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please report errors to info@wildharerc.com**

**Wild Hare R/C
Edge 540 102.5" Fast Build
Assembly Manual**

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Warranty Information

Wild Hare Hobbies, Inc. guarantees this kit to be free of defects in both material and workmanship at the time of purchase . This warranty does not cover any components damaged by use or modification. **In no case shall Wild Hare Hobbies, Inc. liability exceed the original cost of the purchased kit.** Further Wild Hare Hobbies Inc, reserves the right to change or modify this warranty without notice. **This warranty extends only to the original purchaser.**

In that Wild Hare has no control over final assembly or materials used in final assembly, no liability shall be assumed or accepted for any damage resulting from the use by user of the final user assembled product. By the act of using the user assembled product, the user accepts all resulting liability.

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

While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying such as racing or extreme aerobatics the modeler is responsible for taking steps to reinforce the high stress points.

Read through this manual before starting construction. It contains important warnings and instructions concerning the assembly and use of this model.

Warning. This is not a toy. If not properly controlled it can cause injury or death and property damage.

Specifications

Wingspan	102.5 inches
Length	96 inches tail to spinner tip
Wing Area	1990 sq. inches
Weight	23-26 lbs. depending on equipment choice
Recommended engine	DA-85, DA-100, DL-100, TMM 106

Additional equipment required

Computer Radio with at least 8 channels strongly suggested.
2 Elevator servos minimum 180 oz./in. of torque each e.g. Hitec 7955TG or 7985
2 aileron servos, minimum 330oz./in. per wing, Hitec 7955TG suggested.
Rudder servo(s) at least 330 oz./in. Such as Hitec 7955TG (see text)
Throttle/choke servo standard BB servo such as Hitec 425 or better
Radio operated engine kill switch or servo operated choke strongly suggested
Radio battery pack(s) at least 2300 mah capable of delivering 15 amps for short periods.
Switches for receiver and ignition.
Miscellaneous servo extensions. 2x36", 4x18", 2x12"
4 1/2" spinner

The kit may include axles. These are light duty metric size and may not last more than a few flights, stronger axles are supplied in our optional hardware kit. **If a wheel or axles fails it is very likely that the aircraft will be damaged.** The ARF kit also includes a tailwheel assembly, wing tube (carbon fiber 1.50") and miscellaneous small hardware for mounting the cowl, wings, stabs, and landing gear. The carbon fiber stabilizer tube is packaged inside the wing tube.

Please remember, this is a big airplane with high stresses on the controls. You must use high performance servos, pushrods, linkages, horns, etc. **Flexing in linkage or loose hinges can and will cause flutter of the control surfaces which will destroy the airplane in just a few seconds. *Metal gear servos are required, titanium gears are preferred. Metal servo arms are strongly recommended.***

Special Information About This Aircraft

This Edge 540 is capable of competing at a world class level in aerobatic competition. If you are considering purchasing the plane, keep in mind that to fly safely and properly it will require a significant expenditure on servos, batteries, and other equipment for the control system.

This a very large airplane with high stresses. The control systems for it will require large amounts of current for the plane to fly properly. You will need heavy duty servos, extensions, and power supply.

If you do not already have a familiarity with how to equip a large aircraft, it is probably not the right plane for you at this time. Call Wild Hare for advice if you have specific questions, but you should be 100% confident in your setup before flying this plane.

This manual will be kept brief because it is assumed that the reader has extensive experience with large radio controlled aircraft.

Optional Accessories

Wild Hare R/C makes available accessories that can enhance this kit's usefulness.

Hardware kit. Your kit has only basic fasteners included, but our hardware kit includes all the things you need to assemble the Edge 540 except for engine, muffler, spinner, glue, prop, and electronics. The hardware has been tested to be completely compatible with our kits. it contains;

Heavy duty ball links and control horns.

Composite pushrod materials to make pushrods as explained in this manual.

Wild Hare pull-pull kit for rudder.

4" Dubro or Sullivan wheels and 3/16" axles and 4 wheel collars..

24 or 32 oz. gas tank plus tygon line, tee, and fuel dot

2-56 throttle and choke pushrods with nylon clevises plus EZ connectors

Many miscellaneous small parts such as nuts, washers, horns, springs, etc.

Spinner. The Edge 540 requires a 4.5" spinner. Wild Hare normally keeps Dave Brown Vortec spinners in stock, they are cut to fit a large prop such as a 27-10 Bunny, and are normally available drilled for a DA-100 and a 6 bolt pattern as is used on DA-100.

Switches. The Edge 540 has holes laser cut in the fuse sides to accept the Maxx products charge-jack switch, a very nice way to switch your receiver and ignition batteries. Wild Hare sells Smart Fly switches and A123 lithium-nano-phosphate batteries which are highly recommended.

Servos. Wild Hare sells servos from Hitec and other manufacturers. We have flown this plane with servos ranging from the JR 8711a to the Hitec 7955TG. It is absolutely essential that you use good servos. I found that a single Hitec 7955 on the rudder is all that is necessary.

Pilot and instrument panel dresses the plane up and is required to avoid penalty in in upper IMAC classes.

Assembly sequence

The fast-build nature of this plane has changed the natural order of what should be done when. It used to be that the first thing to do was mount the engine, now the landing gear comes first. Below is the approximate sequence for assembling this plane.

1. Open and inspect everything, add any updates or corrections noted.
2. Mount the landing gear and tailwheel.
3. Mount the horizontal stabs and rudder
4. Mount the engine to the firewall.
5. Install control horn studs in all surfaces.
6. Install the canopy/hatch
7. Install the servos
8. Install the pull-pull cables (where needed)
9. Install linkages
10. Set CG and control throws
11. Recheck and fine tune balance and throws, range check, test run engine.

It is extremely important that the engine runs properly and is reliable. More crashes are caused by engine failure than by all other reasons combined.



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Step 1. Open and inspect everything

This section should be fairly self explanatory.

In the large box you should have a fuselage with hatch and attached canopy, wing tube and stab tube, the elevator/stab assemblies, the rudder, cowl, wheel pants, landing gear and packages with the tail wheel assembly plus miscellaneous nuts and bolts. The hinges are installed in the elevators and ailerons. The rudder is also hinged but not attached.

Check everything for shipping damage and/or manufacturing defects. **If there is a problem, report it to us NOW**, not after you start building the plane. **SAVE ALL PACKAGING UNTIL YOU ARE SURE THERE IS NO DAMAGE. THE ORIGINAL PACKAGING IS REQUIRED FOR ANY DAMAGE CLAIM.**

Known issues and improvements

There are a few areas where, at this unassembled stage, you can improve the final results of your assembly project. There are many items that cannot be addressed on the assembly line due to cost and possibly because not every improvement would be welcomed by every builder. Here are a few items that have come up over time.

First, check the fit of wings and stabs to the fuse. Now is the time to report any problems.

Firewall reinforcement — First, be sure the firewall is properly glued, this is one weak spot of assembly line construction. Set the fuselage on its side on an angle with the nose down. Put something under it, glue may drip. Drip thin CA into the joint between the firewall and the motorbox side. Let it dry, then repeat until the wood will no longer absorb any Ca. Turn the fuse over and repeat. It's also a good idea to install triangle stock in the corners where the firewall meets the sides, also with epoxy. After doing this we have never had a firewall fail in normal use.

Re-glue servo trays — One of the areas that the factory can do better is gluing the servo trays. After you have cut away the covering over each servo tray you should use some thin or medium CA to securely glue these into the wings and stabs.

Builder's Tips

Gas planes tend to vibrate more than one might expect. **Fasteners come loose** if not properly retained. Always use washers/lock washers. When possible use nylock nuts. You can put a little RTV silicone in the threads of screws to help keep them from coming loose. Do not use loctite on small screws, you may never get them out. An exception is engine mounting screws which should have blue loctite in their threads. Never use red loctite.

To open the large holes in the covering use a sharp Xacto knife. Cutting covering dulls the blade quickly so have spare sharp blades available.

To open small holes neatly use a hot soldering iron, this creates a much neater opening.

Do yourself a favor and order a bag of socket head/washer head servo mounting screws from microfasteners.com, part # STW0207 (7/16") or STW0209 (9/16"). You will use them everywhere. \$5 well spent.

On wheel collars I replace the small allen head set screw with a conventional 6-32 socket head screw SCA0604 also from Micro Fasteners. This allows you to get the screw very tight and prevents lost wheels, works with the Dubro wheel collars in the WH hardware kits.

It's a good idea to install the control horn studs in the hard points before you mount the h-stabs and rudder. Once installed on the plane handling the surfaces is not as easy.

When making adjustments to controls and balance, make small changes and try to make only 1 change at a time. This seems tedious but it can prevent a lot of troubles.

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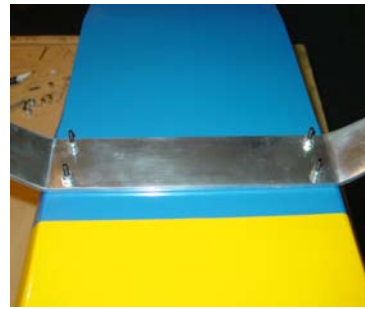
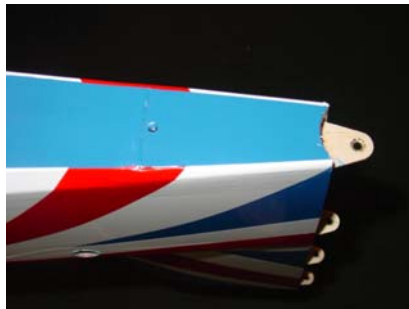
Step 2. Attach the landing gear.

This step is first because it is easier to mount the engine with the plane sitting in its gear.

The main landing gear is bolted to the bottom of the fuselage with 4 8-32 x 1" screws and lock nuts. The holes are already drilled in the fuse, you just need to find them and open the hole in the covering with an Xacto knife or a hot soldering iron.

The tailwheel is inserted into a pre-drilled hole in the rear support plate, then two saddle clamps are attached with small wood screws to hold it in place.

The tailwheel will need to be removed later to install the rudder, that is the time to hook up the tailwheel steering linkage. The wheel is steered from the tiller by means of springs which protect the rudder servo(s) from damage from severe shock on takeoff/landing.

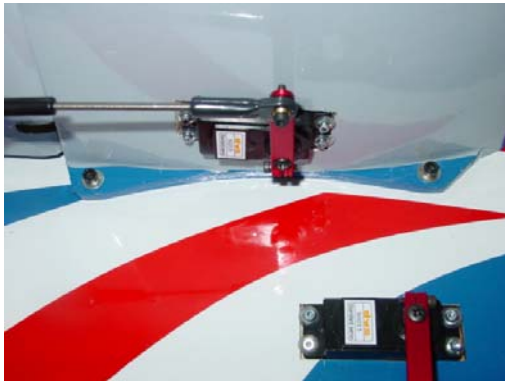


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Step 3. Attach the elevators/horizontal stabilizers and rudder.

The H-stabs mount on a carbon fiber tube/spar and are retained to the fuselage by 2 6-32 screws on each side which go through a tab on the bottom of the stab into pre-drilled holes in the fuse.

The rudder must be hinged to the fuselage. See note on following page.



Step 4. Engine mounting

The first thing to do, before anything else goes in the fuselage, is to get the engine mounted and aligned with the cowl. Here's how it is done on this fast build plane.

There is a "+" cross on the firewall. There is also a template for a DA-100 (or DA-85) included with the plane. It has a center mark also. If you are not using a DA-100 or DA-85 or equivalent you will need to supply your own template with a mark indicating the centerline of the crankshaft. Drill through the two center marks and mount the template to the firewall aligning the two center marks. Note that the DA-100 has the narrower side at top/bottom even though it is marked along its longer side.

Drill the engine mounting holes with a 3/16" drill, then remove the template. Enlarge the holes to 1/4" and install 4 10-32 blind nuts (supplied with our optional engine mounting kit). It is helpful to mount the blind nuts into 1" aircraft ply squares and use CA to glue these squares to the rear of the firewall as you pull the blind nuts in from the front. This makes them easier to install and prevents the nuts from sinking into the lite ply firewall.

Mount the cowl to the plane without the engine in place, and measure the distance from the firewall to the cowl's spinner ring (face). Mount the engine on spacers to put the spinner backplate about 1/16" in front of the cowl face. With a DA-100 this is 2 inches. Using the Wild Hare engine mounting kit will simplify this process.

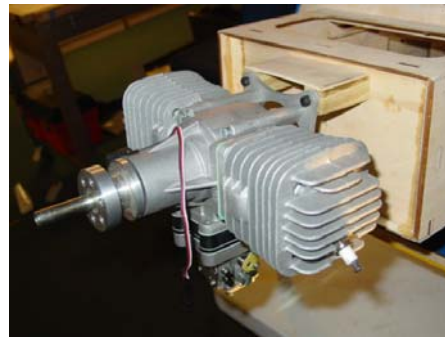
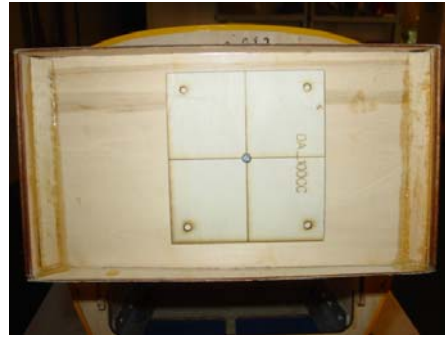
Hinging the rudder

The hinges are glued into one side of the rudder, you will need to glue those hinges into the vertical fin. We recommend a foaming glue like Gorilla glue for this.

It is a very simple procedure. It sounds complicated but should only take a few minutes.

1. Iron down the covering on the hinge line of the fin so there are no loose edges or seams.
2. Put a piece of 2" wide masking tape across each hinge hole so the hole is roughly centered in the tape.
3. With a sharp razor knife cut away the tape and covering material from each hole so only wood is exposed.
4. Again using your sharp razor knife cut the tape along the pointed bevel edge so the tape can later be pulled away with the hinges installed.
5. Pour some Gorilla glue in a cup. With a toothpick (break off the pointed end) pick up as much glue as you can get to stick to a 1" section of the toothpick and then swab the inside of 1 hinge hole until the sides are generously covered with the glue. Wipe off any excess.
6. Insert the hinges of the rudder into the fin.
7. At this point it is a good idea to wipe the hinge line
8. Allow the glue to set for at least two hours, but keep an eye on it for the first 15 to 30 minutes to be sure the glue's foaming action does not push one of the hinges out of the hole.
9. After the glue is set flex the rudder back and forth to break away any glue that might have stuck to the knuckle.
10. Allow to dry for 4 more hours.
11. At this point you should be able to flex the surface back and forth. You can now remove the masking tape.
12. Clean off any residue from the hinge and put a drop of 3-in-1 oil on the knuckle. The surface should move freely.

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Step 5. Install control horns

This plane uses a single servo on each aileron. Because of the stresses involved you will need to use 10-32 screws instead of the usual 8-32. All of the holes in the hard points need to be enlarged to 5/32" so that the #10 screws will thread in securely without cracking/splitting the hardwood dowels that are used as hardpoints.

Control horns are the stud type. A 10-32 steel screw is threaded into the enlarged hard point from one side of the surface (the bottom on aileron and elevators) and then the head is cut off leaving a 10-32 stud which provides a mount for the plastic control horn. The Wild Hare hardware kit includes control horns designed specifically for this plane or they can be purchased separately.

On ailerons and elevators for each horn mark a 10-32 x 2 1/2" screw 1 inch from its end. Thread the screw into the enlarged hole in the hard point until the mark is even with the surface. Then cut the head off the screw using a dremel with cutoff wheel or similar tool. Smooth away any burrs.

Thread the control horn onto the protruding stud. You may need to hold the shaft of the stud with a pliers to prevent it from rotating deeper into the hole. Screw the horn on to the stud until the top of the stud exits the horn. Final adjustment of horn height will come later as you adjust the servo linkage.

On the rudder thread a 4" 10-32 screw in from one side until there is an equal amount of thread showing on each side, then cut the head off.

Here's another hint. Instead of using 10-32 screws, I cut sections from an 10-32 threaded rod. To screw them into the hard point I chucked the threaded rod section into my cordless drill, this worked well and was fast.

Step 6. Mounting the hatch and canopy

The hatch mounts to the fuselage by tabs on each side. The holes for mounting the hatch are pre-drilled and 6-32 blind nuts are already installed, you only need to find the hole under the covering and open it up with a knife or a hot soldering iron.

The canopy is pre-attached at the factory. No additional work should be required, but you may want to add a panel and pilot to dress the plane up.

When you attach the hatch to the fuselage use lock washers and/or some type of thread locker such as RTV silicone in the threads to avoid losing these two screws.

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Step 7. Installing the servos, adjusting the linkages

In attempting to write this chapter, I realized that this operation is something that each person will want to do their own way. I will merely offer information that I know to be accurate and of help.

Use heavy duty (22ga if possible) extensions with good gold plated connectors. Current flow with these powerful servos is very important and connectors introduce resistance which can negatively affect servo operation.

Set the plane up so it's easy to attach and detach the wings, and the h-stabs also if you see that they will be on and off the plane frequently.

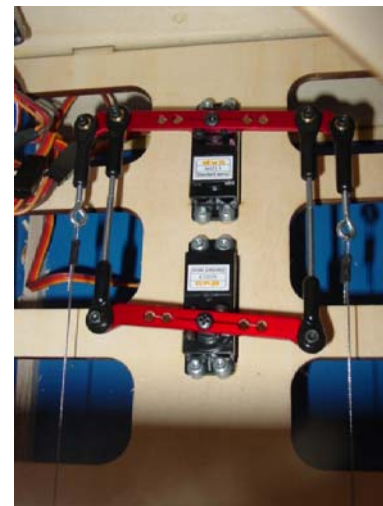
A power expander such as the smart-fly power expander is very helpful in distributing all the signals to all the servos.

The installed rudder tray can be used to gang several servos together for the rudder, however in testing we found that one Hitec 7955 will do anything one could want.

Two servos can be ganged together very easily without any binding, here's how it's done. Wild Hare can provide a kit to do this.

In the photo at the right, there are two servos mounted in the installed tray. The forward servo has a 4" arm with holes also the 3" point. The rear servo has a 3" arm.

The servo with the 4" arm actually drives the rudder. The one with the 3" arm is connected through pushrods with a slip fit into the forward ball links. The rear section is threaded, the front section is a smooth rod that slide in and out of the ball link. Leave a small amount of clearance inside the ball link to prevent binding. When the rudder is under load the main servo will pull back slightly and the rear servo will then provide additional support. When not loaded the two servos are not mechanically connected.



These rudder servos are connected to the receiver through a Y cable.

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Step 8. Install the pull-pull rudder controls

Using a pull-pull rudder linkage has many advantages. It is simple and light and easy to make, here's how to do it using the Wild Hare pull-pull kit.

Start with your control horns installed on the rudder tiller equidistant from the center of the rudder and the servo that will drive the rudder installed. Trim the covering away from the slots in the fuselage.

Screw 4-40 eye bolts into the two ball-links on the rudder horns and into two other ball links. Attach those two ball links to your rudder servo arm, one on each side. Screw the eye-bolts into the ball link about 1/4". This will leave room for adjustment later.

Cut the supplied cable in half, and attach one segment through the eye bolt in each end of the rudder servo arm, and use the supplied crimp sleeve to secure the wire. You should now have an assembly consisting of the double servo arm, 2 ball links, 2 eye bolts and 2 cables..

Install the servo arm on the servo. Fish a long wire from the rear of the fuse through the slot in one side and up through the fuse. Tape the cable end from that side of the arm to the wire and pull it back through the slot. Repeat for the other side.

You now have both cables hanging out of the slots. At this point you will need to have power to the receiver and center the rudder servo. Use subtrim to get the arm exactly square to the fuse centerline. With the fuse sitting on one side slip a crimp collar over the cable and thread the cable through the eye bolt on the top side of the rudder, then back through the crimp sleeve. Holding the rudder centered, pull the loose end of the cable as tight as you can get it and crimp the sleeve down on the cable to secure it. Cut off the excess cable. Repeat this procedure on the opposite side of the fuse.

At this point the cables will be a little loose. If you followed the instructions you will have about 1/2" of adjustment at each eye-bolt/ball link. Tighten the eyebolts into the ball links to take up the slack. You want the wires pulled tight, but not so tight that they place a strain on the servo mount. They are not guitar strings!

When you actuate the rudder the non-pulling cable may become slightly slack, this doesn't hurt anything. There should not be any slack when the rudder is centered.

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Steps 9. Installation of fuel system, radio and control linkages

These 3 subjects are combined on one page because this is the part where you get to do things your way. We have only done a few things to get you started.

There are pre-cut holes in one or both fuse sides that will fit the popular integrated switch/charge jack assemblies. These are available from Maxx Products, Cermark, JR, and probably several other vendors. Some trimming may be required. . **If you do cut into the fuse side for any reason do not cut the balsa longerons at the top and bottom of each side.**

The fuel tank can be mounted on top of the canister tunnel just in front of the wing tube. Putting it there minimizes changes in balance as the engine burns off fuel. There should be plenty of room for a smoke tank also.

The Wild Hare hardware kit supplies the complete fuel system. We anticipate that you will use a two line system. In this arrangement one line is the vent line and simply goes to the outside air. The other line connects to a Tee, one leg of the Tee supplies fuel to the engine and the other leg is used for filling. Drill a 3/8" hole and mount the body of the fuel dot on the fuse side where it will be convenient. The fuel dot glues into the fuse, there is no nut to secure it. Use some thick CA to hold it in place. The line from the Tee goes through the fuel dot and is plugged with the supplied plug.

Please use good strong pushrods and other linkage parts. A sample of the assembly that we used is shown in the picture below. We use carbon fiber reinforced steel pushrods and our own brand of control horns similar to the Rocket City parts. The servo connection is done with Wild Hare #4 ball links attached to aluminum servo arms.

Making pushrods that will withstand the forces involved in a large plane of this type is very simple once you see how it is done. If you have your own design, feel free to use it, but make sure it will handle the load.

You will need a length of 3/16" carbon fiber or fiberglass tubing, a length of 4-40 all-thread rod, and some 4-40 nuts. All this hardware is included in our optional hardware kit. We use fiberglass tubing because CF tends to split under compression, if you use CF use a ferrule to hold it together at each end (*you can get a nice ferrule for this at any bicycle shop, they are used on the cables on bikes*).

First, set up your linkage using the ball links and the 4-40 all-thread cut to the proper length. You can make all your pushrods at once, so get all those rods set to the right length. The rod should screw into the ball link far enough to be sure there is sufficient thread engagement. It's a good idea to draw a mark on the threaded rod about 3/8" from the end, then thread the rod into the ball link until the mark disappears.

Measure each pushrod, and cut a piece of carbon-fiber tube that is 1 1/2" shorter than the rod. Slip the tube over the rod and tighten down a nut from each end so that you leave an equal amount of thread at each end to mount the ball link. Tighten the nuts slightly so they don't come loose (loctite helps) and so there is a little tension on the rod inside the tube.

You're done. Install the pushrods.

Note: With solid steel the full length the rod cannot pull apart. The fiberglass tube carries the load when the rod is pushing. The only place it can bend is in the region of exposed steel rod, so the less steel rod that is showing the better.



The lengths of the pushrods used on the Extra 260 are as follows;

Ailerons	4 1/2"
Elevators	3"
Rudder	10.25" (if not using pull-pull cables)

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Step 10. Mounting the wings, balancing and control throws.

The wings mount to the fuselage on a carbon-fiber tube that goes through the fuselage. The wings are retained with two 1/4"-20 screws on each wing through the fuselage side. Nylon thumb screws are supplied with the kit because they are more resistant to vibration.

The first flight should be done with the plane balanced at the center of the wing tube or slightly in front of the center..

You may move the wings forward or aft to achieve the desired balance. Remember that the CG is relative to the wing, not to the fuselage, so the balance point moves as the wing moves.

Balance is a matter of personal taste, there is no set CG specification for all people. I prefer a CG which flies the same upright or inverted. Your preference will vary, you can adjust it later but it's important on the first flight that the plane is balanced at or slightly ahead of the wing tube when it is in ready to fly condition.

Most people prefer that the plane requires a small amount of down elevator to maintain level flight when inverted.

Control Throws

We set the control throws as follows on planes in test. Please keep in mind the high rates specified here are for 3d. The elevator in particular at these rates will cause instant stalling, tumbling, and all sorts of other things that can only be done at low speeds. **Do not use the 3d settings until you are thoroughly familiar with the plane on low rates.**

	High rate (3D)	Low rate
Ailerons	23 deg	16 deg
Elevators	40+ deg.	12 deg. is plenty
Rudder	45 deg.	25 deg.

Fly the plane on low rates at first. At high 3d rates it is very difficult to fly. The 3d rates are intended only for extreme aerobatics. On the first flight you are much more likely to have too much control throw than not enough, so plan accordingly. Adjust to your preferences after you become familiar with the plane.