de Havilland TIGER MOTH ARF

ALMOST-READY-TO-FLY RADIO CONTROLLED MODEL

INSTRUCTION MANUAL

Length: 60" [1,524mm]
Weight: 10.25 lbs [4,592g]
Wingspan: 71" [1,803.4mm]
Wing Area: 1360 sq in [8,840 sq cm]
Wing Loading: 17.35 oz/sq ft [485.5 g/sq cm]
Radio: 4-ch (5 servos)
Engine: .61 two-stroke, .91 four-stroke [10cc 2-stroke, 15cc 4-stroke]

WARRANTY

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

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

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

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

GREAT PLANES® MODEL MANUFACTURING COMPANY
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(217) 398-8970, Ext 2
airsupport@greatplanes.com

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INTRODUCTION

Thank you for purchasing the Great Planes Tiger Moth ARF. This model is a re-creation of the deHavilland D.H. 82 Tiger Moth which was originally developed from the D.H. Gipsy Moth. It was first flown in October of 1931 and became the basic trainer for Britain's Royal Air Force. More than 8,700 Tiger Moths were manufactured, with 4,200 going to the Royal Air Force, where it trained thousands of pilots for World War II service. It continued to serve the post-war RAF until 1951. There are more than 250 still flying today.

The Tiger Moth has a wingspan of 29 ft. 4 in., a fuse length of 23 ft. 11 in., and is powered by a 145-hp deHavilland Gipsy Major 1C inline piston engine. The plane has a maximum speed of 107 mph, a ceiling of 14,600 ft. and a range of 275 miles.

We hope your new Great Planes Tiger Moth ARF provides you with many hours of flying fun and enjoyment.

For the latest technical updates or manual corrections for the Tiger Moth, visit the web site listed below and select the Great Planes Tiger Moth ARF. A “tech notice” box will appear in the upper left corner of the page if there is new technical information or changes.

http://www.greatplanes.com/airplanes/index.html

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

1. Your Great Planes Tiger Moth ARF should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Tiger Moth, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage property.

2. You must assemble the model **according to the instructions.** Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.

3. You must take time to **assemble straight, true** and **strong**.

4. You must use an R/C radio system that is in first-class condition, and a correctly sized engine and components (fuel tank, wheels, etc.) throughout the assembly process.

5. You must properly install all R/C and other components so that the model operates properly on the ground and in the air.

6. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

7. If you are not already an experienced R/C pilot, you should fly the model only with the help of a competent, experienced R/C pilot.

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

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

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

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

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

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

The Tiger Moth qualifies as a "giant scale" model and is an excellent sport-scale model. It is therefore eligible to fly in IMAA events. The IMAA (International Miniature Aircraft Association) is an organization that promotes non-competitive flying of giant-scale models. If you plan to attend an IMAA event, contact the IMAA for a copy of the IMAA Safety Code at the address or telephone number below.

IMAA
205 S. Hilldale Road
Salina, KS 67401
(866) 366-4622
Or via the Internet at: http://www.fly-imaa.org

DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the Tiger Moth that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

The Tiger Moth requires a minimum 4 channel radio system such as the Futaba® 4VF (FUTJ62**). It requires 5 S-3003 servos (FUTM0031), two Pro HD 12" Aileron Extensions (HCAM2711), and one Pro HD Y-Harness (HCAM2751).

Engine Recommendations

The following engines are recommended for the Tiger Moth:

OS® .61 FX two-stroke (OSMG0561)
SuperTigre® G-61 ABC w/muffler two-stroke (SUPG0181)
SuperTigre G-75 Ring w/muffler two-stroke (SUPG0205)
OS FS-91 II Surpass™ four-stroke (OSMG0896)
OS FS-91 II Surpass w/pump four-stroke (OSMG0890)

Remember that this is a scale model that is intended to fly at scale-like speeds, so throttle management should be practiced.

ADDITIONAL ITEMS REQUIRED

Hardware and Accessories

This is the list of hardware and accessories required to finish the Great Planes Tiger Moth. Order numbers are provided in parentheses.

❑ Propellers – Follow engine manufacturer's recommendations
❑ R/C foam rubber (1/4" - HCAQ1000, or 1/2" - HCAQ1050)
❑ 30-Minute Epoxy (GPMR6047)
❑ 3' Medium fuel tubing (GPMQ4131)

Covering Accessories

- ❑ Top Flite® MonoKote® sealing iron (TOPR2100)
- ❑ Top Flite MonoKote trim seal iron (TOPR2200)
- ❑ Top Flite MonoKote heat gun (TOPR2000)
- ❑ Top Flite Hot Sock™ iron cover (TOPR2175)

Adhesives and Building Supplies

In addition to common household tools and hobby tools, this is the "short list" of the most important items required to build the Tiger Moth. Great Planes Pro™ CA and Epoxy glue are recommended.

- ❑ 1/2 oz. Thin Pro CA (GPMR6001)
- ❑ 1/2 oz. Medium Pro CA+ (GPMR6007)
- ❑ Hobby knife (HCAR0105)
- ❑ #11 blades (HCAR0211)
- ❑ Small T-pins (HCAR5100)
- ❑ Builder's triangle (HCAR0480)
- ❑ Electric drill and 1/16" [1.6mm], 3/32" [2.4mm], 3/16" [4.8mm], 17/64" [6.7mm], and 5/16" [7.9mm] drill bits
- ❑ 8-32 Tap Set (GPMR8108)
- ❑ Small Phillips (HCAR1024) and flat blade (HCAR1002) screwdrivers
- ❑ Pliers with wire cutter (HCAR0630)

Optional Supplies and Tools

Here is a list of optional tools mentioned in the manual that will help you build the Tiger Moth.

- ❑ Great Planes CG Machine™ (GPMR2400)
- ❑ Easy-Touch™ Bar Sander (GPMR6170)
- ❑ Easy Fueler™ fuel filling valve for glow fuel (GPMQ4160)
- ❑ Hobbico® Servo Horn Drill (HCAR0698)
- ❑ 1/4-scale pilot (optional, WBRQ4131)
- ❑ Switch and Charge Jack Mounting Set (GPMM1000)
- ❑ Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700)
- ❑ Great Planes Fingertip Prop Balancer (GPMQ5000)
- ❑ Black Top Flite MonoKote Trim Sheet (TOPQ4109)
- ❑ Black Top Flite LustreKote® Paint (TOPR7208)
- ❑ Straightedge with scale (HCAR0475)
- ❑ Cutting mat (HCAR0456)
- ❑ Masking Tape (TOPR8018)
- ❑ CA Debonder (GPMR6039)
- ❑ CA Applicator tips (GPMR6033)
- ❑ CA accelerator (GPMR6034)
- ❑ 6-Minute Epoxy (GPMR6045)
- ❑ R/C-56 Canopy Glue (JOZR5007)
- ❑ Epoxy Brushes (GPMR8060)
- ❑ Mixing Sticks (GPMR8055)
- ❑ Threadlocker (GPMR6060)
- ❑ Denatured Alcohol (for epoxy clean up)
- ❑ 1/16" to 1/4" drill bit set
- ❑ Curved Tip Canopy Scissors for Trimming Plastic Parts (HCAR0667)
- ❑ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❑ Great Planes Receiver Guard (GPMM1010)
- ❑ Great Planes AccuThrow™ Deflection Gauge (for measuring control throws, GPMR2405)

MonoKote colors used on this model.

The Tiger Moth is covered in Top Flite MonoKote film. Should additional covering for patchwork or repairs be required, use Top Flite Cub Yellow MonoKote (TOPQ0220).

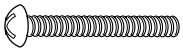
IMPORTANT BUILDING NOTES

- There are two types of screws used in this kit:

Sheet metal screws are designated by a number and a length. For example #6 x 3/4"

This is a number six screw that is 3/4" long.

Machine screws are designated by a number, threads per inch, and a length. For example 4-40 x 3/4"



This is a number four screw that is 3/4" long with forty threads per inch.

- When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or custom fit the part as necessary for the best fit.

- Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.

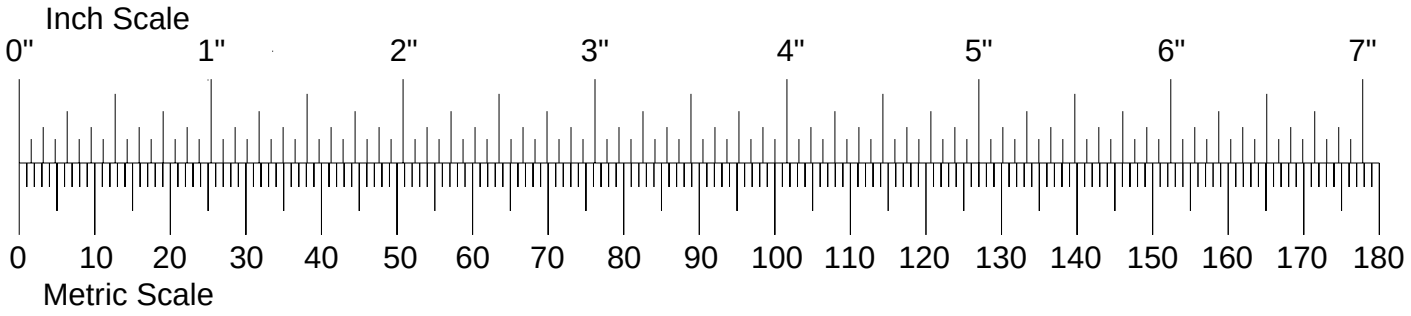
- Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (or 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.

- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

Metric Conversions

1/64" = .4mm	3/8" = 9.5mm	12" = 304.8mm
1/32" = .8mm	1/2" = 12.7mm	15" = 381mm
1/16" = 1.6mm	5/8" = 15.9mm	18" = 457.2mm
3/32" = 2.4mm	3/4" = 19mm	21" = 533.4mm
1/8" = 3.2mm	1" = 25.4mm	24" = 609.6mm
5/32" = 4mm	2" = 50.8mm	30" = 762mm
3/16" = 4.8mm	3" = 76.2mm	36" = 914.4mm
1/4" = 6.4mm	6" = 152.4mm	

To convert inches to millimeters, multiply inches by 25.4



ORDERING REPLACEMENT PARTS

To order replacement parts for the Great Planes Tiger Moth ARF, use the order numbers in the **Replacement Parts List** that follows. Replacement parts are available only as listed. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets. If you need assistance locating a dealer to purchase parts, visit **www.greatplanes.com** and click on "Where to Buy." If this kit is missing parts, contact **Great Planes Product Support**.

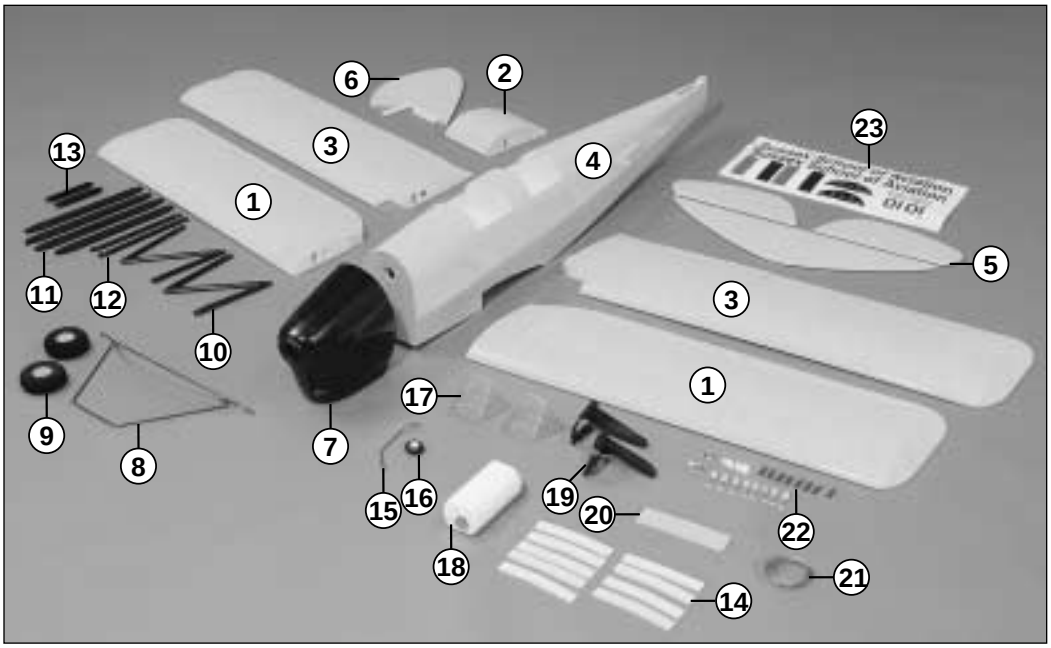
Replacement Parts List

Order Number	Description	How to Purchase
	Missing pieces	Contact Product Support
	Instruction manual	Contact Product Support
	Full-size plans	Not available
GPMA2229	Upper Wing Kit	Contact Your Hobby Supplier to Purchase These Items
GPMA2230	Lower Wing Kit	
GPMA2231	Fuselage Kit	
GPMA2232	Tail Set	
GPMA2233	Cowl	
GPMA2234	Landing Gear	

KIT CONTENTS

Before starting to build, use the **Kit Contents** list to take an inventory of your kit to make sure it is complete, and inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact **Great Planes Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list on this page.

Great Planes Product Support:
Phone: (217) 398-8970
Fax: (217) 398-7721
E-mail: airsupport@greatplanes.com



Kit Contents (Photographed)

1. Top Wing
2. Top Wing Center Section
3. Bottom Wing w/Ailerons
4. Fuselage
5. Stabilizer w/ Elevators
6. Fin w/ Rudder
7. Painted Fiberglass Cowl
8. Landing Gear
9. 3-1/4" Wheels (2)
10. Cabane Struts (2)
11. Interplane Struts (4)
12. Stab Braces (2)
13. Landing Gear Covers (2)
14. Wing Joiners (9)
15. Tail Wheel Wire & Bearing
16. 1-1/4" Tail Wheel
17. Wind Screens (2)
18. Fuel Tank w/ Hardware
19. Engine Mount (R & L Halves)
20. Wing Bolt Mounting Plate
21. Flying Wire
22. Metal Brackets (24)
23. Decal Sheet

Kit Contents (Not Photographed)

(4)8-32 x 1" SHCS (attaching engine mount)
(4) 8-32 Blind nuts (attaching engine mount)
(6) 6-32 x 1/8" Set screws (3/16" wheel collars)
(4) 3/16" Wheel collars (main wheels)
(1) 3/32" Wheel collar (tail wheel)
(1) Brass screw lock connector (throttle linkage)
(1) Nylon retainer (throttle linkage)
(1) 4-40 x 1/4" SHCS (throttle linkage)
(2) 1/4" - 20 Nylon bolts (attach wing to fuse)
(6) Nylon clevises (ailerons, elevators, rudder)
(4) Faslinks (ailerons, elevator, rudder servos)
(4) Nylon landing gear straps
(5) Nylon control horns (ailerons, elevs, rudder)
(26) Silicone clevis retainers
(1) 2" x 9" CA hinge strip (all control surfaces)
(3) .074" x 36" Thread one end pushrod (rudder, elev)
(2) .074" x 12" Thread one end pushrod (aileron)
(1) .074" x 17.5" Thread one end pushrod (throttle)
(1) 11-3/4" Pushrod Guide Tube (throttle)
(8) #8 Washers (engine mount)
(3) 36" Pushrod Guide Tube (pre-installed in fuse)
(12) 4-40 Nylon lock nut (struts & cabanes)
(12) #4 Washers (struts & cabanes)
(12) 4-40 x 3/4" SHCS (struts & cabanes)
(12) #2 x 1/2" Phillips head screws (LG straps and aileron control horns)
(4) 8-32 x 3/4" SHCS (engine to mount)
(2) 5/32" Wheel collars (elevator pushrods)
(1) 4-40 x 1/8" Set screw (3/32" wheel collar)
(4) 2-56 x 5/8" Machine screw (elev cntl horns)
(20) 2-56 Metal clevises (flying wires)
(2) 2-56 x 3/4" SHC Screw (rud cntl horn)
(1) 2-1/4" Black Spinner
(2) 1/4" - 20 Blind nuts (pre-installed in wing hold down plate)
(4) 4 x 18mm Wood screws (cabanes to fuse)
(18) 3 x 12mm Wood screws (brackets for struts and wires)
(4) 2.5 x 8mm Wood screws (cowl to fuse)
(24) Aluminum crimp tubes (flying wires)
(12) 2-56 Threaded brass ends (flying wires)

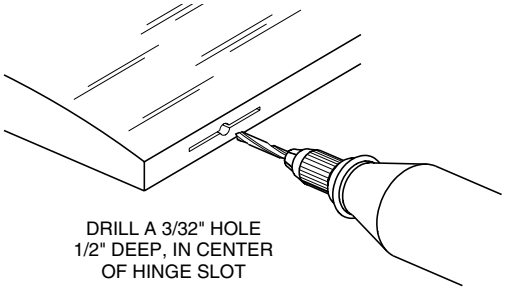
PREPARATIONS

❑ 1. If you have not done so already, remove the major parts of the kit from the box (wings, fuse, cowl, tail parts, etc.) and inspect them for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed on page 6.

❑ 2. Remove the masking tape and separate the **ailerons** from the **wing**, the **rudder** from the **fin** and the **elevators** from the **stab**. Tighten the covering with a **covering iron** on high heat with a covering sock. Apply pressure over sheeted areas to **thoroughly** bond the covering to the wood.

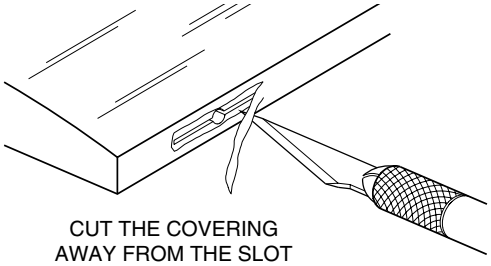
ASSEMBLE THE WING

Hook Up the Ailerons



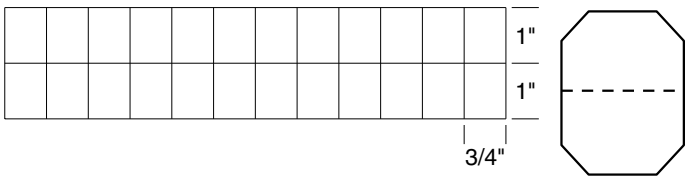
DRILL A 3/32" HOLE
1/2" DEEP, IN CENTER
OF HINGE SLOT

❑ ❑ 1. Drill a 3/32" [2.4mm] hole, 1/2" [13mm] deep in the center of each hinge slot to allow the CA to "wick" in. Follow-up with a #11 blade to clean-out the slots. **Hint:** If you have one, use a **high-speed rotary tool** to drill the holes.

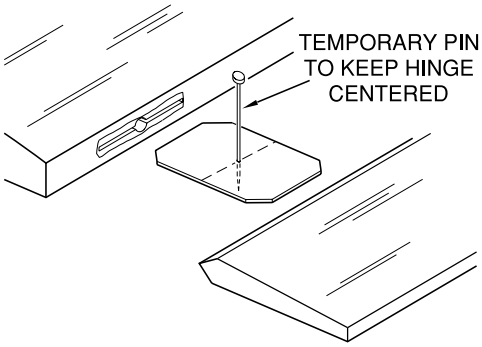


CUT THE COVERING
AWAY FROM THE SLOT

❑ ❑ 2. Use a sharp #11 blade to cut a strip of covering from the **aileron hinge slots** in both halves of the **Bottom Wing** and ailerons.

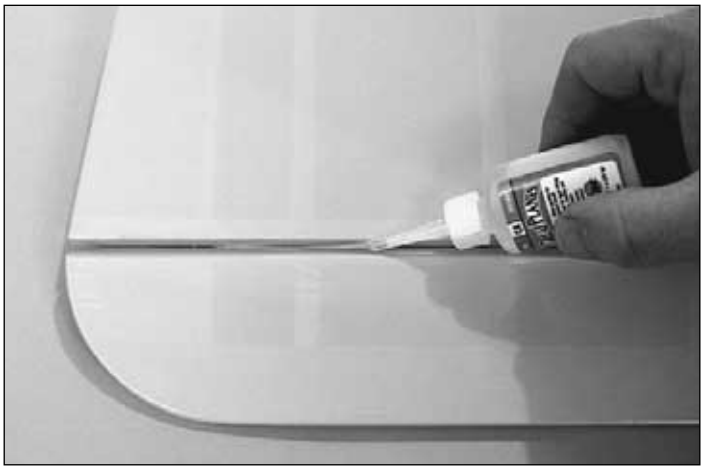


❑ 3. Cut fourteen 3/4" x 1" [19mm x 25mm] **hinges** from the **CA hinge strip**. Snip off the corners as shown so they go in easier. Insert three of the hinges into the aileron hinge slots.

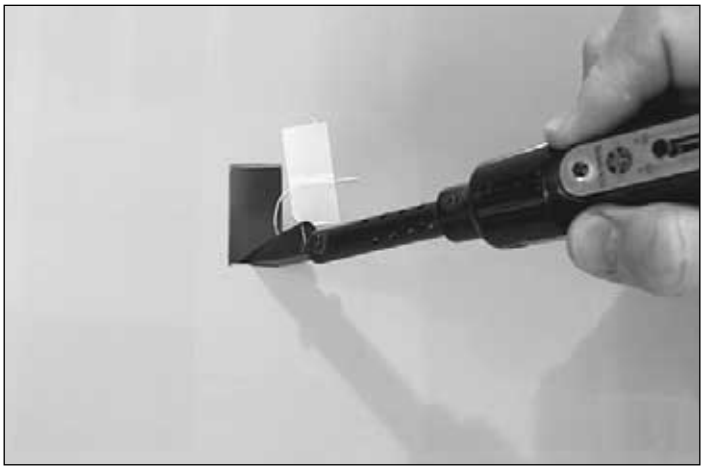


❑ ❑ 4. Test fit the ailerons to the wing with the hinges. If the hinges don't remain centered, stick a pin through the middle of the hinge to hold it in position.

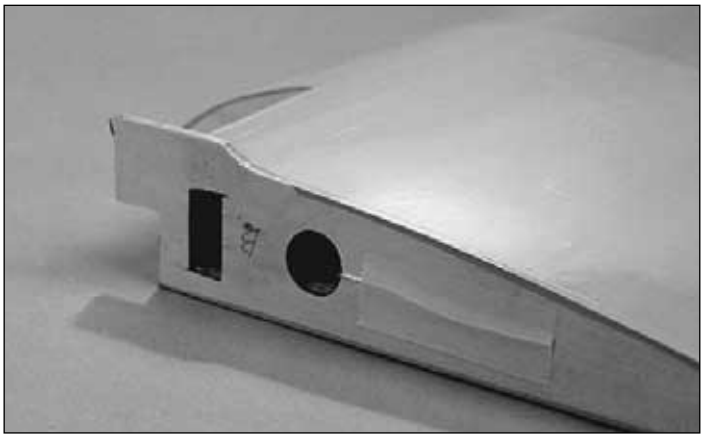
❑ ❑ 5. Remove any pins you may have inserted into the hinges. Adjust the aileron so there is a small gap between the LE of the aileron and the wing. The gap should be just small enough to see light through or to slip a piece of paper through.

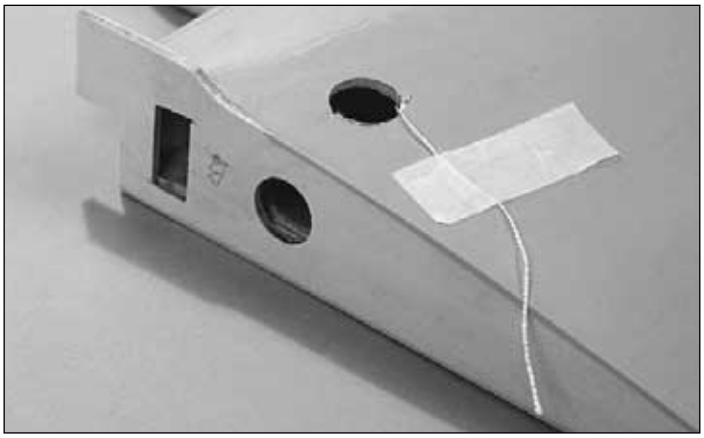


❑ ❑ 6. Apply six drops of **thin CA** to the top and bottom of each hinge. Do not use CA accelerator. After the CA has fully hardened, test the hinges by pulling on the aileron.

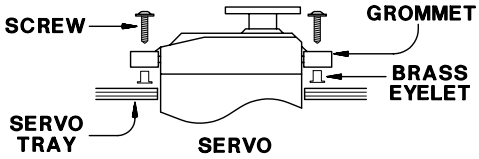


❑ ❑ 7. Cut the covering 1/8" [3mm] inside the opening in the wing for the **aileron servo**. Use a trim iron to seal the covering to the edges of the opening.



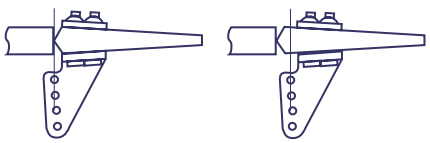


❑ ❑ 8. Cut the covering away from the hole in the top of the wing and feed the **string**, which is taped to the root rib through the hole in top of the wing and re-tape it securely near the hole.



❑ ❑ 9. Install the servo per the manufacturer's instructions. Connect a 12" [305mm] servo extension wire (HCAM2711) to the servo and secure it with **tape** or **heat shrink material**. Tie the string to the aileron servo wire and pull the servo wire out of the hole on top of the wing with the string. Tape the connector to the wing to prevent it from falling back inside the wing. Then discard the string.

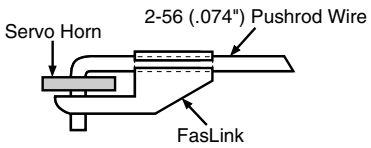
❑ ❑ 10. Place the servo into the wing and drill 1/16" [1.6mm] holes in the wing for the **servo mounting screws**. Then, mount the aileron servo using the screws that came with it.



Correct Incorrect

❑ ❑ 11. The **servo arms** for the aileron servos are placed so that they point outboard from the servo. This is necessary for proper function. Draw a line to the servo arm hole at 90-degrees from the aft edge of the aileron bay. At this location mark and drill the two 1/16" [1.6mm] holes into the bottom of the aileron for mounting the nylon control horn. Saturate the holes with thin CA, wipe away any residual CA and allow it to fully harden. Mount the **aileron control horn** to the aileron with two #2 x 1/2" [13mm] sheet metal screws.

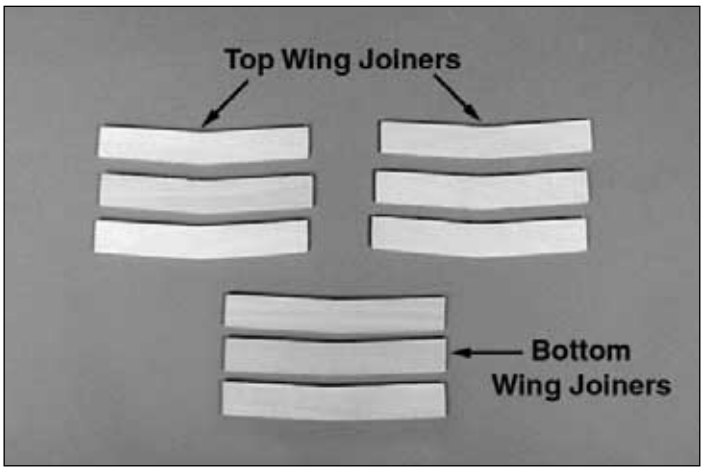
❑ ❑ 12. Enlarge the hole in the servo arm with a **Hobbico Servo Horn Drill** (HCAR0698) or a #48 or 5/64" [2mm] drill bit. Install a **clevis retainer** and a **clevis** onto a 12" [305mm] **pushrod** approximately 25 turns. Center the servo arm, align the aileron with the trailing edge of the wing, and then mark the location of the servo arm hole on the pushrod with a felt tip pen.



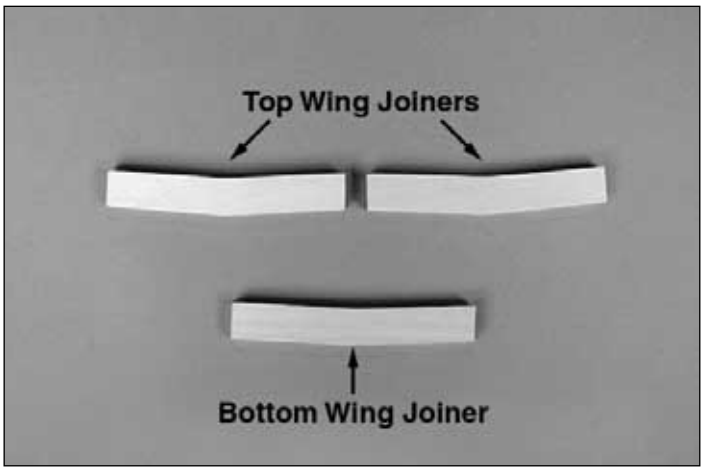
❑ ❑ 13. Measure 1/2" [13mm] past the marked location toward the non-threaded end of the pushrod and cut it off at that point. Make a 90-degree bend in the pushrod at the marked location (servo arm hole). Connect the servo to the aileron as shown using a **Faslink Connector**.

❑ 14. Repeating steps 1 - 12, assemble the other wing the same way.

JOIN THE WINGS

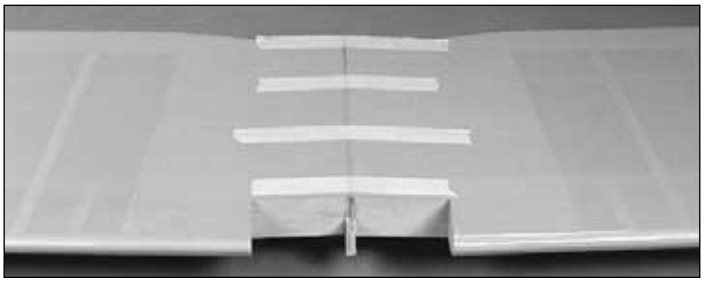


❑ 1. Locate the nine die-cut ply **wing joiners**. Note that there will be three matching wing joiners which make up the bottom wing joiner. Mark these “bottom wing joiner.” There will also be six matching wing joiners which make up the two joiners for the top wing. Mark these “top wing joiner.”



❑ 2. Use 6-minute epoxy to glue the joiners together to form three plywood joiners as shown.

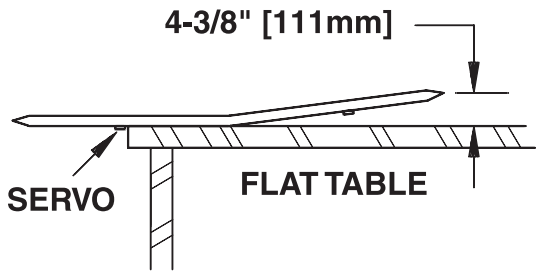
❑ 3. After the epoxy has cured, sand off any excess glue and test fit the lower wing joiner into the two wing halves, making sure the lower wing halves fit together properly and form a good fitting joint.



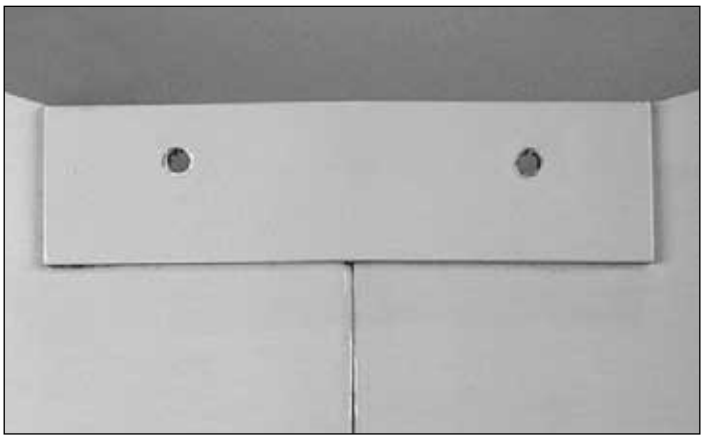
❑ 4. Using 30-minute epoxy, thoroughly coat the root rib of both lower wing halves and the wing joiner. Be sure to apply a generous amount of epoxy into the inside of the wing joiner pocket. **Important:** Make sure the joiner is fitted **upright** to ensure the proper dihedral. Then, join the wing halves tightly, holding them together. Use a paper towel to wipe away excess epoxy that comes out of the wing. Tightly hold the wing together with masking tape, making certain both halves are in full contact and that the leading and trailing edges align.

(Proceed to the next step immediately!)

The following sketch shows how the lower wing dihedral is measured.



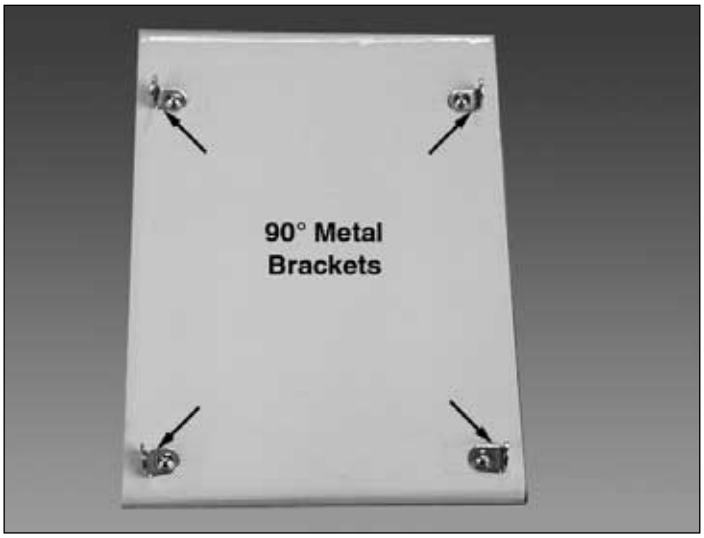
❑ 5. Check for the correct dihedral angle while joining the wing. Place one wing panel on a flat surface and measure the distance from the elevated wing tip to the table top. This distance should be 4-3/8" [111mm] measured at the wing tip former, located 4" [102mm] back from the leading edge.
Note: You will need to avoid the servo to get an accurate measurement.
You can use a paper towel dampened with rubbing alcohol for any epoxy clean-up. Do not disturb the wing until the epoxy has fully hardened.



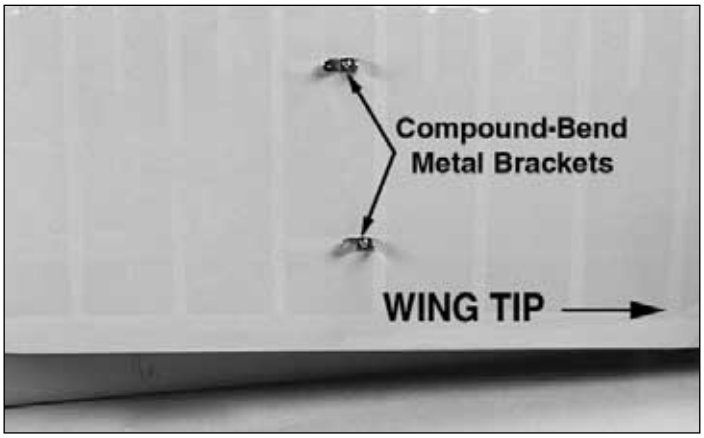
❑ 6. Outline the 1/8" [3mm] plywood **wing bolt plate** on the bottom of the lower wing and cut the MonoKote covering away using a **Hobbico Hot Knife** (HCAR0770). You may also use a **hobby knife with a #11 blade**. If using this method be sure not to cut into the wood under the covering as this will weaken the structure.

❑ 7. After removing the covering use 6-minute epoxy to glue the **wing bolt plate** to the wing and allow the epoxy to cure completely.

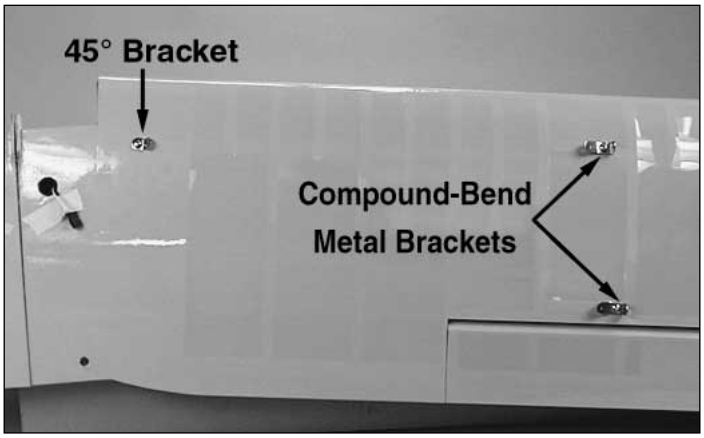
❑ 8. Drill two 17/64" [6.7mm] holes through the wing bolt plate from the top of the wing using the pre-drilled holes in the wing as a guide.

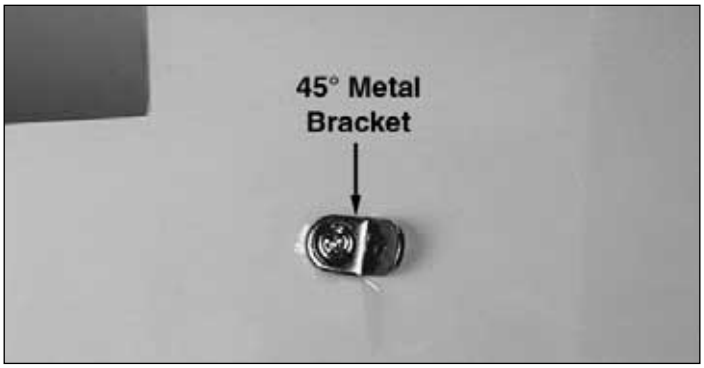


❑ 9. Install four **90-degree metal brackets** into the pre-drilled holes in the bottom of the top wing center section with 3mm x 12mm wood screws.



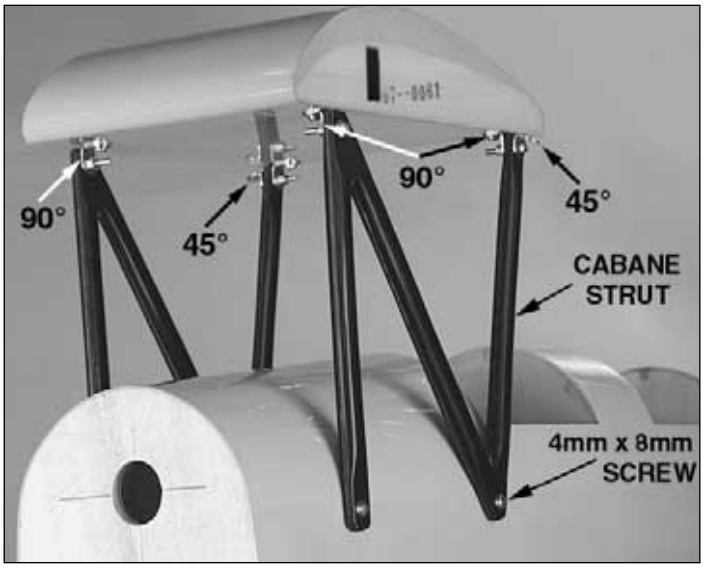
❑ 10. Locate the pre-drilled holes in the bottom of the **top** wing panels. Mount the four **compound-bend metal brackets** (two in each wing panel) using 3mm x 12mm wood screws. The interplane struts and flying wires will attach to them in a later step.





❑ 11. Locate the pre-drilled holes in the top of the **bottom** wing and install the four compound-bend metal brackets in place. Install two **45-degree metal brackets** in the pre-drilled holes near the center of the wing with 3mm x 12mm wood screws as shown in the photo.

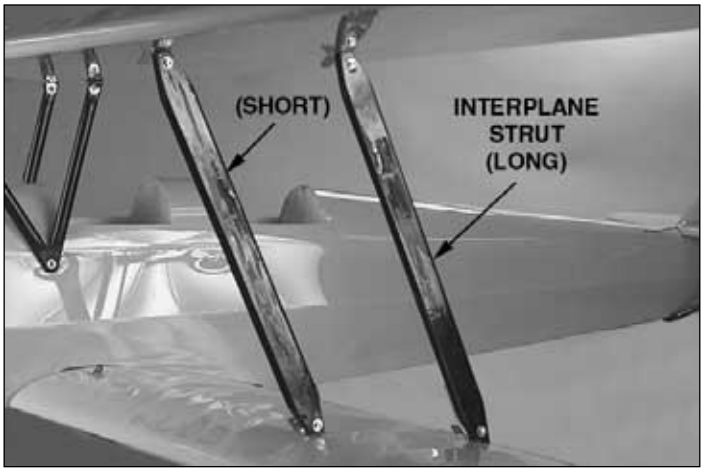
❑ 12. Attach the bottom wing to the fuselage, using two **1/4"-20 nylon wing bolts**.



❑ 13. Mount the cabane struts to the fuselage using the following procedure: Locate the four pre-drilled holes in the fuselage for mounting the Cabane Struts and saturate the holes with thin CA to harden the wood. After the CA cures, mount the Cabane Struts as shown in the photo, using four 4mm x 8mm wood screws (supplied).

❏ 14. Attach the top wing center section by inserting two 4-40 x 3/4" [19mm] socket head cap screws with #4 washers through the 45-degree metal bracket, the **rear** cabane struts and the 90-degree brackets. Then install the 4-40 nylon lock nuts onto the socket head cap screws. Mount the forward cabane struts to the forward 90-degree brackets by inserting two 4-40 x 3/4" [19mm] socket head cap screws with #4 washers through the cabane struts and the 90-degree brackets. Install the 4-40 nylon lock nuts on these screws.
Note: In order to set the proper dihedral for the top wing, it will be joined on the model as follows.

❏ 15. Test fit the wing joiners into the center section of the top wing. Slide the two wing panels onto the wing joiners, and temporarily hold them in place with a few pieces of tape. (Do not glue yet).



❏ 16. Attach the four interplane struts to the top and bottom wings using 4-40 x 3/4" [19mm] socket head cap screws with #4 washers through the struts and compound-bend metal brackets. Note that the longer struts are to be mounted in the aft position, and the shorter struts in the forward position. Temporarily install the 4-40 nylon lock nuts to hold things in place.

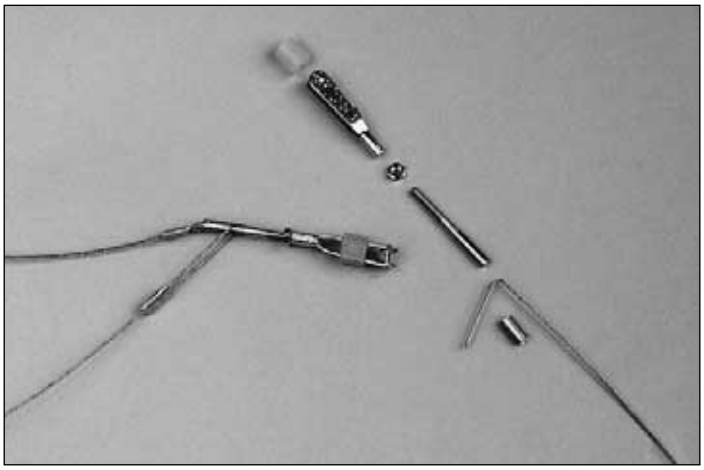
❏ 17. Inspect the fit of the top wing to the center section. They should line up along the bottom edge, and there should be little or no gap where the wing panels join the center section. If any misfits are observed, you may loosen the screws holding the center section to the cabane struts, make minor adjustments, and re-tighten the screws.

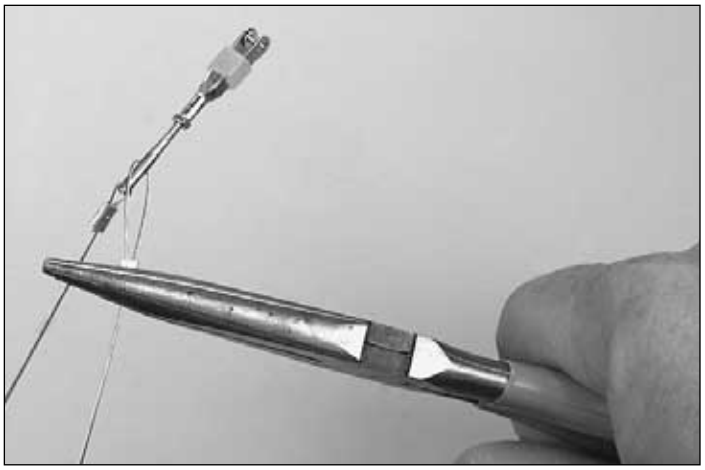
❏ ❏ 18.Use 30-minute epoxy to thoroughly coat the root rib of the right wing half, the outside rib of the center section, and the wing joiner. Apply a **generous** amount of epoxy into the wing joiner slots in the wing panel and the center section. Insert the wing joiner (upright), and slide the wing panel into place. Working quickly, reattach the interplane struts and make certain the root rib is in full contact with the center section and that they align perfectly along the bottom edge. Hold the wing panel securely to the center section with strips of masking tape. Wipe away excess epoxy with a paper towel dampened with alcohol. Do not disturb the wing until the epoxy has fully hardened.

❏ 19. Repeat the above step to attach the top left wing panel.

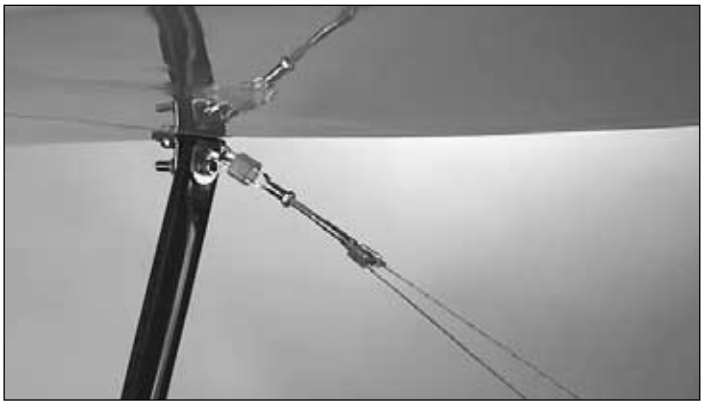
Install Flying Wires

NOTE: ***The flying wires included with the Tiger Moth are not functional or required for structural integrity.***

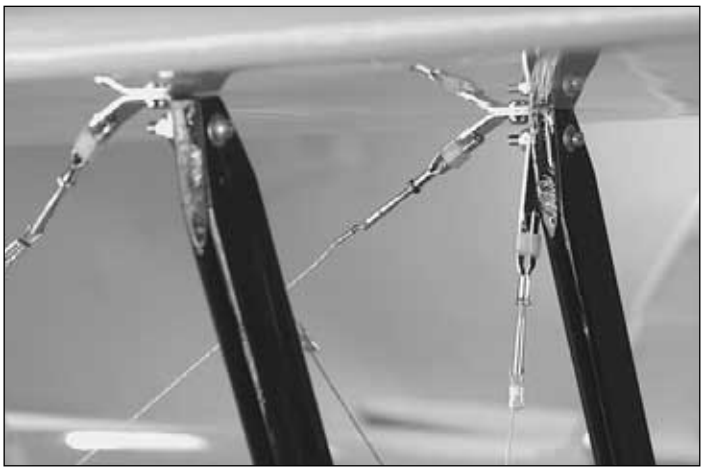




❏ ❏ 1. Use the photos above as a reference guide in assembling the flying wires. Using the **coil of the flying wire**, six **2-56 clevises**, six **2-56 threaded brass ends**, six **2-56 nuts**, eight **aluminum crimp tubes** and six **silicone clevis retainers**, make the flying wires for the right wings first. Start by assembling two clevises with the threaded brass ends and nuts. Note that the single ends of the wire sets are located next to the fuse. Cut four lengths of wire from the coil 17" [432mm] long and attach four of them to two of the threaded brass ends using four aluminum crimp tubes as shown in the photo.



❏ ❏ 2. Attach one of your assembled double wire sets to the bracket located on the aft upright of the cabane and the other to the bracket installed into the bottom wing. Assemble four more clevises, four threaded brass ends, four nuts and four silicone clevis retainers and place them on the brackets you installed with the interplane struts. Run the wires from the single end assembly to the proper clevis, slip the aluminum crimp tube over the wire and run the wire through the hole drilled in the threaded brass end. Pull the wire tight, slip the wire back through the crimp tube twice and use a pair of pliers to squeeze the crimp tube holding the wire in place. Cut off any excess wire protruding from the crimp tube. Repeat this process to the remaining three clevises on the interplane struts.

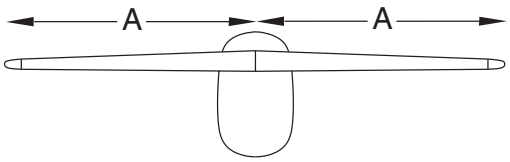


❏ ❏ 3. The flat metal straps which are placed at the top and bottom of each interplane strut are the locations for the "X" wires which run between the two interplane struts as shown in the photo. Cut two pieces of wire 11" [279mm] and make two wire assemblies, using the same process as above. These wires run from the bottom of the aft interplane strut to the top of the forward and from the bottom of the forward strut to the top of the aft strut, forming an X-brace between the forward and aft struts as shown in the previous photo.

❏ 4. Repeat this process for the left wings.

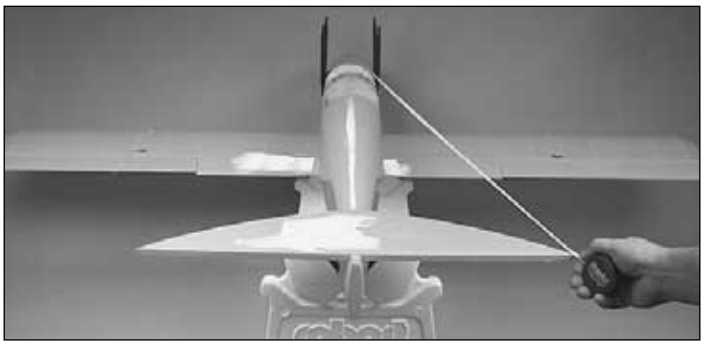
ASSEMBLE THE FUSELAGE

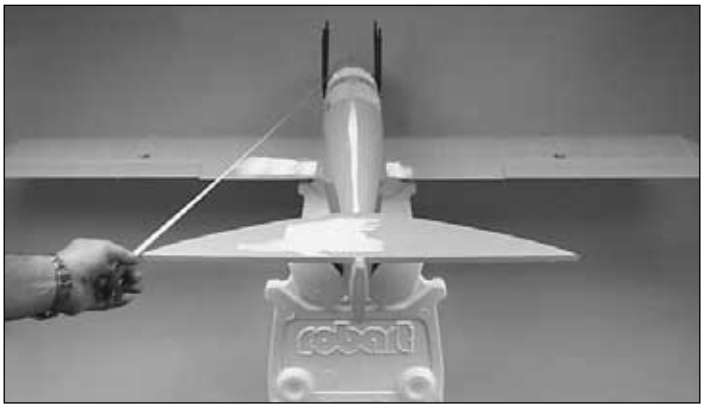
Mount the Stab and Fin



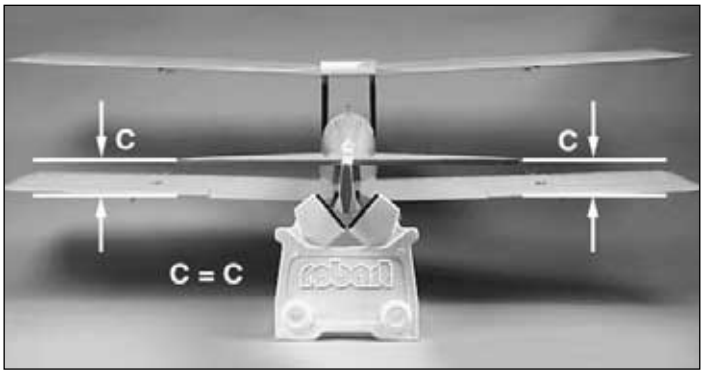
A=A

❏ 1. Locate the **horizontal stab**. Trial fit the stab onto the stab saddle. Measure the distance from the center of the fuse to each tip of the stab. This distance needs to be the same. Make adjustments as needed until the distance is equal.





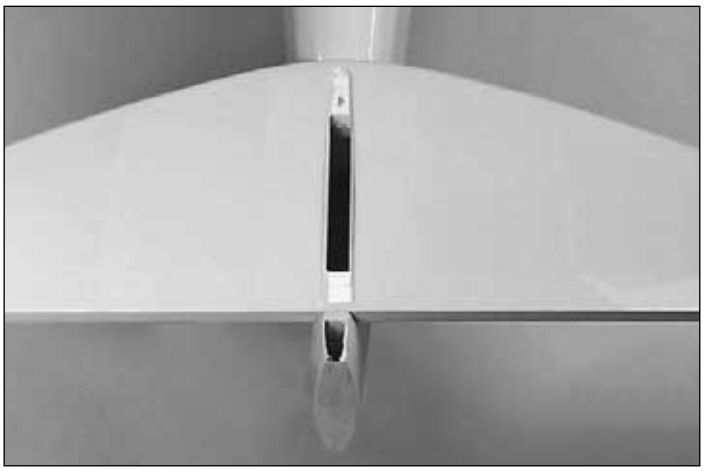
❏ 2. Place a **T-pin** into the center of the fuse at the **firewall**. Measure from the pin to the tip of the stab. The distance from the pin to the stab tips needs to be equal on both sides. Once satisfied with the position of the stab securely tape the stab into place. A **Hobbico Retractable Fabric Tape Measure** (HCAR0478) works well for this step.



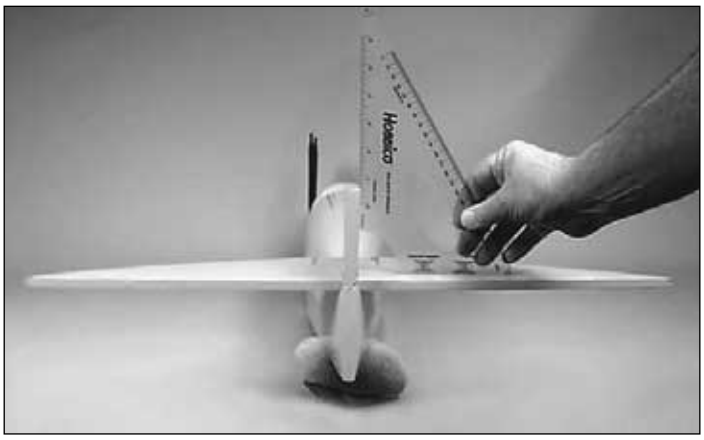
❏ 3. With the wings in place and the stab firmly taped, place the model in a building stand such as a **Robart Super Stand II**, (ROBP1402). Stand ten to fifteen feet behind the model and view the stab and wing. If the stab and wing align with each other, proceed to the next step. If the stab and wing do not align, sand the “high side” of the slot in the fuse where the stab fits until the stab aligns with the wing.

❏ 4. Turn the model over and mark the location of the fuse sides on the stab. Cut and remove the MonoKote covering from the stab with a hot knife using the same technique as on the bottom wing.

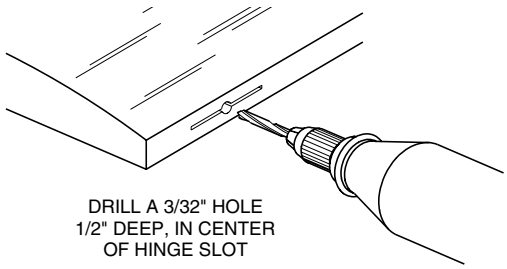
❏ 5. Using epoxy, glue the stab into place, and carefully re-check the alignment of the stab. Allow the epoxy to thoroughly cure before moving the model.

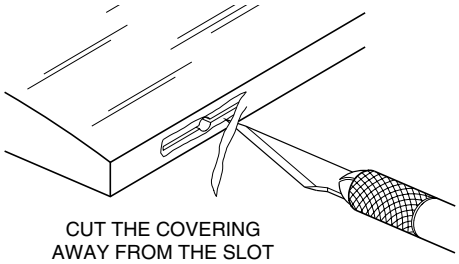


❏ 6. After the epoxy has cured, remove the MonoKote covering from the section where the fin fits into the horizontal stab and just forward and aft of the opening, being careful not to cut into the wood. This will allow the fin to fit properly into place.

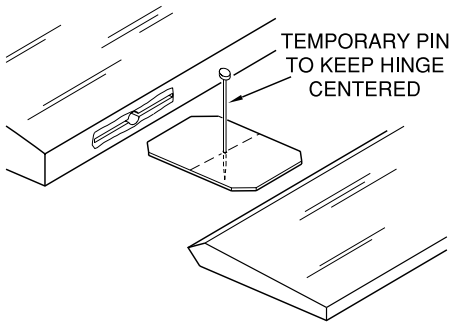


❏ 7. Trial fit the fin to the fuse. Use a triangle like the **Hobbico Builders Triangle** (HCAR0480) to make sure the fin is square. When satisfied with the fit and alignment, glue the fin into place using epoxy.





❏ 8. Drill a 3/32" [2.4mm] hole, 1/2" [13mm] deep in the center of each hinge slot to allow the CA to “wick” in. Follow-up with a #11 blade to clean-out the slots and cut a strip of covering from the hinge slots in the stab and elevators.

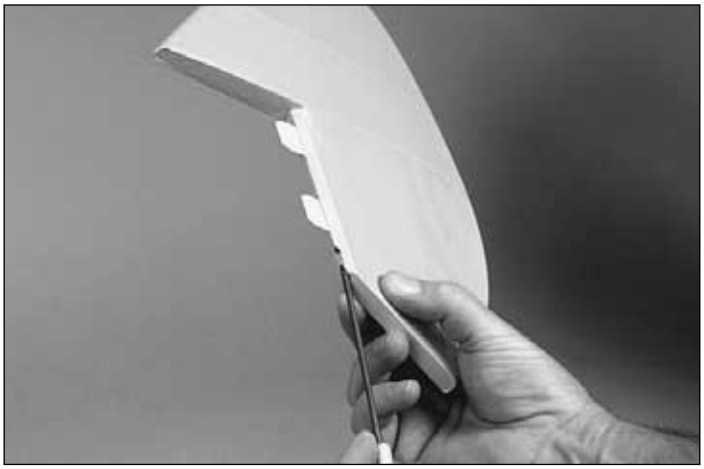


❏ 9. Install the hinges into the stab and then test fit the **elevators**. If the hinges don't remain centered, stick a pin through the middle of the hinge to hold it in position.

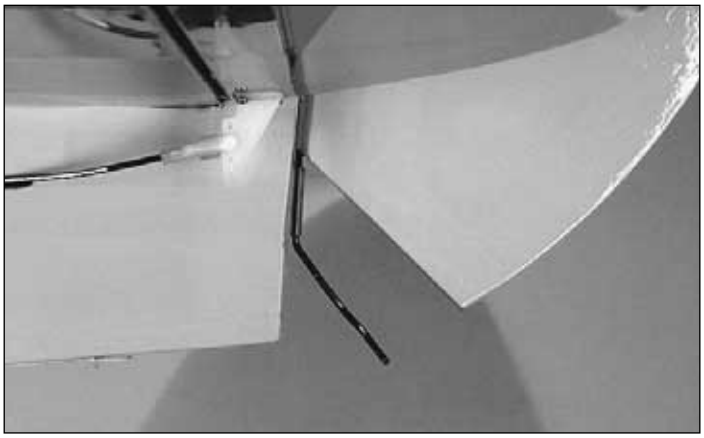
❑ 10. Remove any pins you may have inserted into the hinges. Adjust the elevator so there is a small gap between the LE of the elevator and the stab. The gap should be small-just enough to see light through or to slip a piece of paper through.

❑ 11. Apply six drops of thin CA to the top and bottom of each hinge. Do not use CA accelerator. After the CA has fully hardened, test the hinges by pulling on the elevators.

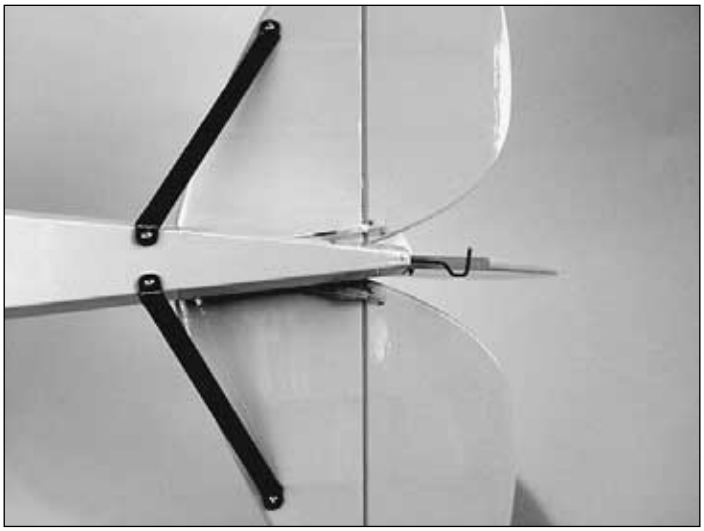
❑ 12. To attach the rudder drill a 3/32" [2.4mm] hole, 1/2" [13mm] deep in the center of each hinge slot to allow the CA to "wick" in. Follow-up with a #11 blade to clean-out the slots and cut a strip of covering from the hinge slots in the fin and rudder. Trial fit two hinges into the rudder and place onto the fin. Locate the **tail wheel wire** in the rudder with the two hinges in place and mark the location (approximately 1-1/2" or 38mm from the top of the angle on the bottom of the rudder). Also mark the location of the **nylon bearing** and cut a slot for it in the aft end of the fuse with a #11 blade.



❑ 13. Drill a 3/32" (2.4mm) hole in the rudder at the marked location to the depth of the tail wheel wire and cut a groove for the wire from the bottom of the rudder with a sharp hobby knife or a **Groove Tube** (GPMR8140) to accommodate the wire.

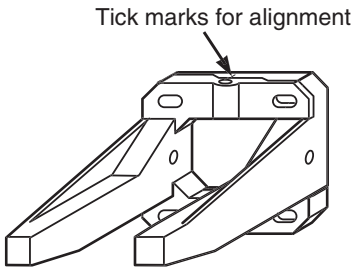


❑ 14. Apply **petroleum jelly** to the tail wheel bearing where the wire passes through. This will prevent the wire from being glued to the bearing. Permanently join the rudder to the fin using epoxy to glue the "arm" portion of the tail gear wire into the rudder and the bearing into the aft of the fuse. Use thin CA to glue in the hinges after the epoxy has cured.



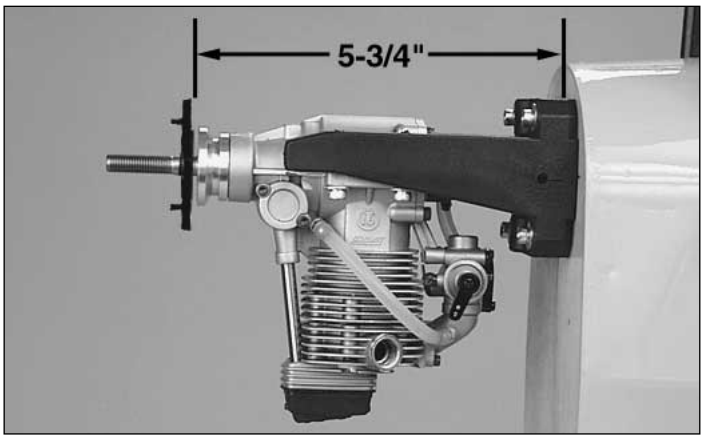
❑ 15. Locate the two stab support braces and drill a 1/8" [3mm] hole in the tab portion at both ends of each brace. Mark the location as shown in the photo and drill a 1/16" [1.6mm] hole in the bottom of the stab and fuse. Apply thin CA to each of the holes to harden the area. Install the braces with the four 3mm x 12mm Phillips head wood screws.

Install the Engine



❏ 1. **Note:** The proper thrust angle for the engine has been built-in. Find the location markings on the firewall and use a straight edge to draw lines between the horizontal and vertical marks. Center the **Great Planes engine mount** using the **tick marks** on the mount to match the lines on the firewall. When satisfied with the location use a small punch or sharpened wire on one end to mark the four engine mount bolt holes to the firewall by making dimples in the wood.

❏ 2. Drill four 7/32" [5.6mm] holes through the firewall at the marks. Apply epoxy to the four 8-32 blind nuts, being careful not to get the glue into the threads, and place them into the holes on the back of the firewall. Attach the engine mount to the firewall with four 8-32 x 1" socket head cap screws and #8 flat washers. This will draw the blind nuts into the back of the firewall. Allow the epoxy to cure.



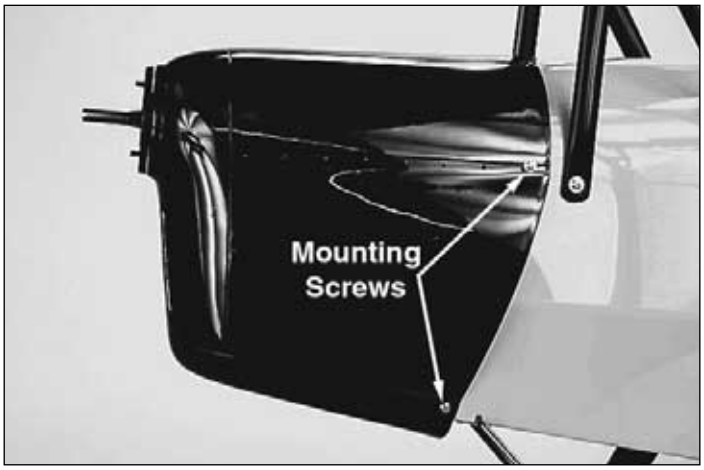
❏ 3. Place the back plate of the spinner on the engine. Adjust the width of the mount to fit the engine. Center the molded-in "tick" marks on the engine mount over the lines on the firewall. Tighten the mounting bolts.

❏ 4. Temporarily secure the engine to the mount with the back plate of the **spinner** 5-3/4" [146mm] from the firewall. A **Great Planes Dead Center Engine Mount Hole Locator** (GPMR8130) works well to mark the location for the engine mount holes onto the engine mount.

❏ 5. Remove the engine from the mount. Drill four #29 [9/64" or 3.6mm] holes through the mount at the marks you made. Tap 8-32 threads into the mount. Attach the engine to the mount with four 8-32 x 3/4" socket head cap screws and #8 flat washers.

Mount the Cowl

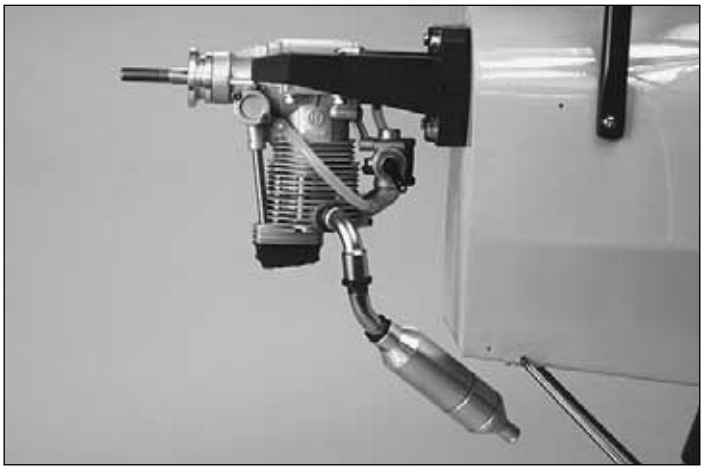
❏ 1. Locate the **cowl** and as shown in the photo, remove the formed portions of the cowl designed for engine cooling with a sharp hobby knife or Dremel tool.



❏ 2. With the engine mounted on the fuselage, place the cowling on the fuselage and attach the **spinner back plate**.

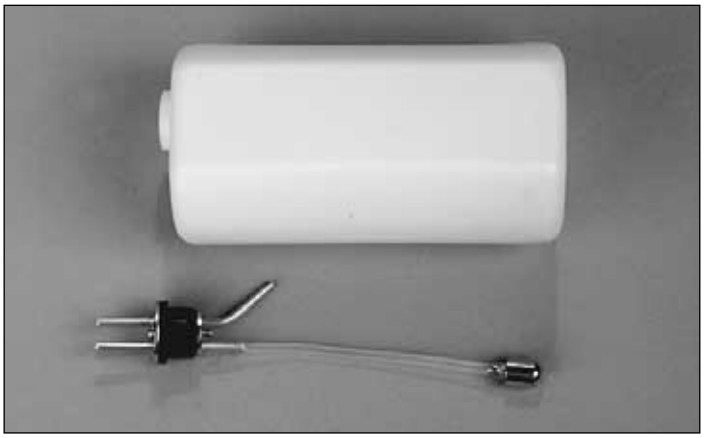
❏ 3. Position the cowl on the fuse so it is in alignment with the **spinner**. Be certain there is at least a 3/32" [2.4mm] gap between the front of the cowl and the back plate of the spinner.

❏ 4. Drill a 3/32" [2.4mm] hole through the cowl and mounting blocks in the positions shown. Apply thin CA to the holes to reinforce the area. Enlarge the hole **in the cowl only** with a 1/8" [3mm] drill bit. Mount the cowl to the fuselage with four 2.5 x 8mm wood screws.



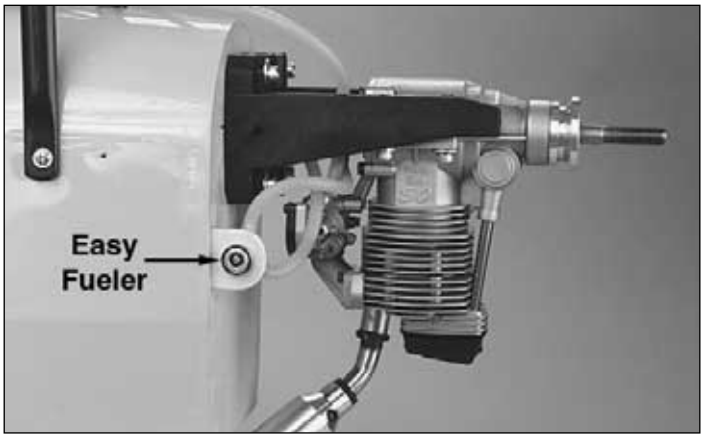
❑ 5. Install the muffler on your engine. Cut holes in the cowl where necessary for items such as the engine exhaust, needle valve, glow plug igniter, or fuel filler valve. For this particular application the use of an **O.S. Exhaust Header Pipe** (OSMG2625) allows the positioning of the muffler in a perfect location under the model as shown in the photo above.

Install the Fuel Tank



❑ 1. Assemble the **stopper** and **tubes** as shown in the photo, then insert them into the **tank**. Tighten the screw to expand the stopper, thus sealing the tank. Be certain the **fuel line weight** (clunk) at the end of the fuel line inside the tank does not contact the rear of the tank. Otherwise, the line may become stuck above the fuel level and stop the fuel flow. Remember (or use a felt-tip pen to mark) which tube is the fuel pick-up tube and which tube is the vent.

❑ 2. Install the tank into the fuse. Fit the neck through the hole in the firewall. Be certain the vent tube inside the tank is pointing upward. Glue the tank into place with epoxy or silicone.

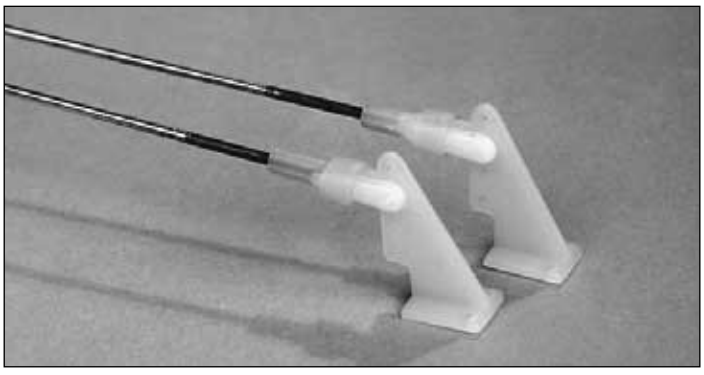


❑ 3. In order to mount the optional **Great Planes Easy-Fueler for glow fuel** (GPMQ4160) used on this model, make a mount from 1/8" [3mm] plywood (not included with this kit) or use the **filler valve mount** from a **Great Planes Handy Mounts** set (GPMQ6000). Use epoxy to securely glue the filler valve mount to the firewall in a location where the filler valve will be accessible outside the cowl when it is time to fuel the engine.

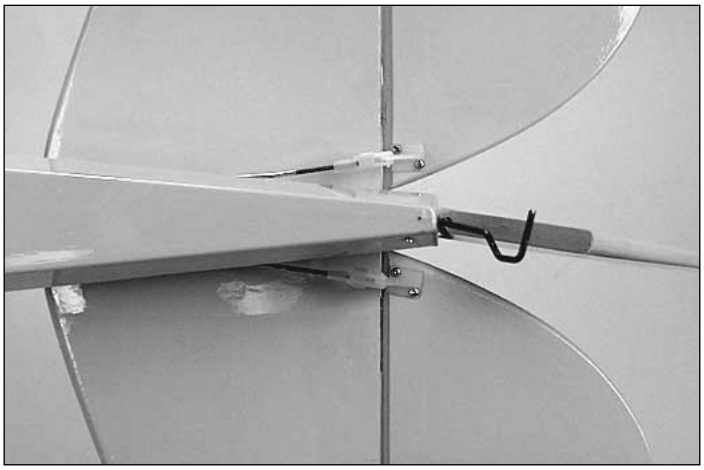
❑ 4. You will notice that the firewall has been fuel proofed but it is necessary to use epoxy or fuelproof paint to coat the fuel filler mount. Make the necessary hole in the cowl to access the filler valve.

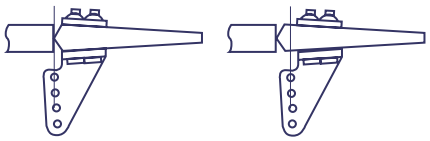
FINAL ASSEMBLY

Install the Radio



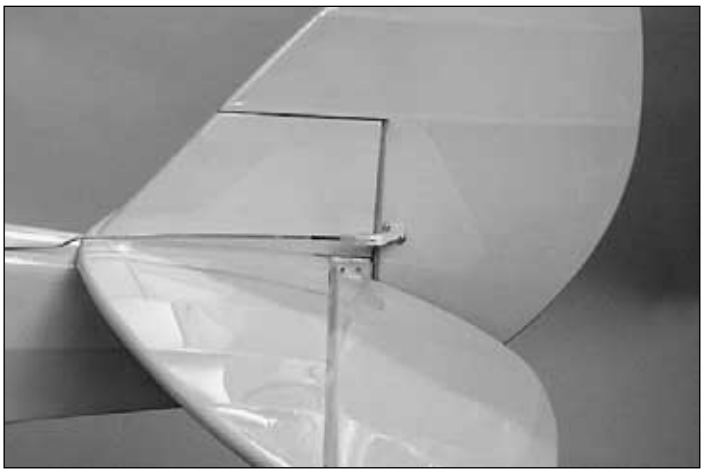
❑ 1. Make the elevator **pushrods** by threading two **nylon clevises** approximately 25 full turns onto the end of two 36" [914mm] pushrods. Connect each clevis to a **large nylon control** horn. Be sure to use the **silicone clevis retainer** as shown.



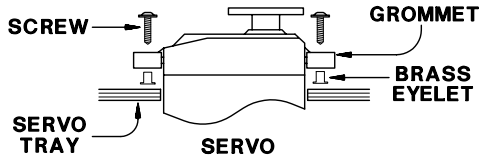


❑ 2. Slide the pushrods into the **guide tubes** at the aft end of the fuse. Slightly bend the pushrods as necessary so the clevises will fit on the control horns. Carefully locate the control horn with the hinge line as shown in the sketch. Drill 3/32" (2.4mm) holes through the **elevators** and then harden the area with thin CA. Mount the horns with 2-56 X 5/8" screws and the **nylon mounting plates** on the other side of the control horn.

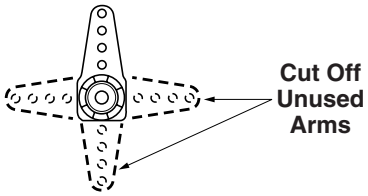
❑ 3. Make the rudder pushrod by threading a nylon clevis approximately 25 full turns onto the end of a 36" [914mm] pushrod. Connect the clevis to a large nylon control horn. Be sure to use the silicone clevis retainer as shown.



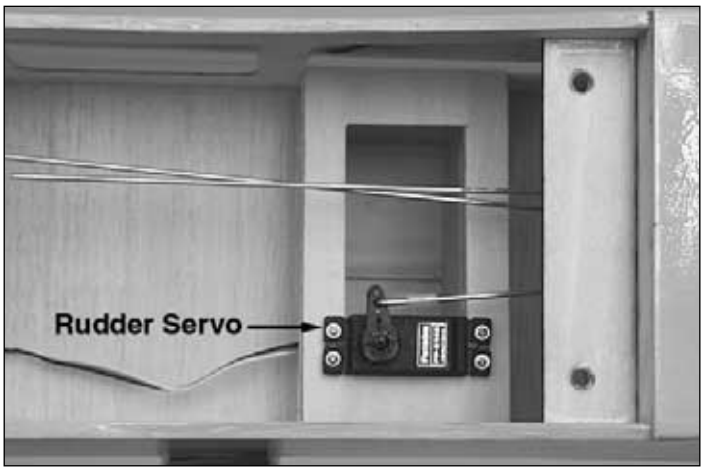
❑ 4. Slide the pushrod into the guide tube at the aft end of the fuse. Bend the pushrod as necessary so the control horn will fit on the rudder and clear the horizontal stabilizer. Position the control horn in a location that will not interfere with the elevator movement. Drill 3/32" [2.4mm] holes through the rudder and harden the area with CA. Mount the horn with 2-56 x 3/4" [19mm] socket head cap screws and the nylon mounting plate on the other side of the control horn.



❑ 5. Install the **rubber grommets** and **brass eyelets** in the servos using the above sketch as a guide.

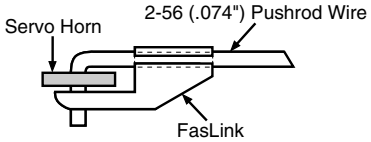


❑ 6. Cut off three arms from three servo horns included with your radio control set to make them into **"one arm"** servo horns. Use an **Easy-Touch Bar Sander** (GPMR6170) to remove the remaining jagged edges left from the cut-off arms.

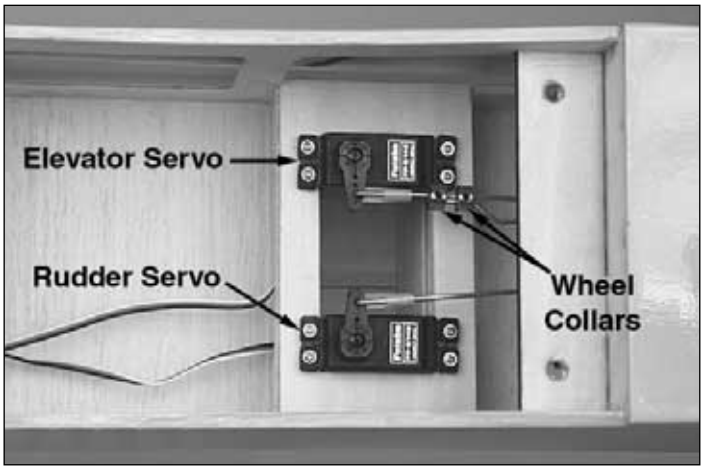


❑ 7. Install the rudder servo by marking its location and drill 1/16" [1.5mm] pilot holes through each mark. Harden the areas with thin CA. Mount the servo with the screws provided with your radio system.

❑ 8. Center the rudder servo and mark the pushrod where it crosses the servo arm. Enlarge the servo horn hole with a 5/64" [2mm] drill bit.



❑ 9. Make a 90-degree bend in the pushrod on your mark and cut the pushrod off 1/2" [13mm] beyond the bend. Insert the wire through the enlarged hole in the servo arm. Secure the wire in place with a **nylon FasLink pushrod keeper**.



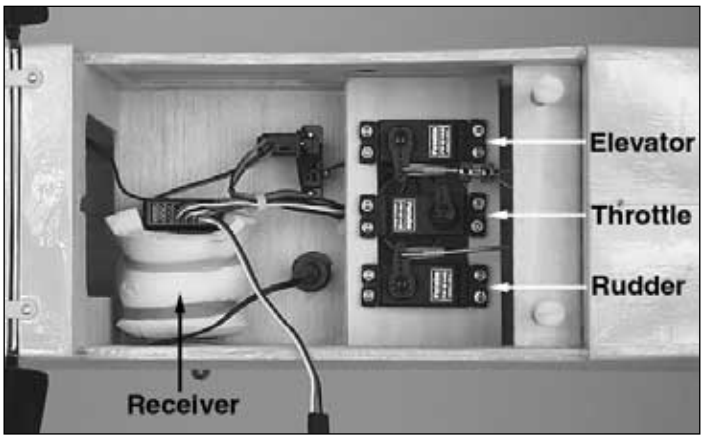
❑ 10. Install the elevator servo using the same method as with rudder servo above. Since the Tiger Moth uses two pushrods to control the elevators, we will begin by attaching one pushrod from one elevator (just as we did in step nine for the rudder) and then we will join the second pushrod with the first. Center the elevators and the elevator servo and mark the first pushrod where it crosses the servo arm with a felt tip pen. Enlarge the servo horn hole with a 5/64" [2mm] drill bit.

❑ 11. Slide two of the 5/32" [4mm] **wheel collars** onto the pushrod wire. Make a 90-degree bend in the pushrod on your mark and cut the pushrod off ½" [13mm] beyond the bend. Insert the wire through the enlarged hole in the servo arm. Secure the wire in place with a **nylon FasLink pushrod keeper**.

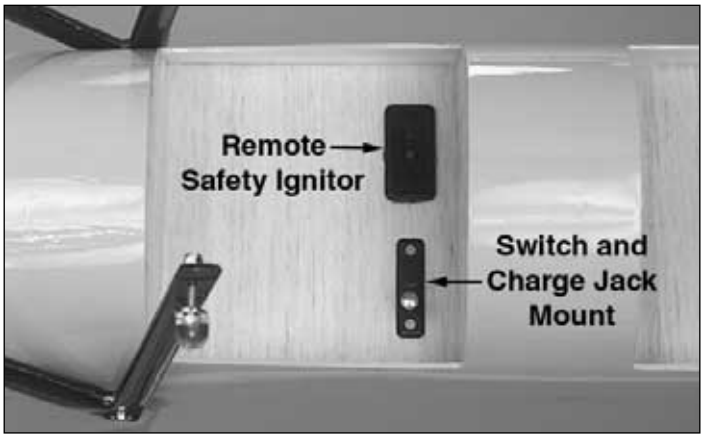
❑ 12. While keeping both elevators centered, connect the two elevator pushrods to each other with two 5/32" [4mm] wheel collars as shown in the photo. Use **Thread lock** (GPMR6165) on the screws to prevent loosening.

❑ 13. Install the throttle servo between the rudder and elevator servos by marking its location and drill 1/16" [1.5mm] pilot holes through each mark. Then harden those areas with thin CA. Mount the servo with the screws provided with your radio system.

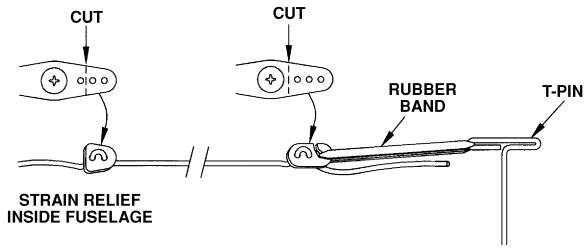
❑ 14. You may find it easier to install your **receiver**, **battery pack** and **switch harness** before installing the throttle linkage.

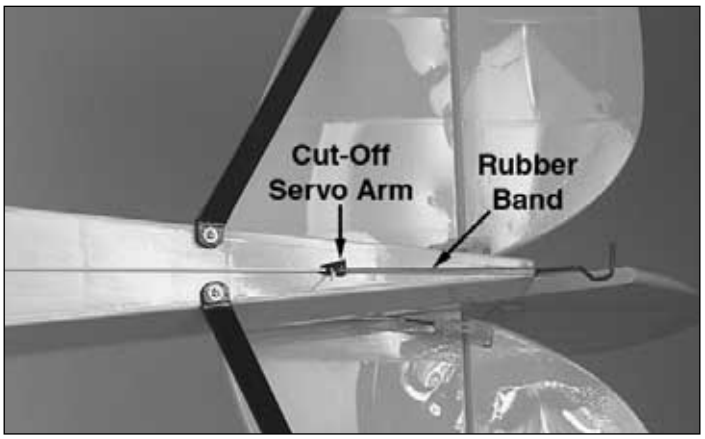


❑ 15. Installation of the receiver can be done using a **Great Planes Receiver Guard** (GPMM1010) or wrap the battery pack and receiver in at least 1/4" of **R/C foam rubber** (HCAQ1000) and mount them on balsa rails which can then be glued into the fuselage. On our model with an **OS FS-91 II Surpass w/Pump** (OSMG0890), the battery was mounted under the fuel tank as far forward as possible and the receiver as shown in the photo to minimize the amount of weight required to balance the model at the correct C.G.



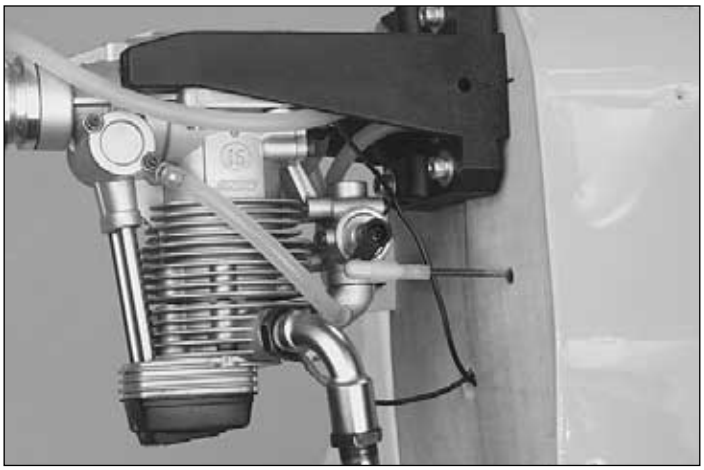
❑ 16. Mount the receiver on/off switch in the forward cockpit. A **Great Planes Switch & Charge Jack Mounting Set** (GPMM1000), not included, was used on this model. A **Du-Bro Remote Safety Igniter** (DUBP1200) was also used on the model and is shown in the photo. You may want to paint the cockpit interiors prior to installing these items.

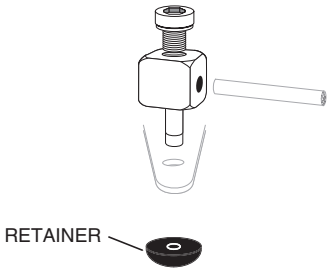




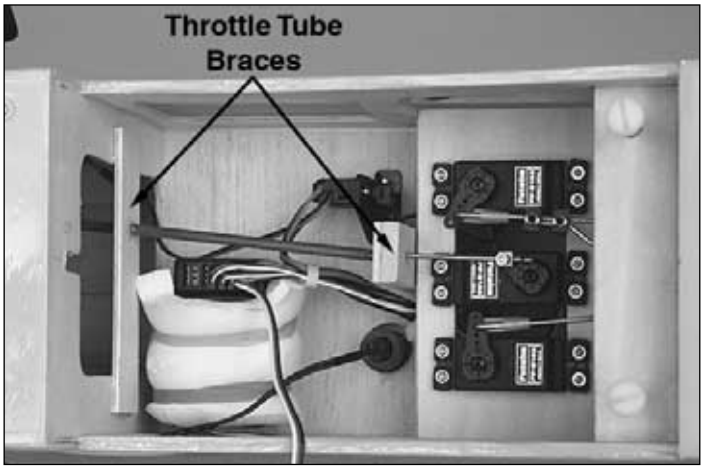
❑ 17. Extend the **receiver antenna** and guide it out of the fuselage and connect it to the tail wheel gear. Be certain there is a **strain relief** on the antenna to keep stress off the solder joint inside the receiver. On our model we drilled a 3/32" [2.4mm] hole through the bottom of the fuselage aft of the bottom wing and routed the antenna through the hole. The antenna was connected to a hook made from a **cut-off servo arm** connected to a **rubber band** placed around the tail wheel gear.

❑ 18. Drill a 3/16" hole through the firewall for the throttle pushrod guide tube. **Be certain to not drill into the tank!** It may be helpful to remove the engine for this step, so it does not interfere with drilling the hole (or use an extended drill bit).





❑ 19. Lightly sand then insert the 3/16" x 11-3/4" [4.8mm x 298mm] throttle pushrod guide tube through the hole in the firewall. Bend the 17-1/2" [445mm] throttle pushrod if necessary. Attach a nylon clevis approximately 25 turns and add a silicone retainer. Then connect it to the carburetor arm on the engine. Connect the opposite end of the pushrod wire to the throttle servo with a **screw-lock pushrod connector**.



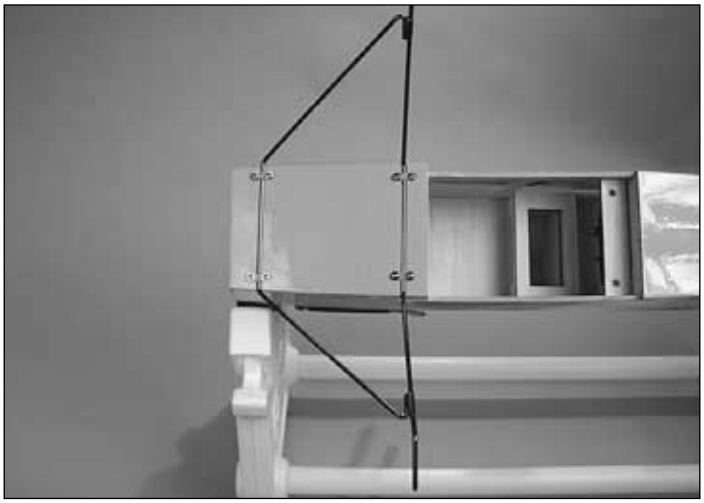
❑ 20. Make a brace for the aft end of the guide tube from 1/8" [3mm] scrap balsa or plywood (not included) and glue it in place as shown. Also make another brace to fit across the former as shown in the photo. You will have to slip the outer tube through the braces or make them with a slot in order fit them properly. Glue the tube into place with epoxy at both braces and at the firewall.

❑ 21. Set the carburetor to the closed position. Turn the radio system on and move the throttle servo to the fully closed position. Tighten the socket head cap screw in the screw-lock pushrod connector. Cut off the excess pushrod aft of the screw-lock pushrod connector.

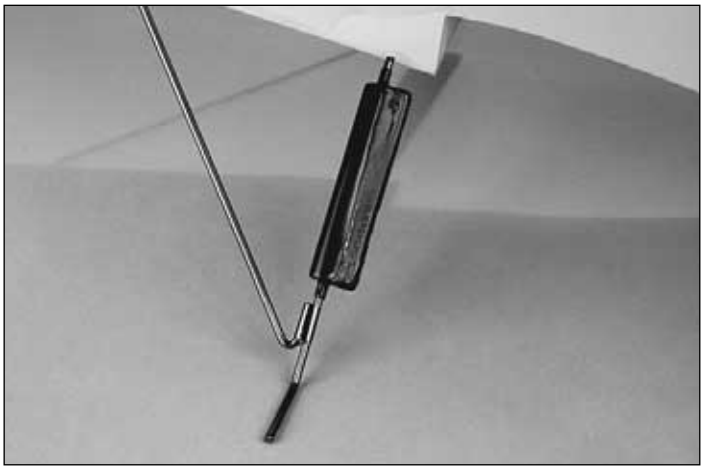
❑ 22. Make certain all the servo arms are secured to the servos with the screws that came with them and that all the clevises have retainers.

❑ 23. Install your aileron extension wire, supplied with your radio system into the receiver. Connect the Y-connector (HCAM2751) to the aileron servo wires taped to the top of the bottom wing. Be sure to tape or use heat shrink material to secure these connections.

Install the Landing Gear



❑ 1. Place the **landing gear** in the **grooved hardwood mounts** at the bottom of the fuselage and mark the position for the **nylon landing gear straps** as shown. Drill 1/16" [1.6mm] holes in the locations for the straps and harden the areas with thin CA. Secure the straps with #2 x 1/2" Phillips head screws.



❏ 2. Locate the **landing gear fairings** and trial fit around the landing gear wire as shown in the photo. When satisfied with the fit, glue them into place with 6-minute epoxy, joining the halves as you do. Clamp in place until the epoxy is thoroughly cured.

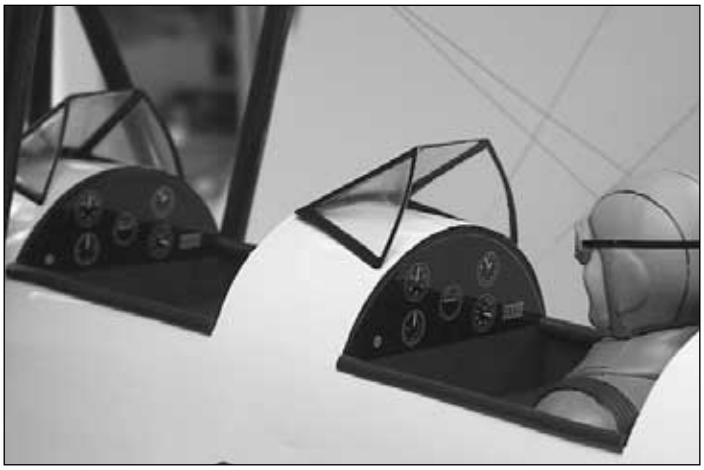
❏ 3. File a flat spot on the gear wires and attach the main wheels with the four 3/16" [4.8mm] wheel collars supplied with the model. Also attach the tail wheel with the 3/32" [2.4mm] wheel collar. Use thread-lock on the set screws to prevent them from coming loose in flight.

Finishing Touches

❏ 1. Apply the **decals** as shown in the photo. The easiest and most accurate way to position the decals is to first cut them from the sheet. When ready to apply one of the decals, even though these are the sticky back type, submerge it in a tub of **warm water** mixed with **liquid dish soap** (about a tablespoon of soap per gallon of water) and peel the decal from the backing. Lay the decal on the model and position it exactly where you want it. Use a **paper towel** to wipe away most of the water, then use a **soft balsa sheet** or something similar to squeegee the rest of the water from under the decal. Allow to dry overnight before flying the model.

❏ 2. On our model we placed a **black trim stripe** cut from a black Top Flite MonoKote Trim Sheet (TOPQ4109).

❏ 3. As instructed before you will note that we painted the two cockpits flat black. We also placed a 1/4-scale **Williams Brothers Scale Pilot** (WBRQ2625) inside the rear cockpit for added realism.



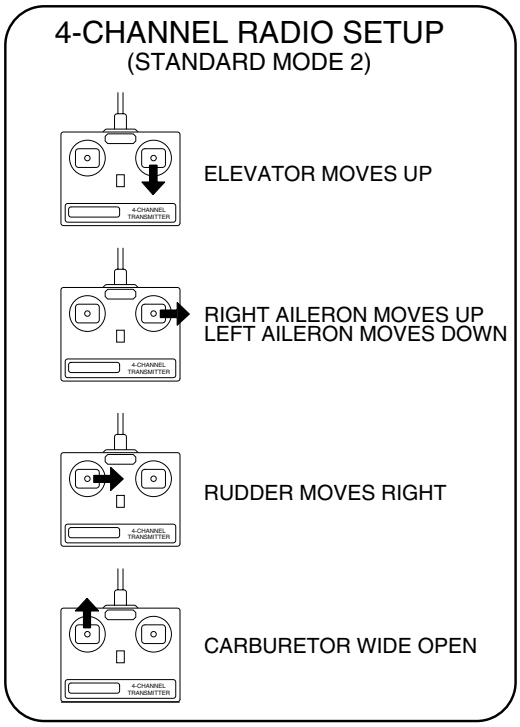
❏ 4. Apply the decals for the **instrument panel** as shown in the photo. Locate the two molded **windscreens**. Carefully cut the excess plastic away. Mask and paint the frames of the windscreens with **Formula-U** or **Cheveron black paint**. When the paint is completely dry glue them into position using **R/C-56 Canopy Glue** (JOZR5007).

GET THE MODEL READY TO FLY

Check the Control Directions

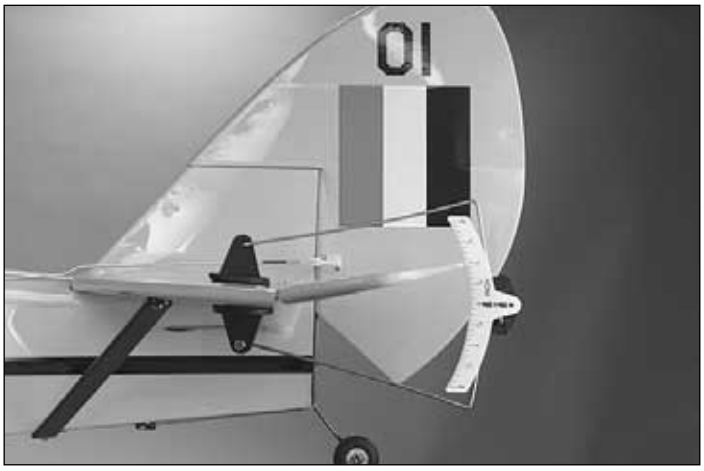
❏ 1. Turn on the **transmitter** and receiver and center the **trim tabs**. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.

❏ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to **center** the control surfaces.



❑ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the **servo reversing** in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.

Set the Control Throws



Use a **Great Planes AccuThrow Deflection Gauge** (GPMR2405) or a ruler to accurately measure and set the control throw of each control surface as indicated in the chart that follows. If your radio does not have dual rates, we recommend setting the throws at the **low** rate setting.

NOTE: The throws are measured at the **widest part** of the elevators, rudder and ailerons.

These are the recommend control surface throws:

	High Rate	Low Rate
ELEVATOR:	1" [25.4mm] up 1" [25.4mm] down	3/4" [19.1mm] up 3/4" [19.1mm] down
RUDDER:	2" [50.8mm] right 2" [50.8mm] left	2" [50.8mm] right 2" [50.8mm] left
AILERONS:	3/4" [19.1mm] up 3/4" [19.1mm] down	1/2" [12.7mm] up 1/2" [12.7mm] down

IMPORTANT: The Tiger Moth has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the Tiger Moth flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model difficult to control, so remember, "more is not always better."

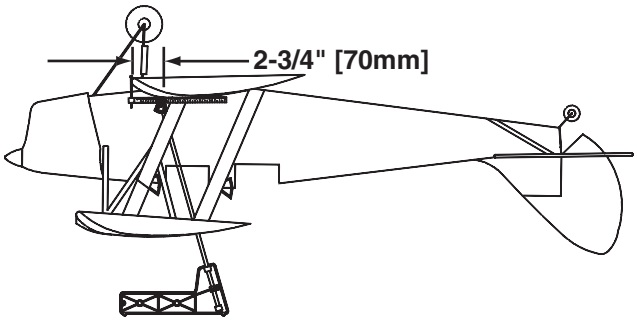
Balance the Model (C.G.)

More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced will be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with all of the systems in place including the engine, landing gear, covering and paint and the radio system.

❑ 1. Use a felt-tip pen or 1/8" [3mm]-wide tape to accurately mark the C.G. on the **top** of the **bottom wing** next to both sides of the fuselage. Start from the forward-most point of the leading edge (not the cut-out area), and measure back **2-3/4"** [70mm]. See the sketch on page 22.

This is where your model should balance for your first flights. Later, you may wish to experiment by shifting the C.G. up to 2-1/2" [64mm] back from the leading edge or 3" [76mm] back from the leading edge to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but it may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult for you to control. In any case, start at the location we recommend and do not at any time balance your model outside the recommended range.



❏ 2. With the wings attached to the fuselage, all parts of the model installed (ready to fly) and an empty fuel tank, place the model **upside-down** on a **Great Planes CG Machine** (GPMR2400), or lift it upside-down at the balance point you marked.

❏ 3. If the tail drops, the model is "tail heavy" and the battery pack and/or receiver must be shifted forward or weight must be added to the nose to balance. If the nose drops, the model is "nose heavy" and the battery pack and/or receiver must be shifted aft or weight must be added to the tail to balance. If possible, relocate the battery pack and receiver to minimize or eliminate any additional ballast required. If additional weight is required, nose weight may be easily added by using a **"spinner weight"** (GPMQ4645 for the 1 oz. weight, or GPMQ4646 for the 2 oz. weight). If spinner weight is not practical or is not enough, use **Great Planes "stick-on" lead weights** (GPMQ4485). A good place to add stick-on nose weight is to the firewall (don't attach weight to the cowl-it is not intended to support weight). Begin by placing incrementally increasing amounts of weight on the bottom of the fuse over the firewall until the model balances. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

Note: Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

❏ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

Balance the Model Laterally

❏ 1. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❏ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

PREFLIGHT

Identify Your Model

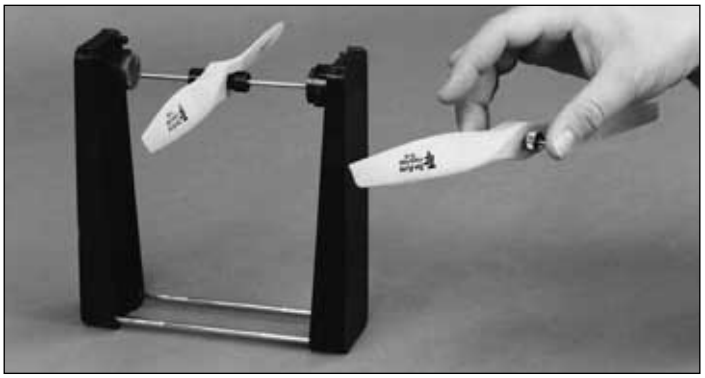
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 25 and place it on or inside your model.

Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter and receiver batteries the night before you go flying and at other times as recommended by the radio manufacturer.

NOTE: Checking the condition of your receiver battery pack is **highly recommended**. All battery packs, whether it's a trusty pack you've just taken out of another model, or a new battery pack you just purchased, should be cycled, noting the discharge capacity. Oftentimes, a weak battery pack can be identified (and a valuable model saved!) by comparing its actual capacity to its rated capacity. Refer to the instructions and recommendations that come with your cycler. If you don't own a battery cycler, perhaps you can have a friend cycle your pack and note the capacity for you.

Balance the Propellers



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

We use a **Top Flite Precision Magnetic Prop Balancer™** (TOPQ5700) in the workshop and keep a **Great Planes Fingertip Prop Balancer** (GPMQ5000) in our flight box.

Ground Check

If the engine is new, follow the engine manufacturer's instructions to break-in the engine. After break-in, confirm that the engine idles reliably, transitions smoothly and rapidly to full power and maintains full power-indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure, the prop is secure and all pushrods and connectors are secure.

Range Check

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

ENGINE SAFETY PRECAUTIONS

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

Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore **do not run the engine in a closed room or garage**.

Get help from an experienced pilot when learning to operate engines.

Use safety glasses when starting or running engines.

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

Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you start and run the engine.

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

Use a “chicken stick” or electric starter to start the engine. Do not use your fingers to flip the propeller. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch it during or right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.

To stop a glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer's recommendations. Do not use hands, fingers or any other body part to try to stop the engine. To stop a gasoline powered engine an on/off switch should be connected to the engine coil. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE (EXCERPT)

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

General

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

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be used to supervise flying to avoid having models fly in the proximity of full scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

9. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

Radio Control

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit or spectator areas and I will not thereafter fly over pit or spectator areas, unless beyond my control.

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

CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a checklist is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items as off they are completed (that's why it's called a *check list*!).

- ❏ 1. Fuelproof all areas exposed to fuel or exhaust residue such as the cowl mounting blocks, wing saddle area, etc.
- ❏ 2. Check the C.G. according to the measurements provided in the manual.
- ❏ 3. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- ❏ 4. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- ❏ 5. Balance your model laterally as explained in the instructions.
- ❏ 6. Use thread locking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- ❏ 7. Add a drop of oil to the axles so the wheels will turn freely.
- ❏ 8. Make sure all hinges are **securely** glued in place.
- ❏ 9. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
- ❏ 10. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- ❏ 11. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- ❏ 12. Secure connections between servo wires and Y-connectors or servo extensions and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.
- ❏ 13. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- ❏ 14. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
- ❏ 15. Make sure the fuel lines are connected and are not kinked.
- ❏ 16. Use an incidence meter to check the wings for twists and attempt to correct before flying.
- ❏ 17. Balance your propeller (and spare propellers).
- ❏ 18. Tighten the propeller nut and spinner.
- ❏ 19. Place your name, address, AMA number and telephone number on or inside your model.
- ❏ 20. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- ❏ 21. If you wish to photograph your model, do so before your first flight.
- ❏ 22. Range check your radio when you get to the flying field. Perform the range check with the engine running and without the engine running.

FLYING

The Tiger Moth is a great-flying model that flies smoothly and predictably. The Tiger Moth does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

Fuel Mixture Adjustments

A fully cowled engine may run at a higher temperature than an un-cowled engine. For this reason, the fuel mixture should be richened so the engine runs at about 200 rpm below peak speed. By running the engine slightly rich, you will help prevent dead-stick landings caused by overheating.

CAUTION: If, while flying, you notice any unusual sounds, such as a low-pitched "buzz," this may indicate control surface *flutter*. Because flutter can quickly destroy components of your airplane, any time you detect flutter you must **immediately** cut the throttle and land the airplane! Check all servo grommets for deterioration (this may indicate which surface fluttered) and make sure all pushrod linkages are secure and free of play. If the control surface fluttered once, it probably will flutter again under similar circumstances unless you can eliminate the free-play or flexing in the linkages. Here are some things which can cause flutter: Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of pushrod in guide tube caused by tight bends; Poor fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire; Excessive *play* or *backlash* in servo gears; and Insecure servo mounting.

Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. Hold “up” elevator to keep the tail wheel on the ground. If necessary, adjust the tail wheel so the model will roll straight down the runway. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind.

Remember to takeoff into the wind. When you're ready, point the model straight down the runway, hold a bit of up elevator to keep the tail on the ground to maintain tail wheel steering, then gradually advance the throttle. As the model gains speed decrease up elevator allowing the tail to come off the ground. One of the most important things to remember with a tail dragger is to always be ready to apply **right** rudder to counteract engine torque. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract engine torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

Flight

For reassurance and to keep an eye on other traffic, it is a good idea to have an assistant on the flight line with you. Tell him to remind you to throttle back once the plane gets to a comfortable altitude. While full throttle is usually desirable for takeoff, most models fly more smoothly at reduced speeds.

Take it easy with the Tiger Moth for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel level, but use this first flight to become familiar with your model before landing.

Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground, regaining tail wheel control.

One final note about flying your model. Have a goal or flight plan in mind for every flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills (though it is never a bad idea!), but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. **Remember to think.**

Have a ball! But always stay in control and fly in a safe manner.

GOOD LUCK AND GREAT FLYING!

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number

Complete this tag and put it in your model. You can protect the tag with clear plastic tape.

GREAT PLANES MODEL MANUFACTURING COMPANY

Ju-87 Stuka

The first ARF of the feared German fighter!

Wingspan: 70 in
Wing Area: 770 sq in
Weight: 8 lb
Wing Loading: 24 oz/sq ft
Length: 55 in
Requires: 2-stroke .61-.75 or 4-stroke .91 engine,
4-7 channel radio w/5-7 servos

The fierce Luftwaffe Stuka dive-bomber struck fear into the hearts of Allied troops during WWII — and now it returns to the skies over your flying field! From the fiberglass cowl and wheel pants to its "underslung" flaps and ailerons on the gull wing, this Great Planes almost ready-to-fly model remains true to the full-size fighter. All-wood construction and interlocking parts keep the airframe light and strong, and the model is fully sheeted and precovered to shave final assembly time to 20-25 hours. Another scale touch is the "greenhouse"-shaped canopy that will accommodate two pilot figures (not included). A wide range of engines can be used to power the Stuka — and it flies as scale as it looks. Large control surfaces, separate aileron servos and a long tail moment add stability and precision to your dramatic dogfight maneuvers! **GPMA1340**

GREAT PLANES MODEL MANUFACTURING COMPANY

Shoestring

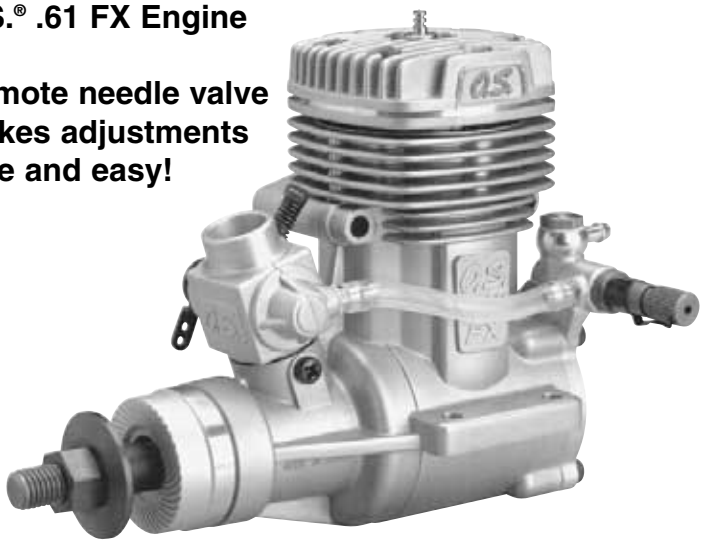
Wingspan: 61.5 in
Wing Area: 712.5 sq in
Weight: (RTF): 7 lb
Wing Loading: 22.6 oz/sq ft
Length: 53 in
Requires: 2-stroke .61 or 4-stroke .91 engine,
4-channel radio w/5 servos

Fun '40s homebuilt — flight-ready in just 14-20 hours!

A small homebuilt racer first seen in the 1940s, the Shoestring's simplicity made it a favorite with builders, while its maneuverability appealed to fun-loving pilots. Those same qualities make the Great Planes Shoestring ARF a standout among R/C models. The kit's all-wood parts make it light and lively. Dual aileron servos and a symmetrical wing supply the speed and might for exciting stunts and new moves. Factory-applied MonoKote® film and factory-painted fiberglass parts add vibrant color and durability, for a distinctive look like few other models at the flight line. **GPMA1325**

O.S.® .61 FX Engine

Remote needle valve makes adjustments safe and easy!



You'll find many refinements on the high-performance O.S. .61 FX engine. Features include a backplate-mounted needle for easy, safe mixture adjustments; advanced carb for precise air/fuel mixing; coarse threads and an O-ring seal on the needle valve to prevent "creep" and air leaks; squared, low-profile head for increased cooling; and dual ball bearing-supported crankshafts for lasting durability. Rated at 1.90 bhp/16,000 rpm, this engine's quality extends to an included muffler with adjustable exhaust, adjustable fuel inlet and 2-year warranty protection. Requires glow plug. **OSMG0561**

O.S. FS-91 Surpass II Engine

Great fuel economy, low noise and maximum power.

Quieter, more realistic airplane sound.

Improve fuel economy, increase horsepower and cut engine maintenance time to the bone with an O.S. Surpass FS-91 II 4-stroke. Enlarged intake valves and rugged working parts provide superior compression and improved output in the power stroke. It easily swings large props and supplies more usable horsepower for quick takeoffs and acceleration — and virtually unlimited vertical performance. Features an improved, easy-to-adjust carb and plated parts to resist rust. Includes muffler and glow plug. **OSMG0896**

Top Flite® Power Point® Wood Propellers

• More thrust for greater power.

• Lighter, quieter, and more efficient than ever!

• Swept tip design reduces noise

The strict quality control used when manufacturing Power Point props ensures symmetric pitch: at any given point on one blade, the pitch will exactly match the pitch at the same point on the opposite blade. This accuracy reduces prop vibration and boosts thrust at any rpm. Combined with a new airfoil design and the "Power Point" tip, these props are a top choice for modelers of every skill level. Lighter than maple props of the same size, these fuelproofed beechwood props reduce rotational mass, letting your engine produce more power with less work. Wood construction also makes Power Point props stiffer than nylon, so they perform predictably throughout the full rpm range. **TOPQ5000-5200**

BUILDING NOTES

Kit Purchased Date: _____

Where Purchased:_____

Date Construction Started: _____

Date Construction Finished: _____

Finished Weight: _____

Date of First Flight: _____

FLIGHT LOG