RAZOR!

Manual Release V 2.0

NEW, IMPROVED!
NOW CONTAINS CARBON FIBER SPAR!

RAZOR Flying Wing Almost Ready-To-Fly R/C Airplane

ASSEMBLY AND OPERATIONS MANUAL FOR PARK RAZOR, 400 AND 600 CLASS KITS AND RTF MODELS - PARK RAZOR ASSEMBLY ALSO REQUIRES PARK RAZOR ADDENDUM - PARK RAZOR DOES NOT CONTAIN CARBON FIBER SPAR

NOTE: PLEASE READ MANUAL COMPLETELY BEFORE OPERATION

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FMA Direct

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INTRODUCTION

Thank you for purchasing the FMA Direct *RAZOR* ARF series R/C aircraft. *RAZOR* is available in fourteen basic kit or Almost-Ready-To-Fly configurations, ranging from a hand-toss glider for youngsters to a 600 Class Performance Electric capable of speeds in excess of 60 MPH in level flight. *RAZOR* is designed using state-of-the-art computer modeling to be extremely efficient, versatile, and rugged. Injection molded of ARCEL(TM), a revolutionary new type of foam composed of expanded polystyrene and polyethylene, the basic airframe is extremely strong, yet highly flexible. Extensive flight testing by FMA engineers has demonstrated the incredible shock absorption and impact resistance of *RAZOR* by spinning the airplane in from as high as 100 feet directly on the nose with little or no damage to the basic wing structure. With the addition of a 22" carbon fiber spar included in the kits, *RAZOR* is arguably the most durable R/C aircraft available today. *RAZOR* is available in blue, white, and gray and requires no painting, covering or finishing of any type. However, unlike other foams, ARCEL(TM) can be painted or trimmed with a wide range of paints including Krylon™ from your hardware store. Additionally, ARCEL(TM) is not damaged by application of CYA cements or glow fuels.

All basic *RAZOR* kits ship complete with airframe, elevons, winglets, ABS plastic tray and canopy, pushrods and related hardware. Kits are configured to support slope soaring, park flier, 400 Class electric motors, or 600 Class electric motors. The various ARF products ship with either 1) propulsion - which includes motor, ESC (electronic speed control), propeller and propeller adapter, and 7 cell battery power pack, 2) flight pack - which includes receiver battery (slope model), receiver, and servos, or 3) a combination of both propulsion and flight pack equipment. The motorized versions include 1) a 280 Class, 6V electric motor, 2) a 400 Class, 6V electric motor, 3) a 600 Class, 7.2V "endurance" motor, or 4) a 600 Class, 7.2V "performance" motor. The following table itemizes the package contents and basic flight characteristics of the latter three electric, motorized ARF models. The information presented in this table and any other specifications listed in this manual were current as of the date the manual was written and are subject to change without notice. Furthermore, at the time this manual was constructed, FMA was working on delivering additional models that include ARF electric models complete with transmitter, receiver crystal and charger, as well as ultra-high-performance gas powered kits.

SPECIFICATIONS

	400 Class RTF Models	600 Class "Endurance" Models	600 Class "Performance" RTF Models
Propulsion Includes:			
Motor	400 Class 6V Motor	600 Class, Low Current 7.2V Motor	600 Class 7.2V Motor
Electronic Speed Control	Mini 20 - 20 Amp Miniature ESC	Mini 30 - 30 Amp Miniature ESC	Mini 30 - 30 Amp Miniature ESC
Propeller	Master Airscrew 5.5 x 4	Master Airscrew 8 x 4	Master Airscrew 8 x 4
Propeller Adapter	PA400	PA600	PA600
Power Pack Battery	Sanyo 7 Cell 600AE w/Tamiya	Sanyo 7 Cell 800AR w/Tamiya	Sanyo 7 Cell 800AR w/Deans Ultra
Max Current Consumption	10 Amps Static	17 Amps Static	28 Amps Static
Flight Pack Includes:			
Receiver (FM or AM) 72 MHz	Fortress Micro FM or AM	Fortress Micro FM or AM	Fortress Micro FM or AM
Servos (Qty 2)	S80, S100 or PS30	S80, S100 or PS30	S80, S100 or PS30
Specifications:			
Airframe Material	ARCEL(TM) Foam	ARCEL(TM) Foam	ARCEL(TM) Foam
Manufacturing Technique	Injection Molded	Injection Molded	Injection Molded
Wing Span	48 Inches	48 Inches	48 Inches
Wing Design	Swept/Tapered Wing	Swept/Tapered Wing	Swept/Tapered Wing
Airfoil	Semi-Symmetrical w/ Reflex	Semi-Symmetrical w/ Reflex	Semi-Symmetrical w/ Reflex
Approx. Weight w/ FMA Equip.	20 Oz. ± 1 Oz.	31 Oz. ± 1 Oz.	31 Oz. ± 1 Oz.
Approx. Wing Area	3.11 Sq. Feet	3.11 Sq. Feet	3.11 Sq. Feet
Nominal Wing Loading	6.43 Oz. / Sq. Foot	9.97 Oz. / Sq. Foot	9.97 Oz. / Sq. Foot
Approx. Flight Time/Top Speed	5 – 14 min. / 35 mph	5 – 11 min. / 45 mph	3.5 – 11 min. / 60 mph
Flight Characteristics	Docile, Thermal, Aerobatic	Moderate Speed, Aerobatic	High Speed, Highly Aerobatic
Pilot Skill Requirements	Beginner to Moderate	Moderate to Advanced	Advanced
Transmitter Requirements	FM or AM, 3 Channel	FM or AM, 3 Channel	FM or AM, 3 Channel
Mixing Requirements	Elevon Mix @ Tx or Rcv	Elevon Mix @ Tx or Rcv	Elevon Mix @ Tx or Rcv
Recommended Tx Capabilities	Dual Rates or Expo	Dual Rates or Expo	Dual Rates or Expo

SAFETY PRECAUTIONS

THIS RADIO CONTROL MODEL IS NOT A TOY! PLEASE OBSERVE THE FOLLOWING CAREFULLY:

- ***FIRST-TIME BUILDERS SHOULD SEEK ADVICE FROM PEOPLE HAVING BUILDING EXPERIENCE IN ORDER TO ASSEMBLE THE MODEL CORRECTLY AND ENSURE SUCCESSFUL OPERATION.***
- ***ASSEMBLE THIS KIT ONLY IN PLACES OUTSIDE THE REACH OF CHILDREN.***
- ***FOLLOW ALL ASSEMBLY AND SAFETY INSTRUCTIONS CONTAINED WITHIN THIS MANUAL TO ENSURE SAFE OPERATION.***
- ***NEVER FLY RADIO CONTROL MODELS IN CONGESTED AREAS OR CLOSE TO POWER LINES***
- ***USE CAUTION WHEN STARTING THE MOTOR - KEEP HANDS CLEAR OF PROPELLER AT ALL TIMES - ESPECIALLY DURING LAUNCH.***
- ***FMA, INC. WILL NOT ACCEPT ANY LIABILITY RESULTING FROM FAILURE TO ASSEMBLE AND OPERATE THIS MODEL AIRPLANE IN ACCORDANCE WITH THE RAZOR ASSEMBLY AND OPERATIONS MANUAL.***
- ***IN SOME AREAS OF THE COUNTRY IT IS NOT LEGAL TO FLY AT FIELDS OTHER THAN APPROVED R/C FLYING FIELDS. CHECK WITH AUTHORITIES IN YOUR AREA, JOIN YOUR LOCAL CLUB.***
- ***FMA, INC. RECOMMENDS MEMEBERSHIP IN AMA (ACADEMY OF MODEL AERONAUTICS) FOR PURPOSES OF INSURANCE - PLEASE CONTACT LOCAL AMA CHARTER FOR DETAILS.***

The product you have purchased is powered by a rechargeable battery. The battery is recyclable. At the end of its useful life, under various national, state, and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or disposal.

PACKAGE CONTENTS

Carefully unpack the contents of your *RAZOR* kit and lay the parts out on a clean workspace, ready for assembly. Identify your kit and verify that it contains the items listed in the following table. Note: if you discover that something is missing or damaged, please contact the authorized FMA Direct dealer where you purchased the product or phone FMA Direct at (301) 668-7614.

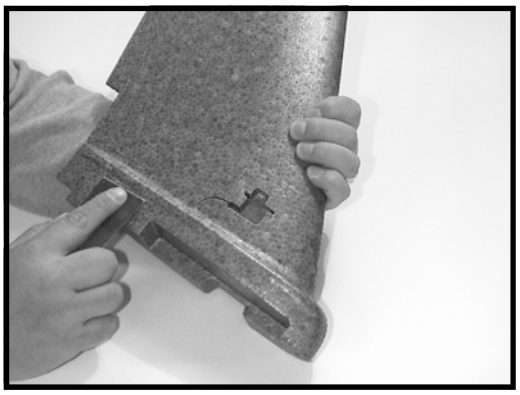
MODEL:	CONTAINS:	CONTAINS:	CONTAINS:
RZRSLPKIT/RZR400KIT	1 LEFT, 1 RIGHT WING		
	1 ELEVON PACK	2 ELEVONS	
	1 WINGLET PACK	2 WINGLETS	
	1 400 PLASTICS PACK	1 400 TRAY, 1 CANOPY	
	1 HARDWARE PACK	1 PUSHROD PACK	1 LEFT, 1 RIGHT PUSHROD
		1 CONTROL HORN PACK	2 CONTROL HORNS, 4 SCREWS
		1 MTL CLEVIS PACK	2 CLEVIS, 2 RETAINING CLIPS
		ELEVON TAPE	2 PCS. 0.005" LEXAN W/ ADHESIVE
		STRUCTURAL TAPE	4 PCS. 0.010" LEXAN W/ ADHESIVE
		SCREEN CLOTH	1 2" X 4" 120 GRIT
		MOTOR TIE	1 8" X 0.142" NYLON TIE
		HOOK & LOOP TAPE	1 5/8" X 2" MALE AND FEMALE
	1 22" 5.5mm CARBON SHAFT		
	OWNER'S MANUAL		
RZRSLPRTF1	RZRSLPKIT CONTENTS PLUS:		
	1 MICRO RCVR FM OR AM		
	2 S80, S100 OR PS30 SERVOS		
	1 MICRO SWITCH HARNESS		
	1 4 CELL 110 mAh BATTERY		
RZR400RTF1	RZR400KIT CONTENTS PLUS:		
	1 400 MOTOR PACK (ASSY)	1 400 CLASS 6V MOTOR	
		2 0.01UF CAPACITORS	
		1 MINI 20 ESC	
		1 SHOTTKY DIODE	
		1 TAMIYA MALE CONNECTOR	
	1 PROPELLER (5.5 X 4)		
	1 400 PROP ADAPTER	1 ADAPTER SHAFT	
		1 SPINNER	
		2 HEX SET SCREWS	
	1 7 CELL 600AE POWER PACK		
RZR400RTF2	RZR400RTF1 CONTENTS PLUS:		
	1 MICRO RCVR FM OR AM		
	2 S80, S100 OR PS30 SERVOS		

MODEL:	CONTAINS:	CONTAINS:	CONTAINS:
RZR600KIT	1 LEFT, 1 RIGHT WING		
	1 ELEVON PACK	2 ELEVONS	
	1 WINGLET PACK	2 WINGLETS	
	1 600 PLASTICS PACK	1 600 TRAY, 1 CANOPY	
	1 HARDWARE PACK	1 PUSHROD PACK	1 LEFT, 1 RIGHT PUSHROD
		1 CONTROL HORN PACK	2 CONTROL HORNS, 4 SCREWS
		1 MTL CLEVIS PACK	2 CLEVIS, 2 RETAINING CLIPS
		ELEVON TAPE	2 PCS. 0.005" LEXAN W/ ADHESIVE
		STRUCTURAL TAPE	6 PCS. 0.010" LEXAN W/ ADHESIVE
		SCREEN CLOTH	1 2" X 4" 120 GRIT
		MOTOR TIE	1 8" X 0.142" NYLON TIE
		HOOK & LOOP TAPE	1 5/8" X 2" MALE AND FEMALE
	1 22" 5.5mm CARBON SHAFT		
	OWNER'S MANUAL		
RZR600RTF1/RZR600RTF3	RZR600KIT CONTENTS PLUS:		
	1 600 MOTOR PACK (ASSY)	1 600 CLASS 7.2V MOTOR	"PERFORMANCE" OR "ENDURANCE"
		2 0.01UF CAPACITORS	
		1 MINI 30 ESC	
		1 SHOTTKY DIODE	
		1 DEANS OR TAMIYA MALE	"PERFORMANCE" OR "ENDURANCE"
	1 PROPELLER (8 X 4)		
	1 600 PROP ADAPTER	1 ADAPTER SHAFT	
		1 SPINNER	
		2 HEX SET SCREWS	
	1 7 CELL 800AR POWER PACK		
RZR600RTF2/RZR600RTF4	RZR600RTF1 OR 3 CONTENTS PLUS:		
	1 MICRO RCVR FM OR AM		
	2 S80, S100 OR PS30 SERVOS		

ASSEMBLY INSTRUCTIONS

Proceed carefully through each of the following assembly steps. Please read each step completely before you begin that step. If you are uncertain about the instructions provided, please call FMA Direct technical assistance at (301) 831-8980.

STEP 1: ARCEL(TM) foam contains polyethylene. While this particular compound is the key to the strength of the foam, when parts are injection molded using ARCEL(TM), the surface finish or "skin" that forms does not readily accept bonding agents. For this reason, it is important to prepare the surfaces of your model for bonding by lightly sanding the skin on the wing panels where you will apply adhesives. When sanding ARCEL(TM), use light, brisk, back-and-forth motions until the finish is dull. Do not sand so deeply that you change the shape of the joints - just remove the "shiny" look. Using the supplied 2" x 4", 120 grit screen cloth, carefully sand the inside portions of both wing halves where the wings will be joined.

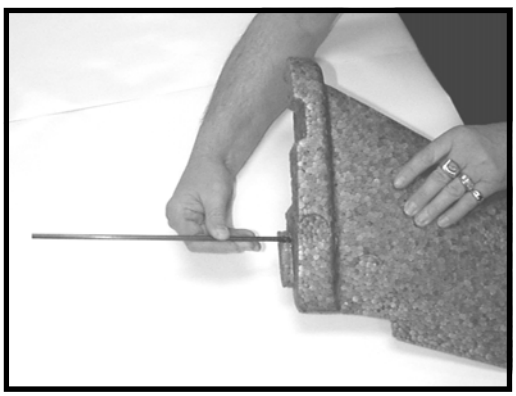


STEP 2: Using the supplied 2" x 4", 120 grit screen cloth, carefully sand the tops of the fuselage halves where the equipment tray will later be joined to the fuselage. The tray fits into the recessed area marked by a ledge around the fuselage top. Sand inside of the ledge so as not to dull the visible portions of the aircraft fuselage.

STEP 3: Using the supplied 2" x 4", 120 grit screen cloth, carefully sand the tips of the wings where the winglets will be bonded to the wing halves.

STEP 4: Using rubbing alcohol and a soft, clean cloth, thoroughly clean the wing halves all over to remove sanding residue and other contaminants. A good cleaning will improve the bond obtained when applying adhesives and adhesive tapes to ARCEL(TM).

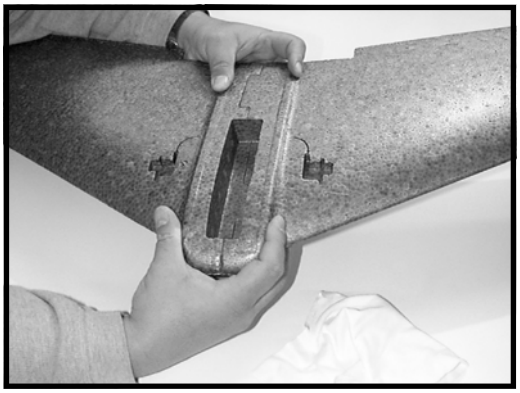
STEP 5: The new improved *RAZOR* kits and ARF's now come with a pre-cut, 22" long, 5.5mm diameter carbon fiber arrow shaft. The shaft has been incorporated into the model as a wing spar to further enhance wing strength during high powered aerobatics and the occasional but often unavoidable crash. Locate the rod in your kit and mark the center at 11" using a felt marker.



STEP 6: Dry fit the shaft into the pre-drilled hole in the left wing panel as shown. Make sure that there is no problem pushing the shaft into the wing section until the mark you made in STEP 5 meets the center line of the fuselage. Once you are satisfied with the fit, remove the shaft, and mix up a modest portion of epoxy. Hold the wing so that the wing tip is facing the floor and dribble the epoxy down into the hole using a popsicle stick or the like. Also coat one half of the shaft itself. Fit the shaft back into the hole all the way to the center mark and wipe away any excess glue.

STEP 7: FMA Direct recommends 5 minute epoxy for joining the *RAZOR* wing halves. Review STEP 8 before continuing. Test fit the wing halves to verify proper installation of the wing spar and correct alignment of all parts. Observe where the wing sections contact each other so that you know where to apply adhesives. Mix a large amount of 5 minute epoxy. Start by holding the right wing upright and dribbling epoxy down into the hole for the spar. Next, coat the rod protruding from the left wing panel. Finally, apply approximately 1/16" thick to the inside of the right wing half as illustrated. Include adhesive in the slot where the horizontal "key" joins the two wing halves.

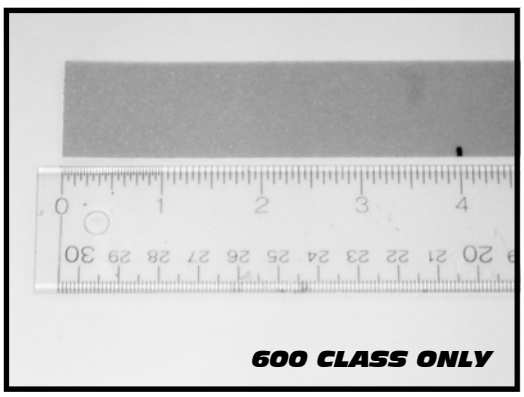
TIP: For best results, use masking tape to mask off the joint on the two wing halves before applying adhesive. This will prevent glue from getting on the visible portions of the airframe. Then after the two wing halves are joined, apply more tape to "capture" the glue and seal the joint!



STEP 8: Hold the two wing halves together firmly as illustrated until the adhesive cures. Keep a soft, alcohol-soaked cloth handy to wipe away any excess adhesive. Once the adhesive has cured, you may wish to sand the wing joint and apply a light weight filler if necessary.

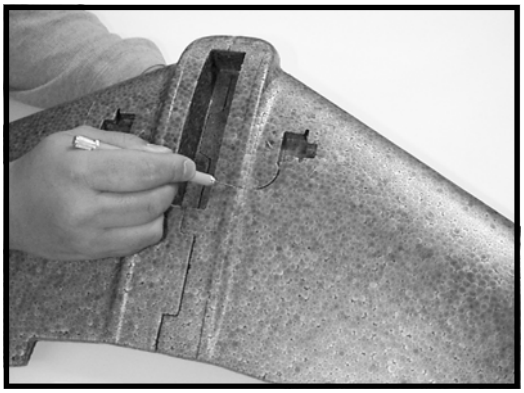
BEFORE CONTINUING: **The concept behind the FMA Direct *RAZOR* is to provide R/C or potential R/C enthusiasts with an inexpensive, highly versatile, easy-to-build aircraft that can meet the various skill levels and tastes of many different pilots through the fourteen kit and ARF versions available. In keeping with this concept, *RAZOR* does not require paint or special covering of any kind, thanks to the revolutionary ARCEL(TM) foam and the injection molding process. In designing and flight-testing *RAZOR*, FMA engineers discovered that with the application of a proprietary LEXAN(TM) tape used as a structural, quasi-spar, the airframe could withstand tremendous flight stress and impact. This manual is intended for use with any of the slope, park, 400 class, or 600 class kits and ARFs available. All kits are supplied with two pieces of 0.005" thick LEXAN(TM) tape to be used for hinging the elevons and also for the hinge that joins the equipment tray to the canopy. The slope, park, and 400 class kits are supplied with four pieces of 0.010" thick LEXAN(TM) tape for structural spars. The 600 class kits include two additional pieces of 0.010" thick LEXAN(TM) tape for added support at high speeds. It is important that you locate and identify the different thickness adhesive tapes supplied so that you use the proper tapes during assembly. Furthermore, unlike other foams, ARCEL(TM) is not attacked by most paint types. For best results, if you intend to paint your *RAZOR*, use Krylon(TM) enamel from your local hardware store. Be sure to apply a light coat of primer on the airframe before adding colors. Mist on one or two fine coats of pigment. Use only enough paint to add color. Too much paint and you will add excess weight and possibly warp the foam wings. If you intend to paint your *RAZOR*, be sure to carefully review the following CAUTION:**

CAUTION: PLEASE NOTE THE FOLLOWING - WHILE ARCEL(TM) IS NOT ATTACKED BY MOST PAINTS, THE PROPRIETARY LEXAN(TM) TAPE USED IN ASSEMBLY IS! IF YOU INTEND TO PAINT YOUR AIRPLANE, COMPLETE ASSEMBLY OF THE RAZOR PER THE MANUAL, THEN USE A PAINTABLE TAPE TO MASK OVER THE LEXAN TAPE USED IN ASSEMBLY TO PREVENT ANY PAINT FROM COMING IN CONTACT WITH THE LEXAN TAPE. THIS INCLUDES THE TAPE HINGE BETWEEN THE TRAY AND CANOPY WHICH IS SUSCEPTIBLE TO DAMAGE FROM PAINTS AS WELL! IF PAINT COMES IN CONTACT WITH THE LEXAN(TM) TAPE, THE TAPE WILL BECOME BRITTLE AND WILL TEAR OVER TIME.



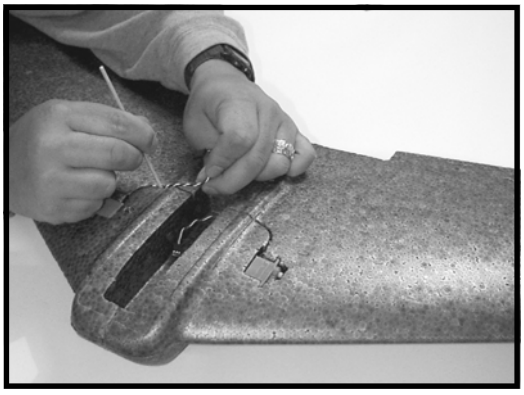
STEP 9: Steps 9 and 10 apply to 600 class kits only! If you do not have a 600 class kit, please proceed to step 11. If you have a 600 class kit, please locate one of the six pieces of 0.010" (thick) LEXAN(TM) tape. Using a measuring stick, mark 4 inches off the tape. Using scissors, cut the tape straight across. You will end up with a 20" piece of tape. Mark the center of the tape.

STEP 10: If you have a 600 class kit, apply the 0.010" x 20" tape you prepared in STEP 9 to the aircraft as illustrated. Please note, the tape shown in this photo is only for positioning. You will need to remove the adhesive backing before installing the tape. Align the center mark you made in STEP 9 with the joint line on the fuselage. Position the edge of the tape approximately 1/4" from the trailing edge of the wing as shown. When applying the LEXAN(TM) tape, rub the tape into the wing vigorously using your thumb or a blunt object such as a screwdriver handle. Note: the very-high-bond adhesive will "cure" to about 50% of its bonding strength immediately. Full strength will be attained within 24 hours.

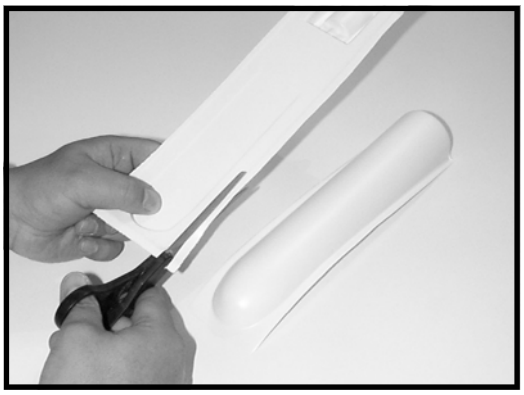


STEP 11: Using a sharp hobby knife, cut the fuselage to extend the servo wire slots straight through the walls of the fuselage and into the battery compartment. These slots should be about 1/8" deep. When you install the servos, the servo wires will pass under the equipment tray and enter the fuselage through the walls of the battery compartment. This arrangement ensures that the servo wires will be well concealed, protected and will not impede the air flow over the wings.

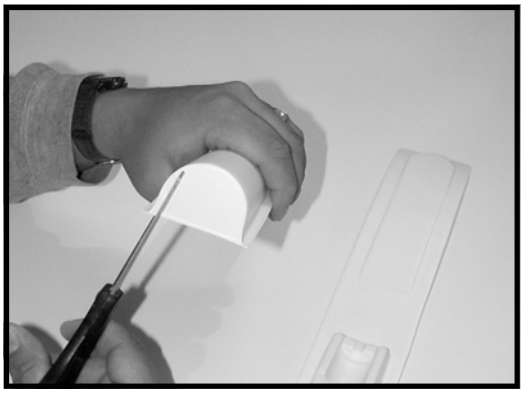
TIP: When using a hobby knife, always make certain to cut away from yourself and your other hand to prevent injury!



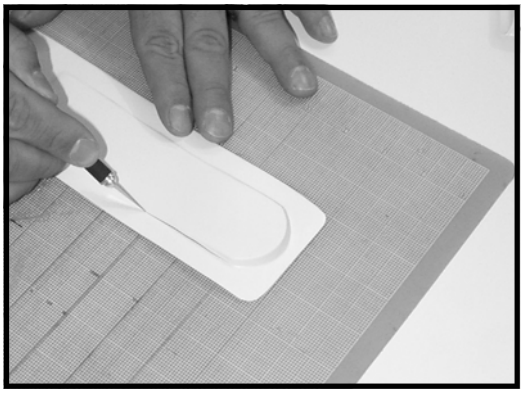
STEP 12: Insert the servos into the molded slots in the wings. Using a dowel rod or the like, press the servo wires into the servo wire slots in the wing as illustrated. Do not use a screw driver or other sharp instrument to install the servo wires or you may cut the wires.



STEP 13: The equipment tray and canopy supplied with your kit are rough cut about 1/4" outside the final shape required. Using scissors, a hobby knife, or tin snips, trim the outside of the plastic equipment tray and canopy to shape along the ledge that is molded into the parts. It works best to hold the assemblies upside down. Be careful when cutting the tray to leave the 1/4" lip on the back of the part. This lip increases the strength of the part and also aids in lining up the part during installation. After you have cut the parts to shape, smooth the edges using sand paper.

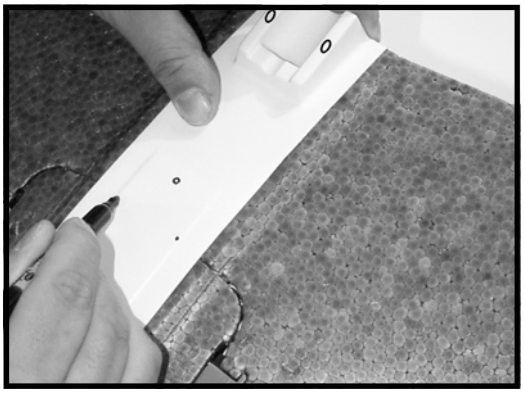


STEP 14: Trim the back face of the canopy out to allow the motor and prop assembly to protrude from the back of the airframe. Cut to within 1/8" of the edge so that the part remains strong. Do not cut on the edge or the part will be too flimsy and may tear over time.



STEP 15: Position the plastic equipment tray right-side-up on a cutting board. Using a sharp hobby knife, trim the outside edge of the battery hatch. Cut the edge along the base of the tray so that when the battery hatch is shut, the edge of the hatch will rest on the top of the fuselage. Do not cut the hatch along the top of this ledge or the hatch will cave into the battery compartment when flight pack equipment is mounted on top of it.

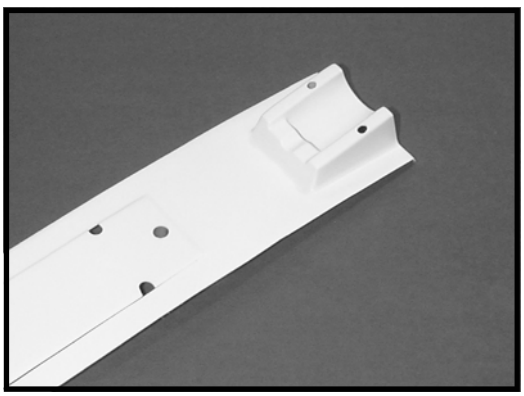
TIP: Electric drills and Dremel tools make cutting holes in the plastic parts much easier if you have access to them.



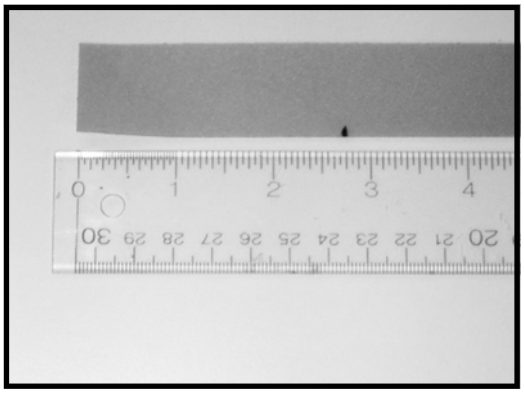
STEP 16: Position the equipment tray on the fuselage temporarily. Using a fine tip marker, mark the following places on the tray as illustrated:

- **mark for two holes on the centers of both ledges of the motor mount to accept the nylon tie that holds the motor to the tray.**
- **mark for one hole near the back center of the battery hatch to allow for the battery wires to pass through from the ESC unit.**
- **mark for two slots on the outside edges of the battery hatch that will allow for the servo wires to pass through from the battery compartment to the receiver to be mounted on the top of the battery hatch.**

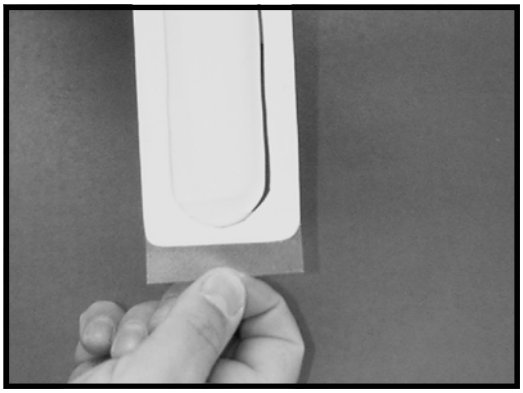
TIP: If you are assembling a 600 "Performance" ARF, the hole in the back of the battery hatch must be large enough to accept the supplied Deans Ultra connector.



STEP 17: Use a sharp hobby knife to cut the holes and slots in the equipment tray as marked in STEP 16. When you are done, the tray should appear as illustrated.

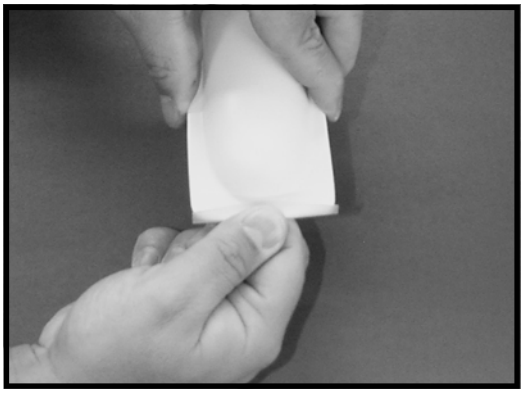


STEP 18: Locate one of the two pieces of 0.005" (thin) LEXAN(TM) tape. Mark the tape at 2 3/4". This small piece of tape will be used to hinge the canopy to the equipment tray for easy access to flight pack and propulsion equipment. Cut the tape straight across.



STEP 19: Remove the adhesive backing from the tape hinge prepared in STEP 18. Hold the equipment tray right-side-up in one hand. With the other hand, install the tape to the bottom front of the equipment tray. Allow about 1/2 the width of the tape to protrude from the front edge of the tray, sticky side up.

TIP: As an alternative to using the LEXAN™ as a hinge, you may also attach the canopy at the front using hook and loop fastener.

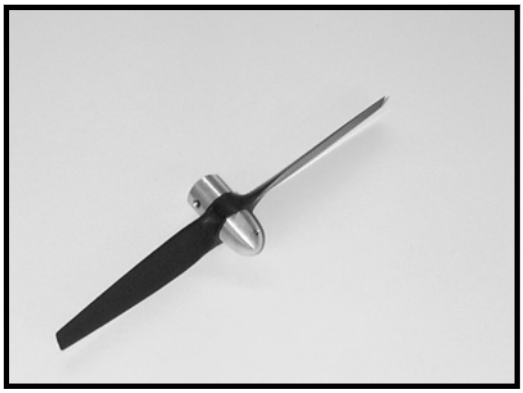


STEP 20: Place the canopy on the equipment tray. Hold the assembly right-side-up and carefully wrap the tape hinge over the top of the canopy as in the illustration. The thin tape easily conforms to the shape of the canopy so there is no need for cutting the tape around the "bubble" of the canopy. Turn the tray/canopy assembly up-side-down and trim away the excess tape that extends under the battery hatch.

TIP: Some customers have expressed having problems routing the nylon motor tie (shown in STEP 25) into the tray after the tray is installed. To make it easier, you may wish to consider feeding the tie through the holes before gluing down the tray in STEP 21 below.

STEP 21: Sand the bottom of the equipment tray/canopy assembly so that the adhesive bond will be strong. Mix a modest amount of 5 minute epoxy and apply a thin layer to the underside of the equipment tray in the places where the tray will touch the fuselage. Avoid getting adhesive on the servo wires. Mount the tray to the fuselage and hold or tape in place until the adhesive cures.

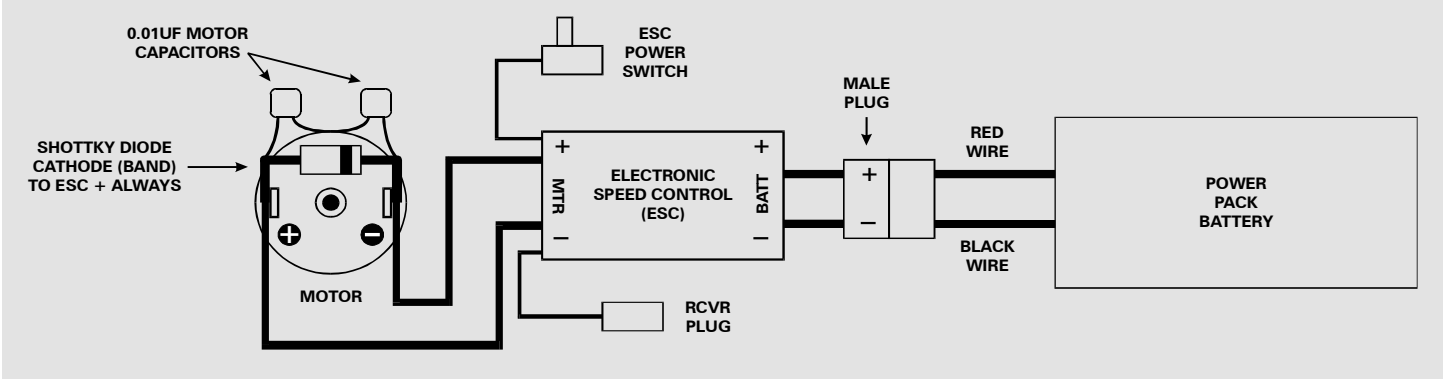
STEP 22: Feed the servo wires up from the battery compartment, through the battery hatch slots as in the illustration. Your finished hatch/canopy assembly should appear as shown. The battery hatch flips back to allow access to the battery. When the battery hatch is closed, the canopy is free to flip back over the tray, capturing the battery hatch and covering the flight pack and propulsion equipment.

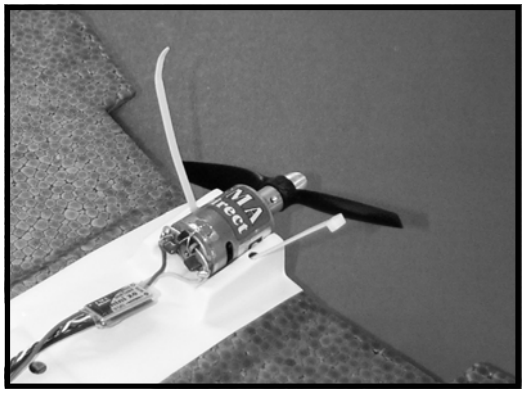


STEP 23: Locate the propeller and propeller adapter shaft, spinner and set screws. Install the propeller onto the propeller adapter shaft so that the propeller "pushes" air away from the back of the wing. This will be backwards from the normal "puller" type installation where the motor is mounted on the nose of the airplane. Verify proper installation of the propeller by checking to see that any printed information such as prop size or brand name is mounted on the side of the prop away from the spinner. Install the spinner and hand tighten using a hex wrench or small screwdriver shaft as a handle through the hole in the spinner. Install the two set screws in the sides of the propeller adapter shaft being careful not to cross thread.

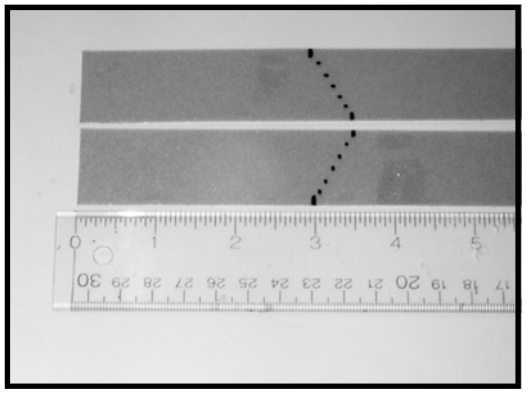
STEP 24: The motor pack that shipped with your ARF is made up of the ESC, the motor, capacitors, Shottky barrier diode, and wiring, pre-assembled and ready for installation. If you are not using an FMA Direct motor pack, please refer to the diagram following this step for proper connection of ESC / motor. Install propeller assembly to the motor shaft. Press the assembly until it is within 1/16" to 1/8" of the motor face. Tighten the two set screws using the proper hex wrench.

MOTOR PACK CONNECTIONS

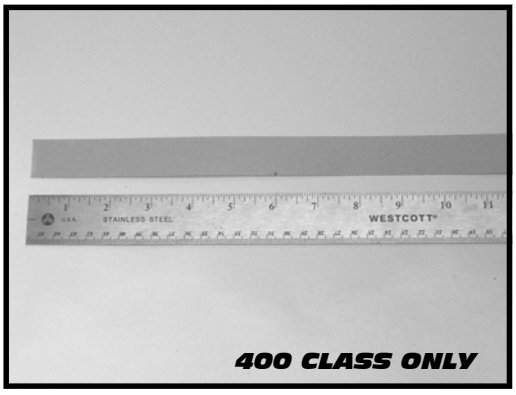




STEP 25: Assemble the motor pack to the equipment tray as illustrated. Feed the nylon tie through the holes you cut in the motor mount. Pull the nylon tie tight so that the clamp is resting closest to either hole and cut off the excess.



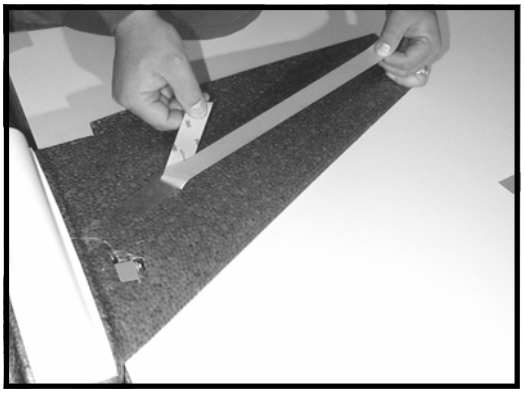
STEP 26: Locate two pieces of the 0.010" (thick) LEXAN(TM) tape. On each piece of tape, mark one side at 3"; mark the other side at 3.5" as illustrated. Cut each of the tapes across the equal but opposite angles as in the illustration. You will end up with two short pieces of tape to be used for holding the servos in place and two longer pieces that will serve as the structural spars for the top sides of each wing half.



STEP 27: Steps 27 and 28 apply to 400 class kits only! If you do not have a 400 class kit, please proceed to step 29. If you have a 400 class kit, locate the four pieces of 0.010" LEXAN(TM) tape provided. Two of these have been cut slightly shorter in STEP 26 above and are angled on one end. Mark and cut off 6" from the square ends of all four pieces of tape. The 6" pieces will provide added structural support to the wing where the prop cutout is molded into the trailing edge of the wing. The two shorter pieces with the angle cuts on one end will be used for structural support for the top of the wing. The two longer pieces will be used for structural support for the bottom of the wing where the most stress occurs in flight during loops.

STEP 28: This illustration shows the placement of the structural and servo tapes prepared in STEPS 26 and 27 for a 400 class kit. Do *not* install the tapes at this time, but test the placement of each as follows. The long tape should be positioned so that the end closest to the fuselage begins where the wing joins the fuselage and is centered over the servo wire slot. The end closest to the wing tip should be centered on the wing panel. The servo tape should butt up against the structural tape and center over the servo. The front of this tape should extend 1" beyond the servo case (toward the leading edge). If required, trim the angle cuts slightly. Put the short servo tapes aside as these will not be installed until radio installation is complete!

STEP 29: This illustration shows the placement of the structural and servo tapes prepared in STEP 26 for a 600 class kit. Do *not* install the tapes at this time, but test the placement of each as follows. The long tape should be positioned so that the end closest to the fuselage begins where the wing joins the fuselage and is centered over the servo wire slot. The end closest to the wing tip should be centered on the wing panel. The servo tape should butt up against the structural tape and center over the servo. The front of this tape should extend 1" beyond the servo case (toward the leading edge). If required, trim the angle cuts slightly. Put the short servo tapes aside as these will not be installed until radio installation is complete!

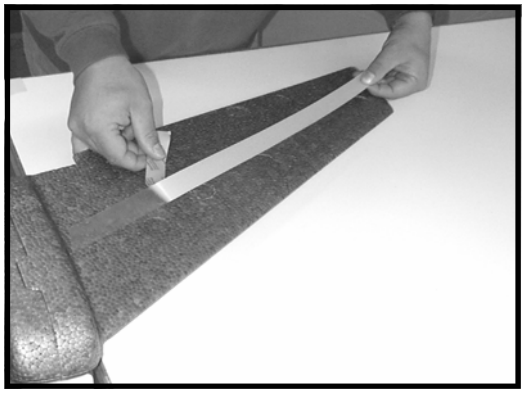


STEP 30: Hang the fuselage and one wing half over the edge of the table as illustrated. Remove the backing from the structural tape prepared earlier and place the tape as detailed in the above steps. Make certain the wing is flat on the table top so no warping of the wing can occur. Seal the tape tightly to the wing using your thumb or a blunt object such as a screwdriver handle. Remember, the very-high-bond adhesive will "cure" to about 50% of its bonding strength immediately. Full strength will be attained within 24 hours. Repeat this step for the top of the other wing.

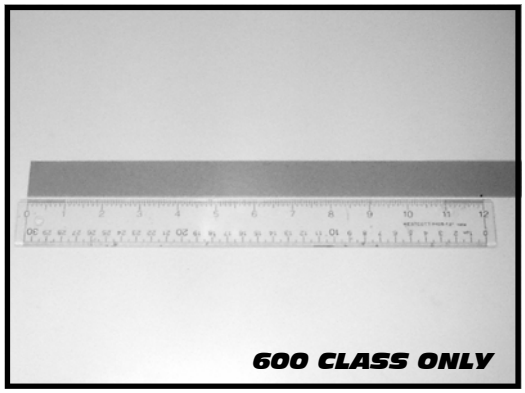
STEP 31: STEP 31 applies to 400 class kits only! If you do not have a 400 class kit, please proceed to STEP 32. This illustration shows the placement of the structural tapes prepared in STEPS 27 for the bottom of a 400 class kit. Locate the remaining pieces of 0.010" (thick) LEXAN(TM) tape. Note: when preparing the tape for installation, you will want to trim the inside end to match the angle of the fuselage. The bottom side structural tapes should be centered along the wing core over the span of each wing.

STEP 32: This illustration shows the placement of the structural tapes for the bottom of a 600 class kit. Locate two of the remaining pieces of 0.010" (thick) LEXAN(TM) tape.* Note: when preparing the tape for installation, you will want to trim the inside end to match the angle of the fuselage. The bottom side structural tapes should be centered along the wing core over the span of each wing.

*** Note: if you have a 600 Class kit, your kit will contain one additional piece of structural tape to be installed in STEPS 34 and 35.**



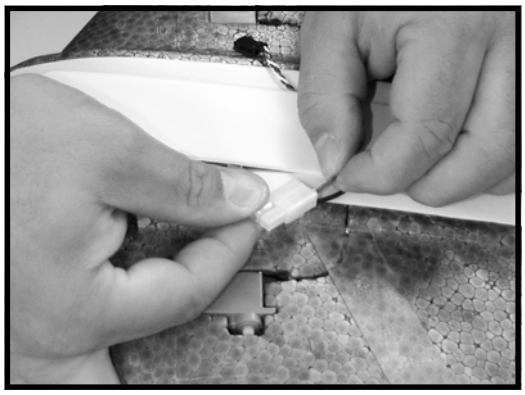
STEP 33: Turn the airframe upside down and hang the fuselage and one wing half over the edge of the table as illustrated. Remove the backing from the tape and place the tape on the bottom of the wing as detailed in the previous steps. Make certain the wing is flat on the table top so no warping of the wing can occur. Seal the tape tightly to the wing using your thumb or a blunt object such as a screwdriver handle. Repeat this step for the bottom of the other wing.

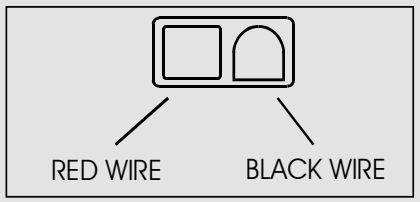


STEP 34: Steps 34 and 35 apply only to a 600 Class kit. If you do not have a 600 Class kit, proceed to STEP 36. If you have a 600 Class kit, locate the remaining piece of 0.010" LEXAN(TM) tape. Mark the center of the tape and cut straight across.

STEP 35: This illustration shows the placement of the 600 Class, additional bottom structural tapes prepared in STEP 34. Remove the adhesive backing from the structural tape. Turn the airframe upside down and hang the fuselage and one wing half over the edge of the table as in STEP 33. Remove the backing from the tape and place the tape on the bottom of the wing as illustrated. Make certain the wing is flat on the table top so no warping of the wing can occur. Seal the tape tightly to the wing using your thumb or a blunt object such as a screwdriver handle. Repeat this step for the bottom of the other wing.

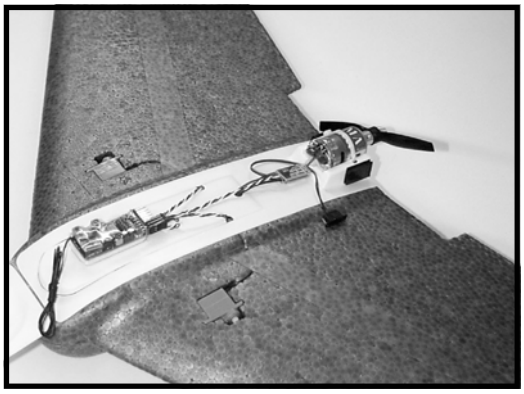
TIP: STEP 36 does not apply to the 600 "Performance" RTF as you have already made the hole large enough to accommodate the entire Deans plug.



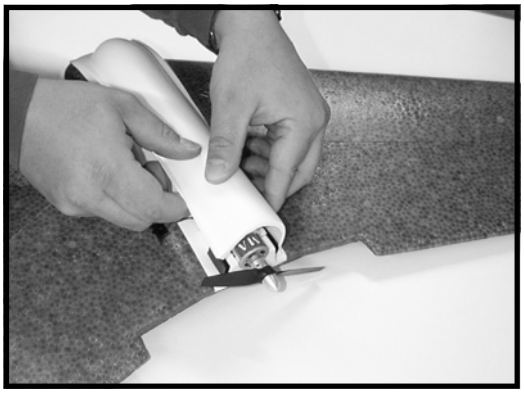


Connector Polarity

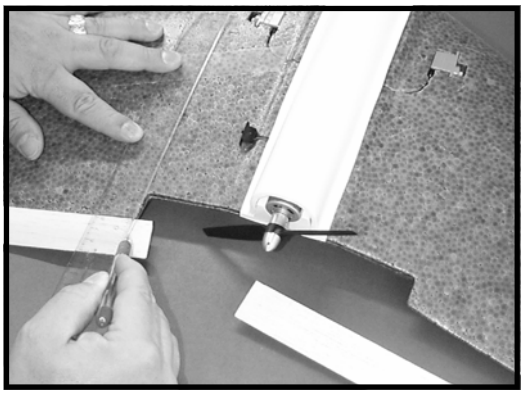
STEP 36: Feed the two power wires from the ESC through the hole in the battery hatch. Locate the plastic, male, Tamiya type shell. Install the shell to the power wires by pushing the wire leads with the connector pins through the back of the shell as illustrated. Be sure to maintain proper polarity of the black and red wires as shown in the diagram. The pins will "click" into place when they are properly seated. Test the connection by lightly tugging on the wires after installation.



STEP 37: Open the canopy. Connect the two servo leads to the receiver outputs. Connect the ESC lead to the receiver. Don't worry if you are not sure which channels are the correct ones for now, you will double check this in final installation. Using double-sided foam tape (not supplied), tape down the ESC, power switch and receiver as illustrated. Cut the supplied hook & loop fastener material in half and apply to the sides of the motor mount as shown. Remove the adhesive backing from the outside of the hook & loop fastener.

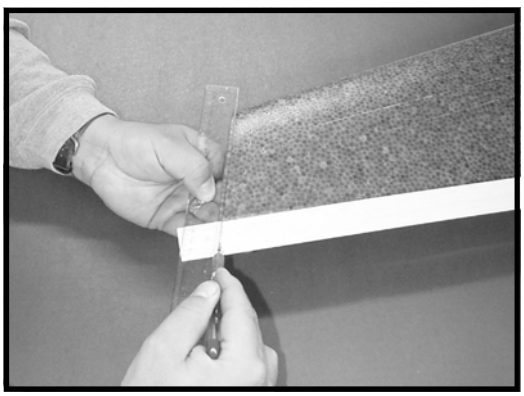


STEP 38: Carefully close the canopy. At the back, press one side down against the tray and then press against the hook & loop adhesive backing. Pull out on the other side of the canopy as you press it down against the tray and then against the hook & loop adhesive backing. See illustration.



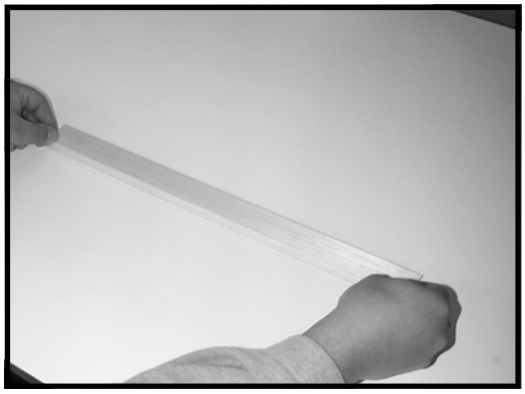
STEP 39: The elevons that come with your kit are pre-cut to a shape that will facilitate the use of the custom LEXAN(TM) tape as a hinge. The elevons are cut at an angle on the leading edge so that they will not bind on the trailing edge of the wing when down elevator is applied. Make sure that you install the elevons with the cut side down. Hold the elevon up against the trailing edge of the wing. Then, using a straight edge, mark the in-board side of the elevon at an angle to match the cut-out for the propeller clearance slot in the back of the wing. See illustration.

TIP: To improve the appearance of the joint between the elevons and trailing edge and to reduce drag, use a sanding block to round off the sharp edge on the bottom of each elevon.



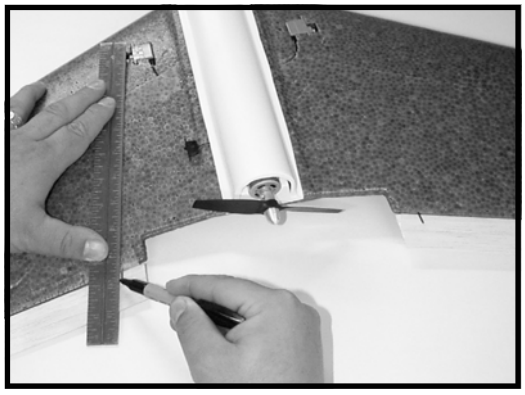
STEP 40: Continue holding the elevon up against the trailing edge of the wing. Then, using a straight edge, mark the out-board side of the elevon 1/8" in from the wing tip and at an angle to match the wing tip. See illustration. Repeat STEPS 39 and 40 for the other elevon.

TIP: It is always a good idea to cover your elevon and winglet surfaces with covering material before installation to prevent moisture from getting into the wood and causing warping or adding weight.



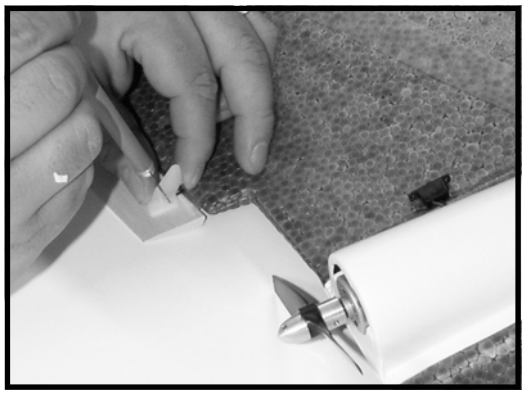
STEP 41: Locate the two strips of 0.005" (thin) LEXAN(TM) tape. Cut one piece of tape to the length of the elevon. Set the elevon right-side-up (leading edge angle down) and facing you. Remove the adhesive backing from the tape and apply the tape to the elevon so that 1/2 the width of the tape hangs off the top leading edge of the elevon.

STEP 42: Hold the leading edge of the elevon up to the trailing edge of the wing and position it so that the in-board side of the elevon is aligned with the propeller cut-out slot. Droop the back of the elevon downward as if full down elevator were being applied. Fasten the elevon to the wing and seal the tape tightly to the wing using your thumb or a blunt object such as a screwdriver handle. When you are finished, the elevon should be hinged and free to move upwards or downwards with ease. Repeat STEPS 41 and 42 for the other elevon.

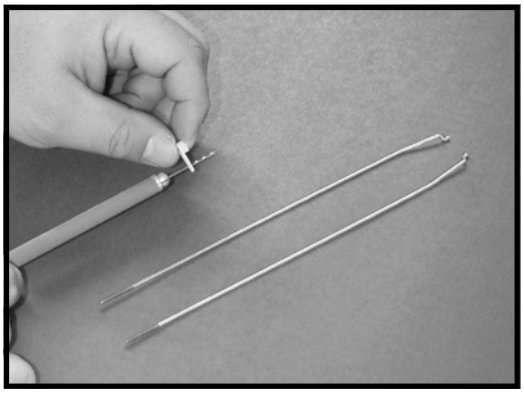


STEP 43: Make a small mark on the leading edge of the elevon at 3/4" from the in-board side of the elevon. Extend a straight edge from the end of the servo output shaft to the small mark you just made. Then extend the small mark along the angle of the straight edge 1/4" toward the trailing edge of the elevon. Repeat for other elevon. These lines will be used to align the control horns installed below.

TIP: To prevent injury, use a pair of heavy diagonal cutters or a Dremel tool with a grinding wheel to cut off the excess from the control horn screws protruding underneath the wing.



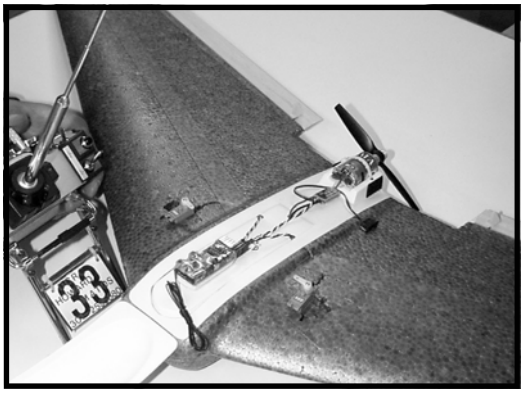
STEP 44: Position the control horn so that the vertical arm of the horn is aligned with the mark you made in STEP 43. Make sure that the holes in the control arm are directly above the elevon/wing hinge joint. Using a small hand drill or screwdriver, mark for and make holes in the elevon using the holes in the base of the control horn as a guide. Hold the control horn plate under the elevon and fasten the control horn using the screws provided. Repeat for the other control horn.



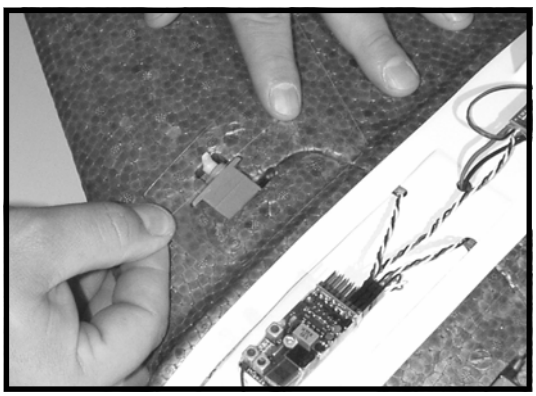
STEP 45: Using a small bit that is slightly smaller than the outside diameter of the pushrods, open up the second hole down on the servo arms to accept the pushrods. The fit should be tight to prevent any slop in the linkages.

STEP 46: Make sure the ESC power switch is off. Open the canopy and battery hatch, and install the fully charged 7 cell battery power pack. Do *not* turn the power switch on at this time.

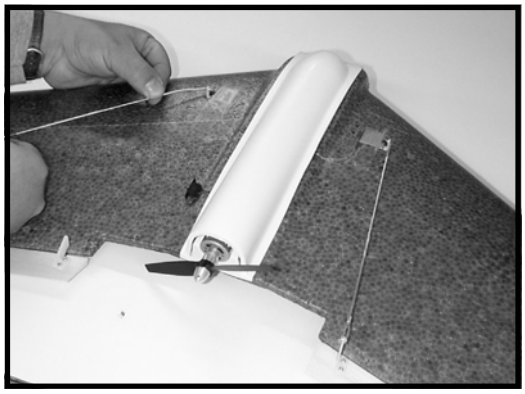
TIP: While the following steps are illustrated with the propeller installed, it is much safer to remove the propeller before applying power and leave it off during initial setup until you're ready to fly the airplane.



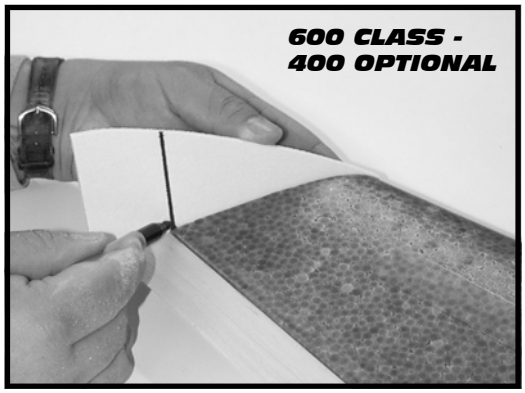
STEP 47: Position the servos up-right in the servo cut-outs. If applicable, install the receiver crystal in the receiver and check that the dip switches are set in accordance with the receiver manual. Be certain the propeller is free of obstructions! Set transmitter throttle and throttle trim controls full off, then turn on transmitter. Turn the ESC power switch on being careful of the propeller. Check to make sure you have the servos and ESC plugged into the correct channels on the receiver; i.e., throttle controls throttle, elevator and aileron control the servos. When everything is working, install and center the servo output arms facing in as illustrated. See the section titled "SETTING UP AND FLYING THE MODEL" for instructions on set up.



STEP 48: Put the servos back into the servo cut-outs and tape in place using the two short pieces of tape prepared in STEP 26.



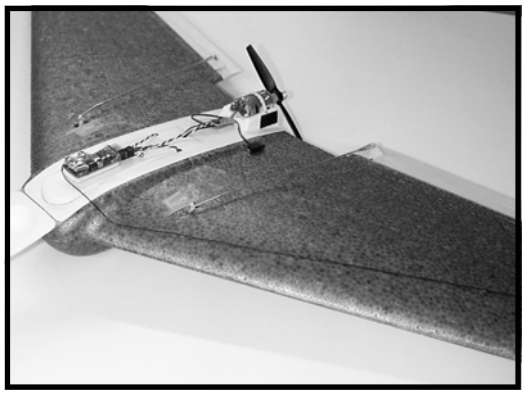
STEP 49: Screw the clevis onto the pushrods. Install the pushrods to the servo output arms from the out-board side of the servo. Your kit contains one left and one right pushrod. Before snapping the clevis to the control horn, adjust the length of the rod so that when the pushrods are installed, the elevons are set for 2 degrees up elevon. You can judge 2 degrees as follows: the horizontal (level) axis of the airframe is along the part line of the molded part. The part line can be identified by small protrusions of foam that outline the entire airframe; i.e. leading edge, trailing edge, wing tips. Hold the aircraft such that the part line of the mold is parallel to the ground. The back of the elevons should rise about 1/16" above this imaginary plane.



STEP 50: Round-off the top edge of the winglets. The shape of the winglet on 400 Class kits is not critical. You may install them as is, or you may change the size and shape to suit your tastes. *For all 600 Class kits, it is mandatory that you reduce the length of the winglet so that it does not protrude beyond the trailing edge of the wing*. For 600 Class kits, hold the winglet up to the wing tip, mark and cut the length of the winglet down as illustrated. Cutting down the winglets for 600 Class models will greatly improve flight handling at slow speeds, helping to prevent tip stall and snap roll.

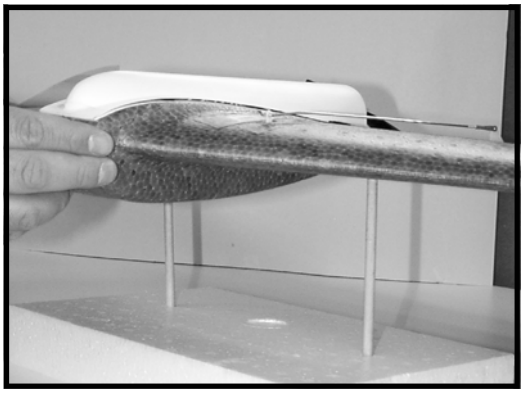
STEP 51: Mix a modest amount of 5 minute epoxy and apply to the wing tip. Attach winglet to wing tip and align the underside of the winglet to match the underside of the wing airfoil. Hold or tape in place until glue sets. Repeat for other winglet.

TIP: Optional antenna routing...drill a small hole through the wing about 1" back from the leading edge and directly opposite the back of the receiver. Route the antenna to the underside of the wing and angle back to the outboard trailing edge. Drill another small hole there and route antenna back up.



STEP 52: Cut a small slot 1/8" deep and 1/2" long in the top of the wing in front of the servo and directly in line with the front of the receiver. Press the antenna into this slot using a small blunt dowel so as not to damage the antenna wire. Use a small piece of 0.005" (thin) LEXAN(TM) tape to "capture" the antenna in the slot but allow it to move freely back and forth through the slot. This arrangement will keep the antenna from coming in contact with the servo mechanism but will allow you to open the battery hatch to change/charge batteries. Route the antenna over the top of the wing toward the back of the winglet. Drill two small holes in the winglet just ahead of the trailing edge of the wing. Loop the antenna through these holes.

STEP 53: Place the aircraft upside down. Using a ruler, measure back exactly 7 inches from the point where the leading edge of the wing intersects the fuselage and make a small dot on the underside of the wing. This measurement is critical as it will determine the CG of the airplane, so take your time. Using a square, extend a line from this point you just made perpendicular to the fuselage. If you don't want to mark on the airplane, use tape so you can remove it later.



STEP 54: With all equipment installed (including the battery), and the canopy shut, check to make sure the plane balances within ±1/4" of the CG line marked in STEP 53. The illustration shows the plane balanced on two dowel rods inserted into a piece of foam for this purpose. If the airplane was constructed in accordance with this manual, it should balance on the CG with the batteries pushed all the way to the front of the battery compartment. If your airplane is nose heavy, slide the battery back until it balances. If the plane is tail heavy, consider cutting down the winglets or sanding the elevons before adding ballast to the nose. With the CG set properly and with 2 degrees of up elevon, the plane should glide level.

STEP 55: This step is optional on all 400 Class models but mandatory on all 600 Class models. The 600 Class aircraft are heavier and the wing loading is higher. To greatly improve flight handling at slow speeds and help to prevent tip stall and snap roll, the outer 1/2 to 2/3 of the leading edge of the wing and the front of the winglet must be sanded round. Rounding the outside of the leading edge ensures that if the airplane begins to stall at slow speed, the wing will stall at the center rather than at the tips, helping to prevent snap roll and making the plane recover faster and with less difficulty. For best results, sand about 1/4" radius into the sharp leading edge and fair it in toward the center of the wing.

TIP: Rounding the leading edge of the wing is a trade-off between top speed and maneuverability. While a sharper leading edge will improve top speed, a rounder one will improve handling. STEP 55 is about the best compromise to give good handling without a noticeable speed reduction.

This completes the assembly portion of the manual. If you elect to apply the FMA Direct decals or other adornments to *RAZOR*, it is a good idea to clean the foam surface with alcohol before you proceed. The next section includes basic setup information and tips for flying *RAZOR* based on extensive flight testing conducted by FMA Direct engineers.

SETTING UP AND FLYING THE MODEL

OVERVIEW

If you are new to radio control, it is important that you seek the help of an experienced modeler to help you set up and learn to fly your new *RAZOR*. The hardest part of learning to fly is adjusting the control surfaces and "trimming" out the model during the initial flights. Also, no matter what your skill level, it is always a good idea to have another modeler around the first time you fly the airplane to launch it for you. Until the airplane is trimmed to fly straight and level with little transmitter stick motion, launching can be a bit tricky. A flying wing has many advantages over a normal design in terms of efficiency. "Tailless" wings can be built much

lighter than normal aircraft so that for the same wing area, the wing loading is much lower and the aircraft can perform better with smaller motors and propellers. In terms of controlling the airplane, the major difference between a flying wing and a standard aircraft design is that both elevator, or "pitch" control (for up and down) and aileron (for banking right and left to turn the airplane) are merged into two flight surfaces instead of three. This convergence of elevator and aileron control is termed "elevons". In order to fly *RAZOR*, you are required to have either 1) elevon mixing capabilities in your transmitter, or 2) an on-board mixing unit such as the FMA Direct MX80 installed in the aircraft that is capable of elevon mixing. Another difference inherent to *RAZOR* is the absence of rudder control which is the vertical control found on normal aircraft and allows the pilot to create turns by "yaw" which changes the direction of the tail relative to the nose of the aircraft. All turns with *RAZOR* will be performed by banking the airplane left or right as opposed to creating yaw. Once you get past the initial stages of set-up and trimming the model, *RAZOR* is easy to fly and capable of performing most basic aerobatic maneuvers not requiring rudder control. The slope, park, and 400 Class models are designed to fly at slow to moderate speeds, are great for thermaling, gliding, and modest aerobatics. The 600 Class models are designed for higher speed, better maneuverability and greater piloting skill levels.

QUICK REVIEW

This section assumes that you have successfully completed the assembly portion of the manual. You have completed installation of the propulsion equipment (STEPS 23 - 25, 36), flight pack equipment (STEP 37) and installed the battery (STEP 46). You have properly installed the servo arms and completed initial radio setup (STEP 47). You have installed pushrods and control linkages and have set the elevons for 2 degrees up elevator (STEP 49). Finally, you have marked and checked the CG (STEPS 53, 54) to ensure that the plane balances properly.

SETTING UP ELEVON MIX

Make certain the aircraft is anchored, that the propeller is free of obstructions, and that the throttle control and throttle trim are set in the full off position before you turn the transmitter and then the ESC power switches on. Follow the instructions provided with your transmitter or with your on-board mixing unit to enable elevon mixing. Once you have successfully completed this step, the following should occur:

1) **Pulling back on the elevator control stick causes both elevons to move up.**
2) **Pushing forward on the elevator control stick causes both elevons to move down.**
3) **Pushing the aileron control stick right causes the right elevon to move up and the left elevon to move down.**
4) **Pushing the aileron control stick left causes the left elevon to move up and the right elevon to move down.**
5) **While holding full left aileron control, pulling back on the elevator control stick causes the right elevon to move up slightly while the left elevon stays up.**

PRE-FLIGHT CHECK AND RANGE TEST

Always perform the following pre-flight test before flying the model:

1) **Make sure the propeller is free of all obstructions.**
2) **Make sure the throttle control stick and throttle trim lever are set in the full off position.**
3) **Turn the transmitter power on and then turn the ESC power switch on.**
4) **Verify that the transmitter controls the proper channels on the receiver; i.e., throttle control runs the motor as the propeller "pushes" air away from the back of the airplane; elevator and aileron controls move the servos.**
5) **Perform the previous, numbered sequence under SETTING UP ELEVON MIX before each flight to verify that mixing is set up properly.**
6) **With the antenna collapsed to the first section on the transmitter and the aircraft anchored and elevated several feet off the ground on a non-conductive surface, walk away from the airplane moving the elevator/aileron stick(s) on the transmitter. At 100 feet, make certain the propeller is free of obstructions, and move the throttle control to full on. Check to see that you still have full control of the flight surfaces. Throttle back quickly to avoid using up valuable battery power.**

GLIDE TEST

Glide testing the airplane is always best when one person is launching the aircraft and another is controlling it. Determine the direction of the wind. On a gentle slope, hold the airplane over your head and run slowly into the wind. Give the airplane a gentle push with the nose pointing straight ahead and the wings level. Correct the flight path with the transmitter controls. If you are glide testing a 600 Class aircraft, run faster and throw the plane harder as the airplane is heavier. Make adjustments to your trim settings until the aircraft glides straight ahead with a gentle downward sink rate. Remember, if the aircraft pitches up and stalls, trim the elevator control to add more down elevator. If the aircraft dives, trim the elevator control to add more up elevator. Make adjustments to the flight control linkages until the correct glide test results are obtained with the trims set at neutral. Note: if you are flying a 600 Class aircraft, be aware that you will most likely add more up trim in a glide test than is required for powered flight.

POWERED FLIGHT

Make sure your flying site has enough area to maneuver the aircraft without getting too close to roads, buildings, trees, or power lines. 400 and 600 class *RAZOR* models are not intended as park fliers. They require a flying field the size of a football field or larger. Never fly over the heads of spectators, and keep the aircraft in sight at all times. A radio control aircraft is a big responsibility and should not be taken lightly. Even an experienced pilot has an occasional lapse of concentration or problems with his equipment.

For at least the initial flight, have an experienced R/C modeler launch or fly the aircraft for you. Determine the direction of the wind. Power up the system as in the pre-flight check. *We cannot stress enough the importance of keeping your hands clear of the propeller at all times!* Hold the airplane over your head, power the motor to full throttle, and run briskly into the wind. While holding about 50% up elevator, give the airplane a strong toss with the nose pointing straight ahead and the wings level. *Be sure to pull your arm down and away from the airplane as you launch to clear the propeller!* Correct the flight path with the transmitter controls. If you are launching a 600 Class aircraft, run faster and throw the plane harder as the airplane is heavier. As you fly the plane, make adjustments to your trim settings until the aircraft flies straight and level with the transmitter control stick centered.

Remember, if the aircraft pitches up and stalls, trim the elevator control to add more down elevator. If the aircraft dives, trim the elevator control to add more up elevator. Upon landing, make final adjustments to the flight control linkages until the correct flight test results are obtained with the trims set at neutral.

ADDING EXPONENTIAL OR DUAL RATES

Although neither function is required to fly the *RAZOR* successfully, extensive flight testing by FMA engineers has determined that handling characteristics can be dramatically improved with the addition of exponential or dual rates on the aileron and/or elevator controls. Begin with 50% exponential and increase or decrease to match your tastes. If you do not have this capability, try setting up dual rates. Use low rates (elevon throws of 3/8" each direction, up and down) for the initial flights during trim-out and then move to high rates (1/2" or 3/4" throws) once you are familiar with the flight characteristics of the airplane.

FLIGHT CHARACTERISTICS

Overall, you will find the *RAZOR* to be a satisfying and enjoyable airplane to fly. The slope, park, and 400 Class models are extremely docile and easy to manage. They can fly very slowly and do not readily approach stall speeds. The 600 Class models are designed for high speed! They require a higher skill level and because of the weight, they should be maintained at an airspeed significantly higher than 400 Class, especially in turns. As with any flying wing design, the one inherent trait to watch out for is tip stalling. If you have successfully completed the instructions relating to limiting this phenomenon in STEPS 50 and 55, you will be pleased with the 600 Class slow speed flight characteristics and stall recovery, but please realize that because of the weight of this aircraft, tip stalls cannot be *completely* eliminated. With either class of *RAZOR*, if you should ever push the aircraft to the point of stall, the tendency is for it to stall at the tip and then begin to spiral. Should this happen, pull back on throttle, allow your control sticks to neutralize, and let the airplane recover itself. At the bottom of one complete spiral, add throttle slowly, gently pull back on the stick and regain level flight. Finally, on a 600 Class model, when the battery runs down and the motor shuts off, release elevator control, level out the plane and maintain your airspeed on approach!

STORAGE INSTRUCTIONS

Never store your airplane inside of your car on a hot summer day. This could cause the structural tape to shrink and thereby create a warp in the wings. If wing warpage or bowing should occur, remove the structural tape from the wings and install new tape as per the instructions provided in this manual. *Never attempt to fly the airplane with warped or bowed wings!* Also be aware that during extreme cold conditions the adhesive tape used in assembly may lose some of its bonding strength.

CONVERTING AIRPLANE MODELS

If you purchased the slope soar model of the *RAZOR*, and later wish to convert it over to a 400 Class model, purchase a 400 motor pack and a 7 cell 600AE battery. Follow the instructions in this manual for installation. If you purchased the 600 Class "Endurance" model and later wish to upgrade to a "Performance" model, purchase the "Performance" 600 motor, a male and a female Deans Ultra pigtail. Install the motor and connectors as per the MOTOR PACK diagram on page 10.

SPARE PARTS

In addition to the following spare parts list available by calling direct or through your local hobby dealer, FMA Direct stocks a full line of receivers, servos, batteries, speed controllers, chargers, etc. For fast charging RAZOR battery power packs, FMA recommends charger models FC300 "MINIPULSE" or FC600 "VERSAPULSE".

	SLOPE Class PN	400 Class PN	600 "Endurance" PN	600 "Performance" PN
AIRFRAME PARTS:				
ELEVON PACK	RZRELVPK	RZRELVPK	RZRELVPK	RZRELVPK
WINGLET PACK	RZRWNGLTPK	RZRWNGLTPK	RZRWNGLTPK	RZRWNGLTPK
PLASTICS PACK	RZR400PLASPK	RZR400PLASPK	RZR600PLASPK	RZR600PLASPK
HARDWARE PACK	RZR400HDWPK	RZR400HDWPK	RZR600HDWPK	RZR600HDWPK
PUSHROD PACK	RZRPRPK	RZRPRPK	RZRPRPK	RZRPRPK
CONTROL HORN PACK	CHNYLSM1PK	CHNYLSM1PK	CHNYLSM1PK	CHNYLSM1PK
METAL CLEVIS PACK	MCLEV2-56PK	MCLEV2-56PK	MCLEV2-56PK	MCLEV2-56PK
ELEVON TAPE	TAPEPK-LEX-005-1X24	TAPEPK-LEX-005-1X24	TAPEPK-LEX-005-1X24	TAPEPK-LEX-005-1X24
STRUCTURAL TAPE	TAPEPK-LEX-010-1X24	TAPEPK-LEX-010-1X24	TAPEPK-LEX-010-1X24	TAPEPK-LEX-010-1X24
22" CARBON ROD	CFS5.5X22	CFS5.5X22	CFS5.5X22	CFS5.5X22
PROPULSION PARTS:				
MOTOR PACK	N/A	RZR400MTRPK1	RZR600MTRPK1	RZR600MTRPK2
MOTOR	N/A	MTR400-RS380PH	MTR600-RS-550PF	MTR600-RS-550SH
MOTOR CAPACITORS	N/A	C0.01UFPOLY	C0.01UFPOLY	C0.01UFPOLY
MOTOR DIODE	N/A	DSR504	DIR80SQ035	DIR80SQ035
ELEC. SPEED CONTROL	N/A	SC20	SC30	SC30
MALE CONN. ASSY	N/A	WW200-M02ASSY	WW200-M02ASSY	DNS-7091ASSY
PROPELLER	N/A	PROPPK-MAS-5.5X4	PROPPK-MAS-8X4	PROPPK-MAS-8X4
PROPELLER ADAPTER	N/A	PA400	PA600	PA600
FLIGHT PACK PARTS:				
RECEIVER	202FM72 / 202AM72	202FM72 / 202AM72	202FM72 / 202AM72	202FM72 / 202AM72
SERVO	S80 / S100 / PS30 /PS50	S80 / S100 / PS30 /PS50	S80 / S100 / PS30 /PS50	S80 / S100 / PS30 /PS50
FLIGHT PACK BATTERY	SAN4C110	N/A	N/A	N/A
SWITCH HARNESS	210LFJ	N/A	N/A	N/A
POWER PACK PARTS:				
BATTERY PACK	N/A	SAN7C600AESTTAM	SAN7C800ARSTTAM	SAN7C800ARSTDNS
OPTIONAL BATTERY	N/A	SAN8C600AESTTAM	SAN8C800ARSTTAM	SAN8C800ARSTDNS
FEMALE CONN. ASSY	N/A	WW200-F02ASSY	WW200-F02ASSY	DNS-7092ASSY