

P-51B Mustang 32e ARF

Assembly Manual



Notice

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, Inc. For up-to-date product literature, visit <http://www.horizonhobby.com> and click on the support tab for this product.

Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.



WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product and NOT a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, Inc. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.



Warnings

Read and follow all instructions and safety precautions before use. Improper use can result in fire, serious injury and damage to property.

Age Recommendation: Not for children under 14 years. This is not a toy.

COMPONENTS

Use only with compatible components. Should any compatibility questions exist please refer to the product instructions, the component instructions or contact Horizon Hobby, Inc.

FLIGHT

Fly only in open areas to ensure safety. It is recommended flying be done at AMA (Academy of Model Aeronautics) approved flying sites. Consult local laws and ordinances before choosing a location to fly your aircraft.

PROPELLER

Keep loose items that can get entangled in the propeller away from the prop, including loose clothing, or other objects such as pencils and screwdrivers. Especially keep your hands away from the propeller as injury can occur.

BATTERIES



Notes on Lithium Polymer Batteries

When misused, lithium polymer batteries are significantly more volatile than alkaline or Ni-Cd/ Ni-MH batteries used in RC applications. Always follow the manufacturer's instructions when using and disposing of any batteries. Mishandling of Li-Po batteries can result in fire causing serious injury and damage.

SMALL PARTS

This kit includes small parts and should not be left unattended near children as choking and serious injury could result.

SAFETY PRECAUTIONS

- Check all control surfaces prior to each takeoff.
- Do not fly your model near spectators, parking areas or any other area that could result in injury to people or damage of property.
- Do not fly during adverse weather conditions. Poor visibility can cause disorientation and loss of control of your aircraft. Strong winds can cause similar problems.
- Do not take chances. If at any time during flight you observe any erratic or abnormal operation, land immediately and do not resume flight until the cause of the problem has been ascertained and corrected. Safety can never be taken lightly.
- Do not fly near power lines.

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Introduction

The razorback P-51B Mustang was the first Mustang to match North American's sleek airframe with the awesome power of a Rolls-Royce Merlin engine. It was this Mustang that gave the Allies their first truly capable bomber escort and Luftwaffe pilots their first taste of things to come.

The E-flite® Platinum Series P-51B Mustang 32e ARF expertly captures the look and feel of this landmark WWII fighter with a scale outline so faithful to form as to be practically indistinguishable from the real thing. Every detail has been pushed to the limits of model size and engineering with features like concealed pocket hinges, airfoil-shaped tail surfaces, aluminum painted spinner, and a painted fiberglass cowl that blends seamlessly into the fuselage.

You can push the scale realism even further with options like electric retracts, a full depth cockpit, static 4-bladed propeller, and functional bomb/drop tank wing mounts. The model has been designed to accept all of these options with minimal modification. And when you're done, you will have a competition-level scale Mustang that will make every flight unforgettable.

Important Information Regarding Warranty Information

Please read our Warranty and Liability Limitations section on Page 42 before building this product. If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Specifications

Wingspan:	52.0 in (1320mm)
Wing Area:	460 sq in (29.7 sq dm)
Length:	45.5 in (1160mm)
Weight with Battery:	5.25–6.00 lb (2.40–2.70 kg)
Weight w/o Battery:	4.50–5.00 lb (2.00–2.30 kg)

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 its completion. Steps with a single circle (○) are performed once, while steps with two circles (○○) 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.

Contents of Kit/Parts Layout

Replacement Parts

EFL4575001	Wing Set
EFL4575002	Fuselage
EFL4575003	Tail Set
EFL4575004	Rudder
EFL4575005	Cowling
EFL4575006	Belly Scoop
EFL4575007	Pushrod Set
EFL4575008	Bomb Set
EFL4575011	Hardware Pack
EFL4575015	3-inch Aluminum Spinner



Covering Colors

HANU904	Olive Drab
HANU882	Light Gray
HANU870	White

Hardware/Accessory Sizes

Main wheel diameter	2 ¹ / ₂ -inch (63mm)
Tail wheel diameter	1-inch (25mm)
Nylon wing bolt	10-32 x 2 ¹ / ₂ -inch

Recommended Radio Equipment

You will need a minimum 5-channel transmitter, receiver and six servos. You can choose to purchase a complete radio system. If you are using an existing transmitter, just purchase the other required equipment separately. We recommend the crystal-free, interference-free Spektrum™ DX8 2.4GHz DSM² 8-channel system. If using your own transmitter, we recommend the following radio equipment.

If you own the Spektrum DX8 radio, or you are using a different DSM2 radio, just add the AR7600 DSM²™ 7-channel receiver and six JR SPORT™ MC35 servos.

Complete Radio System

SPM8800	DX8 DSM2 8CH system
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Or Purchase Separately

SPMAR7600	AR7600 DSM2 6-Channel Full-Range Receiver
JSP20030	MC35 Servo (6)
JSP98030	12-inch (305mm) Servo Extension (2) aileron servo inside wing
JRPA135	Y-harness (2) flaps and aileron to receiver
JSP98100	3-inch (76mm) Servo Extension Ordinance servo to receiver
EFLRS75	Sub Micro Servo (optional ordinance servo)
JRPA211	Offset Servo Horn

Power 32 Motor Setup (Recommended)

EFLM4032A	Power 32 Brushless Outrunner Motor, 770Kv
EFLA1060	60-Amp Pro Switch-Mode BEC Brushless ESC
EFLB32004S30	3200mAh 4S 14.8V 30C Li-Po, 12AWG EC3
APC13065E	13 x 6.5E Electric Propeller, Thin

Power 25 Motor Setup

EFLM4025A	Power 25 BL Outrunner Motor, 870Kv
EFLA1060	60-Amp Pro Switch-Mode BEC Brushless ESC
EFLB32004S30	3200mAh 4S 14.8V 30C Li-Po, 12AWG EC3
APC11080E	11 x 8E Electric Propeller

Optional Accessories

EFLA110	Power Meter
EFLC505	Intelligent 1- to 5-Cell Balancing Charger
EFLAEC312	Charge Lead with 12-inch Wire and Jacks, 16AWG

Optional Retracts

EFLG310	85-degree Electric Retracts
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Optional Scale Accessories

EFL4575012	Decals Set Ill Wind
EFL4575013	Decal Set Bee
EFL4575014	Decal Set Turnip Termite
EFL4575008	Bomb Set
EFL4575009	Drop Tank Set
EFL4575010	Scale Prop and Spinner
HAN9108	Scale Pilot Bust

Required Tools and Adhesives

Tools & Equipment

Balancing stand	Covering iron
Epoxy brush	Felt-tipped pen
Flat file	Flat blade screwdriver
Low-tack tape	Mixing cups
Mixing sticks	Open end wrench: 12mm
Paper towels	Petroleum jelly
Pin vise	Rotary tool with cut-off wheel
Rubbing alcohol	Ruler
Scissors	Side cutter
String	Tapered propeller reamer
Toothpick	Plastic squeegee
Spray bottle	Dishwashing liquid
Trim seal tool	
Drill bit: 5/64-inch (2mm)	
Hobby knife with #11 blade	
Hex wrench or ball driver: 1.5mm, 2.5mm, 3mm 3/32-inch	
Phillips screwdriver: #1, #2	

Adhesives

12-minute epoxy	30-minute epoxy
Threadlock	Hinge glue
Medium CA	Thin CA

E-tips

During the course of building your model we suggest you use a soft base for the building surface.

Such things as a foam stand, large piece of bedding foam or a thick bath towel will work well and help protect the model from damage during assembly. This is not shown in the instructions to provide the greatest detail in the photos.

Hinging the Control Surfaces

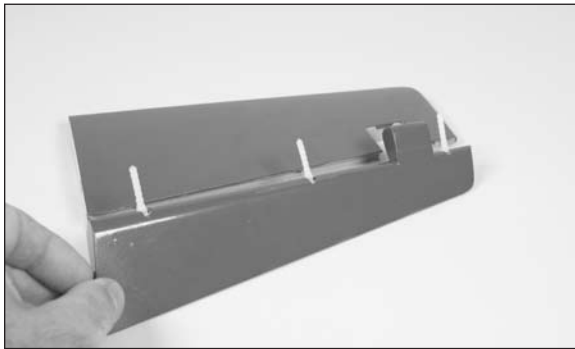
Required Parts

Fuselage Rudder
Nylon hinge (20 total)
Stabilizer and elevator (right and left)
Hinge template: rudder, elevator and aileron
Wing panel with control surfaces (right and left)

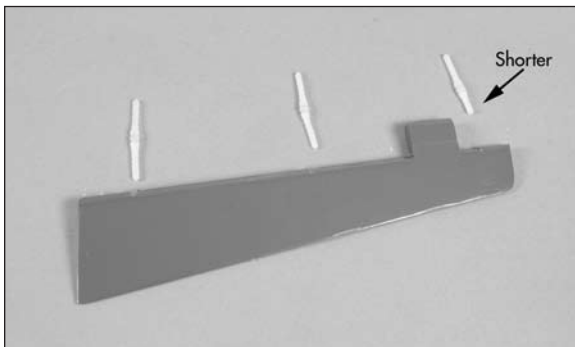
Required Tools and Adhesives

Covering iron Trim seal tool
Petroleum jelly Paper towel
Toothpick Ruler
Felt-tipped pen Hinge glue
Water

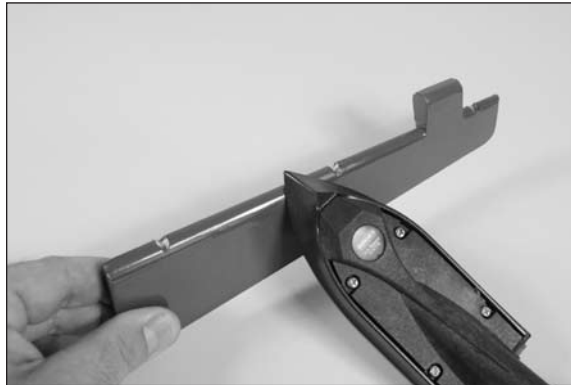
- 1. Locate the stabilizer assembly. Carefully remove the elevator from the stabilizer.



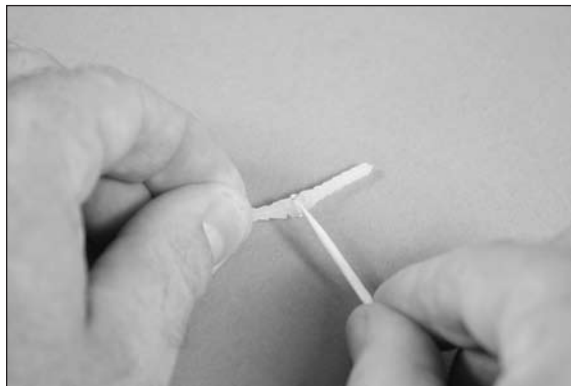
- 2. Remove the hinges from the elevator. Note that the hinge at the tip has been trimmed shorter than the remaining hinges.



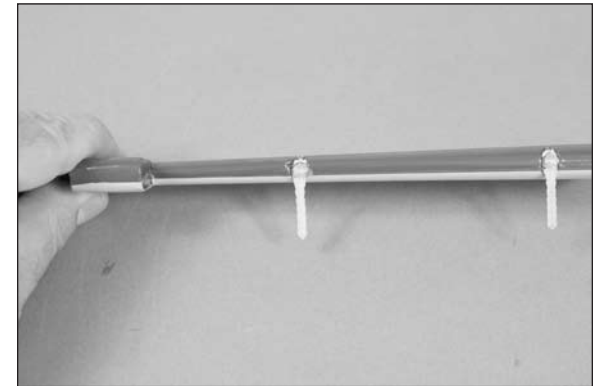
- 3. Use a trim seal tool and covering iron to iron the covering down on the control surface. Make sure the covering is smooth around the hinge line or it might bind when installed.



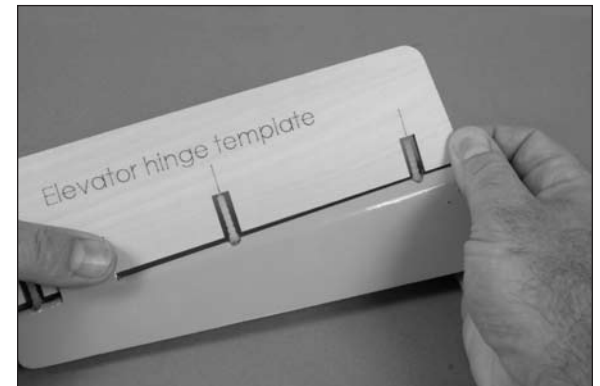
- 4. Prepare the hinges by applying a small amount of petroleum jelly using a toothpick to the knuckle of the hinge. Work the hinge so the petroleum jelly penetrates the hinge. The petroleum jelly will keep the adhesive from entering the knuckle, causing the hinge to bind.



- 5. Insert the hinges into the control surface. Flex the hinge in the direction of the control deflection. Check that the hinge is perpendicular to the hinge line.



- 6. Check the depth of the hinges using the appropriate template. The template will rest flush against the hinge line with the end of the hinge just touching the template as shown in line with the center of the control surface.



Etips

Read through the following steps on positioning the hinges before applying any glue. Improper installation of the hinges will cause the control surfaces to bind, which can cause premature drain on the battery or even damage to the servos.

- ○ 7. Remove the hinges and apply a small amount of hinge glue in each of the holes in the control surface for the hinges. Follow Steps 5 and 6 to insert the hinges in the control surface. Allow the adhesive to fully cure before attaching the control surface. Attaching the control surface before the adhesive cures may change the location of the hinge and cause binding.



- ○ 8. Once the hinges are in place, use a paper towel and the appropriate solvent (water for hinge glue, rubbing alcohol for epoxy) to remove any excess adhesive that may have seeped out when the hinges were installed.

- ○ ○ ○ ○ 9. Repeat Steps 1 through 8 for the remaining stabilizer and elevator, as well as the ailerons and rudder. Do not hinge the flaps at this time.

- 10. While the hinge glue is curing, use a covering iron or trim seal tool to iron the covering on the fixed surface. Make sure the covering has no wrinkles and is ironed tightly, especially near the hinge line of the surfaces. Check the stabilizers, wing and fuselage at this time.



E-tips

Read through the following steps on positioning the control surfaces before applying any glue. Improper installation of the surfaces will cause the control surfaces to bind, which can cause premature drain on the battery or even damage to the servos.

E-tips

Ensure you have at least this much control throw when surfaces are installed.

Elevator:

1/2-inch (13mm) up and down

Aileron:

3/8-inch (9mm) up and down

Rudder:

1 1/4-inch (32mm) right and left

- ○ 11. Fit the control surface to the fixed surface. Check that the control surface can move to the throws specified without any binding. If binding occurs, adjust the position or determine where the binding is occurring and correct as necessary.



- ○ 12. Remove the control surface and apply a small amount of hinge glue in each of the holes in the fixed surface for the hinges. Insert the hinges, attaching the control surface and fixed surface. Allow the adhesive to fully cure before proceeding.



- ○ 13. Once the hinges are in place, use a paper towel and water to remove any excess adhesive that may have seeped out when the hinges were installed.

- ○ ○ ○ ○ 14. Repeat Steps 11 through 13 for the remaining stabilizer and elevator, as well as the ailerons and rudder.

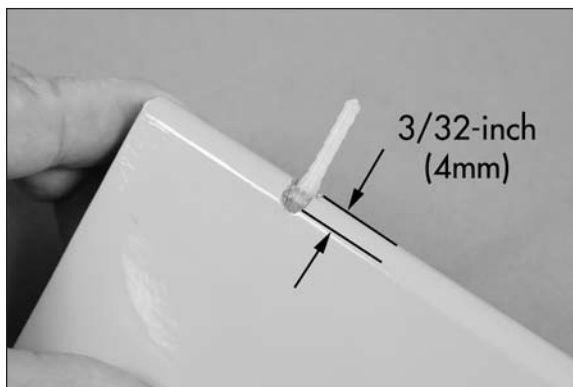
E-tips

Hinging the flaps will take a small amount of trial and error to correctly position the hinges. Read through the following steps on positioning the control surfaces before applying any glue. Improper installation of the surfaces will cause the control surfaces to bind, which can cause premature drain on the battery or even damage to the servos.

- ○ 15. Prepare the flap hinges by applying a small amount of petroleum jelly to the knuckle of the hinge. Work the hinge so the petroleum jelly penetrates the hinge. The petroleum jelly will keep the adhesive from entering the knuckle, causing the hinge to bind.



- ○ 16. Fit the hinges in the flap so the hinge point is recessed into the flap 3/32-inch (4mm).



- ○ 17. Position the flap on the wing. Align the flap with the aileron and the inboard section of the trailing edge.



- ○ 18. Check that the flap can move through its range of motion. If there is binding, reposition the hinges and recheck the flap operation.



- 19. Inspect the hinges and mark on the flap where the hinge point is in reference to the flap using a felt-tipped pen.



- 20. Remove the flap from the wing. Make sure the hinges are removed from the flap and wing at this time. Apply a small amount of hinge glue in each of the holes in the control surface for the hinges. Insert the hinges so the hinge point aligns with the mark made in the previous step. Allow the adhesive to fully cure before proceeding.



- 21. Apply hinge glue in the holes for the hinges in the trailing edge. Insert the flap hinges into the trailing edge of the wing. Repeat Step 16 and 17 to check the position of the hinges. Wrap a small amount of low-tack tape around the flap and inner trailing edge, and around the flap and aileron to keep it in position. Set the wing aside to allow the adhesive to fully cure.



- 22. Repeat Steps 15 through 21 to attach the remaining flap to the opposite wing panel.

E-tips

Ensure your flaps can travel at least 1 1/2-inch (38mm) down for full defelection.

Tail Wheel Installation

Required Parts

Fuselage Pre-bent tail wheel wire
 2mm wheel collar 1-inch (25mm) tail wheel
 Nylon steering arm 3mm x 4mm machine screw
 3mm x 4mm setscrew
 18-inch (457mm) pushrod wire, non-threaded

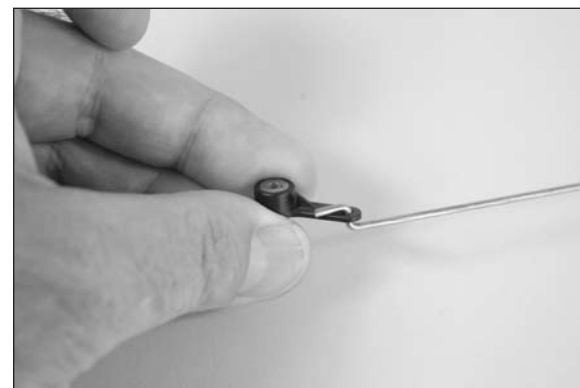
Required Tools and Adhesives

Hex wrench or ball driver: 1.5mm
 Threadlock Phillips screwdriver: #1

E-tips

The following covers the installation of a fixed tail wheel as supplied with your model. We have designed the model so there is room to install a retractable tail wheel if so desired. The installation will be up to the modeler, as there are a variety of options available. The radio tray also has an extra opening to fit the servo necessary to operate this retract.

- 1. Connect the 18-inch (457mm) pushrod wire to the nylon steering arm. Note the position of the arm in relationship to the bend in the pushrod wire.



- 2. Slide the pushrod wire into the tube in the fuselage. Make sure the pushrod is located in the correct tube or the steering arm and servo will not line up with the pushrod correctly.



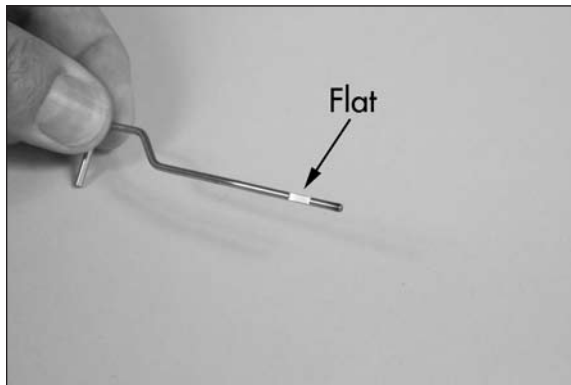
E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

- 3. Use a 1.5mm hex wrench to start the 3mm x 4mm setscrew in the steering arm.



- 4. Locate the pre-bent tail wheel wire. Note the position of the notch in the wire: this will be aligned with the setscrew in the steering arm to prevent the wire from rotating when installed.



- 5. Position the steering arm in the bracket as shown. Slide the tail wheel wire through the bracket and steering arm. Tighten the setscrew in the steering arm on the flat of the tail wheel wire. Use a 1.5mm hex wrench to tighten the setscrew.



E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

- 6. Slide the 1-inch (25mm) tail wheel on the tail wheel wire. Use a 3mm x 4mm machine screw and 2mm wheel collar to secure the tail wheel to the wire. Use a #1 Phillips screwdriver to tighten the screw in the wheel collar.



Stabilizer and Rudder Installation

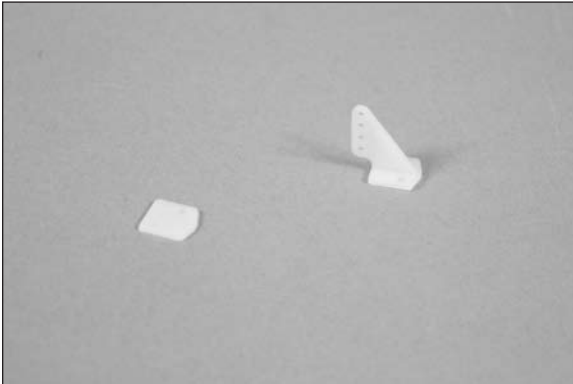
Required Parts

Fuselage Nylon control horn (3)
3mm x 15mm hardwood dowel (2)
Carbon stabilizer tube
2mm x 8mm sheet metal screw (6)
Stabilizer assembly (right and left)

Required Tools and Adhesives

12-minute epoxy Mixing cups
Mixing sticks Epoxy brush
Rubbing alcohol Paper towels
Ruler Hobby knife with #11 blade
Thin CA Phillips screwdriver: #1
Low-tack tape

- 1. Use a hobby knife with a #11 blade to remove the control horn backplate from the control horn. You can discard the backplate as it will not be used when installing the control horn. Prepare all three horns at this time.



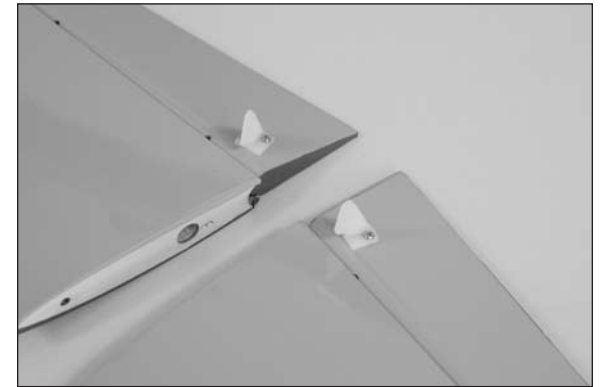
- 2. Wick 2–3 drops of thin CA into the holes in the rudder for the control horn mounting screws. This will harden the surrounding wood, reducing the chances of the screws from pulling loose accidentally. You will want to do this to the elevator holes as well at this time.



- 3. Attach the rudder control horn to the rudder using two 2mm x 8mm sheet metal screws and a #1 Phillips screwdriver.



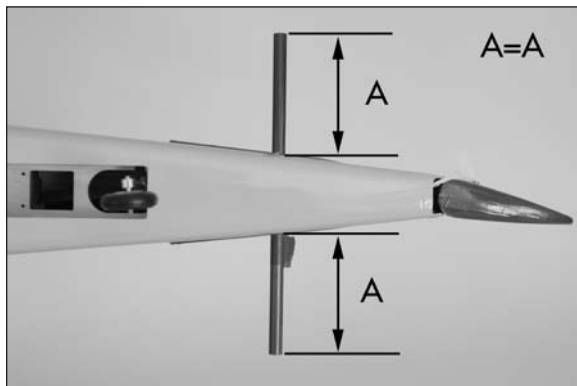
- 4. Attach the control horns to the elevators using 2mm x 8mm sheet metal screws and a #1 Phillips screwdriver.



- 5. Insert the 3mm x 12mm hardwood dowel in the stabilizer so 6mm of the dowel is exposed. Wick 2–3 drops of thin CA around the joint between the dowel and stabilizer to secure its position. Prepare both stabilizer halves at this time.



- 6. Slide the stabilizer tube into the fuselage. Position the tube so it is centered. Use a small piece of low-tack tape on one side as a reference so you can easily reposition the tube if it moves while installing one of the stabilizer halves.



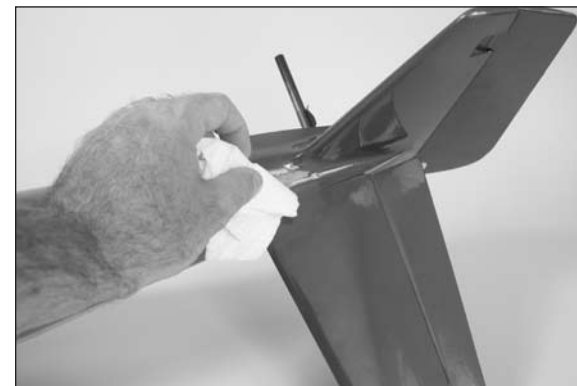
- 7. Test-fit one of the stabilizer halves on the stabilizer tube. It should fit tightly against the fuselage without moving the stabilizer tube. It should also slide freely on the tube with only slight friction.



- 8. Remove the stabilizer from the fuselage. Mix 1/2 ounce (15mL) of 12-minute epoxy. Apply the epoxy to the stabilizer tube, exposed wood on the fuselage, in the stabilizer tube socket of the stabilizer and to the exposed wood on the stabilizer root.



- 9. Slide the stabilizer back into position. Use rubbing alcohol and a paper towel to remove any epoxy that has oozed out before it has a chance to cure. Also check that the stabilizer tube is still positioned correctly in the fuselage.



- 10. Remove the tape from the stabilizer tube. Repeat steps 7 through 9 to install the remaining stabilizer half.



Motor and Cowling Installation

Required Parts

Fuselage	Motor with accessories
Cowling	Speed control
#4 washer (2)	Hook and loop tape
Aluminum spacer, 1/8-inch (3mm)	
Hook and loop strap (2)	
3/16-inch (5mm) aluminum spacer (4)	
4-40 x 3/4-inch socket head machine screw (4)	
4-40 x 3/8-inch socket head machine screw (8)	

Required Tools and Adhesives

Threadlock	Ball driver: 3/32-inch
Scissors	Phillips screwdriver: #2

Power setups: We found the best power system for the P-51B is the Power 32 on 4S using an APC 13 x 6.5E prop. This delivered solid flight performance with a very acceptable current draw. All instructions are regarding the Power 32 setup. If using a Power 25 4S setup, please note the change on the spacers for proper motor placement. The Power 25 uses the 1/8-inch (3mm) spacers only and the Power 32 uses the 1/8-inch (3mm) and 3/16-inch (5mm) spacers.

- 1. Locate the motor, X-mount and hardware to attach the mount to the motor. Use a #2 Phillips screwdriver to install the screws that secure the mount to the motor.



E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

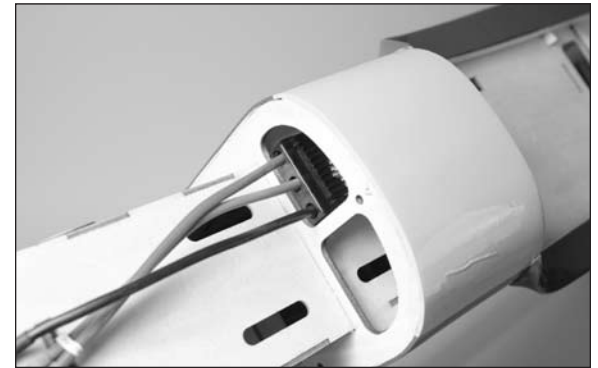
E-tips

The blind nuts in the firewall can be positioned for a variety of different motor options. They will slide easily and may not be in the correct location for any one particular motor when the fuselage is removed from the packaging.

- 2. Use the four 4-40 x 3/4-inch socket head screws, four 3/16-inch (5mm), and four 1/8-inch (3mm) aluminum spacers to attach the motor to the firewall. The spacers fit between the mount and firewall. Use a 3/32-inch wrench to tighten the screws.



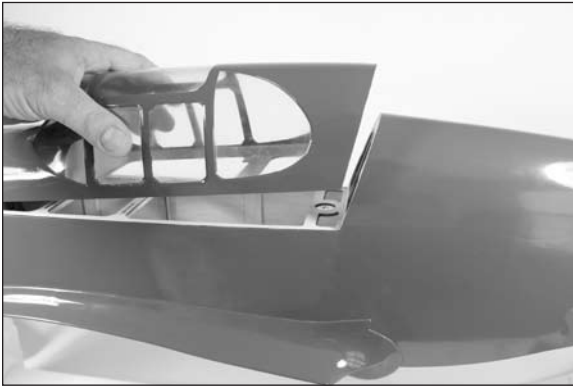
- 3. Place the speed control in the fuselage as shown. Route the leads through the oval hole in the battery tray as shown in the photo.



- 4. Connect the motor and speed control leads. If you are using the recommended motor and speed control, connect the lead wires according to color for the motor to rotate in the correct direction. Secure the leads so they do not interfere with the operation of the motor.



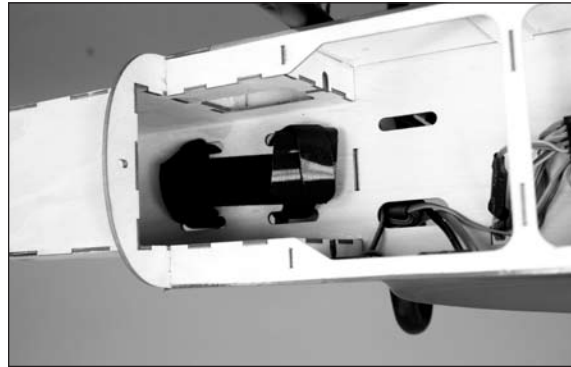
- 5. The canopy is held in position at the rear using a magnet and tabs at the front. Lift the canopy at the rear and slide it rearward to remove. Set the canopy aside in a safe location. Your canopy came in a box inside the kit. We are showing this in case you had installed it.



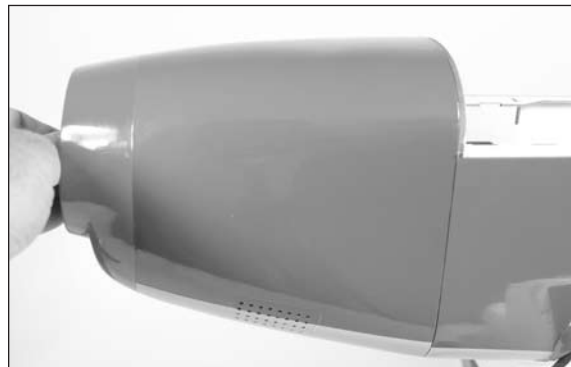
- 6. Route the two hook and loop straps through the slots in the battery tray. One will be located near the front, while the other is located slightly aft of the wing leading edge.



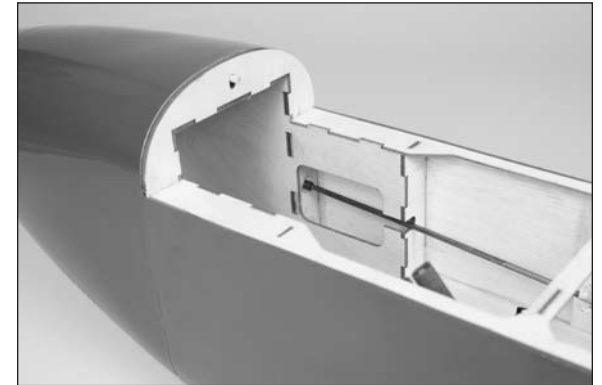
- 7. Place a piece of hook and loop tape on the battery floor, as well as on the bottom of the battery. This will keep the battery from sliding fore and aft in the fuselage.



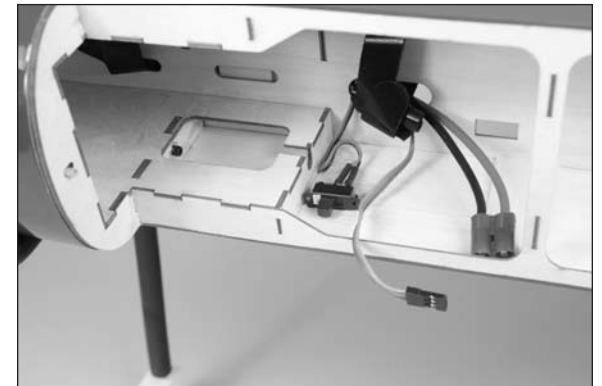
- 8. Slide the cowling in position. The pins at the top and bottom of the cowling at the rear will fit into the holes in the sub-firewall. The cowl will fit tightly against the sub-firewall when installed correctly.



- 9. Use two 4-40 x 3/8-inch socket head machine screws and two #4 washers to secure the cowl to the firewall. You will need to use a 3/32-inch ball driver to tighten these screws.



- 9. Use a small piece of hook and loop tape or double-sided tape (not included) to secure the switch in the fuselage. Make sure it is positioned so the canopy hatch can be installed without any interference.



Rudder Servo, Elevator Servo and Receiver Installation

Required Parts

Fuselage	Motor battery (charged)
Transmitter	Servo with hardware (2)
Receiver	3-inch (76mm) extension
Y-harness (2)	Hook and loop tape (2)
Nylon clevis (3)	Silicone clevis retainer (3)
22 ¹ / ₂ -inch (572mm) pushrod, threaded one end	
Offset servo horn	
Nylon pushrod connector backplate	
3mm x 4mm machine screw	
Brass pushrod connector	
Nylon pushrod connector	
Special Y-harness from retract (if installing the recommended retracts)	

Required Tools and Adhesives

Ruler	Side cutters
Thin CA	Threadlock
Pin vise	Drill bit: 5/64-inch (2mm)
Felt-tipped pen	Phillips screwdriver: #1

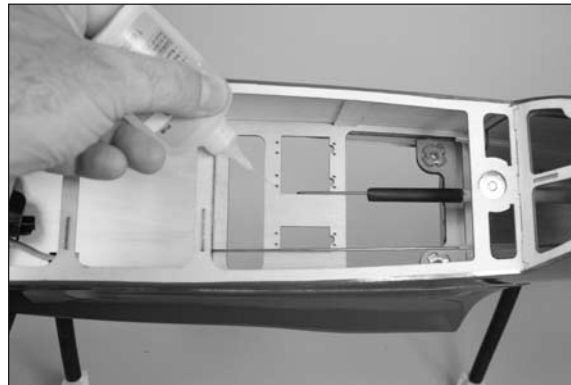
E-tips

Before starting the installation of the servos, we recommend centering the trims and sticks on your transmitter. If using a computer radio, make sure to reset a model memory and name it for this particular model. We also recommend binding the transmitter and receiver at this time following the instructions provided with your radio system.

- 1. Prepare the rudder and elevator servos by installing the brass eyelets and rubber grommets in the servo. Also remove the stock servo horn using a #1 Phillips screwdriver.



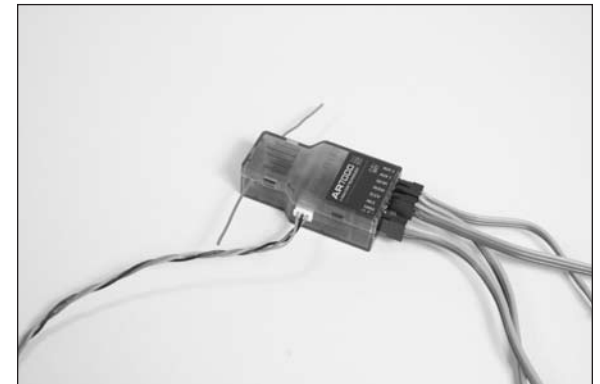
- 2. Apply 2–3 drop of thin CA in each of the servo mounting holes in the radio tray.



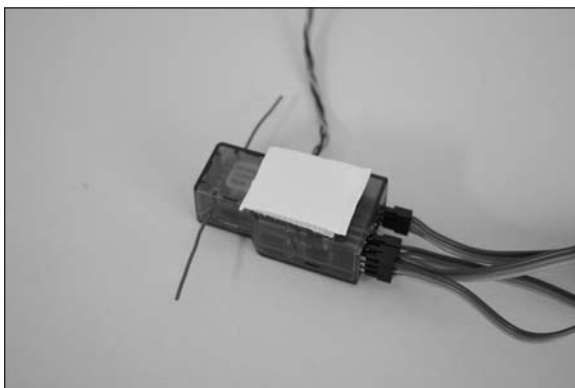
- 3. Mount the rudder and elevator servos in the radio tray. Note the direction of the servos in the photo. Use the screws provided with the servos and a #1 Phillips screwdriver to secure them in position.



- 4. Plug a Y-harness into the aileron and flap port of your receiver. Plug the special Y-harness included with your E-flite retracts into the gear port of the receiver. Plug in a 3-inch extension into the Aux2 port if using the operational bombs or drop tanks.



- 5. Apply a piece of hook and loop tape to the bottom of the receiver.



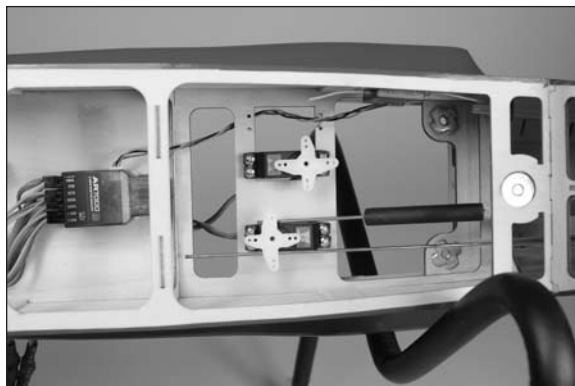
- 6. Plug the leads from the speed control, rudder and elevator servos into the correct ports of the receiver. Use the hook and loop tape to mount the receiver in the fuselage as shown. Route the leads through the hole in the battery tray to reduce clutter inside the fuselage. The remote receiver is mounted toward the rear of the fuselage as shown using hook and loop tape.



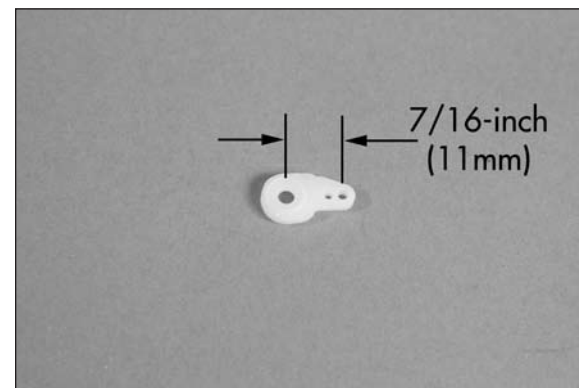
- 7. Use the hook and loop straps to secure the motor battery in the fuselage. Check that the power switch is set to the OFF position and connect the leads from the motor battery and speed control.



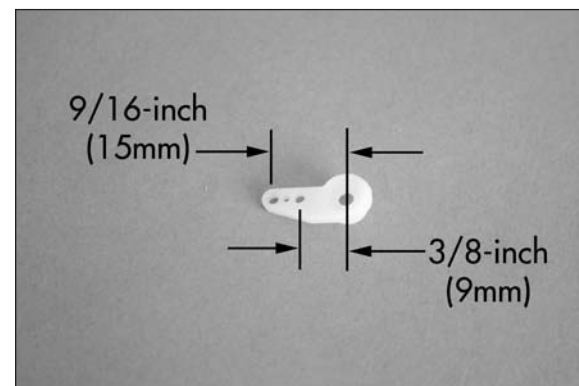
- 8. Center the rudder and elevator trims on the transmitter. Set the throttle stick to the low throttle position. Turn on the transmitter, then the receiver. Place the servo horns on the rudder and elevator servos as shown. Use a felt-tipped pen to mark the servo arms as shown in the photo. These will be the arms the pushrods will be connected to.



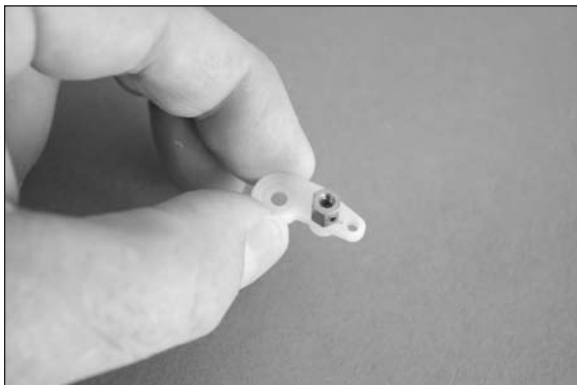
- 9. Remove the horn from the elevator servo. Use side cutters to remove any unused arms so they won't interfere with the operation of the servo. Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole in the horn that is 7/16-inch (11mm) from the center of the servo horn.



- 10. Remove the horn from the rudder servo. From a offset servo horn (not included), use side cutters to remove any unused arms so they won't interfere with the operation of the servo. Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole in the horn that is 9/16-inch (15mm) from the center of the servo horn. You will also need to enlarge the hole that is 3/8-inch (9mm) from the center of the horn using a pin vise and 5/64-inch (2mm) drill bit.



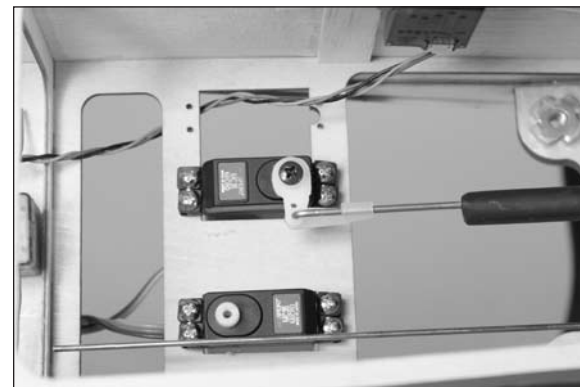
- 11. Insert the brass pushrod connector in the new hole on the rudder servo horn. Use the nylon connector backplate and pliers to secure the connector to the servo horn.



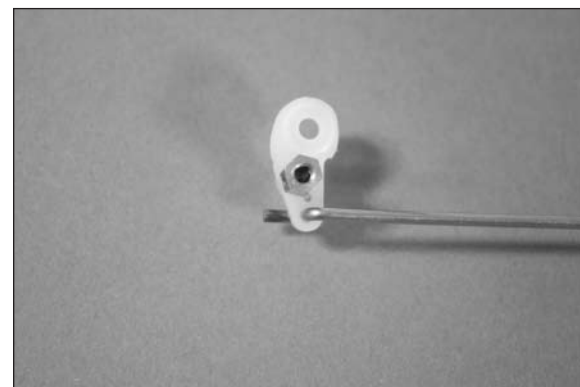
- 12. Check to make sure the elevator pushrod exits the fuselage as shown. If not, position the elevator pushrod as necessary so the threaded ends of the pushrod are exiting the fuselage.



- 13. Attach the servo horn to the servo for the elevator servo using the screw removed in Step 1 and a #1 Phillips screwdriver. The elevator pushrod is connected to the hole enlarged in Step 9 using a nylon pushrod connector.



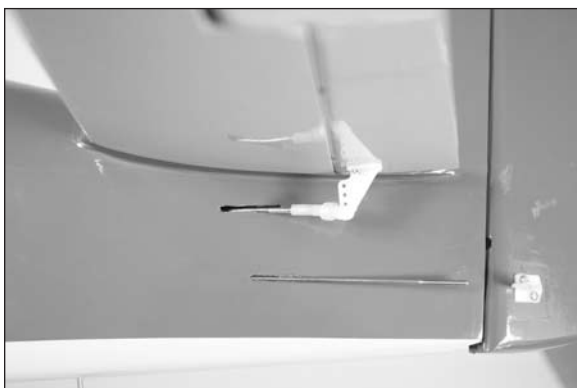
- 14. Insert the Z-bend of the 22¹/₂-inch (572mm) pushrod in the hole enlarged in the rudder servo back in Step 10.



- 15. Slide the rudder pushrod into the tube in the fuselage. The pushrod from the tail wheel will slide into the brass pushrod connector. Secure the servo horn to the rudder servo using the screw removed in Step 1 and a #1 Phillips screwdriver.



- 16. Slide a clevis retainer on a nylon clevis. Thread the clevis on the elevator pushrod wire. When the connector is attached to the outside hole on the elevator control horn, the elevator should be centered with the elevator servo centered. Adjust the position of the clevis as necessary to align the elevator in the neutral position. Once set, slide the silicone retainer over the forks of the clevis so the clevis does not open accidentally in flight.



- 17. Repeat Step 16 for the remaining elevator. Make sure the elevators are aligned in the same position by viewing the aircraft from the rear. If they are not aligned, you may have difficulty trimming your model for straight and level flight.



- 18. Repeat Step 16 to connect the rudder linkage to the rudder control horn.



- 19. Center the tail wheel so your model will taxi straight down the runway. Use a #1 Phillips screwdriver and a 3mm x 4mm machine screw to secure the pushrod from the tail wheel to the brass pushrod connector.



- 20. Turn off the switch at the speed control, then turn off the transmitter. Unplug the motor battery from the speed control.

Etips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

Propeller and Spinner Installation

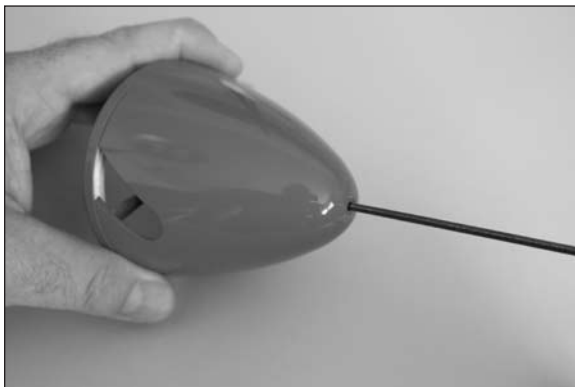
Required Parts

Fuselage	Spinner assembly
Propeller	Transmitter

Required Tools and Adhesives

Open end wrench: 12mm
Hex wrench or ball driver: 3mm
Tapered propeller reamer

- 1. Locate the spinner assembly. Use a 3mm hex wrench to loosen the bolt that secures the spinner cone to the propeller adapter. Set the spinner cone aside.



- 2. Check the rotation of the motor using the radio system. It must spin counterclockwise when viewed from the front of the fuselage. If not, reverse any two of the motor leads to correct the direction of rotation.

- 3. Slide the propeller adapter and spinner backplate (the included spinner does not have the lightening holes as shown in the photo) on the motor shaft. Leave a slight gap of 3/32-inch (2mm) between the backplate and cowling so the backplate does not rub on the cowling.



E-tips

Always balance your propeller and spinner. An unbalanced propeller can cause vibrations to be transmitted into the airframe, which could damage the airframe or other components as well as produce unwanted flight characteristics.

- 4. Remove the nut and washer from the propeller adapter. Fit the propeller to the adapter and use a 12mm wrench to tighten the nut that secures the propeller. You may need to use a propeller reamer to enlarge the hole in the propeller to fit over the adapter.



- 5. Fit the spinner cone in position. Make sure the openings for the propeller do not contact the propeller. Use a 3mm hex wrench to tighten the bolt that secures the spinner cone to the adapter.



E-tips

Double-check that the spinner backplate does not rub against the cowling once the cone is in position. If so, remove the spinner cone and propeller and slide the adapter forward on the motor shaft. Repeat Steps 3 through 5 to replace the propeller and spinner cone.

Aileron Servo Installation

Required Parts

Wing panel (right and left)
Transmitter Receiver
Nylon clevis (2) Silicone clevis retainer (2)
Receiver battery Nylon control horn (2)
Servo with hardware (2)
12-inch (305mm) servo extension (2)
2mm x 8mm sheet metal screw with shoulder (8)
2mm x 8mm sheet metal screw (4)
2-inch (52mm) pushrod wire (2)

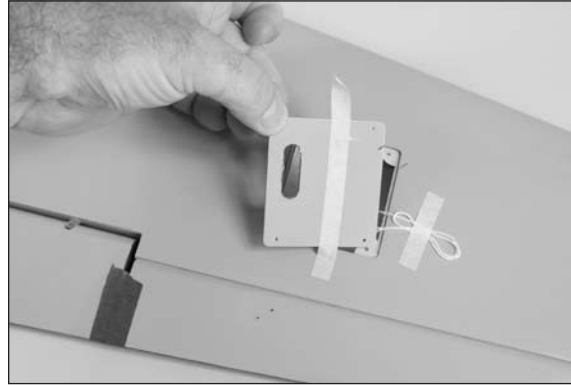
Required Tools and Adhesives

Covering iron Felt-tipped pen
Ruler Phillips screwdriver: #1
Pin vise Drill bit: 5/64-inch (2mm)
String Hobby knife with #11 blade
Thin CA Side cutter

- 1. Use a felt-tipped pen to mark the aileron and flap servo covers so they can be installed in the correct direction after they have been removed from the wing.



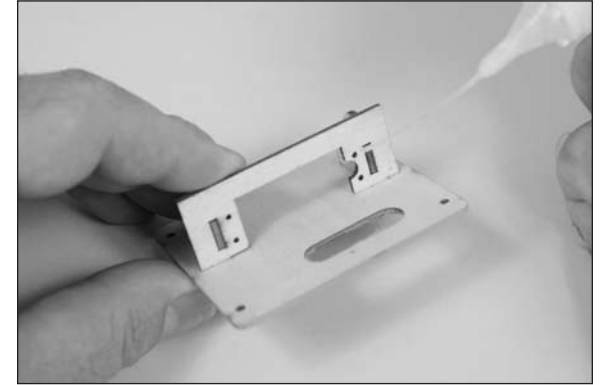
- 2. Remove the flap and aileron servo covers from the wing. Use a covering iron to seal the covering if the tape has lifted it from the wing or servo covers. Set the wing and flap servo cover aside.



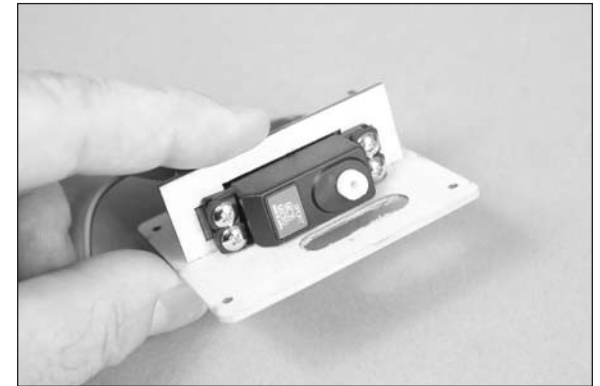
- 3. Prepare the aileron servo by installing the brass eyelets and rubber grommets in the servo. Also remove the stock servo horn using a #1 Phillips screwdriver.



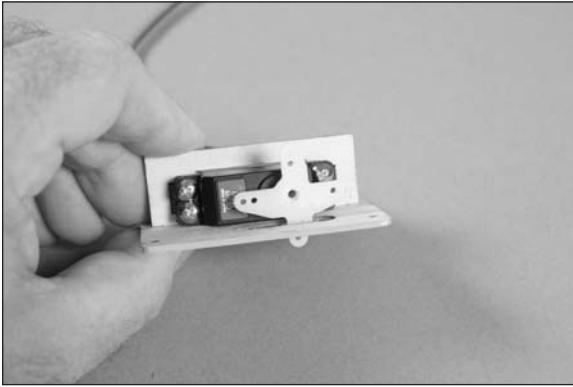
- 4. Apply 2-3 drops of thin CA in each of the mounting holes for the servo screws. This will harden the wood and help prevent the screws from vibrating loose.



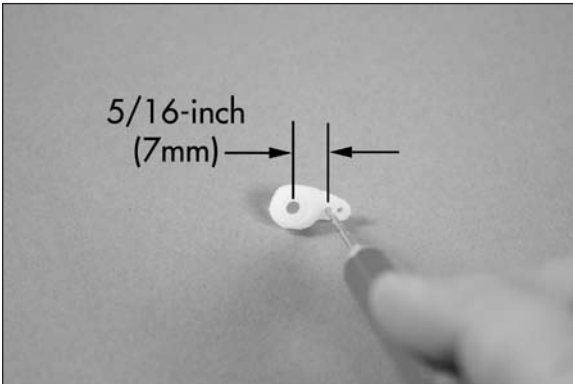
- 5. Mount the aileron servo using the four screws provided with the servo and a #1 Phillips screwdriver.



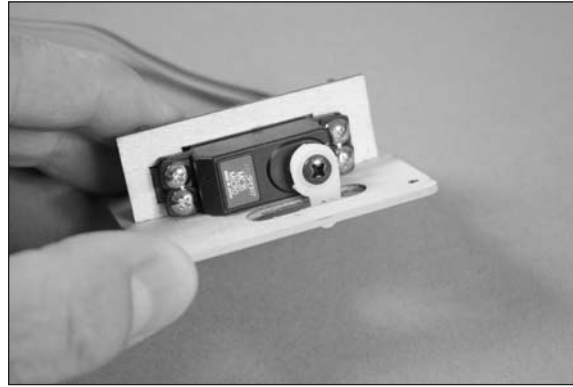
- 6. Use the radio system to center the aileron servo. Place the servo horn on the servo so the longer portion of the arm is parallel to the servo center line. If the horn does not align, rotate the horn 180-degrees, as there are an odd number of splines on the servo output. Use a felt-tipped pen to mark the arm that protrudes through the servo cover.



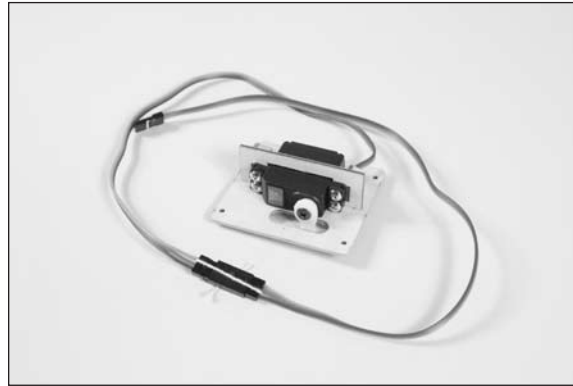
- 7. Remove the servo horn from the servo. Use side cutters to remove the arms from the horn that were not marked in the previous step. Enlarge the hole in the servo horn that is 5/16-inch (7mm) from the center of the horn using a pin vise and 5/64-inch drill bit.



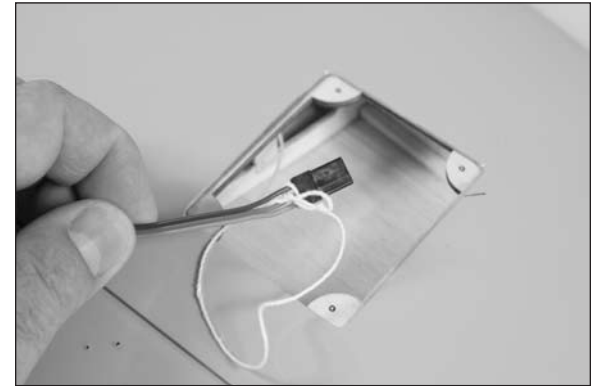
- 8. Attach the servo horn to the servo using the screw removed from the servo and a #1 Phillips screwdriver.



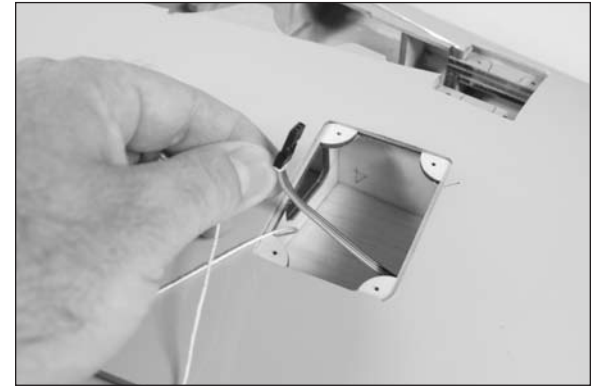
- 9. Use string or a commercially available connector to secure a 12-inch (305mm) servo extension to the aileron servo lead.



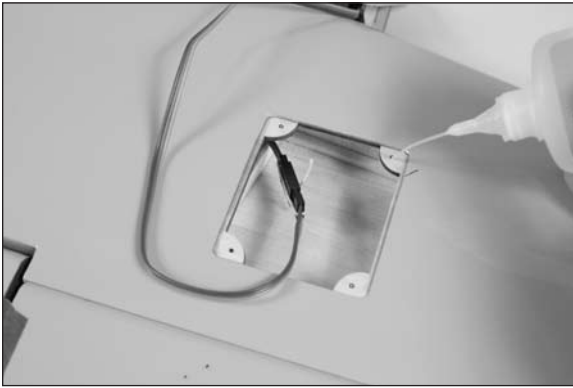
- 10. Remove the tape holding the string located in the wing near the opening for the aileron servo. Tie the string to the end of the aileron servo extension.



- 11. Use the string to pull the aileron servo extension through the wing to the opening for the flap servo. When the flap servo is installed, you will use the string to pull both the aileron and flap servo leads to the root of the wing.



- ○ 12. Use 2–3 drops of thin CA in each of the holes for the aileron servo cover mounting screws. This will harden the surrounding wood, which helps prevent the screws from breaking the wood and vibrating loose.



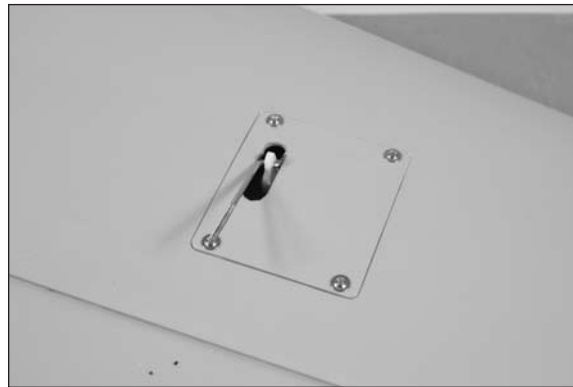
- ○ 13. While you have the thin CA in your hand, apply 2–3 drops in each of the holes for the aileron control horn mounting screws.



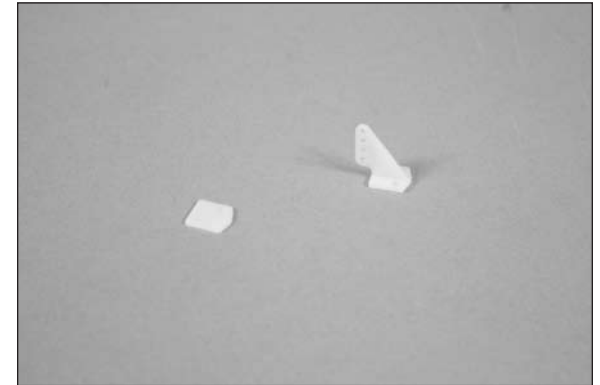
- ○ 14. Insert the Z-bend in the 2-inch (52mm) linkage wire through the hole enlarged in Step 7.



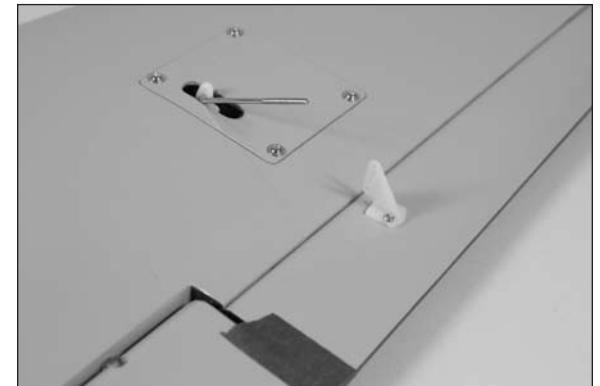
- ○ 15. Use four 2mm x 8mm sheet metal screws with shoulder and a #1 Phillips screwdriver to secure the aileron servo cover to the wing. Use the mark made in Step 1 to make sure the cover is oriented correctly. Then remove the mark can using rubbing alcohol and a paper towel.



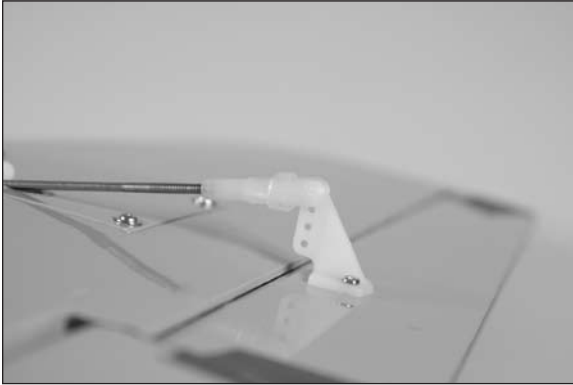
- ○ 16. Use a hobby knife with a #11 blade to remove the control horn backplate from the control horn. Discard the backplate as it will not be used when installing the control horn.



- ○ 17. Use a #1 Phillips screwdriver and two 2mm x 8mm sheet metal screws to attach the control horn to the aileron.



- 18. Slide a silicone clevis retainer over a nylon clevis. Thread the clevis on the pushrod wire. With the radio system on and the aileron servo centered, connect the clevis to the outer hole of the control horn. It may be necessary to adjust the clevis so it lines up with the control horn. Once attached, slide the clevis retainer over the forks of the clevis to prevent it from opening accidentally.



- 19. Repeat Steps 1 through 18 to install the remaining aileron servo and linkage.
- 20. Remove the tape holding the flaps and ailerons on both wing panels. Also make sure your radio system has been turned off as to not run the batteries down.

Flap Servo Installation

Required Parts

Wing panel (right and left)	
Transmitter	Receiver
Nylon clevis (2)	Silicone clevis retainer (2)
Receiver battery	Servo with hardware (2)
2mm x 8mm sheet metal screw with shoulder (8)	
3-inch (76mm) pushrod wire (2)	

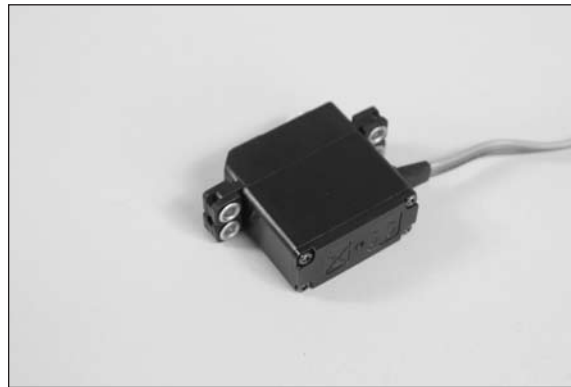
Required Tools and Adhesives

Thin CA	Low-tack tape
Ruler	Phillips screwdriver: #1
Side cutter	Pin vise
Felt-tipped pen	Drill bit: 5/64-inch (2mm)

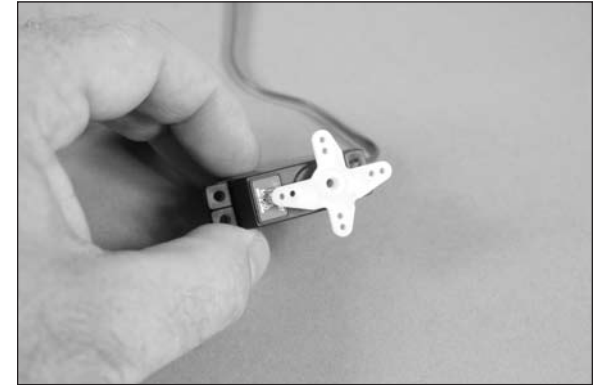
E-tips

Before starting the installation of the flap servos, set the throw for the flaps to 0% in both the UP and DOWN positions. This will center the flap servo and allow for adjustment once the flap servo and linkage are installed in the wing and prevent any damage to the servo or control surface.

- 1. Prepare the flap servo by installing the brass eyelets and rubber grommets in the servo. Also remove the stock servo horn using a #1 Phillips screwdriver.



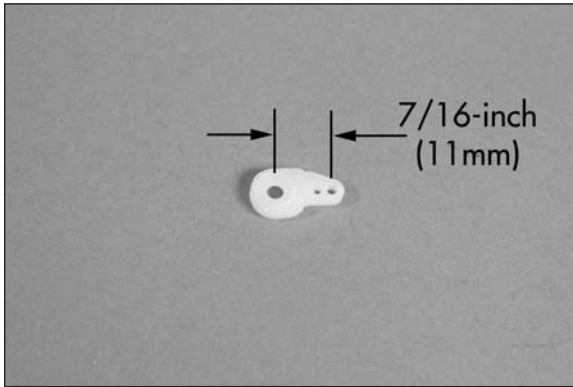
- 2. Use the radio system to center the flap servo. Place the servo horn on the servo so the longer portion of the arm is parallel to the servo center line. If the horn does not align, rotate the horn 180-degrees, as there are an odd number of splines on the servo output.



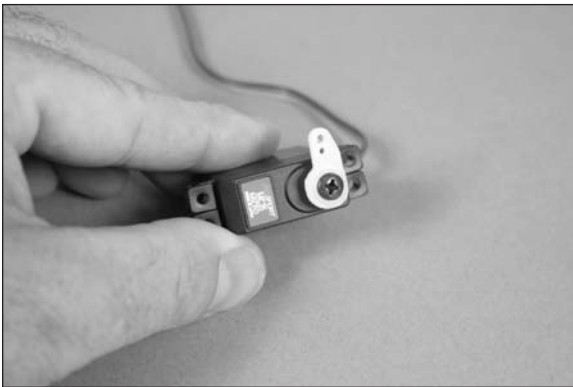
- 3. Check the servo in relationship to the flap servo cover. The notch in the cover mount will be located where the lead exits the flap servo. Use a felt-tipped pen to mark the arm on the servo horn that faces away from the servo cover.



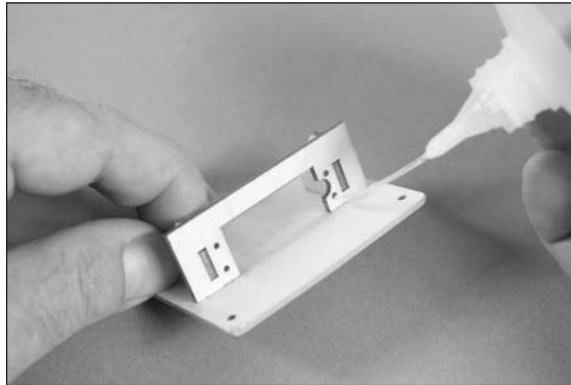
- 4. Remove the servo horn from the servo. Use side cutters to remove the arms from the horn that were not marked in the previous step. Enlarge the hole in the servo horn that is 7/16-inch (11mm) from the center of the horn using a pin vise and 5/64-inch drill bit.



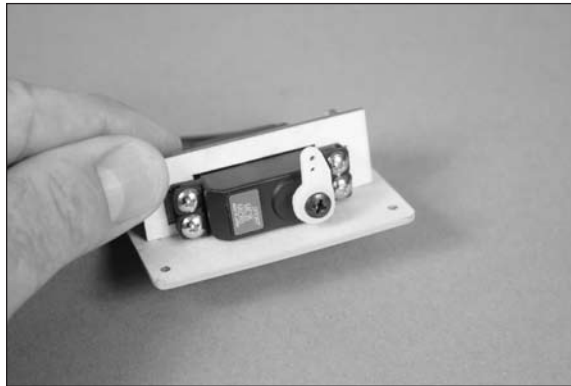
- 5. Attach the servo horn to the servo using the screw removed from the servo and a #1 Phillips screwdriver.



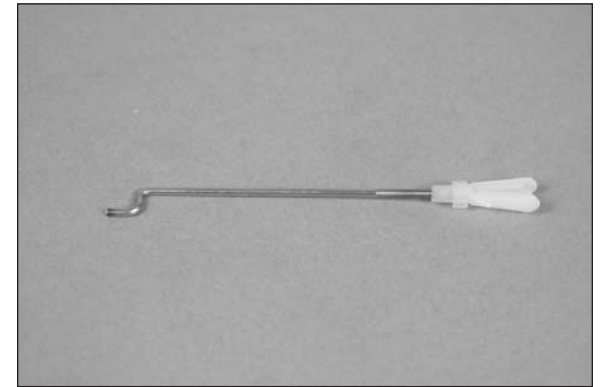
- 6. Apply 2–3 drops of thin CA in each of the mounting holes for the servo screws. This will harden the wood and help prevent the screws from vibrating loose.



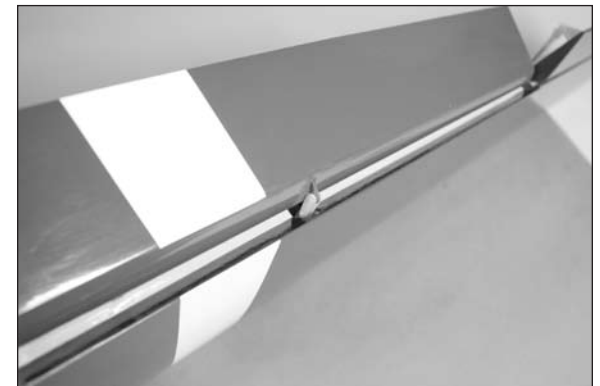
- 7. Mount the aileron servo using the four screws provided with the servo and a #1 Phillips screwdriver.



- 8. Slide a silicone clevis retainer over a nylon clevis. Thread the clevis 10-turns on the 3-inch (76mm) pushrod wire.



- 9. Deflect the flap. Insert the linkage in the hole at the trailing edge of the wing near the flap control horn. Attach the clevis to the flap control horn. Slide the silicone retainer over the forks of the clevis to prevent it from opening accidentally. The overall length of the linkage will be adjusted in the next steps.



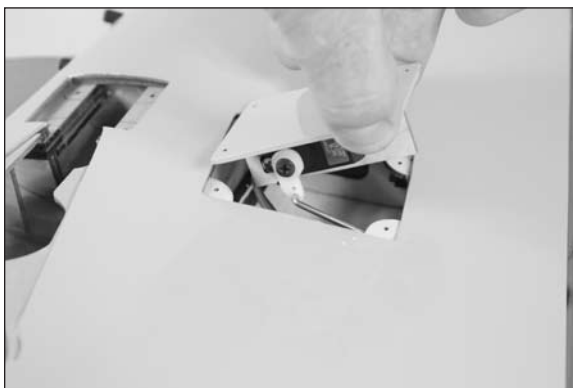
- 10. Tie the string attached to the aileron servo lead to the flap servo lead at this time.



- 11. Use the string to pull the flap and aileron leads through the hole near the wing root as shown. Do not remove the string in case the leads fall into the wing while adjusting the flap linkage.



- 12. Insert the Z-bend in the 3-inch (76mm) linkage wire through the hole in the servo horn enlarged in Step 4.



E-tips

If using a radio with only two flap positions (up and down), following this procedure will provide equal throw in both directions.

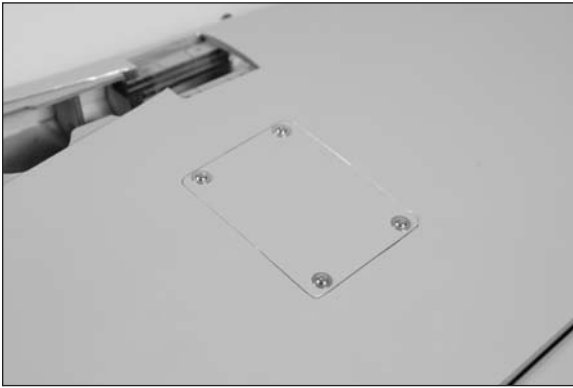
- 13. Place the servo and servo cover in position on the wing. With the radio on and the flap switch (or knob) centered, adjust the linkage so the flap servo is in the center position. Measure the distance between the flap and wing. Adjust the linkage so the distance measures 3/4-inch (19mm). You may need to remove the servo once or twice to set the correct length on the linkage.



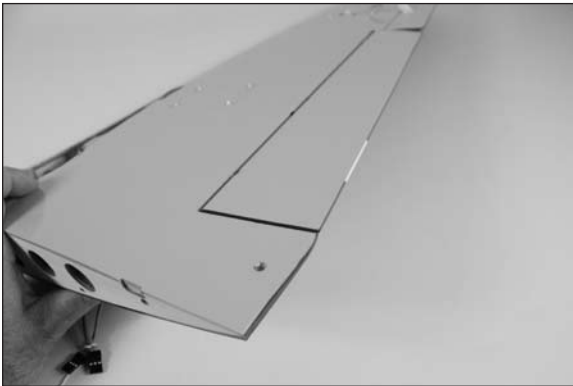
- 14. Move the flap cover aside. Use 2–3 drops of thin CA in each of the holes for the flap servo cover mounting screws. This will harden the surrounding wood, which helps prevent the screws from breaking the wood and vibrating loose.



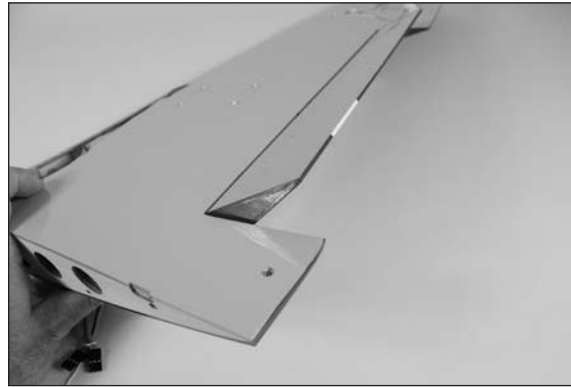
- 15. Use four 2mm x 8mm sheet metal screws with shoulder and a #1 Phillips screwdriver to secure the flap servo cover to the wing. You can remove the mark made earlier when the cover was removed using rubbing alcohol and a paper towel.



- 16. Set the flap switch (or knob) to the UP position. Use the endpoint adjustment to align the flap with the trailing edge of the wing. You will want to make sure both flaps sit up without binding by adjusting the clevis. This will help to ensure they throw the same amount when going down.



- 17. Set the flap switch (or knob) to the DOWN position. Use the endpoint adjustment to set the distance between the wing trailing edge and flap so it measures 1⁵/₈-inch (41mm).



- 18. Repeat Steps 1 through 17 to install the remaining aileron servo and linkage.

Etips

When installing the remaining flap servo, start with the flap and flap servo in the UP position (using the transmitter) to set the correct length for the linkage. This will avoid stalling the servo if the linkage is too short.

- 19. Remove the string from the flap and aileron leads. Mark the flap lead using low-tack tape. Make sure your radio system has been turned off as to not run the batteries down.

Fixed Gear Installation

Required Parts

- Wing panel (right and left)
- Main gear strut (right and left)
- Main gear wheel, 2¹/₂-inch (63mm) (2)
- Main gear strut mount with setscrew (2)
- Wheel collar with setscrew (4)
- 3mm x 8mm sheet metal screw (8)

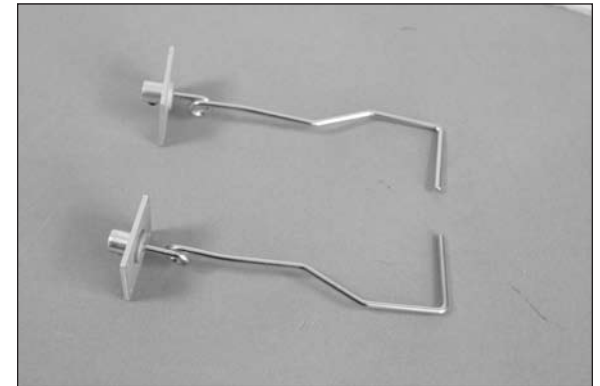
Required Tools and Adhesives

- Hex wrench: 1.5mm
- Phillips screwdriver: #2
- Threadlock

Etips

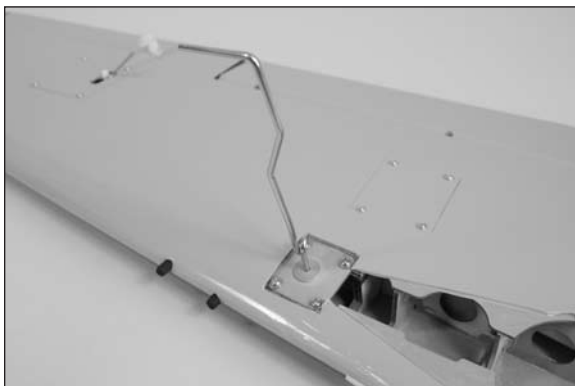
Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

- 1. Insert the main gear strut into the main gear strut mount. Use a #2 Phillips screwdriver to tighten the setscrew on the flat area of the main gear strut. Assemble the right and left main gear at this time.



Note: The included fixed gear will differ slightly from what is shown.

- 2. Use four 3mm x 8mm sheet metal screws to secure the main gear strut in the wing. Tighten the screws using a #2 Phillips screwdriver. Note the direction of the gear in relationship to the wing in the photo to make sure the gear has been installed correctly.



E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

- 3. Use two wheel collars to secure the wheel on the main gear strut. Use a 1.5mm hex wrench to tighten the setscrews on the wheel collars to secure them to the main gear strut.



- 4. Repeat Steps 2 and 3 to install the remaining main gear strut and wheel.

Retract Installation

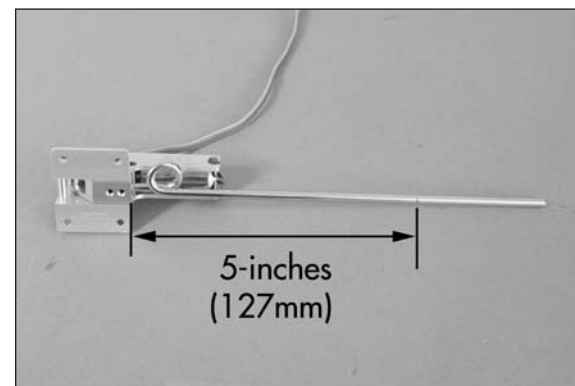
Required Parts

Wing panel (right and left)
 3mm x 8mm sheet metal screw (8)
 Main gear wheel, 2¹/₂-inch (63mm) (2)
 Retracts with hardware
 Landing gear door (right and left)
 Transmitter/radio system

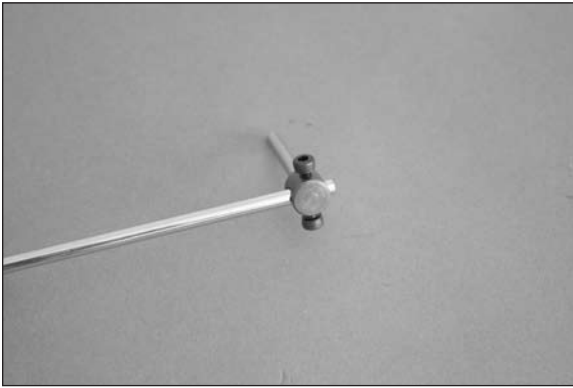
Required Tools and Adhesives

Felt-tipped pen Flat file
 Ruler Phillips screwdriver: #2
 Hex wrench: 1.5mm, 2.5mm
 Rotary tool with cut-off wheel
 Threadlock

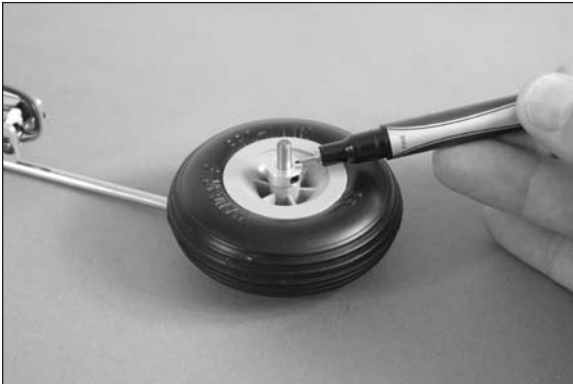
- 1. Locate the main gear retract. Use a rotary tool and cut-off wheel to cut the strut to a length of 5-inches (127mm) as shown below.



- 2. Temporarily attach the axle to the retract strut using a 2.5mm hex wrench. The position of the axle will be adjusted in the following steps.



- 3. Slide the main wheel on the axle. Use a wheel collar and 1.5mm hex wrench to temporarily attach the wheel. Use a felt-tipped pen to mark the axle against the outer edge of the collar.



- 4. Remove the wheel collar and wheel from the axle. Use a rotary tool and cut-off wheel to trim the axle at the mark made in the previous step. Use a flat file to make a flat area on the first 1/4-inch (6mm) of the axle for the setscrew of the wheel collar to rest on when it is tightened.



E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

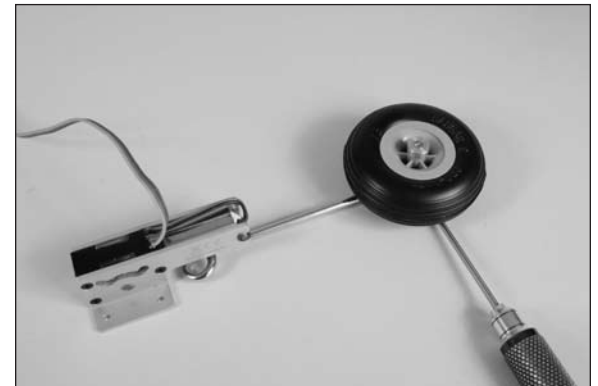
- 5. Place a drop of light machine oil on the axle. Place the wheel on the axle and secure it using the wheel collar and a 1.5mm hex wrench.



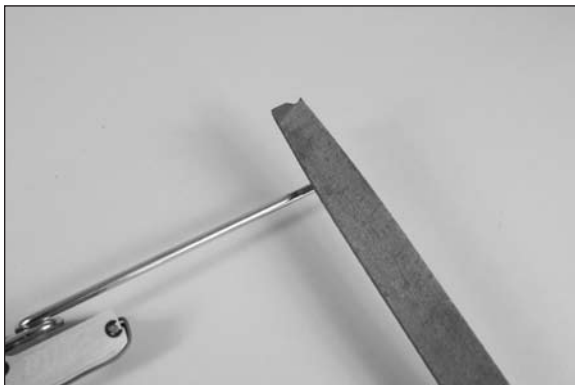
- 6. With the gear in the UP position, place it in the wing. Check that the wheel is centered in the opening when the mounting holes are aligned for the retract. Adjust the position of the wheel if necessary. Use a felt-tipped pen to mark the edge of the axle on the strut as shown.



- 7. Place the retract on a flat surface. The mount for the retract and the axle will rest flat on the surface. Use a 2.5mm hex wrench to tighten the two screws on the axle enough to mark the axle. This will align the wheel so your model will taxi correctly when on the runway.



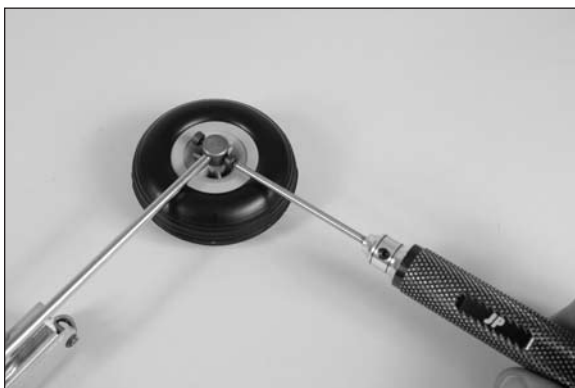
- 8. Remove the axle from the main gear. Use a flat file to make flat areas on the main gear strut for the screws to rest. This will keep the axle from rotating if you encounter less than perfect landings.



E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

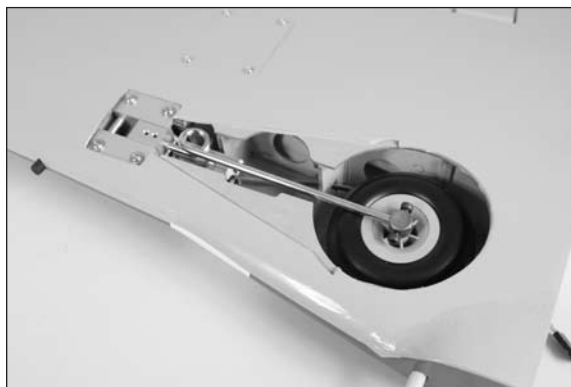
- 9. Place the axle back on the main gear strut. Use the line made in Step 6 to reposition the axle. Use a 2.5mm hex wrench to tighten the screws that secure the axle to the main gear strut.



- 10. Route the lead for the retract through the holes in the wing as shown.



- 11. Use four 3mm x 8mm sheet metal screws to secure the retract in the wing. Check the operation of the retract using the radio system.



- 12. Test fit the landing gear door to the landing gear wire. Use a small drop of silicone adhesive on the mounts of the gear door to secure it to the strut. Allow the adhesive to fully cure with the gear in the UP position.



- 13. Repeat Steps 1 through 12 to install the remaining landing gear retract.

Cockpit Details

Required Parts

Canopy hatch	Pilot seat
Radio box	Pilot (optional)

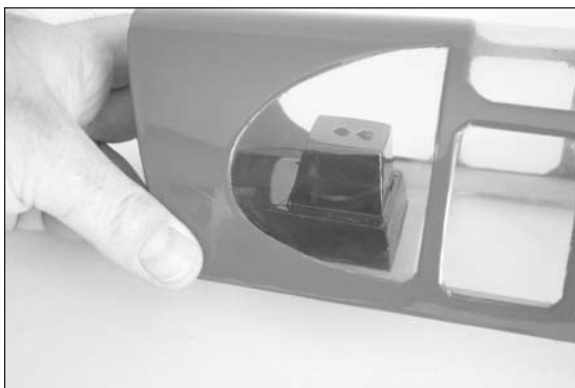
Required Tools and Adhesives

Hobby scissors	Medium CA
Hobby knife with #11 blade	

- 1. Locate the radio box. Use hobby scissors and a hobby knife with a #11 blade to trim the flashing from the radio box.



- 2. Use medium CA to glue the radio box in the rear of the cockpit. Center the radio box side-to-side, and make sure it is as far back in the cockpit as possible. Note that the taller portion of the radio box faces to the front of the cockpit.



- 3. Use medium CA to glue the pilot seat in the cockpit. The seat fits into the notch in the cockpit floor, and the tab on the seat fits tight against the underside of the cockpit floor.



- 4. Use medium CA to glue the optional pilot in the cockpit.



Final Assembly and Center of Gravity

Required Parts

Fuselage	Wing panel (right and left)
Radiator scoop	Aluminum wing tube
Aluminum anti-rotation pin	
Nylon wing bolt (2)	

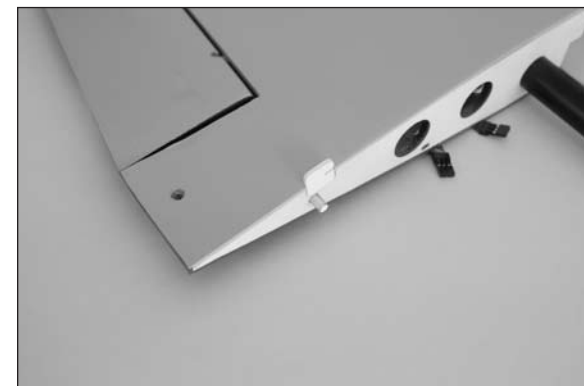
Required Tools and Adhesives

Balancing stand	Felt-tipped pen
Flat blade screwdriver	

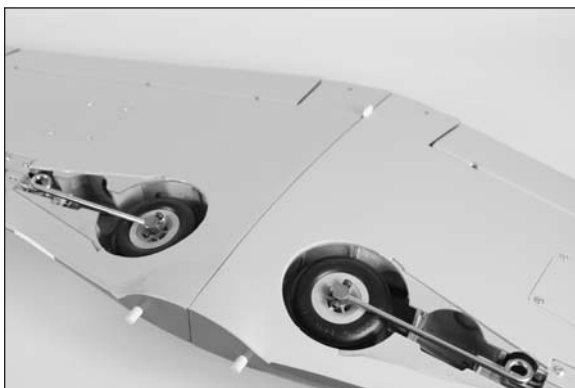
- 1. Slide the wing tube in one of the wing panels. It will slide in easily, so don't force it in any farther than it will easily slide.



- 2. Insert the aluminum anti-rotation pin near the trailing edge of the wing.



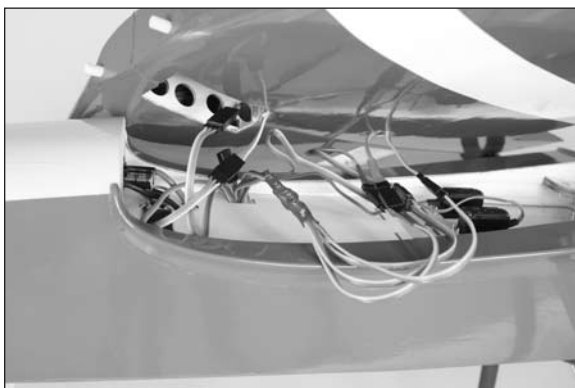
- 3. Slide the two wing panels together. They will fit tightly against each other as shown.



E-tips

You can either leave the wing panels where they can be separated for transport or you may glue them together using 12-minute epoxy. If you elect to glue them together, a small piece of gray UltraCote® covering is included to cover the joint once this is done.

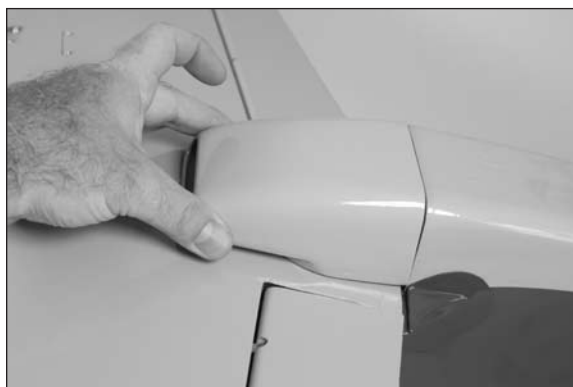
- 4. Connect the leads between the receiver and wing. Make sure the retracts, flaps, ailerons and any other connections are correct at this time.



- 5. Place the wing on the fuselage. Make sure the leads are tucked in and not exposed between the wing and fuselage. Use two nylon wing bolts and a flat blade screwdriver to secure the wing to the fuselage.



- 6. Slide the radiator scoop in position. The notch in the scoop fits the tab on the wing. The scoop is connected to the fuselage using a magnet.



- 7. Attach the cockpit hatch on the fuselage.



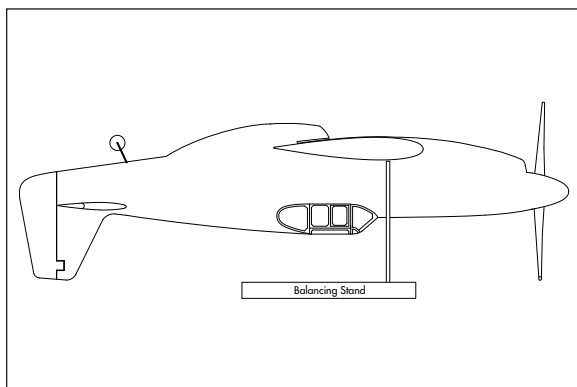
An important part of preparing the aircraft for flight is properly balancing the model.

⚠ CAUTION: Do not inadvertently skip this step or property damage and injury could occur.

- 8. The recommended Center of Gravity (CG) location for your model is 3 to 3½ inches (76 to 89mm) back from the leading edge of the wing as shown with the battery pack installed. Mark the location of the CG on the top of the wing with a felt-tipped pen.



- 9. When balancing your model, support the plane inverted at the marks made on the top of the wing with your fingers or a commercially available balancing stand. This is the correct balance point for your model. Make sure your model is assembled and ready for flight before balancing.



E-tips

If you have installed retracts, balance your model with the gear down.

Adjust the motor battery as necessary so the model is level or slightly nose down. This is the correct balance point for your model. You should find the CG to be very close with the battery installed as shown in this manual. Mark the location of the battery on the battery tray using a felt-tipped pen so it can be returned to this position if it is removed from your model.

After the first flights, the CG position can be adjusted for your personal preference.

Installing the Optional Ordinance Pylons

Required Parts

Wing panel (right and left)

Optional Parts

Drop tank (2) Bomb (2)
 Sub-micro servo (with hardware)
 Micro pushrod connector (2)
 #1 x 1/4-inch wood screw (4)
 Gold-N-Cable (SUL507)
 Ordinance pylon (2)
 Servo with hardware

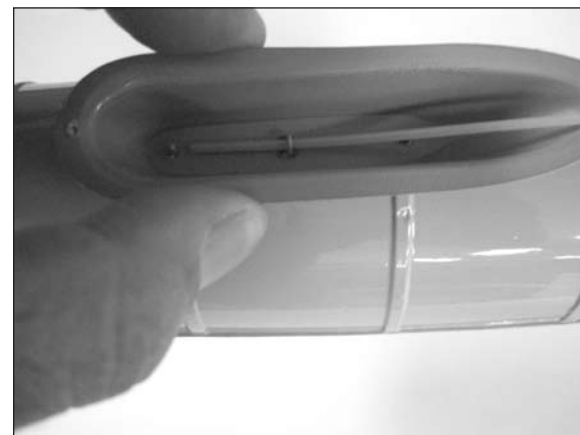
Required Tools and Adhesives

Mixing cup Hobby knife with #11 blade
 12-minute epoxy Mixing stick
 Phillips screwdriver: #0, #1

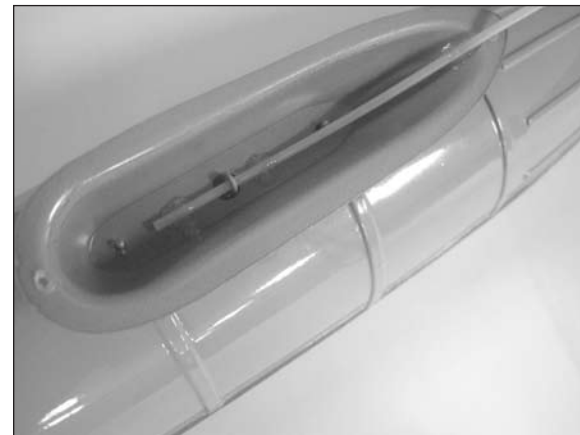
- 1. Locate the drop tank and ordinance pylon. You will also need a Sullivan Gold-N-Cable for this section of the manual.



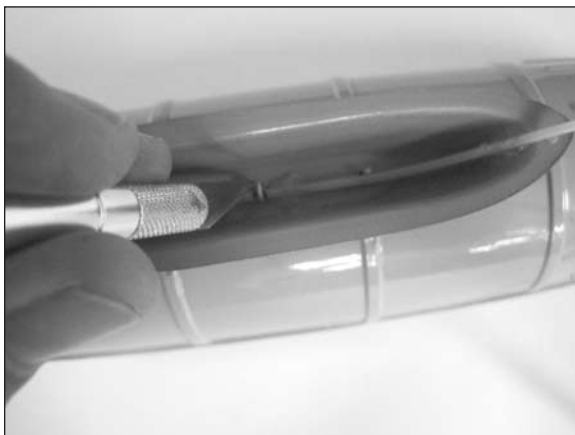
- 2. Position the drop tank on the bottom of the pylon. Slide the tubing through the loop in the drop tank to hold it in position.



- 3. Mix a small amount of 12-minute epoxy. Apply the epoxy to the cable forward and aft of the loop on the drop tank. This will glue the tubing to the inside of the pylon. Allow the epoxy to fully cure before proceeding.



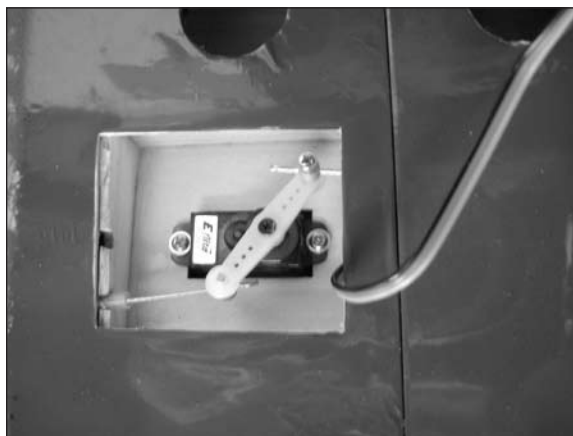
- 4. Use a hobby knife with a #11 blade to trim the tubing near both sides of the loop on the drop tank. This will release the drop tank, yet the tubing will be glued to the pylon. Also trim the tubing off at the back of the pylon.



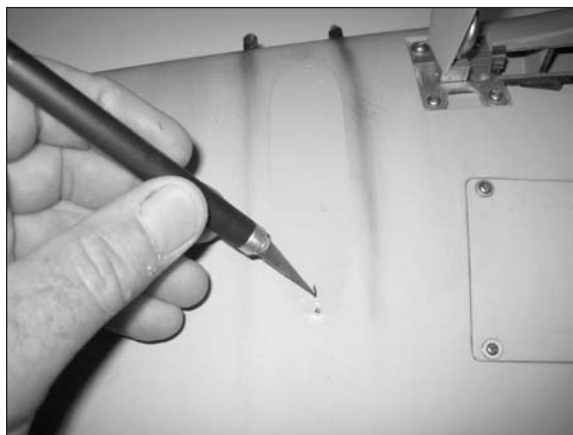
- 5. Slide the cable through the tubing and through the loop in the drop tank. Pulling the cable will now release the drop tank from the pylon.



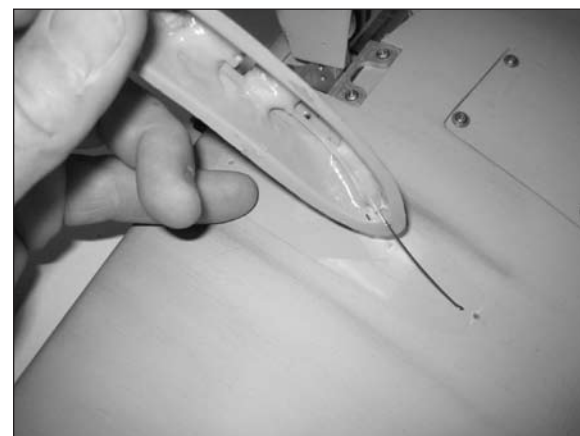
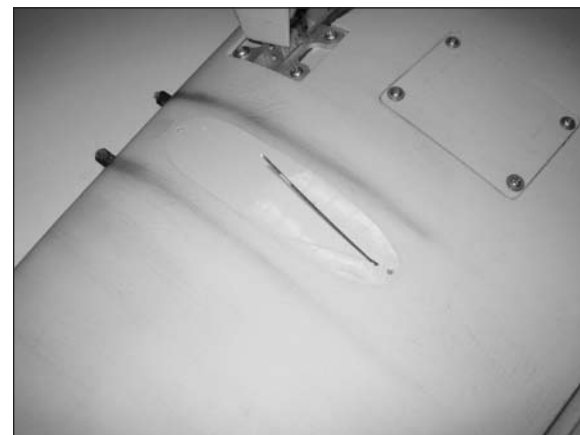
- 5. Mount the sub-micro (we use an S75 servo with a 3D servo horn) servo in the wing using the screws provided with the servo and a #1 Phillips screwdriver. Route the cable through the wing and connect it to the servo using pushrod connectors. You will need to install the pushrod connector that is closest to the trailing edge of the wing upside down on the servo arm. This is to ensure it does not interfere with the rudder and elevator servos in the fuselage when the wing is installed.



- 6. Insert the cable into the pushrod housing in the wing panel. You will find it will make an indentation in the bottom of the wing covering where it exits. Using a hobby knife and #11 blade, slice a small hole in the covering where the cable exits.



- 7. Slip the pylon over the cable that has exited the bottom of the wing. You will have an extra amount of cable sticking out the center section during this process. The cable exit point locates the pylon on the bottom of the wing. Once in position poke a very small hole in the wing skin when the mount holes are in the pylon using a hobby knife and #11 blade.



- 8. Use a #0 Phillips screwdriver to install a screw #1 x 1/4 wood screw into the skin. Remove and harden the hole with thin CA. Once complete install the pylon.



Decal Placement

Required Parts

Decal sheet Completed airframe

Required Tools and Adhesives

Hobby scissor Hobby knife with #11 blade
Paper towel Spray bottle with water
Plastic squeegee Dishwashing liquid

When applying the decals for your model, use a spray bottle and a drop of dishwashing liquid sprayed in the location of the decal to allow repositioning of the decal. Use a paper towel as a squeegee to remove excess water from under the decal. Allow the model to rest overnight so the remaining water can evaporate.

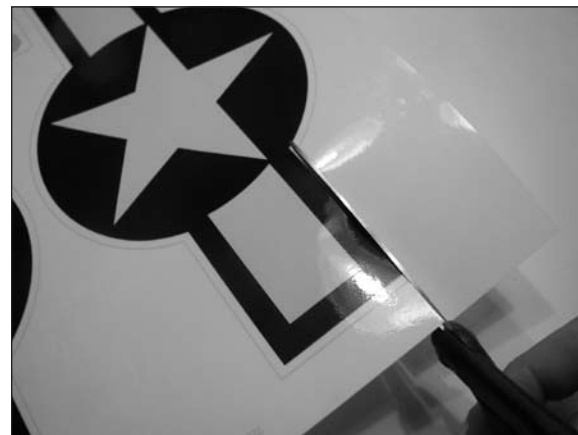
E-tips

We have placed invasion stripes on your model which are for some of the decal options. If your decal option does not use invasion stripes, they can easily be removed.

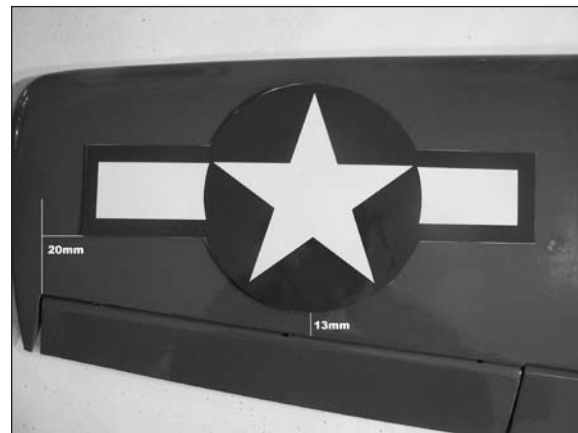
HISTORICAL NOTE:

We have found that Shangri-La had numerous striping configurations during its life. You will find your model has the white stripes on the top and bottom of the wing and stabs. Our diagram below shows the stripes on both the wings and stabs. You will find our box picture shows wings only. You will need to determine which time period version you would like to reproduce. It is easy to peel off the white stripes of the stabs and/or wings to match your aircraft.

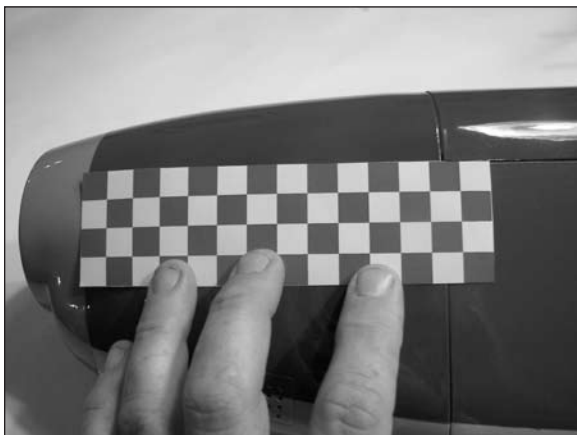
- 1. First you will want to cut your decals out. Trim as close as possible to give the best effect possible when applied. A note here after this step. There are two different sized star and bar decals. The larger ones are for the wings and the smaller ones for the fuselage.



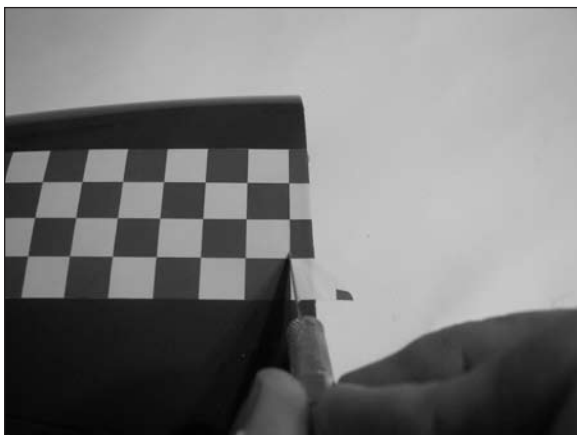
- 2. You will apply a large star and bar decal to the top of the left wing and the bottom of the right wing. Center these towards the tip as shown. The decal should be 3/4-inch (20mm) from the tip and 1/2-inch (13mm) from the aileron at the apex of the circle.



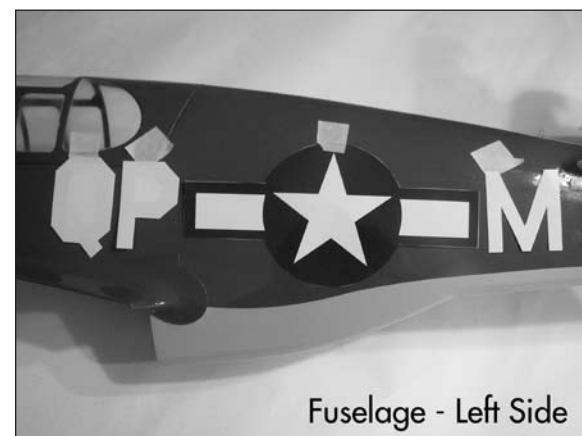
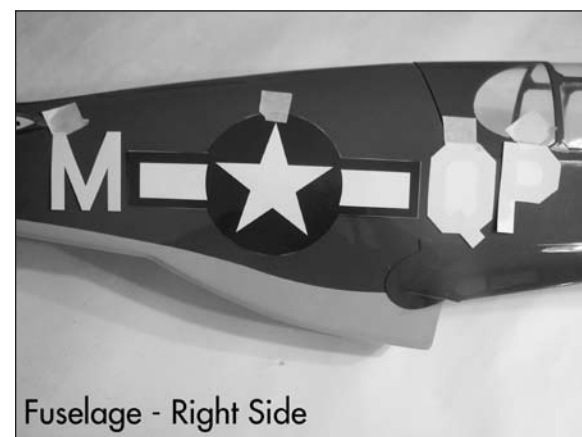
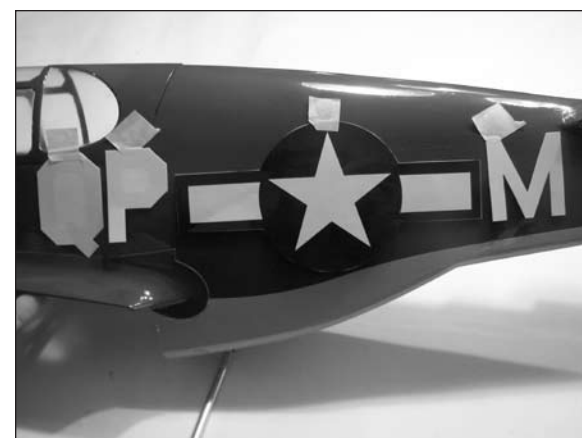
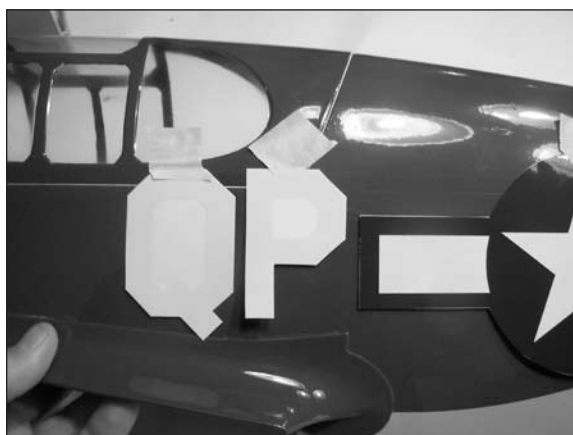
- 3. If you are applying the Shangri-La decals you will need to apply the checkerboard decal to your cowling. Align the decal up with the fuselage hatch line and the red stripe on the front of the cowling. Once lined up remove the backing and apply.



- 4. Trim the decal as shown with a hobby knife and #11 blade. You will need to trim the front slightly as well.

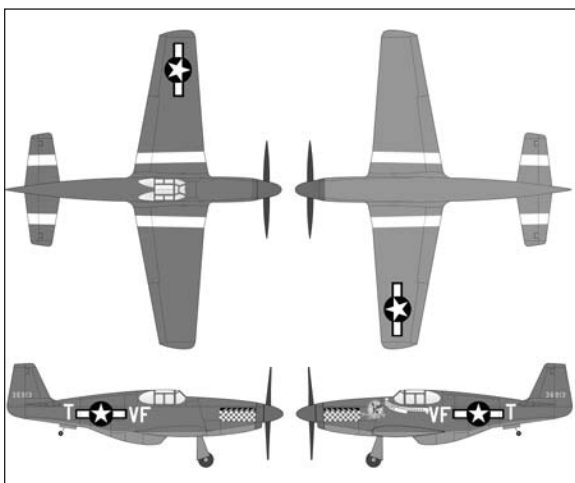


- 5. Using low-tack tape to tape the letters and stars and bars in place on the fuselage. This takes a bit to get them lined up and positioned. The next few pictures will show you the proper alignment on the fuselage side. You will note these decals are being applied to a new fuselage with the stab removed for reference. This will all be done on your completed model. Wording for the fuselage letters on the LEFT side of the fuselage is as follows: Shangri-La (VF - T), Ill Wind (QP - N), Bee (QP - B), Turnip Termite (QP - M). Wording for the fuselage letters on the RIGHT side of the fuselage is as follows: Shangri-La (T - VF), Ill Wind (N - QP), Bee (B - QP), Turnip Termite (M - QP). The dash is for the star and bar decal.



- 6. Apply the tail numbers to the vertical fin and rudder. Two numbers will be on the vertical fin and three numbers on the rudder. This is the same for both sides.
- 7. Apply the nose art you have chosen. Apply per pictures below for your variant.

SHANGRI LA



TURNIP TERMITE




BEE



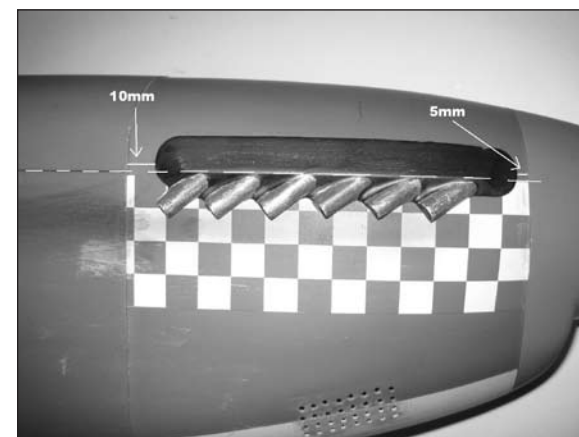
ILL WIND





Use Major Decal Sheet #P-6 for the Hamilton Standard logos on the static prop.

- 8. You may now glue your exhaust stacks in place on the cowling with thin CA.



Gun history with the P-51 B and C model Mustang. Reference photos showing a few B and C models with (6) .50-caliber machine guns, three in each wing. Originally they were equipped with (4) .50-caliber guns. We have included a small plastic fairing with three gun barrels for you if you wish to use them. Your model comes with the simulated four (two per wing) .50-caliber guns. You may choose to remove the wooden guns that are installed and install the plastic guns if you choose.

Detailing Your P-51B Mustang

Required Parts

Completed airframe

Required Tools

Painters grade masking tape
Razor blades Hobby knife w/#11 blade
Glass cleaner Paper towels
Heat gun Covering iron
Drill Drill bit: 1/8-inch (3mm)
Medium CA
Aluminum tubing, 1/8-inch (3mm)

Special Tools and Paint

Steel wool: #0000
Small camel hair artist paint brushes:
 1/4-inch (6mm), 1/2-inch (13mm)
Detail paint brush: #2
Inexpensive paint brush: 1-inch (25mm)
Model Master bottle paint: Aluminum, Rust, Flat Black
Model Master dullcote lacquer (4 cans)
Set of pastel chalks

Overview: This section is to help you take your basic ARF model you just finished and bring a new life to it just like the professional modelers do. This is very easily done using the techniques shown in the next few pages. We will accomplish this in two major sections. The first section will dull the overall look of the model or give it that flat finish just like a military warbird had when it was delivered to the combat unit. The second section will add some minor details and weathering to help show the model in a combat version after a few months flying in the theatre of operation. The main goal is to help you achieve a nice rendering of a scale model using some very basic techniques. Keep in mind there is no right or wrong way to accomplish this. What is shown in the next few pages is a simple technique which should take only a few hours. You can take the model to any level you wish and change it after you are done to achieve a different look if you wish. Please read through

the steps first to better understand what we are doing here. Once you feel comfortable you may begin on a journey that will help you deliver that "real look" on your model taking it from a regular box model to a masterpiece.



DULLING THE OVERALL FINISH

- 1. Use glass cleaner and paper towels to clean the entire model thoroughly.
- 2. Mask off the clear portion of the canopy with a high-grade painters masking tape. We use 3M branded painters tape from the local hardware store. Cut and trim the edges using a razor blade or hobby knife with a #11 blade.



- 3. Use a heat gun and covering iron to ensure all sections of covering are ironed down and smooth with no wrinkles. Take your time here and make this right. Heat is the key, not pressure.

E-tips

UltraCote covering is designed to accept a painted finish from the start. There is no need to scuff the finish with what we are going to do here. If you are using this manual on another product using other brands of plastic film covering, you will need to scuff the covering before painting to ensure proper adhesion. Scuff it by going over the entire model with #0000 steel wool.

- 4. Using the dullcote lacquer – mist the entire model lightly. The key is several light mist coats. Spray a section at a time. Once you have sprayed the dullcote lacquer use a heat gun on the low setting about 8–12 inches (200mm–300mm) above the surface to help accelerate the drying time. We have found it takes between 3–4 coats to get a nice even coverage and a truly flat finish.



- 5. You should now be looking at a brand new clean and flat North American P-51B Mustang straight out of the factory as it would be in 1943. You may wish to stop here or continue to add some weathering to your model and make it even more personalized to your taste.

BASIC WEATHERING AND DETAILS

- 1. We want to start by painting the exhaust pipes aluminum. Using a small #2 detail brush and some aluminum paint, brush 2 light coats on the exhaust pipes of the manifolds until they are silver in color. These need to dry fully before you weather them further.

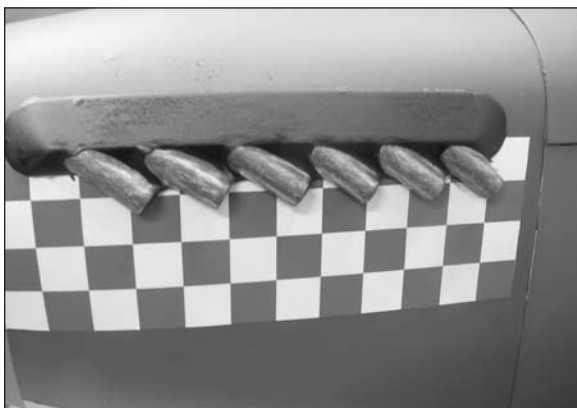


- 2. Using a razor blade cut four pieces of 1/8-inch (3mm) diameter aluminum tubing into lengths approximately 3/16-inch (5mm) long.
- 3. Using a drill with a 1/8-inch (3mm) drill bit, drill a hole in the center of each machine gun. This hole needs to be approximately 1/8-inch (3mm) deep.

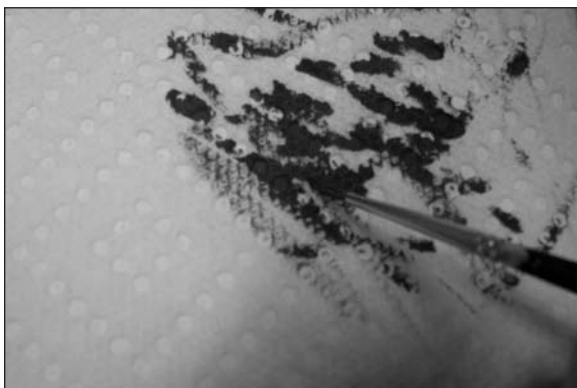
- 4. Now using medium CA glue in a piece of the aluminum tube you cut earlier into each gun. The end result is a nice barrel sticking out of the wooden gun approximately 3/32-inch (2mm). Although not perfectly correct for the scale enthusiast, this delivers a more real look to the model.



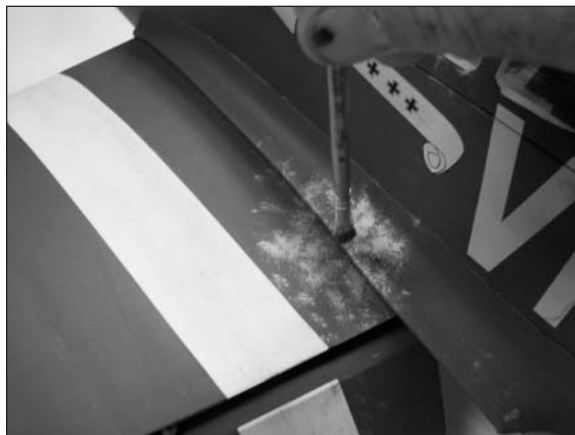
- 5. After the exhaust pipes are dry we need to dry brush them using the rust paint. Using the same #2 detail brush and a folded paper towel, dip the brush into the rust colored paint and then blot the brush on the paper towel. Once most of the paint is removed, lightly brush the aluminum to give it a rustic look. This will take a small amount of time. Do your best to not get any paint on the cowling.



- 6. Get your folded paper towel to blot the brush on once it has paint on it. Blot it until it is very dry. After a few trials you will find the correct formula. Next, lightly hit the areas mentioned above to your preference. As always, less is better. Take your time, do a small area and admire your work. If you don't like what you have done, take some mineral spirits and lightly wipe the mistake away. If you do this the dullcote will come off as well. No problem, just re-spray until flat and try again.



- 7. Once all the exhaust pipes have been dry brushed with the rust color, you may need to touch up the cover with some flat black. Do this now. Once this is complete, feel free to mist on a couple of light coats of dullcote and hit with the heat gun on low.
- 8. Now we will do some very basic paint chipping around the model. Key areas are: nose of spinner, leading edges of wings and tail, leading edge of nose inlet, front canopy frames, walk area on wing where the pilot and crew chief spent a lot of time getting in and out of the model, leading edges of pylons, etc. You can apply chipping heavily, lightly or almost not at all. To do this use the 1/4-inch (6mm) artist brush. Cut off the brush to half its length. This will make the bristles slightly stiffer.

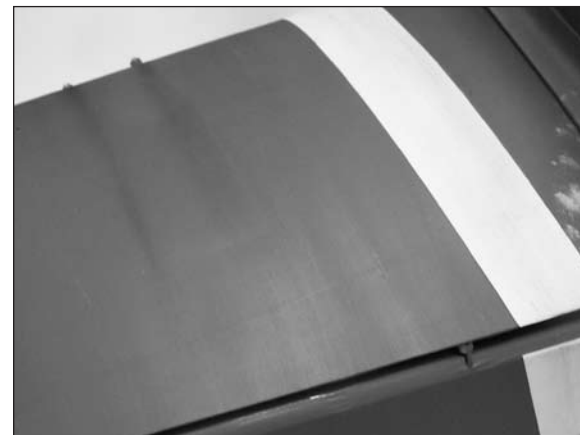


Now you should have a clean model with what looks like paint chips all around. It is now time to get it dirty. Fighter planes in a combat arena are not pretty. They are not extremely clean. Gun residues are cleaned off for the most part as it is very corrosive, but there are always stains. Exhaust residue is always alive but routinely light if the engine was run correctly.

- 9. Using the pastels, scrape off some of the colors to use for weathering. The main colors are brown and black. Scrape them off using a razor blade on its side. Scrape onto a paper towel making two piles of coloring chalk.



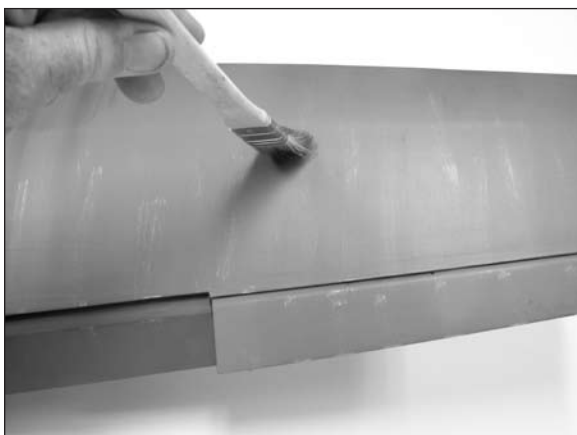
- 10. You can do this for the gun streaks first. Use a 1/2-inch (13mm) artist brush on its side. Lightly press it into the brown chalk and then make a streak behind each gun. Follow this with some black chalk. Do this for each gun (top and bottom) until you are happy with the results. If you are not happy at any time, use the glass cleaner and a paper towel to remove the chalk. Most of it will come off easily.



- 11. Next work on the exhaust streaks. These are done similar to the gun streaks but with a bit more brown then black. Make them heavy or light, this is your choice.



- 12. Open up the aluminum paint again and get the 1/4-inch (13mm) brush we used before. Get some paint on the brush and blot dry, A LOT. Now lightly go over the entire model in the direction air would flow over the model. Very, very little aluminum will transfer to the model. This will take some time but will yield a more realistic looking model. It will highlight certain points of the model.



- 13. Back to the chalks. Using the 1/2-inch (13mm) artist brush, streak the entire model lightly. Start at the spinner and work back on the fuselage. All of this streaking should be done horizontally in the direction of airflow over the model in flight. Continue with the tail and the wings. As you do this you want to also burnish the entire model with #0000 steel wool in the direction of airflow. You will find the steel wool will pull very tiny streaks of the dullcote off delivering a very realistic effect. Continue with the chalks (both brown and black) and then steel wool to get the desired effect. Once you have a nice sized area completed (like a wing panel), mist it with the dullcote once again. Do this until the entire model is where you like it. There is no right or wrong way to this. The more you do it the more comfortable you will feel and the better your results.



- 14. Once you are complete and have the entire model chalked and dullcoted, do one more light stroke over the entire model with the #0000 steel wool. You may now admire your results.



- 15. Stroke over the static spinner and flying spinner during this process.

Control Throws

- 1. Turn on the transmitter and receiver of your model. Check the movement of the rudder using the transmitter. When the stick is moved right, the rudder should also move right. Reverse the direction of the servo at the transmitter if necessary.
- 2. Check the movement of the elevator with the radio system. Moving the elevator stick toward the bottom of the transmitter makes the airplane elevator move up.
- 3. Check the movement of the ailerons with the radio system. Moving the aileron stick right makes the right aileron move up and the left aileron move down.
- 4. Use a ruler to adjust the throw of the elevator, ailerons and rudder. Adjust the position of the pushrod at the control horn to achieve the following measurements when moving the sticks to their endpoints.

Elevator High Rate (100%)

Up	1/2-inch	(13mm)
Down	1/2-inch	(13mm)

Elevator Low Rate

Up	3/8-inch	(9mm)
Down	3/8-inch	(9mm)

Aileron High Rate (100%)

Up	3/8-inch	(9mm)
Down	3/8-inch	(9mm)

Aileron Low Rate

Up	1/4-inch	(6mm)
Down	1/4-inch	(6mm)

Rudder High Rate (100%)

Right	1 1/4-inch	(32mm)
Left	1 1/4-inch	(33mm)

Rudder Low Rate

Right	1-inch	(25mm)
Left	1-inch	(25mm)

Flap (Take-Off)

	5/8-inch	(16mm)
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Flap (Landing)

	1 1/2-inch	(38mm)
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E-tips

Measurements are taken at the inner or widest point on the control surface.

These are general guidelines measured from our own flight tests. You can experiment with higher rates to match your preferred style of flying.

E-tips

Travel Adjust and Sub-Trims are not listed and should be adjusted according to each individual model and preference.

E-tips

We highly recommend re-binding the radio system once all the control throws are set. This will keep the servos from moving to their endpoints until the transmitter and receiver connect.

Preflight

Check Your Radio

Before going to the field, be sure your batteries are fully charged per the instructions included with your radio. Charge the transmitter and motor battery 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.

Before each flying session, be sure to range check your radio. See your radio manual for the recommended range and instructions for your radio system. Each radio manufacturer specifies different procedures for their radio systems. Next, run the motor. With the model securely anchored, check the range again. The range test should not be significantly affected. If it is, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

Double-check that all controls (aileron, elevator, rudder and throttle) move in the correct direction.

Check the radio installation and make sure all the control surfaces are moving correctly (i.e., the correct direction and with the recommended throws).

Check all the control horns, servo horns, and clevises to make sure they are secure and in good condition.

Flying Your P-51B Mustang 32e ARF

Now that your Mustang is at the field lets go over a few things first. Is the main battery fully charged? Is the transmitter fully charged? Are dual rates set for the first flight? Has the center of gravity been verified? If the answer to all of these questions is yes, then we are ready for that first flight. The P-51B is not slow and should be flown at a flying field, not a park. Plug in the flight battery, turn on the transmitter, and turn on the switch for the radio. Check all control surfaces and basic motor operation. Check the motor at full throttle. Pick the model up and cycle the retracts. If everything is working properly you are ready for flight.

Taxi the model onto the runway. Set the idle on your transmitter to a low idle, this will be your flight idle. For your first flight leave the flaps up on takeoff until you are familiar with the Mustang. Now, applying power slowly and steering with the rudder to keep the model straight, the P-51B should accelerate quickly and the tail will rise. As the tail comes up and the model gains flight speed, you will want to rotate when you feel comfortable. The P-51B should climb out with authority. Once in the air retract the landing gear. Climb to a safe altitude and begin to trim the model out. Once you have the model trimmed out you will want to get an idea of the flight quality with the flaps down and slowed down. Once you are happy with this now we can enjoy the Mustang.

You will find the model tracks very well through all aspects of flight. From high-speed passes to inverted flight to loops and rolls, you will be flying like a fighter pilot over Europe in just a few short minutes. If you have installed the optional pylons and are planning on dropping the bombs or under-wing tanks let's do a pass and clean the bird up. The Mustang can be flown through the entire flight range with the ordinance on, it will not affect any part of the flight performance. I normally set up for a pass about 20 feet high at about 5/8 throttle. Approach the target or drop area, with the plane level or in a shallow dive, release the ordinance and fly away. The big key here is **DO NOT WATCH** the ordinance fall. You **NEED TO FLY** the model. More than one modeler has watched the bombs continue to fall and the plane continues on into the ground because no one was flying it. Don't let this happen to you.

To set up for landing, drop the flaps and retracts and enter the downwind pattern for landing. Adjust power to slow the plane down but keep flying speed. As you roll onto final approach manage the power and begin to pull the nose up. The key to a great warbird landing is to touch down on the wheels and roll down the runway. That is how the pro's do it. Before long you will be enjoying sorties over the field destroying anything in your path. We hope you enjoy flying the P-51B Mustang.

Happy Landings!

Range Test Your Radio

Before each flying session, and especially with a new model, it is important to perform a range check. It is helpful to have another person available to assist during the range check. If you are using a Spektrum transmitter, please refer to your transmitter's manual for detailed instructions on the range check process.

- 1. With the model resting on the ground, stand 30 paces (approximately 90 feet) away from the model.
- 2. Face the model with the transmitter in your normal flying position. Be sure the throttle is in the full down position and plug the flight battery into the speed control.
- 3. As you move the controls, watch to be sure the airplane's motor and controls operate smoothly. You should have total control of the model at 30 paces (90 feet).
- 4. If control issues exist, call the appropriate Horizon Product Support office (see page 43) or go to **horizonhobby.com** to find a local Spektrum distributor in your country for service if using a Spektrum radio system.

Daily Flight Checks

- 1. Check the battery voltage of the transmitter battery. Do not fly below the manufacturer's recommended voltage. To do so can crash your aircraft.

E-tips

When you check these batteries, ensure you have the polarities correct on your expanded scale voltmeter.

- 2. Check all hardware (linkages, screws, nuts, and bolts) prior to each day's flight. Be sure that binding does not occur and that all parts are properly secured.
- 3. Ensure all surfaces are moving in the proper manner.
- 4. Perform a ground range check before each day's flying session.
- 5. Prior to starting your aircraft, turn off your transmitter, then turn it back on. Do this each time you start your aircraft. If any critical switches are on without your knowledge, the transmitter alarm will sound a warning at this time.
- 6. Check that all trim levers are in the proper location.
- 7. All servo pigtails and switch harness plugs should be secured in the receiver. Make sure the switch harness moves freely in both directions.

Warranty and Repair Policy

WARRANTY PERIOD

Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warranties that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

LIMITED WARRANTY

Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for all warranty claims.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any Product by Purchaser must be approved in writing by Horizon before shipment.

DAMAGE LIMITS

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

Warranty Services

QUESTIONS, ASSISTANCE, AND REPAIRS

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a Product Support representative. You may also find information on our website at www.horizonhobby.com.

INSPECTION OR REPAIRS

If this Product needs to be inspected or repaired, please use the Horizon Online Repair Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. An Online Repair Request is available at www.horizonhobby.com <http://www.horizonhobby.com> under the Repairs tab. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for repair. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Notice: Do not ship batteries to Horizon. If you have any issue with a battery, please contact the appropriate Horizon Product Support office.

WARRANTY INSPECTION AND REPAIRS

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon.

NON-WARRANTY REPAIRS

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for inspection or repair, you are agreeing to Horizon's Terms and Conditions found on our website under the Repairs tab.

UNITED STATES

(Electronics and engines)
Horizon Service Center
4105 Fieldstone Rd
Champaign, Illinois
61822 USA
877-504-0233

Online Repair Request visit:
www.horizonhobby.com/repairs

(All other products)
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Compliance Information for the European Union



INSTRUCTIONS FOR DISPOSAL OF WEEE BY USERS IN THE EUROPEAN UNION

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

2010 Official Academy of Model Aeronautics Safety Code

GENERAL

1. A model aircraft shall be defined as a non-human-carrying device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.
2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.
3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.
4. I will not fly my model aircraft in sanctioned events, air shows, or model demonstrations until it has been proven airworthy.
5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.
6. I will not fly my model aircraft unless it is identified with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.
7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.

8. I will not operate model aircraft carrying pyrotechnic devices which explode, burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.
9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.
10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.
11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.
12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

RADIO CONTROL

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.
2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.

3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.
4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of airshows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.
5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.
6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequency management agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.
7. With the exception of events flown under official AMA rules, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and located at the flightline.



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