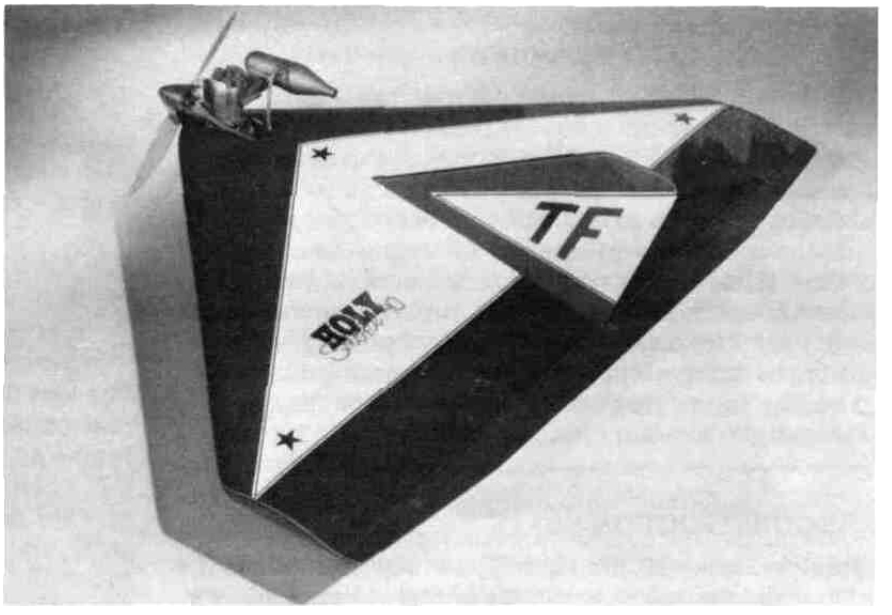
Holy Smoke 40

RC-34 INSTRUCTION MANUAL

INTRODUCTION



Holy smoke, what a name for an airplane! The name was derived from comments made by other modelers when they saw this delta fly for the first time. From a marketing standpoint, we're very happy that the standard comment was not "Holy Cow"!

The delta that we are presenting in this kit was designed by Hal Parent! and it has a long and successful history. The design is exceptionally easy to fly due to its inherent stability and will accept a fairly broad range of engine sizes (2-cycle) and still remain flyable and fun. The design itself is the essence of simplicity. We feel that it is entirely possible to start construction on a Monday evening and have it ready to fly by the following Saturday. It may well be the perfect "other" airplane.

The "H.S. 40" has been test-flown off of grass fields as well as asphalt with uniformly good results. When powered with one of today's strong-running .40 engines (Enya CX, O.S., etc.), the take-off is short and to the point. We have test-flown the airplane with engines as small as .25 (an 0.S. FSR) and it still flys quite nicely. Those of you who may be considering the installation of a .60 engine might first strongly consider one of the .40's or .45's mentioned earlier. A .60 is going to give you some balancing problems which might well result in a rather heavy airplane.

The radio installation in your H.S. 40 is straight-forward and the radio/tank compartment is roomy enough for all but the largest of servos. As with most R/C models, the radio installation should be made with achieving the correct Center of Gravity as the goal. If your battery pack, for instance, has to be located at the rear of the radio compartment in order to achieve the correct C.G., that's fine and superior to having to add lead. The installation shown on the plans is typical of our prototypes; yours may be different due to varying radio components and engine weights.

Flying your H.S. **40** should prove to be a delight. There just aren't many maneuvers that this design is not capable of. The possible exception might be those maneuvers which require some rudder.

IMPORTANT NOTE:

TOP FLITE MODELS, INC. does not recommend the Holy Smoke 40 as a first R/C powered aircraft. However, if you are a beginner to the sport of R/C flying, we would *urge* you to seek and use experienced assistance in constructing and flying this airplane. Again, if you are new to this hobby, consider this:

Flying this or any other radio-controlled model aircraft is a PRIVILEGE and not a RIGHT and this privilege begins with the utmost safety considerations to others and yourself as well. An R/C model airplane in inexperienced hands has the potential of doing serious personal or property damage. These safety considerations start at the building board by following instructions, seeking competent help when you are confused and avoiding shortcuts. These considerations have to be carried over to the flying field where safety must come first and limitations

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cannot be exceeded. We urge you to:

1. Send for and obtain your AMA (Academy of Model Aeronautics) membership which will provide insurance for your R/C activities — DO NOT RELY ON HOMEOWNERS INSURANCE.
2. Join an AMA sanctioned R/C flying club in your area where you can obtain competent, professional instruction in trimming and learning how to fly this model.

Check with your favorite local hobby shop for the required AMA forms or the address where they can be obtained.

WARNING!!!

A radio controlled model is not a "toy." Care and caution must be taken in properly building the model, as well as in the installation and use of the radio control device. It is important to follow all directions as to the construction of this kit as well as installation and use of the engine and radio gear. The advice and assistance of a well experienced builder and pilot is highly recommended. Don't take chances! Improper building, operation, or flying of this model could result in serious bodily injury to others, yourself, or property damage.

PRO-CONSTRUCTION NOTES

The **Holy Smoke 40,** like other Top Flite kits employs the use of die-cut wood to ease the task of construction, parts fit and identification. The dies used for this kit have been rigorously checked for absolute accuracy and should provide you with excellent fit. Die-cut parts should be carefully removed from their sheets by first lightly sanding the *back* of each sheet of parts and then carefully removing each part. Use a light garnet paper for the sanding and keep a sharp hobby knife with an X-acto #11 blade, or equivalent, handy for assistance in removing any parts that might not have completely cut-through by the dies. Parts which oppose one another and must be precisely uniform—such as ribs, etc.—should be carefully "matched" after their removal from the part sheets. Matching is the process of holding the opposing pieces together with either pins, tape or spot gluing and lightly sanding the edges of the parts until they are identical. A sanding block with light garnet paper is most useful for this and other phases of construction.

Your building surface should be at least large enough to accommodate the wing. This surface should be as absolutely flat as possible and yet be able to accept pins easily. We have found that a product such as Celotex fiber board works quite well for this purpose. Another good surface can be found in most well-stocked hardware stores—a 2' x 4' fiber board ceiling tile. These are quite inexpensive and can be used for several airplanes before needing replacement.

As with most R/C kits that are constructed from wood, a selection of tools—most of which can be found in the average workshop—are a must to do the job correctly:

- Hobby knife and sharp #11 blades
- Single-edge razor blades
- T-pins
- Sanding blocks in assorted sizes
- Sandpaper in various grits
- Hand-held hobby saw, such as an X-acto
- Dremel tool or power drill and assorted drill bits
- Straight-edge, preferably metal, at least 36" long
- 90" triangle
- Soldering iron, flux (silver) and solder
- Carbide cut-off wheel for wire cutting
- Small power jig-saw, such as a Moto-Saw
- Razor plane
- Tapes, such as masking and cellophane

Our Holy Smoke 40's were constructed using a variety of common hobby adhesives including 5-minute epoxy, cyano-acrylates, aliphatic resin (such as Titebond) and 1-hour epoxy. Since all of us have our own construction techniques and favorite adhesives, stick with the ones that you are familiar with and prefer. However, in certain areas there will be callouts for certain types of adhesives, and we urge you to try not to substitute since doing so could possibly cause problems structurally.

The last thing we should touch on before we begin actual construction is the sequence in which the Holy Smoke 40 is assembled. The sequence given to you in this booklet has been proven to be the most straightforward and provides the finished components in the order that you will need them to progress to the next assembly phase. Try to stick with the building order presented here to avoid mistakes.

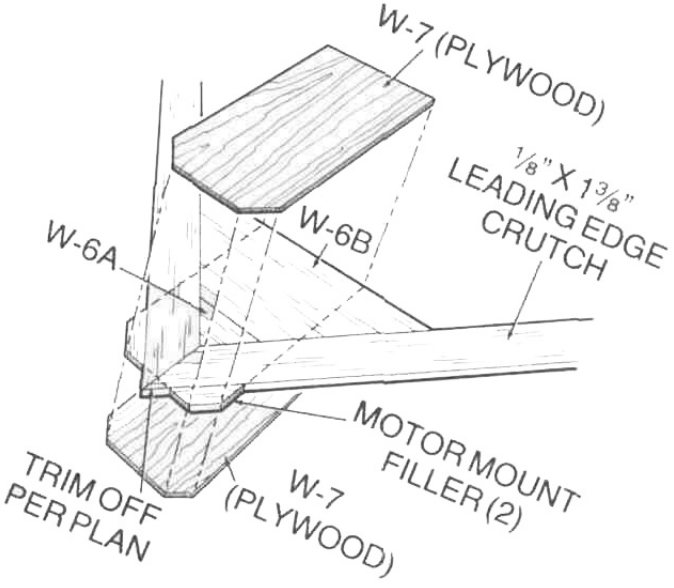
Spread the plans out on your work surface, cover them with a clear plastic material, such as the backing from a roll of Monokote or plastic wrap and commence construction.

LEADING EDGE CRUTCH ASSEMBLY

The Leading Edge Crutch serves to "tie together" all ten of the wing ribs and align them at the same time. This assembly should be built flat over the plans. Be sure that your plans are covered with either the clear backing from a roll of Monokote or a clear food wrapping material.

1. From your kit box, locate the two pieces of *1/8"* x 1-3/16" x 28" balsa sheets that will become the leading edge crutches. Lay these directly over the plans and carefully cut each end to fit as shown. The outer end is cut to fit against the *inside* face of tip rib W-5 while the inner end is cut at an angle corresponding with the centerline of the airplane. Once satisfied with the fit over the plans, glue the two crutch pieces together at the center, pin parts accurately over the plans.
2. From your die-cut sheet RC-34-2, carefully remove parts W-6A and W-6B. Glue W-6A to W-6B to form a triangle. Fit the finished W-6A/B part in place directly behind the leading edge crutch assembly at the center. You might have to lightly sand this assembly for a nice fit. Once satisfied, glue this part in place, directly over the plans.

3. Locate die-cut sheet RC-34-1 (2 req'd.) and remove the two Motor Mount Fillers. These are now glued in place against the leading edges of the two leading edge crutches, at the nose, directly behind the spinner shown on the plans. Now use your sanding block to lightly smooth off the glue joints. From the ply die-cut sheet RC-34-6, remove the two W-7 parts. Use your sanding block to clean up their edges. Glue one of the W-7 parts directly on top of the leading edge crutch assembly, aligning its rear edge with the rear edge of W-6B and its forward edges with those of the two motor mount fillers. Use weights to make sure that W-7 stays flat against the leading edge crutch assembly until it is dry.



4. Remove the leading edge crutch from the plans, turn it over and use your sanding block to smooth out any glue joints. Glue the remaining W-7 part in place to the bottom surface of the crutch assembly, exactly aligned with the W-7 previously glued to the top surface. Again, use weights to hold this part in place and allow it to dry.

   Remove this assembly from your building board as we will now build the rest of the airplane.

GENERAL CONSTRUCTION

1. From the die-cut sheets provided, carefully remove all of the required wing ribs W-1 through W-5, two **of** each. Note that these ribs each have temporary "tabs" attached to the front and rear ends (W-2 and W-3 have them in the center as well). These are there **to** provide stability during construction on a flat surface—do not remove these until told to do so. Use pins to now locate each rib in its appropriate position over the plans and vertical to your work surface. We would suggest using a 90° triangle to be sure that the ribs are truly vertical.

2. Carefully slide the previously built leading edge crutch assembly into the slots provided on the front of each rib (except W-5). The ply W-7's should fit on the inside faces of the two W-1 's at the nose and the outer ends of the crutch assembly should be in contact with the inner surfaces of the two W-5's. It may be necessary to trim a little here or there to achieve the proper fit. If so, do it now.

   With the crutch still in place but not yet glued, **turn** your attention to the slots provided in the ends of each rib. Locate the 3/32" x 7/8" x 36" bottom trailing edge balsa piece provided in your kit and carefully slide it into place in the rear rib slots.

   Now take the time to inspect this structure for correct alignment and that each piece is indeed contacting the other in the previously described manner. Once satisfied, glue the leading edge crutch and trailing edge piece to each rib. A slow-setting CA is just the ticket here. Don't worry about getting glue onto the bottom of the crutch assembly, we'll do that when we remove the structure from the building board.

3. From die-cut sheet RC-34-2, carefully remove former W-9. Lightly sand the edges of this part to fit in place between the two W-1 ribs and against the rear edge of the crutch assembly. Note that the "peaked" side of W-9 is the top. Once satisfied, glue W-9 in place, again being sure that it is vertical to your building surface.

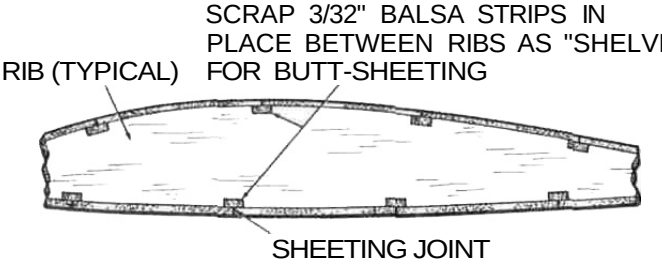
4. There are four (4) 3/16"x3/8"x24" wing spars provided in your kit; locate two of them. Bevel the inboard ends of these spars to fit against W-9 as shown on the plans. Test fit the spars in place in the slots provided. Once satisfied, glue these spars in place. Trim the outer ends flush with the outer faces of the two W-5's.

5. Use light sandpaper and your sanding block to now bevel the front edges of each rib flush with the leading edge crutch. From your kit box remove the two 1/2" x 1-1/8" x 36" balsa strips provided. These are the leading edges and wingtip material. From each piece cut a 24" length and place the balance back in the kit box for later use. Bevel the inner and outer ends of the two 24" pieces to fit in place as shown on the plans. Note that each rib has been provided with "lip" at the leading edge; these position the leading edge accurately for gluing. Glue the leading edges in place to each rib and the front edge of the crutch assembly. Pin and/or weight as needed and allow to dry.

6. Your kit has been provided with twelve pieces of 3/32" x 3" x 36" balsa for planking purposes, locate and have ready six of these at this time. Stress-relieved balsa sheet can sometimes have curved edges and it may be necessary for you to use a straight-edge and X-acto knife to true them up. This is important especially when the wood is used for butt-glued planking purposes.

   IMPORTANT NOTE: The plans depict the *top* view of the airplane. The *right* side is shown with the top planking removed and you can therefore see the planking patterns used for the *bottom* of the wing. The *left* side of the wing depicts the patterns used for the *top* sheeting. In the next steps we are dealing only with the *top* sheeting.

7. The first piece of planking that you are going to attach will be the rear one which is one-piece from tip to tip and flush with the bottom 3/32"x 7/8" balsa strip installed in the rib slots earlier—see cross-sections on plans. Glue and pin this rear piece of planking in place to the tops of the ribs and along the trailing edge of the bottom sheet.
8. The next two pieces of planking to be installed are those that fit from the the centerline of the spars, forward to the rear face of the landing edges. Trim the inboard ends to fit flush with the inside faces of the W-1 ribs and on top of W-9, as shown. Once the planking pieces are trimmed to fit, use a little ammonia on their top surfaces to get them to bend easier to fit the tops of the ribs. Glue these two pieces of planking in place, pin or weight as needed and allow to dry.
9. Remove W-10 from its die-cut sheet and lightly sand its edges to fit between the W-1 's at the rear position shown on the plans. Use a triangle to accurately locate this former and glue it in place, aligning the top edge with the tops of the W-1's.
10. Using the left-hand view of the wing (remember, that's the *top* planking patterns shown), finish planking the left and right-hand side of the top of the wing. Trim the centerline ends of each piece of planking to provide a true centerline for accurately locating the fin. Note that the entire left and right center planking pieces can also be made separately, on a flat surface and then fitted in place on each side of the centerline. Just be sure that, if you do it this way, you leave just a little extra material at the rear to trim and therefore achieve a nice, gapless fit.



11. Using the 1/4"x3"x36" piece of balsa provided and the pattern shown on the plans, carefully cut and glue the four required pieces together to form the rough shape of the fin. Use a sanding block to finish the fin into the side-view configuration shown. Follow this by sanding the fin assembly smooth on each side and then rounding the leading, trailing and top edges to a "half-round", as shown. Streamlining or airfoiling this surface is not needed or desirable.
12. The fin's support tab requires a slot that is 1/4" wide and 3-1/16" long. This is located on the exact centerline of the wing. As shown on the plans, the rear end of this slot is measured at 3-1/16" from the trailing edge. Cut this slot with a fresh #11 X-acto blade. The forward end of the slot should be at the rear face of W-10. Trial fit the fin in place and dress the bottom edge of it as required to achieve a uniform fit to the top surface of the wing's planking. Once satisfied, set aside the fin for later installation.
13. From your parts bag, locate the four 4-40 blind mounting nuts and their corresponding 1-1/4" motor mount bolts. Also locate the two 3/16" x *3/4"* x 5-1/2" maple motor mounts and the two top 7/8" x 1-3/4" x 5-1/2" balsa cowl blocks. Before assemblying the motor mounts and cowl blocks in place as shown on the plans, let's first trial fit the whole thing on the nose *with* your engine sitting in place between the maple mounts. Is the fit a comfortable one or is it too tight or too loose? Engines vary somewhat in case width and if yours happens to be a little too wide, then you will find that the engine will either not fit at all or a little too tight. If this is the case then you must use a sanding block to remove a little of the width from the two balsa cowl blocks. Try to do this evenly and a little at a time while continually trial-fitting the engine. Once satisfied, you can move on to the next step. If your engine fits too loosely between the mounts then you must add material to the sides of the cowl blocks to space them out a little. 1/16" sheet balsa on each block would move the mounts inward 1/8", etc.
14. Glue the balsa cowl blocks in place in the nose against the inside faces of the W-1's, against the front face of W-9 and against the W-7 ply floor. Use a scrap of balsa to scrape out any oozing glue because we want the maple motor mounts to fit in place squarely to the floor and the cowl blocks. Lightly tack glue the two maple motor mounts to the ply floor only, exactly in the position they will eventually be. Set your engine in place on the mounts with the thrust washer just clearing the front of the nose (see top view and engine cross-section on plans). Now carefully mark the lug hole positions on the motor mounts with a pencil or sharpened object of some kind. Remove the engine and break the two motor mounts free from the ply floor. Use a drill press and a 1/8" dia. drill bit to drill the two required holes in each motor mount (a hand drill can be used if you are careful). In order to get the motor mounts to sit flush against the W-7 ply floor, you must now use a Moto-Tool and grinder bit to counter-sink the 4-40 blind nuts. Epoxy these nuts in place to the bottom of each motor mount, being careful to keep glue out of the nut's threads. Using medium to slow curing epoxy, glue the mounts permanently in place. When the glue has cured remove the pins holding the structure in place to your building board and remove the wing.
15. Turn the wing over exposing the unplanked bottom and block-up the nose until the trailing edge lays flat to your work surface. Use an X-acto knife to carefully remove the rear building tabs on all of the ribs. This exposes the forward edge of the bottom trailing edge strip installed at the beginning. Take one of the 3/32"x3"x36" planking pieces, true-up its edges with a straight-edge and razor and glue it in place against the forward edge of the trailing edge piece and against each rib. (We found that a truer butt-joint could be made by first gluing scrap pieces of balsa underneath the piece of balsa planking that was already in place thus creating a sort of "shelf". The excess material left over from the die-cut sheets provides plenty of these shelf pieces.) Pin or weight this

planking in place and allow to dry.

16. Again using the X-acto knife, remove all remaining building tabs from the bottoms of all of the ribs. Accurately bevel cut the ends of the two remaining bottom spars and glue in place.

17. From your parts bag locate two 5-1/4 " long slotted hardwood landing skid mounts and two slotted landing gear uprights. Epoxy the two 5-1/4" long skid mounts in place in the cutouts provided in ribs W-2 and W-3 as shown on the plans. Be sure the slotted side is exposed! Use a 3/32" dia. drill bit to drill a hole through each block, in the slot, at the outboard face of W-2. Temporarily install the two formed *3/32"* dia. M.W. skids in place in the slotted blocks. Apply epoxy to the two short slotted blocks—on the slotted side and bottom edge—and glue these in place over the stub ends of the wire skids and against W-2. Carefully remove the wire skids and allow these assemblies to cure.

18. While the bottom of the leading edge crutch assembly and the ribs are still exposed, finish gluing these pieces together as you did on the top. A bead of slow set CA on each side of each rib will do nicely.

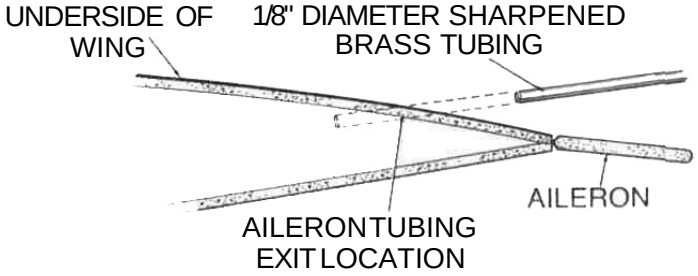
19. Cut, fit and glue the bottom leading edge planking pieces in place. Note that like the top planking, the rear edges are cut to fit halfway across the width of the spar and that the inboard ends are cut to fit flush with the inside faces of the W-1 ribs and the W-9 former (the exposed cavity described by the shape of W-7 will be filled-in with balsa blocks and the hardwood nosegear mount). When dry, use your sanding block to sand the outer faces of W-5 tip ribs flat. Using the two remaining pieces of the *1/2"* x 1-1/8" leading edge stock, glue these in place to the W-5's as wingtips. Sand the leading and trailing edges of these tips flush with those of the wing when viewed from the top. Sand the tops and bottoms to match the airfoil contours except for the leading edge; this will be shaped later.

20. If so desired, now is a good time to lay in a strip of light fiberglass along the inside centerline of the top planking from W-9 back to W-10. Although there is no real stress in this area, fiberglass does serve to stiffen and strengthen the wood. This is also a good time to give the entire tank/radio compartment a coat or two of polyester resin. While the resin is curing, take the time to make your fuel tank. An 8 ounce DuBro tank is shown on the plans. We've also used a Pylon SS-8 Slant tank which fits nicely in place on its side thus giving you a bit more room in the nose, if you need it. Set the tank aside; it will be installed in a little while.

21. You now must install the servos on their respective hardwood mounts (four pieces of *1/4"* x 3/8" x 5" basswood are supplied for this purpose). First cut the length of these rails to fit snuggly between the W-1 sides as shown. Start with the rearmost mount and epoxy it in place at the lowest possible point that still allows your servos to fit without contacting the top planking. Using your servos as spacers, install and glue the next rail in place—remove the servos. The next rail to be installed is the rear aileron servo mount. Note that in the cross-section we show that the aileron servo is mounted lower than the two rear elevator and throttle servos. This is done to allow clearances of the various drive cables. Again using your servo as a spacer, install and glue the forward aileron servo rail in place and remove the servo. Allow the epoxy to cure. Cut about 19" of white tubing (two piece @ 36" supplied) and install it in the left wing panel from just inside W-1 through all of the wing ribs, exiting at the wing tip; this is the receiver antenna tube. CA adhesive works well to secure this tube, and the others, to each rib if you first lightly sand the tube's surface. Using wood screws (not supplied), position and install the three required servos.

22. The throttle pushrod, unlike the others is made up of a plastic inner and outer tubing (one piece of each @ 12" supplied). Install and glue in place the outer throttle pushrod tubing as shown on the plans. Next, drill a small dia. hole, about 1/8", through W-10 where the elevator pushrod (one piece @ 12", threaded one-end, supplied) exits the elevator servo toward the rear—see cross-section of radio compartment on plans. Use an X-acto knife to now make a small exit slot in the bottom planking to allow the free fore and aft movement of the elevator pushrod. Note that we are showing a "Z-bend" at the servo output arm. Once you're satisfied you can remove and set aside the elevator servo, its pushrod and the throttle servo, they have served their purpose for now and will be installed after the airplane is finished.

23. From you parts bag, locate the small metal "ball-link" (threaded), the small nut for it, the nylon dual take-off aileron ball connector and three brass threaded couplers. As shown on the plans, the ball-link is mounted on your aileron servo's output arm and secured with the nut. Now snap the nylon dual take-off connector on the ball-link, positioned as shown on the plans. Drill two 1/8" dia. holes, one through each W-1 rib side at the exit points of the aileron drive cables. From your kit box, locate the remaining 36" length of braided cable. Cut each of these in two equal 18" lengths (a carbide cut-off wheel will cut the cable nicely). Use a soldering iron to solder a threaded brass coupler on one end of each cable. Slip the white tubing over the cable.



Working on top of the exposed ribs, visually line-up the coupler end of the cable/tubing assembly with the previously drilled hole in W-1 and either pin it in position so that it does not move or have a friend hold it for you. As shown on the plans, gently bend

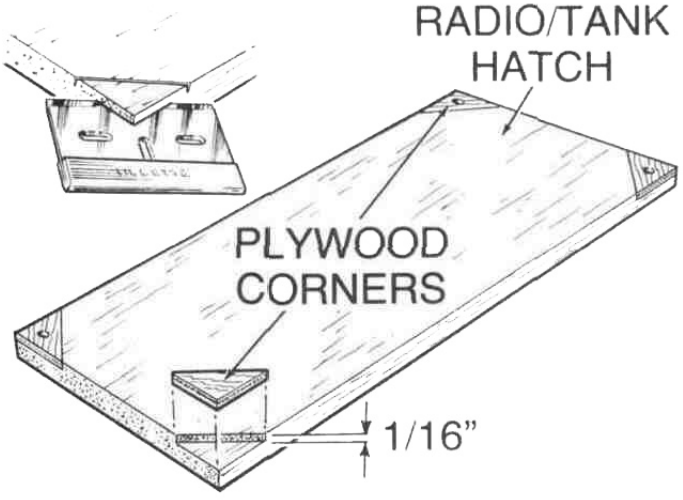
the cable/tube assembly around to the exit point shown at the aileron horn location. Use a marking pen to note the location of the tube on each rib. Repeat this operation for the opposite wing panel. Again, use the 1/8" drill bit to drill holes through the W-2's and W-3's that will allow the tubing to pass. Now use a piece of sharpened 1/8" dia. tubing to make the tubing exits, at the angles shown, through the bottom, rear planking. With the cables still inside the tubes, feed the tubes through the various holes until they exit. Test the action of the cables; movement should be free and easy. Once satisfied, use slow setting CA to anchor the tubes in place to the ribs and planking. Trim the aileron exit tube ends flush with the planking—remove the cables and set aside for installation when the airplane is finished.

24. You should have about 15"-16" of white tubing left over from the antenna tube; this will be used for the nosegear steering cable. As shown, this cable is driven by the opposite end of your servo's output arm. Locate the remaining 12" length of braided cable and solder the brass coupler in place. Thread one of the black nylon mini-links in place on the coupler. This will be the servo end of the steering cable. From your planking stock (3/32" balsa), cut a 2-7/16" x 3-7/8" rectangle and glue this in place on the W-1 ribs and flush with the *front* face of W-9. You should wind-up with a little of the W-1's thicknes still exposed on each side to allow seating for the rest of the bottom planking—fit this piece carefully. As before with the aileron tubes, drill a 1/8" dia. hole through the right-side W-1 at the correct position for the servo's output arm to drive the steering cable. Slip the cable into the tubing and hold it in position over this hole, again, you might have a friend hold it there for you. Now gently bend the cable/tubing as shown on the plans around towards the nose to the exit point shown. Use a marker to note the passage point through W-1 at the front. Use a drill bit to drill the hole through W-1 and a sharpened piece of tubing to make the exit hole through the planking just installed. Install the tubing through all three holes and test the action of the cable, as before, it should be a free fit. Adjust the tubing to obtain the optimum movement and glue it in place. Remove the cable and the aileron servo. Trim the tubing flush with the planking.

25. The balance of the bottom planking can now be installed. In order to find and clear out the landing gear skid slots later, use a straight edge and pencil to make horizontal and vertical reference marks on the sheeting already in place. Note that the hatch area is left open with the inboard ends of the planking trimmed flush with the inboard faces of the W-1's. All that should remain after planking is the open hatch area and the nose bottom.

26. From the kit, locate the four blocks required to fill-in the bottom nose area; 2 @ 1" x 1-1/2" x 5-1/2" balsa; 1 @ 3/4" x 1" x 3-1/2 " balsa and 1 @ 3/4" x 1-7/8" x *2"* bssswood. The hardwood block is used to mount the 5/32" dia. coiled nose gear. The two 1-1/2" wide balsa blocks fit on the outside edges of the W-1 's, against the W-7 ply floor and against the face of W-9. The remaining 3/4" wide block fills in the remaining slot. Use your sanding block as needed to achieve a good, flush fit of these four blocks. Use a drill press to drill a *vertical* 5/32" dia. hole through the hardwood block at the position shown on the plans for the nose gear. Glue all four blocks in place. After the glue has set, chuck-up the 5/32" dia. drill bit in a hand drill and complete the hole in the hardwood block all the way through the floor, into the engine compartment.

27. The radio compartment hatch supplied in your kit measures 1/4" x 3 - 3 / 4 " x 9" and is balsa. It is mounted to the four 1/2" sq. hardwood blocks supplied. Glue these blocks in place in the four corners of the hatch opening at a depth which will leave the hatch flush with the planking. Install the four die-cut ply triangles that were left from die-cut sheet RC-34-6, on each corner of the hatch. Use a razor blade to remove 1/16" of depth of the hatch corners, in the shape of the ply triangles and epoxy these in place.



Now locate the hatch in position on the four hardwood mounts—use tape to hold it there if need be. With a 3/32" drill bit, drill a guide hole through each of the four corners of the hatch and in contact with the hardwood mounts, just enough to leave a mark on each of the mounts. Remove the hatch and use a 1/16" drill bit to drill a guide hole through each of the mounts. Locate four of the #2 x 3/8" wood screws supplied and screw the hatch in place to the mounts. Once satisfied with the fit, remove the screws and lightly tack glue the hatch in place to the mounts—you want to be able to remove it after sanding. Using the cross-reference marks made earlier, use an X-acto knife to clear-out the two rear landing skid slots.

28. Use a razor blade to first rough shape the upper and lower nose blocks. Follow this with a sanding block and coarse sandpaper to bring these blocks down further. Use the razor plane again to rough shape the leading edges—refer to cross-sections on the plans. Finally, the entire wing can be sanded with progressively lighter sandpaper until ready for covering. Take your time and get it right. Remove the tack glued hatch and set it aside for covering.

29. Locate and remove the W-8 ailerons from their die-cut sheet. Glue lengths of 1/8" x 1/4 "balsa on each of their ends as shown for stiffening. Tape these in place to the trailing edge of the wing. Locate the 1/8" x 1-3/4 " x *20"* elevator piece and likewise, reinforce each end with lengths of 1/8" x 1/4" balsa. Trim the elevator as needed to fit snuggly between the ailerons; we recommend about 1/16" spacing. Remove these surfaces, sand them smooth and set them aside for covering.

30. Use a slow cure epoxy to now glue the fin in place on top of the wing. Apply adhesive liberally to those areas of the tab that will contact W-10 and the bottom sheeting as well as the bottom surface which contacts the top sheeting. Squeegee off any excess glue when the piece is in place. Use a 90° triangle and tape to make absolutely sure that the fin is positioned squarely in place when viewed from the top and that it is truly at 90 degrees vertical to the wing itself. Allow this structure to cure completely. Although not shown, we have included a length of 1/4" triangular stock which some of you may wish to use to further strengthen the fin/wing joint. While we have found this to be unnecessary, we understand that some of you might like a fillet in this area.

FINAL ASSEMBLY

1. We have provided your kit with eight nylon hinges. If you wish to hinge the flight surfaces with these now is the time to carefully slot the surfaces themselves and the trailing edge. An alternate method of hinging these surfaces is the use of Monokote. These hinges are incredibly strong, color co-ordinated and exceedingly effective aerodynamically. They are so effective that the surface movements must be cut down about 25%.

2. Locate the four metal landing gear straps and the eight #2 x *3/8"* wood screws used to retain them. As shown on the plans, position the straps across the landing skid slots and use an X-acto knife to clear-out the balsa down to the hardwood, two straps for each skid. Use a 1/16" drill bit to drill guide holes through the hardwood blocks and secure the straps with the #2 wood screws. Remove the screws and straps for assembly when the airplane is covered.

3. As shown on the plans, assemble the nose gear with the steering arm and the top and bottom retaining wheel collars in place on the nose of the wing. File or grind small "flats" in the nose gear wire to accept the wheel collar's set screws, once you are satisfied with the fit and movement. Remove these parts and set them aside for assembly after covering.

4. Drill the appropriate holes through W-9 for your fuel lines. A typical no-nonsense system is the two-line set-up. This is where the fuel line from the tank's clunk pick-up goes to the engine's carb and also is used for filling the tank. The second line goes to the engine's muffler nipple to provide tank pressure and is also used for overflow when the tank is being filled. You might want to use some of those pieces of triangular stock supplied to position the tank in place. We have also found it helpful to wrap a little strapping tape around the tank, lengthwise, leaving a little "pull-tab" at the end to facilitate removing it whenever needed.

COVERING

The Holy Smoke 40 really lends itself to the use of Monokote for covering. Besides being light, colorful and strong, Monokote is totally fuel-proof and easily repairable.

Why not try a really wild trim or color scheme on your H.S.40? On our prototypes we have done one color scheme on the top and a totally different one on the bottom. Think about it! At the speeds this airplane flies, it is comforting to know which end is **up!**

Once your color scheme has been decided, cover each component separately; the wing/fin itself, the ailerons, elevator and hatch cover. Once the covering is all in place, clear-out the exit locations for the antenna tube, the ailerons, the slot for the elevator pushrod, the landing skid slots and the nose gear steering cable. Apply a couple of coats of polyester resin to the engine compartment area, carefully covering any area where Monokote has been overlapped—this will permanently seal those edges. You can then paint the engine compartment area. We recommend the use of two-part epoxy paints but there are several one-part paints that are on the market which will match Monokote.

Clear-out the slots made earlier for the ailerons and elevator and hinge these surfaces to the trailing edge of the wing. A few small holes drilled in the hinges themselves will let the epoxy use to glue them in place, act as nails.

RADIO INSTALLATION & PRE-FLIGHT

1. Install all three servos. Using the cables with the connectors soldered in place for the ailerons, screw the couplers into the nylon dual take-off ball fitting. There should be plenty of excess cable protruding from the aileron ends of the tubes Center your servo. Slip a piece of card stock underneath the protruding cable and cut-off the excess cable with a carbide cut-off wheel. Now solder the brass coupler in place to the cable and thread one of the black nylon clevises in place on the coupler Repeat this procedure on the other aileron As shown, mount the nylon horns on each aileron and connect the clevises to the outer-most holes.

2. Use the above method to now connect the steering cable to the steering arm on the nose gear. First mount the nose gear to the nose; then make the clevis connection to the opposite output arm of the aileron servo. Cut-off the excess cable, solder the brass connector in place and complete the connection with a black nylon clevis.

3. The elevator connection is made next. Slide the elevator pushrod through the hole in W-10 and out the slot on the bottom. Install the large nylon elevator horn to the elevator at a position corresponding to the slot. Thread the large nylon clevis on the

threaded end of the pushrod. With the elevator servo centered, mark the location for the required "Z-bend" in the pushrod. Make the "Z-bend", attach the output arm to the pushrod and then to the servo.

4. As shown on the plans, the throttle pushrod is plastic tubing with a 6" threaded wire and "Z-bend" at the throttle servo end and a 1" threaded stud and kwik-link at the carb end.

5. There is a gauge fixture provided on die-cut sheet RC-34-2. This gauge, as shown on the plans, is used to set the flight surfaces for neutral trim. DO NOT ATTEMPT TO SET NEUTRAL TRIM ON THIS AIRPLANE USING ANY OTHER METHOD. With your radio on, use this gauge and the adjustments available to you through the clevises to set the ailerons and elevator to neutral. Adjustments should be made either mechanically or electronically (through your radio) **for** the following flight surface movements:

   Ailerons..... 3/8" up
   3/8" down
   Elevators.....3/4" up
   3/4" down

   Remember what was said earlier about the use of Monokote hinges—they will make the flight surfaces about 25% more effective.

6. Note on the cross-section of the landing skid that the skid itself is bent back at an angle. You should do this now. The angle should be about 20 to 25 degrees. You should also bend the ends of these to a "half-round". You might consider adding small wheels to these skids by bending out an axle at the ends, slipping on the wheel (1/2" to *3/4* "dia. would do) and soldering a washer in place as a retainer. If you fly off of a hard surface, wheels might be easier on your ears. Mount the skids in place on the bottom of the wing.

7. Adjust the nose gear steering arm and/or clevises for **neutral.**

8. Install the fuel tank, fuel tubing, engine and muffler. Make all necessary fuel connections and throttle hook-ups.

9. We have found it convenient to install both the receiver's switch harness and charging receptacle directly to the radio hatch cover. Wrap the reciever and battery pack in foam and install in the radio compartment. Button-up the hatch cover and, assuming that you have already mounted your *2-1/4"* dia. nose wheel, you should be ready to balance the airplane.

10. Balancing this airplane at the point shown on the plans is very important and should not be underestimated. The design is very pitch stable when balanced at this point. Much can be done to move the Center of Gravity fore or aft; a plastic spinner is lighter than a metal one and no spinner is lighter than both, battery packs can be moved as far back as W-10 and the throttle servo could be repositioned next to the aileron servo, etc., etc. Once the balance has been achieved and your engine completely broken-in and reliable, you can head for the flying field.

FLYING

This is the part all of us love and fear at the same time. The Holy Smoke 40 is not too much different than most aircraft in that all of the homework must be done before lift-off. Since it isn't reasonable to ask you to test-glide this airplane over tall grass, we're going to assume that you did indeed follow the fore-going instructions. Because if you did, then the test flights should be almost routine.

We say "almost" because unless you are told ahead of time, like right now, you could be in for a surprise or two. First of all, the take-off. The take-off will be quick; be ready for it. There is some tendency for the airplane to torque a bit to the left due to its high power-to-size ratio; be ready for it. For first flights we would suggest that you have a helper hold the airplane on the ground, pointed into the wind while you apply full power. Have the helper release the airplane at your command. In this situation, the airplane is "flying" in less than a few feet. Now that you're up there and have things pretty well under control you might be interested in observing the airplanes roll-rate. Next you might want to observe the roll-rate while climbing vertically—neat, huh? Our Enya CX powered H.S. 40's will climb and roll out of sight, a maneuver guaranteed to make you an instant "club pro"!

All good things must come to an end, even eight ounces of fuel—time to land. Delta's can fly slowly with their noses up just so long. At some point all of the up elevator available will peter-out and at that point a stall is achieved. As mentioned earlier, deltas tend to stall straight ahead and gently. Gently, however, is a relative term. At 200 feet, gentle is one thing, but at 10 feet gentle can be something else. All of this is telling you to keep the speed up on your approach to a landing. Our best landings have been done by maintaining about 1/3rd throttle throughout the entire approach while steadily decending to the field. As soon as field threshold has been reached, lower the throttle to full idle and flair to touchdown. Don't worry that your first few attempts are a bit bouncy; you'll get the hang of it soon enough.

The stunt repertoire of the Holy Smoke 40 is just about endless. Even without rudder input, we've been able to knife-edge from one end of the field to the other on sheer speed.

We sincerely hope that you've enjoyed this project and that your Holy Smoke 40 will indeed become your perfect "other airplane".

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