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## **Industria Aeronautica Română IAR-80**

Romania's Indigenous WWII Fighter

Scale: 1/12
Wingspan: 34 in
Area: 146 sq in
Length: 29 in
Weight: 17-19 oz
Power: Speed-400



## Materials

This kit contains the following materials:

- This manual
- Plan sheet
- Decal sheets (2)
- Laser-cut wood pack
- Plastic canopy
- Plastic cowl (two pieces)
- Plastic cowl scoop
- Plastic spinner
- 3/8" Super Magnet, 4 each

**To complete this kit, you will need the following additional materials:**

- 3/32" Aluminum tubing, 3"
- 1/16" Music wire, 20"
- 1/16" x 4" x 36" Balsa sheet, 4 each
- 3/8" x 1/2" x 36" Balsa stick, 1 each
- 1/8" x 4" Hardwood dowel
- 1/4" square x 9" Hardwood stick
- Material for fillets (balsa, pink foam, etc.)
- 1 ea Wing mounting bolt
- Hinges (ailerons, elevator)
- Miscellaneous servo mounting materials and pushrods

- Covering materials and paint
- Glue
- 6-Volt Speed-400 power system

**NOTE: We recommend that you read this entire manual before beginning construction.**

## Construction

### Wing Skins

- Each wing bottom skin consists of two laser-cut pieces: forward, center and aft. Gently clean up the mating edges of the pieces with 220 grit paper on a sanding block.
- Lay the pieces of a wing skin on a flat board or table, with the outer surface up. Run a length of masking tape along the join lines. Turn the assembled skin over, bend the joints open, and run a bead of aliphatic resin or wood glue down the joints.
- Lay the assembled skin back down on the board – masking tape side down. Run a damp paper towel over the joints to remove excess glue. Place a sheet of wax paper over the assembled skin. Then weight it down with another board, books or what have you. Keep the weight on the skin until it is completely dry.
- When the skin is dry, remove the masking tape. Lay a skin on a flat board with the outer surface up, and sand it smooth with 120 grit paper on a long sanding block. Be sure to keep your sanding motion at a 45 degree

angle to the joints and wood grain. Clean the skin with a tack rag.

**Note** – it should not be necessary to sand the inner surfaces of the wing skin. Just be sure to remove any excess glue.

- Follow the same steps to assemble two wing top skins, using 1/16" x 4" x 36" balsa sheets.
- Lay a bottom skin on a top skin. Trace the shape of the bottom skin onto the top skin, adding a 1/4" margin at the trailing edge. Cut out the top skin.

### Wing Panels

- Pin a lower wing skin to your building board. The lower skins are the ones with the rib and spar positions etched into them.
- Glue the ribs and main spar to the bottom sheet. Note that the spar is notched at the dihedral angle for root rib W1. To maintain an accurate Clark Y airfoil, moisten the leading edge of the sheeting and pack it up so that it follows the curve on the bottoms of the ribs.
- Glue the 3/8" x 1/2" leading edge strip in place against the front of the wing skin. Note that the leading edge strip sits on your building board, not on the wing skin.
- Glue the aileron spar to the bottom sheet and ribs.
- Glue the aileron leading edge to the bottom sheet, about 1/32" aft of the aileron spar. DO NOT glue the aileron leading edge to the aileron spar.
- Glue the stub ribs to the rear of the aileron leading edge and the bottom sheet.

- Cut three aileron crank bearings from 3/32" aluminum tube. Make them about 1/2" long.
- Make an aileron crank from 1/16" music wire and the three bearings.
- Trim a slot in the aileron leading edge for the aileron crank. Glue the aileron crank in place, with glue on the bearings where they pass through ribs W2, W3 and W4.
- Use scrap balsa to make a bearing block for the aileron crank. DO NOT glue the music wire crank to the bottom skin or to the bearing block.
- Glue scrap 1/16" or 1/8" balsa reinforcements to the outside rear portion of rib W1. Using a sharp #11 blade, cut a slot in root rib W1 for the wing bolt, but don't cut the reinforcements. The center of the slot should be about 1/2" forward of the trailing edge. Notch the bottom skin so that you can find the bolt hole later.
- Using a long sanding block and fine grit sandpaper, sand the assembled wing panel to prepare it for the top skin. Sand the airfoil angle into the trailing edge, so that the trailing edge is about 1/32" thick.
- Put the washout jig in place under the wing trailing edge. The thick end of the jig goes at the wingtip. Pin the wing down.
- Cut a hole in the top skin for the aileron crank.
- Apply a thin bead of Pro-Bond or aliphatic resin to the tops of the ribs and spars and along the top of the leading and trailing edges. Lay the top skin in place and pin it firmly to the ribs and spars. Let the wing assembly dry.

- Laminate two WT pieces to make a wing tip block. Glue the wing tip block to the wing.
- Notch the leading edge for the 1/8" dowel.
- Sand the wing panel to its final shape.
- Repeat these steps with the opposite wing panel.

### **Wing Panel Joint**

- Use a long sanding block to prepare the root rib faces for joining.
- Join the panels using 15-minute epoxy between the root ribs. Use masking tape to hold the bottom skins flush. With one wing tip flat on the building surface, elevate the other wing tip to the required total dihedral.
- Reinforce the root rib joint by wrapping it with nylon or glass cloth. Saturate the wrap with CA.
- Use a 1/8" drill bit to clear the wing bolt hole and the dowel hole in the leading edge.
- Use a sharp blade to cut the ailerons free from the wings. Use a sanding block to finish the aileron leading edges and the aileron slots in the wing.
- Cover the wing as desired.
- Hinge the ailerons.
- Install the 1/8" dowel in the leading edge. The dowel should project about 1/4" forward of the wing.

### **Fuselage**

- Lay a sheet of wax paper on your building board and pin the crutch over it.

- Glue formers F2U through F10U to the crutch.
- Glue the DORSAL KEEL in place to formers F6U through F10U.
- Glue cockpit floor CF in place on formers F4U, F5U and F6U.
- Glue the FORWARD KEEL in place on formers F2U, F3U and F4U.
- Plank the top of the fuselage with 1/16" balsa strips. The planks should overhang the rear of the fuselage by at least 2.5". At the tail, do not plank above the cutout for HSP in F10. Start with a 3/4" wide plank against the crutch. Finish planking with 1/4" wide strips.
- Glue the 1/4" DORSAL CAP in place.
- Temporarily fit the canopy to the fuselage and trace its outline on the fuselage with a soft pencil.
- Cut the cockpit opening about 1/8" inside the canopy outline.
- Remove the upper fuselage from the building board.
- Cut a slot in the upper fuselage planking for the elevator pushrod.
- Prepare F4L as follows:
  - \* Glue the two F4L BRACE parts in place on the rear of F4L.
  - \* Use a sharp blade to score F4L along the broken line.
  - \* Fold the bottom of F4L back against the F4L BRACE parts and glue it in place.

- Glue F2L through F10L to the crutch.
- Glue the VENTRAL KEEL in place on formers F2L through F10L.
- Glue F11 to the VENTRAL KEEL. Glue the two Horizontal Stabilizer Platforms HSP to F10U and F11. Sand the fuselage curvature into the HSP parts.
- Glue former F2A in place on the VENTRAL KEEL. Use a scrap of wax paper or plastic wrap between F2A and F2L to keep them separated.
- Repeat for former F4A.
- Dampen the wing saddles and glue them to formers F2L, F3L and F4L.
- Plank the fuselage bottom with 1/16 x 1/4 balsa strips. All lower planks end at the rear of F11.

**NOTE:** As you add strips, mark each to show the dividing line between F2L and F2A, and F4L and F4A. Also mark the curve of the wing saddle on the planking.

- Laminate the four parts of the tail skid assembly: skid - skid mount - skid mount - skid.
- Cut slots in the ventral keel for the tail skid assembly. DO NOT glue the tail skid assembly in place until after you have covered the fuselage!
- Fill the lower fuselage area between F10L and F11 with scrap 1/4 balsa.
- Cut the planking and keels to remove the section of fuselage below the wing.

- Laminate the two 1/16 ply wing mounts WM. Then fit the WM assembly into the slots in the wing saddles. Glue the WM assembly to the saddles and planking.
- Fit the wing in place on the fuselage. Drill and tap the mounting bolt hole.
- Bolt the wing to the fuselage.
- Carefully fit the lower fuselage section back in place, trimming as necessary to fit it to the wing.
- Cut a hole in the planking to permit access to the wing bolt. You can insert a rolled paper tube in this hole to guide the bolt.
- Glue the fuselage bottom to the wing.

### **Cowling**

**NOTE:** The cowling is held to the fuselage by two magnets and two locating dowels.

- Glue the 1/4 NOSE SPACER blocks in place.
- Glue former F1 in place.
- Carve and sand the NOSE SPACER blocks to shape.
- Note the 1/8 holes top and bottom of former F1. Drill 1/8 through these holes into the NOSE SPACER blocks about 1/4 inch.
- Glue short 1/8 locating dowels in the two holes you just drilled. These dowels should protrude forward from former F1 about 1/8 to 1/4 inch.
- Glue one super magnet in each magnet hole in former F1.

- Glue magnet plates MP behind the magnet holes in ply former F0. Hint – the magnet plates MP are on sheet 1, inside former F2U.
- Place a strip of wax paper or covering material over the fuselage-mounted magnets. Now place the other set of super magnets on top of their fuselage-mounted mates. Apply epoxy liberally to the exposed magnets and fit former F0 over them.

### **Motor Mount**

- Cut two 4-1/2 inch lengths of 1/4 square hardwood stick. Push the two 1/4 square sticks into the fuselage from the front.
- Mount the cowling to the fuselage.
- Push the two 1/4 square sticks forward until they just touch the cowling nose.
- Glue the two 1/4 square sticks in place.
- Glue the two ply motor mounts MM to formers F1 and F2, and to the 1/4 square sticks.

### **Cowling**

- Temporarily install the motor and propeller shaft adapter.
- Trim the round section of plastic cowling to shape.
- Glue the cowling nose to the cowling.
- Set former F0 in place on the fuselage.

- Glue the cowling to former F0 making sure that it is aligned with the fuselage and the motor shaft is centered.

### **Empennage**

- Join the two elevators E1 together with a 1/16 MW joiner. Hinge the elevators to stabilizer S1.
- Glue fin parts R1, R2 and R3 together.
- Cover the fin, stabilizer and elevators as desired. Don't cover the stabilizer between the two etched lines that mark the position of the fuselage.
- Glue stabilizer S1 in place.
- Glue the assembled fin in place on stabilizer S1, and to former F11.
- Shape and glue tail blocks TB1 and TB2 in place.

### **Scale Details**

- Make the wing-mounted machine guns from 1/8 dowel.
- Make the exhaust pipes from 1/2 plastic tube (not supplied). Flatten them to oval shape at the outer end. Glue the pipes to former F0.
- Assemble the scale spinner using the 1/16 ply back-plate provided.

## **Finishing Your IAR-80**

- We suggest covering the entire model (except the plastic bits) with 1/2-ounce glass cloth and finishing resin for maximum strength.

- Apply a light coat of primer – just enough to fill the weave of the glass – and sand most of it off.
- Paint and decorate the model as desired – see the *Paint and Markings Guide* on our Website for more information.
- Seal the entire model with a light coat of Krylon clear spray.
- Glue the canopy in place.

### Decals

**CAUTION: You must seal the decals before immersing them in water!**

The decals included in this kit are printed with Epson DuraBrite™ inks on premium inkjet water-slide decal paper available. Follow the steps below to achieve a great looking set of markings on your model.

- Seal the decals with several thin coats of Krylon Crystal Clear™ spray varnish. Make sure you thoroughly cover the ink; this will prevent smears and stains during everyday handling.
- Make sure the surface where the decal is to be applied is smooth and glossy. Matte surfaces will permit tiny air bubbles to be trapped between the surface and the decal, thus spoiling the decal.
- Cut out and trim all the markings that you plan to apply in this session.
- Dip the decal in a bowl of water for about 30 to 40 seconds. Using your fingers, gently try to slide the decal off the backing paper. As soon as the decal

slides, slide it off the backing paper and onto the model in the desired position. Use a soft absorbent cloth to gently blot excess water from the decal. Allow the decal to dry.

**TIP** – You can practice with bits of decal cut from the copyright notice.

- Spray a coat of Krylon Crystal Clear varnish over the decal.

### Flying Setup

- Keep the model as light as possible for best performance.
- The IAR-80A should balance at 1.5" behind the leading edge at the center chord. This is approximately 24% of the mean aerodynamic chord (MAC). For the first few flights, you may want to move the balance point forward 1/4".
- Set the control throws to:
  - Elevator: 1/2" up – 1/2" down
  - Ailerons: 3/8" up – 1/4" down

### HELP!

If you have questions or need help with assembly of the kit, drop an email to [tom@warbirdkits.com](mailto:tom@warbirdkits.com).