

# How to Build a Dog House



**An insulated dog house made from inexpensive and recycled building materials.**

Here is a do-it-yourself dog house that I have dubbed the "Sparky1". It features an insulated floor, roof, and walls, a removable roof for ease of cleaning, a cedar deck with roof, an optional inner wall, and solid construction throughout.

It was made from common construction materials - including recycled cedar boards from an old deck, T1-11 exterior grade plywood, and 2X pine framing lumber. The whole thing cost less than \$150. (A similarly constructed commercial dog house could easily go for \$500+.)

The doghouse was built as a gift for a needy local family. That's their pooch "Nicky" in the picture. He seemed to be right at home as soon as he climbed into the house for the first time.

**Dimensions:** The house was designed for a medium sized dog. It is 30" wide, 33" deep, and 37" high. The doorway is 11" wide and 15" high. The front deck measures 18" by 26". The whole thing weighs about 100 pounds.

Drawing and materials list

The house consists of six insulated panels. The side and roof panels are made from 2"x3" framing lumber sandwiched between T1-11 exterior sheathing and sanded plywood interior panels (1/2" for the walls, 1/4" for the roof). For insulation, I used 1" thick foam sheeting. This comes in 4' x 8' sheets and is pretty easy to cut to exact size. The floor, which measures 28-3/4" x 32", consists of a cedar frame with 1/2" plywood on top and foam sheet insulation on the underside.

Cedar was used for the floor frame, the deck, roof cap, and trim boards. It was salvaged from 5/4" decking material that was cleaned and planed down to 4/4". It almost looked too nice to use for a dog house, but at least it wasn't being thrown out or left to rot...

## **Building the Dog House**

Here are the steps for building the dog house:

Step 1: Floor and Side Walls

Step 2: Front and Back Walls

Step 3: Roof

Step 4: Deck

I found that it worked best to partially build the front and back walls (step 2), build the roof next (step 3) and then come back and finish up the front and back walls. The step 2 page provides details on the construction sequence.

The house can be constructed using standard woodworking tools. I used the following ones: table saw, radial saw, power hand saw, jig saw, router, drill, 1/4 sheet sander. I also used a planer to plane down some old deck boards but that's not an essential tool for the project.

I estimate that the house can be built over a weekend or two - with the aid of the plans provided here. (It took me more like 4 weekends partly because I was designing as I went.)

### **Building the Floor**

The floor of the dog house is pretty simple: a sheet of 1/2" plywood attached to a frame of decay resistant cedar (recycled from the old deck of course). The floor measures 28-3/4" by 31-3/4". Once the 5/8" walls are attached, this brings the outer dimensions of the dog house to 30" by 33" (not including the corner trim).



Begin by constructing the base. It is made from 3/4" x 2-1/2" boards that are screwed or nailed together. For a little extra support, I opted to insert a board in the middle of the frame.

Once the frame is built, the plywood floor is screwed onto it and foam insulation panels are inserted in each of the two halves of the base (Figure 2). To hold the panels in place, I ran duct tape along the edges. Screws inserted into the sides of the frame with the heads projecting out would also get the job done.

### Side Walls

At this point, the floor is done and it's time to work on the walls. Start with the two side walls. Cut the outer plywood panels to size (28-3/4" by 23-3/4"), making sure that the length exactly matches the length of the floor.

Create the wall frames using 2" x 2" or 2" x 3" studs. I used 2" x 3" studs for the side walls and 2" x 2" studs for the front and back walls because I had both in stock and wanted to use them up. Just keep in mind that the actual dimensions of construction lumber are a half-inch less than the stated dimensions.

Cut the studs to size to frame the perimeter of the wall panels, keeping 1" exposed on the bottom of each panel for it to overhang the base. Then attach the studs to the panels. For each wall, I used six 2" screws inserted from the inside - to keep the exterior as hole free as possible. Later on, the screws that hold the exterior corner trim in place will also serve as additional attachment points for the walls to the frames.

The side walls are screwed into the floor as shown in Figure 3. To keep from having to use extremely long screws, I counterbored the screw holes an inch or so (that's what I get for using 2" x 3" studs). I also put in some of the screws at an angle (toe-screwed?) which saves you from having to drill counter bores.

By the way, the drill shown in the picture is my favorite. It's a reconditioned Black & Decker that I picked up for about \$30 some years ago at a factory outlet. It's lightweight, has a keyless chuck that is easy to grip, and there are no batteries to recharge. What more could one ask for in a drill?

Once both walls are attached to the base, you can go ahead and insert insulation panels inside the frame and then screw on the interior wall panels. The wall panels are made

from 1/2" plywood and are sized to fully cover the framework of the wall (should be about 23" x 31-3/4").

### **Cut Outer Wall Panels to Size**

Like the side walls, the front and rear walls consist of a 5/8" T1-11 plywood exterior, an insulated inner frame made of 1-1/2" material, and an inner "skin" made from 1/2" plywood. However, there are a lot more angles and a door cutout to contend with. But, that's all part of the fun...

Start by ripping a piece of T1-11 plywood to match the width of the base with side walls attached. This should be about 30". From this piece, cut two pieces that are about 36" long (Figure 1). These two pieces will form the front and rear outer wall panels.

Clamp the two pieces together and layout the cut lines that will form the peak of the dog house (Figure 2). The angled cuts will start at about 23-3/4" from the bottom of the panel - the height of the side walls. Once the lines are drawn, clamp a straight-edge in place that is offset the proper distance for your radial saw and commence cutting. **Tip:** To make the grooves in the front and back panels line up, clamp the two pieces together back-to-back with exterior sides facing out.

What if you cut the panels and then find that the base of the angled cuts doesn't quite line up with the side walls? (Don't tell anyone, but that happened to me). Well, that's easily solved by clamping the panels in place with the angled cuts in the proper position and then trimming off material at the bottom so the sides and front/back all line up. It's better if the front/back pieces are a bit short vs long because it's easier to rip the rectangular side pieces to size on the table saw than it is to trim the front/back pieces to length with a hand-held radial saw. I hope that makes sense...

### **Establishing Roof Position**

Because the dog house design features a removable roof, the position of the roof must be established before the front and back inner wall frames can be constructed. The idea is that the roof should fit snugly against the top of the wall frames (Figure 3). So, go build the roof and then come back here...

### **Framing the Walls**

Ok, you've built the roof -- right? Now attach the back wall to the side walls with a couple of screws and place the roof on top (Figure 4). Crawl into the house and use a pencil to trace along the edges where the back wall meets the side walls and roof. Now temporarily attach the front wall with a couple of screws and remove the back wall that you just traced. Repeat the tracing process on the front wall and remove that wall when done. You now have the outer framing outline traced on both end walls. (In a perfect world, the outlines would be identical, but what are the chances of that?)

With the wall panels lying flat on the workbench, measure out and cut the framing pieces. Start with the two vertical studs. Cut the upper end at an angle to match the pitch of the roof using the wall panel as a template to mark the cut line. While you're at it, cut the lower end of each upper framing stud at the same angle. Put each vertical stud in position (using the trace marks), mark the bottom cut-off line, and cut to finished length. Put in a few screws to secure the vertical studs to the wall panel. Tip: leave some of the pencil trace line showing to give yourself a little wiggle room. Cut two horizontal studs that fit snugly between the two upright studs. One is a bottom stud and the other goes near the top of the uprights.

One way to mark the cut lines on the upper end of the top angled studs (the peak) is to put the top stud in position with the previously-cut lower end mated against the vertical stud. Now put a framing square against the bottom of the wall panel with the other end projecting up to bisect the traced peak. Mark the upper stud where the square crosses over it. This is your cut line. Set up your miter saw and cut the stud (maybe just a hair long). Cut the other stud and see how they line up. Trim to final size as necessary. With any luck, the two studs will be the same length and meet perfectly in the middle (not that anyone other than you will ever notice).

At this point, attach all of the back wall framing pieces to the inside face of the T1-11 wall panel. I found that toe-screwing the studs to the panel from the inside (so as not to mar the exterior), with clamps in place to secure the studs, worked pretty well. Insert insulation panels into the upper and lower cavities formed by the framing (Figure 6). Mark and cut the inner plywood panel. You should be able to lay the plywood on top of the framing and trace around the framing to establish the cut lines. Screw the inner panel to the framing and then screw the completed wall assembly to the house. Three screws per side should be more than adequate.

Hold off on attaching the framing for the front wall because you need to create a doorway first.



Figure 1. Cutting front/rear panels to rough length.



Figure 2. Ready to create the peak.

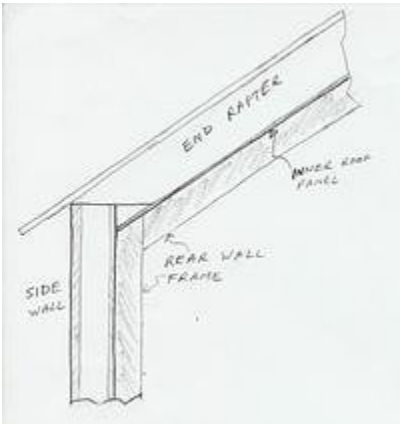


Figure 3. Exploded view of roof and rear wall frame.



Figure 4. Side view of roof with front wall removed.



Figure 5. Close-up view



Figure 6. Back wall with framing and insulation in place.

### **Ridge Pole and Rafters**

With the front and rear outer walls temporarily attached to the side walls with a couple of screws or pipe clamps, cut a ridge board for the roof that spans the distance between the front/rear walls. Position the ridge board so that it is centered at the peak and hold in place with a pipe clamp (Figure 1). Now you can layout and cut the rafters.

To establish the top angle for the rafters, clamp a scrap piece of 2x3 material to the inside of the outer wall and with a square held against the ridge board, mark the cut line on the wood scrap (Figure 2). Use the same approach to layout the bottom angle, this time placing the square against the side wall. Also measure the distance from the outside of the side wall to the top edge of the ridge -- this represents the length of the top edge of the rafter. It should be about 18" more or less.

With the rafter angles and length established, cut out the rafters with your miter saw. I recommend first cutting the bottom angle on all the rafters. Using one of these pieces as a template, measure up from the cut end and mark the location of the top cut. Then set the miter saw for the top angle and cut the template slightly long. Gradually sneak up on the layout line until the rafter fits snugly in place. (If you've done things correctly, the top and bottom cut lines will form a right angle when a square is placed against them). Finally, set a stop for your saw and cut the rest of the end rafters to final length (total of 4).

Clamp the end rafters in place as shown in Figure 3 and screw the top of each rafter to the ridge beam. You may want to drill a countersink so as not to risk splitting the material. Also secure each end rafter to the wall using 1-2 screws inserted from the outer wall. These will hold the structure in place for the rest of the assembly (the clamps would be in the way when the roof panels are attached).

The two inner rafters are cut slightly shorter than the end rafters because they butt up against the concealed fascia boards that run along the base of the roof frame. These boards enhance the structural integrity of the removable roof. With the end rafters clamped in place, cut two fascia boards that span the distance between the rafters. Position each fascia so that it rests against the top of the side wall and is in the same plane as the rafters (See the pics). Then measure the distance between the top edge of the fascia and the ridge beam -- this will define the length of the inner rafters. Mark and cut the inner rafters.

At this point, all of the roof framework should be cut to size. Toe screw the end of each fascia into the end rafters. Do the same for the inner rafters. A single screw at each joint will suffice for now -- additional screws can be added later when the frame is removed to install the insulation panels.

You'll notice in the photos that the inner rafters are not actually in the middle of the roof. This is because I used two pieces of plywood for one side of the roof and positioned the inner rafter to line up with the point where the two pieces met. For the sake of symmetry, I also offset the other inside rafter.

### **Roof Panels and Insulation**

The next step is to create the two exterior roof panels. Each is 22" wide by 39" long, which allows for about 3" of overhang all around. It's best if each panel is a single piece of plywood. However, I ended up using two pieces for one side because I wanted the grooves in the T1-11 plywood to all line up and run vertically, and I didn't have enough large pieces left - with the proper groove orientation - to use a single piece for each side. If you plan to cover the roof with shingles, it should be much easier to find two whole pieces of plywood since you won't care if the grooves line up or not.

Alright, enough rambling... Do what you must to come up with two roof panels of sufficient size. Rip each to rough width and cut to finished length. The ends where the two panels meet at the peak of the roof should be cut at an angle so the panels fit tightly together. This angle is the same as the top angle of the roof rafters. Transfer this angle to your table saw and cut two pieces of scrap wood to see how they line up. Adjust as necessary and when the angle is correct, go ahead and cut each roof panel.

Position the roof panels on top of the roof frame. When you're satisfied that they meet tightly at the peak and overhang evenly on the front/back, remove one of the panels and clamp the other in place as shown in Figure 4. (It helps to have an assistant for this

operation). Then insert a few screws into the clamped panel to attach it to the frame. Remove the clamp and attach the other roof panel in a similar manner.

Now it's time to work on the interior roof panels. For these, I used some 1/4" thick material that I found on the woodpile. Remove one of the end walls as shown in Figure 5 and measure the distance from the peak to the side wall, with the tape measure held against the bottom edge of the roof rafter. This distance represents the width of the interior panels. (Actually, one panel will be slightly narrower than the other - by the width of the plywood - because it will butt up against the other panel). Measure the panel length also - it should be the same as the length of the side wall panels. Cut the two panels to size and check their fit. Don't get too mental if the panels are a little undersize - only the dog will ever see it.

Remove any screws securing the roof to the walls and with the help of your able-bodied but underpaid assistant, pick up the roof and place it upside down on the workbench. Cut out four pieces of foam insulation panel to fit inside the roof frame and tape in place (Figure 7). Then screw on the interior roof panels. This is also a good time to insert additional screws to better attach the outer roof panel to the frame. I recommend toe-screwing them from the inside rather than putting holes into the top of the roof.

### **Ridge Cap**

The last step is to attach a ridge cap. It not only enhances the appearance of the house but helps to keep water from getting into the roof panel joint and really stiffens up the roof structure. I made a cap from 3/4" x 3-1/2" cedar with a piece of 6" wide flashing underneath it (Figures 9-12). To reduce the opportunity for water to get into the joint, I ripped one edge of each cap piece at a 16.5 degree angle (to match the pitch of the roof) and then put in 3-4 screws to attach the pieces to each other. The completed cap is then screwed onto the roof with a half dozen screws or so.



Figure 1. Temporarily attaching ridge pole.

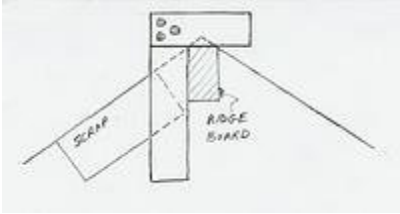


Figure 2. Laying out the top angle for the rafters.



Figure 3. Test fitting rafters.



Figure 4. Roof frame depicting end rafters, inner rafter, concealed fascia, and ridge.



Figure 5. Close-up view of roof joint.



Figure 6. Side view of roof with front wall removed.



Figure 7. Underside of roof with insulation panels in place.



Figure 8. Close-up view of ridge beam and rafters.



Figure 9. Roof flashing.

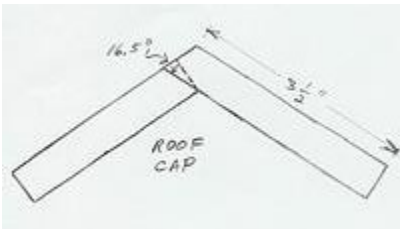


Figure 10. Layout diagram of roof cap.



Figure 11. Ridge cap in place.

### **Building a Covered Deck**

A covered deck like the one shown here is a nice touch for a dog house. It provides a place for your dog to hang out and see what's going on without lying in flea-infested dirt or being entirely exposed to the sun. It also adds a certain stateliness to the dog house -- it elevates it from being just a box with a hole in it to a stylish abode that any self-respecting dog will appreciate.



Figure 1. Your basic dog house

This is a fairly small deck - about 18" by 26". I used 3/4" thick cedar boards for the deck surface and framing. For the roof, I used a piece of left-over T1-11 plywood, hung at a 12 degree slope. The whole thing - deck and roof - only weighs about 20 pounds.

Begin by building a frame for the deck using 1-3/4" wide stock. As shown in Figure 2, this is simply a box that is screwed onto the front of the house. It measures 17-1/2" by 25-1/2" and is centered between the front corner trim. The bottom of the deck frame lines up with the bottom of the house frame.

The front roof supports are made from two 1-1/2" wide boards that are screwed together. For now, cut these boards to rough length (23"); hold off on attaching them until the roof position is established. Same goes for the decking.

Create a support header for attaching the roof to the house. This board is 1-1/2" wide by 25-1/2" long. Cut a bevel on top of the board to match the pitch of the roof (I went with 12 degrees). Cut two such pieces - the other will be used for the front roof frame. Then create the two side pieces of the roof frame, cutting the ends at the same angle as the roof pitch. I'll leave it as a little carpentry challenge to you to figure out the proper length of the side pieces so that the front of the roof frame lines up with the front of the deck frame.

Screw the roof frame together and attach it to the house with a few screws; I positioned it as high as possible without getting in the way of the main roof (don't forget to account for the thickness of the T1-11 plywood on top). Place the house on its side so you don't have to support the front of the deck. Measure and cut the two vertical roof supports (cutting the top at the same 12 degree angle) and screw to the front corners of the deck and roof frames (Figure 4).

Cut the deck boards to size and screw in place. I allowed about 1/4" of overhang on the front and sides. Of course, I had to round the ends with a router to make it look legit. Finally, cut the T1-11 roof panel to size (18" x

with covered deck.



Figure 2. Underside of house and deck frame.



Figure 3. New life for recycled deck boards.



Figure 4. Front view of deck.

26") and screw in place. Voila, a covered deck!

Note: if you make the deck roof a little larger and with a little less pitch, it can double as a loft for your dog to observe the world around him from a higher vantage point.



Figure 5. The finished deck and deck roof.



Figure 5. Final inspection of the deck by the family cat.