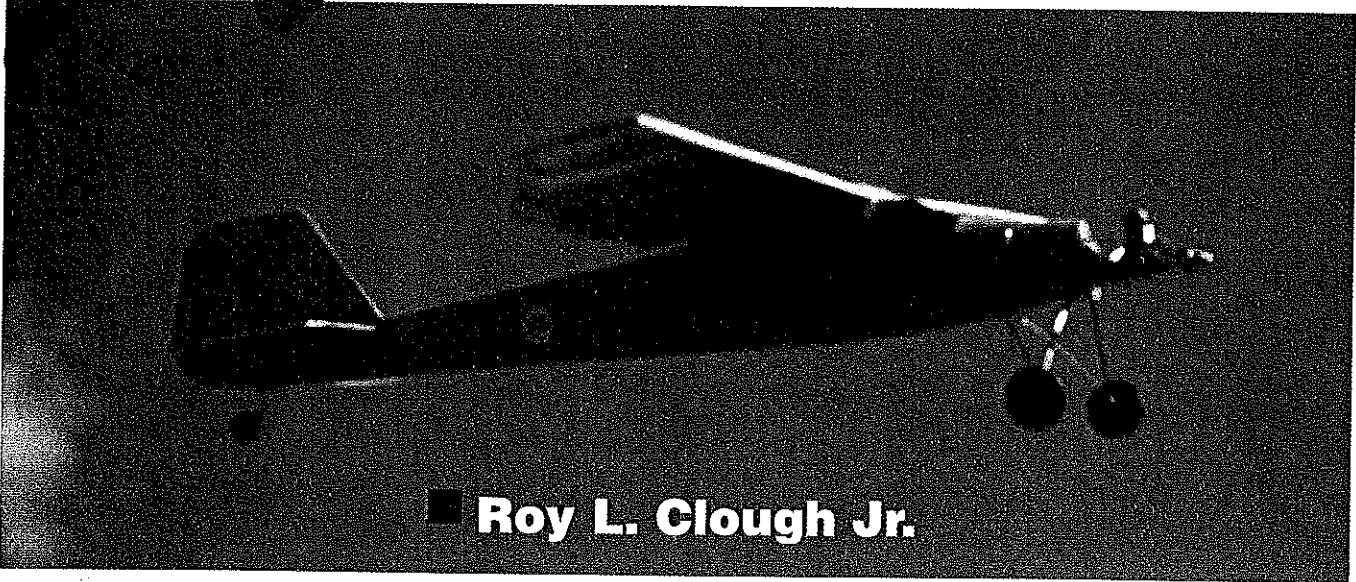


# TRAIN



■ Roy L. Clough Jr.

## Learning to use ailerons? Bank on this model to keep you on track

If you are a rudder-and-elevator hotshot who is looking for new places to go, take the A Train! A is for ailerons; *Train* is for trainer. You get elevators, ailerons and throttle. Coupling the ailerons to a steerable tail wheel gives you control on the ground. The throttle makes you the boss over takeoffs, power in the air, and landing where you want to.

A Train assumes a healthy modicum of rudder-elevator experience and familiarity with orientation; that is, knowing how a model looks in the air, coming and going. It is not intended to be a raw beginner's model; its design aim is to introduce aileron control. Ailerons *must* be used—there isn't a rudder.

Newcomers to aileron-and-elevator models sometimes get into trouble at low speed when the drag and disturbed airflow over a

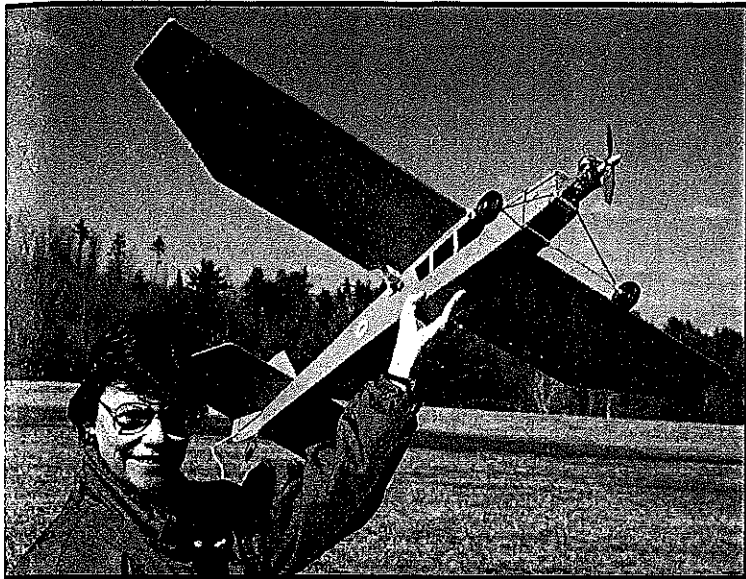
deflected aileron results in wingtip stalling. This can cause a snap-roll on takeoff or wallowing into a spin from a slow landing approach.

A Train pretty much gets around this problem. The ailerons have been moved inboard, leaving the low-drag wingtips free of stall-inducing clutter. Despite this somewhat-unusual aileron position, control is positive. Several of my fellow Winnepesaukee Radio Controllers who have wrung out the A Train agree that its turns seem very well coordinated, without appreciable yaw despite lack of rudder input.

Design objectives have been pretty well met. Lean and rangy lines, with the engine out on the end of a long nose, spread inertial moments and smooth out control response. With no dihedral, this results in largely neutral stability—the airplane tends to stay where

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The inboard aileron position is unusual, but is intended to leave A Train's fingertips free to operate in "clean" air.

I put it. That's exactly what you want from a trainer—if you want to do something, you have to *make* it do something.

The model was purposely designed with a dash of nostalgia for old-time cabin gas model look (they used to put the wheels right front, to protect hand-carved props and expensive engines).

A Train gets you into tail-dragger technique, in case you haven't already been there. Learn two-wheeling early on and you'll be able to handle anything on the ground. There is no rudder but there is a fixed-adjustable rudder tab. All model airplanes tend to simulate minor surface deflections that affect tracking to some degree. If alternate slow and fast overhead passes reveal a bit of wobbling, like a hound dog running down the road, tweak the tab to make the model beeline it.

### CONSTRUCTION

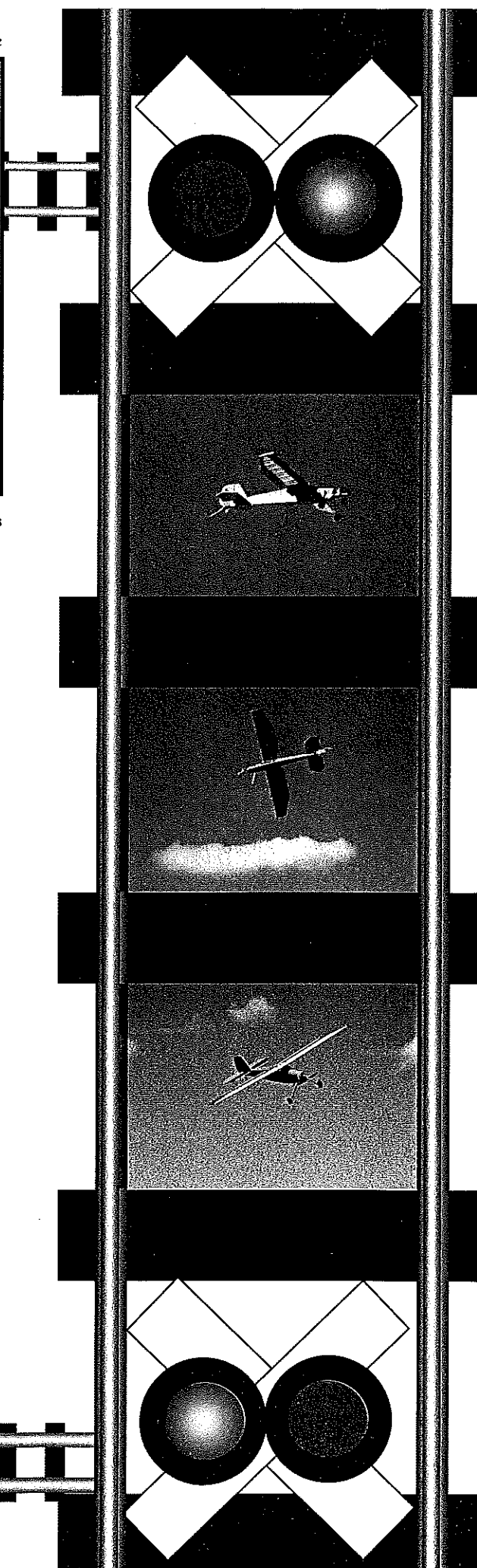
A Train uses a great little engine that seems to have been largely overlooked by other designers. The Medallion .09 is easy starting, lightweight, and powerful. Its cylinder-sleeve exhaust restrictor provides reliable throttle control with quick recovery to full power after long periods of idling. I suspect that this is because back pressure keeps the glow element hot. (Larry Renger tells me that this is a reasonable notion.)

On the other hand, anybody who has his heart set on the Tee Dee .09 (which comes with a "big engine" muffler and adjustable carburetor) can use it. After several of the guys in the club put the question to me, I swapped engines in a matter of ten minutes.

The Tee Dee is a little heavier and more powerful, but balance is easily maintained with a nudge of the Velcro-mounted battery. I chose the Cox Cobra 3 radio system. Servo reversing makes the kind of installation simple. The transmitter has an "ergonomic" feel that is not only attractive but comfortable to hold. It has a novel thumb-lever throttle control in just the right place to feel natural, but there isn't a trim for the throttle. This makes the difference between *idle* and *off* a bit chancy.

Larry Renger passed along a clever trick that makes low-end throttle control easy: Glue a chunk of foam to contact the throttle lever at idle. This gives a tactile cue to the idle position. To stop the engine, simply squeeze the lever to compress the foam for shutoff.

The fuel tank is a transparent 35mm film container. I've used these containers in various small models and have never had a



ker, despite the friction-fit covers. Polaroid color negative film is packaged in the container that I prefer.

The film containers make great tanks, but there is no room for finery clunks and fittings. No problem; fittings aren't needed.icone fuel line squeezed through undersized drilled holes won't k. Cut a long taper on the end of the tubing to poke through the e, then pull it into place. Use the same method to pull the fuel feed e through the one-inch length of thick-wall brass tubing that serves the clunk.

I wanted A Train to have ground steering, despite the absence of a rder control (to which the tailwheel is usually connected). There s no problem in getting the aileron servo to work the tail wheel; trick was to devise a quick disconnect so the wing could be ber-banded for crash protection and easily removed for transport.

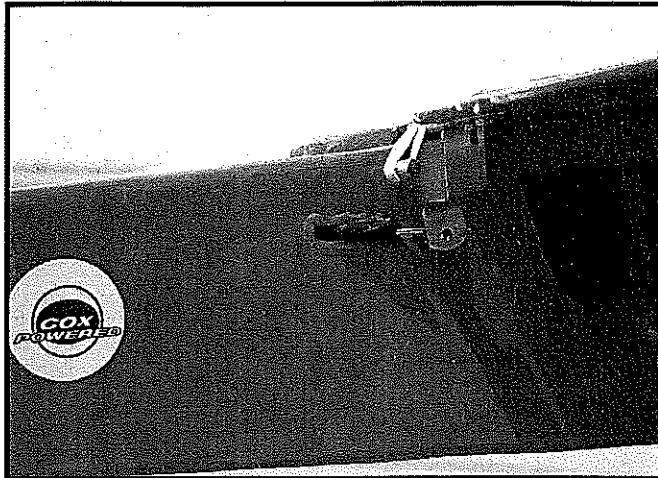
ing: To my knowledge, the wing construction is a new way of ng about it. I've used it on several airplanes lately, with good ults. One of the best things is that it gets you out of fussily carving : curved-and-notched wing ribs.

Before you start, look over the wing plan to fix the procedure in r mind. Note that the standard 36-inch wood eliminates trimming rs and sheeting to length.

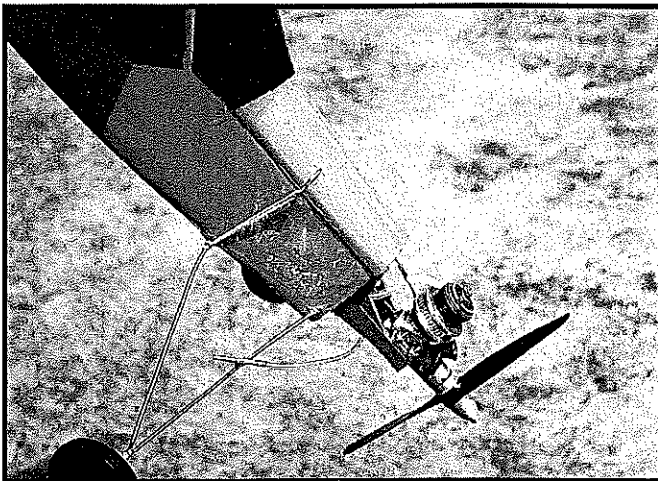
Start by cutting compression struts from hard  $\frac{3}{16}$  square balsa. t V notches in one end to mate with the diagonally positioned  $\frac{3}{16}$  ding edge. On a flat work surface glue to standard  $\frac{3}{16}$  x 1 trailing ge and  $\frac{3}{16}$  square leading edge. Add the wingtip outlines on each e. Note how the size and placement of the wing spars controls the vature of the sheet balsa upper leading edge sheeting. Allow the rs to dry in place, and gently sand off the corners to profile the et balsa curvature.

The  $\frac{1}{16}$  soft sheet balsa sheeting is put on the easy way. Bend it in ce over the spars, mark the width, and trim. When you know it l fit, dampen one side to promote a bit of curl and stick it to the rs with cyanoacrylate (CyA) glue. Do not use water-based glue to k down the dampened sheet balsa—the wood might warp.

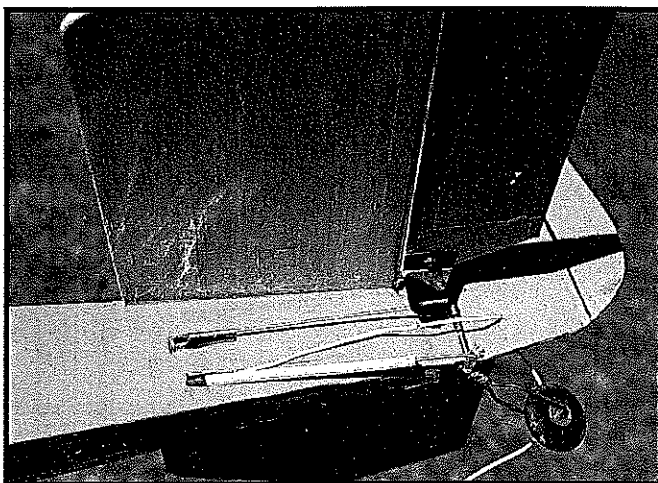
Now do the wingtips with spliced-on leading edges, trailing ges, and tapered spars. Sheet with more  $\frac{1}{16}$  balsa. When



Aileron quick-disconnect allows the wing to be rubber-banded in place for crash protection and transportation convenience.



Landing gear is designed to separate from the fuselage in the event of a hard landing. Engine is a Cox Medallion .09.



Steerable tail wheel is linked to the aileron servo. Cox Cobra three-channel radio was used on the original A Train.

# A TRAIN

Type: RC Sport/Trainer

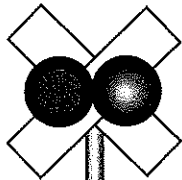
Wingspan: 47 $\frac{3}{4}$  inches

Engine: Cox Medallion .09

Functions: Throttle, elevator, ailerons

Construction: Built-up

Covering/finish: Iron-on film



everything is solid, glue the triangular ribs  
 assets to the main spar and compression  
 ts and cover the center section, top and  
 om, with 1/16 sheet back to the trailing  
 2.

The ailerons are hinged with ordinary  
 zer tape. Leave a 1/8 gap doing the first  
 so that when you tape the second side  
 can squeeze the sticky faces together in  
 crack of the hinge. Tough and simple. If  
 doubt that these hinges will stay put,  
 ember the last time you tried to remove  
 king tape after it had been left in place  
 a week or two.

The wing is covered with any lightweight  
 -on material, up to but not over the  
 ge gap. Use separate pieces to cover the  
 rons.

**Fuselage and Tail Surfaces:** These are  
 rly conventional and require little  
 anation except to note the swing-open  
 deck. This provides easy access to  
 ron hookup (you won't need an aileron  
 nsion wire) and you get the satisfaction  
 illing the fuel tank by sight; less messy  
 a waiting for it to signal "full" by spilling  
 out of the vent. A simple paper clip wire  
 k and a thin rubber band to the rear  
 ling gear leg holds the hatch down in  
 ht. Also note that the top fuselage has a  
 g stop and notches to make certain  
 ring can shift and lock up the ailerons in  
 ht. (Guess how I learned *that* one!)  
 The landing gear attachment is rather  
 —and practical. Crossbars are glued  
 a CyA in slots in the firewall and the  
 ling gear fuselage support crossbar.  
 ver with Tyvek before applying iron-on  
 v. It's rugged, but it will tear off without  
 ing the fuselage.


The tail wheel is mounted in a simple  
 vel bearing of brass tubing soldered to a  
 ch of tin-can metal. If you'd rather use a  
 mercial assembly, do so.

**Servos:** Locating the servos as shown on the  
 1 makes them accessible with the wing  
 and is good for balance. Hold the servos  
 lace with "Goop." Get to know Goop—  
 a better servo mount than any amount of  
 dware, transmits little vibration, and  
 ps off fairly easily.

The wing-mounted aileron servo is set

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 SIX SHOOTER FUEL PUMPS • POLYURETHANE  
 FIBER REINFORCED SYSTEMS • THE FINE WHEELS • TRAGEDY THE FINE WHEELS • SPECTRA THE WHEELS • TREADS TECHRA THE WHEELS • BIG LITE WHEELS • TRACED BIG LITE WHEELS • R/C FLUSH SMALLATORS FOR SW COMPIUTERS  
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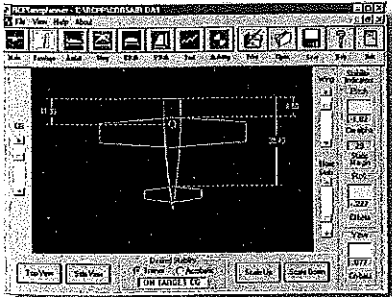


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3/32 x 2 .46 .61	1/16 x 1/4 .12 .12	1/20 x 3 .78 1.19	3/4 x 3/4 .92
1/8 x 2 .49 .65	1/16 x 3/8 .13 .13	1/16 x 3 .78 1.19	<b>SPRUCE/ BASS 36" 48" 60"</b>
3/16 x 2 .60 .74	1/16 x 1/2 .17 .17	3/32 x 3 .93 1.44	1/16 x 1/4 .24 .30
1/4 x 2 .68 .90	3/32 SQ .11 .11	1/8 x 3 1.14 1.75	3/32 x 1/4 .25 .39
3/8 x 2 .86 1.19	3/16 x 1/4 .14 .14	3/16 x 3 1.32 2.02	1/8 SQ .21 .29
1/2 x 2 30" 1.10 42" 1.43	3/32 x 3/8 .15 .15	1/4 x 3 1.57 2.37	1/8 x 1/4 .28 .36
1/32 x 3 .36 .43 .50 .60	3/16 x 1/2 .19 .19	3/8 x 3 1.88 3.07	1/8 x 3/8 .35 .46
1/20 x 3 .36 .43 .50 .60	1/8 SQ .11 .11	1/2 x 3 2.38 3.82	1/8 x 1/2 .41 .55
1/16 x 3 .36 .44 .50 .60	1/8 x 3/16 .13 .13	3/4 x 3 3.75 5.19	1/8 x 3/4 .47 .63
3/32 x 3 .43 .52 .61 .87	1/8 x 1/4 .14 .21	1 x 3 5.32 7.19	3/16 SQ .28 .38
1/8 x 3 .52 .63 .73 .84	1/8 x 3/8 .15 .23	1/32 x 4 1.23 1.88	3/16 x 3/8 .40 .53
3/16 x 3 .62 .76 .84 1.01	1/8 x 1/2 .21 .27	1/20 x 4 1.23 1.88	3/16 x 1/2 .48 .64
1/4 x 3 .76 .94 1.13 1.30	1/8 x 3/4 .26 .36	1/16 x 4 1.23 1.88	3/16 x 3/4 .65 .88
5/16 x 3 1.09 1.52 1.70	1/8 x 1 .35 .45	3/32 x 4 1.49 2.32	1/4 SQ .45 .57 1.00
3/8 x 3 1.05 1.15 1.48 1.70	3/16 SQ .14 .23	1/8 x 4 1.69 2.62	1/4 x 3/8 .53 .69
1/2 x 3 1.35 1.50 1.75 2.05	3/16 x 1/4 .18 .27	3/16 x 4 1.97 3.00	1/4 x 1/2 .61 .81 1.30
3/4 x 3 2.25 3.10	3/16 x 3/8 .21 .29	1/4 x 4 2.37 3.32	1/4 x 3/4 .83 1.10 1.86
1/32 x 4 .56 .66 .79 .92	3/16 x 1/2 .24 .36	3/8 x 4 3.57 5.63	3/8 SQ .64 .85 1.38
1/20 x 4 .56 .66 .79 .92	3/16 x 3/4 .30 .45	1/2 x 4 4.82 6.88	3/8 x 1/2 .75 .91 1.54
1/16 x 4 .56 .66 .79 .92	3/16 x 1 .38 .59	(All 4-6 lb wood subject to availability)	1/2 SQ .85 1.05 1.80
3/32 x 4 .68 .82 1.06 1.14	1/4 SQ .22 .30	<b>SUPERIOR LITE 12" 24" 48"</b>	1/2 x 3/4 .94 1.25 2.00
1/8 x 4 .76 .93 1.12 1.34	1/4 x 3/8 .27 .33	1/8 x 6 2.50 3.95	<b>ADD \$5.00 EXTRA FOR PACKAGING</b>
3/16 x 4 .87 1.09 1.40 1.56	1/4 x 1/2 .29 .41	1/8 x 12 3.95 7.50	<b>GROOVED LG MOUNTS</b>
1/4 x 4 1.06 1.52 1.62 1.79	1/4 x 3/4 .42 .58	1/4 x 12 4.95 9.50	3/8 x 3/4 (1/8) .50
5/16 x 4 1.82 2.34	1/4 x 1 .52 .78	<b>LITE PLY 12" 24" 48"</b>	3/8 x 3/4 (5/32) .50
3/8 x 4 1.65 2.10 2.36 2.85	3/8 SQ .27 .35	1/8 x 6 1.00 1.25 2.35	1/2 x 3/4 (3/16) .55
1/2 x 4 2.49 2.85 3.15 3.36	5/16 SQ .36 .45	1/8 x 12 1.25 2.35 4.50	<b>WING SKINS 36" 36"</b>
3/4 x 4 3.50 4.71	3/8 x 1/2 .40 .57	1/4 x 6 1.25 1.75 3.40	1/32 x 12 4.79 5.35
<b>MATCHED SHEETS</b> 42" 48"	3/8 x 3/4 .53 .68	1/4 x 12 1.75 3.45 6.50	1/20 x 12 4.79 5.35
3/32 x 4 1.25 1.42	3/8 x 1 .67 .86	<b>3 PLY BIRCH 12" 24" 48"</b>	1/16 x 12 4.79 5.35
1/8 x 4 1.50 1.69	1/2 SQ .49 .64	1/64 x 6 1.40 2.75 4.95	3/32 x 12 5.79 6.45
3/16 x 4 1.64 1.89	1/2 x 3/4 .60 .82	1/64 x 12 2.79 5.10 9.50	<b>TRAILING EDGES 36"</b>
1/4 x 4 1.76 2.05	1/2 x 1 .76 1.04	1/32 x 6 .95 1.80 3.25	1/8 x 1/2 .29
<b>BIRCH DOWELS 36"</b>	3/4 SQ .81 1.11	1/32 x 12 1.80 3.35 6.35	3/16 x 3/4 .35
1/8 .16	3/4 x 1 .99 1.32	1/16 x 6 .95 1.80 3.25	1/4 x 1 .39
3/16 .17	<b>BUNDLE DEALS 36" 48"</b>	1/16 x 12 1.80 3.35 6.25	5/16 x 1-1/4 .50
1/4 .20	(20) 1/16 x 3 7.99	1/8 x 6 .95 1.80 3.35	3/8 x 1-1/2 .56
5/16 .27	(20) 3/32 x 3 9.70	1/8 x 12 1.80 3.35 6.50	1/2 x 2 .90
3/8 .37	(15) 1/8 x 3 8.75	<b>4 PLY BIRCH 12" 24" 48"</b>	<b>EPOXY 4-1/2 OZ. 9 OZ.</b>
1/2 .54	(15) 3/16 x 3 10.50	3/16 x 6 1.09 2.15 3.45	5 Minute 4.25 6.69
5/8 .74	(10) 1/4 x 3 8.75	3/16 x 12 2.15 3.45 6.85	15 Minute 4.25 6.69
<b>AILERONS 36" 48"</b>	(10) 3/8 x 3 10.50	<b>5 PLY BIRCH 12" 24" 48"</b>	30 Minute 4.25 6.69
1/4 x 1 .57 .82	(5) 1/2 x 3 6.95	3/32 x 6 1.35 2.60 4.90	2 Hour 4.25 6.69
1/4 x 1-1/4 .65 .90	(20) 1/16 x 4 12.35	3/32 x 12 2.60 5.00 8.95	20 Minute 4.29 8.40
1/4 x 1-1/2 .74 1.05	(10) 1/16 x 4 11.50	1/8 x 6 1.45 2.80 5.25	<b>INSTANT GLUE</b>
1/4 x 2 .80 1.15	(10) 3/32 x 4 10.75	1/8 x 12 2.80 5.50 9.50	1/2 oz. Thin or GF 1.85
5/16 x 1-1/4 .74 1.05	(10) 1/8 x 4 8.75	1/4 x 6 1.25 2.50 3.80	1 oz. Thin or GF 3.00
5/16 x 1-1/2 .75 1.06	(5) 1/8 x 4 6.25	1/4 x 12 2.30 3.90 7.25	2 oz. Thin or GF 5.50
5/16 x 2 .86 1.20	(10) 3/16 x 4 10.00	<b>7 PLY BIRCH 12" 24" 48"</b>	8 oz. Thin or GF 16.50
3/8 x 1-1/4 .80 1.15	(5) 3/16 x 4 7.35	3/8 x 6 1.50 2.85 5.25	1/2 oz. Extra Thick 2.00
3/8 x 1-1/2 .83 1.16	(10) 1/4 x 4 14.00	3/8 x 12 2.85 5.50 10.00	1 oz. Extra Thick 3.30
3/8 x 2 .95 1.35	(5) 1/4 x 4 8.35	<b>9 PLY BIRCH 12" 24" 48"</b>	2 oz. Extra Thick 6.00
1/2 x 1-1/2 .95 1.40	(5) 3/8 x 4 9.50	1/2 x 6 2.00 3.50 5.75	8 oz. Extra thick 18.00
1/2 x 2 1.06 1.50	(5) 1/2 x 4 13.00	1/2 x 12 3.50 5.80 11.25	<b>ODORLESS FOAM</b>
1/4 x 2 1.09	<b>TRIANGLES 36"</b>	<b>HARD MAPLE 18"</b>	1/2 oz. Thin or GF 4.25
1/4 x 3 1.25	1/4 .29	1/4 x 1/4 .45	1 oz. Thin or GF 7.85
3/8 x 2 .90	3/8 .33	1/4 x 3/8 .50	2 oz. Thin or GF 13.85
3/8 x 3 1.31	1/2 .40	1/4 x 1/2 .56	2 oz. Accelerator 3.15
1/2 x 3 1.54	3/4 .54	3/8 x 3/8 .50	8 oz. Acc. Refill 6.95
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3/8 x 3/8 .54	2 2.25	3/8 x 1 .75	
1/2 x 1/2 .75		3/8 x 1-1/2 1.15	
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into a cutout in the lower surface sheeting and held in place with a couple of gobs of Goop adhesive on its sides. Don't bother with the normal mounting lugs here.

The use of Cox servos is assumed. The radius of servo arm holes to the radius of elevator and aileron horn shown on the plan produces approximately the right amount of deflection for smooth and positive handling.

Aileron hookup should be quite clear from the plan sheet. After the wing is complete, add the tail wheel steering arm. I used 1/32 sheet brass and left it unpainted to show up better in the picture.

The elevator push-pull rod can be just about anything (I used a 3/16 dowel with lashed-on paper clip wire ends), the tail wheel control should be a sheathed plastic pushrod because both ends of the sheath must be glued in place for the semiflexible pushrod to operate properly. A simple bend in the screw-in wire end engages a hole in the aileron bracket when the wing is put on.

**Flying:** Be sure that the model balances 1 3/4-2 inches back from the leading edge when the airplane is supported on fingertips under the wing. This slight nose-heaviness is intentional and much easier to start with than a tail-heavy model. The balance point is easily altered by moving the battery back and forth along its Velcro hold-down strip. After you get some experience handling the A Train, move the battery pack back a little to liven up the maneuvers.

Universal advice to a flier with a "move-up" airplane is to have it test-hopped by an old salt. When he gets through fooling with the trims, you'll get at least get a level start.

Takeoffs are made with the engine wide open. Just remember that with the tail wheel connected to aileron control, you should hold the stick back a little to keep the tailwheel on the runway. Just let the airplane take off in three-point attitude.

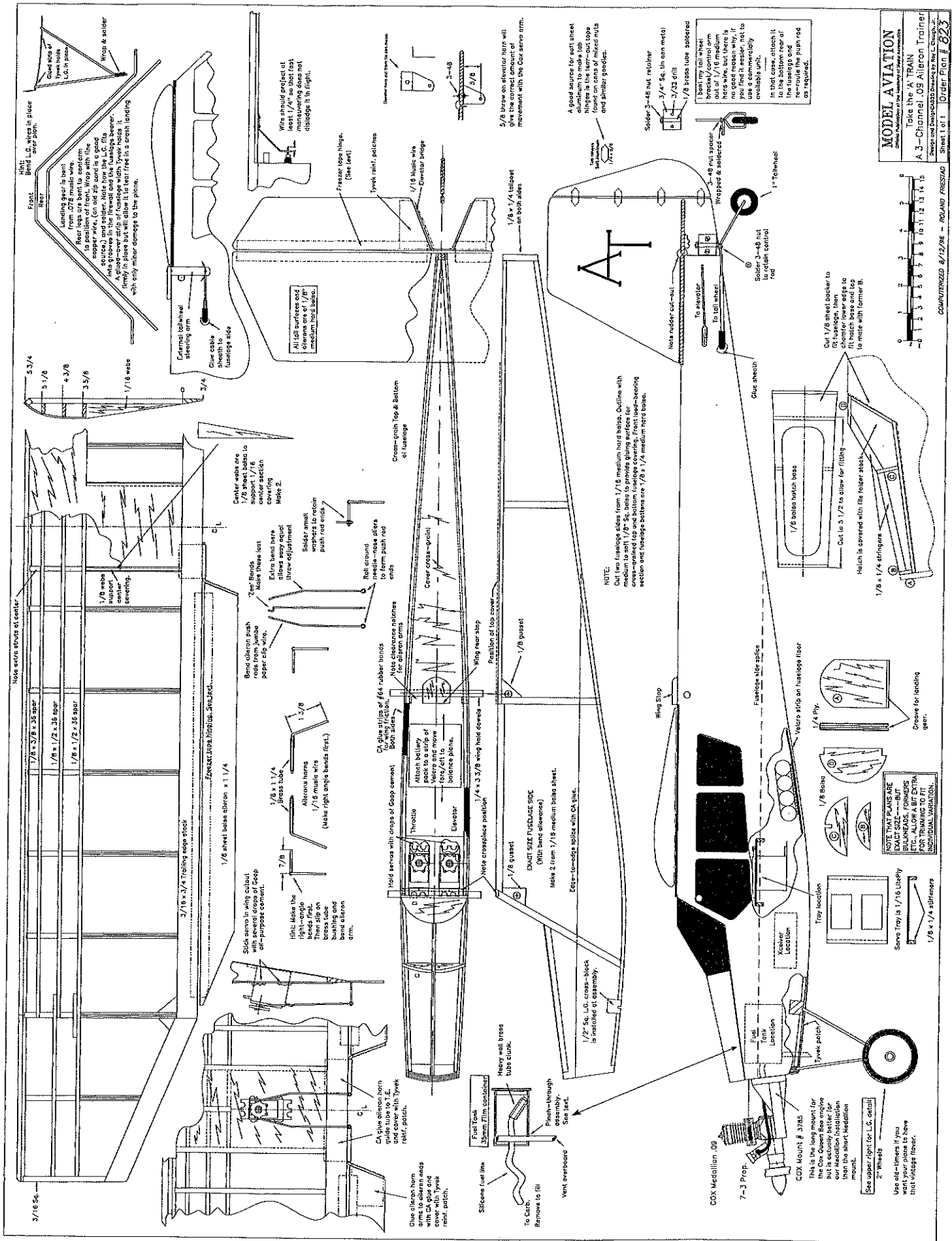
The A Train has quite a wide speed range—from faster-than-you-might-expect to slower-than-you'd-think-it-would-stay-up. Use the throttle to get comfortable while you practice turning in both directions until you have a feel for the reaction produced by stick motions. When you start more advanced maneuvers, remember that altitude is the only friend you have. Begin with loops, then learn to roll out on top to make an Immelman turn. Note that with a high-wing airplane you will also have to use elevator correction as the model goes over.

Learn the difference of inverted flight "feel" with a flat-bottomed airfoil—a valuable insight if you build and fly high-wing Scale models.

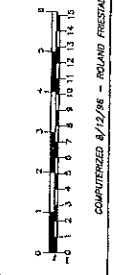
A Train is not intended to be an advanced aerobatic model, but it will perform most common maneuvers with power to spare. The main thing is, it will teach you to think ahead of your airplane. →

Roy L. Clough Jr.  
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**MODEL AVIATION**  
 Take the 'A' TRAIN  
 A-3-Channel .09 Aileron Trainer  
 Sheet 1 of 1 Order Plan # 823



**NOTE:** Cut two fuselage slots from 1/16 medium hard bass. Outline with medium to soft 1/8" Sq. bass to provide gluing surface for 1/8" x 1/4" stringers. Use 1/8" x 1/4" stringers to cover the fuselage sections and fuselage bottom over 1/8" x 1/4" medium hard bass.

**NOTE:** Cut 1/8" sheet bass to fit fuselage. Then chamfer lower edge to match with one flap to mate with former B.

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