Sequence™ 1.20

INSTRUCTION MANUAL

SPECIFICATIONS

Wingspan: 71.5 in [1815 mm]
Wing Area: 836 in² [53.9 dm²]
Wing Loading: 27–30 oz/ft² [82–92 g/dm²]
Length: 73 in [1855 mm]
Weight: 9.75–10.75 lb [4420–4870 g]
Radio: 4–6 channel
Engine: 1.20 cu in [20cc] 2-stroke glow, 1.55 cu in [25cc] 4-stroke glow, Rimfire 1.20 Brushless electric

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.

To make a warranty claim send the defective part or item to Hobby Services at the address below:

Hobby Services
3002 N. Apollo Dr. Suite 1
Champaign IL 61822 USA

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

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

Great Planes® Model Manufacturing Company

Champaign, Illinois
(217) 398-8970, Ext 5
airsupport@greatplanes.com

TABLE OF CONTENTS

INTRODUCTION

Congratulations and thank you for purchasing the Great Planes Sequence 1.20 ARF! The Sequence may not have all of the frills of your exclusive, composite pattern plane, but it's still a contender at a fraction of the price. And the Sequence's simplicity makes it the perfect entry for beginner/intermediate pattern pilots or a great practice/backup ship for experienced pilots. And while we're at it, the Sequence is a great all-around sport plane too!

NOTE: An optional wood motor mount for brushless electric motors is available separately (GPMA4382). This mount allows outrunners to be "front mounted" and has provisions for geared inrunners. Full instructions for assembly and mounting are in the back of the manual on page 28.

For the latest technical updates or manual corrections to the Sequence 1.20 ARF visit the Great Planes web site at **greatplanes.com**. Open the "Airplanes" link, then select the Sequence 1.20 ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

Academy of Model Aeronautics

If you are not already a member of the AMA, please join! The AMA is the governing body of model aviation and membership provides liability insurance coverage, protects modelers' rights and interests and is required to fly at most R/C sites.

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252

Tele. (800) 435-9262
Fax (765) 741-0057

modelaircraft.org

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

SAFETY PRECAUTIONS

Protect Your Model, Yourself & Others…
Follow These Important Safety Precautions

1. Your Sequence 1.20 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 Sequence, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to 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 **build straight, true** and **strong**.

4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.

5. If you are not an experienced pilot or 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.

6. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

7. **WARNING:** The cowl, landing gear and wheel pants included in this kit are made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part (wheel pant, cowl) to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass parts.

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

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

ADDITIONAL ITEMS REQUIRED

Engine Recommendations

The glow engine sizes are straightforward and as printed on the cover. You cannot get any simpler than with the O.S. 1.20AX 2-stroke. If a 4-stroke is preferred, the O.S. 1.55FS-a provides gobs of "grunt" to get you through all the advanced pattern maneuvers. Both engines may use the standard O.S. mufflers that come with them.

Propellers: On the O.S. 1.20AX we preferred the APC 16 x 8 propeller (APCQ1608). With the O.S. 1.55FS-a the APC 17 x 8 (APCQ1710) was preferred.

OTHER ACCESSORIES IF USING A GLOW ENGINE:

- ❍ 1/4" [6.4mm] R/C foam rubber (HCAQ1000)
- ❍ 3' [900mm] standard silicone fuel tubing (GPMQ4131)
- ❍ Great Planes Dead Center Hole Locator (GPMR8130)
- ❍ 8-32 tap and drill set (GPMR8103)

Brushless Electric Motor

The 50-65-450kV RimFire 1.20 powered by a 5,000mAh 6S battery and APC 17 x 8E propeller flies the Sequence 1.20 nicely. With throttle management the Sequence completes the Intermediate pattern sequence with a little time to spare. This combination puts out approximately 1900 watts @ 7,700rpm, 85A (static ground readings of a newly-charged battery). In-flight, the maximum current draw during full-throttle bursts will be approximately 72A with an average current draw of around 40A when using the throttle judiciously. 72A is above the motor's 50A constant current limit (but under its 80A surge limit), so full-throttle may be used only in bursts. Always use a Watt meter to verify the current your setup is drawing. (See more about motor setup on page 25.)

FOLLOWING ARE THE ITEMS REQUIRED TO OUTFIT YOUR SEQUENCE WITH THE RIMFIRE 1.20:

- ❍ ElectriFly RimFire 1.20 brushless motor (GPMG4770)
- ❍ Great Planes brushless motor mount for large motors (GPMG1260) ***OR*** optional wood motor mount box (GPMA4282 illustrated on page 28)
- ❍ Great Planes Silver Series 80A Brushless ESC (GPMM1860)
- ❍ FlightPower Pro 50 6S (22.2V) 5000mAh 50C LiPo (FPWP5103) ***OR*** FlightPower EON-*X* 30 6S (22.2V) 5000mAh 30C LiPo (FPWP6702) ***OR*** (2) FlightPower EON-*X* 30 3S (11.7V) 5000mAh 30C LiPo (FPWP6698) and ElectriFly series adapter (GPMM3143)

NOTE: See ***LiPo Battery Charger Requirements*** on page 4 to help you decide on a battery.

- ❍ Great Planes 6mm male/4mm female bullet adapters (GPMM3119) ***OR*** Great Planes 4mm female bullet connectors (GPMM3115) and 3/16" [5mm] heat shrink tubing (GPMM1056)

❍ Great Planes adhesive-back Velcro (GPMQ4480)

❍ Electrify Powermatch Power Meter Balancer (GPMM3220)

IMPORTANT: Before connecting multiple battery packs with adapter plugs, refer to the **Battery Precautions** on page 12.

OPTIONAL:

If using the GPMG1260 brushless motor mount for large motors, it is suggested to replace the Phillips screws and thin washers that come with the mount with socket-head cap screws and regular washers (see page 13):

❍ 3 x 8mm socket-head cap screws (DTXC8640)

❍ 3mm flat washers (DUBQ3307)

A 2.0mm precision-machined hex driver (DTXR0289) is also suggested for securely tightening the set screws in the collar on the shaft of the RimFire 1.20

The preferred propeller for the RimFire 1.20 on 6S is either the APC 17 x 8E (APCQ4018) or the Xoar 17 x 8 Electric Series propeller (XOAQ4073).

Note: The battery wires from the ESC will have to be extended to reach the battery. See page 14 for more details. Following are the items that will be required:

❍ 2' Deans 12 gauge silicone wire (WSDC1000)

❍ Deans Ultra Plug™ set (WSDM3001)

❍ Electrical solder, soldering flux, soldering iron

LIPO BATTERY CHARGER REQUIREMENTS

A LiPo-compatible battery charger with cell balancing is required. When shopping for a charger (if you don't already have one) select a charger (and DC power supply if required) capable of enough power (Watts) to charge your batteries within an acceptable time—usually one hour. Once you calculate the Watts required add in a factor of 20% for loss from normal inefficiency:

To find out how many Watts are required to charge a 6S, 5,000mAh battery, first multiply the number of cells (6) times the Voltage of a fully-charged LiPo cell (4.2V):

6 x 4.2V = 25.2V

Then multiply the Voltage of the fully-charged pack by the pack's capacity in Amps:

25.2V x 5A = 126 Watts

Finally, increase the Watts needed from a charger by a factor of 20%:

126 Watts x .2 = 25W + 126W = approximately 150 Watts.

You will need a charger capable of approximately 150 Watts to charge a 6S 5000mAh battery in about one hour.

If you use two 5000mAh 3S batteries connected in series with a series adapter you will need a charger capable of approximately 75 Watts (3 x 4.2 x 5 = 63 + (63 x .2) = 75W). But then you will have to charge each battery separately (unless you purchase a charger with multiple charging ports).

If your charger is not capable of the Watts required you should still be able to charge the battery, except it will take more than one hour.

Radio Equipment

The Sequence can be flown with as few as four channels, but the ailerons will have to be connected to the same channel in the receiver via a dual servo connector (FUTM4130 for Futaba) and the elevator servos will have to be connected to the same channel via a servo reverser (FUTM4150). If flying with six channels, the ailerons and elevators can be linked electronically through the programming in the transmitter to allow for unlimited mixing/fine-tuning options.

Pattern flyers typically prefer digital servos. Powering the servos from a 6V receiver battery is also in-line with current pattern practices, but make certain the servos you chose are compatible with 6 Volts. Following are the recommended Futaba servos with the associated servo extensions illustrated in the manual—if setting up your model differently, different extensions may be required:

❍ Rudder: S9155 (FUTM0215)

❍ Elevators (2): S9650 (FUTM0260) (2 pcs. 36" [915mm] servo extension—TACM2726)

❍ Ailerons (2): S9252 (FUTM0222) (4 pcs. 6" [150mm] servo extension—TACM2701)

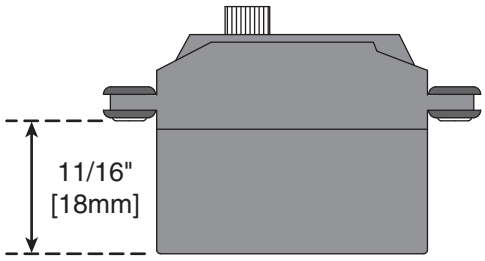
❍ Throttle (for glow): S3102 (FUTM0034) (12" [305mm] servo extension—TACM2711)

❍ HydriMax 1600mAh 6.0V NiMH (HCAM6342) or 2000mAh 6.0V NiMH (HCAM6351) receiver battery

❍ Futaba Switch Harness (FUTM4370)

❍ Great Planes 3"[75mm] double-sided servo arm (for the rudder servo, GPMM1165)

NOTE: The elevator servos must measure no more than 11/16" [18mm] from the bottom up to the mounting grommets in order to fit in the horizontal stabilizers. Taller servos will require shimming to fit.



ADHESIVES, HARDWARE AND OTHER ACCESSORIES

Other than common hobby tools here is a list of the rest of the items required:

❍ 1/2 oz. [15g] Thin Pro CA (GPMR6001)

❍ 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)

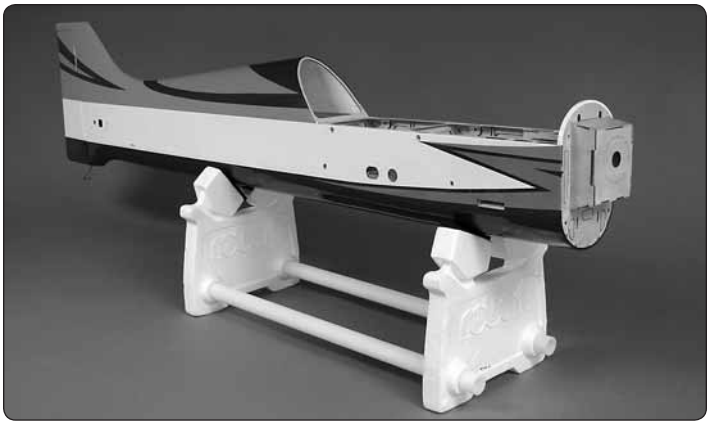
❍ 2 oz. [57g] spray CA activator (GPMR6035)

❍ Threadlocker thread locking cement (GPMR6060)

❍ 2-1/2" spinner (GPMQ4770)

❍ 8mm Propeller Reamer (for O.S. engines or RimFire 1.20 brushless motor) (GPMQ5007)

❍ Drills bits: 1/16" [1.6mm], 3/32" [2.4mm], 1/8" [3.2mm], 7/32" [5.6mm], 7/64" [2.8mm]



A Robart Super Stand II (ROBP1402) is also indispensable for working on your Sequence 1.20.

Following are the MonoKote colors used on the Sequence 1.20 should repairs or patches ever be required.

White (TOPQ0204)	Sky Blue (TOPQ0206)
Orange (TOPQ0202)	Sapphire Blue (TOPQ0226)
Pink (TOPQ0215)	Matte Dove Gray (TOPQ0511)

KIT INSPECTION

Before starting to build, take an inventory of this 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 **Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list.

Great Planes Product Support
3002 N Apollo Drive, Suite 1 Ph: (217) 398-8970, ext. 5
Champaign, IL 61822 Fax: (217) 398-7721

E-mail: airsupport@greatplanes.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Sequence 1.20 ARF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company.

To locate a hobby dealer, visit the Great Planes web site at ***greatplanes.com***. Choose "Where to Buy" at the upper right side of the page. Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

Parts may also be ordered directly from Hobby Services by calling (217) 398-0007, or via facsimile at (217) 398-7721, but full retail prices and shipping and handling charges will apply. Illinois and Nevada residents will also be charged sales tax. If ordering via fax, include a Visa® or MasterCard® number and expiration date for payment.

Mail parts orders and payments by personal check to:
Hobby Services
3002 N Apollo Drive, Suite 1
Champaign IL 61822

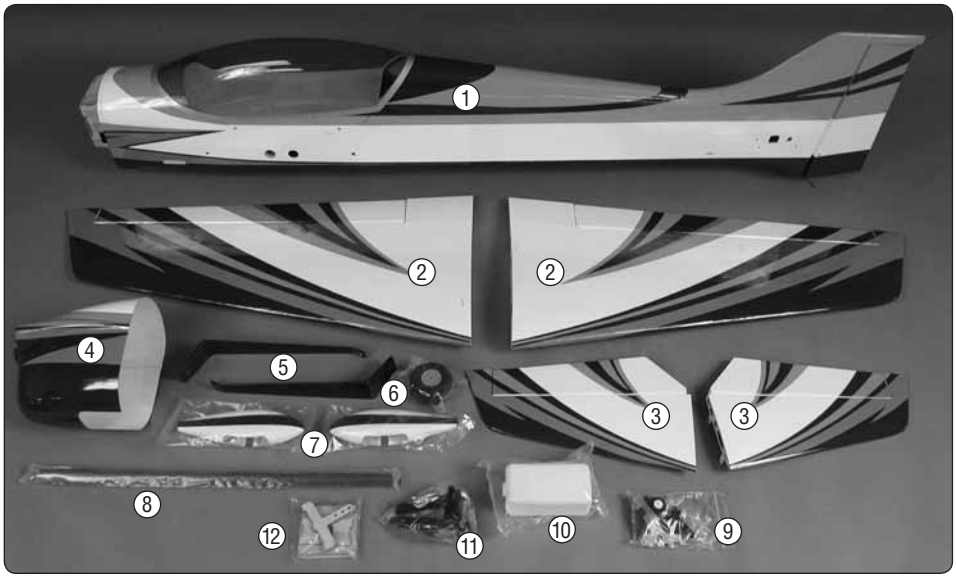
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

If additional assistance is required for any reason contact Product Support by e-mail at productsupport@greatplanes.com, or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST

Order No.	Description	Order No.	Description
GPMA4370	**FUSELAGE**	GPMA4377	**WHEEL PANTS**
GPMA4371	**WING**	GPMA4378	**WING TUBE**
GPMA4372	**STABLIZER**	GPMA4379	**STABILIZER TUBE**
GPMA4373	**RUDDER**	GPMA4380	**DECALS**
GPMA4374	**CANOPY/HATCH**	GPMA4381	**WING BOLTS (2)**
GPMA4375	**COWL**	GPMA4382	**MOTOR MOUNT**
GPMA4376	**LANDING GEAR**		**BOX PARTS SET**

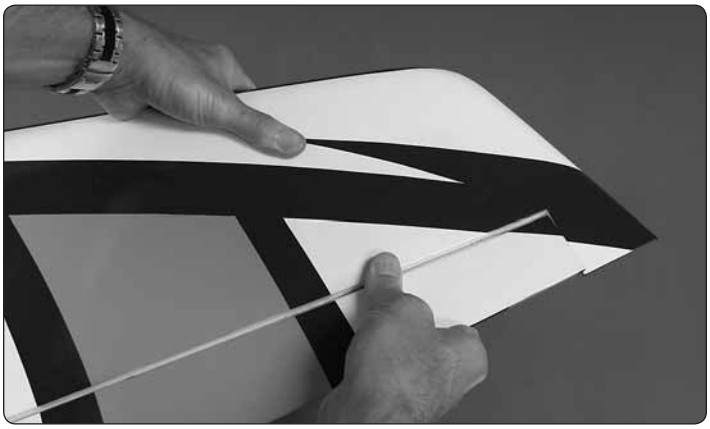
KIT CONTENTS



Kit Contents

1. Fuselage
2. Wing Halves
3. Horizontal Stab Halves
4. Cowl
5. Main Landing Gear
6. Main Wheels
7. Wheel Pants
8. Wing Tube
9. Tailwheel Hardware
10. Fuel Tank
11. Glow Engine Mount
12. ESC Mount Set

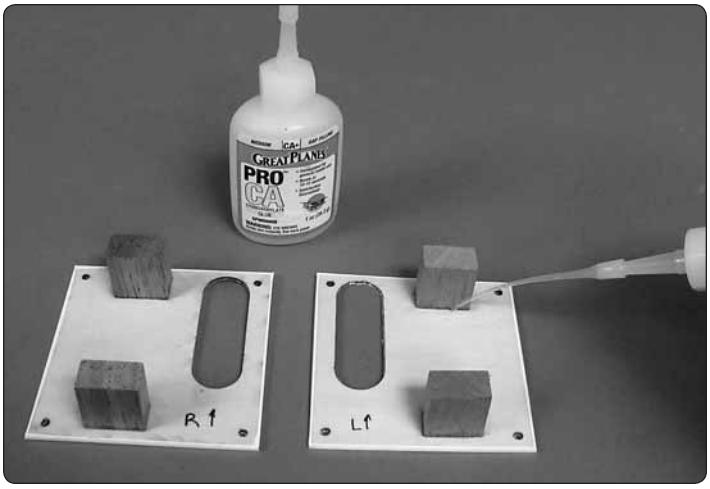
ASSEMBLE THE WINGS



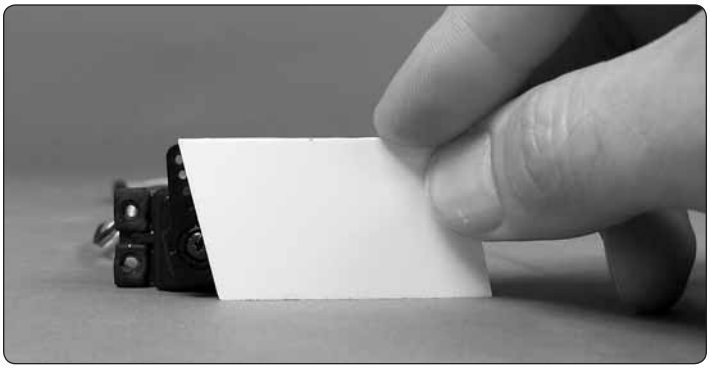
❏ 1. Pull hard on the ailerons to test the hinges. Inspect the hinges to be sure enough glue has been used. Add a few drops of thin CA to any hinges that look dry. **Note:** CA "fogging" deposited on the covering can be cleaned with CA debonder.

❏ 2. Remove the aileron hatch covers and use naphtha (lighter fluid) or commercially-available sticker removal fluid to wipe away any glue left from the tape that held on the hatches.

❏ 3. Refer to the "How to Tighten Covering on ARF Models" sheet and remove wrinkles and bond the covering to the wings. You can go over the whole model now, or just start with the wings and get to the rest of the model later.

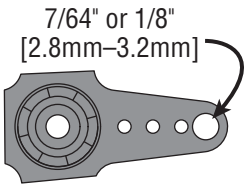


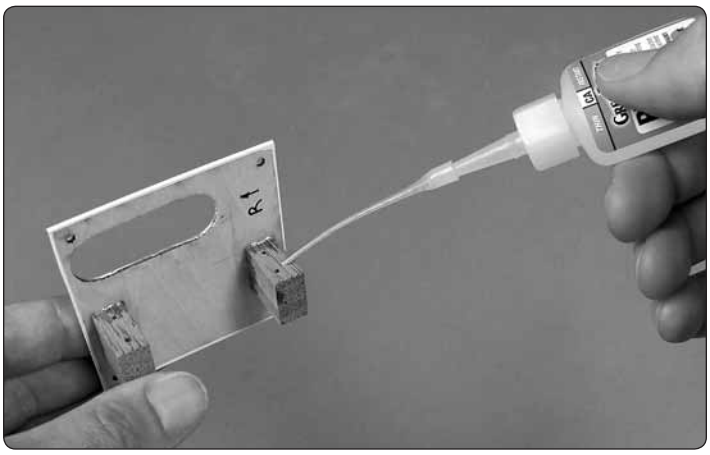
❏ 4. Use thin CA followed by a **small** fillet of medium CA to reinforce the servo mounting blocks to the hatch covers.



❏ 5. With the servos plugged in and the radio turned on, use the plastic **servo arm gauge** to find the servo arms that will align with the gauge as shown. (This will allow the servo arms to be perpendicular to the pushrods.) Cut the other arms off.

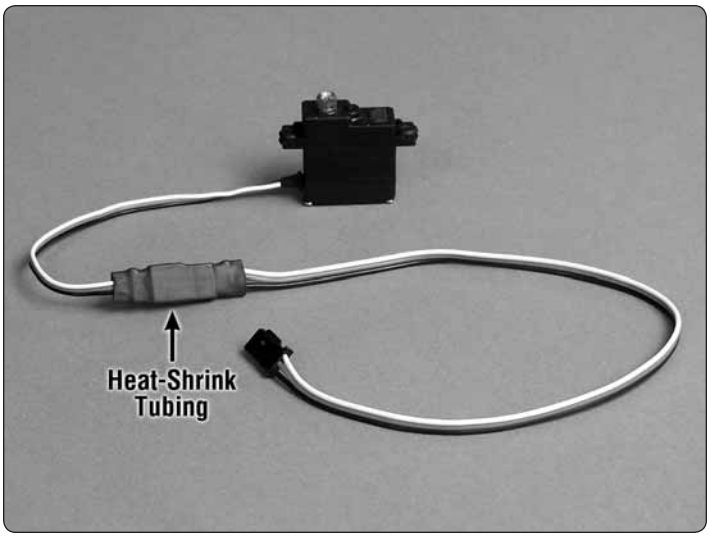
❏ 6. If using the included Great Planes 4-40 ball links, enlarge the holes in the servo arms with a 7/64" or 1/8" [2.8mm or 3.2mm] drill.



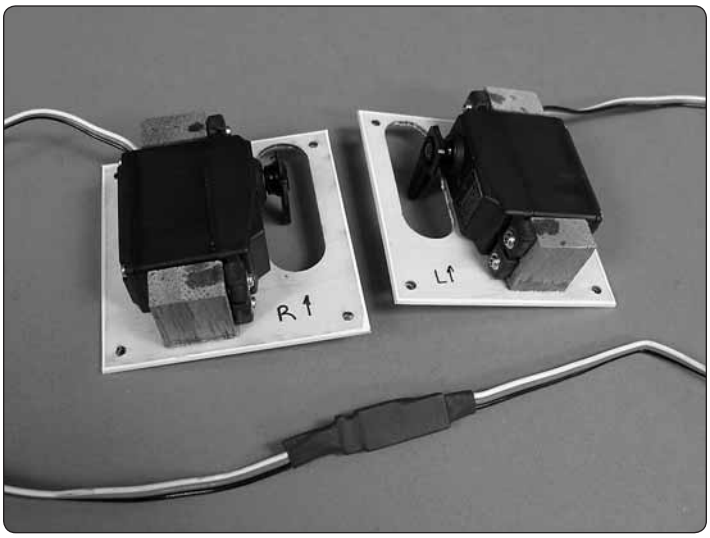


❏ 7. Temporarily mount the aileron servos to the mounting blocks by drilling 1/16" [1.6mm] holes for the screws. **Remove the screws and servos.** Use a few drops of thin CA to harden the screw holes. Allow the CA to harden before remounting the servos.

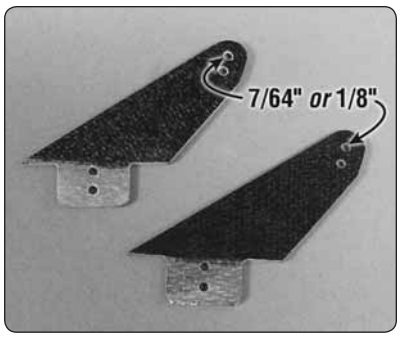
NOTE: Every time wood screws are used throughout the rest of assembly **always** perform this procedure of installing and removing the screws, then hardening the holes with thin CA.



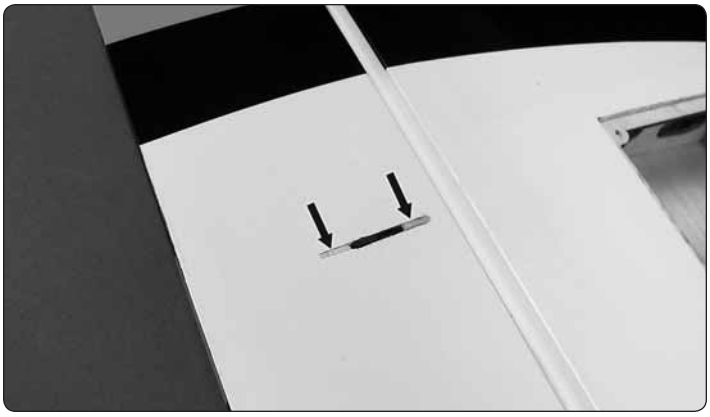
❏ 8. Add a 6" [150mm] servo extension to each aileron servo. Secure the connections with 1-1/2" [40mm] pieces of the included heat shrink tubing as shown. Use a heat gun to shrink the tubing.



❏ 9. Mount the servos to the hatches—be certain the servo arm screws are in place. If you used metal-gear servos, use a small drop of threadlocker on the threads.

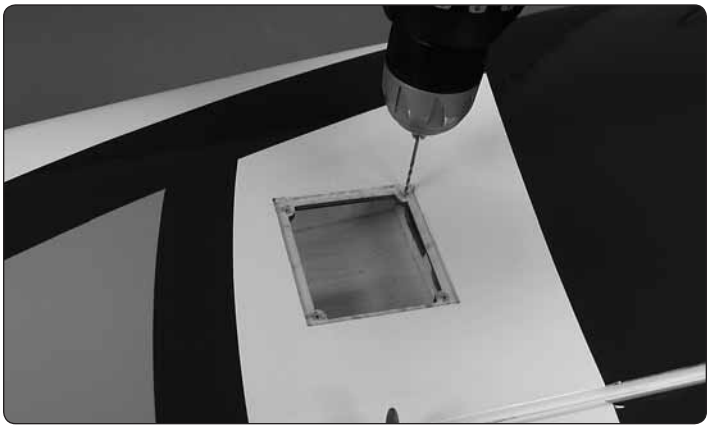


❏ 10. Roughen the tabs on two of the included, fiberglass **control horns**. Same as was done for the servo arms, if using the included Great Planes 4-40 ball links, enlarge the holes. Without any glue, test fit the horns into the slots—be certain the horns fit **all the way down** and make any adjustments for a proper fit.



❏ 11. Cut and remove the covering from around the base of the horns.

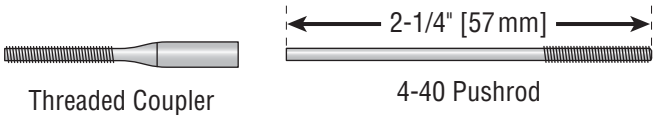
❏ 12. **Securely** glue the horns in to position with CA.



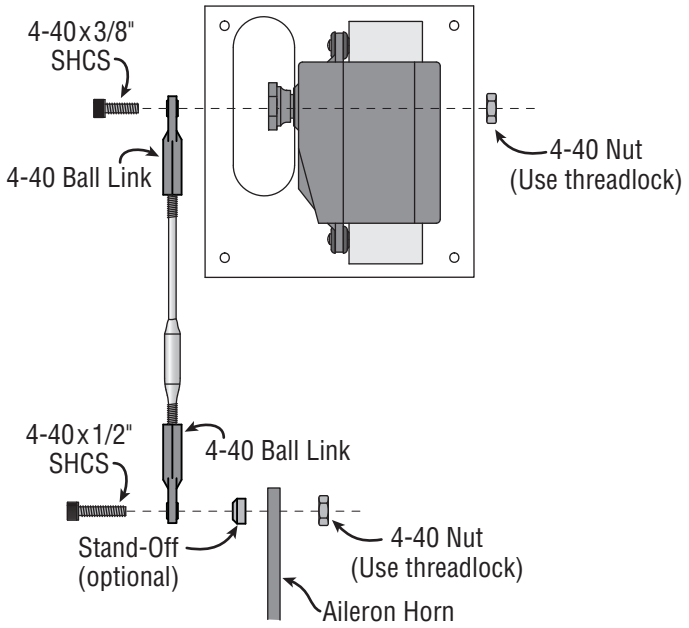
❏ 13. Drill out the screw holes in the hatch cover frame with a 1/16" [1.6mm] drill.

Refer to this photo while hooking up the ailerons:

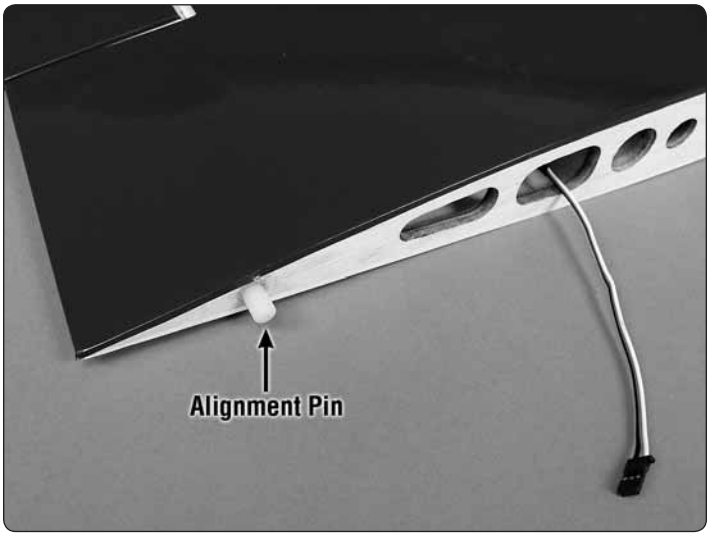
❏ 14. Guide the aileron servo wires out the end of the wing and mount the hatch covers with four #2 x 3/8" [9.5mm] button-head screws—do not use a ball-end hex wrench. Use a quality, machine-ground hex driver. If you don't have a good hex driver you could replace the included button-heat screws with Phillips screws and washers (not included) instead. Don't forget to temporarily remove the hatch covers, harden the screw holes with thin CA and **allow to harden** before remounting the hatches.



❏ 15. Make the aileron pushrod from a 4-40 x 4-1/2" [115mm] pushrod cut to a length of 2-1/4" [57mm]. Clean the pushrod with denatured alcohol, scuff the end with sandpaper, then silver solder on a 4-40 threaded coupler.



❏ 16. Connect the aileron horn to the servo arm with the hardware shown in the illustration—the stand-off on the aileron horn is optional and not used with the servos shown, but if your servo spacing is different the standoffs may be used to keep the pushrod perpendicular to the aileron horn. Be sure to use threadlocker on the nuts.



❏ 17. Glue a large alignment pin into the end of each wing.

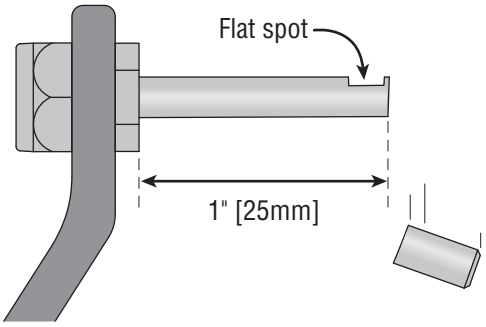
ASSEMBLE THE FUSELAGE

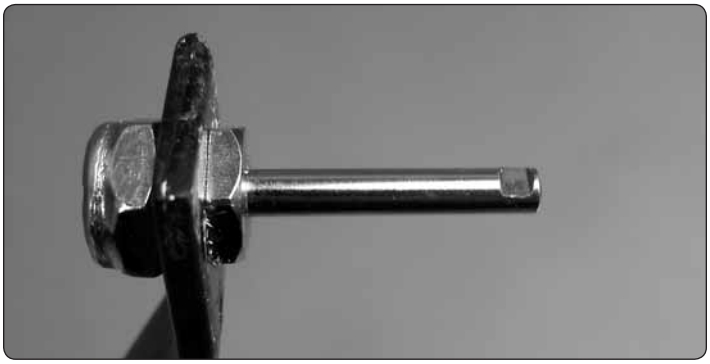
CAUTION: The turtledeck and fuselage bottom of the Sequence 1.20 are made from balsa-covered foam. Some solvents and adhesives will attack the foam, so use care—especially when using CA which will definitely "eat" into the foam.

Mount the Landing Gear

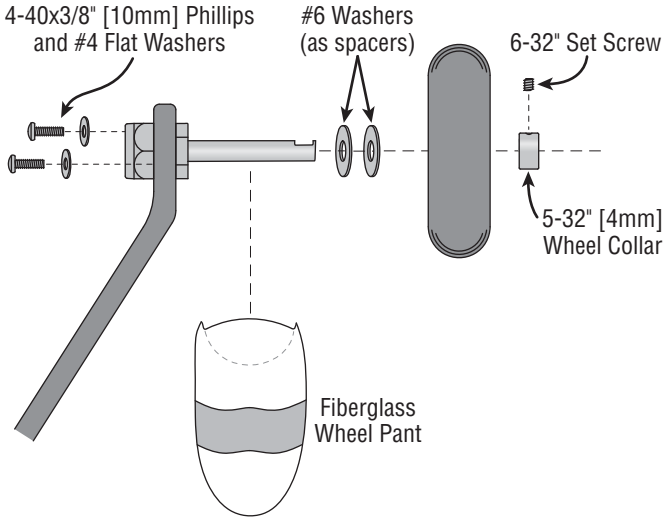
❏ 1. If you haven't yet done so, use a covering iron with a cover sock to go over the fuselage to remove any wrinkles and bond the covering to the airframe—remember to support the inside of the sheeting where possible.

❏ 2. Test-fit the main landing gear legs in the fuselage to distinguish the left from the right and mark them as such.





❏ 3. Mount 5/32" [4mm] axles to the main landing gear with the large lock nuts and threadlocker. Use a rotary tool with a fiber-reinforced cutoff wheel to **accurately** cut the axles to a length of 1" [25mm], as shown in the illustration. Grind or file a flat spot on the end of both axles.

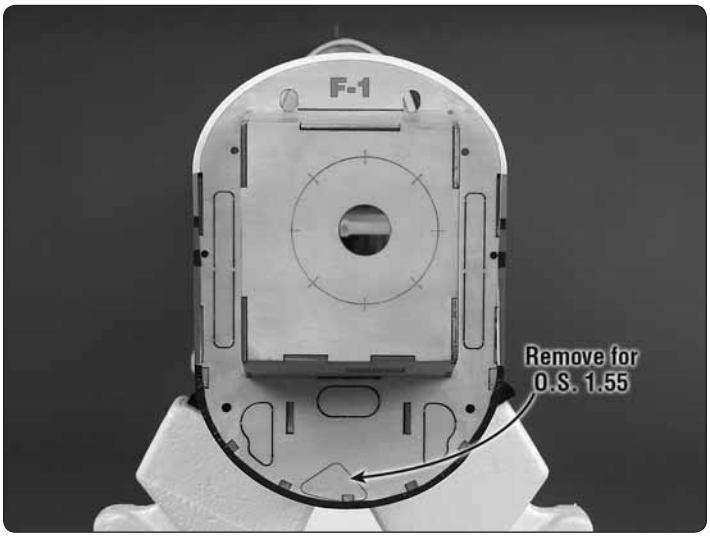


❏ 4. Mount the wheels and wheel pants as shown—don't forget to use threadlocker on all the screws.

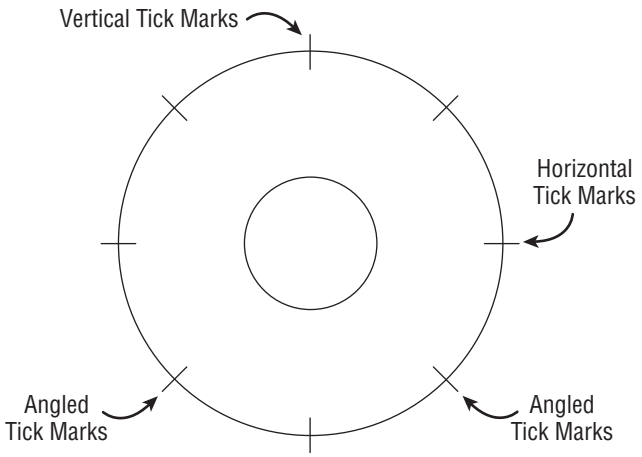
❏ 5. Mount the main landing gear in the fuselage with #8 x 1/2" [13mm] SHCS (socket-head cap screws), #8 lock washers and flat washers—note that the inner screw on each gear leg uses no washers so the heads will not protrude too much above the fuel tank/battery plate. As you have been doing all along, be certain to use threadlocker on all the screws.

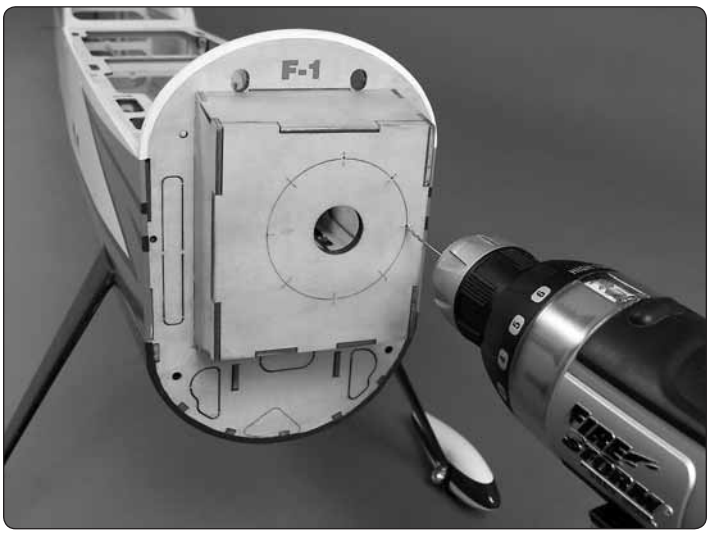
❏ 6. Mount the tail wheel with a 3/32" [2.4mm] wheel collar and a 4-40 set screw and threadlocker.

Prepare the Fuselage for Mounting the Engine (or Electric Motor)



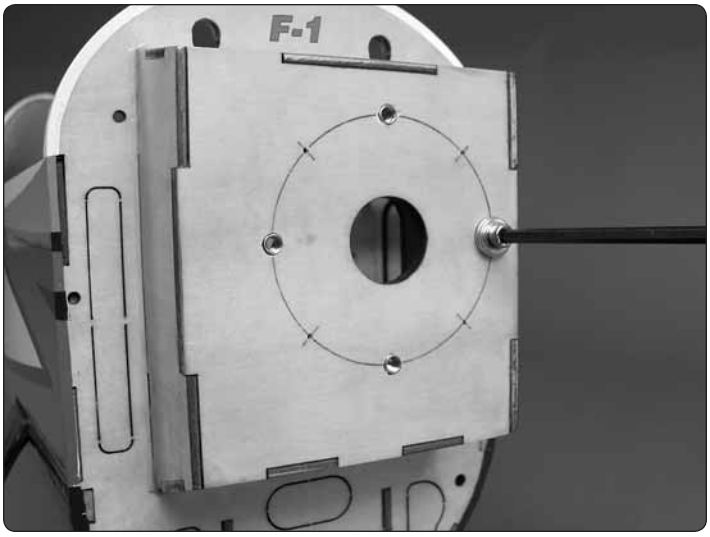
❏ 1. If using the O.S. 1.55 FS-a, remove the bottom cutout for the muffler. If using a brushless electric motor, remove all the other cutouts instead. Use epoxy to seal the MonoKote around F-1, the seams around the cutouts not removed and the edges of the cutouts you did remove.



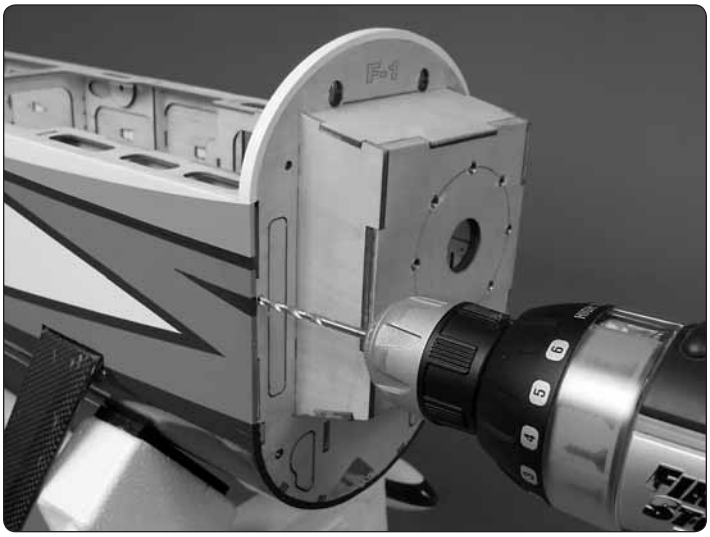


❏ 2. If mounting a glow engine drill 1/16" [1.6mm] pilot holes through the firewall at the four **horizontal** and **vertical**

tick marks. If mounting the Great Planes *Brushless Motor Mount for Large Motors* drill the holes through the firewall at the four **angled** *tick* marks. If mounting the optional wood motor mount box, refer to the instructions on page 28 and assemble/mount the box as illustrated.



❏ 3. Enlarge the holes with a 7/32" [5.6mm] drill to accommodate the 8-32 blind nuts. *Draw* the blind nuts into the back of the firewall with a #8 SHCS (socket-head cap screw) and washers.

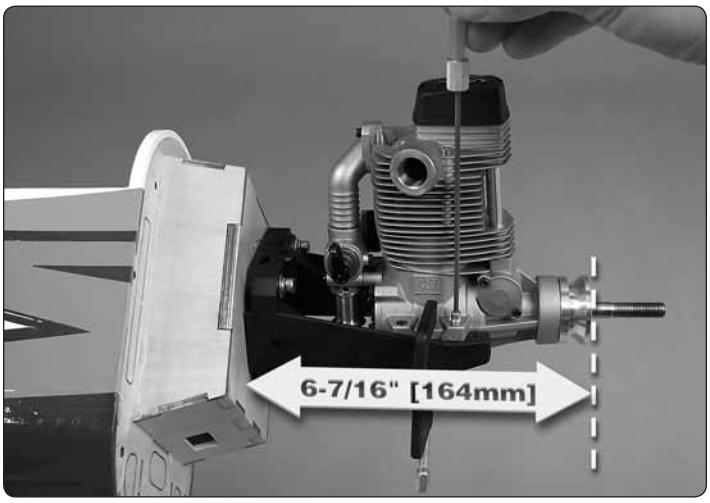


❏ 4. If you will be mounting the cowl with the optional cowl ring, drill 1/8" [3.2mm] holes 3/8" [9.5mm] deep into the fuselage sides through the two laser-cut holes in F-1. (If you're not certain how you will mount the cowl, read ahead about what's involved to help you decide.)

If mounting an electric brushless motor skip ahead to "Mount an Electric Motor" on page 13.

Mount a Glow Engine

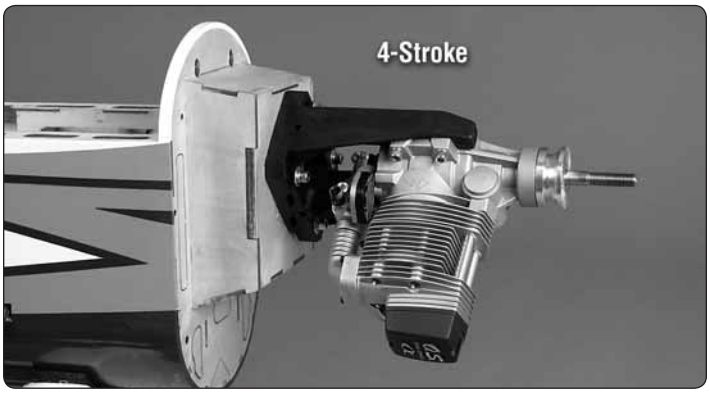
Refer to this photo for the following two steps.

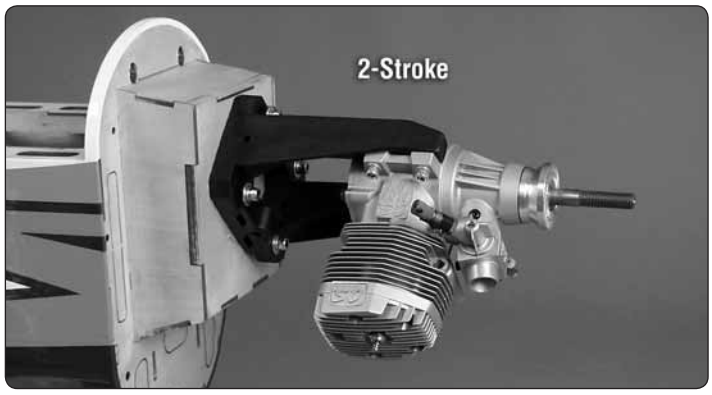


❏ 1. Temporarily mount the included engine mount to the firewall with four 8-32 x 1" [25mm] SHCS, #8 lock washers and flat washers. Clamp your engine to the mount so the drive washer will be 6-7/16" [164mm] from the firewall.

❏ 2. Mark the engine mounting bolt holes with a Great Planes Dead Center Hole Locator (GPMR8130).

❏ 3. Take the mount off the firewall and drill #29 (or 9/64" [3.6mm]) holes at the marks. Tap 8-32 threads into the holes—a variable speed hand drill makes tapping the threads fast and easy!



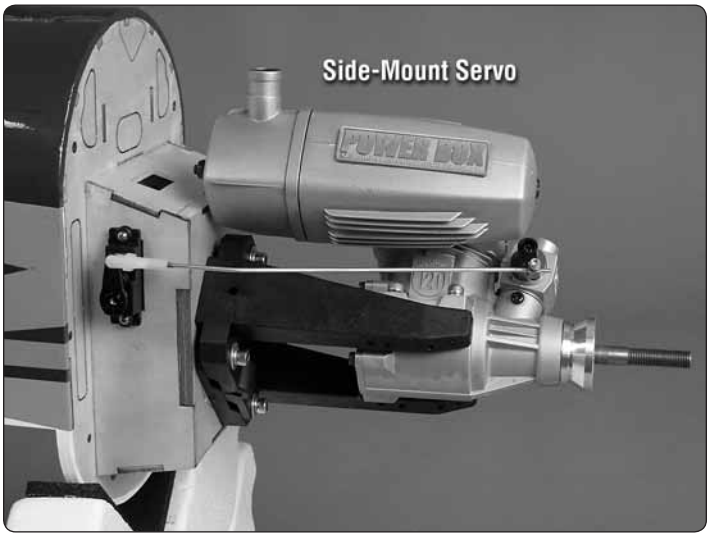


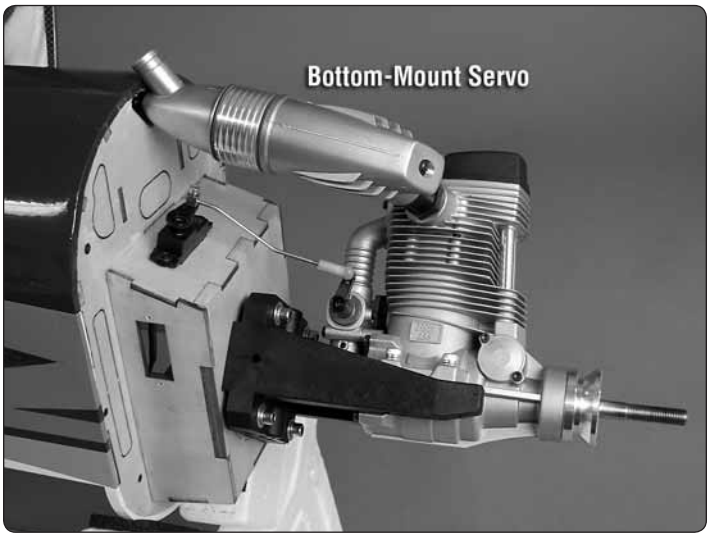
❏ 4. Fasten the engine mount back onto the firewall and bolt the engine to the mount with four 8-32 x 1" [25mm] SHCS and #8 lock washers.

Hook Up the Throttle

❏ 1. Refer to following photos to see which of the two throttle servo mounting locations will work best for your engine. Cut the side or bottom servo mount hole from the location you will use.

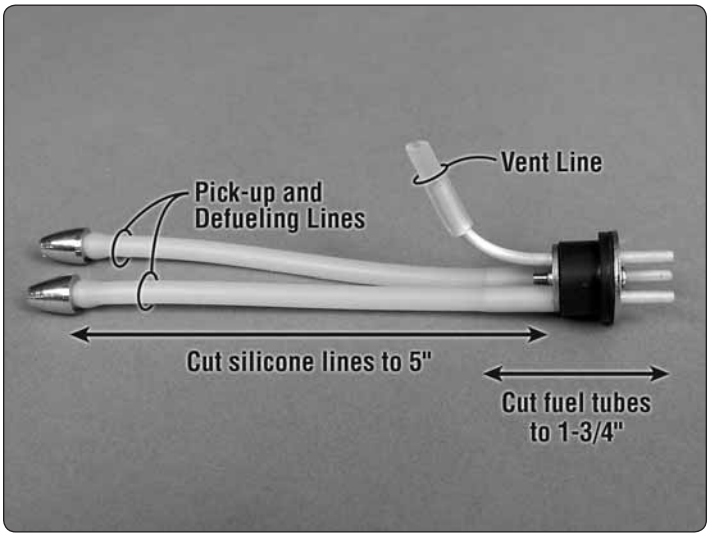
❏ 2. Connect a 12" [305mm] servo extension to your throttle servo and secure the connection with another piece of shrink tubing.





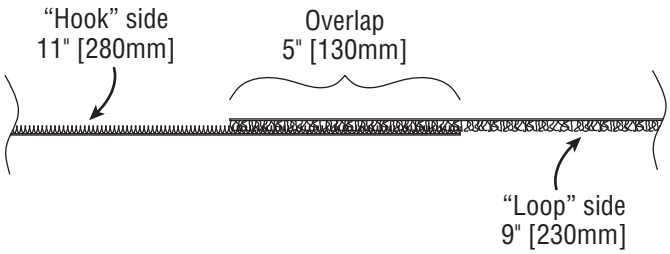
❏ 3. Mount the throttle servo and hook up the throttle using the hardware shown in the photo. (It's not necessary to mount the muffler yet, but it's shown in the photo so you can see how it fits and where to position the exhaust).

Install the Fuel Tank

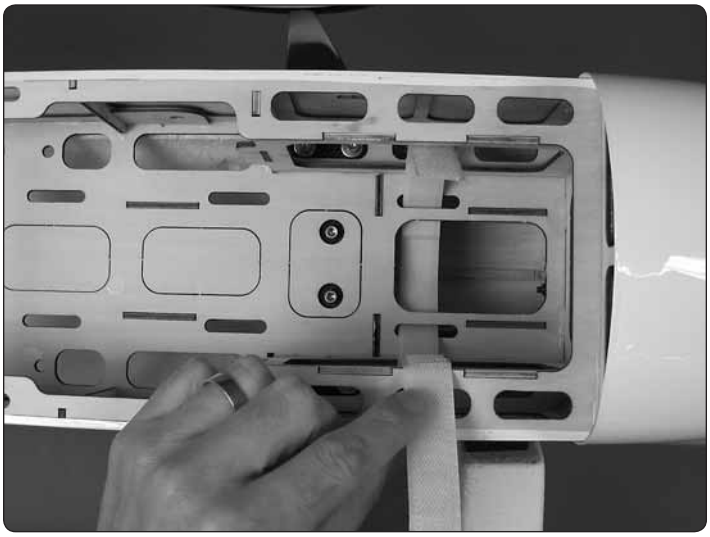


❏ 1. Prepare the stopper assembly as shown. Insert the stopper into the tank and tighten the screw.

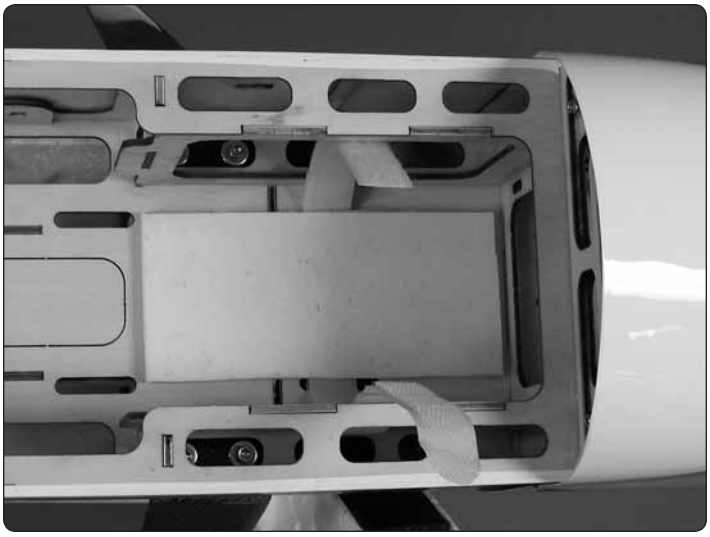
Velcro Fuel Tank Strap

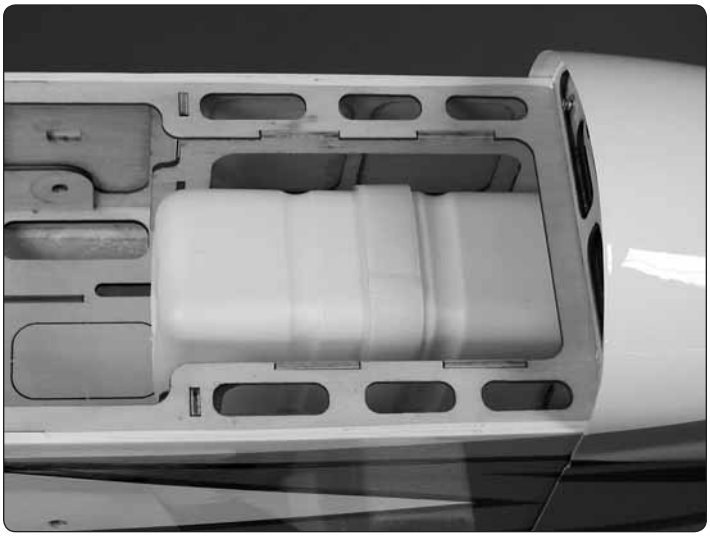


❏ 2. Make the **fuel tank strap** from the included Velcro strip as shown.



❏ 3. Install the strap in the fuselage in the location you will be mounting the tank—it may be necessary to temporarily punch out one of the lightening holes to install the strap, then glue the piece back in.





❏ 4. Mount the fuel tank with a piece of 1/4" [6.4mm] R/C foam underneath and securely tighten the strap.

❏ 5. Connect the fuel lines (not included) to the engine. A plastic *fuel line plug* is included for plugging the fill line after fueling.

Proceed to "CUT THE COWL" on page 16.

Mount an Electric Motor

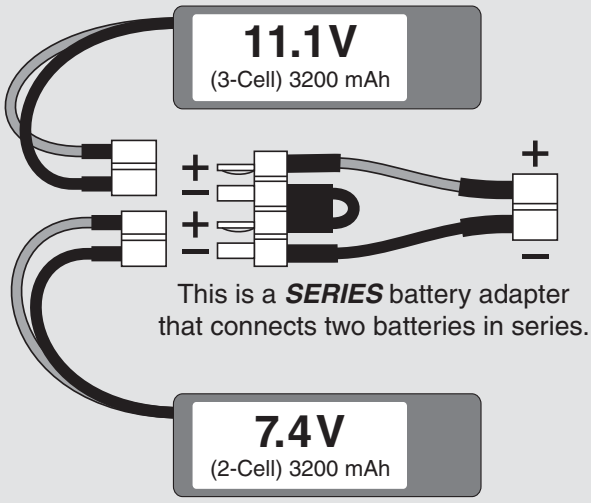
Before mounting the motor and setting up the ESC and battery, read the following important battery precautions:

IMPORTANT: If using multiple battery packs that are connected with an adapter, never charge the batteries together through the adapter. Always charge each battery pack separately. Charge the batteries, then read the following precautions on how to connect multiple packs for flying the model:

Battery Precautions:

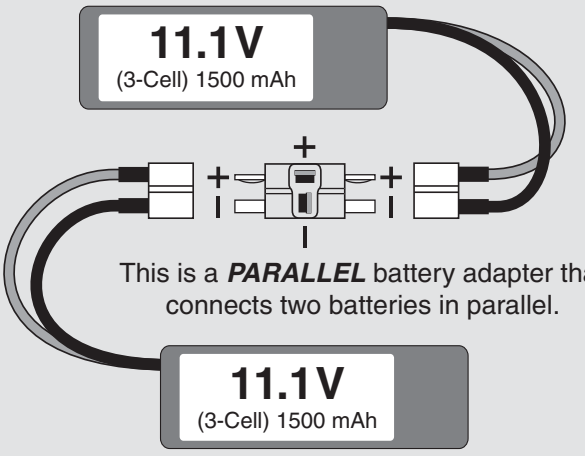
There are two ways to connect multiple battery packs: In **Series** and in **Parallel**.

These are two 3200mAh batteries (one 11.1V and the other 7.4V). When joined in ***SERIES***, the result will be a 18.5V, 3200 mAh battery.

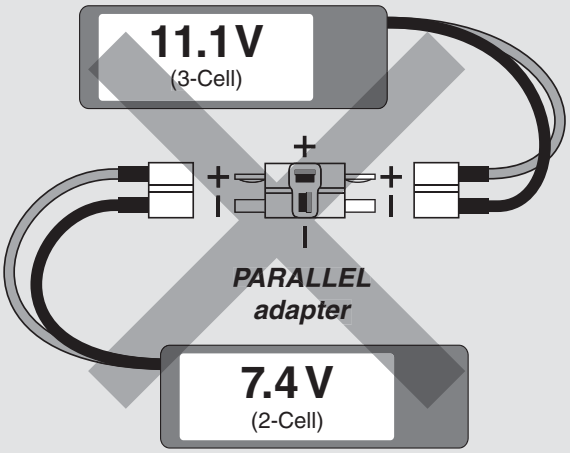


1. Connecting batteries in **"Series"** means to connect the +'s to the –'s and the –'s to the +'s. This combines the battery's Voltages, but the capacity remains the same.

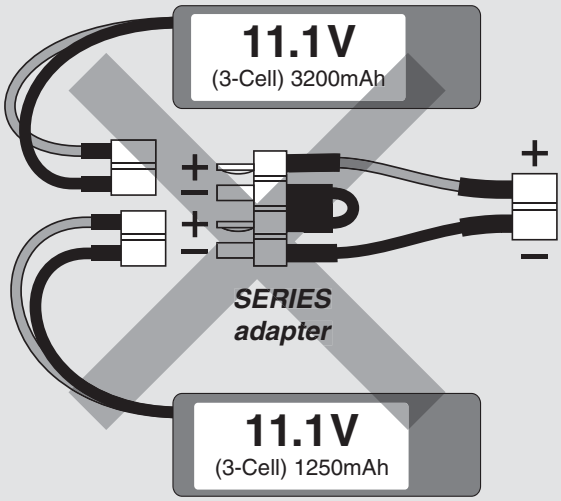
*These two 1500mAh batteries (both 11.1V) are being joined in **PARALLEL**. The result will be one **11.1V, 3000mAh** battery.*



2. Connecting batteries in **"Parallel"** means to connect the +'s to the +'s and the -'s to the -'s. This combines the battery's capacities, but the Voltage remains the same.



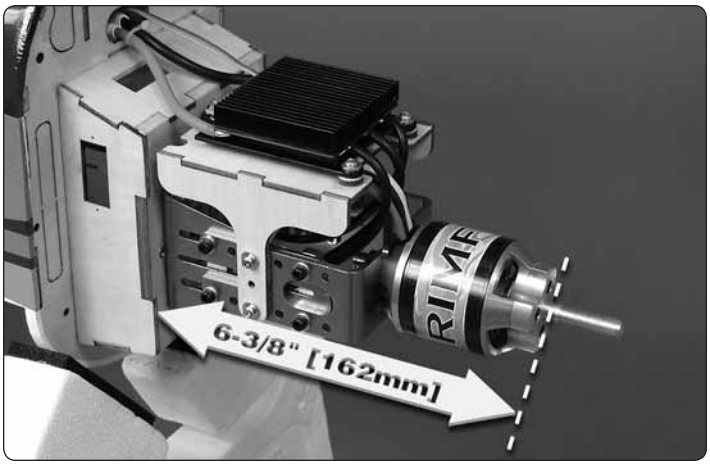
NEVER connect battery packs with different Voltages in **Parallel**–only combine in **Series**. Otherwise, the batteries will try to "equalize" with the larger one trying to "charge" the smaller one, thus causing heat and likely a fire.



Also **NEVER** connect battery packs with different capacities in Series or in Parallel.

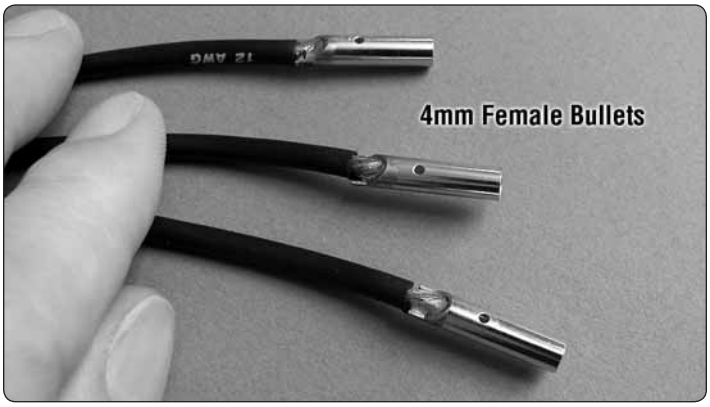
❑ 1. The Great Planes Large Brushless Motor Mount comes with Phillips motor mounting screws and thin washers, but some modelers prefer socket-head cap screws and regular, thicker washers. If so, substitute the Phillips screws with 3x8mm screws (DTXC8640) and 3mm or #4 washers.

❑ 2. Use a 2.0mm hex wrench to remove the set screws from the collar on the end of the RimFire 1.20 motor shaft. Then, reinstall them with threadlocker and securely retighten.



Refer to this photo while mounting the motor and ESC.

❑ 3. Mount the motor to the mount. Adjust the mount and tighten the bolts so the base of the prop adapter will be 6-3/8" [162mm] from the firewall.



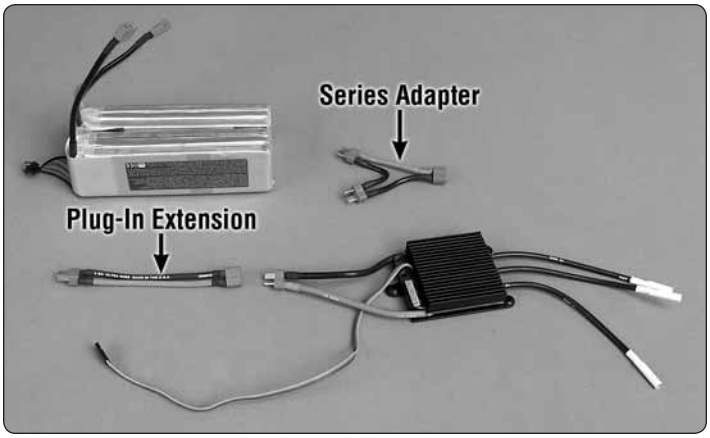
❑ 4. If using the Great Planes ElectriFly 80A ESC, install Great Planes 6mm male/4mm female bullet adapters (GPMM3119) on the motor wires, or remove the 6mm female bullet connectors from the ESC and solder on 4mm female bullet connectors (GPMM3115) instead.

❑ 5. If you soldered on 4mm connectors, cover the connectors with 3/16" [5mm] heat shrink tubing (GPMM1056).

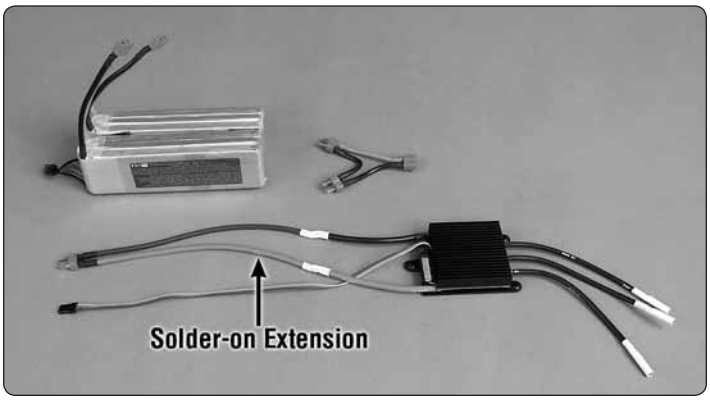
❑ 6. Assemble and mount the plywood **ESC mount** to the motor mount with four 4-40 x 1/2" [13mm] SHCS, #4 flat washers and 4-40 nuts with threadlocker. Mount the motor mount with the motor to the firewall with four 8-32 x 1/2" [13mm]

SHCS, #8 lock washers and flat washers and threadlocker.

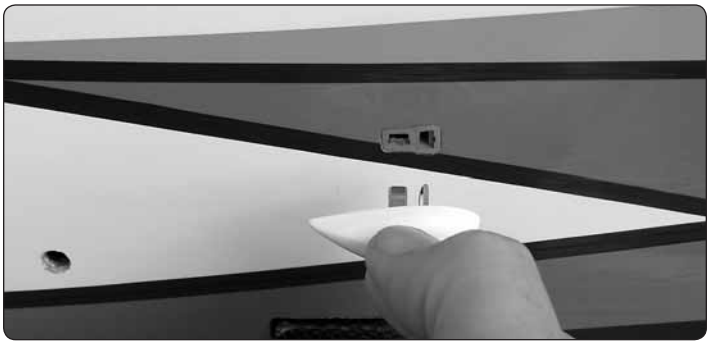
❏ 7. Before mounting the ESC consider the options for connecting the battery. First, the wires coming from the ESC are probably not long enough to reach the battery, so an extension of some sort may have to be made. And if using two 3S LiPo packs connected in series (as illustrated here in the manual), a Series Deans Ultra 2 to 1 Adapter (GPMM3143) will also be required. (If using a single 6S battery pack no adapter will be required.)



The easiest way to get the ESC wires to reach the battery is to make a *plug-in* extension with a Deans connector on both ends.



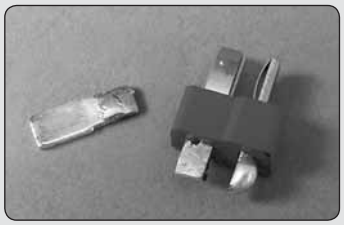
Or, additional wire could simply be soldered directly onto the ESC.

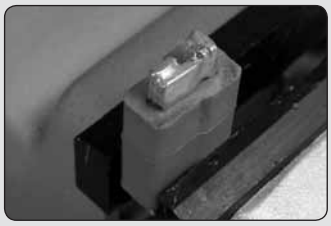


Finally, an external ***motor arming plug*** could be incorporated with the necessary wiring and receptacle plug soldered to the ESC. With an arming plug you'll never have to handle the airplane while the motor is armed—you can simply install and connect the battery, mount the canopy hatch, then insert the arming plug right before you fly!

How to Make an Externally-Accessible Arming Plug:

❏ A. First, you'll need a short metal tab to bridge the tabs across a Deans male Ultra Plug. A tab extracted from another male or female plug works perfectly for this.





❏ B. Cut the tab to length and make a 90° bend on one end. Solder the tab across the tabs on the plug. **Hint:** Plug the arming plug into a female plug to serve as a heat sink and to make it easier to hold in a vice for soldering.

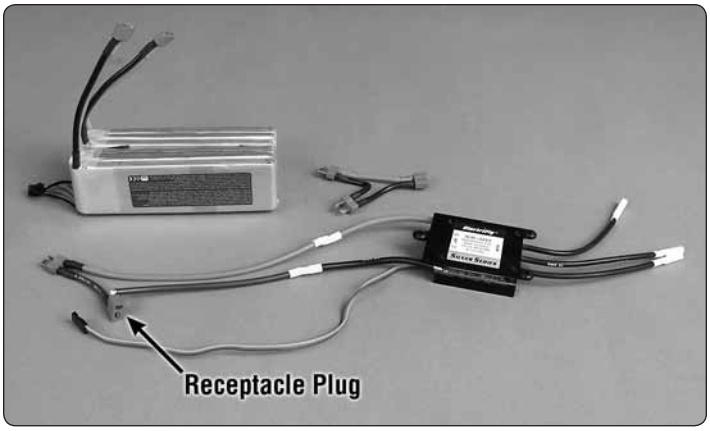
❏ C. Trim the edges around the Deans plug as shown. Glue together the plastic pieces of the frame for the plug and test-fit the plug into the frame. Make any adjustments necessary and glue the assembly together with CA.

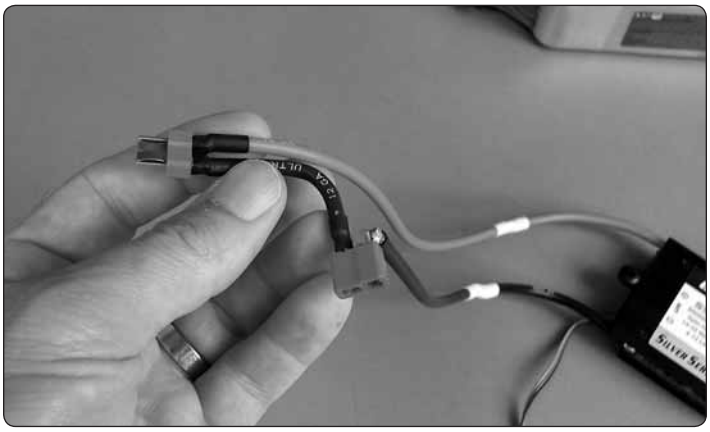
❏ D. Apply auto body filler to the frame and allow to partially harden. While the filler is still "rubbery" use a hobby knife to roughly carve it to a teardrop shape.

❏ E. After the body filler has hardened use coarse sandpaper to sand to the final profile.

❏ F. Use a small rod or dowel wrapped with medium-grit sandpaper to cut the depressions into the sides of the plug so you can grip it.

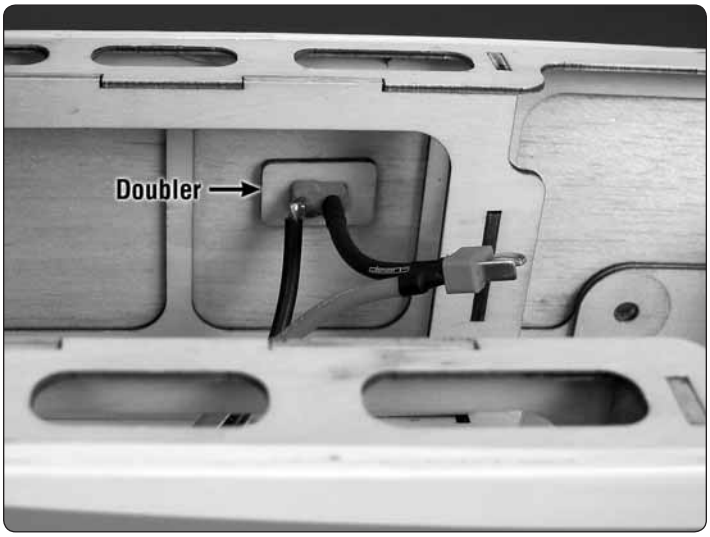
❏ G. Prime, sand, then paint—just about any kind of paint will work, but we used enamel spray paint.



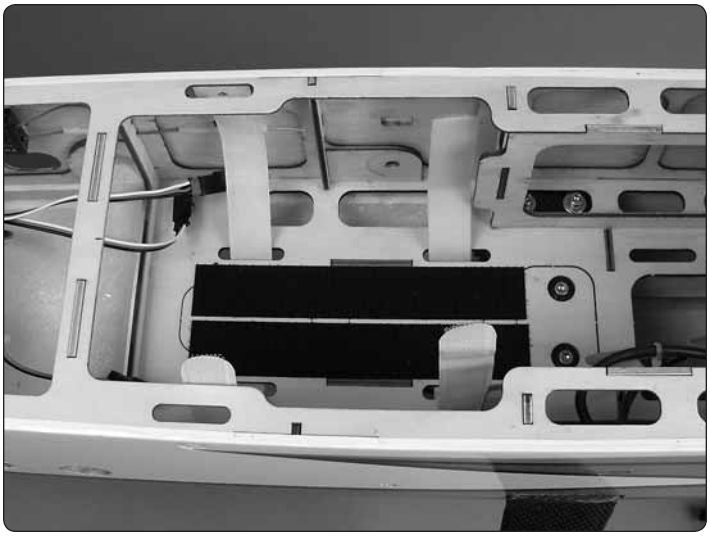


❏ 8. Once you've made the arming plug, decide which of the three precut locations in the fuselage side you will use for mounting a Deans female Ultra Plug to serve as the receptacle. Solder the plug in-line between one of battery leads. Solder on any additional wire so the battery and ESC will reach.

❏ 9. Mount the ESC to the ESC mount with three #4 x 1/2" Phillips screws and #4 flat washers. After mounting the ESC, temporarily remove the screws, harden the holes with a few drops of thin CA, allow to harden, then remount the ESC.



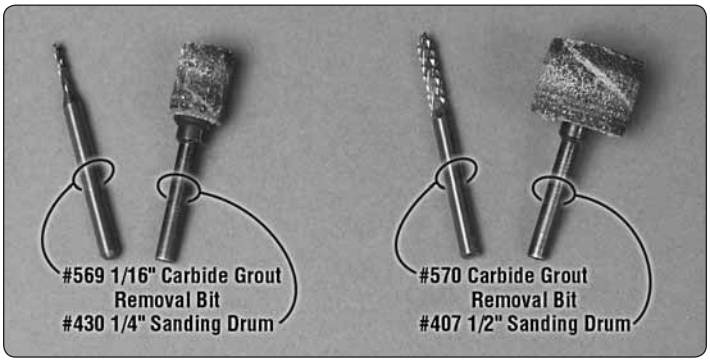
❏ 10. If using the arming plug, carefully cut the covering from the side of the fuselage over the location you will use for the receptacle. Securely glue the receptacle plug into place with the plywood **doubler**.



❏ 11. Make battery straps from the included Velcro strips and guide them in and out of the slots in the battery floor (the rear strap can be reached with your fingers under the rear of the floor, but the front strap will require a piece of wire to pull it up through). Apply strips of the rougher, "hook" side of Great Planes adhesive Velcro to the battery floor and apply strips of the softer, "loop" side to the batteries. Then test mount the battery into position just to see how it all fits.

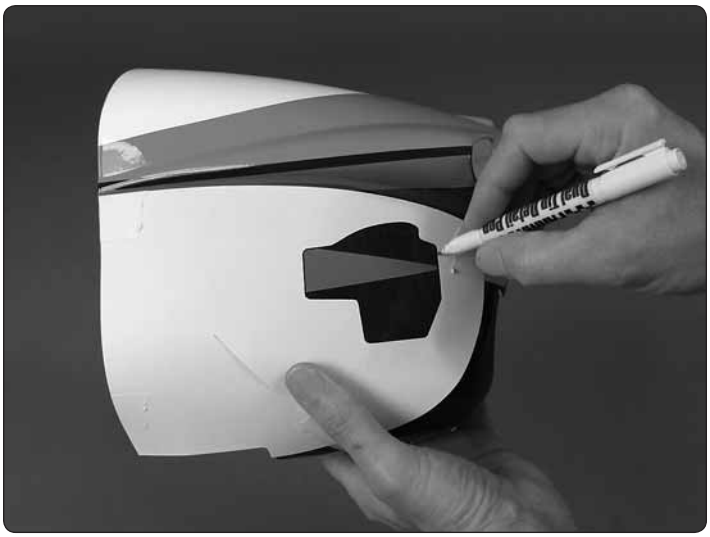
Cut the Cowl

If going electric the cowl probably doesn't need to be cut—just skip ahead to "Mount the Cowl" on page 18. But if using a glow engine the cowl must be cut to fit over the head and cylinder. If using an O.S. 1.55FS-a you're in luck because we've provided a template that can be used as a guide. If installing a different engine you'll have to figure out where to make the cut yourself. Some modelers dread this process, but you can make it easier and achieve great results by **proceeding slowly and using the proper tools**. The best way is to cut in small increments, fitting and marking the cowl as you go. When you zero-in on the final shape of the cutout you can position the cowl more accurately until you can make the final cuts.



With or without a template, the most important thing is to have the proper tools. It cannot be over emphasized how helpful a Dremel carbide **grout removal bit** and a Dremel **sanding drum** are for cutting a fiberglass cowl—these can be found at most hardware and home-improvement stores. Initial cuts go easy, fast and accurate with the carbide bit. Then, the rough edges can be smoothed and rounded with the sanding drum. The 1/16" carbide cutter and 1/4" sanding drum are absolutely a MUST, but the 1/8" cutter and 1/2" sanding drum come in handy too:

❏ 1. The cowl will be easier to start fitting if you can remove the head from your 2-stroke engine or remove the valve cover from your 4-stroke engine. Also leave the muffler off the engine for now.



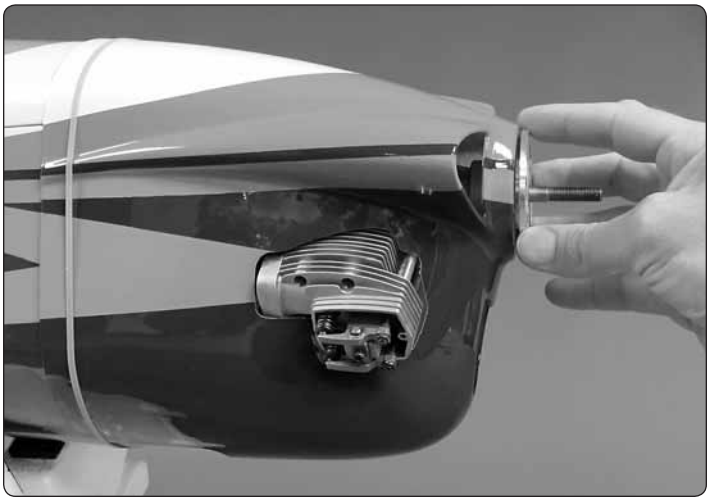
❏ 2. If using the O.S. 1.55FS-a, cut the template from the back of the manual and tape it into the cowl. The top of the template aligns with the bottom of the cowl "cheek" and the back of the template aligns with the back of the cowl. Use a fine-point felt-tip pen to mark the cutout directly onto the cowl.

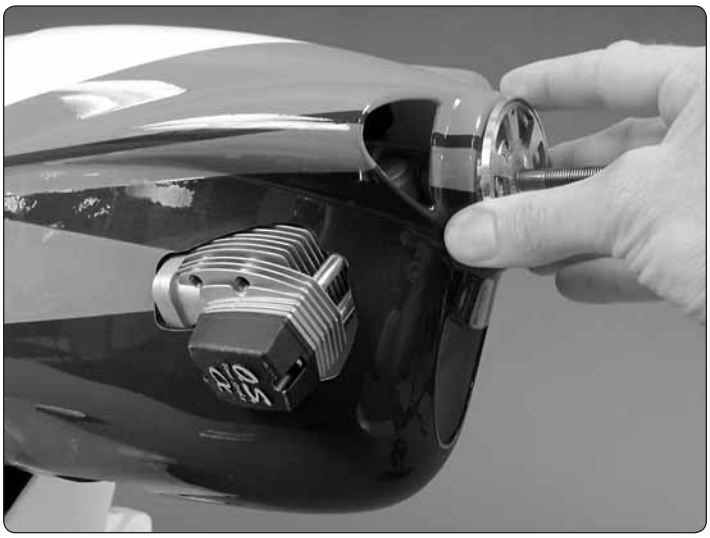
❏ 3. If ***not*** using the template you will have to determine where to mark and cut the cowl yourself. Position the cowl as far over the engine as it will go. Use a lead pencil to mark the inside of the cowl where it needs to be cut to clear whatever part of the engine is in the way.

It's time for cutting. Work in a well-ventilated area and always wear protective gear including goggles or glasses, hearing protection and an appropriate breathing filteration. Also do your self a favor and wear a long sleeve shirt to protect your arms from itchy fibers that get into the air.

❏ 4. Use one of the grout removal bits to start cutting the cowl. If you've marked the cut with the template, cut approximately 1/8" [3mm] inside the lines. If you didn't use the template, cut where you made your first marks. **Note:** The grout removal bits work best and cut most accurately with the speed of your rotary tool turned all the way up to **full** rpm.

❏ 5. Test fit the cowl and see where it needs to be cut next. Mark the inside again if necessary, or switch to a fine-point felt-pen to mark the outside. Remove the cowl and continue to cut in small increments.





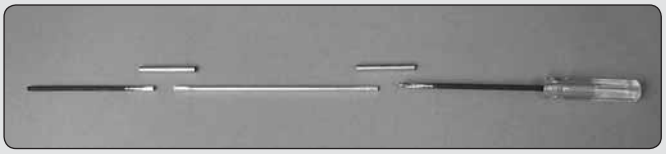
❏ 6. Proceed slowly continuing to fit, mark and cut the cowl in small increments until you can get it over the engine—as you really "zero-in" on the cutout, switch to the sanding drum. When you're really close, install the spinner back plate for aligning the front of the cowl. Replace the head or valve cover onto the engine and continue to adjust the cutout accordingly. Don't worry about perfecting the cutout yet—for now just make the cutout large enough to fit over the engine as closely as possible. The final cutout will be perfected after the cowl has actually been mounted to the fuselage.

Mount the Cowl

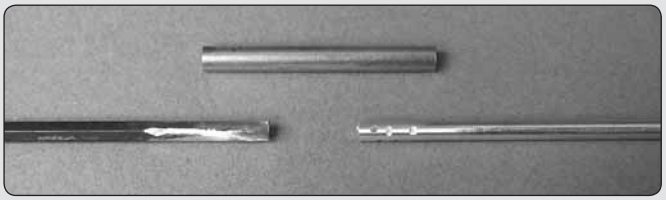
Now that you can get the cowl to fit over the engine it is time to determine how the cowl will be mounted. There are two options: You can use the standard wood screws from the outside, or use the optional **cowl ring**. Review the cowl fitting process to decide which way you prefer. The cowl ring requires fabrication of an extended ball-end hex driver, but the installation is "cleaner" and more durable as there will be no external screws.

METHOD 1: Mounting the Cowl with the Cowl Ring

If using the cowl ring, first make an extended hex driver…



❏ A. Use a Dremel with a fiber-reinforced cutoff wheel to cut a Great Planes 3/32" Hex driver ball wrench in half. Then cut a 4" [100mm] section from a 4-40 (.095") pushrod wire.

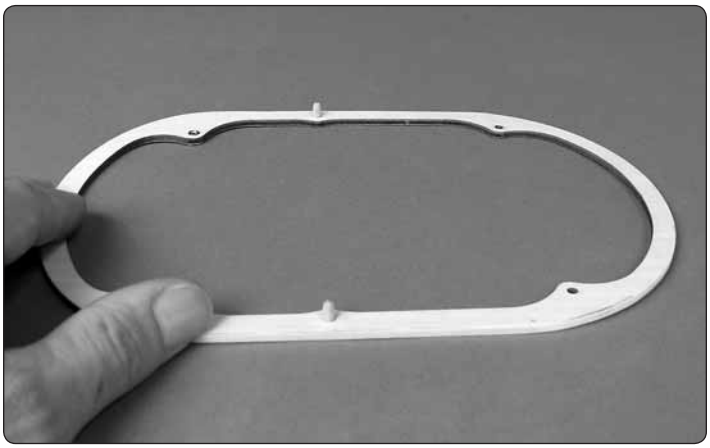


❏ B. Grind 1/2" [13mm] of the joining ends of the hex driver so the included brass tube couplers will fit over the ends. Then use coarse sandpaper to roughen both ends of the pushrod wire.

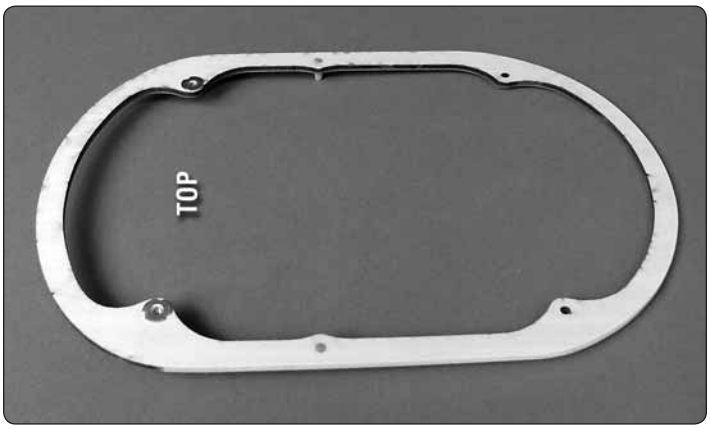
❏ C. Use silver solder with plenty of acid flux (that comes with silver solder) to join the pushrod wire between the ends of the hexdriver with the brass tubes. The key to a good soldering job is first to *tin* the ends of the hex driver and the pushrod wire—for the hex driver this requires continually heating the ends and quenching them in flux. After doing this several times the ends of the hex driver will be thoroughly tinned and ready for joining.

❏ D. After all the soldering is done use a small paper towel square dampened with acid flux to clean residual flux from the wrench. Then follow with steel wool and a thin coat of oil.

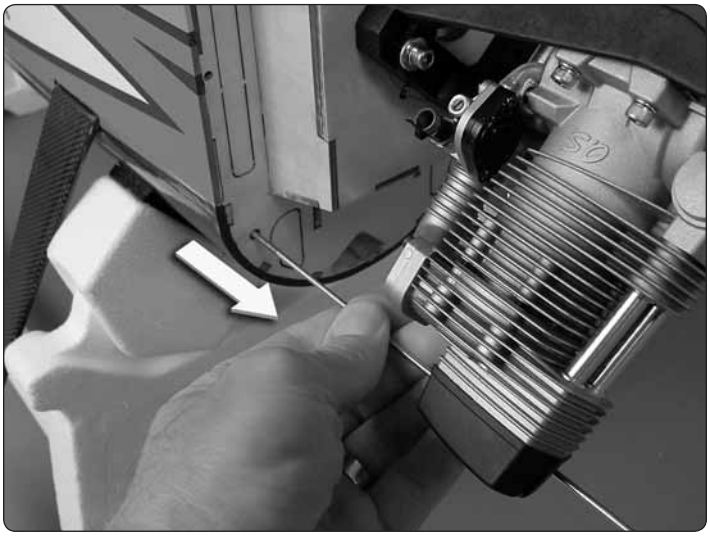
Now let's get back to the cowl ring…



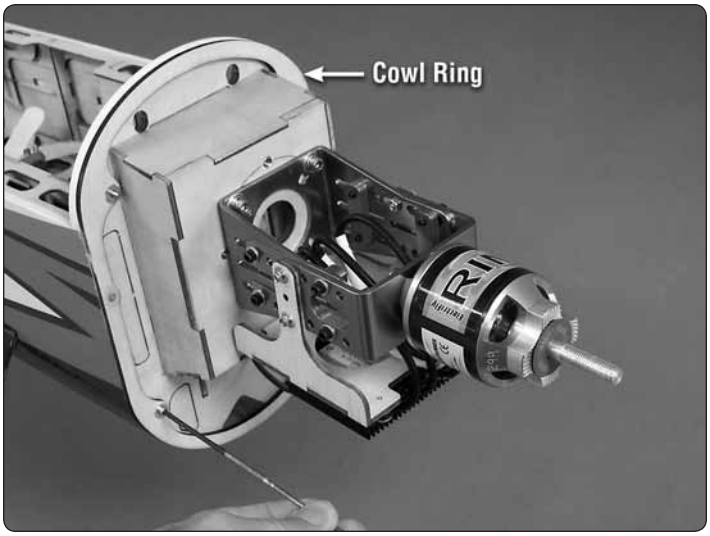
❏ 1. Round both ends of the included 1/8" [3.2mm] hardwood dowel and cut it in half. Glue the dowels into the cowl ring with 1/4" [6.4mm] protruding from one side—this will now be the back.



❏ 2. Press two 4-40 blind nuts into the **front** of the **top** two holes in the cowl ring.



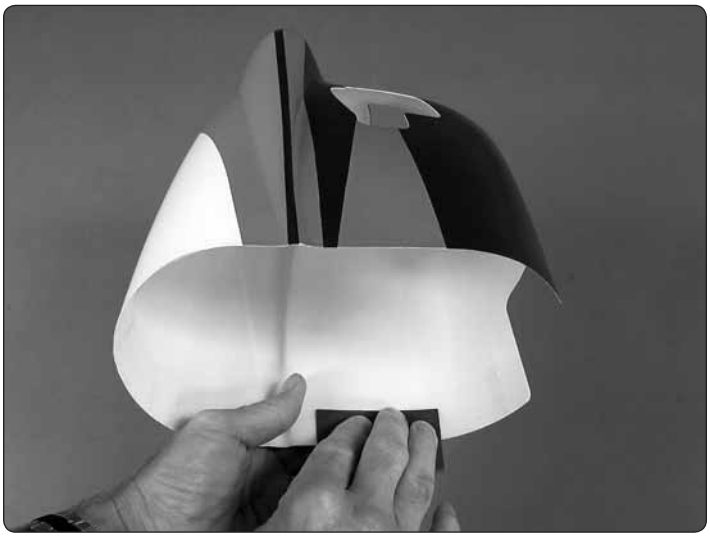
❏ 3. Use the remainder of the 4-40 pushrod you used for extending the hex driver to pull two 4-40 blind nuts into the **back** of the bottom two holes in F-1. Use a 4-40 screw with washers to draw the blind nuts tightly all the way in. Carefully add a few drops of thin CA around the blind nuts so they will not pop out.



❏ 4. Temporarily fasten the cowl ring to F-1 with four 4-40 x 1/2" [13mm] SHCS and flat washers—now you can test out your new extended hex driver!

❏ 5. View the cowl ring all the way around the fuselage to make sure it fits well and doesn't protrude too far over the edge—it should be pretty much even or extend no more than approximately 1/64" [.4mm] over the sides of the fuselage. Where necessary, use a fine-point ballpoint pen to mark the back of the cowl ring where it extends too far over the fuselage. Remove the cowl ring and sand as necessary.

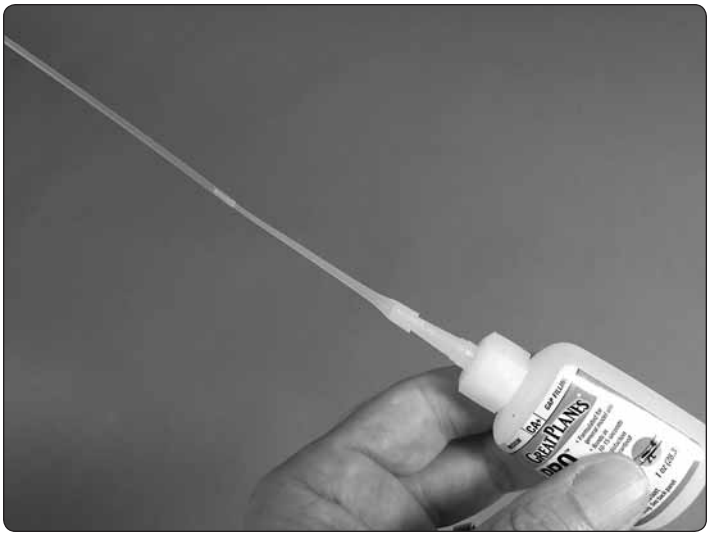
❏ 6. Once satisfied with the fit of the cowl ring, re mount it to the fuselage with the screws.



❏ 7. Use coarse sandpaper to roughen the cowl all the way around the inside so glue will adhere. "Prime" the inside of the cowl with a few squirts of CA accelerator to keep the CA from leaking around the cowl ring inadvertently gluing it to the fuselage.

❏ 8. Position the cowl with a #64 rubber band to hold it into position. Place the fuselage upside-down in your building stand to get ready for gluing.

❏ 9. You'll need the back plate of the spinner for aligning the front of the cowl, but it's best to use the complete spinner assembly which also usually requires the propeller. If necessary, trim the propeller cutouts in the spinner cone to fit your propeller, and then mount the propeller and spinner.



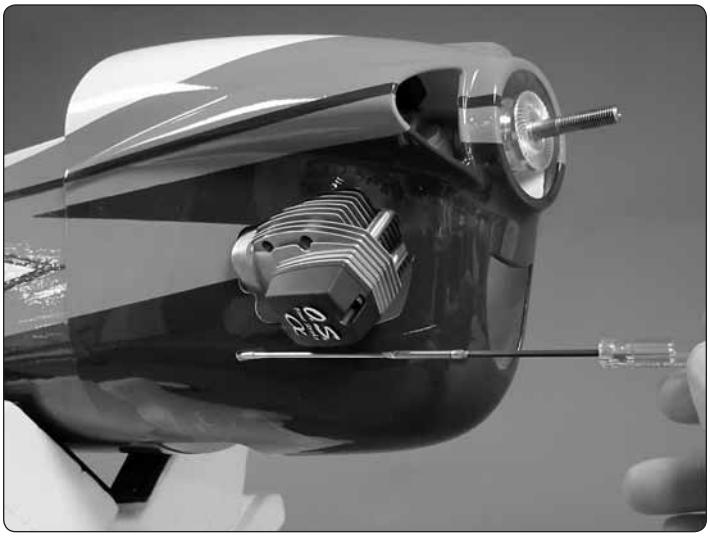
❏ 10. Medium CA will be used to glue the cowl to the cowl ring, but you'll need an extended glue tip in order to reach down inside. Pipettes and Teflon tubing may be used, but we used a length of micro pushrod tubing fit over a CA tip.

❏ 11. Double-check that the cowl is positioned **precisely** as you want it viewing it from all angles to make sure. The rubber band should securely hold the cowl in position while gluing.

❏ 12. Use your extended glue tip to tack-glue the cowl to the ring with medium CA wherever you can reach—for now, the cowl only needs to be tack-glued well enough to hold during removal.

❏ 13. Once you've got the cowl glued to the cowl ring, use your extended hex driver to remove the cowl screws. Then, take off the cowl.

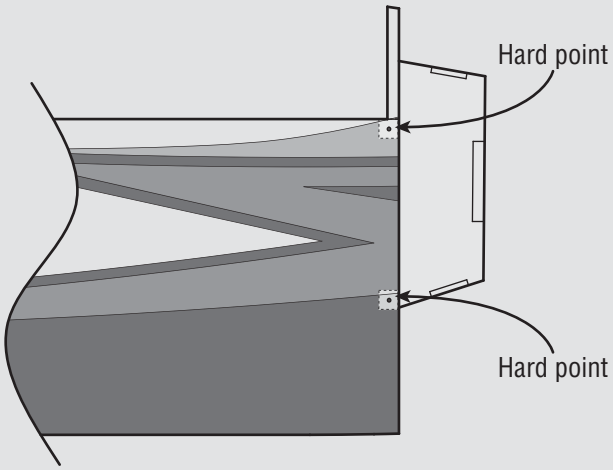
❏ 14. Securely glue the back of the cowl ring with thin CA and the front of the cowl ring with medium CA.



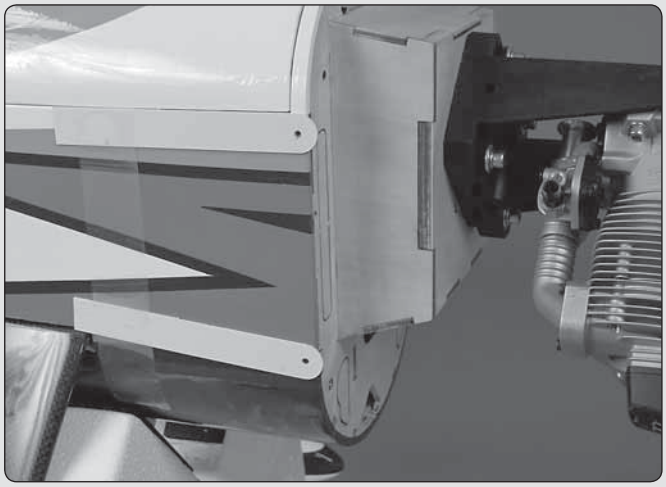
❏ 15. If running a glow engine and the bottom cowl ring screws are not accessible through the air inlet in the front of the cowl, cut a rounded slot on both sides of the cowl for the hex driver. If the bottom two screws are accessible through the inlet, the slots may not be necessary.

Proceed to "Finish the Cowl" on page 22.

METHOD 2: Mounting the Cowl with Wood Screws



❏ A. If using wood screws to fasten the cowl, mark the screw hole locations over the *hard points* under the covering on both sides of the fuselage where shown.



❏ B. Make four **screw hole templates** as shown from thin plastic or cardstock. Tape the templates to both sides of the fuselage, aligning the holes in the templates over the marks made over the hard points.

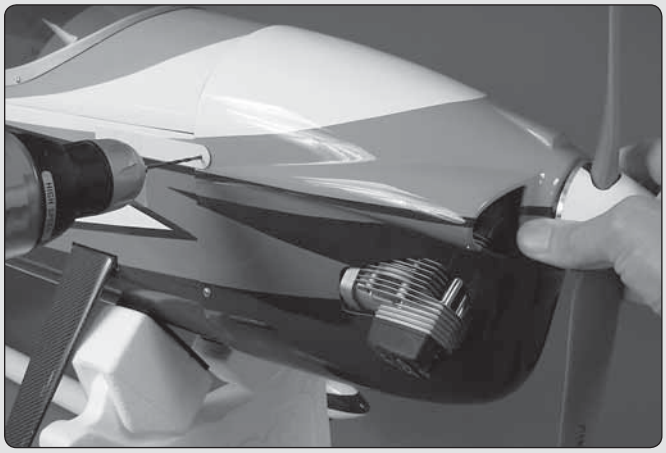
❏ C. Fit the cowl into position. If you haven't yet done so, trim the propeller cutouts in your spinner cone to fit the propeller, and then mount the propeller and spinner.

In the following steps it may be helpful to have an assistant drill the holes while you hold the cowl…

❏ D. Holding the cowl in position, use one of the templates as a guide to drill the first 3/32" [2.4mm] hole through the cowl into the fuselage.

❏ E. Enlarge the hole **in the cowl only** with a 1/8" [3.2mm] drill. Mount the cowl to the fuselage through that first screw hole with a #4 x 1/2" [13mm] Phillips screw.

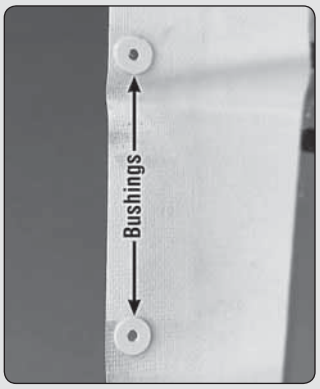
Don't forget to put the 3/32" [2.4mm] drill bit back into your drill before drilling the next hole.



❏ F. Holding the cowl in alignment again, drill the second 3/32" [2.4mm] screw hole. Enlarge that hole **in the cowl only** and insert the second screw.

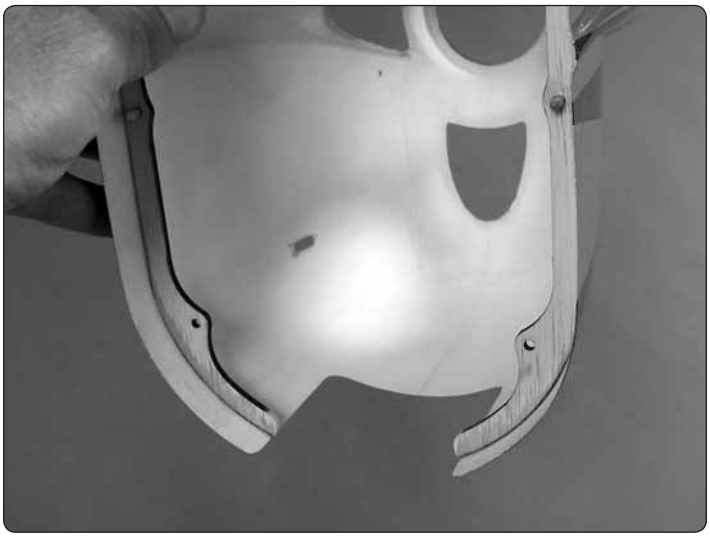
❏ G. Drill the two holes and mount the other side of the cowl to the fuselage the same way.

❏ H. After all the holes have been drilled remove the cowl. Use CA to glue the thin, plastic bushings to the inside of the cowl centered over the holes.



❏ I. Add a few drops of thin CA to each screw hole in the fuselage and allow to harden.

Finish the Cowl



❏ 1. If using a glow engine, mount the muffler and make any additional cuts necessary—you may have to cut through the cowl ring, but this won't weaken the cowl because the ring will be braced by the fuselage when bolted into position.

❏ 2. Make any other cuts/holes necessary for the needle valve, glow plug and fueling lines.

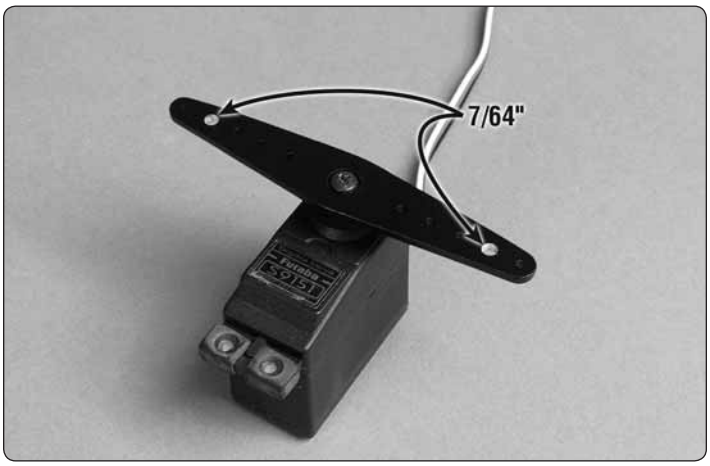
❏ 3. Once all the cowl holes have been cut final-sand the edges of all cuts with 320-grit or 400-grit sandpaper.

❏ 4. If using a glow engine, lightly coat the cowl ring with thinned epoxy or fuelproof paint.

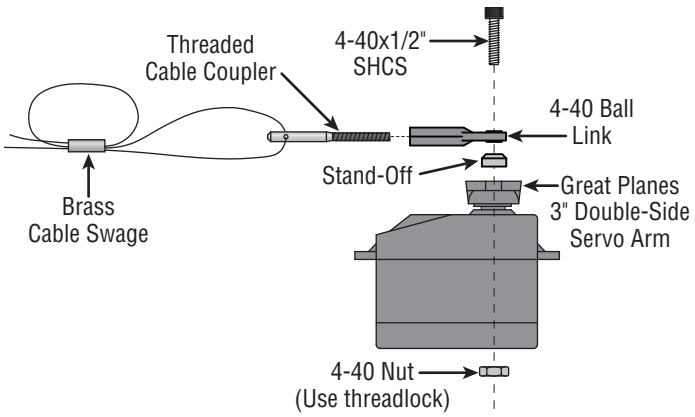
Hook Up the Rudder and Elevators

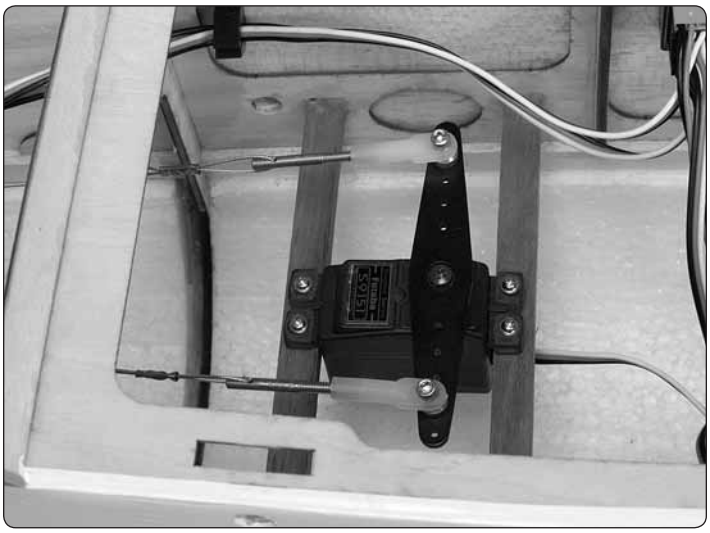
❏ 1. Same as was done with the ailerons, give a good pull on the rudder and look at the hinges to make sure they are all secure. Use thin CA to wet any hinges that look dry.

❏ 2. Making sure the trims and sub trims are centered, use your transmitter to center the rudder servo.



❏ 3. Enlarge the second-from-the-outer holes in a Great Planes 3" [150mm] double-side servo arm (GPMM1165) with a 7/64" [2.8mm] drill. Mount the servo arm to the servo.

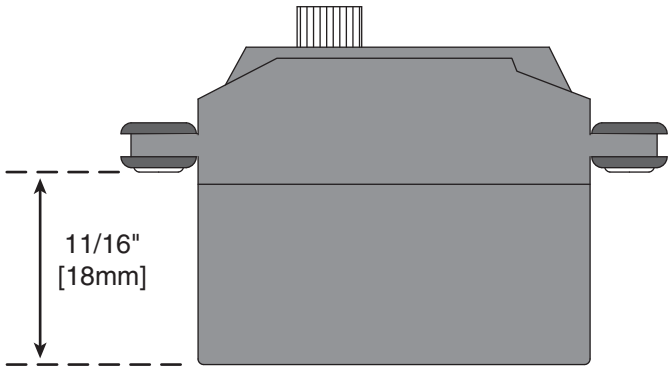




❏ 4. Fit the **aft rudder servo rail** into position in the fuselage and adjust it to fit the rudder servo. **Securely** glue the rail in

place. Mount the rudder servo and hook up the rudder using the hardware shown—be certain to use threadlocker on all the 4-40 nuts and don't forget to harden the servo mounting screw holes with thin CA. **NOTE:** Stand-offs are used under the ball links on the servo arm, but are not required on the rudder horn.

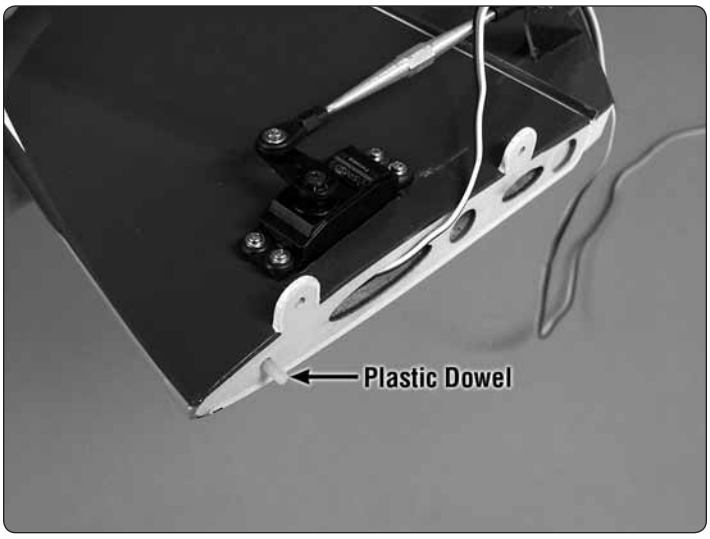
❏ 5. Pull on the elevators and inspect the hinges. Add thin CA to any hinges that look dry.



❏ 6. If your elevator servos are higher than 11/16" [18mm] from the bottom of the grommets to the bottom of the servo, they will need to be shimmed up in order not to interfere with the sheeting on the top of the horizontal stabilizers.

❏ 7. Cut two more 4-40 pushrods to a length of 2" [50mm] and solder on the threaded couplers to make the elevator pushrods. Connect the elevators to the servos with the same hardware as the ailerons—standoffs were not used under the ball links on the servos, but were used on the elevator horns. Be certain to use threadlocker on the nuts.

❏ 8. Connect a 36" [910mm] servo extension to each elevator servo wire and secure the connections with 1-1/2" [40mm] pieces of heat shrink tubing.



❏ 9. Glue a 1/8" [3.2mm] plastic dowel into each stab half.

❏ 10. Fit both stabilizer halves to the fuselage with the aluminum joiner tube as you guide the servo wires down through the fuselage—a long piece of wire with a hook bent on the end works for pulling the wires.

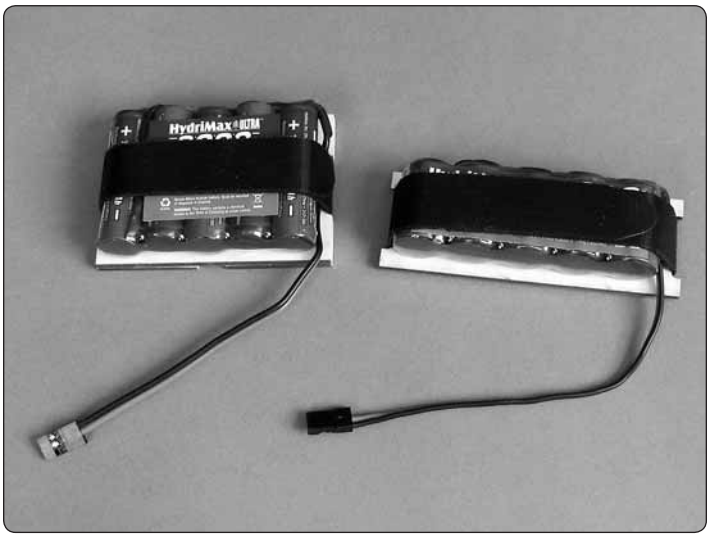
❏ 11. Fasten the stabs to the fuselage with #2 x 3/8" [10mm] Phillips screws, #2 lock washers and flat washers. Be certain to use threadlocker on the threads.

FINAL ASSEMBLY

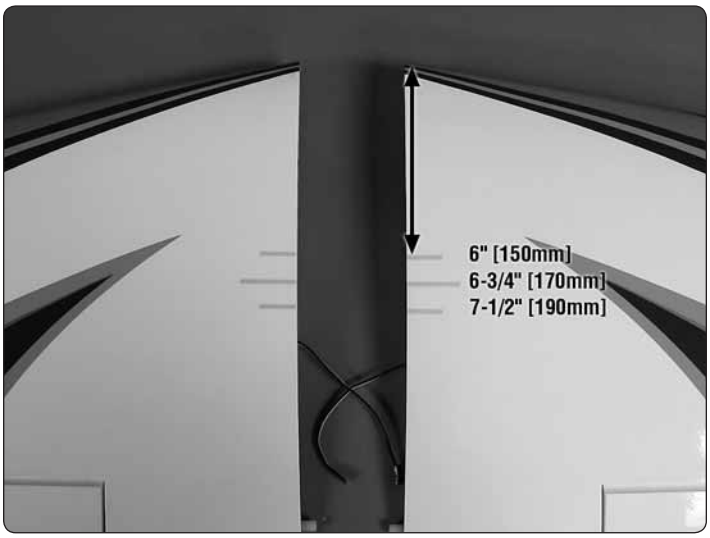
Set the C.G.

Determine where the model balances before mounting the receiver battery. Then, mount the battery where required to achieve the correct C.G.

❏ 1. With the exception of the receiver battery, receiver and on/off switch, the Sequence should otherwise be in ready-to-fly condition with everything else installed (including the motor battery positioned in the approximate location shown in previous photos if using an electric motor).

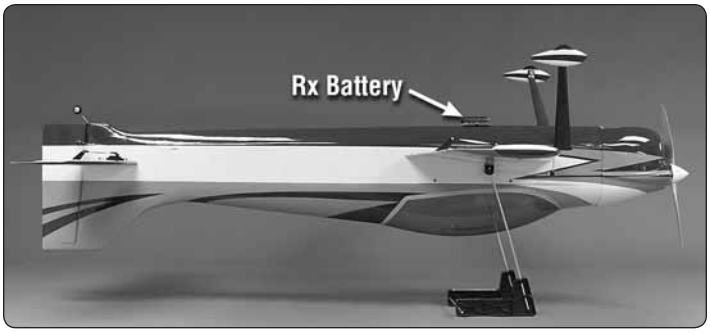


❏ 2. Mount the receiver battery to whichever of the two included plywood mounting plates fits best.



❏ 3. If you will be balancing the model with your fingers mark the recommended C.G. location and the forward and aft C.G. on the **top** of the wing as shown.

Forward C.G. location	6"	[150mm]
Recommended C.G.	**6-3/4"**	**[170mm]**
Aft C.G. location	7-1/2"	[190mm]



❏ 4. Use a Great Planes C.G. Machine or lift the model with your fingers at the balance point. Position the receiver battery over the fuselage (and/or shift the motor battery) to get the model to balance.

❏ 5. Securely mount the receiver battery in the location required to get the desired C.G.; then, mount the receiver, switch and an external charge receptacle using the included plastic mounting plate for the Futaba mini switch and Ernst charge receptacle. If using a different switch or charge receptacle, cut the mounting through the side of the fuselage holes as necessary.

❏ 6. Connect the servos to the receiver. Also connect a 6" [150mm] servo extension into each of the two channels you will be using in the receiver for the ailerons. Use pieces of the included small plastic tubing for mounting the Rx antennas.

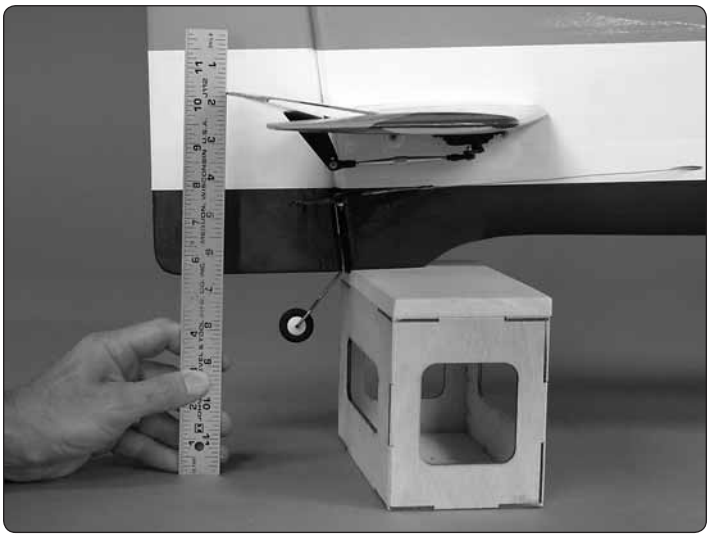
❏ 7. **IMPORTANT:** Once the receiver battery and the rest of the radio components have been mounted, recheck the C.G. Any small adjustments required can be made with Great Planes stick-on lead weights (GPMQ4485).

Balance the Model Laterally

❏ 1. With the wing level, lift the model under the tail and by the propeller shaft. 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 flight and maintain its heading better during maneuvers when the plane is climbing.**

Set the Control Throws



Measure and set the throws according to the chart below. The measurements are taken at the **widest part** (front-to-back) of each surface. If the endpoints in your transmitter programming require more than a 10% to 15% change to get the required throws, relocate the pushrods on the control horns or on the servo arms instead. Then, go back and perfect the throws using the programming in the radio.

These are the recommended control surface throws:				
	LOW RATE		HIGH RATE	
	Up	Down	Up	Down
ELEVATOR	3/8" [10mm] 7°	3/8" [10mm] 7°	5/8" [16mm] 11°	5/8" [16mm] 11°
	Right	Left	Right	Left
RUDDER	1-1/4" [32mm] 13°	1-1/4" [32mm] 13°	1-3/4" [44mm] 19°	1-3/4" [44mm] 19°
	Up	Down	Up	Down
AILERONS	1/2" [13mm] 9°	1/2" [13mm] 9°	3/4" [19mm] 13°	3/4" [19mm] 13°

PREFLIGHT

Identify Your Model

Always attach your name, address, telephone number and AMA number somewhere on or inside your model.

Ground Check

GLOW ENGINES:

Perform your usual checks and tune the engine so it idles and runs smoothly at full-throttle and transitions reliably between the two. With the engine running at full-throttle, have an assistant hold the plane in different orientations (including nose-up and inverted) to make certain the engine continues to run smoothly and reliably.

ELECTRIC MOTORS:

Whatever motor, battery, propeller and ESC you are running, you should find out what current and Watts your setup is drawing before the first flight. Once you have the data you can compare it to the manufacturer's specifications (or data from other reliable sources) to make sure everything is operating within its limits. Noting and recording the current and Watts (and rpm) your system is making can also be used as a base for comparison if experimenting with different propellers, motors or batteries later.

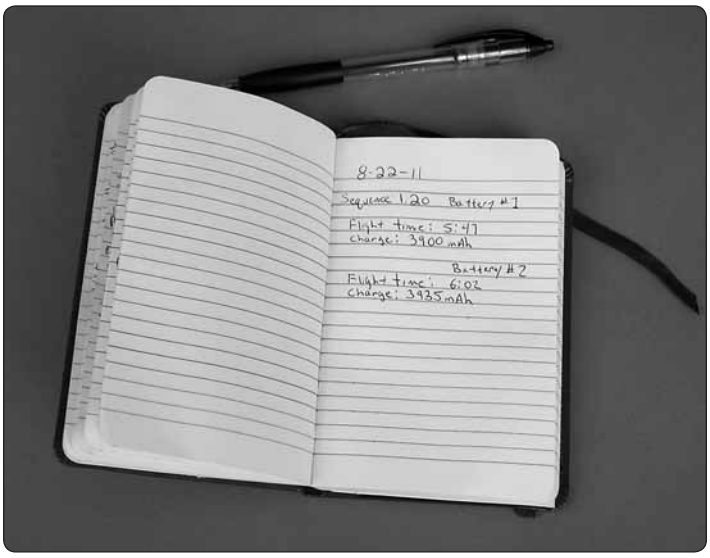
There are a few ways to get this data. One way is to **briefly** run the motor on the ground with a "Watts Up" Watt meter (RELP0100) connected in-line between the battery and ESC. The Watt's Up meter will display the current (Amps), battery Voltage and Watts. Another way is to use on-board data logging such as an Eagle Tree Systems ELogger (ETRP8032) or logging in your ESC. The ELogger stores data that can be downloaded and viewed on your personal computer. Additionally, the ELogger can be used in-flight to give you a constant and more accurate picture of what the system is doing.

Although the static (non-flying) data will not be the same as what it happening in the air, it can still be used as a reference: For example, testing has shown that the RimFire 1.20 with an

APC 17 x 8E propeller powered by a 5,000mAh 6S battery draws about 80A, 1,750 Watts @ 7,500rpm (these are the **initial,** static/non-flying readings using a fully charged battery). And in-flight data from the ELogger shows that the average current draw throughout a normal flight is about 40A with the maximum current draw during full-throttle events about 72A. Once you run your motor on the ground you can compare your numbers to these as well as the current specifications for the motor. The specified limits for the RimFire 1.20 are 50A ***constant*** current and 80A ***surge*** current. Because the setup we are using draws a maximum of 72A in the air, this is within the specified 50A constant/80A surge limit and is an acceptable combination as long as full throttle is used only in short bursts (say, during up-lines or on takeoff).

So, if you are using a RimFire 1.20 and your Watts-Up meter tells you it is pulling around 80A on the ground, you will know everything is working normally. However, if for some reason you are not getting close to those numbers, you will know something is wrong. It could be a greatly imbalanced propeller, too large of a propeller, a damaged motor, defective wiring, etc. Find and correct the problem before flying your Sequence.

CAUTION: Never run the motor on the ground for more than a few seconds. Otherwise, you may overload the motor, battery or ESC.



Another smart thing you can do is record the **flight time** and **capacity** used from the battery for each flight in a log book. Record the flight time (from the timer on your transmitter or other timer) immediately after each flight and record how much mAh (capacity) went back into the battery read from the display on your charger. (Number your flight packs so you will be able to correlate each battery to each flight.) When you know the flight time and recharge capacity (capacity used for the flight) you can calculate valuable data indicating how your motor is performing and whether or not your flight time is too long or too short.

For the Sequence 1.20 for example, say we record a 6 minute flight. And back in the shop we record that the battery took 4,000mAh to recharge. With these numbers we can calculate the average, in-flight current draw:

4,000mAh (used in flight) / 1,000 = 4 Ah / 6 minutes = .67Amps/minute x 60 minutes = 40A.

The average, in-flight current draw was 40 Amps. Even though we know the motor is drawing 72A during brief, full throttle bursts, the average current draw over the duration of the flight was only 40A so the motor and ESC are operating comfortably within their limits.

Another calculation we can make is the percentage of charge remaining in the battery. If 4,000mAh was used from a 5,000mAh battery, 20% was remaining. This is generally accepted as a safe reserve. Flying your LiPos down to no further than 20% capacity is a good way to extend its life and performance.

Based on this information, you may want to start out setting your flight timer to a conservative four or five minutes. After the flight note the exact flight time and the recharge capacity in your log book. Calculate the percentage of charge that was left in your battery and adjust your flight time accordingly.

Keep in mind that many variables can determine your in-flight current consumption such as how much you used full-throttle, weather conditions, battery condition, etc. Due to these variables it is always a good idea to calculate your maximum flight time **conservatively**.

Range Check

Don't forget to perform your usual ground range checks as written in the instruction manual that came with your radio system to be certain it is operating correctly.

ENGINE / MOTOR 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 (excerpts)

Read and abide by the following excerpts from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

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 and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

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

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

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

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

5) **I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed** [in the complete AMA Safety Code].

9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

CHECK LIST

Perform these last-minute checks to make sure nothing has been forgotten:

- ❏ 1. Confirm that all controls respond in the correct direction and the throws are set up according to the manual.
- ❏ 2. Make sure you have checked the C.G. as instructed.
- ❏ 3. Make sure the lock nuts are present on all the screws that retain the pushrods to the servo arms and that the screws that retain the servo arms are in place.
- ❏ 4. Be certain the battery and receiver are securely mounted.
- ❏ 5. If using a radio system on 72 MHz, be certain to extend the receiver antenna all the way down the antenna tube in the fuselage.
- ❏ 6. Use threadlocking compound to secure all critical fasteners including any servo screws that go into a metal output shaft.
- ❏ 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.
- ❏ 10. Where appropriate, 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.
- ❏ 11. Make sure the fuel lines are connected and are not kinked.
- ❏ 12. Balance the propellers (and spare propellers).
- ❏ 13. Place your name, address, AMA number and telephone number on or inside your model.
- ❏ 14. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- ❏ 15. Range check your radio when you get to the flying field.

FLYING

There are no particular flight characteristics about the Sequence 1.20 that you need to be made aware of ahead of time. The Sequence is a well-balanced, neutral flying plane that will go wherever you point it. Simply fly the Sequence within your capabilities and take it easy for the first couple of flights to give your self time to become acclimated to it.

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

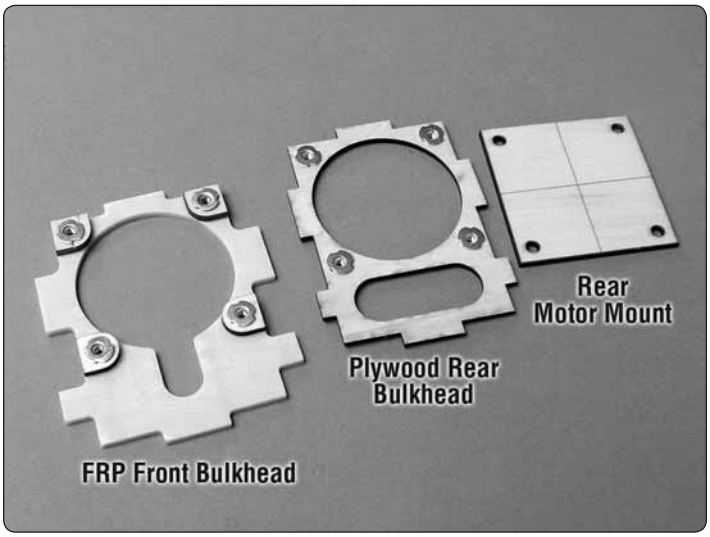
GOOD LUCK AND GREAT FLYING!

OPTIONAL WOOD/FRP EP MOTOR MOUNT BOX

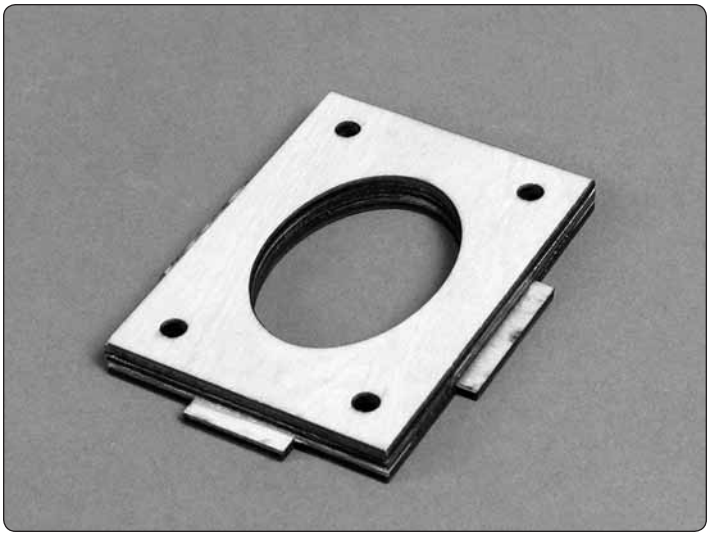
The wood/FRP (fiber-reinforced plastic) motor mount box may be used to "front-mount" a RimFire 1.20 brushless motor (or other outrunners), or a geared inrunner.

ITEMS REQUIRED:

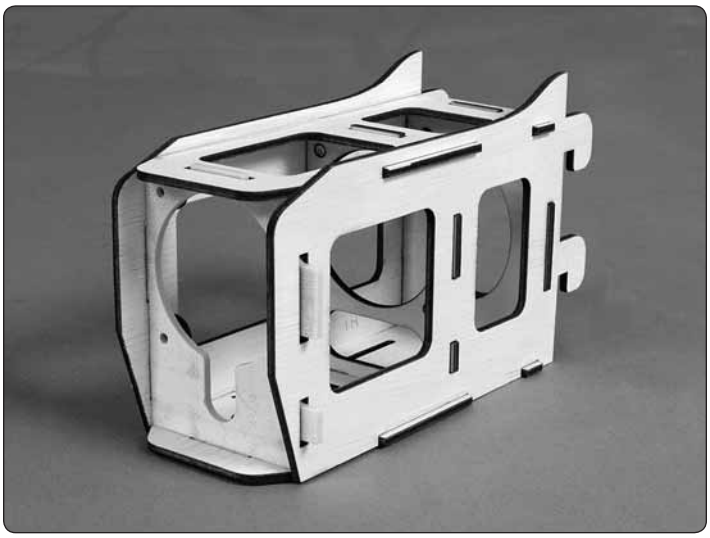
- ❍ (4) M3 x 8 motor mounting screws for RimFire 1.20 or suitable mounting screws for your motor
- ❍ (4ea) 4-40 blind nuts, 4-40 x 1/2" screws, #4 flat washers and lock washers
- ❍ Great Planes 8mm to 3/8-24 thread propeller adapter (for RimFire 1.20, GPMQ4971)

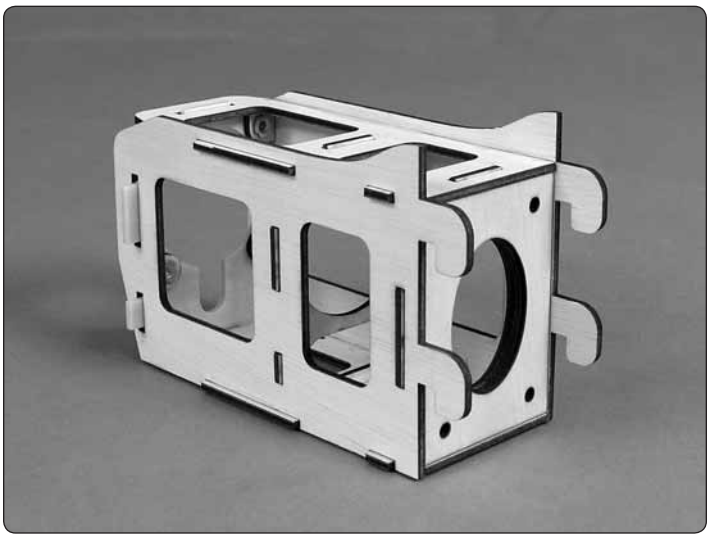


1. Use medium-grit sandpaper to roughen both sides of the FRP **front bulkhead** so glue will adhere. Glue the four **blind nut doublers** to one side of the bulkhead as shown. Then press 4-40 blind nuts into the doublers. If using a geared inrunner that requires additional support, also press four more 4-40 blind nuts into one side of the **rear bulkhead**. If used, the **rear motor mount** may be custom fit to your motor and bolted to the rear bulkhead.

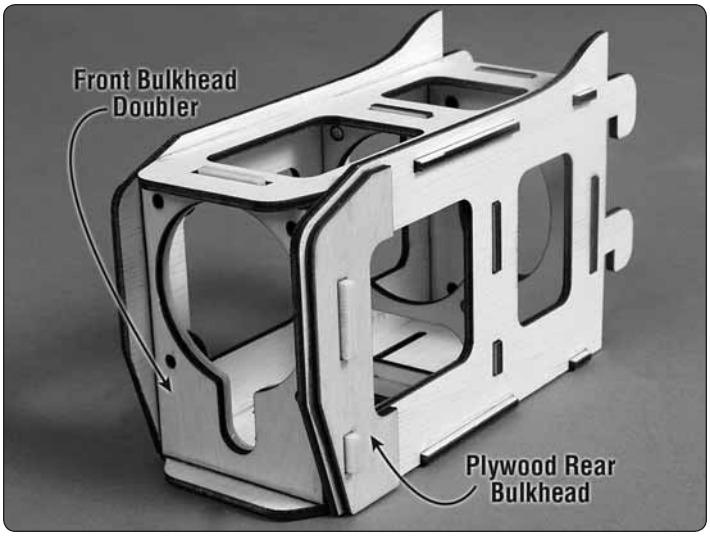


2. Glue both **backplate doublers** to one side of the tabbed **backplate**.

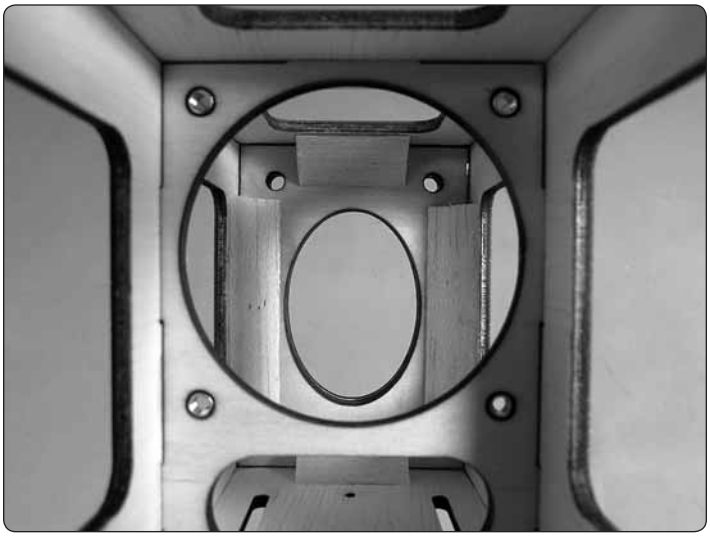




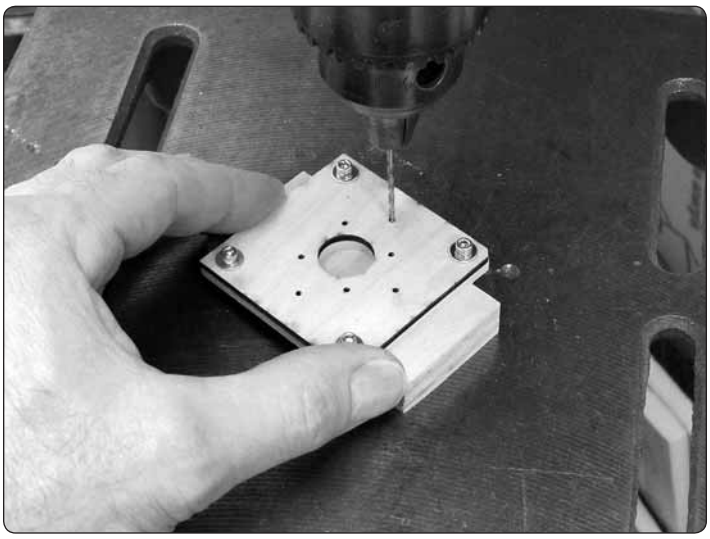
3. Test fit the sides, top, bottom, backplate assembly, rear bulkhead and front bulkhead together—be certain the blind nuts on the front bulkhead and the blind nuts (if used) on the rear bulkhead are facing **aft** and the doublers on the tabbed back plate are also on the back of the stack. Make any adjustments necessary, and then securely glue the assembly together.



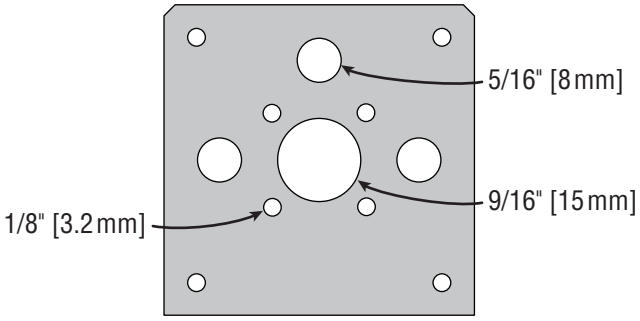
4. Glue the **front bulkhead doubler** and the **side doublers** to the assembly.

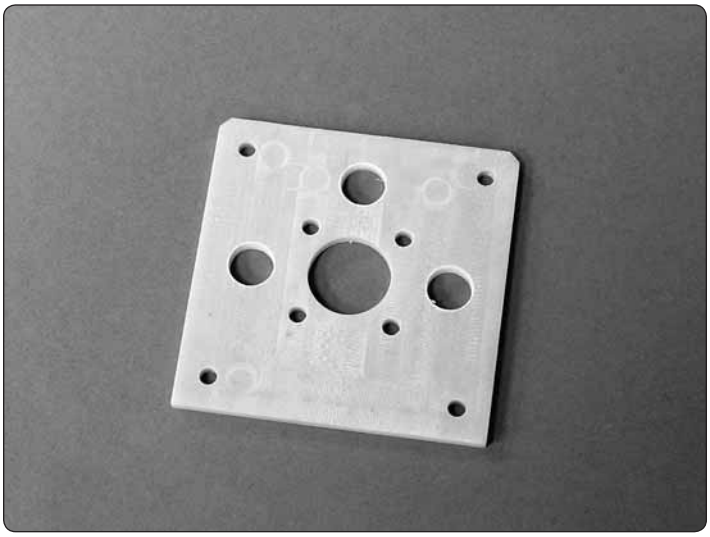


5. Cut two 1" [25mm] pieces and two 2 " [50mm] pieces from the included balsa triangle stock. Securely glue the triangle stock pieces around the inside corners of the back plate.

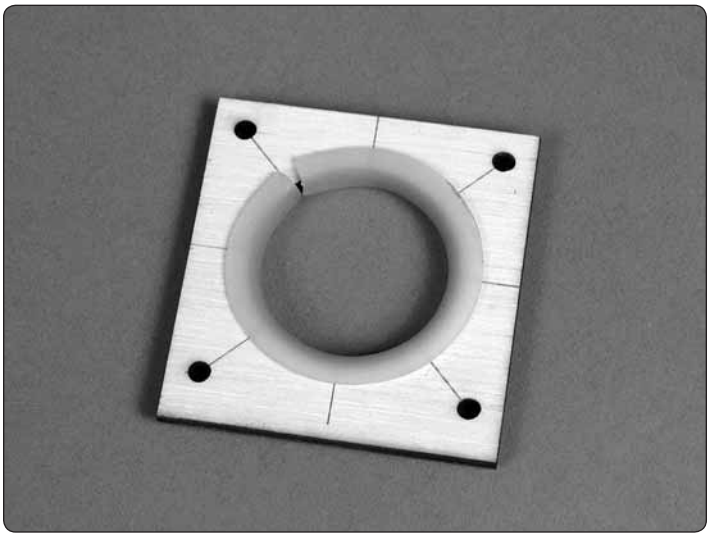


6. If using a RimFire 1.20, use the included plywood **RimFire 1.20 motor mount template** (and a drill press if available) to drill 1/16 " [1.6mm] pilot holes through the FRP **motor mount plate**. If using a different motor, mark, then drill holes to fit your motor. **Hint:** For perfection, fasten the template to the mount with 4-40 screws and nuts.

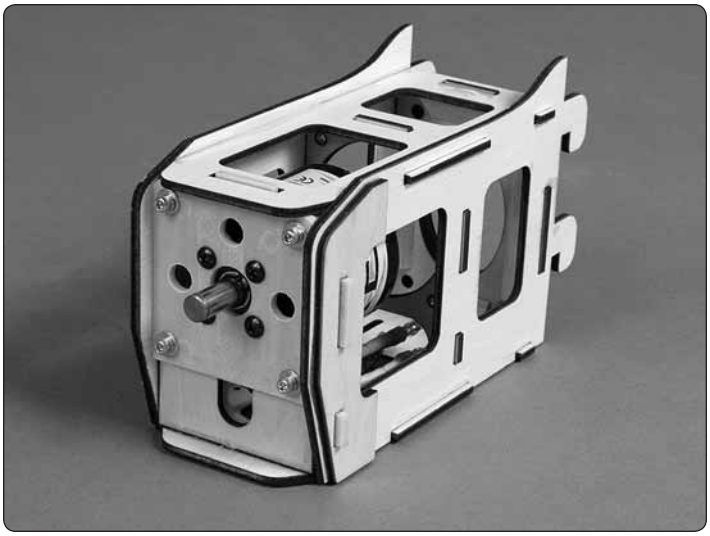




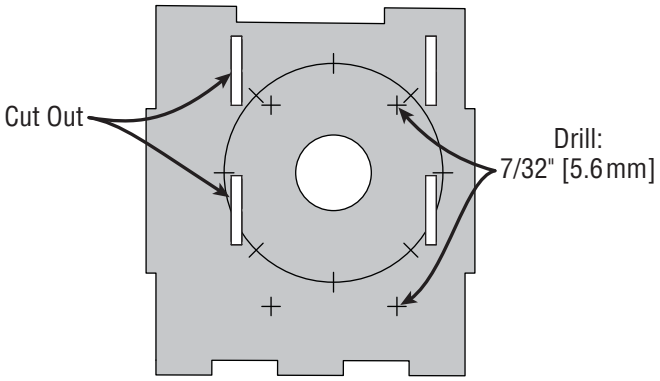
7. Remove the plywood template, then enlarge the pilot holes as illustrated for the RimFire 1.20.



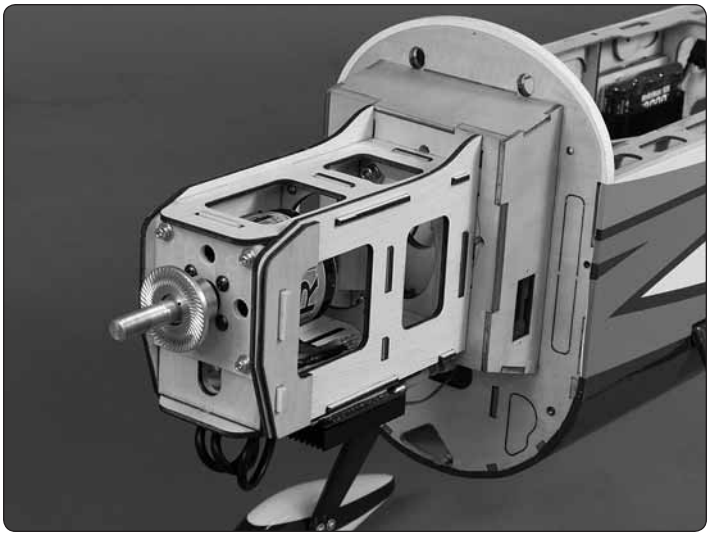
8. If using an inrunner with a gearbox that requires additional support, cut a hole in the **rear motor mount** to fit to your motor with whatever shock absorption preferred (usually fuel tubing).

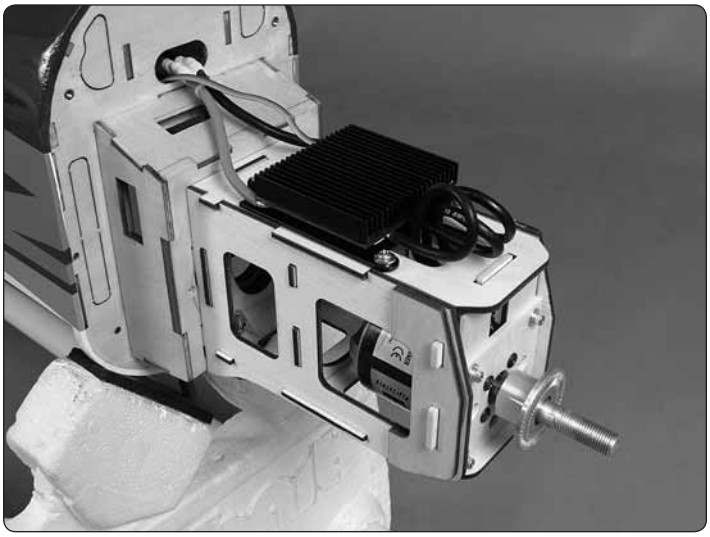


9. Mount your motor to the motor mount plate—the RimFire 1.20 uses four M3 x 8 screws. If also using the rear mount, fasten it into the mount assembly with four 4-40 x 3/8 " screws and washers. Test-mount the plate/motor assembly to the box with four 4-40 x 3/4" screws, washers and lock washers. Turn the motor by hand, making sure there is no interference and everything turns free and smooth. Make any adjustments necessary. Then, remove the mount plate/motor assembly from the mounting box.



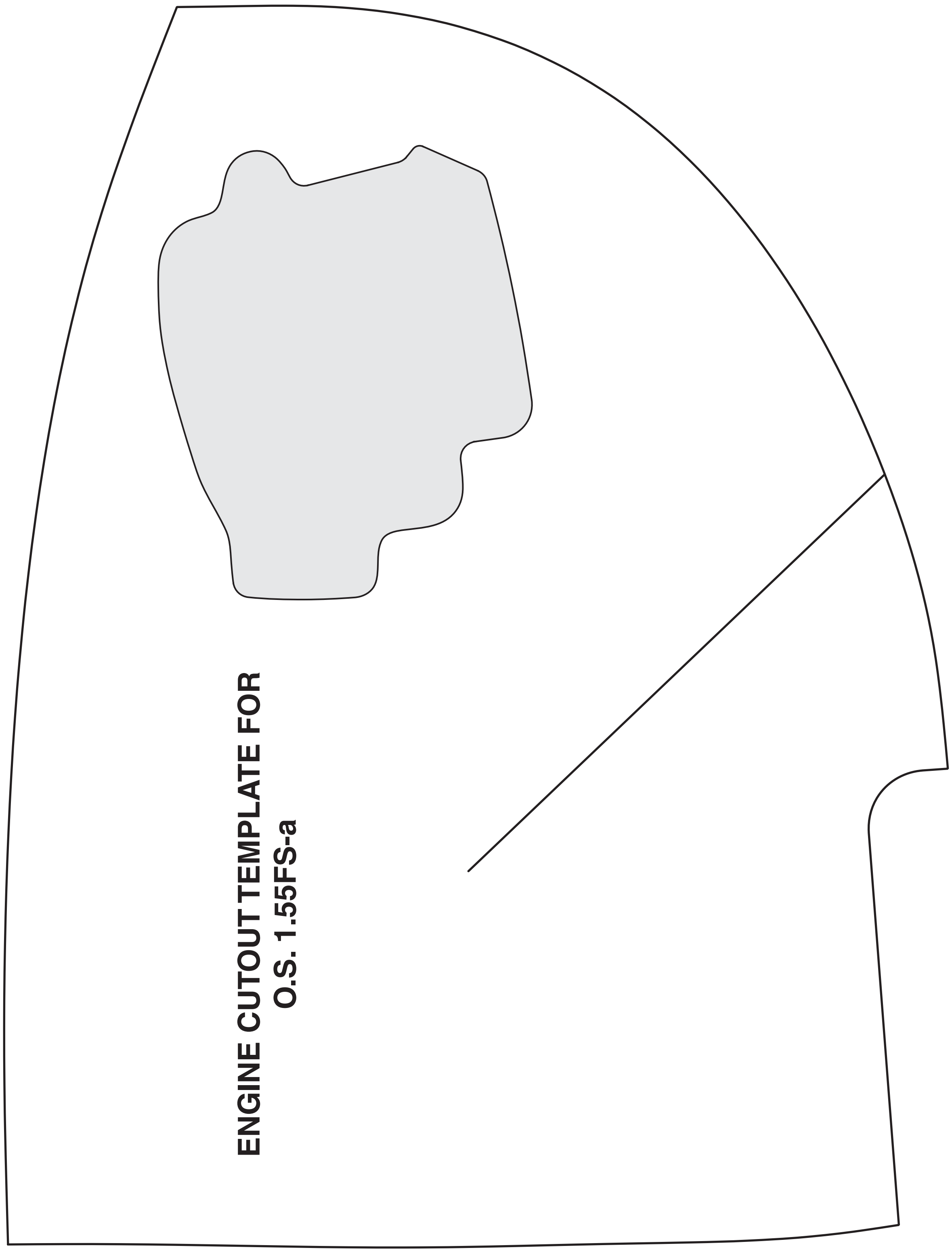
10. Drill 7/32 " [5.6m] holes through the firewall at the four "+" marks and cut the rest of the way through the four, partially-cut slots for the tabs on the motor mount.





11. Key the mount tabs on the mounting box into the slots in the firewall and fasten the mount with four 8-32 x 3/4 " socket-head cap screws, #8 lock washers, flat washers and 8-32 blind nuts. Mount the motor and ESC to the assembly.

12. Rejoin the assembly manual at ***Mount an Electric Motor*** on page 13. **Note:** The spinner back plate will have to be enlarged with a 3/8 " [9.5mm] drill for the Great Planes propeller adapter.


ENGINE CUTOUT TEMPLATE FOR
O.S. 1.55FS-a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