

## B. WING JIG CONSTRUCTION

The dihedral and airfoil of the wing are molded in at the factory. Until the upper wing panel is bonded to the lower panel, however, the wing panels are free to twist. A wing jig is needed, therefore, to support the wing in a level and untwisted condition until wing fabrication is complete. The wing jig consists of a sturdy support table to which a series of plywood supports is fastened. The idea in fabricating the wing jig is to position the supports on the jig stand so that they most closely match the contour and dihedral of the molded lower wing panel while supporting it in a level and untwisted condition.

### STEP B-1

Using the supplied full size support templates, cut out the (9) wing supports from 1/2" plywood. Make (1) "A" support and (2) each of supports "B", "C", "D", and "E", as shown in FIGURES (C-4) and (C-5). To duplicate the B, C, D, and E supports, use sheet rock screws or the equivalent to fasten two pieces of plywood together, glue the support template to one of the sheets, and cut both supports at once.

A level line is marked on each of the wing jig support templates. Transfer these lines to all of the plywood supports.

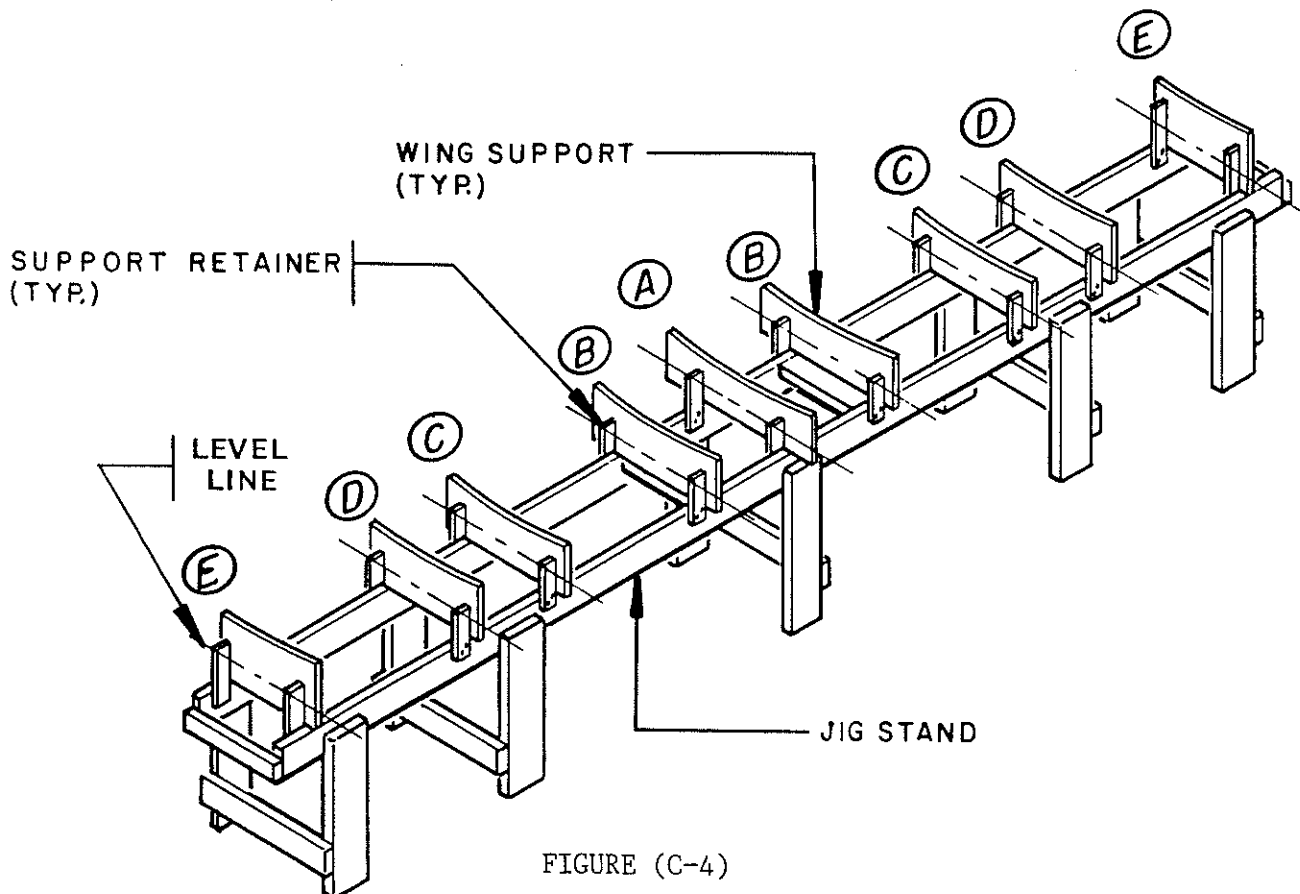


FIGURE (C-4)

**STODDARD-HAMILTON**  
AIRCRAFT, INCORPORATED

MODEL GLASAIR II	ASSEMBLY NAME RG WING ASSEMBLY	REVISION E	DATE 10/01/90	VOLUME I	PAGE C-5
---------------------	-----------------------------------	---------------	------------------	-------------	-------------

Construct the wing jig stand, as shown in FIGURES (C-4) and (C-5), using 2 X 4's and 2 X 6's as noted. Select the lumber for the stand carefully, choosing the straightest pieces you can find. Warped, twisted, or crowned lumber will cause difficulties in building a straight and flat support table.

NOTE: All critical dimensions are shown. All other dimensions are up to the builder. The top of the stand must be perfectly flat to insure no twist or incorrect dihedral in the completed wing. Use a carpenter's level, transit, or water level and (2) taut strings to check this.

NOTE: When constructing the jig stand, do not install legs or cross bracing between the 2 X 6 boards in the areas of the jig between the "B" and "C" supports. This area must be open to permit installation of the main landing gear struts.

✓ STEP B-3 5.3-98 1.5

With the stand complete and flat, mark the "A" support centerline and the "B" and "E" wing support locations on the aft side only of the stand.

NOTE: The support locations are measured from the center of the A support to the inboard surfaces of the supports.

Using scrap pieces of 1/2" plywood, make 2" wide support retainers to brace the wing jig supports perpendicular to the top of the wing jig stand. See Detail A of FIGURE (C-5).

Install retainers on the inside surfaces of the aft rail of the jig stand at the marked E support positions only. Do not install the forward E support retainers at this time.

NOTE: The retainers for the A and E supports will be installed on the inside surfaces of the rails, as shown in FIGURE (C-5). The retainers for the other supports will be installed on the outside surfaces of the rails, as shown. Install the aft E support retainers only at this time, however.

Use sheet rock screws to fasten the aft E support retainers to the jig stand. These screws can be purchased at any local hardware store, do not require pilot holes, and can be driven easily with a variable speed, reversible electric drill.

Place the E supports on the jig stand between the aft support retainers. Square the E supports to each other by comparing the two diagonal measurements between the forward and aft ends of the supports. Install retainers to the inside surfaces of the forward rail of the jig stand, as shown in FIGURE (C-5), to hold the E supports square to each other.

NOTE: Do not fasten the E supports to the retainers at this time.

  
**STODDARD-HAMILTON**  
AIRCRAFT, INCORPORATED

MODEL GLASAIR II	ASSEMBLY NAME RG WING ASSEMBLY	REVISION D	DATE 5/24/89	VOLUME I	PAGE C-7
---------------------	-----------------------------------	---------------	-----------------	-------------	-------------

✓ STEP B-4 5-3-98 8.75

Pull a taut string between the lower aft corners of the two "E" supports stretching the full length of the stand. Use this line to square the "B" supports by placing a carpenter's square against the string and lining it up with the marks on the aft side of the jig stand that were laid out in STEP B-3. Transfer the support location marks to the forward side of the jig stand using the square as a reference.

Install the "B" support retainers on both the forward and aft sides of the jig stand as was done previously for the E supports.

NOTE: Do not fasten the supports to the retainers, at this time.

STEP B-5


Place the lower wing panel onto the wing jig. Align the trailing edge of the wing panel 3/4" aft of the aft ends of the supports (shift the supports forward or aft slightly to achieve this). Divide the distance between the wing attach fitting slots in the main spar to mark the centerline onto the lower wing panel. Use this mark to center the wing panel from side to side over the support "A" centerline marked on the jig stand.

NOTE: Do not use the upper wing panel split line as a centerline. This is not necessarily the true centerline of the wing.

NOTE: Due to storage sets, the wing panel may lift up in a few places. Usually, when the wing is resting in the B supports, the wing tip leading edges are elevated slightly above the E supports. In this case, shim under the E supports so they contact the underside of the wing panel directly under the lower spar cap. If, on the other hand, the wing rests on the E supports without contacting the B supports, raise and shim the B supports so they contact the wing panel directly under the lower spar cap.

NOTE: The contours of the wing jig supports may not exactly match the contour of the wing panel because the dimensions of the paper templates vary with changes in temperature and humidity. This is acceptable since any gaps between the wing panel and the jig supports will be filled with body putty in a later step.

NOTE: The important result to achieve in this step is to support the wing panel in the jig with all of the B and E jig supports contacting the underside of the wing panel directly under the lower main spar cap.

 <b>STODDARD-HAMILTON</b> AIRCRAFT, INCORPORATED			
MODEL	ASSEMBLY NAME	REVISION	DATE
GLASAIR II	RG WING ASSEMBLY	E	10/01/90
		VOLUME	PAGE
		I	C-8

STEP B-6

At this time the wing airfoil chord line must be leveled in a fore-and-aft direction at both the wing roots and the wing tips. The forward end of the chord line coincides with the leading edge of the airfoil. The aft end of the chord line is 16% of the airfoil thickness above the lower wing surface at the wing-panel trailing edge hinge line. Since the airfoil thickness at the wing-panel trailing edge is 2.75" thick at the wing roots (24" outboard of the wing centerline) and 1.76" thick at the tips (just inboard of the wing tip attach flange joggle), as shown in FIGURE (C-17), the chord line is .44" (16% of 2.75") above the lower surface of the trailing edge at the wing root and .28" (16% of 1.76") above the lower surface of the trailing edge at the wing tip.

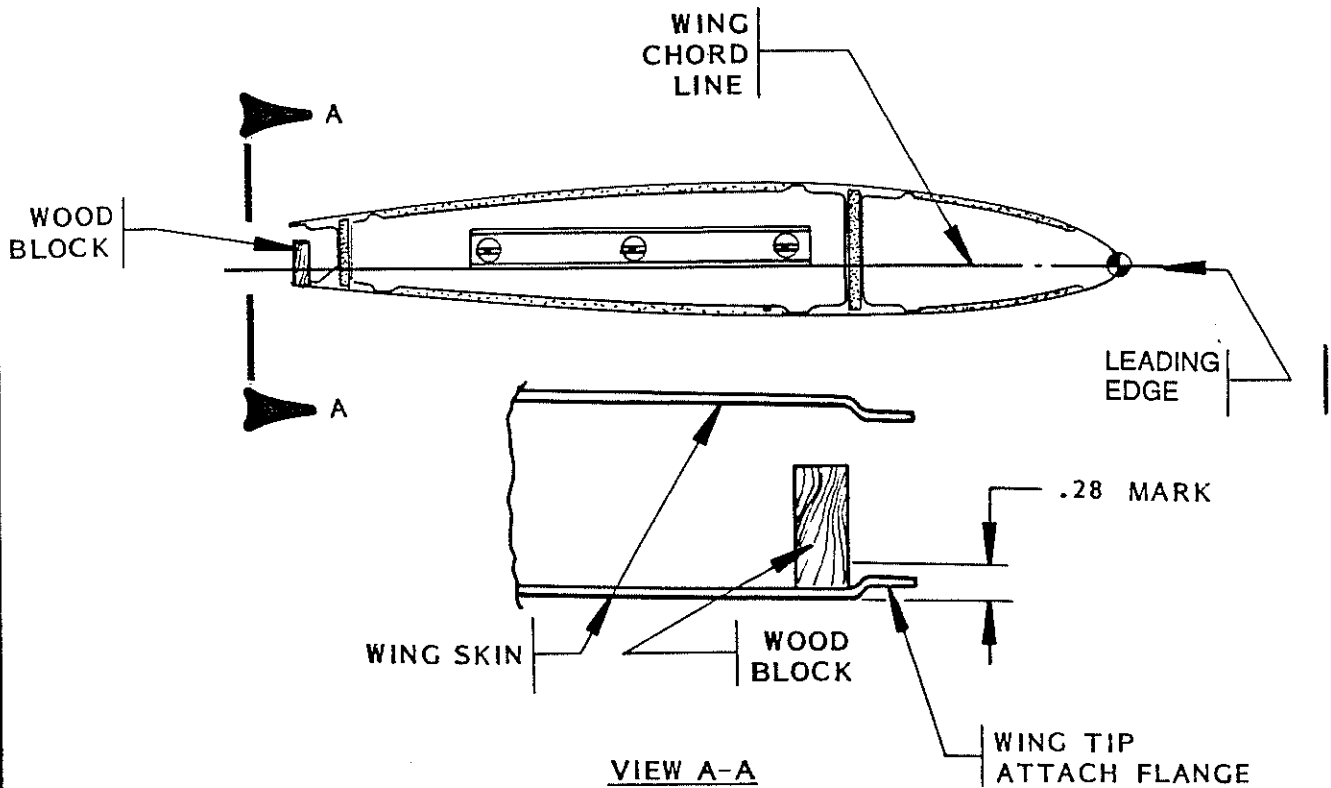


FIGURE (C-6)

Using hot glue, temporarily bond small wooden blocks into the lower wing panel at the trailing edge. Bond one block at each wing root, 24" outboard of the wing centerline. Bond one block at each wing tip, just inboard of the wing tip attach flange joggle, as shown in FIGURE (C-6). Measure up 0.44" from the lower surface of the lower wing panel 24" outboard of the wing centerline and mark this point on the wing root blocks. Similarly, measure 0.28" up from the lower surface of the lower wing panel just inboard of the wing tip attach flange joggle and mark this point on the wing tip wooden blocks. Pull a taut string between the marks on the two wooden blocks on each side to mark the position of the chord line at the trailing edge from the wing roots to the tips.

*6-13 up to this point  
3.5*

**STODDARD-HAMILTON**  
AIRCRAFT, INCORPORATED

MODEL GLASAIR II	ASSEMBLY NAME RG WING ASSEMBLY	REVISION F	DATE 10/01/91	VOLUME I	PAGE C-9
---------------------	-----------------------------------	---------------	------------------	-------------	-------------

Place weights into the lower wing panel above the B and E supports to hold the wing panel firmly into the supports. Apply (4) layers of duct tape (equal to 0.04") on the upper surface of the upper main spar cap to simulate the thickness of the mat cloth that will be used to bond on the upper wing panels in subsection AH (BONDING THE UPPER WING HALVES TO THE LOWER WING HALF).

**NOTE:** The mat cloth supplied with early Super II RG kits was 0.04" thick; the mat cloth supplied with later kits is 0.028" thick. Use a dial caliper to measure the thickness of the mat cloth supplied with your kit. For the early, thicker mat cloth use four layers of duct tape (0.04") on the spar cap; for the current, thinner mat cloth, use three layers of duct tape (0.03").

Place the upper wing panels over the lower panel and tape the leading edge together. Prop the upper panel trailing edges with wooden blocks (or the equivalent) to achieve the required 2.75" thickness 24" outboard of the wing centerline and the 1.76" thickness just inboard of the wing tip attach flange joggle.

Use the wing leading edge templates on pages C-257 and C-258 to determine the actual wing leading edge points near the wing root and near the wing tip on each side. Copy the templates onto stiff cardboard or thin plywood and cut them out. Slide the templates inboard or outboard on the wing to find the spanwise positions where they fit the wing best. Hot glue the templates in place temporarily.

Use a water level, a transit, or any other means to check the chord line for level. As references for leveling at each leading edge template location, use the chord line mark on the template and the trailing edge string at the same spanwise location as the template.

Shim between the wing jig stand and the forward or aft ends of the B supports as necessary to achieve a level chord line at the wing roots. Once the chord line at the roots has been leveled, use similar procedures to level the chord line at the tips by shimming the E supports. Make sure any shims you use are securely fastened to the jig stand so that they cannot be displaced.

At the same time, make sure that the wing is level in a spanwise direction by checking similar points at each wing tip with a water level. Raise or lower the B and E supports on one side of the jig stand to achieve this condition.

**STEP B-7**

Once the wing is level in the B and E supports in both a spanwise and a chordwise direction, the remaining supports can be installed on the wing jig. Without disturbing the wing's position in the B and E supports, slip the A, C, and D supports into position under the wing in the approximate positions shown in FIGURE (C-5). Since the wing sags slightly from its own weight between the B and E supports, position and shim the C and D supports so they hold the wing panel straight. Use a string line or a long straightedge to check at both the leading and the trailing edges. Position the supports with their aft ends 3/4" forward of the lower wing panel trailing edge. When the best position of each support has been determined, install the support retainers to the forward and aft rails of the jig stand as was done previously for the B and E support retainers.

**NOTE:** Install the A support retainers on the inside surfaces of the wing jig rails, as shown in FIGURE (C-5).

*6/14  
C-D supports  
in place  
2.5"  
7-21  
remaining  
supports in place  
1.0"*



MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
SUPER II	RG WING ASSEMBLY	S2-C	5/15/97	I	C-10

STEP B-8

7-19 left wing only 2.0  
 7-21 Right wing 1.25

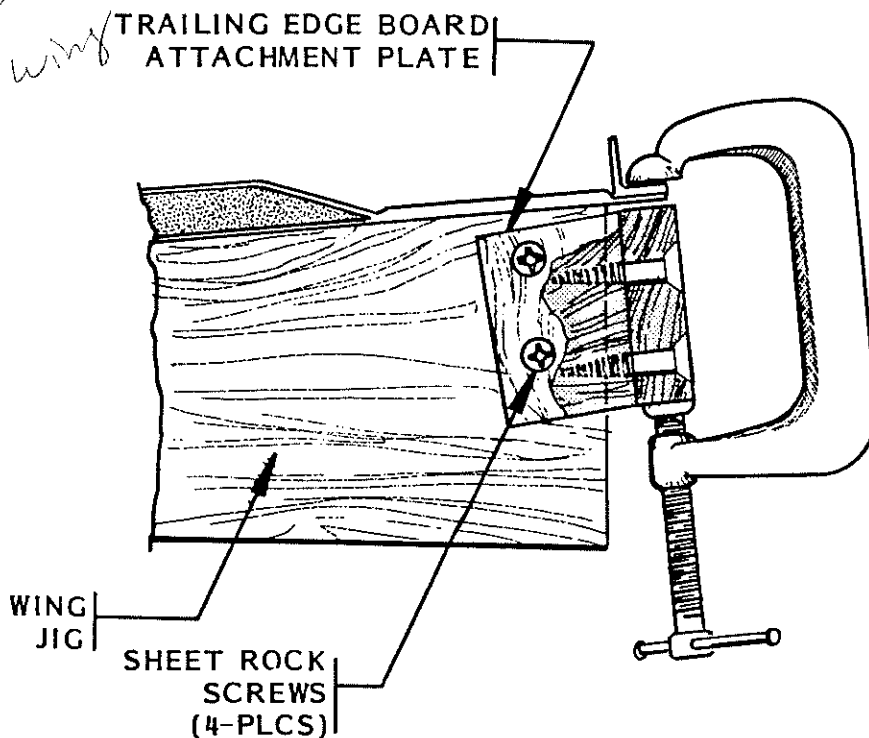



FIGURE (C-7)

To insure a straight lower trailing edge for the flap and aileron hinge line, fasten (2) straight 1 X 4 boards onto the aft ends of the supports spanning from the A support to the E supports, as shown in FIGURE (C-7). Use 2 X 4 or 1 X 4 blocks, as shown, to space the 1 X 4's away from the supports and to hold them at the proper angle relative to the under side of the wing trailing edge. Using C-clamps and (2) long aluminum angles, or something equivalent, lightly clamp the trailing edge to the 1 by 4's, as shown in FIGURE (C-7). The C-clamps and angles may be removed after the forward surface of the rear shearweb is layed up and cured.

**NOTE:** The trailing edge of the lower wing panel in the center section extends aft beyond the 1 X 4 boards. Do not clamp the lower wing panel in the center section area.


 <b>STODDARD-HAMILTON</b> AIRCRAFT, INCORPORATED			
MODEL GLASAIR II	ASSEMBLY NAME RG WING ASSEMBLY	REVISION E	DATE 10/01/90
		VOLUME I	PAGE C-11

STEP B-9

Double check that the wing chord lines are still level at both roots and at both tips and the wing is level in a spanwise direction. Recheck the positions of all supports as described in previous steps. When satisfied that everything is positioned as required, use hot glue to securely fasten the supports to the retainers and to the jig stand. Make sure the entire system, including any shims used, is firmly fastened together to prevent movement between the individual components during the time the jig is in use.

Finally, use body putty, L-shaped brackets, or some other method to firmly attach the legs of the jig stand to the floor. This is important to prevent movement of the wing jig during construction.

Remove the lower wing panel from the jig and apply a 2" wide strip of brown polypropylene crating tape to the lower surface of the panel where each wing jig support contacts it. Replace the wing panel in the jig and use body putty to fill any gaps between the jig supports and the polypropylene tape on the lower surface of the wing panel.

COMPLETED 

7-21

1.0



MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
GLASAIR II	RG WING ASSEMBLY	D	5/24/89	I	C-12