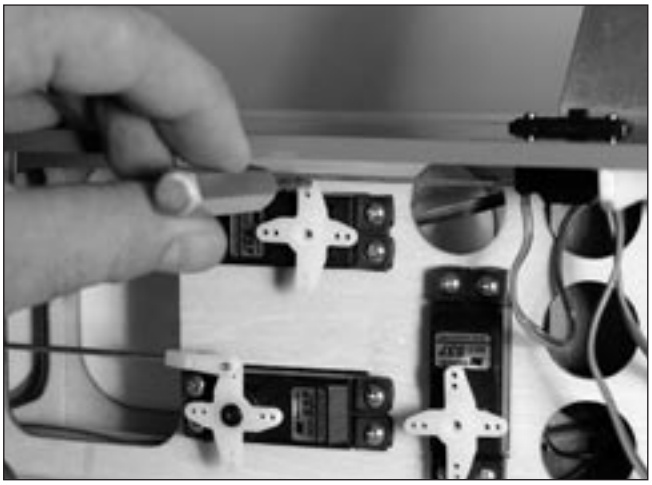
With the radio on, use a straight edge to make sure the elevator is in line with the stabilizer. If not, thread the clevis in or out on the pushrod wire until the elevator and stabilizer are in alignment.



Section 10: Control Linkage Installation

☐ **Step 11**

Drill a 3/32" hole in the outer hole in the rudder servo arm as shown.



☐ **Step 12**

Remove the servo arm. Slide the brass wire connector into the hole. Secure the connector using the nylon connector keeper.

☐ **Step 13**

Slide the steering wire through the brass wire connector. Place the servo arm back onto the rudder servo.

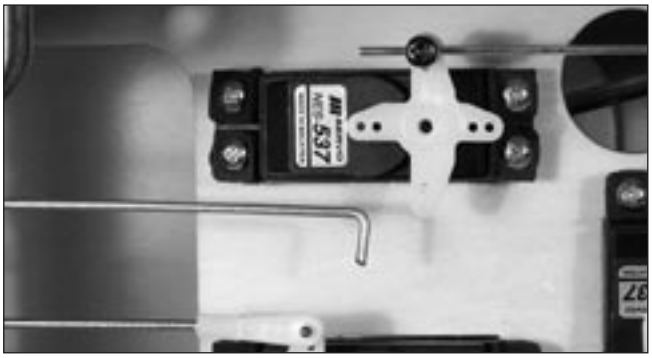
☐ **Step 14**

Position the nose wheel so it is in line with the centerline of the fuselage. Use a 3mm x 5mm screw to secure the steering pushrod wire.

Note: If your plane does not track straight on the runway, loosen the screw and adjust the nose wheel. Changing the rudder trim will change the steering trim, but will trim the rudder also. Use the trim for in-flight adjustments, and the screw for steering.

☐ **Step 15**

Locate the 3/32" x 29 3/4" rudder pushrod wire inside of the fuselage.



☐ **Step 16**

Install the rudder control horn using three 2mm x 18mm screws.

☐ **Step 17**

Place a clevis retainer onto a clevis. Thread the clevis 12 turns onto the rudder pushrod wire.

☐ **Step 18**

Drill the outer hole in the rudder servo arm using a 5/64" drill bit.

☐ **Step 19**

Secure the rudder pushrod wire to the servo arm using a nylon wire keeper.

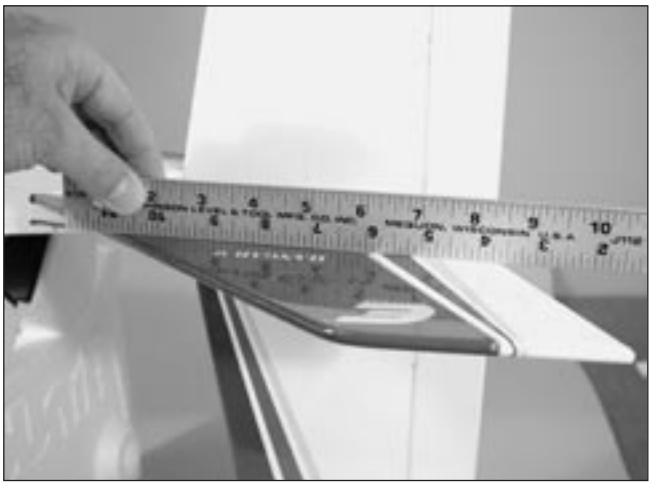
☐ **Step 20**

Attach the clevis to the center hole on the rudder control horn.

Section 10: Control Linkage Installation

☐ **Step 21**

With the radio on, use a straight edge to make sure the rudder is in line with the fin. If not, thread the clevis in or out on the pushrod wire until the rudder and fin are in alignment.

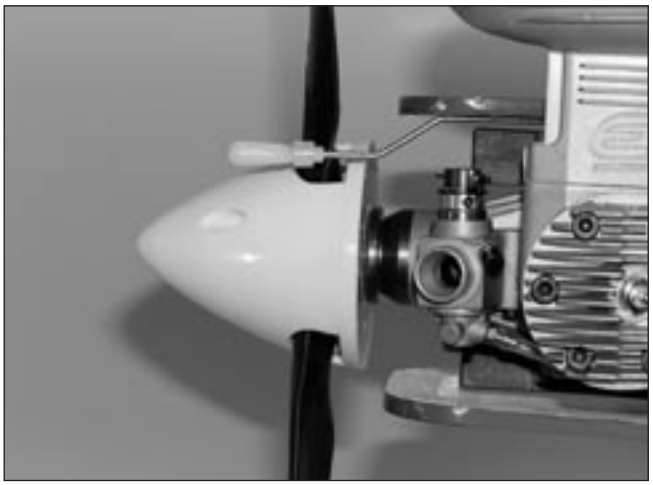


☐ **Step 22**

Install the screw in the servo arm to secure it to the servo.

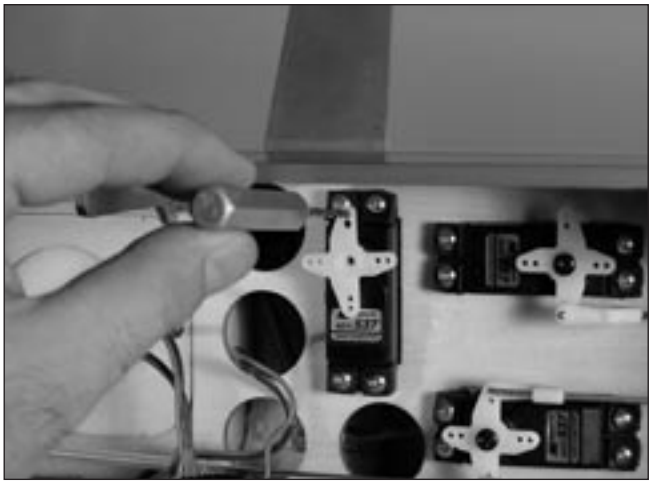
☐ **Step 23**

Locate the prebent $15\frac{3}{4}$" throttle pushrod wire. Place a clevis retainer onto a clevis. Thread the clevis 12 turns onto the throttle pushrod wire. Slide the pushrod wire into the fuselage.



☐ **Step 24**

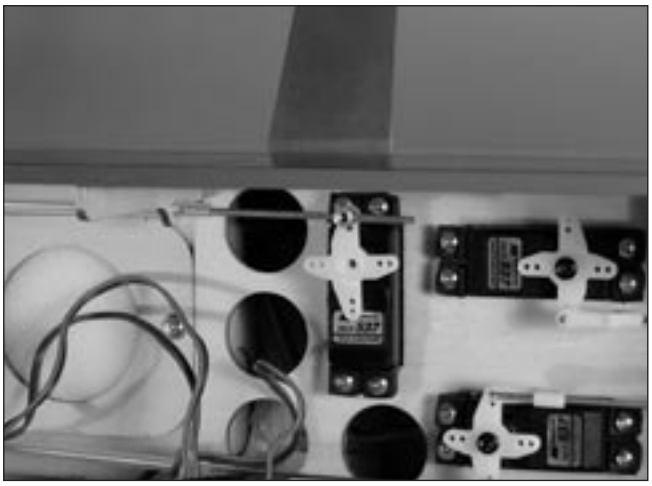
Drill both holes next to the fuselage in the throttle servo arm using a 5/64" drill bit.



Note: The next few steps may take a bit of trial and error to get the throttle operating correctly. It is suggested to work slowly until the throttle operates as described. Also, a computer radio can make this a much easier job if you happen to own one.

☐ **Step 25**

Attach a brass connector to the throttle servo arm. Slide the pushrod wire through the connector.



☐ **Step 26**

Turn on both the transmitter and receiver. Move the throttle stick to the fully open position. Attach the clevis to the carburetor control arm. At this time, it really doesn't matter which hole. Position the pushrod so the carburetor is at the "wide open" position. Temporarily tighten the screw to secure the pushrod wire.

Section 10: Control Linkage Installation

☐ **Step 27**

Move the throttle stick and trim to the closed position. The carburetor should move to the fully closed position.

If the servo is binding, you may need to reduce the amount of travel mechanically. Moving the clevis away from the center on the carburetor arm, or the linkage towards the center on the servo arm will accomplish this.

If the carburetor is not closing, you need to increase the amount of travel mechanically. Moving the clevis toward the center on the carburetor arm, or the linkage away from the center on the servo arm will accomplish this.

This is all done to allow for a full range of operation of the carburetor using the radio.

If you must move the linkage, return to Step 26 and start over the process of adjusting the clevis.

☐ **Step 28**

Move the trim lever up, but leave the stick down. The carburetor should open about 1/16".

33

☐ **Step 28**

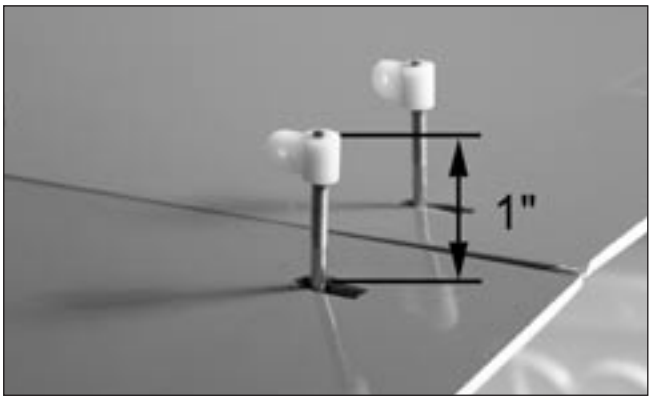
Once the throttle servo has been adjusted, install the nylon wire clevis and screw in the servo arm.

☐☐ **Step 29**

Place a clevis retainer onto a clevis. Thread the clevis 12 turns onto the 3/32" x 5" aileron pushrod wire.

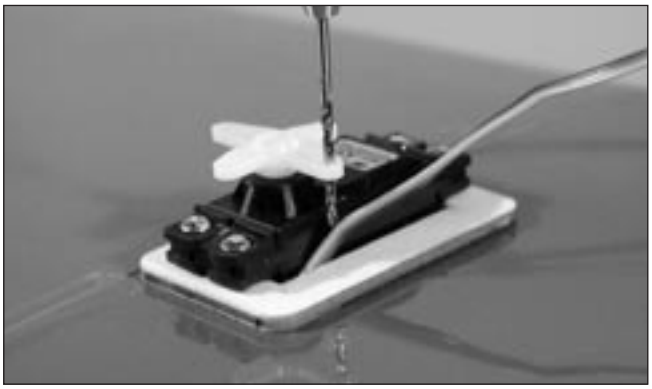
☐☐ **Step 30**

Thread a nylon control horn onto the aileron control wire. Adjust the horn so it is 1" from the surface of the wing.



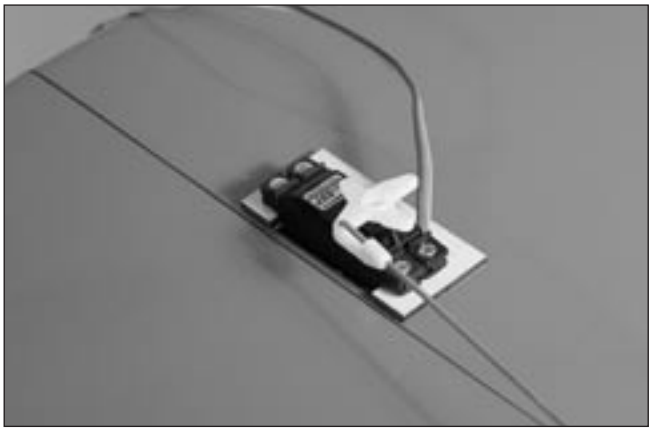
☐☐ **Step 31**

Drill the outer hole in the aileron servo arm using a 5/64" drill bit.



☐☐ **Step 32**

Secure the aileron pushrod wire to the servo arm using a nylon wire keeper.

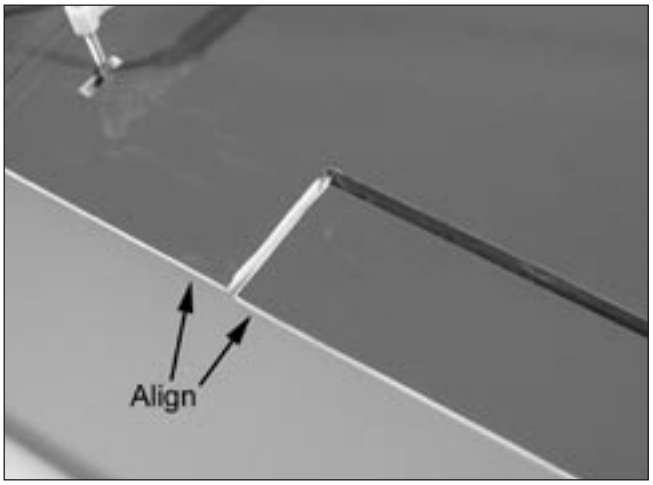


☐☐ **Step 33**

Attach the clevis to the aileron control horn.

☐☐ **Step 34**

With the radio on, check to make sure the aileron is in line with the center area of the wing. If not, thread the clevis in or out on the pushrod wire until the aileron and wing are in alignment.



☐ **Step 35**

Repeat Steps 29 through 34 for the remaining aileron linkage.

☐ **Step 36**

Install the screw in the servo arm to secure it to the servo.

Section 11: Wing Installation (Rubber Band Option)

Required Parts

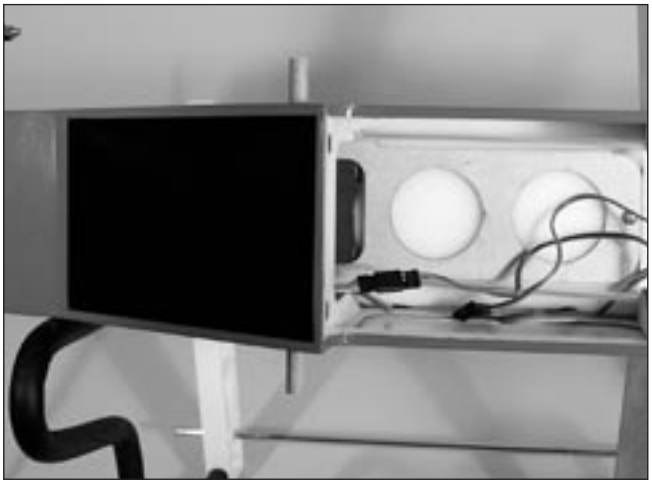
- Wing
- Wing dowel (2)
- Fuselage
- Rubber band (10)

Required Tools and Adhesives

- Medium CA

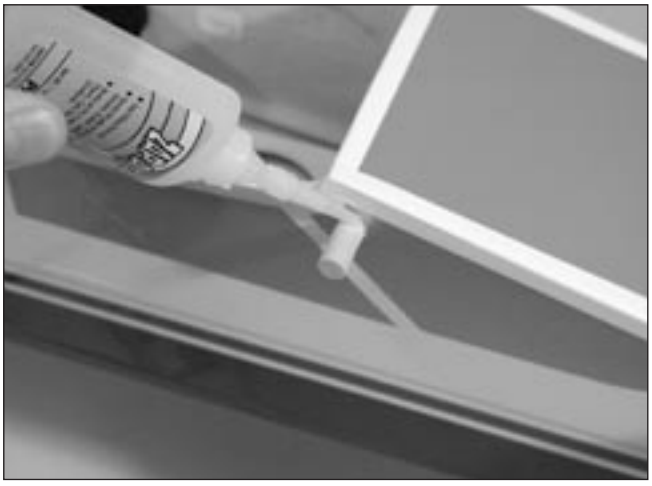
☐☐ **Step 1**

Insert one of the wing dowels into the holes in the fuselage at the front of the wing saddle. Center the dowel in the fuselage.



☐☐ **Step 2**

Apply medium CA to the dowel where it enters the fuselage. The CA will seep into fuselage, securing the wing dowel.



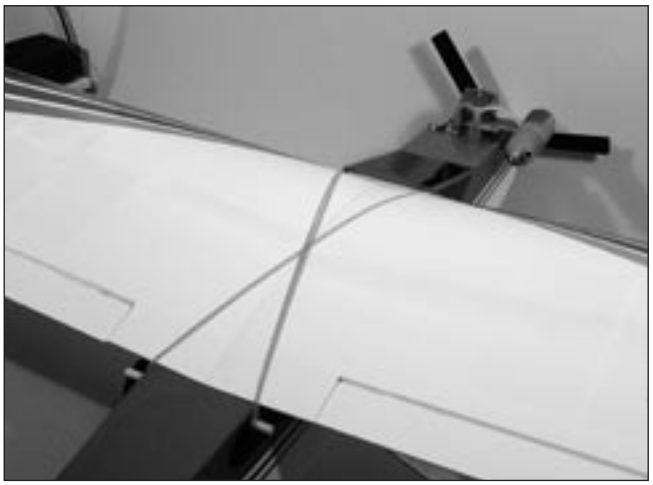
Hint: Apply a thin layer of CA to the exposed dowel to prevent fuel from soaking into the dowel.

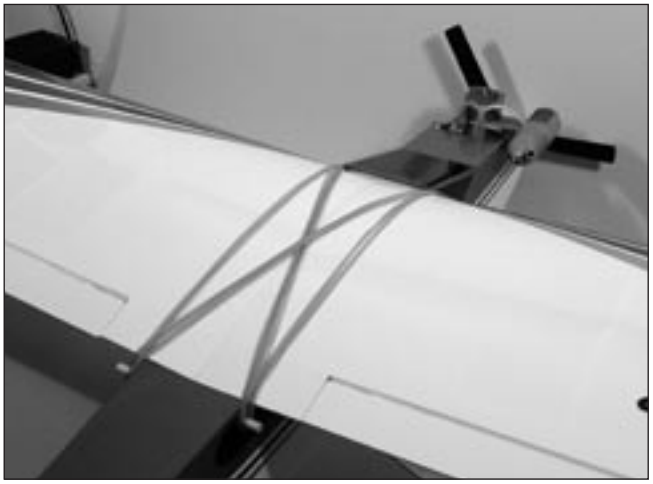
☐ **Step 3**

Repeat Steps 1 and 2 for the rear wing dowel. Allow the CA to fully cure before continuing.

☐ **Step 4**

Plug the aileron servo into the aileron extension. Attach the wing to the fuselage using 14 rubber bands. The first set of rubber bands should cross as shown. Alternate straight and crossed until all but the last two rubber bands are installed. The last two should cross, as this helps hold the other rubber bands on the dowels.





Section 11: Wing Installation (Rubber Band Option)

A good general rule is using at least two rubber bands per pound of airplane. A 5-pound plane will use 10 rubber bands. Using more than the recommended amount is fine, just don't go overboard.

When removing the rubber bands, place them in a container with a small amount of talcum powder. This will soak up some of the fuel from the rubber bands, making them last longer.

Also note: When putting on the rubber bands, start from the front dowels at the leading edge of the wing and stretch them to the dowels at the trailing edge of the wing. This applies greater pressure to the leading edge of the wing and keeps it from raising in flight.

Section 11: Wing Installation (Bolt-On Option)

Required Parts

- Wing
- Fuselage
- 1/4-20 x 2" wing bolt (2)
- Wing dowel (2)

Required Tools and Adhesives

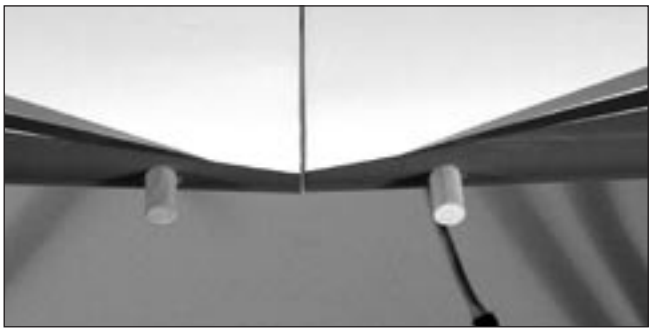
- 6-minute epoxy
- Hobby knife

☐ **Step 1**

Use a hobby knife to remove the covering to expose the wing dowel holes in the leading edge of the wing.

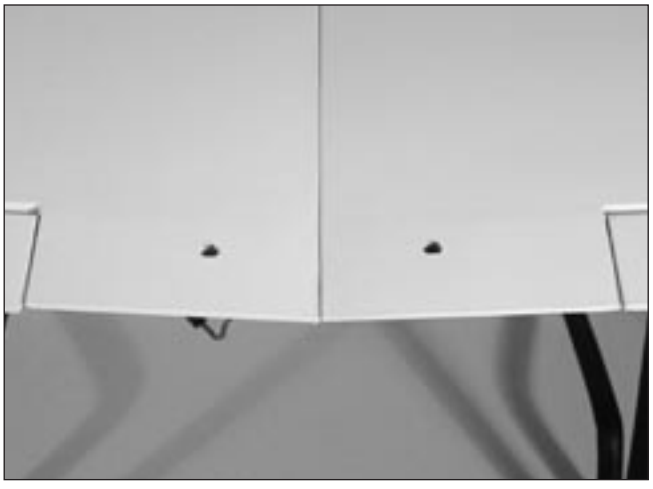
☐ **Step 2**

Use 6-minute epoxy to glue the dowels into the leading edge of the wing.



☐ **Step 3**

Use a hobby knife to remove the covering from the trailing edge of the wing using a sharp hobby knife.



Section 11: Wing Installation (Bolt-On Option)

☐ **Step 3**

Position the wing onto the fuselage. Bolt the wing into position using the two 1/4-20 x 2" wing bolts.

Section 12: Control Throws

☐ **Step 1**

Check to make sure the controls move the right direction when using the transmitter. Use the following photos to make sure things are working correctly.

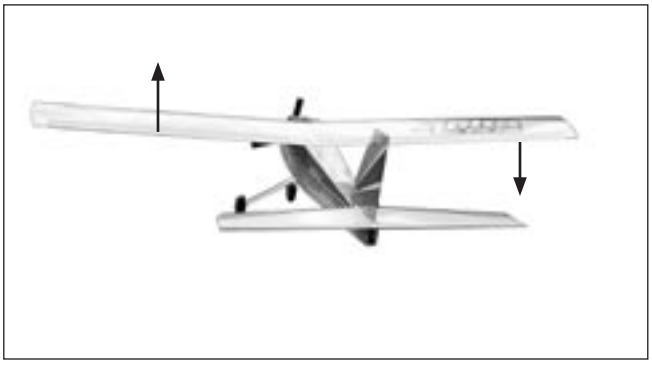


Photo for Step 1

Photo for Step 1

Photo for Step 1

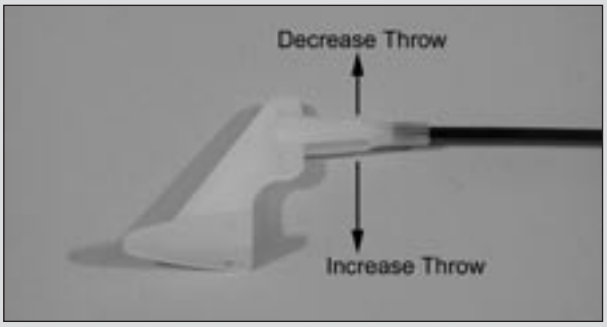
Photo for Step 1

☐ **Step 2**

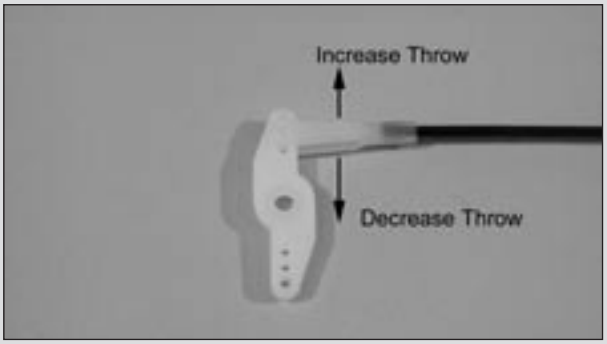
Adjust the amount of control throw on each surface as indicated. Control throws are measured at the widest part of the elevator, rudder, and aileron.

Elevator	1/2" up	1/2" down
Rudder	$1\frac{1}{4}$" right	$1\frac{1}{4}$" left
Aileron	3/8" up	3/8" down

The amount of control throw should be adjusted as closely as possible using mechanical means, rather than making large changes electronically at the radio. By moving the position of the clevis at the control horn toward the outermost hole, you will decrease the amount of control throw of the control surface. Moving the clevis toward the control surface will increase the amount of throw.



Moving the pushrod wire at the servo arm will have the opposite effect: Moving it closer to center will decrease throw, and away from center will increase throw. Work with a combination of the two to achieve the closest or exact control throws listed.



☐ **Step 3**

Once the control throws have been set, slide the clevis retainers onto the clevises. This will prevent them from opening during flight due to vibration.

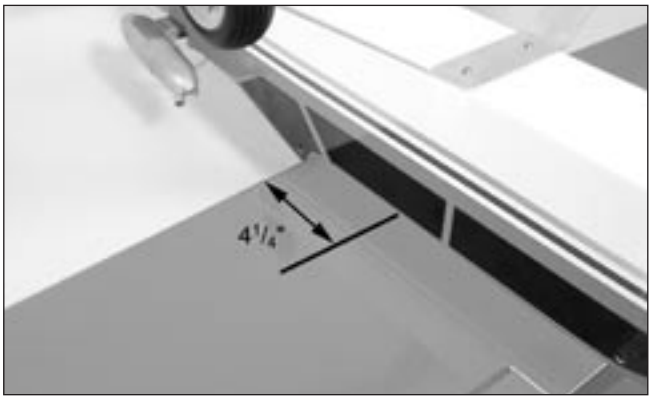
Section 13: Center of Gravity

An important part of preparing the aircraft for flight is properly balancing the model.
Do not inadvertently skip this step!
This is especially important when various engines are mounted.

The recommended Center of Gravity (CG) location for the Alpha is $4^1/_4$" behind the leading edge of the wing against the fuselage.

☐ **Step 1**

Turn the wing (and plane, if assembled) upside down. Where the sheeting stops on the underside of the wing, measure back $4^1/_4$" from the leading edge of the wing and use a felt-tipped pen at the location. This will be the balance point.

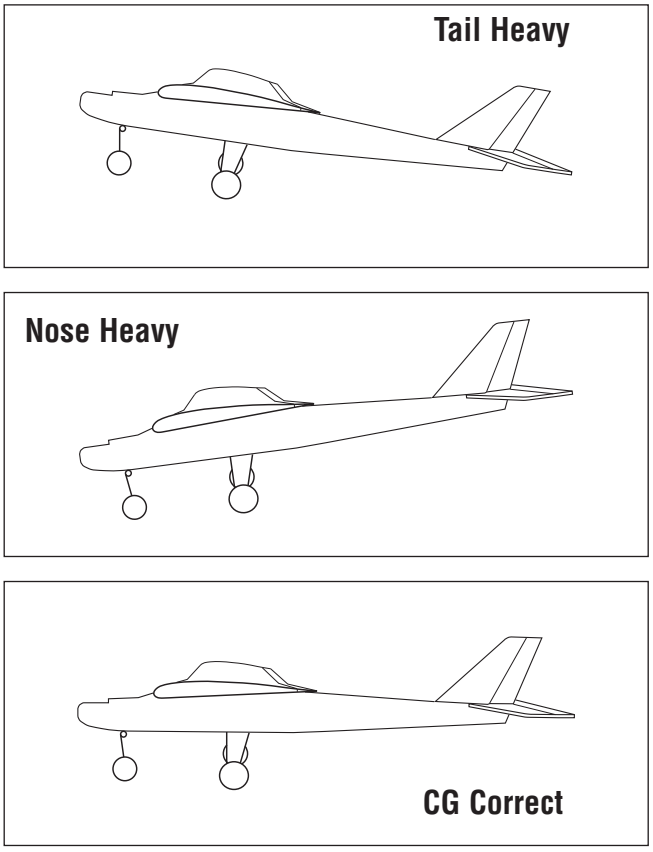


☐ **Step 2**

Attach the wing as described in Section 11. Turn the model upright and lift the model at the marks made in the previous step. It should balance with the fuselage level or with the nose down slightly when balanced correctly.

If the plane hangs with the tail down, some weight must be added to the nose of the plane.

If the plane hangs with the nose down, weight must be added to the tail of the plane to correct the balance.



Stick-on weights are available at your local hobby shop and work well for this purpose.

Section 14: Range Testing the Radio

Before each flying session, range-check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane. With your airplane on the ground, you should be able to walk 30 paces away from your airplane and still have complete control of all functions. If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

Section 15: Adjusting the Engine

☐ **Step 1**

Completely read the instructions included with your engine and follow the recommended break-in procedure.

☐ **Step 2**

At the field, adjust the engine to a slightly rich setting at full throttle and adjust the idle and low-speed needle so that a consistent idle is achieved.

☐ **Step 3**

Before you fly, be sure that your engine idles reliably, transitions and runs at all throttle settings. Only when this is achieved should any plane be considered ready for flight.

Section 16: Preflight

> **Note**: If this is your first RC model, it is highly recommended you seek the assistance of a qualified RC flight instructor. Do not attempt to fly the model alone.

Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases the radio should be charged the night before going out flying.

Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the engine and make sure it transitions smoothly from idle to full throttle and back. Also ensure the engine is tuned according to the manufacturer's instructions, and it will run consistently and constantly at full throttle when adjusted.

Check all the control horns, servo horns and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

Glossary of Terms

- Ailerons: Each side of this airplane has a hinged control surface (aileron), located on the trailing edge of the wing. Move the aileron stick on the transmitter left, the left aileron moves up and the right aileron moves down. Moving the left aileron up causes more drag and less lift, causing the left wing to drop down. When the right aileron moves down, more lift is created, causing the right wing to rise. This interaction causes the airplane to turn or roll to the left. Perform the opposite actions, and the airplane will roll to the right..
- Clevis: The clevis connects the wire end of the pushrod to the control horn of the control surface. A small clip, the clevis has fine threads so that you can adjust the length of the pushrod.
- Control Horn: This arm connects the control surface to the clevis and pushrod.
- Dihedral: The degree of angle (V-shaped bend) at which the wings intersect the fuselage is called dihedral. More dihedral gives an airplane more aerodynamic stability. Some sailplanes and trainer planes with large dihedral dispense with ailerons and use only the rudder to control the roll and yaw.
- Elevator: The hinged control surface on the back of the stabilizer that moves to control the airplane's pitch axis. Pulling the transmitter's control stick toward the bottom of the transmitter moves the elevator upward, and the airplane begins to climb. Push the control stick forward, and the airplane begins to dive.
- Fuselage: The main body of an airplane.
- Hinge: Flexible pieces used to connect the control surface to the flying surface. All hinges must be glued properly and securely to prevent the airplane from crashing. (This has already been done for you on the Alpha Advanced trainer.)
- Horizontal Stabilizer: The horizontal flying surface of the tail gives the airplane stability while in flight.
- Leading Edge: The front of a flying surface.
- Main Landing Gear: The wheel and gear assembly the airplane uses to land. It is attached to the bottom of the fuselage.
- Nose Gear: The part of the landing gear that is attached to the nose of the fuselage. The nose gear is usually connected to the rudder servo to help you steer the airplane on the ground.
- Pitch Axis: The horizontal plane on which the airplane's nose is raised or lowered. By moving the elevator, you can raise the airplane's nose above the pitch axis (climb) or lower it below the pitch axis (dive).
- Pushrod: The rigid mechanism that transfers movement from the servo to the control surface.
- Roll Axis: The horizontal plane on which the airplane's wings are raised or lowered. By adjusting the ailerons, you can drop a wing tip below the roll axis and cause the airplane to bank or roll.
- Rudder: The hinged control surface on the vertical stabilizer that controls the airplane's yaw. Moving the rudder to the left causes the airplane to yaw left; moving the rudder to the right causes it to yaw right.
- Servo: The servo transforms your ground commands into physical adjustments of the airplane while it's in the air.
- Servo Output Arm: A removable arm or wheel that connects the servo to the pushrod (also called servo horn).
- Spinner: Term describing the nose cone that covers the propeller hub.
- Threadlock: A liquid that solidifies; used to prevent screws from loosening due to vibration.
- Torque Rods: Inserted into the ailerons, these rigid wire rods run along the wing's trailing edge, then bend downward and connects to the pushrod.
- Vertical Stabilizer: The vertical flying surface of the tail gives an airplane stability while in flight.
- Wheel Collar: The round retaining piece that anchors wheels in place on the wheel axle.
- Wing: The lifting surface of an airplane.
- Yaw Axis: The vertical plane through which the airplane's nose rotates as it yaws to the left or to the right. The rudder controls the yaw axis.

2004 Official AMA National Model Aircraft Safety Code

Effective January 1, 2003
Model Flying MUST be in accordance with this Code in order for AMA Liability Protection to apply.

GENERAL

1) I will not fly my model aircraft in sanctioned events, air shows or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.

2) I will not fly my model higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way 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.

4) The maximum takeoff weight of a model is 55 pounds, except models flown under Experimental Aircraft rules.

5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. (This does not apply to models while being flown indoors.)

6) I will not operate models with metal-bladed propellers or with gaseous boosts, in which gases other than air enter their internal combustion engine(s); nor will I operate models with extremely hazardous fuels such as those containing tetranitromethane or hydrazine.

7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind) including, but not limited to, rockets, explosive bombs dropped from models, smoke bombs, all explosive gases (such as hydrogen-filled balloons), ground mounted devices launching a projectile. The only exceptions permitted are rockets flown in accordance with the National Model Rocketry Safety Code or those permanently attached (as per JATO use); also those items authorized for Air Show Team use as defined by AST Advisory Committee (document available from AMA HQ). In any case, models using rocket motors as a primary means of propulsion are limited to a maximum weight of 3.3 pounds and a G series motor. (A model aircraft is defined as an aircraft with or without engine, not able to carry a human being.)

8) I will not consume alcoholic beverages prior to, nor during, participation in any model operations.

9) Children under 6 years old are only allowed on the flight line as a pilot or while under flight instruction.

RADIO CONTROL

1) I will have completed a successful radio equipment ground range 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 flier, unless assisted by an experienced helper.

3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.

4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission. (Only properly licensed Amateurs are authorized to operate equipment on Amateur Band frequencies.)

2004 Official AMA National Model Aircraft Safety Code

5) Flying sites separated by three miles or more are considered safe from site-to site interference, even when both sites use the same frequencies. Any circumstances under three miles separation require a frequency management arrangement, which may be either an allocation of specific frequencies for each site or testing to determine that freedom from interference exists. Allocation plans or interference test reports shall be signed by the parties involved and provided to AMA Headquarters. Documents of agreement and reports may exist between (1) two or more AMA Chartered Clubs, (2) AMA clubs and individual AMA members not associated with AMA Clubs, or (3) two or more individual AMA members.

6) For Combat, distance between combat engagement line and spectator line will be 500 feet per cubic inch of engine displacement. (Example: .40 engine = 200 feet.); electric motors will be based on equivalent combustion engine size. Additional safety requirements will be per the RC Combat section of the current Competition Regulations.

7) At air shows or model flying demonstrations, a single straight line must be established, one side of which is for flying, with the other side for spectators.

8) With the exception of events flown under AMA Competition rules, after launch, except for pilots or helpers being used, no powered model may be flown closer than 25 feet to any person.

9) Under no circumstances may a pilot or other person touch a powered model in flight.

Organized RC Racing Event

10) An RC racing event, whether or not an AMA Rule Book event, is one in which model aircraft compete in flight over a prescribed course with the objective of finishing the course faster to determine the winner.

A. In every organized racing event in which contestants, callers and officials are on the course:

1. All officials, callers and contestants must properly wear helmets, which are OSHA, DOT, ANSI, SNELL or NOCSAE approved or comparable standard while on the racecourse.

2. All officials will be off the course except for the starter and their assistant.

3."On the course" is defined to mean any area beyond the pilot/staging area where actual flying takes place.

B. I will not fly my model aircraft in any organized racing event which does not comply with paragraph A above or which allows models over 20 pounds unless that competition event is AMA sanctioned.

C. Distance from the pylon to the nearest spectator (line) will be in accordance with the current Competition Regulations under the RC Pylon Racing section for the specific event pending two or three pylon course layout.

11) RC night flying is limited to low-performance models (less than 100 mph). The models must be equipped with a lighting system that clearly defines the aircraft's attitude at all times.

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