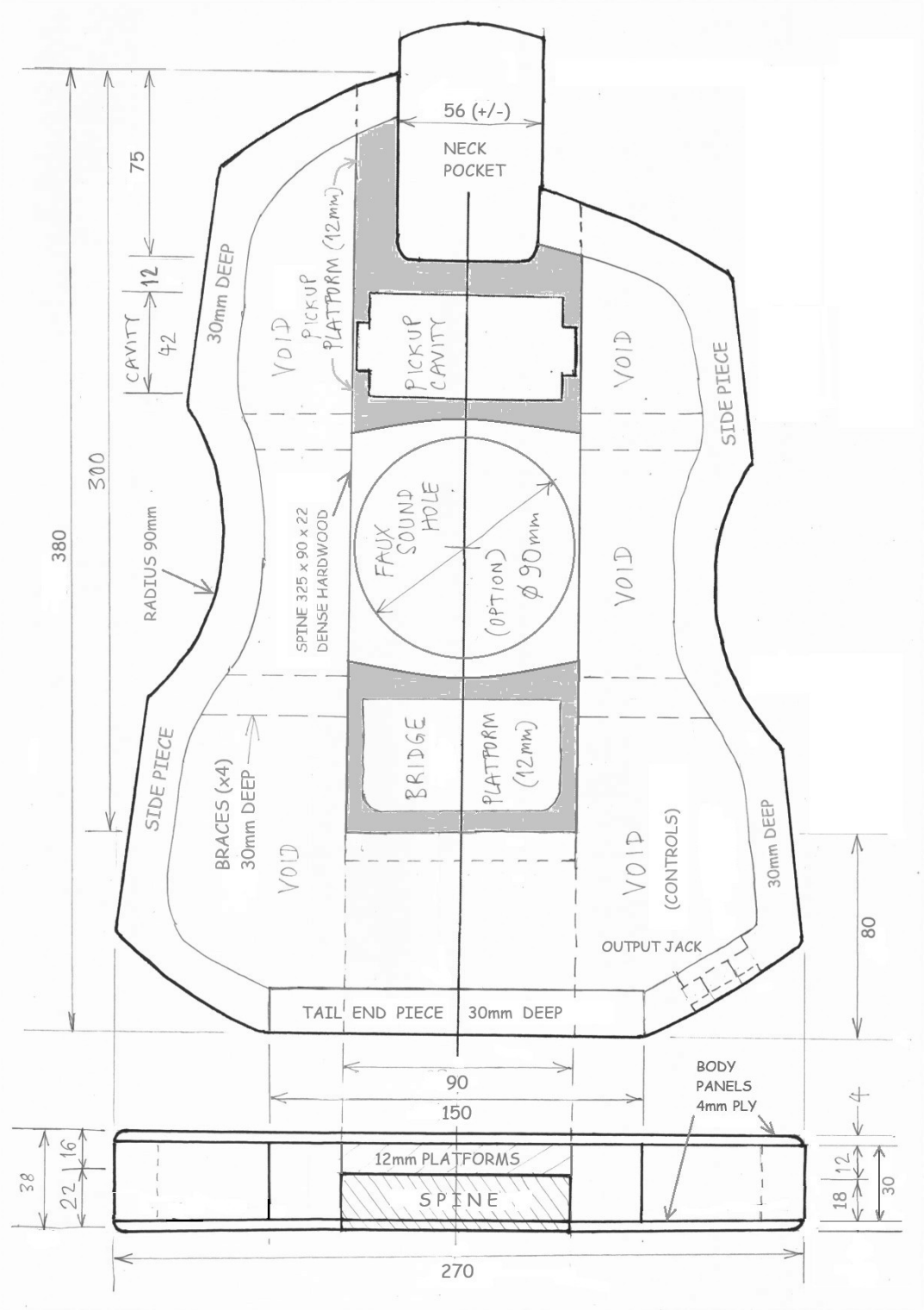
Easy DIY Electric Guitar -- Build Notes

(Semi-hollow body version)

Reference: www.mjbauer.biz/Guitar_maker_resources.html



Step-by-step build procedure:

1. **Source timber** – Dense hardwood 90mm wide x 22mm thick* for the "spine" piece, plus lighter wood, e.g. pine, spruce, 30mm thick (maybe layered) for the side pieces, plus small offcuts of 12mm plywood for the bridge and pickup "platforms", plus 4mm plywood or MDF for the upper and lower body panels. Choose MDF only if the body is to be painted opaque. (* If 22mm hardwood is unobtainable, it may be made of two layers, e,g. 18mm + 4mm).

2. **Machine hardwood spine piece to size:** 90 x 22 x 325+ mm. *(Precise length TBD.)*

3. **Print the template** actual size on A3 paper. Tape template onto 4mm plywood (or MDF) to be used for upper body panel and mark outline and centreline plus cutouts for neck pocket, pickup cavity and (optionally) the "faux sound hole".

4. **Cut the upper body panel piece** around the periphery. Allow 2 mm of overhang to be trimmed off later, after the side and tail end pieces are attached.

5. **Make cutout for pickup in upper body panel**.

6. **Measure depth of pickup...** If greater than 22mm (typically 25mm for a humbucker), cut a slot across the spine, 42mm wide x 3mm deep, aligning with pickup cutout in upper body.

7. **Cut the faux sound hole (if desired):** Use a 90mm hole saw to make a clean circular cut.

8. **Cut the 2 side pieces and tail end piece** (30mm thickness) using the template to mark outlines of side pieces.

9. **Cut the 12mm "platforms" for the bridge and neck pocket areas.** Cut pickup cavity in platform near the neck pocket. NB: The neck pocket is not cut out at this step.

10. **Glue the platforms in place on the upper body piece,** aligning them on the centre line. Total thickness of upper body panel with platforms should be 16mm (±0.5).

11. **Cut out neck pocket in upper body piece** (after the glue sets).
First measure the heel width on the neck to ensure a "snug" fit in the pocket. Cut corners with 6mm radius. Ensure neck can be aligned with centre line on the body.

12. **Glue the spine precisely in place** on the upper body piece (with 12mm platforms). Hold with clamps until glue sets.

13. **Lay the side pieces and tail-end piece in their respective positions** with the body assembly placed upside down on the workbench. Mark positions of the 4 "braces" which will add reinforcement to the upper and lower body panels. Cut brace pieces to size as marked.

14. **Glue the side pieces, tail end piece and braces onto the upper body panel.**

15. **Drill 6mm holes through braces on the shorter side** for the pickup cable to be passed through to the cavity where the pickup controls will be located.

16. **Drill a hole for the output jack** in the side piece nearest to the controls cavity.
There are various methods and fittings available to mount the output jack.

17. **Make the under-body panel pieces:**
Tape template onto a piece of 4mm ply (or MDF) and mark the outlines of the underside body panel pieces (2 sides and tail-end cover piece). The shorter side piece will be further cut in two pieces making one removable (with screws) to cover the cavity housing the electronics (volume and tone controls, output jack, etc). Again, allow 2 mm of overhang to be trimmed off later, after the all the body pieces are glued together.

18. **Glue the underside panel pieces to the body, except for the piece(s) which provide access to the electronic controls.** This piece will be attached with screws to make it removable.

19. **Trim the upper and lower body panels flush with the side pieces and tail end piece.**
Edges should be rounded to 3mm radius, more or less.

20. **Contour the spine at the neck pocket** to follow contour in neck. Hold neck in place temporarily in the pocket and mark on spine area to be contoured.

21. **Attach neck to body spine**:
Determine position of neck fixing plate. Mark positions of screws and drill pilot holes (3mm) in spine using a drill press. Mark centre line on upper body in bridge area. Align neck with centre line and clamp lightly in pocket using a jig to prevent damage to frets. Drill pilot holes through the spine into the heel to a depth of 15–17mm.

22. **Remove the neck**. Widen the pilot holes in the spine to a size equal to the outer diameter of the neck fixing screws. Attach neck to spine with screws, aligned with centre-line.

23. **Determine position of bridge on body**:
Adjust one or two bridge saddles to their fully forward position (end of screw travel) then back up 2mm. The bridge is positioned correctly when the distance from the nut to the adjusted saddles is equal to the scale length (normally 648mm for a “Tele” neck).
This position allows more adjustment toward the rear of the bridge than forward. Locate the correct bridge position laterally using a straight-edge on the neck sides. Mark bridge mounting holes and the six “thru-body” string access holes.

24. **Drill bridge mounting holes** to suit screw gauge. Also drill the 6 holes (3.5mm) to feed the strings through. Drill a 4mm hole under the bridge beside the mounting hole nearest to the high-E string for a ground wire to pass through to the controls cavity. On the underside of the spine, enlarge the 6 string “feed-thru” holes to suit retainer ferrules (6.3mm drill). Use a stopper on the drill bit to avoid drilling too deep.

25. **Drill holes in the upper body panel for volume and tone controls.**

26. **Finish the guitar body surfaces with sandpaper.** Start with P120 grit; finish with P240+.
The neck should be removed during this step and re-attached after the next step.

27. **Apply wood grain filler and varnish or timber oil, or whatever treatment is preferred**.
Allow to cure/dry/harden thoroughly before proceeding.

28. **Insert ferrules into string feed-thru holes**. Use a small wooden block to avoid damage to the ferrules from hammering directly.

29. **Complete assembly and wiring of components inside the controls cavity.**
Self-adhesive copper foil should be used to line the cavity for screening EMI radiation.

30. **Mount the bridge in place** after fitting and re-aligning the neck. Strip 12mm of insulation from a length (~200mm) of multi-strand hook-up wire. Feed wire through hole into the controls cavity. Ensure bare wire ends make good electrical contact with the bridge when screwed down. (If the bridge is painted black, scrape off paint around the screw hole.)

31. **Mount the pickup** in its frame and thread the pickup cable through to the volume control and solder wires according to the pickup wiring diagram. Fit the pickup assembly into the cavity and screw the frame in place. Complete wiring of pickup to controls.

32. **Fit cover piece over controls cavity (under-side) and screw in place.**

33. **Fit shoulder strap retainer buttons** at 2 or 3 points on the body: e.g. one each side of the tail end piece and one near the neck heel.

34. **Fit machine heads (tuning pegs) to head-stock.** Attach string tee(s) for treble strings.

35. **Install the strings.** Be sure to stretch them so they stay in tune better. Check finger-board is straight (frets in-line). Adjust truss rod if necessary.

36. **Tune the guitar.** Adjust the bridge saddles for correct intonation and action.
Adjust height of pickup for optimum response.

Parts List and Cost Estimate

Description	**Cost (AU$) ^**
Neck, fret-board, 22 frets, heel 56 x 25mm, scale length 648mm	$80.00
Neck fixing plate + screws	$4.00
Bridge, hard tail, 10.5mm string spacing (thru-body string term.)	$14.00
Pickup, humbucker (pref. Alnico 5) neck position	$22.00
Pickup shroud/frame (*aka* mounting plate)	$4.00
Machine heads (*aka* tuning pegs), set of 6	$15.00
String tee (retainer post on head-stock for B & E strings)	$3.00
Shoulder strap retainer buttons	$3.00
Copper foil, self-adhesive, for screening inside controls cavity	$10.00
Volume and tone controls (A250k pots), ¼" phone jack, 22nF capacitor	$10.00
Strings, set of 6 (Light gauge 10-46)	$10.00
Ferrules, set of 6, for string feed-thru holes	$4.00
Total (incl. GST and postage)	**$175.00**

^ Based on best prices of selected AliExpress items at the time of writing.