Chuck Box Construction Plans

These plans should guide the user in building a Scout chuck box to match the style and construction depicted below. Prices of materials are based on “Lowes” and “Home Depot” typical prices in the spring of 2007.

Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
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<tbody>
<tr>
<td>1 and 1/4 sheets of 1/2-inch plywood–boxframe</td>
<td>$20</td>
</tr>
<tr>
<td>2 – 12’ x 2” x 4” – legs and end box leg holders</td>
<td>$7</td>
</tr>
<tr>
<td>9’ – 1”x2” – inside framing</td>
<td>$3</td>
</tr>
<tr>
<td>12’ – 1/2” x 1” – slats, inside framing (assumes cut down 1”x2”)</td>
<td>$3</td>
</tr>
<tr>
<td>1 – 4’ x 4’ x 1/4” plywood or Masonite (oak plywood)</td>
<td>$14</td>
</tr>
<tr>
<td>8’ – 2” x 2” – bottom skids</td>
<td>$2</td>
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<tr>
<td>Formica (as desired)</td>
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<tr>
<td>1&amp;1/2” wide 1/8” thick aluminum plate – bottom skids</td>
<td>$14</td>
</tr>
<tr>
<td>1&amp;1/4” wood screws (box of 100)</td>
<td>$7</td>
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<tr>
<td>8 – ½” eye hooks for door chains</td>
<td></td>
</tr>
<tr>
<td>8’ – small chain for holding doors up</td>
<td></td>
</tr>
<tr>
<td>1 – 4’ piano hinge</td>
<td>$10</td>
</tr>
<tr>
<td>Wood Glue (recommend gorilla glue or TiteBond III)</td>
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<tr>
<td>1/2” brads</td>
<td>$4</td>
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Tools

- Large wood clamps
- 4’ long pipe clamps or parallel clamps
- Table saw (recommended) or Circular saw.
- Chisel
- Screwdriver (preferred - drill with screw bits)
- Hacksaw
- Measuring tape
- Carpenter’s square
- Sander
- Small brad hammer (pneumatic brad nailer works much easier)
**Construction Overview**

Due to fitting requirements—it is pretty important that the cutting and assembly follow the sequence defined below. This is a summary of main steps. The following sections will provide detailed instructions for each step with all relevant measurements, and photos to help you along.

1. Measure and cut the 1/2” plywood for the top, bottom, external end pieces and internal end pieces.
2. Cut the legs
3. Use the legs and the external end piece to layout the 2”x4” blocks to hold the legs in both carry and stand-up positions (see photos of finished box below). This section is critical to the strength and safety of the box – go carefully and review the detailed directions closely.
4. Assemble the two end caps – glue & screws–set aside to cure thoroughly.
5. Measure and cut the internal dividers and dado the frame and dividers to fit together.
6. Assemble the bottom and sides.
7. Assemble the internal dividers.
8. Assemble the top.
9. Measure and cut the front and back doors.
10. Cement the Formica on the doors – set aside to cure. (Optional – put Polyurethane on doors inside side.)
11. Assemble doors.
12. Build options if desired – drill holes as described for the options.
13. Prime and finish/paint – (and any desired decorations)
14. Fill with equipment and enjoy.

A well built chuck box can easily last 10 years or more of monthly campouts and scout abuse. Ours has 6 years of history at the time we wrote this – and are still in great shape.

**Step 1: Measure and cut the ½” plywood for the top, bottom, external end pieces, and internal end pieces.**

   a) Top is 40 ¾” x 18 ½”.
   b) Bottom is 36 ¾” x 17”.
   c) External end caps are 18 ½” x 18 ½”.
   d) Internal end cap is 18” x 18 ½”. This is ½” shorter than the external end cap because the bottom runs under the internal end cap (butt joint).
Step 2: Cut the legs

a) The legs are a total of 54” long for younger scouts. 61” long for Crews and adults (to give it more height).
b) The foot is at an angle of 70 degrees
c) The top has a 90-degree angle cut as follows...

d) See photo-1 for what the top of the legs look like and how they fit together.
e) You have an option at this point. You must either shave the legs to 1.5 inches by 4, or put 1/4 inch of plywood or some sort of sheeting on top of the 2x4 blocks described in the next step for the end caps. The reason is that the 2x4 legs will not slide easily into the end cap unless you have more space. We usually shave the legs.

Step 3: Use the legs and the external end piece to layout the 2” x 4” blocks to hold the legs in both carry and stand-up positions (see photos of finished box below). This section is critical to the strength and safety of the box – go carefully and review the detailed directions closely.

a) The angle for the foot of the legs is repeated as the angle for all of the 2” x 4” pieces in the end caps. So, plan out your cuts and you will save wood.
b) Keep putting the legs on the layout and make sure there is at least ¼” extra clearance to leave room for swelling, paint, etc.
c) The diagram below shows the layout. Also see Photo-1 for a picture of what it looks like.
d) Bottom piece (A) is 15” on the bottom, and 11 ½” on the top.
e) The next piece up (B) is 7 3/8” on the bottom and 4 ¼” on the top.
f) The next pieces (C) are 1 ¼” on the bottom and 3” on the top.
g) The top pieces (D) are 5” on the bottom and 6 ¾” on the top.
h) Photo-1 shows the end cap layout before gluing and screwing.
i) Make sure there is plenty of clearance for the legs – too tight – and after painting they will stick. Have at least ¼” clearance all around – both in the position below – and in the carrying position (see assembled box photo).
7. Step 4: Assemble the two end caps – glue & screws – set aside to cure thoroughly.

a) Once the pieces are all cut and the fit is checked, then mark the external end cap (the 18 ½” x 18 ½” one) and glue the pieces to the external end cap. If you use gorilla glue, it requires wetting both sides, putting your glue on, then clamping the pieces together. We used 1 ¼” wood screws to both add strength and to clamp the wood together.

b) This is where your optional step would be done. If you decided to NOT shave the legs – then cut ¾” ply or Masonite to match the pieces just cut above, and glue it to the pieces to space out the internal end cap. WARNING – all of the dimensions are for a plan where the legs are shaved (since we forgot about this until after we completed this step). If you do this – the interior of your box will be ½” shorter than the dimensions we show – and your internal pieces will have to be adjusted accordingly.

c) Once the pieces are all glued and screwed on – wet the wood and put glue on the pieces to put the internal end cap on top. Remember – the internal end cap should be aligned on the top, and show ½” of the bottom brace (A). Glue and screw it together.

d) Set the end caps in a warm place to cure (but not in the direct Texas summer sun – it will not cure properly).

e) After curing (5+hours) – you will need to take a chisel and clean up the foam from the glue that has come out of the joints and hardened.
f) Photo-2 shows a completed end cap after curing.

Photo-2 assembled end cap

Step 5: Measure and cut the internal dividers and dado the frame and dividers to fit together.

a) WARNING: We used a 1/8” Dado. The dimensions for the internal dividers are based on that. If you use a different depth dado, remember to adjust your dimensions.

b) Thebottomshouldbe7/8” inset from the front of the end caps to allow room for the door to fit flush and the hinge to fit.

c) All internal shelves and dividers are inset by 1 ¼” from the front. This allows room for the door and chains when closing the box.

d) Set the end caps on the bottom and place the top on the box – hold it all together with clamps (or a couple of helpers) and make sure everything fits OK. Photos-3 & 4 shows what this looks like.
e) **WARNING:** Do not glue or assemble anything – just check for fit. You have to get all the internal pieces fitted properly – then there is a specific assembly sequence below.

f) We have used both ¼” plywood and ¼” masonite. The plywood is a bit lighter, but costs a few dollars more.

g) The inside back is 16” from the front of the box.

h) The inside back is 36” x 18 3/8”.

i) The top shelf is 14 ¼” x 26”.

j) The vertical dividers are 10 5/8” x 14 ¾”. There are 3 of these.

k) The small shelf on the right of the box is 5 ¾” x 14 ¾”.

l) The small shelf to the left is 6 ½” x 14 ¾”.

m) Starting from the left, the vertical dividers are placed with an opening of 11 ¾” for the first two and 6 ½” for the next one.

n) The small shelves are set at 6 ¼” up from the bottom. Be careful to measure from the bottom of the box – don’t forget to take into account the dado if measuring on the vertical divider.

o) Measure and mark your dados for the frame and end caps, then cut all of your dados. Check the fit before going on to the next step.

**Step 6: Assemble the bottom and sides**

a) Set the bottom and the two end caps together – wet the wood and put your glue on.

b) Put the end caps and the bottom together – check the alignment of the dado marks for the inside back. Clamp it together (or use a person to hold it together) and nail the bottom to the end caps with 2” finishing brads. If you have it – a pneumatic brad nailer can make this a whole lot easier.

**Step 7: Assemble the internal dividers**

a) First, rip some of your 1” x 2” into 14 ¾” long strips. Rip the 1” x 2” in thirds so you have 3 -14 ¼” long strips. Glue & nail (with 1” brads) two strips to either side of the top of each vertical divider.

b) Then glue & nail strips on the right inside end cap at 6 ¾” from the bottom (this is to hold the small shelf).

c) Then glue & nail strips on both sides of the right most vertical divider at 6 ¾” from the bottom of the box (don’t forget to compensate for your dado inset).

d) Then glue & nail one strip on the right side of the next divider at the same height.

e) Wet the wood and put your glue in the dado strips for the internal back divider and set it in the bottom and end caps.

f) Start working from the right hand side of the box. Photo 6 shows what this looks like.

g) Wetting the wood and putting in glue – install the right most vertical divider. The strips you put on earlier should be on the top and middle.
h) Put in the right small shelf (the 5 ¾” wide one). Using 1” brads – nail it to the support strips on both sides.
i) Put in the next vertical divider.
j) Put in the other small shelf (the 6 ½” wide one). Using 1” brads – nail it to the support strips on both sides.
k) Put in the third divider (the one with no strips in the middle).
l) Now put in the top shelf. Bend it up in the middle to get it to fit into the dados.
m) Using the same 1” brads – nail it to the vertical dividers.

11. Step 8: Assemble the top.

a) Now wet & glue the top and fit it over the end caps and get the internal back wall fitted into the top dado. Make sure everything is fitted together. This usually takes 3-4 people. One on each end, pushing it all together, one with the top, and one poking the back to line it up with the dado.
b) Use your long clamps (or lots of weights) to clamp the top to the bottom at the back inside divider. Photo-5 shows this.
c) Use more long clamps or weights to clamp the top shelf to the bottom of the box. Photo 6 & 7 show this.
d) Relax and let the glue cure.

Photo-5 Back side of assembled frame and internal dividers.
Photo-6 Front dividers and shelves assembled...

Photo-7 Front dividers and shelves...
Step 9: clean and sand the box.

a) Once the glue has cured, use your chisel to clean up any foam that squeezed out of the joints.
b) Sand the edges, and outsides to make everything flush, no rough edges, no splinters, etc. You may want to use some wood putty to fill in any gaps or excess dado cuts, let that cure and then sand that as well.

Step 10: Measure and cut the front and back doors.

a) The doors are 35 ½” x 18 ¼”. Check to be sure you have a minimum of 1/8” of clearance all around – and do not forget to allow room at the bottom (between 1/8” and ¼” for the hinge.)
b) Cur your hinges to fit the door. Optionally – if you are trying to save some money – cut one 4’ hinge into 4 individual 1’ pieces and use two per door.
c) Grind the sharp edges of the hinges so the adults don’t cut their fingers. (Notice – we don’t worry about scouts cutting their fingers – go figure!)

Step 11: Cement the Formica on the doors – set aside to cure & prime the box.

a) Two options. One is to get Formica and cement it on the inside of the doors and the edges of the doors. The other is to put about 10 coats of hard outdoor polyurethane on the inside and edges of the doors. If you go to your local hardware store, identify yourself as a poor scout troop, you may get donations – we did.
b) Prime the overall box before you start putting hardware on.

Step 12: Assemble doors.

a) Turn the box upside down and put the hinges on the bottom of the box. Drill pilot holes – the brass screws are soft and the heads will tear if you don’t have feeder holes.
b) Turn the box right side up – arrange some boards to support the doors in the right position and the door part of the hinge goes on the inside of the door (see photo below for hinge placement)
c) Put the chain on to hold the doors. Start with a 2-foot section for each side, and adjust by cutting off links as needed to get it level – depending on where you put the eye hooks. See photo below.
d) Put the bolts on the outside of the doors at the top to hold the doors closed. WARNING – you probably have to cut down the screws so they don’t come out the inside of the doors!

Step 13: Build options if desired – drill holes as described for the options.

Step 14: Finish paint – then do any decorations.

Step 15: Fill with equipment & enjoy.