

Building the Replica Martin Backpacker Guitar

Plans and video courtesy of David Gamble

Video can be found at:

www.Davidgamble.pbworks.com

search “guitar videos” on David’s page and select the building a backpacker guitar video



Guitar body Prep – part 1

1. Mill 2" blank to final dimensions of $1 \frac{15}{16}$ " x $2 \frac{1}{2}$ " x $37 \frac{3}{16}$ "
2. Measure $4 \frac{1}{2}$ " from the end and then another $\frac{1}{4}$ " after that for the nut
3. Measure 16" from the bottom of the nut location
4. Draw center line from top to bottom of blank
5. Raise table saw blade to max height (make sure a riving knife is used)
6. Set fence on table saw at $\frac{5}{32}$ " and a stop block at 15" from front of the blade
7. Rip both sides of blank
8. Mark the centerline of the $1 \frac{7}{8}$ " hole at $21 \frac{15}{16}$ " from the head stock end and drill with a forstner bit until tip of bit appears on backside. Flip over and finish hole.
9. Use a band saw to finish the cut (IMPORTANT: KEEP OFFCUT)
10. Sand insides smooth with the spindle sander and a $1 \frac{1}{2}$ " drum installed
11. On the band saw, rip 2 pieces from cut off at a thickness of $\frac{1}{4}$ ". These are for the end boards
12. Plane both pieces to a thickness of $\frac{1}{8}$ " (remember to plane both sides)

Fret-board

1. Using 1" thick stock, (any hard wood such as purple heart, white oak, rosewood will do) rough cut to approximately $3 \frac{1}{4}$ " wide and 22" long. Joint each surface and one edge, and then re-saw to obtain 2 pieces approx. $\frac{7}{16}$ " thick.
2. Plane one board to exactly $\frac{5}{16}$ " thick, this is the bridge material
3. Plane the second board to exactly $\frac{1}{4}$ " thick, this will be for the fingerboard
4. Rip Bridge material to exactly $2 \frac{3}{4}$ " wide
5. Set bridge stock aside for now
6. Rip fret board to $2 \frac{1}{2}$ " wide
7. Square one end, then cross cut at 17" for the fret-board
8. Hand fret-board to Mr. McCallum to take home and cut fret slots
9. Square up headstock end of fret board, then cut body end of fret board at 16". This end should also be cut at 45 degrees degrees
10. Using Polyurethane glue such as Gorilla Glue, adhere fret-board to body, make sure the fret-board is orientated in the correct direction. Remove any excess glue at fret-board ends at this time
11. Using lots of clamps, make sure fret board is set true to neck
12. Once clamps are removed, redraw centerline on neck surface

Guitar body prep – part 2

1. Mark out neck taper on neck with a **sharp** pencil ($2 \frac{1}{2}$ " at bottom of neck and $1 \frac{3}{4}$ " at top of headstock). **ENSURE MARKS ARE CENTERED VERY CAREFULLY.** Carefully cut on band saw to outside of pencil mark
2. Using a very sharp #5 hand plane, clean up band saw marks being careful not to cut past the pencil mark

3. Attach 1" pieces to sides of headstock. Joint must be perfect
4. Using a steel bench rule, mark cut on neck and cut carefully outside the line with the band saw. DO NOT THROW OUT THE OFFCUT, YOU WILL NEED THIS
5. Layout headstocks cut mark's as per plans
6. Submerge body and end board in warm water for a minimum of 45 minutes, ensure water reaches to neck but not beyond
7. After 45 minutes, carefully place pieces into their correct bending jig's and let sit overnight
8. Remove end board from Jig, find center then measure 4" to each side. Cut at end lines for a final length of 8". **ENSURE SAW IS SET UP FOR A PERFECT 90 deg CUT**
9. Mill a 12" piece of scrap hardwood to 1/4" x 1/2", this will be used for the end blocks
10. Shape, glue and clamp the end blocks to bottom of guitar body (temporarily taping in end board helps to define shape). Blocks must be exactly 1/8" from end of body
11. Carefully glue end board, make sure joint is tight as this is a visual element of the guitar
12. Glue and clamp in a strap support block at inside center of end board, this block should be made of white hard maple

Guitar back

1. Select material and mill to a final size of 1/8" x 10" x 21"

Bridge

1. Set 5/16" bridge stock into bridge routing jig, using wedge shims to firmly secure
2. Set router to cut a depth of 1/8" into bridge stock
3. Cut slot in 1 pass
4. See drawing for reference for next steps
 - a) Draw perpendicular lines at each end of the saddle slot
 - b) Draw parallel lines 1/4" outside of the first lines
 - c) Draw diagonals
 - d) Draw line 1/2" back and parallel to saddle slot
 - e) Find center of saddle slot and measure out exactly 1 1/8" to each side
 - f) Divide into 5 spaces at exactly 7/16"
 - g) Lay out peg design (holes do not have to be in a line, you may curve or stagger the holes)
 - h) Center-punch hole locations
 - i) Drill using #8 countersink drill bit
 - j) Crosscut to length, use laser on chop saw for alignment
 - k) Shape to desired shape using stationary disk sander
 - l) Finish sand with random orbit sander

Body Assembly

1. Trace the inside and outside onto the back material
2. Trace outside of guitar onto front material
3. Cut about ½" outside of the line
NOTE: DO NOT THROW OUT OFFCUTS, THEY WILL BE USED LATER
4. Glue soundboard to front of guitar; make sure sufficient number of clamps along with clamping jig are used. There can be no gaps between guitar sides and front material
5. Draw Centerline on inside of sound board
6. Locate sound hole 21" from top of Fret board
7. Drill Sound hole using a 1 7/8" Forstner bit
 - a) Drill from inside until tip of forstner bit pokes through
 - b) Flip guitar over and drill from top until hole is clear
8. Using leftover soundboard material, carefully cut a piece that is 2 ½" to 3" wide. This will be for the sound board bracing at the sound hole
9. Carefully fit this piece to the inside the guitar so that the back half of the sound hole is covered. It should be a tight fit with the inside of the guitar body
10. Bevel the front of the brace at 45 degrees
11. Again with leftover sound board, make a piece that is 2 ½" to 3" wide and 4 ½" long
12. Using the clamping support and a ¼" shim board, glue and clamp both pieces of bracing in using their respective clamping blocks. Bridge support must be 27 ¼" from the top of the fret board
13. Re-drill the sound hole and chamfer so that bracing can not be seen from the front of the guitar
14. Mill a piece of poplar to 3/8" x 2" x 14"
15. Using a small block plane, round over one edge
16. Carefully rip this edge off at 3/8" thick using the table saw, this will be used for back support material
17. Locate bracing 6" and 14" from the wide end of the back and cut to length, bracing must be long enough to touch each edge
18. Glue and clamp to back board
19. Rough cut back board approximately ½" wider than lines
20. Glue back to body of guitar, using as many clamps as necessary.
NOTE: keep glue lines neat and clean up any excess glue that can be see from the sound hole for a professional looking glue job
21. Cut and sand excess material from the body of the guitar

Installing the Bridge

1. Locate center of bridge, 24 5/8" from the top of the fret board
2. Find the centerline of the guitar neck and mark this at the bridge location only

Guitar Body Prep – Part 3

1. Layout shape and rough-cut head stock
2. Rough sand head stock
3. Redraw centerline on head stock
4. Layout Machine head locations as per plans
5. Center punch hole locations
6. Drill a 1/8" hole completely through
7. Carefully drill out from top of head using 21/64" drill bit. Only drill half way through the head
8. Flip guitar over and finish drilling machine head locations from the backside
9. Glue and clamp Bridge to top of guitar soundboard
REMEMBER TO CLEAN UP ANY EXCESS GLUE
10. Once glue is dry, re-drill peg holes with #8 drill bit
11. Using the 6" belt sander, very carefully rough shape the neck. You are looking to create a 1" radius near the head stock
12. Medium sand neck and guitar. Do not sand soundboard at this time.

Fret Installation

1. Using fret snips cut fret wire to length and gently tap in using a brass or acrylic mallet. **MAKE SURE FRET WIRE IS FULLY SEATED**
2. Snip excess fret wire close to the neck as you install at each fret location
3. File fret ends smooth. Very important for an easy playing guitar. **See reference for link to fret filing demo**

Final Steps

1. Cut nut to length and sand until flush with neck sides
2. Sand nut down until approximately 1/8" above top of neck
3. Lay out string grooves, 5/16" from the edge and evenly spaced in between
4. Carefully file string grooves. The bigger the string, the bigger the notch
5. Round over the back edge of the nut
6. Glue nut in place
7. Fit saddle to the bridge
8. The height will need to be adjusted for string action

Finishing

1. Mask guitar and oil neck and bridge. Do not get any oil onto wood surrounding the neck and bridge
2. Mask neck and bridge then spray finish the rest of the guitar

Stringing the Guitar

1. Using bridge pin hole reamer and pin, very carefully ream hole until pin is a snug fit
2. String guitar
3. Tune
4. Play and play and play

Sources and References

- davidgamble.pbworks.com – Great video to follow when building the backpacker
NOTE: Do not follow dimensions from video, only follow dimensions on plans attached to this set of instructions
- <http://www.stewmac.com> - where I shop for all the guitar parts. Also has great tutorials on guitar building and maintenance
- <http://www.youtube.com/watch?v=0460Cb55PUw&list=UU5ilZ1eCu-aD0Qs2PWASxEQ&feature=c4-overview> - Fret Guru tutorial on filing fret ends – Excellent site