



# CONSTRUCTION

BY PAT TRITLE



Though not a trainer, the Cessna 172 is a docile, easy-to-fly airplane. In flight the model is smooth, steady, and easy to control. With the flaps deployed, takeoffs are short and landings are slow and easy.

## Cessna 172 Skyhawk

### Build this 5-channel light-plane classic

**four-place, single-engine private aircraft**, the Cessna 172 is considered the most successful light plane ever built. First flown in 1955, the earlier models were straight-tail fastback models, and later variations were equipped with the now characteristic swept tail and wraparound rear-cabin window. The Cessna 172 found its way into military service as the T-41 Mescalero and was also used by the United States Border Patrol for surveillance along the U.S./Mexico border, so there are plenty of attractive paint schemes to choose from.

#### THE MODEL

My model is 1/8 scale and has a 53.5-inch wingspan. It utilizes conventional stick-and-tissue fuselage and tail-group construction, and the wing's easy-to-assemble egg-crate construction makes assembly quick, strong, and light. Though not overly large, the model has plug-in wing panels that are removable for easy transport and are held in place by magnets, so no tools are required to take the

model apart.

The battery and radio gear is easily accessed through a removable hatch on the bottom of the fuselage. And to make things simpler, a package of laser-cut wood and plastic parts is available from Manzano Laser Works ([manzanolaser.com](http://manzanolaser.com)) for those who would prefer not to cut their own parts. The C172 is set up for 5-channel RC control using six submicro servos that include the standard flight controls plus functional flaps, making it the perfect candidate for small flying fields due to its slow and gentle flying qualities and short-field takeoff and landing capability.

Power is provided by a low-cost outrunner motor and a 2-cell LiPo battery, which will provide flight times in excess of 15 minutes.

#### BUILDING THE MODEL

Construction begins with the vertical and horizontal stabilizers, which are built directly over the plans. Because the stabilizers have an airfoil shape, use shims to center the leading and trailing edges on the ribs. Fit and glue

#### SPECIFICATIONS

**Model:** Cessna 172  
**Type:** Sport scale  
**Scale:** 1/8  
**Wingspan:** 53.5 in.  
**Length:** 38.75 in.  
**Weight:** 25.6 oz.  
**Wing area:** 390 sq. in.  
**Wing loading:** 6.9 oz./sq. ft.

#### GEAR USED

**Radio:** JR XG8 transmitter w/ JR RG612BX receiver ([jramericas.com](http://jramericas.com)); six E-flite S-75 servos ([horizonhobby.com](http://horizonhobby.com))  
**Motor:** Suppo 2217/9 outrunner ([altitudehobbies.com](http://altitudehobbies.com)); 20-amp E-flite speed control w/ 3A BEC ([e-fliterc.com](http://e-fliterc.com))  
**Battery:** Venom 2S 2000mAh LiPo ([venompower.com](http://venompower.com))  
**Propeller:** APC 11x5.5E ([apcprop.com](http://apcprop.com))

blue foam or light balsa blocks to the bottom of the rudder, and sand to shape. The rudder and elevator are hinged using 5/32 x 1/2-inch strips of light CA hinge material. The hinges aren't glued in place until after the frames have been covered.

#### WING ASSEMBLY

Begin by pinning SM1 (the servo plate) in place

over the plan. Dry-fit all of the ribs onto the main and rear spars over the plan, and pin the assembly in place using the washout jig under R9 to support the outer ends of the spars. Glue each point of contact, followed by the leading edge. Build the flaps and ailerons in place along the wing assembly over the plans, then remove the assembly from the board and add the aileron servo and strut mounts; sand the assembly to shape. Hinge the flaps and ailerons as described in the stabilizer assembly. Cut and

fit the brass joiner tubes to length, and glue them in place. Last, glue the flap and aileron servos in place using silicone caulk, and run the servo wiring out through the root rib. Make up the wingtip blocks from blue foam or soft balsa, glue the R9WT rib in place, and carve the tips to shape using the provided detail drawing. Glue the tips in place on the wing assembly.

#### FUSELAGE ASSEMBLY

Start by building the side frames over the

assembly drawing. Remove the frames from the board, align and glue B2 (the landing-gear mounts) in place on the inside of the left- and right-hand side frames. Bend the landing gear to shape, and glue it into the former assembly (4A/4B/4A). Join the frames, beginning with the upper-cabin formers and landing-gear assembly, taking extra care to ensure that the assembly is square. Then add the remaining formers to complete the basic assembly.

Fit and glue the servo mounts in place, install



A section of the aft fuselage former is removed to allow the horizontal stabilizer to be fitted into the fuselage.



The flap and aileron assemblies are built directly over the plans, along with the main wing assembly. The brass joiner tubes are glued in place after the wings are sanded to final shape.

#### Materials List

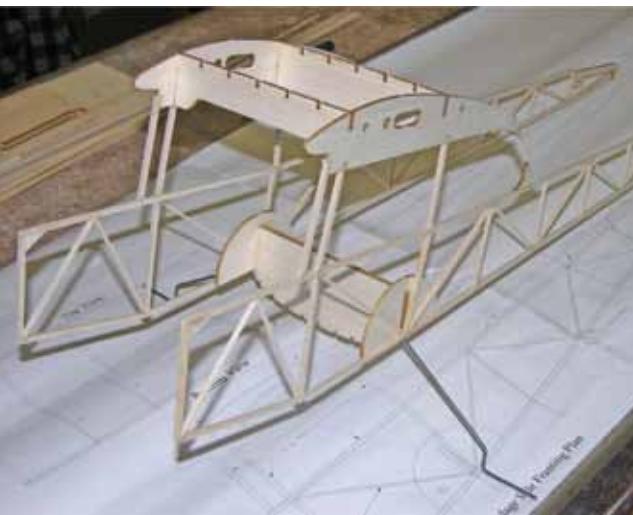
Here's a list of wood sizes, material, and hardware you need to build the Cessna 172.

- 2 balsa sheets, 1/16 x 4 x 36 inches
- 1 balsa sheet, 3/32 x 4 x 36 inches
- 3 balsa sheets, 1/8 x 4 x 36 inches
- 1 ply, 1/32 x 3 x 8 inches
- 1 light ply, 1/8 x 3.5 x 13 inches
- 3 balsa sheets, 1/16 sq. x 36 inches
- 7 balsa sheets, 1/16 x 1/8 x 36 inches
- 3 balsa sheets, 1/16 x 3/16 x 36 inches
- 2 balsa sheets, 1/16 x 1/4 x 36 inches
- 18 balsa sheets, 3/32 sq. x 36 inches
- 1 balsa sheet, 3/32 x 1/4 x 36 inches
- 8 balsa sheets, 1/8 sq. x 36 inches
- 2 balsa sheets, 1/8 x 3/16 x 36 inches
- 1 balsa sheet, 3/16 x 1/2 x 36 inches
- 2 balsa sheets, 3/16 sq. x 36 inches
- 2 balsa sheets, 1/4 x 3/8 x 36 inches
- Blue foam or balsa block (wingtips and rudder fairing)
- 1 steel wire, 0.025 dia. x 36 inches
- 1 steel wire, 0.032 dia. x 36 inches
- 1 steel wire, 0.046 dia. x 36 inches
- 1 steel wire, 0.093 dia. x 36 inches
- 1 brass tube, 5/32 o.d. x 36 inches
- 1 aluminum tube, 3/16 o.d. x 36 inches
- 1 brass strap, 0.032 x 1/4 x 2 inches
- 1 nosewheel, 2 inches
- 1 pair main wheels, 2 1/4 inches
- 3 wheel collars, 3/32 inches
- 1 1/2 rolls Microlite
- 1 sheet white styrene, 0.010 x 6 x 12 inches
- 2 sheets acetate, 0.008 x 6 x 12 inches
- 2 servo Y-harnesses
- 2 servo extensions, 6 inches
- 2 servo extensions, 9 inches
- 1 Micro E/Z Connector

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The flap and aileron servos are glued in place using silicone caulk.



The fuselage side frames are built directly over the assembly drawings and then joined vertically, beginning with the upper cabin formers and landing-gear assembly.

the servos, and install the elevator pushrod tube and rudder pull-pull cables. Build up the motor-mount assembly, and glue it in place. Bend the nose-gear strut wire to shape, build up the control horn, and assemble the nose gear into the overall mount assembly. Connect the pushrod to the servo arm using a Du-Bro E/Z Connector. Now that everything is in place,

add all the top and bottom stringers, and sand the fuselage assembly to final shape. Install the motor and speed control, and run the power leads into the fuselage. Make the cabin fairings from manila-file-folder material, and glue them in place to complete the fuselage assembly.

Build up the lift struts as shown in the provided detail drawings. Sand the struts to

an airfoil shape, then fit and glue the lower retention clips in place. Plug the wings into the fuselage and hand-fit the struts, then secure the outer retention clips to the struts.

### ASSEMBLING THE PLASTIC PARTS

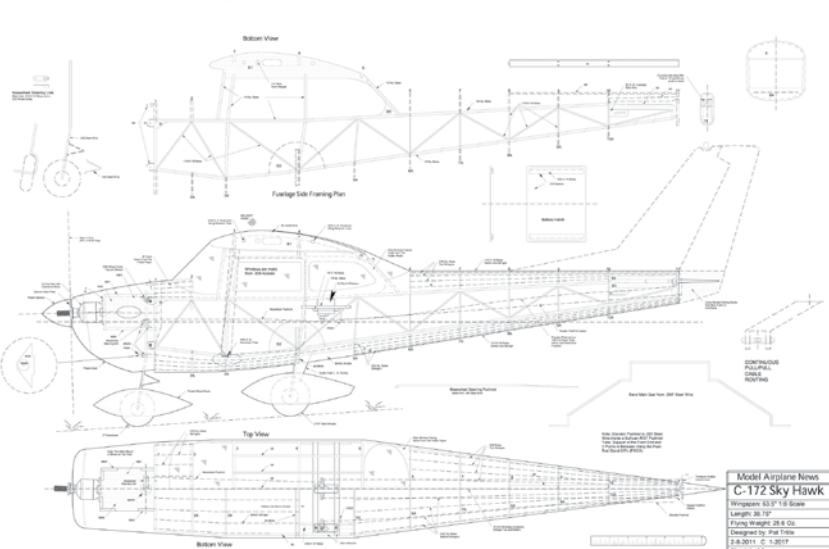
Build the cowl and wheel pants and fit them onto the fuselage assembly, but don't glue them in place until after final assembly. If you're new to assembling plastic wheel pants, go to [patscustom-models.com/wheelpants.html](http://patscustom-models.com/wheelpants.html) for a complete tutorial. Assemble the cowl, trim as needed, and fit it to the fuselage with the motor in place and then secure it with the mounting screws left over from the flap and aileron servos. Build the battery hatch from balsa and styrene, using the detail drawing provided.

### COVERING

Any of the lightweight iron-on coverings, such as Microlite or CoverLite, are well suited to these light structures. Before you begin covering, disassemble the model and do a final detail sanding to prep the assemblies for cover. Then apply the covering material per the manufacturer's recommendations, and add any desired paint and trim scheme. Make up all the cabin windows from clear acetate sheet. The windows can be glued in either on the inside of the paper fairings or on the outside; however, fitting them on the inside produces a much nicer-looking finished model. If you opt for the inside, start at the rear of the cabin and work your way forward to the windshield.

### FINAL ASSEMBLY

Glue all of the hinges in place with white glue, such as Zap Formula 560 Canopy Glue. Plug the wing panels into the fuselage, and attach the lift struts. Remove the hatched section of former 11, and slip the horizontal stabilizer into the mount. Using the wing for reference, align



#### Cessna 172 | X0517A

Designed by Pat Tritte, this 1/8-scale Cessna 172 is easy to build and uses conventional stick-and-former construction and egg-crate wing assembly. It is lightweight and flies great. The model has a steerable nosewheel and functional flaps. Laser-cut and formed plastic parts are available.

WS: 53.5 in.; Power: Suppo 2217/9 outrunner; Radio: 5-channel; LD: 2; 3 sheets; \$27.95



To order the full-size plan, visit [AirAgeStore.com](http://AirAgeStore.com).



With more than 43,000 aircraft made, the Cessna 172 Skyhawk is the most popular civilian aircraft ever produced. (Photo courtesy of Wikimedia Commons)

## The Most Popular Aircraft of All Time

First flown in 1955, the four-seat, single-engine Cessna 172 Skyhawk is a high-wing, fixed-wing aircraft manufactured by the Cessna Aircraft Company, now part of the Textron. An offshoot of the Cessna 170 tail-dragger, the tricycle-gear 172 was an improved variant with a Continental O-300-A engine, and it featured larger elevators and a more angular vertical fin. The 172 was viewed as an overnight sales success, and more than 1,400 were built in 1956, its first full year of production. Further aesthetic improvements, beginning with the 1963 172D version and all later 172 models, included a lowered rear deck, which allowed an aft window. The airframe has been such a success that Cessna has not changed the configuration since then, except for updates in avionics and engines (including a Garmin glass cockpit in 2005). Production stopped in the mid-1980s but was resumed again in 1996, with the introduction of the 160hp-engine Cessna 172R Skyhawk. And in 1998, Cessna introduced a newer

180hp version, referred to as the Cessna 172S Skyhawk SP. Further refinements followed, including an increase in power from 180 to 210hp, constant-speed propellers, additional fuel-tank capacity in the wingtip and baggage-compartment tanks, and landing-gear wheel pants to reduce drag. With more than 43,000 airframes produced, more Cessna 172 Skyhawks have been built than any other aircraft, making it one of the most successful in history.



The Cessna 172 went through several upgrades throughout its development, and its most distinct features are its rearview window and its sweptback vertical fin and rudder.

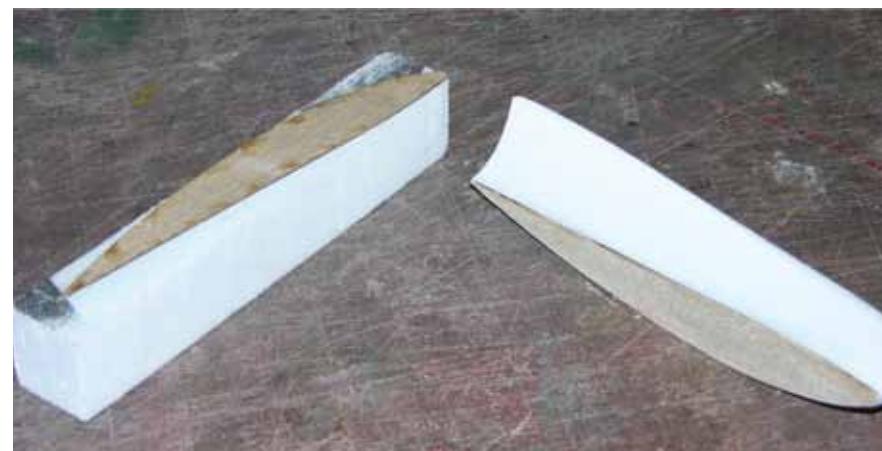


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and glue the stabilizer in place. Align and glue the vertical tail in place, again using the wing for reference. Install the elevator pushrod through the cutout in the firewall, and secure it to the servo arm with a Z-bend. Then make another Z-bend at the stabilizer hinge line, align the elevator in the neutral position, and glue the control horn in place.

Install the rudder cables using the provided diagram. Run the cables into the fuselage, and tie them off to the control horn. Test the system to ensure that the rudder and nosewheel both move in the same direction. If they don't, swap sides by crossing the rudder cables (that will be a lot easier than changing the nosewheel linkage!). When everything is functioning properly, secure the cables to the control horn. Make up the aileron control rods from 0.032-inch-diameter steel wire. Make a

Z-bend on one end, and slip it onto the servo arm. Make a Z-bend at the hinge line, align the aileron to the neutral position, and glue the control horn in place. To set up the flaps,



The Horner-style wingtips are carved from blue foam or soft balsa blocks.

position the servos to the full up position, then follow the same procedure as the ailerons to fit the pushrods. Set the controls for the throws called out for on the plans. The flaps will require

a bit of elevator-trim correction, so mix in a little downtrim at half and at full deflections. The final setup will be adjusted as needed when the model is flown. Then, with the flaps



The fuselage assembly is finished with the addition of the servos, mounts, and all the top and bottom stringers.



The window frames and fairings are made out of file-folder paper and glued in place around the cabin.



Access to the radio gear and battery is made through a hatch on the bottom of the fuselage.



The vacuum-formed plastic cowl is built up and fitted onto the fuselage, then trimmed to fit the motor used.



With all the framing and sanding done, the model is fully assembled to check for final fit and function while the internal components are still accessible.

in the up position, make the 0.010-inch-thick styrene-flap gap fairings, and glue them in place on the top of the wing. Install the wheels and pants, and reinstall the nosewheel into the motor-mount box. Attach the cowl, and add any desired details to complete the model.

Balance the model 2.3 inches from the wing leading edge at the root rib, using the battery to your best advantage. My model has been flown with a 2S 2000mAh LiPo and balanced correctly with the battery mounted on the back side of former 4A/4B/4A. The battery is secured to the former with some Velcro fastener. And with that done, the Skyhawk is ready to fly.

### IN THE AIR

Though not a trainer, the Skyhawk is gentle, docile, and easy to fly. Control is crisp and

responsive, but it isn't the least bit twitchy when set up as shown on my plans. Power is more than adequate, but the model is not overpowered, though rarely does the throttle need to go much past half. The flaps are effective in slowing the model for landings, and when takeoffs are done at half flaps, the rollout is quite short. Takeoffs can also be done with full flaps, but due to the added lift, be prepared to push in a bit of down-elevator during the climbout.

Before your first flight, double-check the controls to ensure proper throw and direction of travel. To take off, slowly advance the throttle until the model is light on its gear, then lift off with just a touch of up-elevator. Keep the climb shallow, and when at a safe altitude, trim the model for straight and level flight with a comfortable cruise speed. To check the flap/

elevator trim, slow the model down a bit and pull the flaps down to the takeoff setting. If the model pitches up, more downtrim is needed; if it pitches down, some trim correction will need to be removed. After the takeoff settings have been determined, try slowing the model a bit more and go to the landing flap setting, where the same trim setup will apply.

Landing without flaps is not a problem, but the model will land more slowly with half flaps and slower yet using full flaps. Try a few stalls at altitude at both flap settings to see how the model handles in slow flight; once you get a feel for it, you can start experimenting with full- and half-flap landings. Where the model really shines is with touch-and-go landings. Fly the approach with full flaps, and when the mains touch down, go to half flaps, power up, and you're off and running again. Above all, enjoy the ride. 



The Cessna 172 is all buttoned up and ready for her maiden flight.