



APACHE III

BASIC TRAINER MODEL

**WITH POLYCOTE™ ECS
ENHANCED GRAPHICS SYSTEM**



VMA-A140.3

**Assembly
and
Operations Manual**

**Please review this manual thoroughly
Before assembling or Operating
The
APACHE III
Basic trainer model**

POLYCOTE™ ECS
ENHANCED COVERING SYSTEM

**This model is covered with our ULTRA TOUGH POLYCOTE
ECS Enhanced Covering System. Please see back cover for
tips on how to care for & clean POLYCOTE ECS.**

Liability Disclaimer

It is important that the following liability disclaimer be **READ BEFORE ASSEMBLING OR USING THIS PRODUCT.**

Model airplanes, model engines, model engine fuel, propellers and products such as this trainer model can be hazardous if improperly used. Be cautious and follow all safety recommendations when using your model. Keep hands, tools, clothing and all foreign objects well clear of engines when they are operating. Take particular care to safeguard and protect your eyes and fingers and the eyes and fingers of other persons who may be nearby. Use only a good quality propeller that has no cracks or flaws. Stay clear of the propeller and stay clear of the plane of rotation defined by the propeller.

The Manufacturer, Distributor, Retailer and/or other suppliers of this product expressly disclaim any warranties or representations, either expressed or implied, including but not limited to implied warranties of fitness for the purposes of achieving and sustaining remotely controlled flight.

In no event will the Manufacturer, Distributor, Retailer and/or other suppliers of this product have any obligation arising from contract or tort, or for loss of revenue or profit, or for indirect, special, incidental, consequential or other damages arising from the use of this product.

In purchasing and/or using this product, the user accepts all responsibility for its use and accepts all liability associated with such use.

PROCEEDING WITH ASSEMBLY AND USE OF THIS PRODUCT INDICATES AGREEMENT WITH AND ACCEPTANCE OF THE LIABILITY DISCLAIMER .

CAUTION.

A remote control model aircraft is not a toy. It is a flying model that functions much like a full size airplane. If you do not assemble and operate this product properly you can cause injury to yourself and others and damage property. **DO NOT FLY** this model if you are not qualified.

You are ultimately responsible for the mechanical, aeronautical and electrical integrity of this model and its structure, control surfaces, hinges, linkages, covering, engine, radio, wiring, battery and all other components. Check all components before and after each flight. Do not fly until it's right!

INTRODUCTION

Thank you for purchasing a VMAR product. VMAR Manufacturing is committed to delivering superior value to the RC modeler. Your new model is the market leader in features, ease of use and flexibility. Please review these instructions before beginning the simple assembly procedure.

We've used metric measurements throughout these instructions. We know that some of you like metric while others think that furlongs per fortnight makes a nifty velocity indicator. If you are in the furlong camp, bear with us....

It's not a big deal...3 millimeters is stated as 3mm and 3mm is about 1/8 of an inch. Fire up your calculator and you will find that 25.4 mm makes an inch. In places where you have to actually set up something according to a recommended measurement, we've listed an approximate imperial measurement in inches as well.

Whenever we've used the directional terms left or right, they are with respect to the model when viewed as you would when sitting in the cockpit...that is when viewed from the back looking forward.

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CHECK OUT THE CONTENTS.

You've taken the lid off the box and reviewed the instruction booklet...you are about 6-8 hours away being ready to go flying! Now is the time to look over what's in the box. Please go through the contents and make sure nothing has been damaged in shipping. Damaged or missing components must be reported to your vendor **BEFORE** any assembly begins. Please **DO NOT START** if something is damaged or missing. As you can imagine, once you join the wing halves or install your radio or engine your options for returns are very limited. Your vendor will not be able to provide you with exchanges or replacements of parts that have been assembled. **DO NOT START UNLESS IT'S RIGHT!**

CHECK OFF COMPONENTS AND PARTS INCLUDED.

MAJOR COMPONENTS AND SUB-ASSEMBLIES

- 1 Fuselage with pre-installed elevator and rudder control rod
- 2 Wing halves (left and right)
- 1 Horizontal stabilizer with pre-installed elevator
- 1 Vertical stabilizer with pre-installed rudder
- 1 Master bag of hardware
- 2 Fiberglass main landing gear
- 1 Documentation set including assembly and operations manual
- 1 Set of trim sheets if required

CONTENTS OF MASTER BAG

- 3 Ultralight treaded wheels
- 1 Main landing gear parts bag
- 1 Wing parts bag
- 1 Spinner parts bag
- 1 Control horn parts bag
- 1 Nose landing gear
- 1 Miscellaneous parts bag
- 1 Spare parts bag

CONTENTS OF MAIN LANDING GEAR PARTS BAG

- 4 mounting screws
- 2 Axle assemblies with wheel collars

CONTENTS OF CONTROL HORN PARTS BAG

- 5 Metal bolts 3mm x 45mm - 50mm
- 5 Metal nuts 3mm
- 5 Plastic control horns
- 5 Plastic T - nuts
- 5 Plastic beveled washers

CONTENTS OF WING PARTS BAG

- 1 Wood spar joiner
- 2 Wood alignment dowel guide
- 1 Wood wing dowel (thicker)
- 1 Small roll of wing joint tape
- 2 Aileron control rod assemblies with clevises
- 2 Plastic wing mouting bolts

CONTENTS OF SPINNER PARTS BAG

- 1 Spinner with allen screws
- 1 Allen wrench
- 1 Collet set

CONTENTS OF NOSE GEAR PARTS BAG

- 1 Pre-bent nose gear wire
- 1 Steering arm
- 2 Wheel collars

CONTENTS OF MISCELLANEOUS PARTS BAG

- 2 Wood guide blocks with slot for control rod support if needed
- 1 Allen wrench for control rod EZ connectors

CONTENTS OF SPARE PARTS BAG

Assortment of extra spare parts that are not required but may come in handy in service

ITEMS SHIPPED IN FUSELAGE

- 1 Fuel tank assembly with stopper, clunk and pre-bent metal tubes
- 1 Universal servo tray with mounting screws and slider plates



CHECK OFF TOOLS AND SHOP MATERIALS NEEDED.

These tools and shop materials are not included and are required to complete and operate your model and most other remote control aircraft.

- Clean flat table or work surface approximately 600 x 1800 mm (24 x 72 in.)
- 2.5 mm ball socket screw driver or Allen wrench
- 3.0 mm ball socket screw driver or Allen wrench
- 4.0 mm ball socket screw driver or Allen wrench
- Phillips (cross head) screw driver small size
- Phillips (cross head) screw driver medium size
- Flat blade screw driver medium size
- Low tack masking tape, ruler or tape measure
- C/A glue
- Side ("wire") cutters
- Pencil, pliers, hobby knife with #11 blade
- 30 minute Epoxy and 240 grit sandpaper
- Silicon Based Sealant (Dap – A – Goo)
- Epoxy mixing dishes, brushes and sticks
- Paper towels
- Rubbing alcohol
- Crescent wrench (optional)
- Heat gun and soft cloth for covering (optional for covering touch up)

CHECK OFF OTHER ITEMS NEEDED TO COMPLETE THIS TRAINER MODEL

These items are not included and are required to complete and operate your VMAR MODEL and most other remote control aircraft.

Medium fuel tubing appropriate for your choice of engine and fuel. 500mm – 750 mm (24-36 in.)

Liquid thread - lock

RC FM radio with at least four channels of control and on a frequency appropriate for your market area.

Five servos compatible with the RC FM Radio. Servos generally are provided with new radio systems

External Switch Actuator appropriate for your radio system (optional)

Engine and muffler suitable for use in a remote control model aircraft. A two stroke glow fuel .40 -.53 cubic inch engine is recommended.

Propeller suitable for the engine. See the engine instruction manual recommendation for diameter and pitch.

Engine glow plug

Engine glow plug igniter

Engine 4 way wrench

Fuel for the engine

"After run" oil for engine

RC Foam sheeting for wrapping the radio receiver and battery pack.

Two Servo extension (long)

CHECK OFF OPTIONAL EQUIPMENT AND ACCESSORIES.

These items are not included and are not required but make the operation of your model and most other remote control aircraft easier & more enjoyable.

Power Tote "Deluxe" field box # VMA-PT109D

Fuel pump and connecting tubing

Fueling valve

Chicken stick or electric starter

Stick on weights

Battery to power electric starter

Battery charger

Power Panel to manage starter and pump (if electric.)

Extra propellers

Extra glow plugs

Misc tools

Engine test stand # VMA – ETS120

Stage 1

WING ASSEMBLY



JOINING THE WING HALVES

To join the wing halves you will need the following items :

Wing spar joiner supplied with kit.

Two alignment dowel guides supplied with kit

Rolled wing joint tape supplied with kit

30 minute epoxy

Sandpaper (Coarse 240 grit recommended)

Epoxy brush or stir sticks

Disposable mixing dish for the epoxy

Low tack masking tape to hold the wing in position while the epoxy sets Pencil

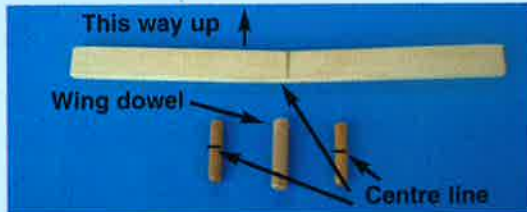
(Use only low tack masking tape)

Pencil

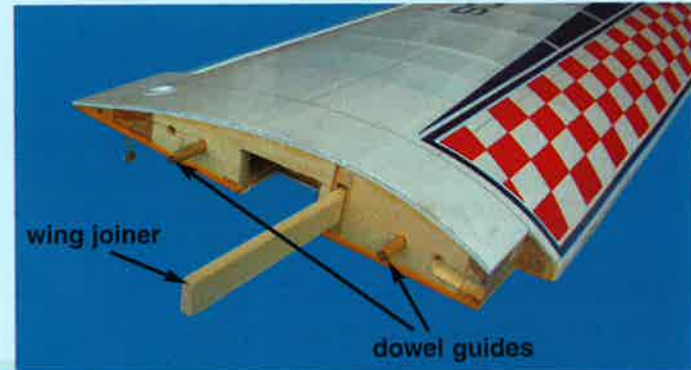
Ruler

Paper towels.

Locate the wing joiner and insert it in one of the wing panels as shown, use a pencil to mark a centre line on the wing joiner and dowel guide, as shown below, trial fit the second wing panel to ensure a good fit



1.1 Note orientation of wing joiner, dowel guide and wing dowel



1.2 Trial fit the wing joiner and dowel guides

Stage 2

Apply plenty of 30 minute epoxy to one end of the wing joiner, using a stir stick or epoxy brush. Carefully insert the joiner into the first wing panel as shown in the sequence below. Wipe off the excess glue that squeezes out of the joint with a cloth or tissue. Repeat this process several times to ensure that the wing joiner and cavity are well coated in 30 minutes epoxy. Do not use 5 minute epoxy to join the wings



2.1 Apply epoxy to one end of wing joiner



2.2 Carefully insert the joiner... Also the dowel guide

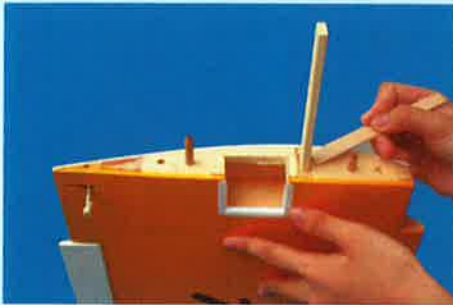


2.3 ... all the way into the centre line



2.4 Wipe off the excess epoxy

Stage 3



3.1 Apply plenty of 30 minute epoxy

When the glue has cured in Stage 2, trial fit the second wing panel onto the first to ensure that the two panels fit without an excessive gap. Now apply plenty of epoxy to the exposed half of the wing spar joiner and both wing roots where they will meet when the wing is joined. Ensure you use plenty of 30 minute epoxy and apply to all sides of all parts to be joined. Use 30 minute epoxy to ensure a strong bond and give yourself plenty of working time. As with the wing joiner, the epoxy should ooze from joint and the excess is cleaned off with a rag or tissue before it cures.

Use low tack masking tape to hold the two panels tightly together until the glue cures.



3.2 Align the two wing panels



3.3 Slowly close the gap



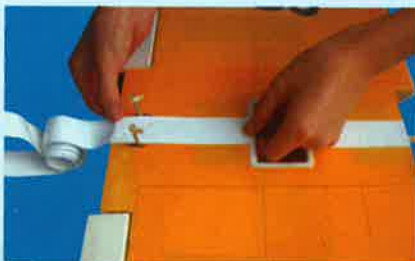
3.4 Use tape to hold tightly together also install the wing dowel

Stage 4

Once the glue has cured completely (allow several hours at least), the tape can be removed from the wing panels. To avoid lifting the covering, peel the masking tape back on itself when you removing it. Do not pull the tape up, peel it back horizontally against itself. To cover the joint in the wings, a length of wing joint tape is supplied. Starting from the upper side, stick the tape centrally over the joint ensuring that it is pressed down firmly as you work around the wing. Wrap the tape all the way around the wing joint in one piece, starting and finishing at the flap servo cutout in the top of the wing.



4.1 Apply tape over the joint, starting here



4.2 Carry on over the bottom of wing pressing down firmly as you go



4.3 Trim off the excess trim strip

FITTING AILERON SERVOS

Stage 5 INSTALLING A SINGLE AILERON SERVO INTO THE WING. (STANDARD CONFIGURATON)

To install a single aileron servos into the wing you will need the following items :

- Servo
- Servos mounting screws and grommets as supplied with servos.
- Servo control arms as supplied with the servos.
- Two aileron control rod assemblies supplied with the kit. The assemblies consist of a metal rod with a plastic clevis screwed onto both ends.
- Low tack masking tape.
- 2 aileron control horn assemblies



5.1 Prepare the servos by fitting the rubber grommets & ferrules supplied with your radio

Turn the wing upside down. Trial fit the aileron servo into the centre of the servo mounting cavity. You may have to modify the cavity slightly to provide clearance for the servo and servo wires. Use a hobby knife to modify the cavity as required. Most servos have their output shaft closer to one end than the other. We recommend locating the servo so that the output shaft is as close to the back of the wing as possible. Screw the servo into place with the screws and grommets supplied. It is important to install the grommets and screws correctly. See the manual that came with your radio for instructions about your particular servo grommets. Fasten the screws down according to the manufacturers recommended tightness.



5.1 Aileron servo location

Stage 6

Step 1 Consult your radio instruction manual and centre the aileron servo by plugging it into the aileron channel in the receiver. Turn on the transmitter and then the receiver. Centre the aileron trim lever on the transmitter. Remove the servo arm mounting screw and the servo arm.

Step 2 Mount the servo arm back on the servo. Position the arm so that the arm to be parallel with the back edge of the wing. Screw the arm into place with the servo arm mounting screw supplied with the servo.

Locate the two aileron control rods in the hardware bag. Ensure the clevises are screwed well onto the threaded portion of the rod. Rotate and tug aggressively on the clevises and ensure that they are not loose on the rods.

Tape the ailerons into their neutral position so that they are even with the trailing edge of the wing and not pointing either up or down.

Step 3 Ensure that the aileron control horns are screwed onto the threaded aileron torque rods that protrude from the wing and that both control horns are in approximately the same place on their respective torque rods.

Step 4 Connect the aileron control rods to the aileron control horns. If one of the two clevises on each rod has a metal pin or screw, attach that clevis to the servo output arm.

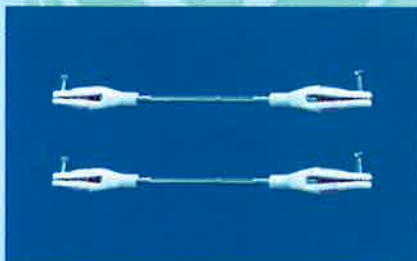
Step 5 Connect the other clevis to the aileron control horn.

Step 6 Remove the masking tape holding the ailerons.

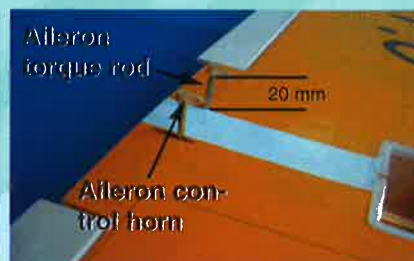
Step 7 Turn on your radio and activate the ailerons, using the aileron stick and ensure that a smooth full motion can be achieved.

Step 8 With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the left raises the left aileron and lowers the right aileron. Movement of the stick to the left will roll the aircraft to the left. (Counterclockwise roll of the wing when viewed from the back).

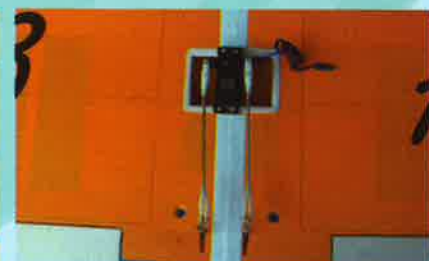
Step 9 With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the right raises the right aileron and lowers the left aileron. Movement of the stick to the right will roll the aircraft to the right.



6.1 Aileron control rod assembly



6.2 Aileron torque rod with control horn



6.3 Aileron control installed

FLAPERON CONFIGURATION

Stage 7

The APACHE III is "Flaperon Ready" providing modellers using most computer radios with the option of using two servos coupled together electronically by the transmitter. Check your computer radio manual to review flaperon capabilities of your radio system.

Flaperons provide a whole new dimension to your Apache III. Once you've got the basics down, you can move on to flaperons for dramatic short slow takeoffs and landings. If you are planning on using flaperons in the future but you consider yourself a beginner now, you can either mount a single servo (see previous page) or install two servos now but hold off on the electronic coupling feature. In the case of using two servos without flaperons, you end up with a servo for each aileron while you are ready to move to flaperons at the flick of a switch.

To install two aileron servos into the wing a flaperon configuration you will need the following items:

- A radio system that is flaperon capable. Most computer radios meet this requirement but read your manual to be sure.
- Two identical servos
- Servo mounting screws and grommets as supplied with the servos
- Servo control arms as supplied with the servos

Two aileron control rod assemblies supplied with the kit. The assembly consist of a metal rod with a plastic clevis screwed onto each end.

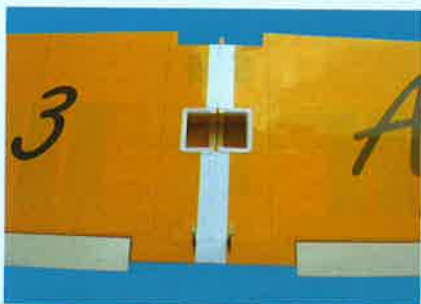
- Masking tape

Note: We recommend gluing the wing halves together if intending to use the flaperon option. Review step for further information.

To install two aileron servos into the wing without configuring them for flaperon use, you will also need a suitable Y connector effectively allows two servos to be plugged into a single receiver channel.

Turn the wing upside down. Trial fit the aileron servos into the servo mounting cavities at the center of the bottom of the wing either side of the wing joint. You may have to modify the cavities slightly to provide clearance for the servos and servo wires. Carefully cut the white cavity liner away from the ends of the cavities where the servo screws will be installed into solid wood. Use a hobby knife to cut back the cavity liner as required.

Screw the servos into place with the screws and grommets supplied. Fasten the screws down according to the manufacturers recommended tightness.



7.1 Aileron servo location



7.2 Aileron servo position



7.3 Aileron torque rod with control horn

INSTALLING THE AILERON LINKAGES WHEN USING TWO AILERON SERVOS

Stage 8

Step 1. If you are going to use two aileron servos without the flaperon option, plug both servos into a Y connector suitable for your radio system and plug the Y connector into the aileron channel of your receiver.

Step 2. If you are going to use two aileron servos with the flaperon option consult your radio manual carefully at this time. Connect each servo into the appropriate channel on your receiver. Follow the radio manual instruction carefully. In general, one servo will be plugged into the aileron channel on the receiver and the second aileron servo will be plugged into another channel which you will program to work with the first servo.

Consult your radio manual carefully.

Step 3. Turn on the transmitter and then the receiver. Center the aileron trim lever on the transmitter. Retract the flaperons using the flap switch on your transmitter. Turn off your receiver and then turn off your transmitter. Remove the servo arm mouting screws and the servo arms from both servos.

Step 4. Mount the servo arms back on the servos. Position the arms to be parallel with the back edge of the wing. Screw the arms into place with the servo arm mouting screws supplied with the servo.

Step 5. Locate the two aileron control rods in the hardware bag. Ensure that the clevises are screwed well onto the threaded portions of the rod. Rotate and tug aggressively on the clevises and ensure that they are not loose on the rods.

Step 6. Ensure that the aileron control horns are screwed onto the threaded aileron torque rods that protrude from the wing and that both control horns are in approximately the same place on their respective torque rods.



8.1 Flap servo position



8.2 Aileron torque rod with control horn



8.3 Aileron control installed

Step 7. Tape the ailerons into their neutral position so that they are even with the trailing edge of the wing and not pointing either up or down.

Step 8. Connect the aileron control rods to the servo output arms as shown in the illustration. Attach that clevis to the servo output arm.

Step 9. Connect the other clevis on the right hand aileron control rod to the right aileron control horn.

Step 10. Connect the other clevis on the left hand aileron control rod to the left aileron control horn.

Step 11. Adjust the length of the aileron control rods by rotating the clevises on the threaded rods so that the servos are centered when ailerons are at a neutral position with respect to the wing.

Step 12. Remove the masking tape holding the ailerons.

Step 13. Turn on the radio and activate the ailerons using the aileron stick and ensure a smooth full motion can be achieved.

Step 14. With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the left raises the left aileron and lowers the right aileron. Movement of the stick to the left will rod the aircraft to the left (counterclockwise roll of the wing when viewed from the back)

Step 15. With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the right raises the right aileron and lowers the left aileron. Movement of the stick to the right will rod the aircraft to the right (clockwise roll of the wing when viewed from the back)

Step 16. If when doing the tests noted in Step 14 and Step 15 the direction of aileron deployment is incorrect, consult your radio manual for how to reverse the direction of rotation of your servos. Control surface movement and alignment will be checked again during final setup but it is a good idea to set things up properly as you go along with the assembly of your model.

Step 17. If you have set up your aileron servos in the flaperon configuration, test now that activating flaps on the transmitter, deploys the ailerons down, evenly on both sides. Some transmitters offer a number of flap deployment stages between up and full down. Check all stages and at all stages confirm that the aileron stick continues to move the aileron up and down independently and in the correct direction.



8.4 Flaperon up



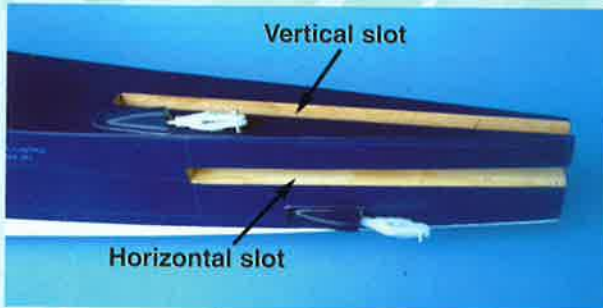
8.5 Flaperon down

FITTING THE HORIZONTAL AND VERTICAL STABILIZERS

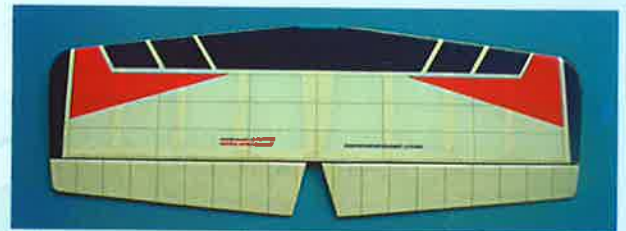
Stage 9

To install the stabilizers to the fuselage you will need.

- Fuselage
- Vertical stabilizers with pre-installed rudder
- Horizontal stabilizers with pre-installed elevator



The completed fuselage slot should look like this



Horizontal stabilizers with pre-installed elevator



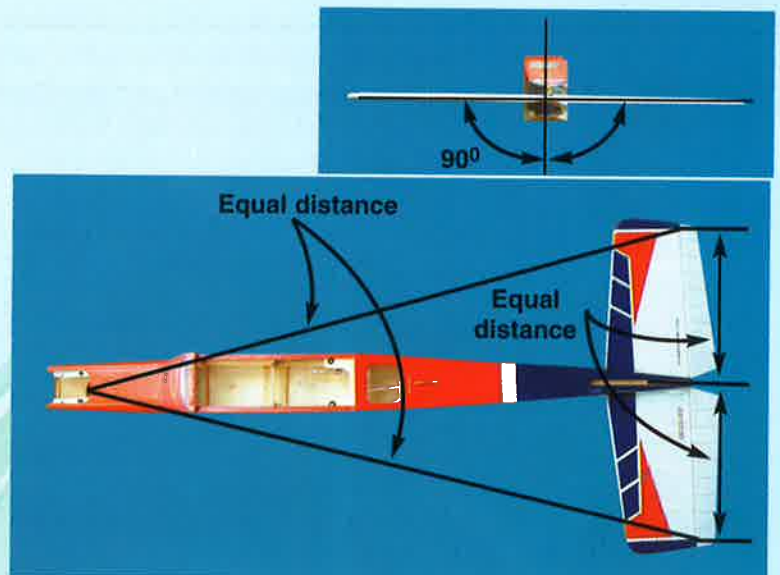
Vertical stabilizers with pre-installed rudder

Stage 10

Check the fit of the horizontal stabilizer in its slot. Make sure the tail is square and centred to the fuselage by taking measurements as shown in the diagrams on the right, but don't glue anything yet.



10.1 Trial fit the horizontal stabilizer in its slot



Stage 11

With the horizontal stabilizer correctly aligned, mark the shape of the fuselage on the top and bottom of the tailplane using a water soluble felt-tip pen as shown here.



11.1 Mark the top of the horizontal stabilizer



11.2 Followed by the bottom

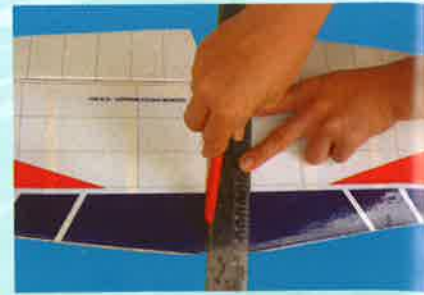
FITTING THE NOSE GEAR

Stage 12

Now remove the horizontal stabilizer and, using a sharp knife and a ruler CAREFULLY cut 2mm inside the marked lines and remove the covering on the top and bottom of the tail as shown. Make sure you only cut the film and not the wood, otherwise the horizontal stabilizer will be severely weakened.



12.1 Marked lines on horizontal stab



12.2 Cutting inside the lines



12.3 Removed covering from top surface



12.4 Exactly the same underneath



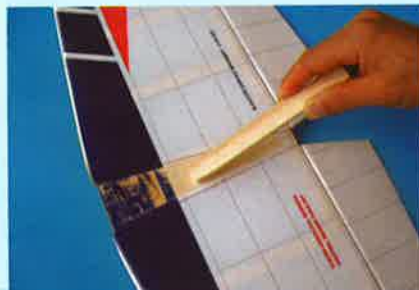
12.5 Clean off any traces of pen

Stage 13

Now apply sufficient epoxy to the top and bottom of the horizontal stabilizer. Use 30 minute epoxy to ensure a strong bond and give yourself plenty of working time. Insert the horizontal stabilizer in its slot in the fuselage and re-check the alignment as in Stage 9. Excess epoxy should be cleaned off with a rag or tissue before it cures.



13.1 Apply plenty of epoxy



13.2 Apply plenty of epoxy



13.3 Slide the horizontal stabilizer in place



13.4 Wipe off excess epoxy

FITTING THE VERTICAL STABILIZER WITH RUDDER

Stage 14

Check the fit of the vertical stabilizer in its slot. To make sure that it is glued square to the horizontal stabilizer and fuselage



14.1 Trial fit the vertical stabilizer onto fuselage.

Stage 15

Mark the shape of the fuselage on the left and right sides of the vertical stabilizer using a felt-tip pen. Now remove the vertical stabilizer and, using a sharp knife & ruler, CAREFULLY cut just 2mm inside

the marked lines and remove the covering on both sides of the fin, just as you did with the horizontal stabilizer, making sure you only press hard enough to cut the covering, not the vertical stabilizer.



15.1 Mark both sides of the vertical stabilizer



15.2 Carefully cut through the covering



15.3 Remove covering from both sides

Stage 16

Now apply sufficient epoxy to both sides and the bottom of the vertical stabilizer. Use 30 minute epoxy to ensure a strong bond and give yourself plenty of working time.

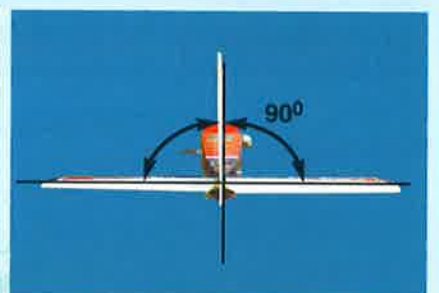
Insert the vertical stabilizer in its slot in the fuselage and re-check the alignment. Excess adhesive should be cleaned off with a rag or tissue before it cures.



16.1 Apply plenty of epoxy



16.2 Slide the fin in place



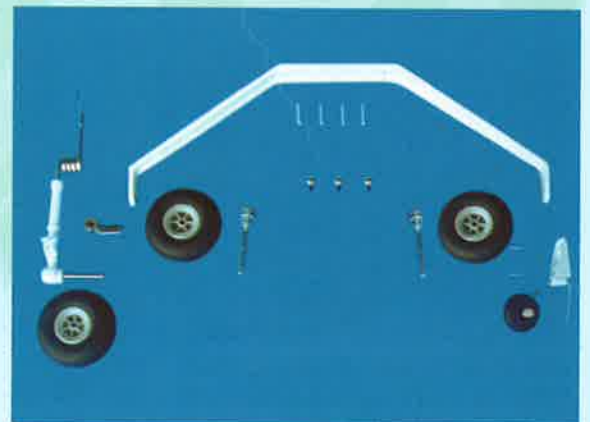
16.3 90 degrees angle between the horizontal and vertical stabilizer

FITTING THE LANDING GEAR

Stage 17

There are two ways to build your Apache III, either in a "tricycle gear configuration" using a nose wheel and main landing gear or in a "tail dragger configuration" using the tail wheel and the main landing gear. The Apache III comes with all parts included for either configuration. If this is your first RC aircraft, we recommend the tricycle gear configuration using the steerable nose wheel and the main gear.

Both of these methods utilize the same main landing gear, which will be assembled first. Once the main landing gear assembly is complete, please follow step 20 if you wish to go with the tricycle configuration or step 19 if you wish to go with the tail dragger configuration.



17.1 Completed landing gear components

FITTING THE MAIN LANDING GEAR

Stage 18

The main landing gear assembly consists of the following items:

- The main landing gear
- Two axles including two mouting nuts, two large washers, two wheel collars with set screws
- Two ultralight treaded wheels (60mm x 20mm)

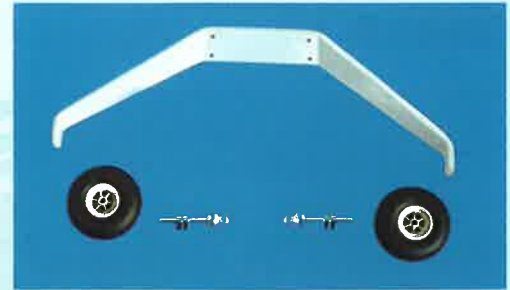
Step 1. Remove the nuts, large washers and wheel collars from the axles.

Step 2. Place one of the nuts and then one of the washer onto the threaded portion of each axle and insert the threaded portion of the axle through the hole in the landing gear so that the non-threaded smooth axle points outboard away from the main landing gear.

Step 3. Place a second washer onto the threaded portion of each axle after inserting it into the main landing gear.

Step 4. Secure each axle into place with a second nut and tighten firmly. Lock the nuts in place with a suitable liquid thread - lock.

Step 5. Install the wheel collar on each axle followed by a wheel and then another wheel collar. Securely tighten the set screws in each wheel collar (*Tip: file flats on the axle where the wheel collar set screws contact the axle. The set screws will stay tighter longer. Apply liquid thread locker to the set screws*)



18.1 Main landing gear components



18.2 Install the axle and wheel to the main gear

FITTING TAIL DRAGGER CONFIGURATION (Not for beginners)

Stage 19

The tail-dragger configuration with steerable tail wheel is not recommended for beginners. Beginners should skip Stage 19 and use the Trike Configuration described in Stage 20.



19.1 The Apache III with tail dragger configuration



19.2 Turn over the fuselage to locate the 4 pre-drilled main landing gear mounting holes (as shown)



19.3 Use 4 sheet metal screws (5 x 35mm) to mount the main landing gear onto the fuselage



19.4 Turn over the fuselage to locate the 2 pre-drilled tail wheel mounting holes (as shown)



19.5 Insert the tail wheel steering wire into the steering guide tube



19.6 Screw the tail wheel assembly to the fuselage



19.7 Trim off the excess tail wheel steering wire

FITTING THE TRICYCLE CONFIGURATION

Stage 20

The tricycle configuration with steerable nose gear is recommended for beginners



20.1 The Apache III with tricycle configuration



20.2 Turn over the fuselage to locate the 4 pre-drilled main landing gear mounting holes (as shown)



20.3 Use 4 sheet metal screws (5 x 35mm) to mount the main landing gear onto the fuselage



20.4 Nose gear assembly



20.5 Put the end of the pre-installed Z-bend wire through the hole in the steering arm



20.6 Nose gear with wheel



20.7 Holding the nosegear steering arm in place, slide the nosegear into the nylon mount, passing through the steering arm.



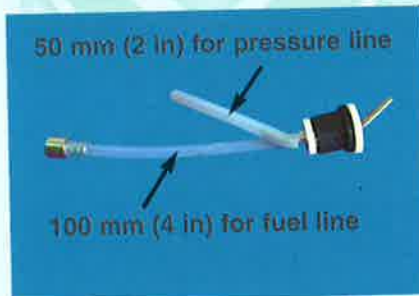
20.8 Now tighten the nosegear steering arm

FITTING THE FUEL TANK

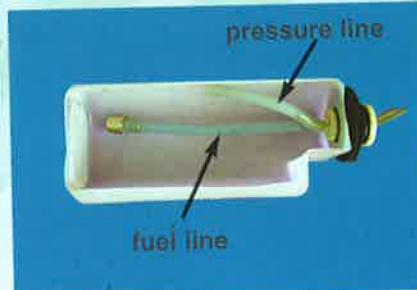
Stage 21

To assemble the fuel tank you will need the following items:

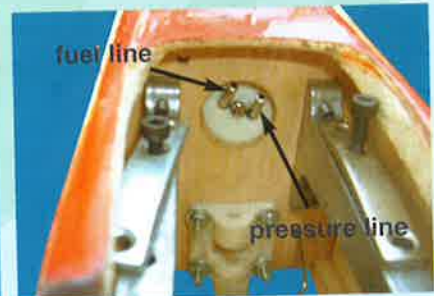
- The fuel tank and fuel stopper assembly (supplied)
- The clunk (supplied)
- About 7" (20 cm) of medium ID silicone fuel line (DUB 197 or similar)
- Cross head Philips screw driver



21.1 Use 100 mm (4 in) for fuel line and 50 mm (2 in) for pressure line



21.2 Illustration of fuel line positioning inside the tank



21.3 Fuel tank installed into the fuselage

INSTALLING THE ENGINE

Stage 22

Engines vary quite a bit in sizes, styles and brands but most have mounting lugs, a carburetor with a throttle (speed) control arm, a prop washer, a prop nut and a muffler

The procedure we describe here assumes that you are mounting a 2-stroke engine that has a side exhaust on the right (when viewed from behind looking forward) and a throttle control arm on the right.



VMAX Pro.46 2 cycle engine recommended



22.1 Engine mount pre-installed into the fuselage



22.2 Use a 4mm socket ball wrench or Allen Key to remove the 4 black machine screws that work with the clamping plates on the metal engine mount that has been pre-installed into your Apache III



22.3 Remove the muffler, position the engine on the engine mount and confirm that the fuel tank metal tubes clear back of the engine. Trial fit the engine temporarily into plates. Tighten the screws only enough to tack the engine into place

Stage 23



23.1 Clevis attached to engine throttle arm



23.2 Throttle control rod connected to the engine throttle arm and to the servo arm

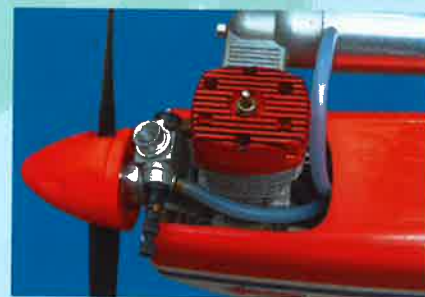
CONNECTING THE FUEL & PRESSURE LINES

Stage 24

Step 1. Install the muffler then connect the fuel tubing from the tank metal pressure lines to the muffler

Step 2. Connect the fuel tubing from the tank metal fuel line to the carburettor

Step 3. Double check that you have the metal fuel line from the tank connected to the carburettor and that the metal pressure line from the tank to the muffler.



24.1 Engine mount pre-installed into the fuselage

INSTALL THE PROPELLER AND THE SPINNER

Stage 25

Step 1. Consult your engine manual and select a suitable propeller.

Step 2. Install the thrust washer, the spinner backing plate, the propeller, the prop washer, and the prop nut. Ensure that they are all firmly attached

Step 3. Trial fit the spinner cone and spinner cone retaining screws. If necessary enlarge the cutouts in the spinner cone to allow adequate clearance for the propeller. The spinner should not touch the edges of the propeller.

Step 4. Double check that the spinner cone retaining screws are firmly attached.



25.1 The spinner and propeller installed to the model

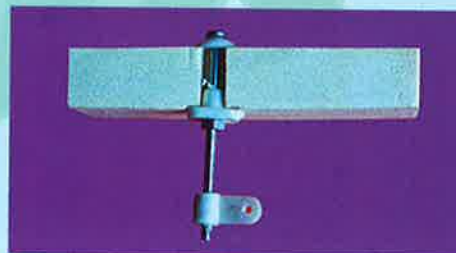
FITTING ELEVATOR AND RUDDER CONTROL HORN

Stage 26

The elevator control is fitted on the underside of both right and left of the elevator halves. Pierce the covering over the pre-drilled hole for the control horn installation as shown.



26.1 Control horn assembly



26.2 Typical control horn mounted to the surface control



26.3 Elevator control horn location



26.4 Rudder control horn location

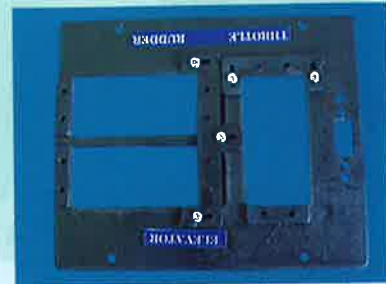


26.5 Elevator control horn connected to the control rod

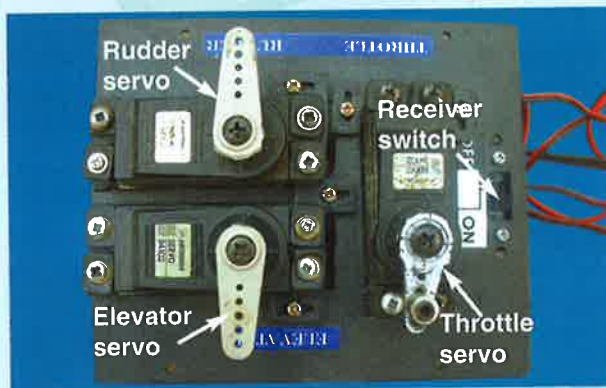
INSTALLING THE SERVO

Stage 27

Install the rubber servo grommets and brass ferrules supplied with your radio equipment. The three servos that control the elevator, rudder and throttle are installed in the servo tray mounted in the fuselage. Remove the servo tray from the fuselage. Mount the servos to the servo tray as shown.



26.1 Universal servo mount



27.2 Note the orientation and positions of the three servos and receiver switch in the servo tray



27.3 Throttle, elevator and rudder servos connected to their pushrods

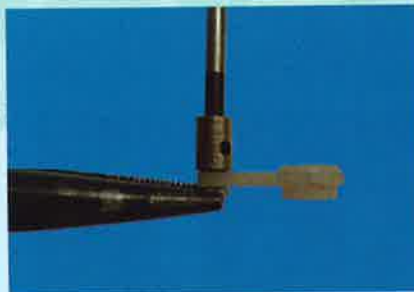
CONNECTING THE PUSHRODS TO THE THROTTLE, RUDDER AND ELEVATOR SERVOS

Stage 28

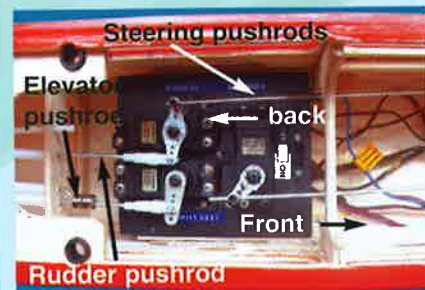
Consult the picture showing how the throttle, rudder, nose gear steering and elevator servos are positioned and connected to the pushrods.



28.1 Pre-installed elevator and rudder pushrods



28.2 Install EZ connector to the servo arm



28.3 Connecting the nose steering pushrods to the rudder control

CONNECTING THE PUSHRODS TO THE ELEVATOR

Stage 29

Connect the elevator servo to the receiver and turn on your transmitter. Confirm that the neutral positions of the elevator servo are sustained as per illustration 28.3



29.1 Two independent elevator control horn shown in position



29.2 Connecting the elevator pushrods to the control horns



29.3 Loosen collars to align elevator surfaces. Tighten collars securely

CONNECTING THE PUSHRODS TO THE RUDDER

Stage 30

Connect the rudder servo to the receiver and turn on your transmitter. Confirm that the neutral positions of the rudder servo are sustained as per illustration 28.3



30.1 Rudder control horn installed and shown in position

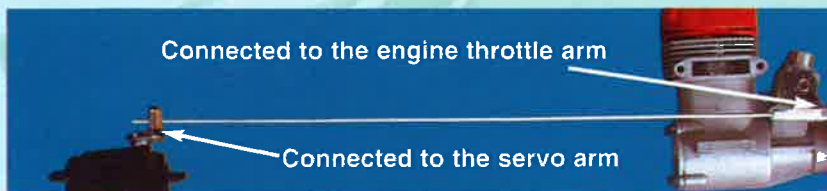


30.2 Connecting the rudder pushrod to the rudder control horn

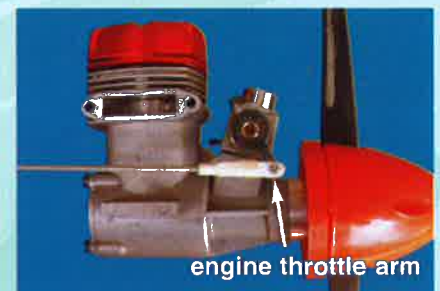
CONNECTING THE THROTTLE CONTROL

Stage 31

Connect the clevis to the engine throttle arm at roughly half throttle. Look into the throat of the engine carburettor as you rotate the throttle arm and select a position where the throttle opening is about half what it is when fully open.



31.1 Typical throttle control rod connection



31.2 Throttle control rod connected to the engine throttle arm

CONNECTING THE THROTTLE CONTROL

Stage 32

This is a very important stage in the completion of the model. The throttle must open and close fully - without the linkage binding at either end of its travel. Work by setting the high throttle position first, followed by the low. Once the linkage has been properly setup it can be adjusted mechanically or by using the travel adjust, or ATV/EPA feature on most modern transmitters. Note: The final adjustment of the low throttle point can only be carried out with the engine running and throttle trim on transmitter up. (The low throttle stick and the throttle trim down will shut down the engine)

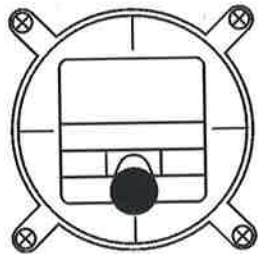
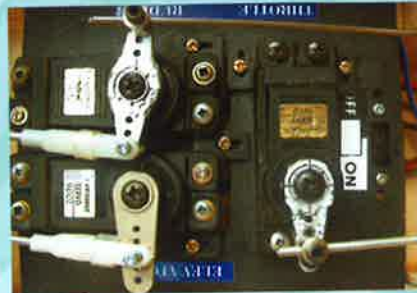
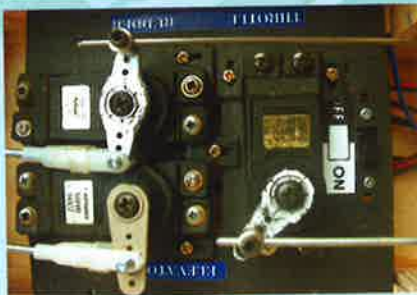
(A) Low throttle



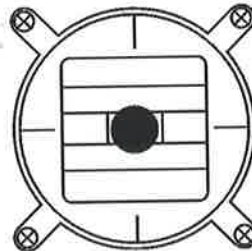
(B) Mid throttle



(C) High throttle



Low throttle stick position



Mid throttle stick position



High throttle stick position

ADJUST CONTROL SURFACE THROW LIMITS.

Stage 33

Adjust the deflection of the control surfaces to match the specifications on page 19

You can reduce the amount of throw by doing either or both of the following:

From the servo end, move the clevis or EZ connector to a hole in the servo arm that is closer to the servo output shaft.

From the control horn end, move the horn out further on the threaded bolts. Always confirm that the horn is still thoroughly engaged with the threaded bolt after you have adjusted it.

FINAL R/C SET-UP

Stage 34

Before starting the final set-up of the model, switch on the radio and ensure that all trims are in their neutral positions. Check that the ailerons, elevator and rudder are centred. If any adjustments are needed, do these by uncoupling the relevant clevis and turning it clockwise to shorten the linkage or counter-clockwise to lengthen it. Only when each control surface has been centred mechanically in this way should you begin adjusting the surface movement (or throw)

Now confirm that the control surfaces are moving in the correct direction. Use the servo reversing switches on your transmitter to reverse the direction of a servo if necessary. The most popular transmitter mode (with the throttle on the left, with ailerons and elevator on the right) is shown here.

INSTALLING THE RECEIVER BATTERY

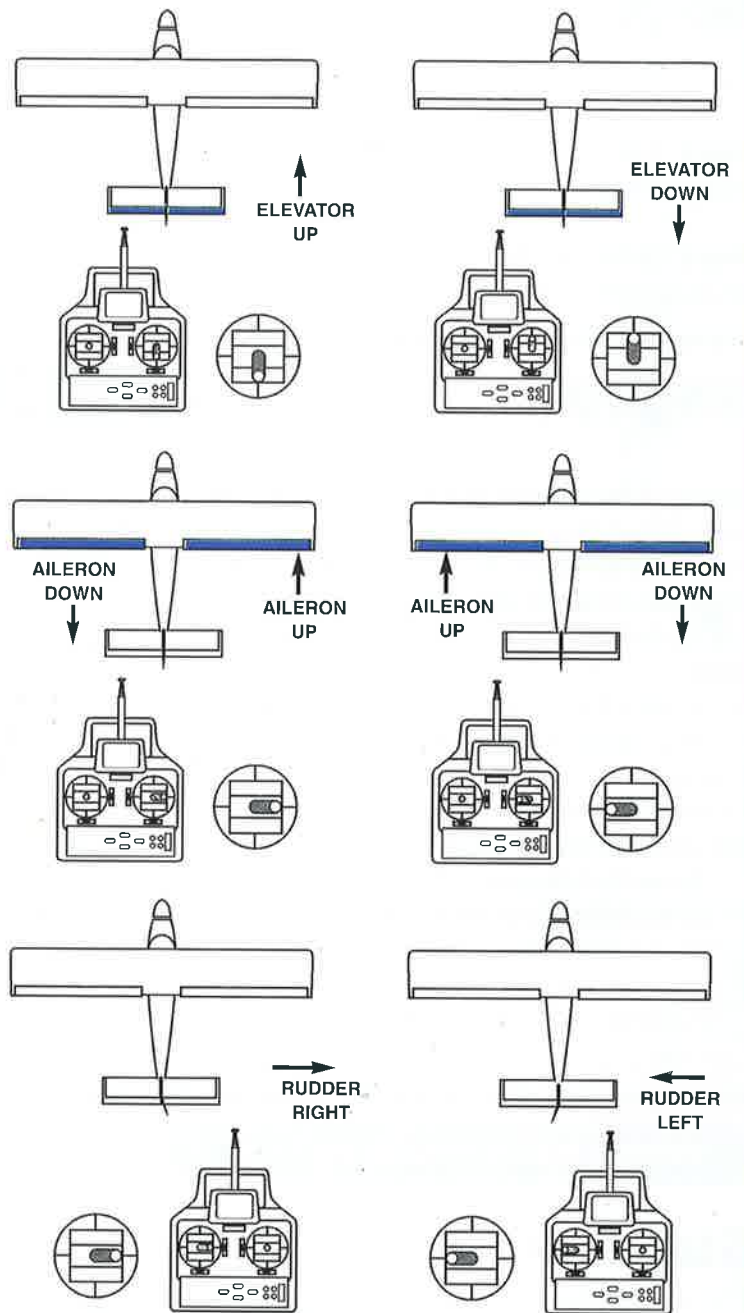
Stage 35

Step 1. Consult your radio manual for instructions about hooking up your receiver battery, receiver and switch harness.

Step 2. Wrap the battery pack securely in foam suitable for RC equipment and wrap the foam insulated pack in a plastic bag or cling wrap.

Step 3. Thread the battery pack connector back through from beneath the fuel tank to the radio compartment by passing the battery connector through an opening beside the fuel tank.

Step 4. Connect the battery connector to your radio system according to the radio manual.



INSTALLING THE RECEIVER

Stage 36

Step 1. Consult your radio manual for instructions about hooking up your receiver.

Step 2. Plan where you are going to put the receiver with consideration for routing the antenna safely.

Step 3. Wrap the receiver securely in foam suitable for RC equipment and wrap the foam insulated receiver in a plastic bag or cling wrap.

Step 4. Generally in the absence of specific instructions from the radio manufacturer, it is recommended that the receiver should be placed where it is least likely to have impact during a crash. Keep the battery pack and other heavy loose items ahead of the receiver.

Stage 37

CONFIRM RADIO OPERATION

Step 1. Consult your radio manual for instructions about testing and operating your radio system.

Step 2. Pay particular attention to charging your radio system batteries and range testing the system before and after each flight.

Step 3. Check that all controls are working correctly before and after each flight.

Stage 38

BALANCING THE AIRCRAFT.

The CG of your Apache III is located at 89 to 108 mm (3 1/2 " to 4.1/4 inch) back from the leading edge of the wing when the wing has been attached to the fuselage.

For the initial flight, the CG should be located at 3 3/4" (95mm) back from the leading edge of the wing when the wing has been attached to the fuselage.

The CG is measured with the engine, radio gear and all other components installed but WITH NO FUEL IN THE TANK.

Set up the CG as it will be when you fly it BUT WITH NO FUEL IN THE TANK.

It is very important to have the CG correct. Flying your model with the CG too far will likely lead to loss control and a crash.

If you discover that after you have assembled your model and installed your radio and engine that the CG is incorrect you must bring the CG to the correct location by doing the following BEFORE FLYING :

- Move the battery pack fore or aft.
- Move other components fore or aft.
- Change engine to a lighter or heavier model.
- Add weight to the nose or tail. If adding it to the nose, try to make it useful by going to a heavier duty engine or adding a spinner with a heavy metal backing plate. As a last resort, add stick on "dead" weight where appropriate.

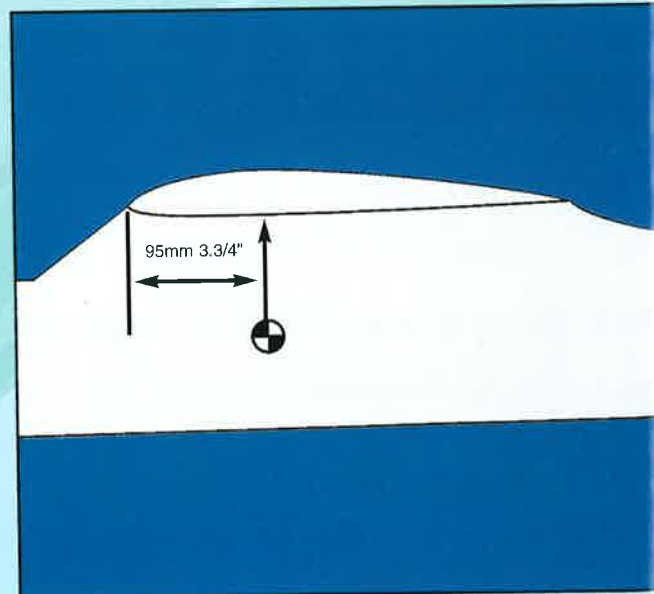
CONFIRM MECHANICAL INTEGRITY

Stage 39

33.1 Once you have confirmed that the CG is correct, you should do a thorough review of the entire model before your first flight. Check everything twice! Every hook up, every coupling, everything! Do it twice!!

33.2 Before your first flight , have an experienced flyer review your work. Do not fly your model until it has been checked out by a third party who knows how to fly and how to set up a model aircraft

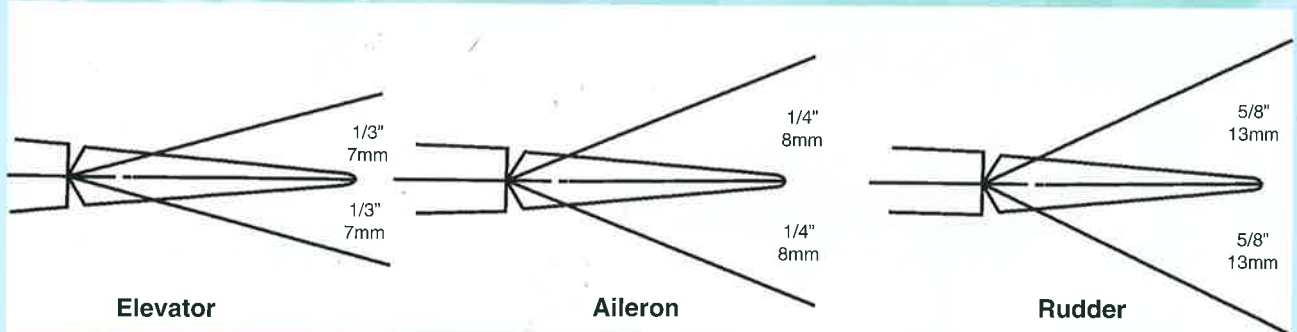
33.3 Once you have completed your first flight, get in the habit of checking your model over before and after each flight! Don't fly if you find something that is not right!



NOTE : The throws are measured at the widest part of the elevator, rudder and aileron. Adjust the position of the pushrods at the control/servo horns to control the amount of throw. You may also use the ATV's if your transmitter has them but the mechanical linkages should still be set so that the ATV's are near 100% for best servo resolution.

	High rate	Low rate
ELEVATOR	1/2 " (12mm) up 1/2 " (12mm) down	1/3" (7mm) up 1/3" (7mm) down
RUDDER	1 " (25mm) right 1" (25mm) left	5/8" (13mm) right 5/8" (13mm) left
AILERON	3/8" (11mm) up 3/8" (11mm) down	1/4" (8mm) up 1/4" (8mm) down.

Note: If your radio does not have dual rates, then set the control surfaces to move at the low rate throws.



Picture of APACHE III cocpitt decoration



Parts for this VMAR Model

In the event that you require replacement parts for you APACHE III, you can order parts from your retailer or from the VMAR On - line store at www.richmondrc.com.

Fuselage	#VMA-A140XF (with servo tray & all rods)
Wing set	#VMA-A140XW (a set of left and right with joiner ect)
Tail set	#VMA-A140XT (contains horizontal and vertical stabilizers)
Canopy set	#VMA-A140XN (dummy pilot assembly)
Main gear	#VMA-A140XMG (fiberglass main landing gear with axle set)
Nose gear set	#VMA-A140XNG (with main gear axles)
Tail wheel assembly	#VMA-A140XTW (with mounting screws)
Covering set	#VMA-A140XV (POLYCOTE ECS)
Wing parts bag	#VMA-A140XWPB (spar joiner, aileron rods etc)
Master bag	#VMA-A140XMB (as in kit)

For aftermarket parts and other information related to this model see VMAR On - line at www.richmondrc.com.

POLYCOTE™ ECS

ENHANCED COVERING SYSTEM



This model is covered with our ULTRA TOUGH POLYCOTE ECS Enhanced Covering System.



POLYCOTE ECS

is a proprietary Enhanced Covering System engineered in Canada and available only from VMAR.

With POLYCOTE ECS the graphics are inside the covering... not stuck on top. No Decals! No Layers! No Strips! No Stripes! POLYCOTE ECS utilizes ULTRA TOUGH polyester and our SURE SEAL system to ensure that the seams stay down! Best of all POLYCOTE is totally fuel proof! Quite simply... POLYCOTE ECS leads the pack in ARF covering systems!

CARE & CLEANING OF POLYCOTE ECS.

CARE: Avoid leaving your model in a closed car exposed to direct heating from the sun for lengthy periods. Temperatures under such conditions can exceed 50C (122F) and sagging may occur.

TIGHTENING: To tighten POLYCOTE ECS we recommend using a hobby heat gun set for medium heat and a soft cloth. We do NOT recommend an iron. Practise on the bottom of a less noticable section first. On open bays, heat and then let cool. On solid surfaces, heat and then lock down by rubbing.

RESEALING SEAMS: POLYCOTE ECS seams are sealed with our SURE SEAL system and will not normally lift. If you find a loose edge, clean any oil residue from the area and reseal with thin CA.

PATCHING: If you should puncture POLYCOTE ECS, clean any oil residue from the area of the paper. Patch with low temperature covering using a heat gun and soft cloth. See Tightening tips above.

CLEANING: To clean POLYCOTE ECS we recommen "Fantastic" household cleaner and disposable paper towels. You can use just about any cleaner and we are not aware of any cleaner that will damage POLYCOTE but it is a good idea to always test a small out of the way spot first. Wipe along seams, not across.

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