Daughter Stacy showing off dad's Super Duper Joy Stick. Photo by Bill Laskar.

Any of you modelers who have built Noel's Joy Stick will welcome this .60 size version. It does all the good things the smaller one's do, only it does them easier and better.

SUPER DUPER JOY STICK

By Noel L. Rozelle

Photos By David Lowell

The Super Duper Joy Stick is built from standard size balsa and although some splicing is necessary on the fuselage sides, I prefer this to buying 4' wood and having a lot of scrap left over.

If you have built any of the planes I have designed, the 1/2A Hornet, Super Joy Stick and Joy Stick, you will find that I follow the same basic theme in my designs and building techniques — simplicity and strength.

The Super Duper Joy Stick came about because I received many requests for a larger version of the Super Joy Stick, which is built for .25 engines and is an outstanding fun-fly and sport model. Unfortunately, some of the old timers are hung up on .60 size aircraft and won't fool with anything smaller. After blowing up the Joy Stick to the same size as an Ugly Stick and beefing it up to handle the extra loads, I built the first prototype and realized why they like big models better. There was no problem trying to jam all the radio gear in since there was loads of room; in fact, the one I just completed has an extra 12 ounce tank in it for smoke. Sixty size engines are also a welcome change from the smaller ones which can sometimes be a little temperamental. As for flight characteristics, big planes definitely fly better. The wind doesn't affect them as much and they can be seen at a greater distance. They also land a good deal slower because the wing loadings are usually much lighter.

Some of the comments that prompted this model came from die-hard Ugly Stick and Contender fliers. The comparisons they made to these great old standards were very favorable toward my Super Duper. They went like this: "It is as stable a low wing airplane as you will ever fly and it's great for a novice flier's transition from a trainer to a full-house aircraft." "In fun flys it is almost unbeatable, as it will take a pretty good bash without being put out of commission and it is extremely maneuverable and precise for spot landing and limbo type events."

It is even a great model for breaking into pattern. I'm not putting it into a class with pattern planes because it's not, but for pre-novice through advanced class it is far better than a lot of planes the novices choose to fly and much more forgiving.

I could have written that the Super Duper won the Masters class at the Albuquerque pattern meet last summer and it did, but it was the only entry in that class so, although it performed all the maneuvers well and turned in a fair score, there was no competition, so you can see how rumors get started. The Super Duper did, however, turn in very respectable scores in pre-novice, novice and advanced, against some good competition.

Where the Super Duper really comes into its own is in the hands of a Sunday flier, or at fun fly events.

A group of guys I fly with have been covering a lot of contests in the southwest and we fly the .25 size Joy Sticks, only we use .40 size engines in them. They are almost unbeatable in most of the fun fly events. They have all the power and maneuverability you could ever ask for in a fun fly type plane. Although the .60 size doesn't have the awesome vertical performance of the .40's, it is every bit as quick to land in a musical pylon contest and as precise an airplane as you could ever want in a blackjack or spot landing contest. We've flown in a lot of contests and the only thing that will consistently beat a Super Duper Joy Stick is another Super Duper Joy Stick.

So let's start building. First, as always, familiarize yourself with the plans. It's so much easier than going back and saying to yourself, "Oh, so that's how it's supposed to go."

As I mentioned earlier, you may not like some things in the construction — specifically, the wings are rubber banded on, but that's my own preference. You can use hardwood wing hold-downs and nylon screws if you wish. Also I'm sort of a frugal person and I don't mind splicing a chunk of balsa here and there. The rear end of the fuselage is spliced and the longerons are spliced. The reason for doing this is just to keep from using 4' lengths of wood which come at a premium price and are sometimes hard to find at your local hobby store. If you wish to use 4' wood, please be my guest. Now that this is settled, let's start building.

CONSTRUCTION

Fuselage:

(1) Cut the fuselage sides and bottom sheet from 3/16" x 4" x 3' balsa. (See Photo #1, layout.)

(2) Splice the tail end onto the fuselage halves. This joint does not have to be very strong because the longerons will be spliced at a different location. (See Photo #2.)

(3) Now after cutting the **crossgrain** doublers from 1/8" x 3" x 36" balsa, glue or epoxy them in place on the insides of both fuselage halves. (See Photo #2.)

JOY STICK

SUPER DUPER JOY STICK
Designed By: Noel L. Rozelle

TYPE AIRCRAFT
Sport/Fun/Pattern Trainer
WINGSPAN
61 Inches
WING CHORD
12 Inches
TOTAL WING AREA
720 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord

DIHEDRAL EACH TIP
1¼ Inch
O.A. FUSELAGE LENGTH
48" (Incl. Spinner)
RADIO COMPARTMENT AREA
(L)11" x (W)3" x (H)3"
STABILIZER SPAN
21⅜ Inches
STABILIZER CHORD (incl. elev.)
6" Average
STABILIZER AREA
123 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7¼ Inches

VERTICAL FIN WIDTH (incl. rud.)
6½" (Avg.)
REC. ENGINE SIZE
.45-.61 Cu. In.
FUEL TANK SIZE
12-16 Oz.
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Hardwood
Empennage	Balsa
Wt. Ready To Fly	**88-96 Oz.**
Wing Loading	**17.6-19.2 Oz./Sq. Ft.**

(4) Next, glue and pin the 1/2'' triangle stock longerons to the **inside top** of the fuselage sides (see section A-A on plans). Make one right side and one left side.

(5) Next, glue the bottom longerons in place. The front lower longerons are glued on top of the crossgrain doublers.

(6) Cut out the fuselage top sheet from a sheet of 3/8'' x 4'' x 36'' balsa, and starting at the front, glue and pin the fuselage sides to the top sheet. (Check plans — the top sheet is not glued between the fuselage sides — it sits on top of them.)

(7) When the glue on top is dry, remove the pins from the top sheet and glue the rear bottom sheet in place after sanding any excess glue from the longeron joint. This assures a good fit.

(8) Next cut out the lower front fuselage sheet from 3/8'' x 4'' x 36'' balsa and glue it in place.

(9) If you have cut all the parts neatly and accurately, the front end of the fuselage should be square and ready to accept the 1/4'' ply firewall. Use a square to check the fuselage sides and bottom, using the top sheet for a reference. Sand where necessary and fit the firewall directly to the front of the fuselage and mark the top.

(10) Next, from the plans locate the thrust line and draw a line horizontally across the firewall; also draw a center line from top to bottom and place your engine mount on the firewall, center it on these lines and mark and drill the mounting holes. Place 6-32 blind nuts on the back side of the firewall and glue them in place. (See Photo #3.)

(11) After preparing the firewall for mounting, epoxy it in place on the front of the fuselage. Masking tape may be used to hold it in place while curing. Reinforce firewall backside with additional strips of 1/2'' triangle stock (inside fuel tank compartment.)

(12) If you are going to use the wing dowels to hold the wing on, locate and drill the holes, then cut the 1/4'' dowels and trial fit them but do not glue them in place at this time. This will make it easier to sand and cover the fuselage. You will notice the significance of the cross grain doublers now. They keep the dowels from splitting the fuselage sides when you make one of those unplanned hard landings out in the boonies. This type of construction can save some major repairs.

(13) Next, screw on the engine mount and mark and drill the nose gear hole. The hole should be far enough forward to allow clearance for the steering arm. If the arm you use interferes with the firewall, you can cut a small indentation in the firewall for clearance. Also at this time you can drill the holes for your steering cable and throttle cable in the firewall.

(14) Mount the engine, leaving plenty of room behind it for any plumbing from the fuel tank. After all, if you think of these things ahead of time you can avoid a problem further down the line.

(15) Install the 3'' spinner onto the engine shaft to use for a guide for the cowl, then cut the cowl blocks from 3/8'' balsa and fit them to the firewall and glue them in place.

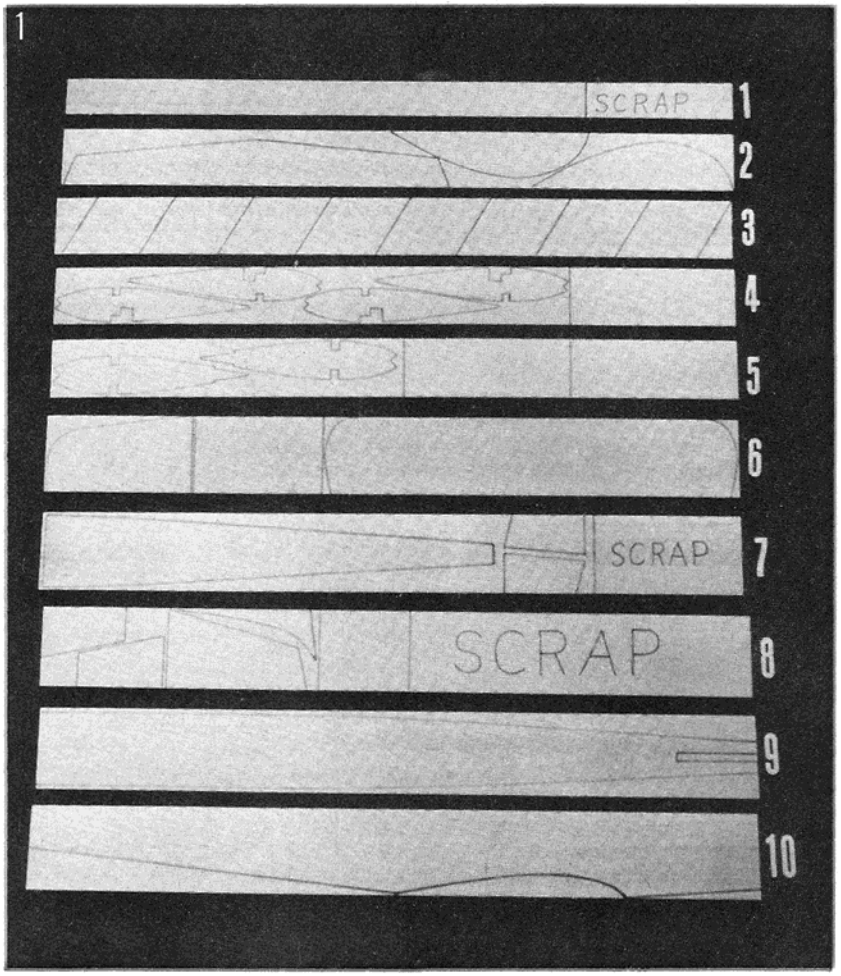
(16) While the two side cowl blocks are drying, you can cut the bottom cowl blocks from 3/8'' balsa, sand it to fit and glue it in place.

(17) Remove the spinner and engine and glue in the 1/2'' triangle stock in the corners of the cowl and replace the engine with spinner and mark where the spinner ring will go and remove the engine again. (See Photo #4.)

(18) Cut the spinner ring from 1/16'' ply, using the spinner as a template. Glue it in place and rough sand the cowl to blend in with the spinner. (See Photo #4.)

(19) Rough sand and contour the rest of the fuselage and don't be afraid to round the corners off. (Check cross-section on plans.) Rounding the corners well gets rid of unnecessary weight and takes away the boxy look of the fuselage.

(20) The only other things that may be necessary to do to the fuselage before covering is to check the alignment of the wing and stab in relation to the thrust line. The thrust line, stab and wing should all be

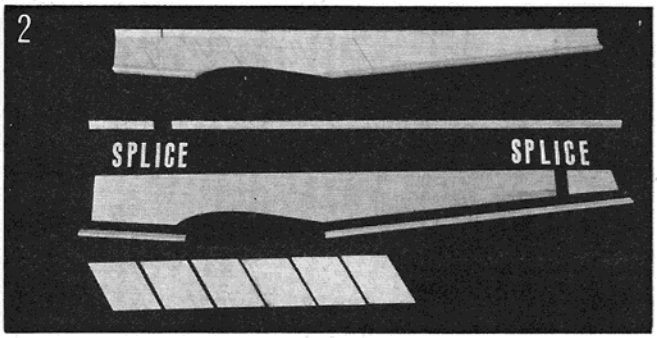


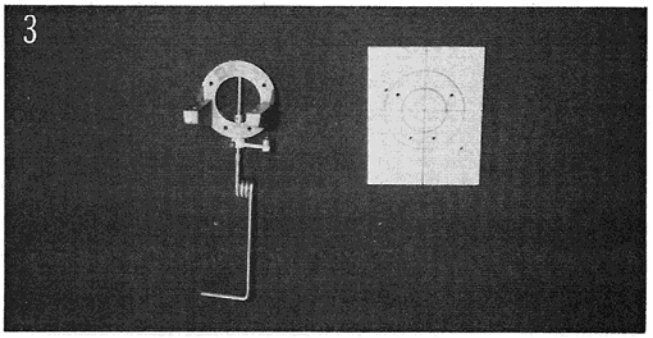
MATERIAL LIST
AND CUTTING LAYOUT
SHOWN IN PHOTO NO. 1

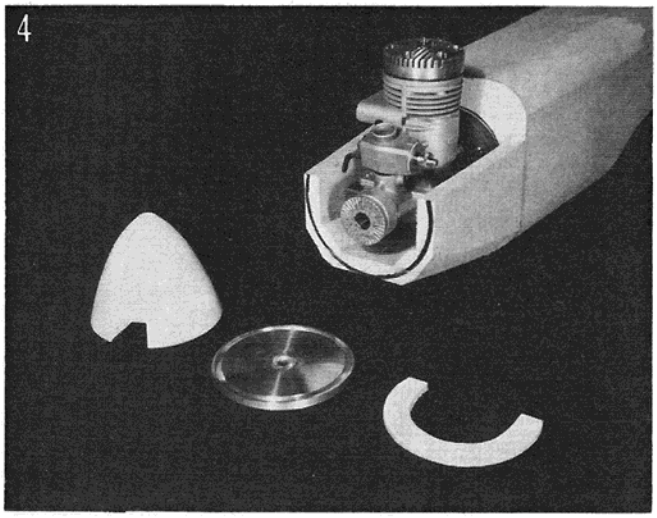
1 (4 req'd) 1/8'' x 2'' x 36'' — wing trailing edge.
2 (1 req'd) 3/8'' x 3'' x 36'' — elevator & two wing tips.
3 (1½ req'd) 1/8'' x 3'' x 36'' — fuselage crossgrain doublers.
4 (2 req'd) 1/8'' x 3'' x 36'' — center section ribs & center sheeting.
5 (5 req'd) 1/8'' x 3'' x 36'' — main ribs & center sheeting.
6 (1 req'd) 3/8'' x 4'' x 36'' — vertical & horizontal stab & lower front fuselage block.
7 (1 req'd) 3/16'' x 4'' x 36'' — lower rear fuselage sheet & rear fuselage add-ons.
8 (1 req'd) 3/8'' x 4'' x 36'' — cowl blocks, rudder & dorsal fin.
9 (1 req'd) 3/8'' x 4'' x 36'' — fuselage top sheet.
#10 (2 req'd) 3/16'' x 4'' x 36'' — fuselage sides.

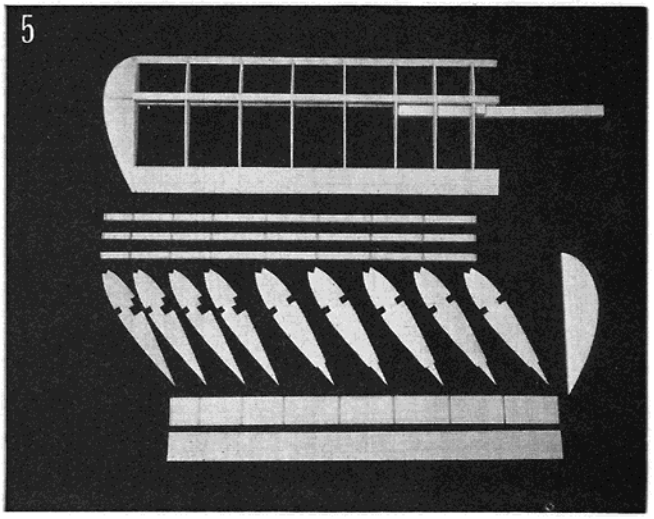
NOT SHOWN IN PHOTO

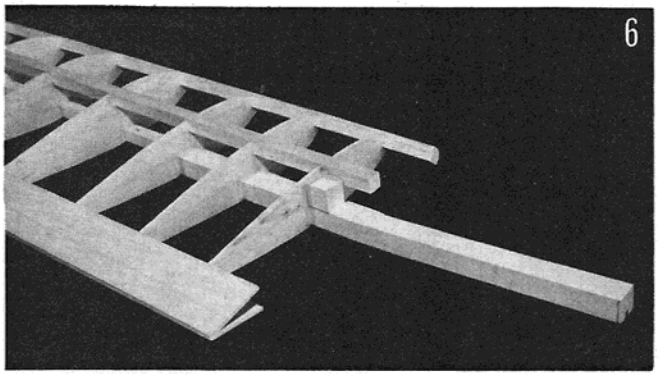
2 pieces of 3/8'' x 1½'' x 36'' tapered trailing edge stock for ailerons.
5 pieces of 1/2'' x 36'' triangle for longerons on fuselage corners.
6 pieces of 1/2'' sq. x 36'' for wing spars and leading edge.
2 pieces of 5/32'' music wire for gears.
1/4'' ply for firewall.
1/16'' ply for spinner ring.
1/4 dowel rod for wing hold-down and a piece of 3/4'' x 2'' x 24'' basswood, pine or any semi-hardwood for the landing gear brace and blocks. Use your favorite brands for hinges, horns and all other hardware.

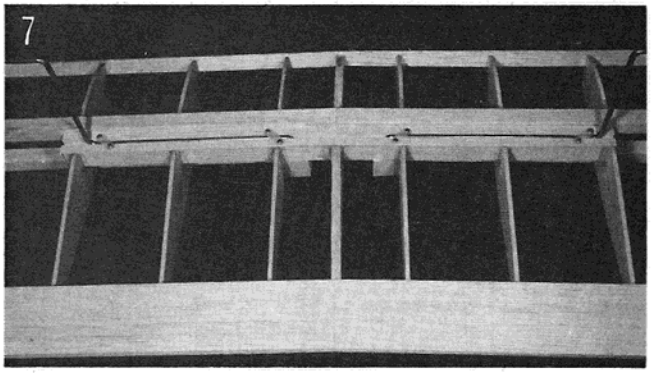


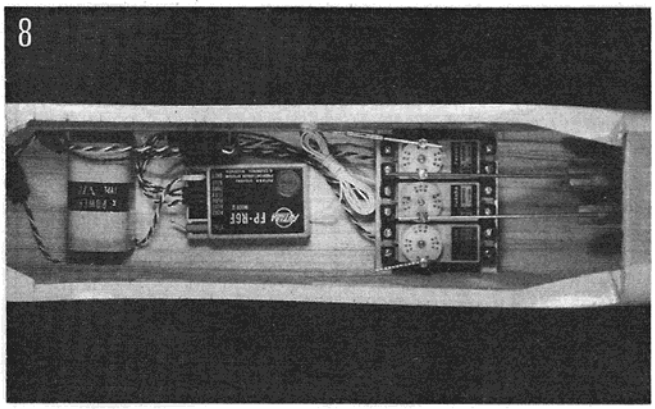












(Photo #2) Fuselage side detail & splicing.
(Photo #3) Engine mount & firewall detail.
(Photo #4) Shaping the nose to the spinner.
(Photo #5) Completed panel & parts for other one.
(Photo #6) Gear support block in place.
(Photo #7) Landing gear installed.
(Photo #8) Uncongested radio installation.

zero degrees incidence to each other and of course the wing and stab should be parallel. Sand the wing saddle to fit the wing after it is built and when everything is fitted and aligned, final sand and cover the fuselage with your choice of film covering or finishing material.

Wing Construction:

(1) Cut ribs, trailing edge, center planking and wing tips after checking layout (Photo #1) and cut spars, leading edge and center brace from patterns on the plans.

(2) Pin the trailing edge to the plans on top of a flat building surface and place a scrap piece of 1/4'' square under the lower spar to elevate it to the proper height to accept the ribs.

(3) After propping up the spar, place all the ribs in place except the center rib and glue and pin them, remembering to check for squareness with a small modeling square.

(4) When all ribs are dry, remove pins and place top spar in place and glue and pin it.

(5) Slightly bevel the rear of the top trailing edge to make a good glue joint

where the two trailing edge pieces come together and glue it in place.

(6) Next, glue and pin the leading edge in place and when dry, remove the wing from the building board.

(7) Repeat steps 1 through 6 to build the second wing half, referring to Photo #5 if you have any questions.

(8) After cutting out and notching the center brace, fit and glue it in place on one half of the wing using epoxy. See Photo #6 for center section detail.

(9) Next, epoxy the gear support block in place on the inside of rib #2 as shown in Photo #6.

(10) Fit the second wing half in place, trimming where necessary for a good fit and, when this is done, slide the two remaining center ribs in place on the half of the wing the gear brace is glued to. Join the two halves with epoxy, then slide the two center ribs into place and glue and pin them in place until dry. If both wings have been built accurately, the wing will be straight if joined carefully and the proper dihedral angle will be formed by the center brace.

(11) Epoxy the remaining gear support block in place and drill the 5/32'' holes necessary to mount the main gears. Then bend the mains as per plans and mount them with your choice of landing gear straps as shown in Photo #7.

(12) Using 1/8'' x 3'' balsa sheet as shown on layout, sheet the center section of the wing; also cut out the wing tip and small braces and glue them in place.

(13) Reinforce the wing center section with a 6'' wide strip of 6 oz. fiberglass cloth and epoxy or resin (top and bottom).

(14) Cut out the servo well open to suit servo to be installed and box in opening with 1/8'' sheet. Install hardwood servo rails.

(15) Round the leading edge and sand wing to desired smoothness before covering. You may want to add some small pieces of scrap trailing edge stock to the inside of the trailing edge strips where you plan to put the hinges, but try this method once and see how you like it. Cover the top half of the wing first and overlap the covering material approximately 1/4'' around the bottom of the trailing edge. Cut the notches for the hinges in the trailing edge and place them in the notches and glue them in place from the inside of the trailing edge with liberal amounts of epoxy. After the epoxy has cured, cover the bottom halves of the wing, overlapping the 1/4'' of upper covering for a good seal. Shape and sand the ailerons and drill and notch them to accept the aileron control arms you have decided to use, then cut hinge slots to correspond with the hinges in the trailing edge. Cover the ailerons and glue them on with liberal amounts of epoxy.

Empennage:

(1) Cut out all empennage pieces from 3/8'' balsa as shown on layout (Photo #1.).

(2) Glue the dorsal fin to the vertical stab and sand and airfoil all pieces.

(3) Cut hinge slots in approximate positions shown on plans and cover the pieces before epoxying the hinges in place.

Finishing:

Finishing consists of a lot of little time-consuming things, like alignment, balancing, fuel tank and radio installation, etc.

All these things are important and most people have their own way of doing them. I'll just cover them briefly with more attention given to what to do than how to do it.

(1) Alignment is very important if you want a good flying airplane, so as was said earlier, before gluing the tail and rudder in place, align them with your favorite method and glue them in place accurately so they are true to the fuselage and true with the wing.

It wouldn't hurt to purchase or build an incidence meter to check alignment. This is a good practice in all the planes you build.

(2) Balancing is very important to the flight characteristics of an airplane, so make sure you not only check it nose-to-tail, but also wingtip-to-tip so you won't have an airplane that the best maneuver is a stall turn to the same side every time.

(3) Fuel tank installations are important, so make sure the tank is surrounded by foam to reduce foaming. Also make sure the fuel lines can't kink and the klunk is free and won't bind.

(4) The radio installation is the most important and if done properly can save a lot of problems at the field. I think the key to a good installation is planning. If you start at the control you want moved and go from there and work your way to the servo, you will save a lot of criss-crossing of cables and having too many connections on the same side of the servo arm.

I'll use the throttle for an example. Most throttle arms are on the right side of the engine and pull or turn clockwise to close. Lay the engine on the bench and find the proper servo (left or right) that when placed in the fuselage against the right hand side will move in the proper direction to pull the NyRod or cable from the end of the output arm closest to the fuselage side. Using this ''straight shot'' method on controls will give you more precise control and will not drain on the battery as much as one full of twists and turns causing unnecessary strain on the servos and slop in the linkage.

Photo #8 shows an uncongested radio installation with both forward cables running along each side of the fuselage straight to their functions with a minimum of deviation. The rudder control is also on the opposite side of the output arm avoiding any possible interference with the steerable nose gear.

The only thing remaining is to wrap the battery pack and receiver in foam for protection from vibration and crash damage.

In summing it up, I hope you'll enjoy building and flying the Super Duper. It has a lot of built-in simplicity and can be covered with any material you choose, including MonoKote-type films. As far as the flying goes, you'll find it's one of the most maneuverable models you can imagine while giving you that little extra edge of forgiveness that we all sometimes need when we get a little too overconfident. Also, when the flight is over and it comes time to land, you'll think you're back flying one of those nice stable trainers that you learned on. Try one, you'll be happy you did.

The kits aren't going to be available from Mile High Models Co. (4805 Baja Ct., N.E., Albuquerque, New Mexico 87111, Phone (505) 296-2405.) for a few months. For this reason I wanted to get the plans and instructions out to my fellow fliers so you can get one in the air as soon as possible and get the same feeling as I did when I first flew the Super Duper Joy Stick. □

Editing By Hlsat.
RCModeler
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