Introduction

Specifications

Wingspan:	118"
Length:	112"
Wing Area:	2670 sq in
Weight:	36 - 39 lbs

Recommended Engines:

3W 140iB2F, 150iB2F, 156B4, 157xiB2F

Already Completed By 3W:

- Wheels, wheel Pants, main gear pre-mounted
- Tailwheel bracket pre-mounted
- All control surfaces pre-mounted and hinged but not glued (use your favorite glue)
- The canopy is cut out and fitted to the canopy frame with approx. 90 stainless steel screws
- The cowl has been pre-mounted

Most of the hardware and accessories needed for completion of your airplane are available from Aircraft International.

Items Needed For Completion:

- Motor
- 14 High Torque Metal Gear Servos
- Heavy Duty Arms & Linkages
- 5" Spinner
- Fuel Tanks, Tubing, and Fittings
- Power Distribution System (PowerBox)
- Batteries
- Receiver
- 22ga Heavy Duty Servo Extensions
- 3W Servo Mounting Trays
- Aluminum Servo Arms

Although this builders guide is specifically geared to show the assembly of a
3W 40% Extra 330S - Level 3 Kit,
This builders guide can be used for most of the 3W aerobatic kits.

Disclaimer:

Although your 3W Extra 330S was highly prefabricated from the factory, you are required to install your motor, fuel system, smoke system, radio gear, linkages, and power distribution system.

The recommended steps for completion of this aircraft are outlined in the following pages. We understand there are other methods and components that may be used to complete this aircraft. For best results and overall success with your 3W Extra 330S we highly recommend that you build your Extra with similar techniques and equipment as illustrated in this builder's guide.

Thank you for purchasing your 3W Extra 330S.
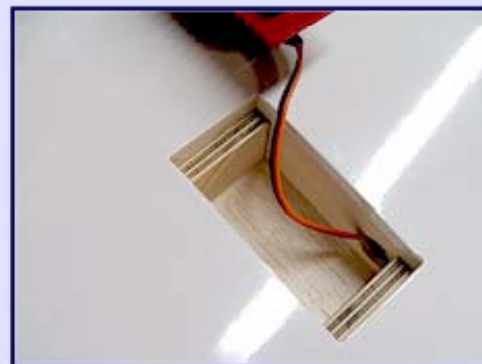
[1]   Install aileron hinges. We like to use 3 hour epoxy which gives plenty of working time and flows nicely. 3W Monster Hinges in Flat and Point styles are available from Aircraft International and work very well.

[2]   Once the epoxy has cured, we strongly recommend sealing the hinge gaps. Clear Ultracote works best for this. Now might be a good time to apply any graphics as well.

[3]   The wing servo holes were designed to fit the 3W servo trays. In this installation, we used the upright servo trays. Cut a bunch of aircraft plywood blocks to use as mounts for the 3W servo trays. The blocks should be as wide as the hole in the wing and as high as neccessary for your servo case top to be just above the bottom of the wing. When satisfied with the fit of each servo, glue in all of the blocks with epoxy. Rough up the bottom of the trays where they will glue to the blocks with 80 grit sandpaper. Glue all trays in place with epoxy. Repeat this process for both wings.

[4]   Now you need to install the control horns and linkages of your choice. We chose to use the Hangar 9 brand 8-32 Ball Link Hardware. It consists of a bolt that threads into a hard point in the wing with a delrin yoke on top that attaches to a ball link and pushrod. Depending on your version or build level of your plane, the hard points may be installed in your wings and stab already. Put a little glue in the holes of the hardpoints and screw in the horns.

[5]   We used SWB aluminum servo arms for our installation. Attach the servo arms to each servo. It is best to do this with the servos turned on at neutral. If not, the servos may fight each other when turned on later and they could damage something. Attach ball links to the control horns and arms. Measure the length of pushrod each one needs. We used Hangar 9 Pro Link Titanium Rods.

[6]   After the servo installation is complete, slide both wings onto the wingtube. Mark the locations of the wing retaining bolts, the anti-rotation pins, and the servo leads.

[7]   Using aircraft grade plywood, fabricate some plywood reinforcing rings for the wing attachment bolts and the anti-rotation pins. These rings will be sanded to the contour of the fuselage side. They should only be glued in place after the installation of the electronics tray.

Wing Anti-Rotation Ring

Wing Bolt Ring

Preparing the horizontal stabilizer assembly:

[8] Glue in the hinges like you did with the wings. 3 Hour epoxy works best here.

[9] Seal the hinge gaps. Clear Ultracote works best here.

[10] Cut pieces of 1/8" medium to hard balsa to use as floors in the servo cutouts. The 1/8" balsa spacers will raise the servo mount for proper clearance.

[11] Apply any graphics now, before any servos are installed.

[12] Using 3W Flat Mount Servo Trays available from Aircraft International, pre-mount your elevator servos. The rubber grommets should be installed in your servo but not the brass eyelets. The servo mounting tabs fit on each side of the mounting ear, then get fastened to the tray with sheet metal screws.

[13] Rough up the bottom of the tray with 80 grit sandpaper and glue in place with epoxy.

[14] Install the linkages just like you did with the wings.

[15] Install a 1/2" hardwood dowel into the root of each stab half. Screw eye-hooks into both dowels. These assemblies should be epoxied into the root of the stab with the eye hook protruding.

[16] Slide both stab halves onto the two stab tubes. Mark the locations of the hooks and servo wires. Cut clearance holes for them.

[17] Using a wire hook and rubber bands, connect both stab halves to the fuselage with the rubber bands attached to each eye-hook. This is easiest when the rubberbands are attached to one side, fished through the hole on the opposite side with the hook, then attached to the second stab half. 6 to 8 rubber bands are more than enough.

[18] Use spiral cable wrap on the servo leads where they enter the fuselage.

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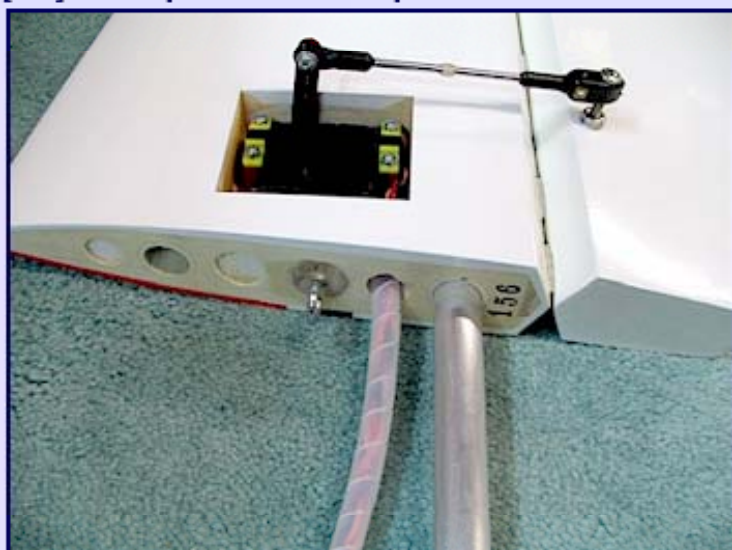
Installing The Rudder:

Your kit is shipped with the rudder post (or trailing edge of the vertical fin) detached for shipping reasons. You will need to glue this piece into the rear of the vertical fin on the fuselage.

[19] Start by dry fitting the rudder post into the rear of the vertical fin. It should slide in with a minimal amount of effort. Press on both sides of the fin to flatten the composite sides if the rudder post seems too tall. It was test fit at the factory when they covered and painted your model so it should fit well.

[20] After dry fitting, lightly rough up the interior of the fin where the rudder post will go to give your glue some extra grip. You might also consider using a T-pin to poke small holes along the edge of the balsa rudder post's gluing surface for the same reason.

[21] Using painter's easy peel masking tape, apply a band around the outside rear of the fuselage to protect against clamp marks and stray epoxy. Mix up a batch of 3 hour epoxy and glue in the balsa rudder post. For added strength, you might consider fiberglassing the assembly to the fuselage from the inside. Keep plenty of rags handy to clean up the excess epoxy. A friend can help stabilize the fuselage while you glass in the rudder post. Two straight hardwood sticks clamped to each side of the fin will assure a good straight joint.

[22] After everything cures, install your hinges with 3 hour epoxy.

Pull/Pull Cable Installation:

Important: Before proceeding with the pull/pull rudder cables, you must install your electronics tray and rudder servo system. We chose to use an SWB servo tray and a 3W 3D Pull/Pull Arm.

[23] Install your control horn/s. Our method used a 5-3/4" piece of stainless threaded 8-32 rod with washers and lock nuts on each side and Hangar 9 ball link horn hardware. This goes through a dowel hardpoint which was already built into our rudder from the factory. Center the threaded rod and attach the clevis links to each end of the rod so they are flush with the ends of the rod. Tip: This step is easier to accomplish by using an oversize piece of rod with 2 flats ground down on one end. Thread the rod through the hole by using small vice grips on the flats. Cut off the excess with a Dremel tool when done.

[24] Thread the wires through the plane after cutting your cable exit holes. See the Pro Tips section for details on finding where these holes go.

[25] Use SWB Wire Tensioners at the bellcrank end, and ball-links at the rudder end.

Mounting The Engine:

[26] Tape the appropriate motor mounting template (supplied in the back of this booklet) on the front of the motor dome and drill (4) 1/4 Inch mounting holes.

[27] Cut (4) 1" x 1" x 1/4" thick blocks from aircraft grade plywood.

[28] Drill a hole in the center of each block to accept the front of a 10-32 blind nut.

[29] Solder (4) 10-32 nylon lock nuts to the bottom of (4) 10-32 blind nuts. (Refer to tips sheet in back of this manual: Making Locking Blind Nuts)

[30] Epoxy the 10-32 locking blind nuts into the holes in each of the four mounting blocks.

[31] Glue the mounting blocks to the inside rear of the motor dome with 30 minute epoxy.

[32] Bolt your motor onto the mounting dome to position the blocks while the epoxy cures.

[33] After the epoxy has cured, remove the mounting bolts and reinstall them with blue LocTite #242. It is a good idea to degrease the bolts before using LocTite.

Attaching The Motor Dome to The Fuselage:

[34] Drill (6) 1/8" pilot holes through the motor dome mounting flanges.
(4) Holes will be through the corner feet on the motor dome.
(2) Holes will be through the top edge of the motor dome.

[35] Align the motor dome to the front of the fuselage. You may find it easier to have a friend assist you here. You can either stand the fuselage on its tail while standing on a ladder, or carefully c-clamp the dome to the front of the fuselage without overtightening.

[36] After the motor dome is in position, slide the cowl over the motor and use the spinner to center the motor through the cowl opening. After centering, remove the cowl.

[37] Using the motor dome's pilot holes as a guide, drill the (6) mounting holes in the front of the fuselage bulkhead. Afterwards, open up the holes to accept 10/32 mounting bolts.

[38] Repeat steps 27 through 30 to make (6) additional mounting blocks with locking blind nuts. Glue them in place on the rear of the fuselage bulkhead with 30 minute epoxy.

[39] Attach the motor dome with 10/32 steel socket cap bolts and washers.
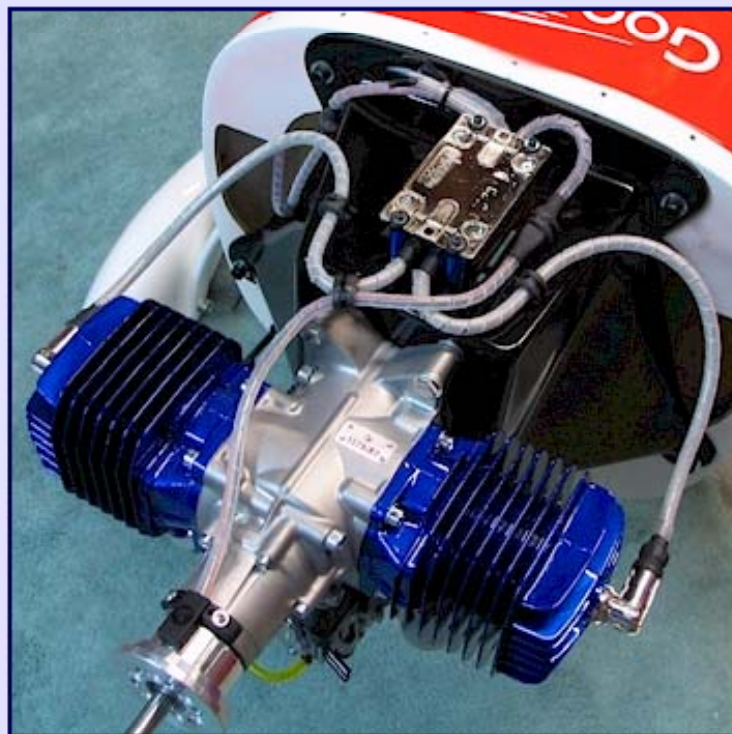
Installing The Ignition:

The ignition module is mounted upside down to the top of the motor dome for accessability, cooling air, and allows all of the wires to reach the motor easily. The ignition module will be mounted on small stand-offs to position it about 1/4" below the cowl.

[40]   Make a doubler frame out of 1/8" aircraft plywood to fit over the top of the ignition Module. Make the width of the frame 1/4" wider than the hole. The length of the frame should be 1" longer than the hole on each end to accept blind nuts for the ignition.

[41]   Solder (4) 4-40 nylon lock nuts to the bottom of (4) 4-40 blind nuts.
       (Refer to tips sheet in back of this manual: Making Locking Blind Nuts)

[42]   Install the (4) rubber grommets in the mounting ears of the ignition's mounting plate.

[43]   Place the ignition on the doubler, right side up, to mark and drill your mounting holes. Drill these holes to accept the front of a 4-40 locking blind nut.

[44]   Transfer these hole locations to the motor dome using the doubler as a template.

[45]   Drill (4) 1/8" mounting holes in the motor dome and cut out the rectangular hole.

[46]   Attach the doubler to the inside of the motor dome with 30 minute epoxy and clamps.

[47]   Glue the (4) 4-40 locking blind buts to the inside of the doubler.

[48]   Make (4) spacers 5/8" long from 1/4" hardwood dowel. Drill the center out with a 1/8" bit.

[49]   Using washers, spacers, and 1-1/2" long 4-40 steel socket cap bolts, attach the ignition upside-down in the hole. Use a washer on each side of the ignition grommets to prevent crushing them. Snug the ignition down until the grommets just start to compress.

[50]   Use polyethelene spiral cable wrap to protect the sensor and spark plug wires from chaffing. Spiral cable wrap is available in a different sizes and colors from Home Depot, Lowes, and Radio Shack.

[51]   Use 1/2" heat shrink tubing to safety-lock battery and sensor connectors together. This is an easy way to securely lock connectors together and still allow for easy removal later.

[52]   You can find nice self adhesive zip-tie anchors in the same stores that carry the spiral cable wrap. These little square anchors have loops to accept zip ties when wrapped around a cable or hose. Use a few in strategic locations to secure all of the ignition wires. This will prevent vibration damage to the wires and connectors.
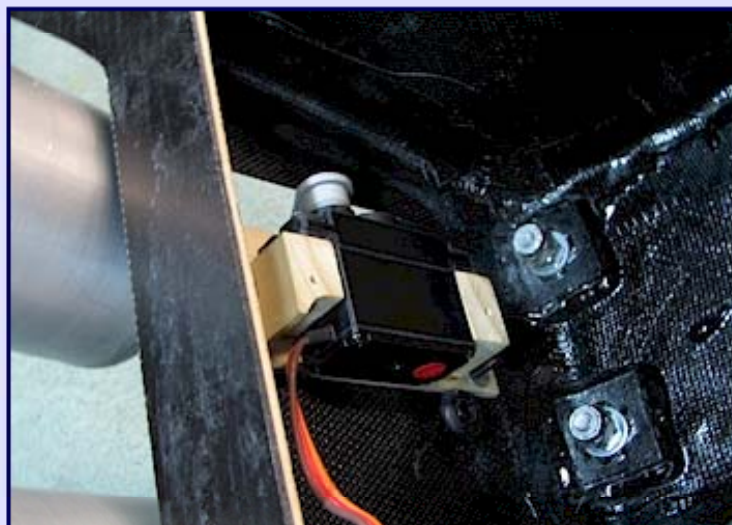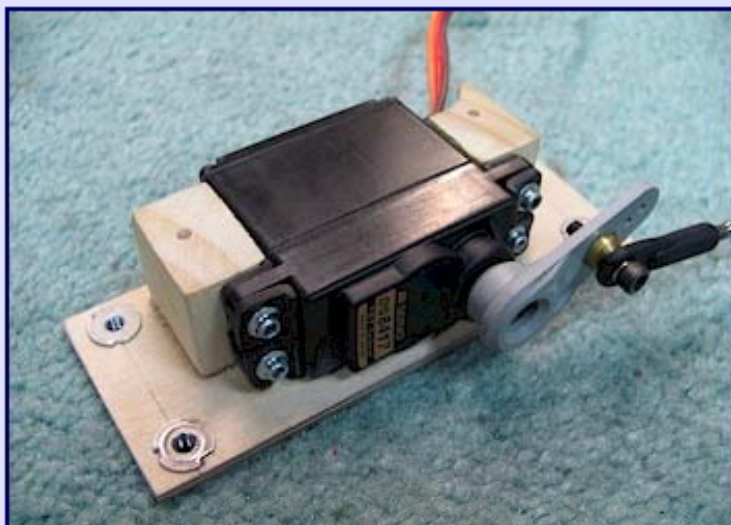
Throttle Servo Installation:

[53] Construct a throttle servo mount using 1/8 plywood and hardwood blocks.

[54] Mount the servo sideways in the mount with a 1/16" gap between the servo and the plate.

[55] Reinforce the bottom inside section of the motor dome with carbon or fiberglass cloth.

[56] Bolt the supplied throttle extension arm to the throttle shaft with 2-56 locknuts and bolts.

[57] Cut an oval hole in the bottom of the motor dome approx. 5/8" wide by 1-1/2" long behind the carburetor's throttle arm location like pictured above.

[58] Drill holes in the corners of the plate and in the bottom of the motor dome.

[59] Make (4) 4-40 locking blindnuts and attach to the servo-side of the servo plate.

[60] Attach the servo plate to the inside of the motor dome.

[61] Using heavy duty 4-40 ball links, washers, bolts, and lock nuts, attach your throttle linkage ends to the throttle and the servo arm. Measure the spacing between the ball links and use the approriate length of 4-40 threaded rod or Hangar 9 Pro-Link.

Exhaust System Installation:

Your 3W aircraft is designed with the ability to accept bolt-on or canister mufflers without the need for modification. In this exapmple, we will show the installation of canisters.

If your area has noise restrictions, or you fly IMAC, you might want to consider the canisters. They are the best type of muffler for quietness and they add about 100 RPM for more power. If you are looking for the best in overall performance the canister mufflers are a great choice.

Supersonic Bolt-On Mufflers

Assembling The Canister Holders:

[62] Cut the holder along the perforation to separate the adjustable bracket from the holder

[63] Attach the bracket to the holder with 4-40 socket cap bolts, washers, and locknuts.

[64] Center the mount's ring on the fiberglass sleeve and tack in place with a few drops of CA.

[65] Wrap the sleeve with carbon fiber tow (strands) soaked in 30 minute epoxy. This is an important step to prevent vibration from damaging your headers. Wrap this treatment around the sleeve a few times to form a reinforced fillet of epoxy and carbon fiber. When the epoxy has set, the sleeve and the mount should be one unit and ridgid.
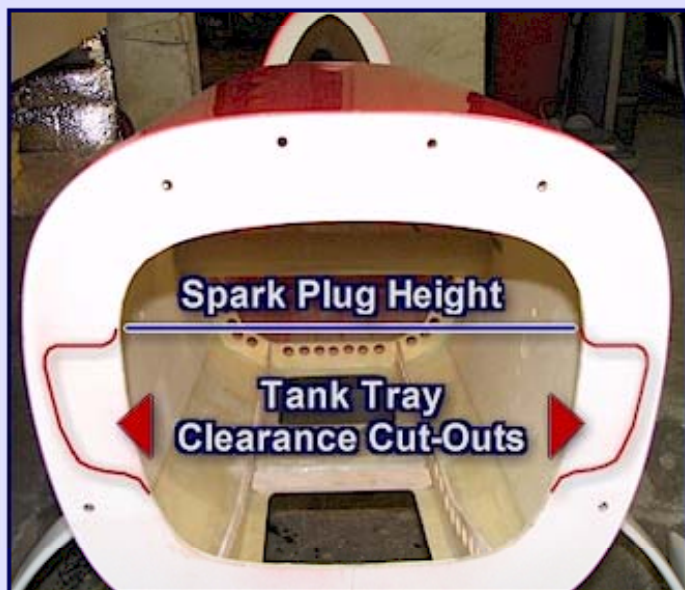
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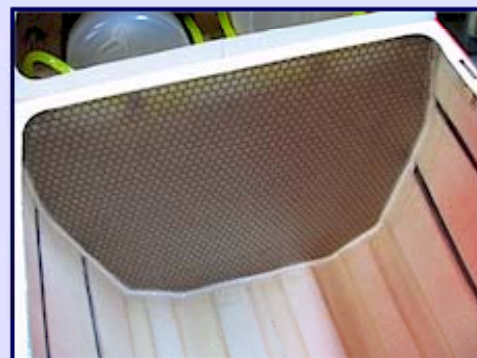
Installing The Canisters:

[66] The landing gear mount is located between the ventilation holes for the exhaust system. Just forward of the landing gear mount, a plate needs to be installed for the canister mounts. Install a 1/8" aircraft plywood plate 1-1/2" wide to fit between the reinforcing trusses on either side of the ventilation holes. Secure the plate to the front of the landing gear mount, the floor, and inside of the trusses with 30 minute epoxy.

[67] Temporarily mount the headers to the canisters and the motor. The motor dome should now be a complete unit with the motor and canisters all attached together.

[68] Loosen the adjustment bolts on the canister mounts and retract the brackets fully. Slide the mounts onto the canisters like shown above. The straight sides of the 'P' should both be in the center. Carefully slide the exhaust assembly into the plane and bolt on the motor dome. Line up the canister mounts to the mounting plate and mark the hole locations. Drill the mounting holes to accept 4-40 bolts.

[69] Attach the canister mounts with 4-40 socket cap bolts, washers, and locknuts.

[70] Your headers should be a "perfect fit" if purchased with the canisters as a set to fit this specific aircraft. If you are using Krumscheid headers or a non-3W header, trim your header so the exhaust down-stacks exit approx. 1/2" in front of the fuselage firewall. if your headers are not quite pointing where they should, you can tweek them by carefully heating and bending. This should be done off of the aircraft. Clamp the bend of the header in a vice. Insert a socket wrench handle into the tail of the header. Evenly heat the front of the horizontal run before the bend. You need even heat with a broad flame. Don't overheat it or it will crack. Use the socket handle to slightly tweek the header in small increments.

[71] Once everything is in alignment and you are ready for final installation of your exhaust system, de-grease all header bolts and the mating ends of the canister and header. Use LocTite Red #271 for the exhaust bolts. Use a small bead of GE white silicone on the neck of the canister and tail of the header to seal the teflon coupler. Don't forget to use the provided exhaust gaskets. They seal as well as help to dampen vibration.

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Installing The Tank Tray:

The kit includes a composite molded tank tray. This tray accepts (2) 3W round tanks available from Aircraft International. In this example, a 51 oz. (1.5L) tank is used for fuel and another tank, 34 oz. (1.0L) is used for smoke. To install this tank tray, clearance cuts need to be made.

Note: The edges of the tank tray were intentionally left as loose fiberglass cloth for the installation process. Do not trim these edges off as we will use them to glue in the tray assembly later.

[72] With the motor dome and engine mounted, mark a line 1/2 inch below the spark plugs on the front of the fuselage. This is easily done by leveling the plane and using a bubble level against the spark plug to mark a reference line.

[73] Using the photos above as a reference, mark and cut the tank tray clearance areas. A cutting wheel and a sanding drum in a dremel rotary tool works well here.

[74] Assemble the fuel and smoke tanks as pictured. If your smoke tank came with a felt filter remove it by sliding it off of the klunk. Use small zip-ties to secure all tubing conections. Also, use a bit of teflon plumbers tape on the threads of the tank's cap to prevent leaks.

We highly recommend the use of a 3-line system as shown. A 2-line system containing a fueling valve between the tank and carburetor can sometimes cause problems. Air bubbles in the fuel line can result from a failing fueler that doesn't seal completely. We prefer to use 3W Fuelers or Fuel Dots for trouble-free operation.

Additionaly, do not install a fuel filter between the tank and carburetor. It restricts fuel flow and causes delays in throttle advancement, or in the worst case, even dead-stick landings.

A better practice would be to filter the fuel as it goes into your tank. Install a filtered pickup and filters on either side of your fuel jug's filling pump. You still get the benefits from a filter, without restricting fuel flow to your engine.


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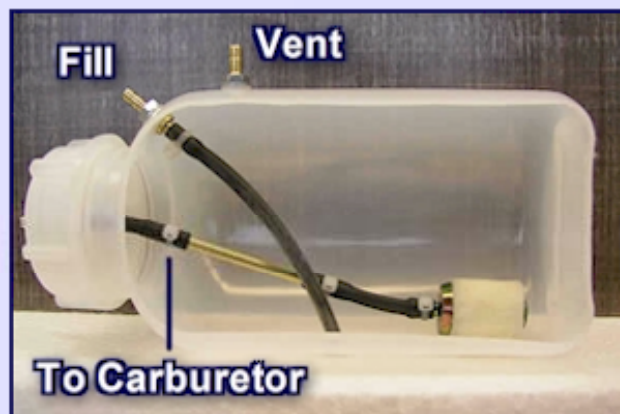
Installing The Tank Tray (Continued):

[75] Use a dremel tool to cut (4) oval slots around each of the two tank depressions. These slots should be large enough to insert strips of 1 inch velcro straps. The product we recommend for this is called One-Wrap from VelTye (www.veltye.com). The straps have hooks on one side and fuzz on the other. They are available in any length, size, or color.

[76] The tanks should be padded to prevent fuel foaming. Use pieces of foam under each tank or use self adhesive foam gasket material. You can get a roll of 1/8" x 1/2" foam insulation gasket material from Home Depot or Lowes.

[77] The forward portion of the tank tray has a flat area to mount your ignition battery and smoke pump. Install hard points for your smoke pump and battery like shown above. Use more of the One-Wrap and some foam to secure your ignition battery. Use zip-ties and anchors to secure your smoke pump filter, tubing, and wiring. If you plan to use a PowerBox LiPo battery here, install hard points for the battery tray instead. Note the location of the two rubber grommets in the rear corners of the tray. The vent lines go through these grommets to tank fittings on the bottom of the fuselage behind the canisters. The grommets prevent chaffing and can be found at Radio Shack.

[78] After trial fitting the tanks, remove all components and test fit the tank tray in the fuselage. You may need to flex the tray to squeeze it into the front of the fuselage. Check for proper canister mount clearance under the tray. The tray should clear the canister mounts and wing tube.

[79] Mark the final location of the tray in the fuselage. The placement should be where the rear of the tank tray is forward of the reinforcing former at front of the cockpit. Cut 1/4" x 1/4" balsa rails to frame the bottom perimeter of the the tank tray. Glue the front and back rails to the bottom of the tray. Glue the side rails to the inside of the fuselage with epoxy.

[80] When the epoxy has cured, slide the tray into the fuselage. The loose fiberglass should lay up the sides of the fuselage. The tray should be resting on the rails. Use finishing resin or slow set epoxy to bond the tray to the side rails and fuselage sides.

[81] Once the tank tray is in place you can install your lines, fuel dots or fuelers, and wiring. Be sure to protect your wires and tubing with spiral cable wrap. Secure tubing and wires with velcro or zip-tie anchors where needed.

[82] Using fiberglass or carbon fiber honeycomb panel, install a bulkhead that closes off the canister and tank compartment. The bulkhead should glue to the back of the tank tray, the lower front of the dash panel area, and the fuselage sides and floor. Page 11
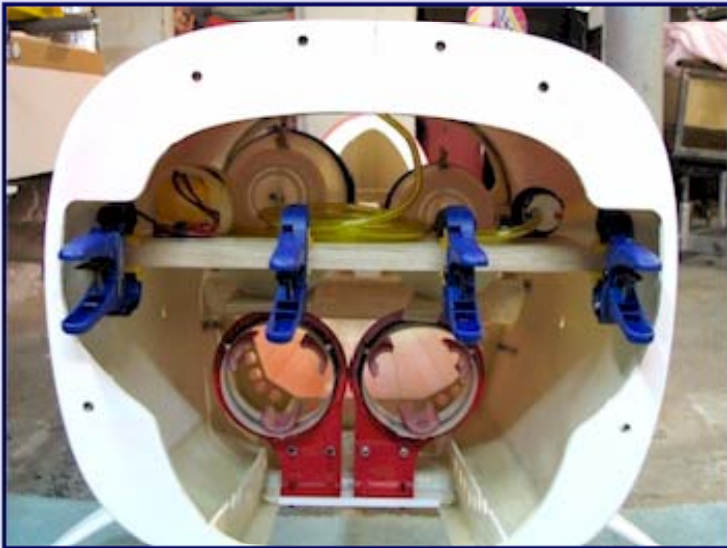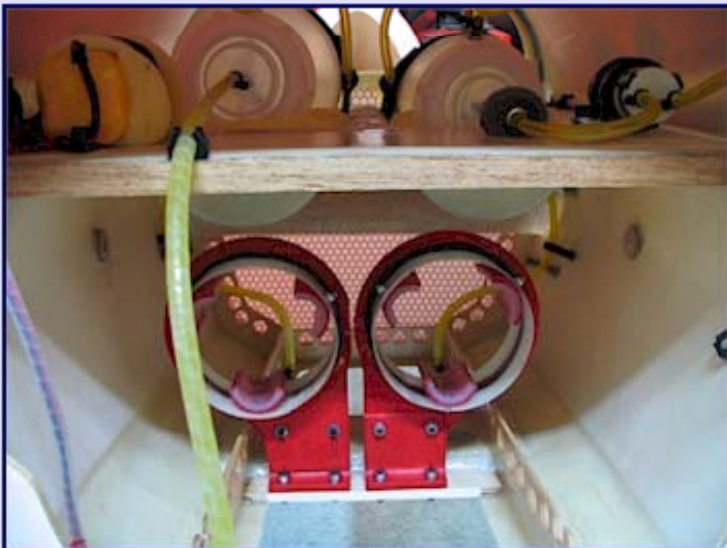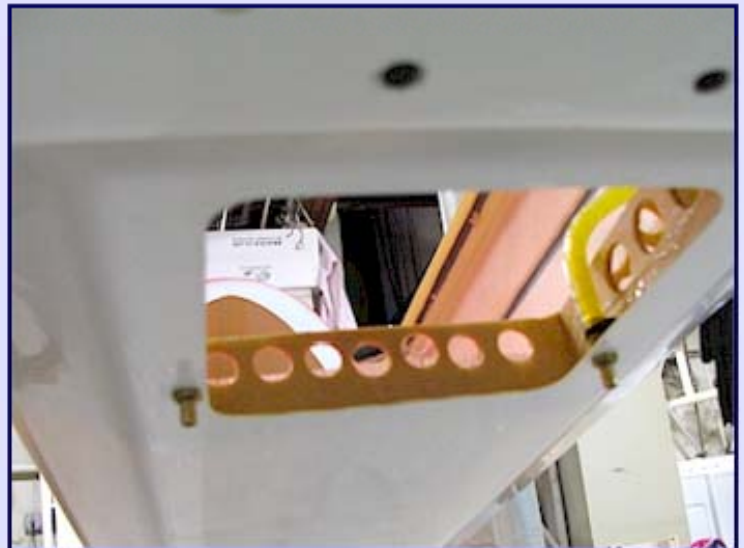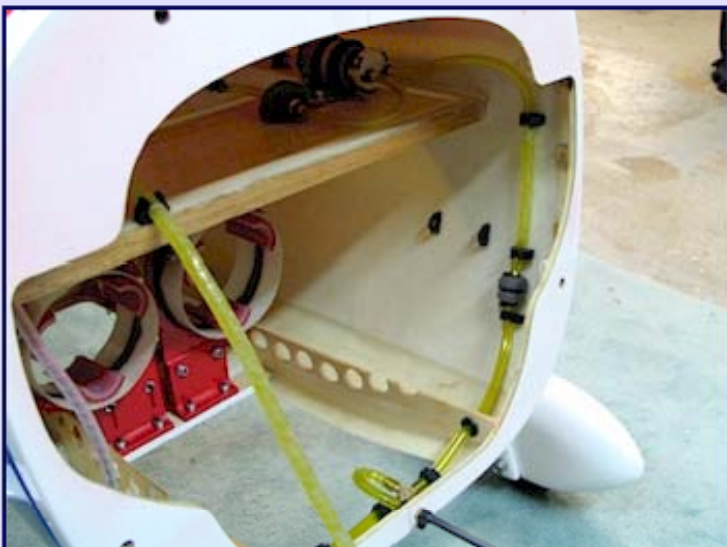
Clamping & Gluing The Tank Tray
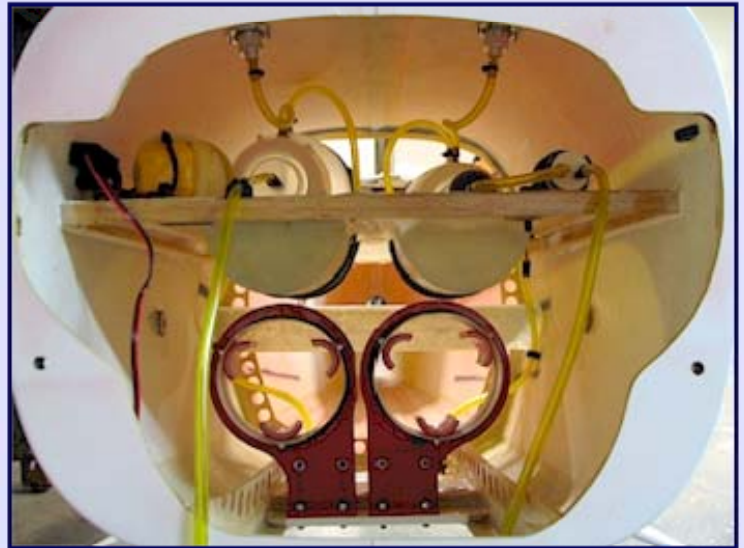
Plumbing Detail Including 3W Fuelers (Top)

Vent Lines & Canister Clearance

Tank Fittings Used For Tank Vents

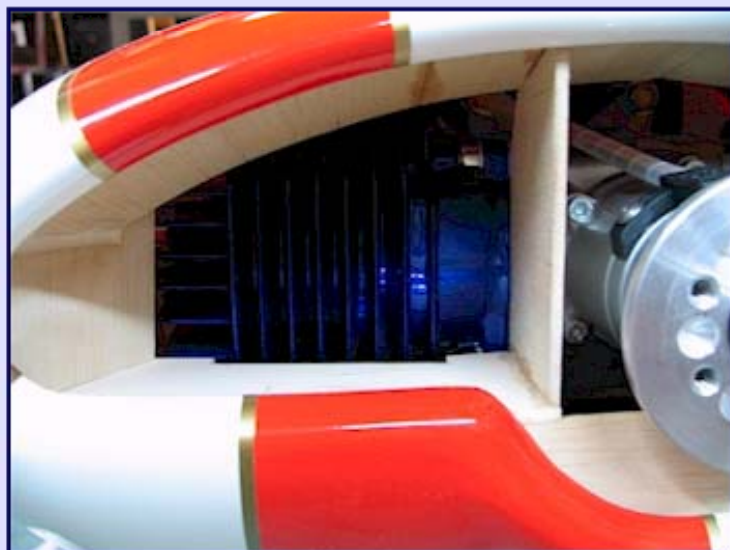**Plumbing: Smoke Lines / Check Valve**

Honeycomb Bulkhead

www.aircraftinternational.com

Front Baffle Made From 1/8" Balsa

You Want A Tight Fit To Each Cylinder (1/16")

The Spinner Cleanly Covers The Middle Structure

Krylon Stone Gray Paint Looks Professional

Installing The Engine Baffles:

The baffles are required to keep the engine cool. Just like full size aircraft, baffles direct airflow through the cowl and force the cooling air to go through the cylinder fins. When properly installed, your engine should run anywhere from 150 Degrees Fahrenheit to 195 Deg. F. even on the hottest summer days. If your engine runs hotter than this your engine may develop a piston seizure and damage will result. A big hole in the bottom of the cowl doesn't help cooling since the air is trapped in the upper cowl. Follow our baffling technique and you will keep your engine cool and enjoy a long service life.

Tip: To check engine temps - After landing, use an infrared temperature gun aimed at each cylinder through the spinning prop at idle. Have a friend hold your plane while doing this.

[83] Using the photos and drawings on pages 13 & 14, construct baffles from 1/8" light ply or balsa for the front and rear of your engine.

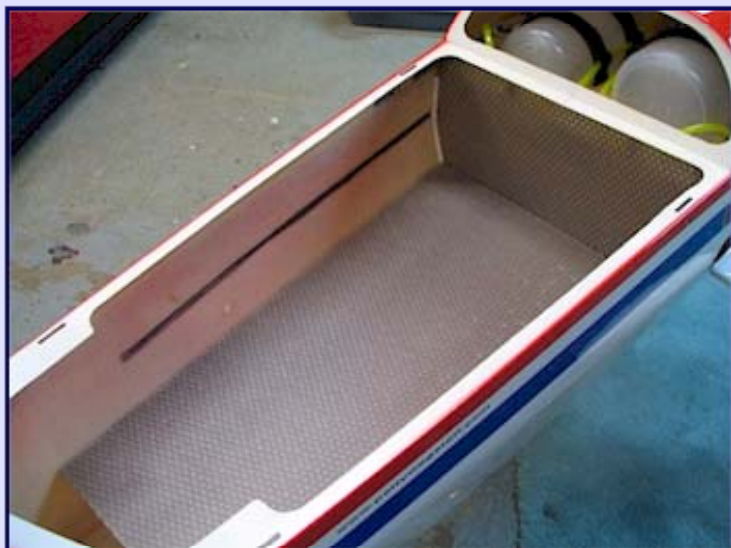[84] Attach the finished front baffle to the inside front of the cowl with epoxy.

[85] Attach the rear baffle to the motor dome. You might want to install hard points in the rear baffle so it can be attached with bolts and blind nuts for easy removal.
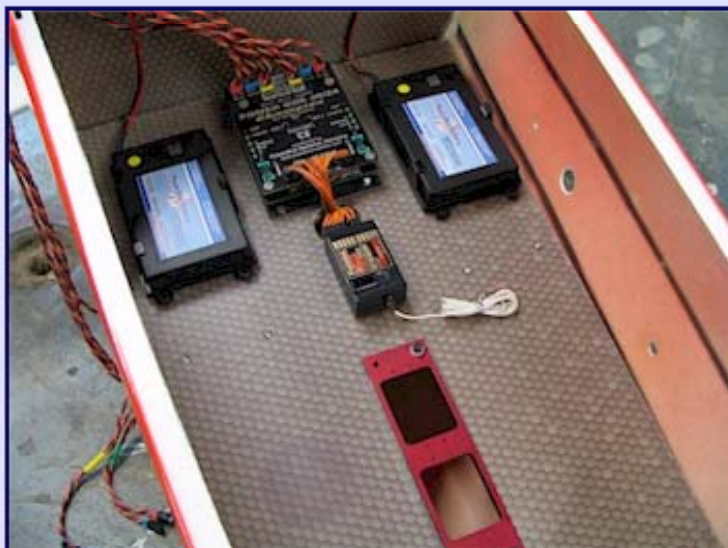
Page 13

Cowl

Rear
Baffle

Front
Baffle

Cowl

Side
View

Front
Baffle
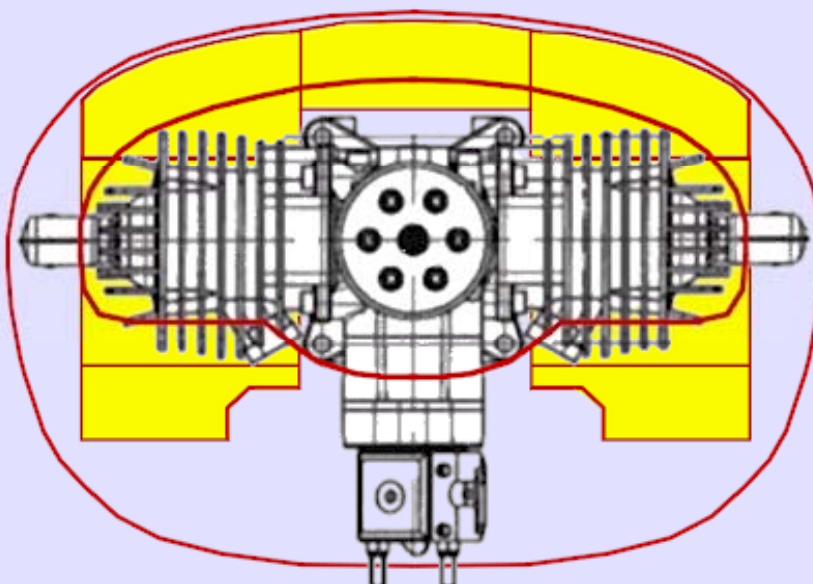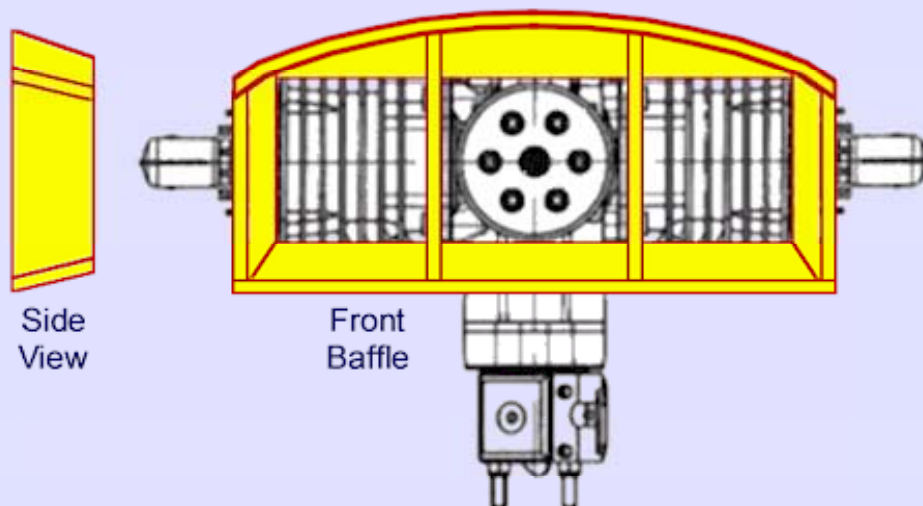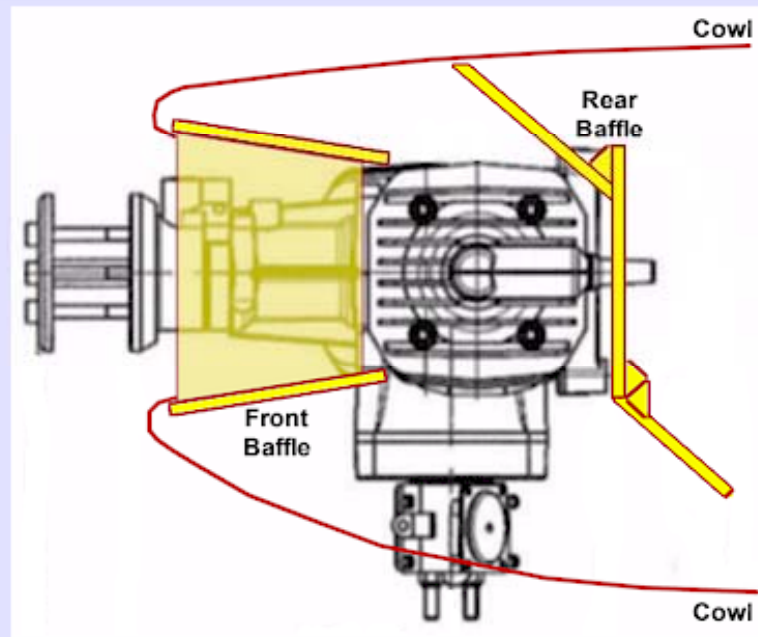
Rear Baffle - Note the curved top and notches for the headers
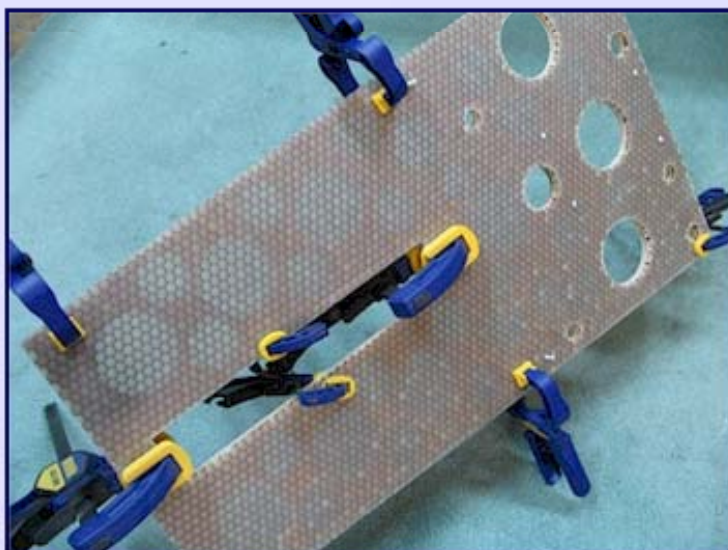
Test Fitting The Electronics Tray
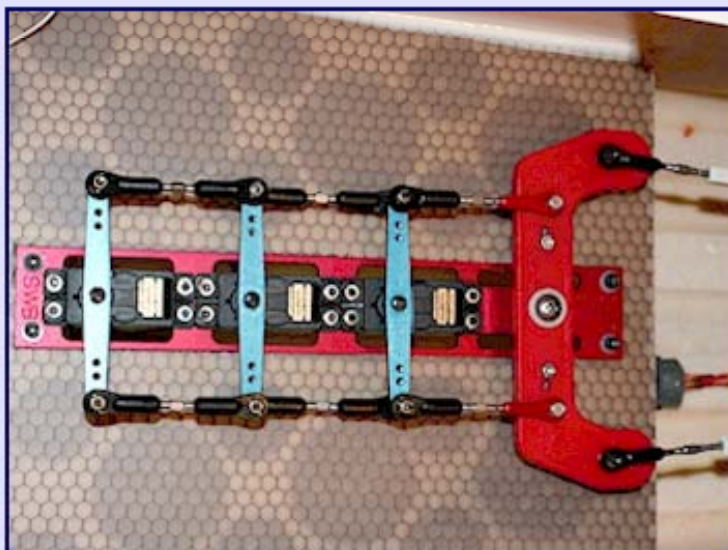

Placing Components & Drilling Mounting Holes

Light Ply Doubler

Laminating The Doubler To The Tray

Everything Installed And Tray Glued In

SWB Rudder Pull-Pull Tray With 3W Arms

www.aircraftinternational.com

Installing The Electronics Tray:

Your radio equipment and rudder pull-pull tray needs a place to be attached to. We recommend a flat tray that can accept your receiver, batteries, power distribution system, and rudder servos. A tray works better than just installing rails since it adds strength to the airframe and provides a clean and professional installation with all the wires out of the way and secure.

[86] Construct an electronics tray from composite honeycomb material. It can be fiberglass faced or carbon faced honeycomb. The appearance and price range will dictate your choices here. Make the tray wide enough to contact the fuselage sides 1/2" under the wing anti-rotation doublers. It should be long enough to fill the cockpit area from the tank bulkhead to the rear of the canopy. Make sure it is long enough for your rudder servo tray with room to spare. The tray may also need to be tapered front to back to match the fuselage.

[87] Arrange your radio gear on the tray. Start with your PowerBox and batteries. Put them toward the nose. Allow for a cable openings in front of and behind the power box. These openings are for cable routing and storage. Mark locations for all components. Mark mounting hole locations for your batteries and PowerBox, as well as the servo tray. Also mark locations for lightening hole cutouts.

[88] The honeycomb tray will need hard points installed to provide enough support for the mounting screws of all of the radio gear. If using VelTye OneWrap and no PowerBox system, the hard points can be small strips of wood glued to the underside of the honeycomb inside the holes for the velcro. For a PowerBox installation there are two ways to accomplish this...

(A) Drill a series of 3/8" holes where each screw will go and glue short dowel stubs into the holes. Later, cut the dowel stubs nearly flush and drill holes for your mounting screws.

(B) Make a light ply doubler to laminate to the underside of the tray. In this case, once all of the mounting locations are determined, lighten the doubler with a series of holes.

[89] Using a few scraps of honeycomb, cut out (3) 3" squares. Cut the squares in half diagonally to get (6) triangles. Cut holes in the center of each triangle to accept a clear plastic servo cable tube. You can get these from a few places like Gator RC or Central Hobbies. Make the tube long enough to go from a spot 2" aft of the tank doubler to a spot 2" in front of the stabilizer's aluminum tube spar. Space the triangles evenly over the length of the tube and on each end. Glue this assembly to the fuselage floor.

[90] Mount all equipment in the electronics tray. This assembly must now be glued in place. Glue a piece of triangle stock to each fuselage side 3/4" below the bottom edge of the wing anti-rotation pin doublers. Epoxy the tray in place with 30 minute epoxy.

[91] After everything cures, mix microballoons with some 45 minute epoxy and run a fillet around all joints, including the joint to the tank baffle. This will reinforce everything and make the whole installation strong and clean looking.

[92] Install anti-chaffing grommets in the cable holes in the tray. An easy way to do this is to get some corrugated cable sheathing from home depot. Split it open and use it to cover any edges of cable exit holes. It looks professional and keeps your cables from getting damaged.

[93] Fish your elevator servo extensions through the conduit installed earler. Use a piece of bent wire to catch the ends by the tail. Labeling the connectors with a labeling machine like a Brother P-Touch or Dymo labeler saves some effort and cunfusion later. A simple labeling scheme is: ER1, ER2, EL1, EL2 - Elevator Right 1 & 2, Elevator Left 1 & 2. After fishing out the wires at the tail, use a clothespin on each side to keep the wires from falling back into the fuselage.

Wiring any large plane takes some patience. If you plan to use a PowerBox System, the whole thing becomes easier. With this in mind, it is still somewhat confusing the larger the plane is. This page will briefly explain the best way to set up a PowerBox System in a 40% or 36% aircraft. While we can't completely predict every installtion issue, we'll try to outline the major points here.

Imagine your airplane divided down the middle, from spinner to rudder, into a left and right half.

Following the guide at the left, connect the servos to the PowerBox. Each servo should have its own 22ga extension. There should be no "Y" cables anywhere. This will allow each servo to have its own power supply up to 20 amps without having to share it with other servos on a "Y" connector.

The servos for the rudder on bus 4 should plug into your rudder channel of your receiver through wire 4.

The servos for the ailerons get divided into left wing and right wing. These would plug into the aileron channel and an aux-A channel. Your radio will be set up with a flaperon mix program.

The elevators would also be divided into left and right. They would connect to the elevator and aux-B channels. They would also need a mix program in your radio.

It is also a good idea to connect your smoke pump through the PowerBox in case there is any noise generated from the pump itself.

The throttle is also a good function to run through the PowerBox. If your aircraft uses flaps, put them where the throttle was and run the throttle servo directly to the receiver. The idea is to keep the major flight-critical functions going through the PowerBox for protection and noise filtration. The other less critical channels on the airplane should run directly to the receiver. They tend to need less power to operate anyway.

Turn everything on with the programmer connected to the PowerBox and your linkages disconnected from the servos. Connect one servo at a time for each maching bus. Set the centering and endpoints. Add the second servo's linkages and set the centering and endpoints until the buzzing stops on your servos. Save each bus setting and disconnect.

If you are building a Level 3 kit like the example in this guide, you don't have any painting or covering to do. Finishing details can consist of a pilot figure and instrument panel. If you fly IMAC, these are required. Many of these are available at Aircraft International.

Another finishing touch is vinyl graphics. Graphics can be obtained from vinyl cutting shops or sign shops in your area. We highly recommend Cutting Edge Graphics (www.rc-decals.com) for a good source of professional graphics at a good price.

Here are some photos of the finished 3W 40% Extra 330S - Patty Wagstaff - Level 3 Kit:

www.aircraftinternational.com

Here are some notes from pilots who use these models in competition.
These notes should answer some of the basic questions we receive regularly.

What is the preferred CG or Balance Point?

The starting CG location should be the center of the wingtube. Since 3W designed all of the equipment mounting locations into the aircraft, and most equipment is pretty much standard from plane to plane, you should come close to the CG without needing to add weight. You are looking for a slight nose heavy condition. One way to tell if the chosen CG location is correct is to fly the plane and enter a 45 degree vertical climb while inverted. If the plane tracks straight for a few hundred feet then slowly arcs toward the canopy, you're right where you want to be. If the tail starts to drop and it prefers to arc toward the belly, you're slightly tail heavy.

What weight should I come in at?

The example in this builders guide is a Stock 3W 40% Extra 330S that was pre-painted at the factory as a level 3 kit. came in at 41 lbs. You can expect a final weight for this plane to be anywhere from 39 to 43 lbs depending on how light you build. This includes what painting and covering techniques you use if your kit is not a level 3 kit. If you are looking for the lightest possible aircraft, 3W also produces a version called the Competition Version. They skeletonize the control surfaces and use a honeycomb material for a stiffening lamination in the forward fuselage. The Competition Version weighs 2 lbs less than the Stock Version.

What control deflection values should I use?

Starting points for IMAC and general flying:

15 Degrees	- Elevator (You may want some differential)
20 to 25 Degrees	- Rudder
20 to 25 Degrees	- Aileron

3D flying:

"Bevel to Bevel" maxed out throws. (Greater than 45 Degrees)

What are your favorite propellers for this plane and engine combo?

On a 157xiB2-F Stock Motor after 8-12 hours of break in:

Well, you can ask 10 pilots and get 10 answers, but here's the top choices...

2-Blade:	Fuchs 33 x 12	3-Blade:	Fuchs 29 x 12
	3W Carbon 32 x 14		Biela 29 x 12
	Biela 33 x 12		

What flying characteristics can I expect?

It's a broad question, but the most common answers are:

- No tendency to tip stall. Forced stalls are straight forward.
- Very stable and precise. It goes where you point it, on rails.
- A multi-purpose competition plane. Great for all classes of IMAC and crazy 3D flying too.
- Wicked cool knife edge spins.

For more information on ordering your 3W kit, call Aircraft International at (732) 761-0997 or visit our website at http://www.aircraftinternational.com. You can see more pictures and information on the website along with demo videos and specifications.

This section's purpose is to provide you with a few "tricks of the trade." These are ideas we have used through the years to make things easier when building our own aircraft. We refer to these ideas throughout the builders guide and will spell them out in detail here.

Tip: Making locking blind nuts - Soldering nylon lock nuts to blind nuts:
The easiest way to do this without melting the nylon lock nut is...
(A) Partially thread a blind nut, flat side up, onto the end of a bolt that is clamped in a vice.
(B) Using silver solder, tin the top of the blind nut.
(C) Thread the blind nut down the bolt until a little of the thread protrudes.
(D) Apply flux to the tinned area and the bottom of the blind nut.
(E) Thread together just enough so both surfaces touch.
(F) Heat the blind nut until the solder melts and fuses to the lock nut.
(G) Cool immediately with a wet sponge. Unthread from bolt.

Tip: Figuring out where to cut the rudder pull-pull cable exit holes:
This is accomplished by taking a moment to make a simple full-size sketch...
(A) Get a piece of butchers paper or brown packing paper that is a bit longer than the distance from your rudder bellcrank to the rudder control horns.
(B) Draw a centerline down the length of the paper.
(C) Draw a perpendicular (90 deg.) line across the centerline at one end of the paper that represents the rudder servo belcrank wire attach points.
(D) Measure the distance from your bellcrank wire attach ponts to the rudder control horn wire attach points. Mark that distance from the rudder bellcrank line as another perpendicular line across the centerline.
(E) Mark the width of the bellcrank cable attach points on the bellcrank line.
(F) Mark the width of the rudder horn cable attach points on the rudder horn line
(G) Use a straightedge to connect the wire attach marks from the bellcrank line to the rudder horn line. Cross them just like they will be in the plane. This represents the pull-pull cables.
(H) Measure and draw your fuselage top view on the paper. The easiest way is to Take a fuselage width measurement every 2 inches forward from the rudder hinge line. Connect the dots with a straightedge and your fuselage top view is done.
(I) Using masking tape and a pencil, mark the position of the bellcrank on each side of the airplane. You want a height reference for the wire attach point on the bellcrank.
(J) On the drawing, you can see where the wire exits / intersects with the fuselage outline. Using a long straightedge, imagine a line from the bellcrank wire attach point mark on the side of the fuselage to the rudder horn attach point. Measuring the distance on the drawing, mark the spot along the straightedge where the hole should go. We prefer to cover the area with masking tape and mark the line on the tape - just in case you need to move it. Remember, measure twice, cut once.
(K) Use a Dremel tool with a cutting wheel to cut a small starting slot just the width of the cutting wheel.
(L) Set up all of the pull-pull hardware to test fit everything including the hole location. If the wire drags on one side, widen the hole a little on that side. When everything is done, you should wind up with a 1" x 1/8" straight sided oval hole.
(M) When you're all finished, glue a 3W rudder cable exit guide over the holes. It's a nice finishing touch and a scale-like accessory that looks great.

mounting bolt pattern
Bohrschablone
3W 120i B2 - 140i B2 - 150i B2
front induction

90

45

ø 6.5 (4x)

Ø13

ø50

40

80
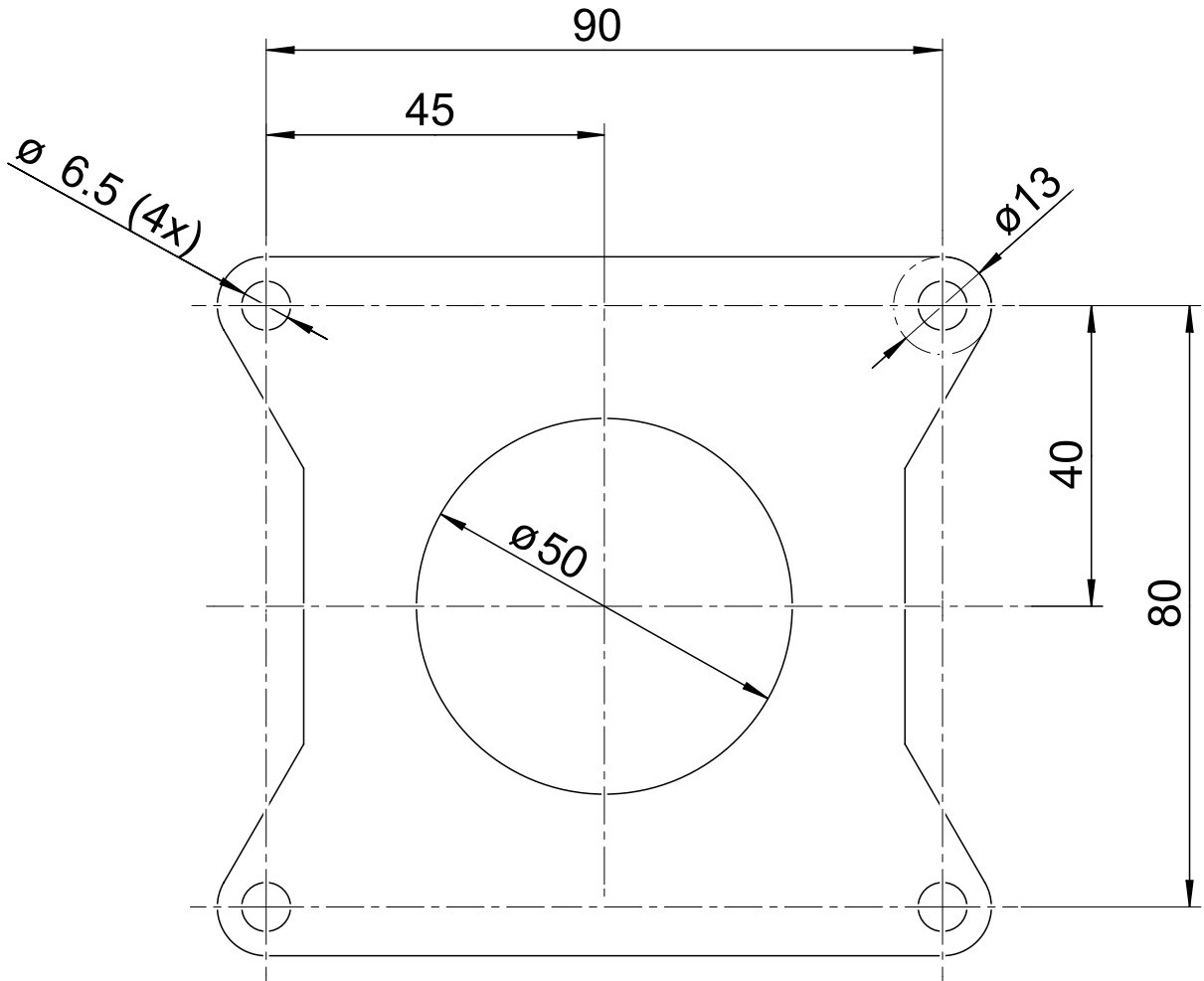
ATTENTION:
This drawing is in original size. Disable any Acrobat print setting to fit it into paper size.

ACHTUNG:
Diese Zeichnung ist im Maßstab 1:1. Deaktivieren sie die Acrobat Druck - Einstellungen

3W 157xi B2
mounting bolt pattern
Bohrschablone

Ø 6.5 (4x)

100

50

Ø 13

R10

29

58

Ø 92

30

60

R10
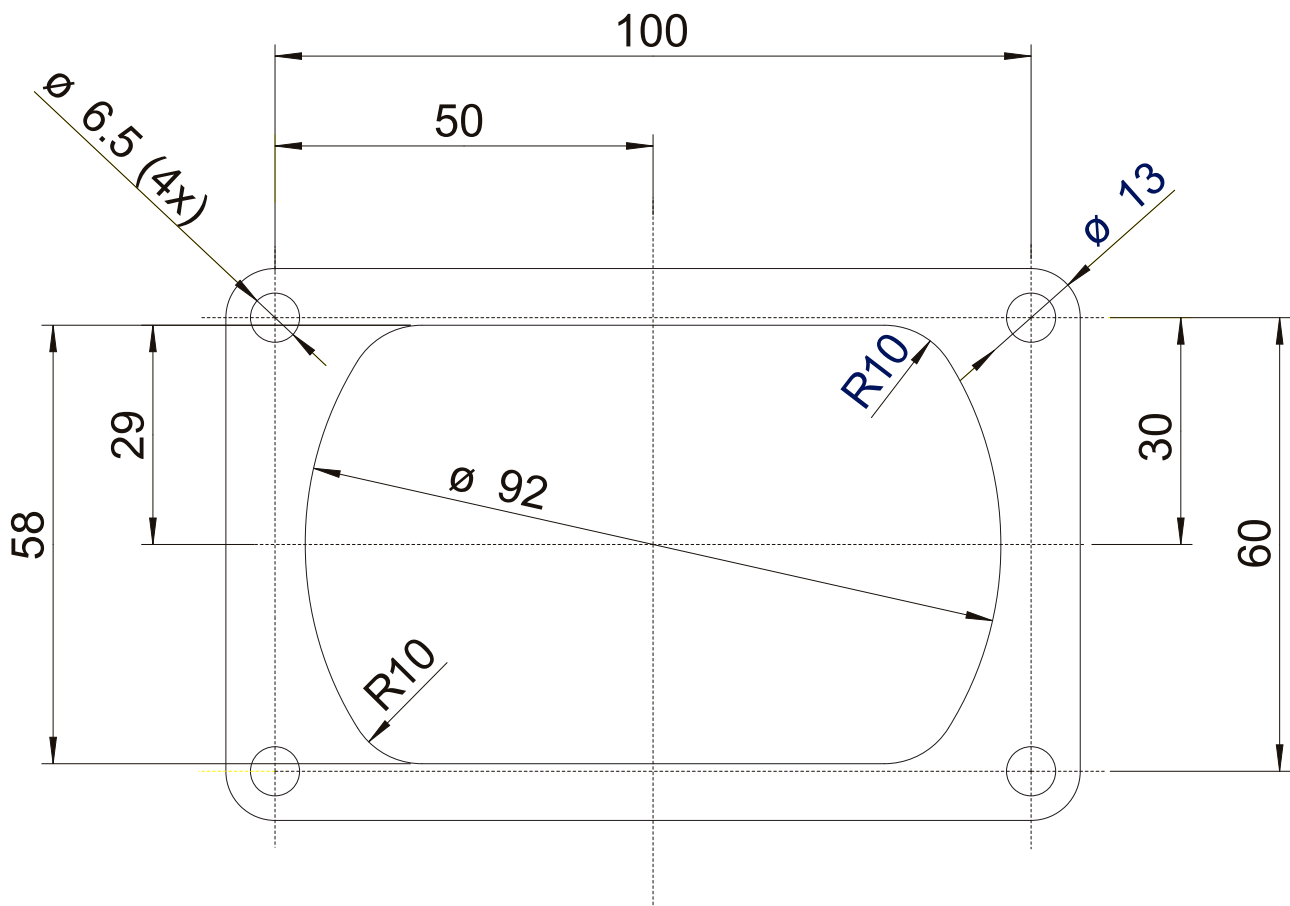
ATTENTION:
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