

Cubey 2 T-plans

Homemade Puzzles

This is another fairly small sliding panel puzzle box, apparently similar to Cubey. However, the appearance is the only thing in common. All six side panels are cut with beveled edges, so that when the cube is assembled, it's impossible to tell which side you're looking at. In common with Cubey, there is only one sliding outer panel for each side, but in this case, every outer panel has to be moved **twice** to get the lid off. There is a sequence of six moves which takes you back to where you started, and the same sequence has to be gone through again, making a total of twelve moves. All the moves are exactly the same, but in different directions, and again, you can't tell where you are. You could even get part way through, then start to go backwards-but you wouldn't know it, until you arrived back at the start...

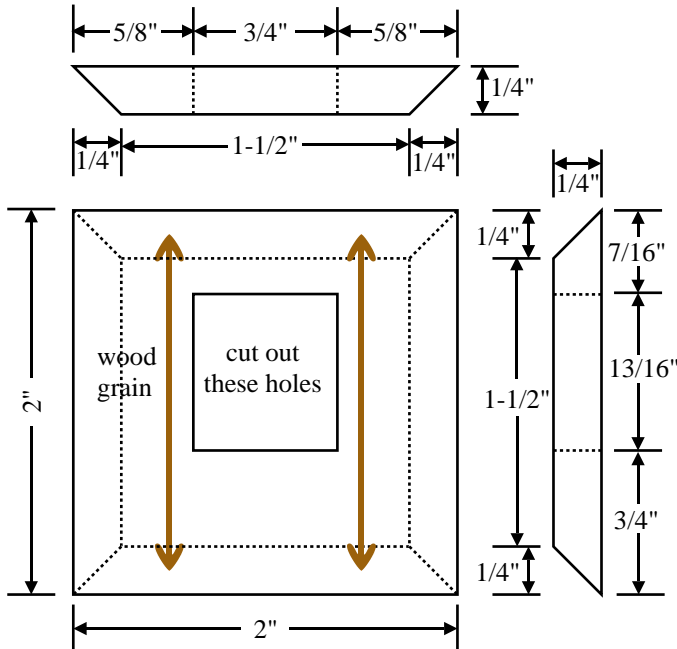


What is a T-Plan? See the last page.

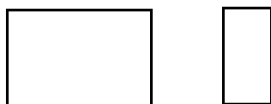
T represents 1/8" thick plywood.

Side panels.

From 1/4" plywood, make six. All the outer edges are cut at 45 degrees. Note the direction of the wood grain on the larger (outer) face. The inside surfaces should be 1-1/2" square. You can make these side panels from 3/16" plywood. In that case, the inside faces will be 1-5/8" square. The movements of the inside panels depend on the size of the inside faces, so we're going to call this size "W".



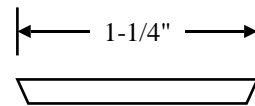
Spacers: from the same wood as the side panels, make six at 3/4" x 1/2".



This size will give a spacer movement of 5/16". If two pieces of your 1/8" plywood is thicker than 5/16", reduce the 1/2" measurement.

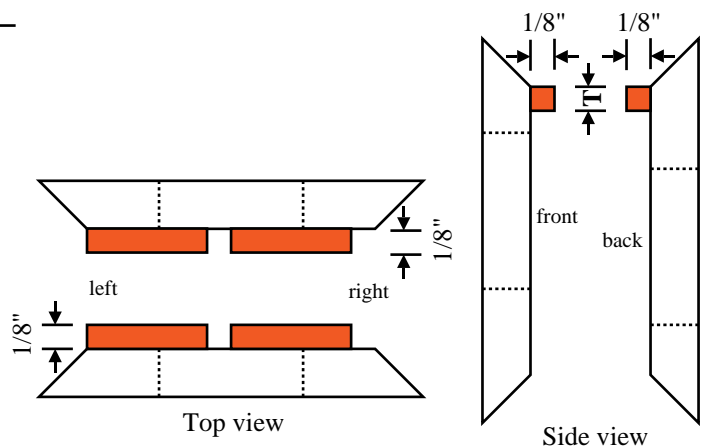
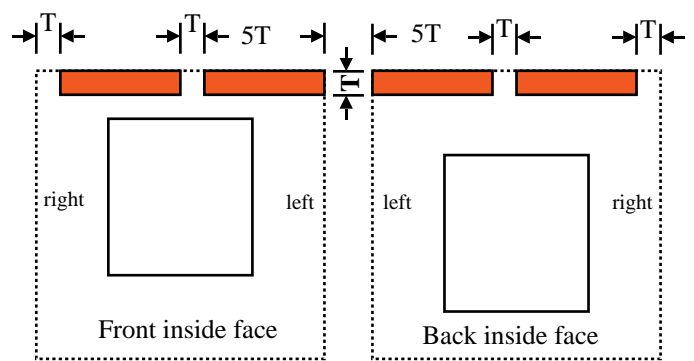
Outer panels:

From 1/8" plywood, make six at 1-1/4" x 1-1/4". Slightly bevel all four edges of each piece. The larger face is the outside face. Note: the 1/8" thickness is not strict-you can make these any thickness you wish, but I think anything more than 1/8" looks a bit cumbersome.



Also cut four pieces at T x 1/8" x 5T.

These are the rails for the front and back panels, which hold the top piece (the lid) in place. The front and back panels are oriented the same way: the grain and the holes are upward. The hole in the front panel is nearer the top; the hole in the back panel is nearer the bottom. Glue the rail pieces onto these two panels as shown:



The Inner Panels

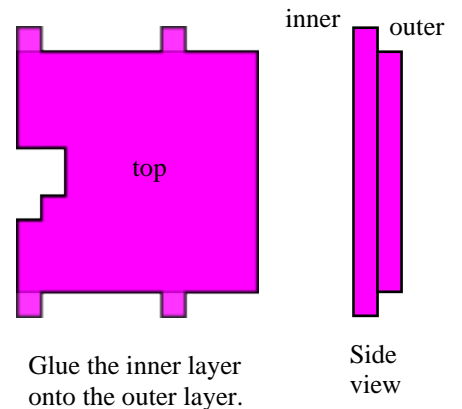
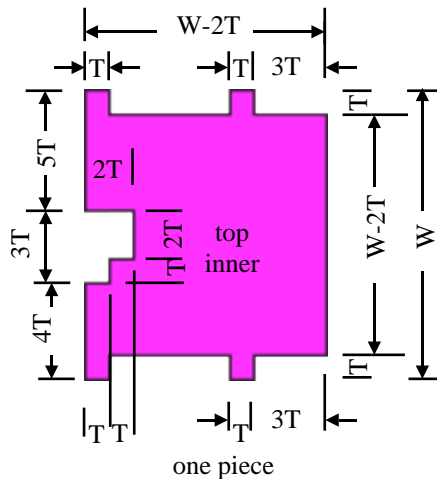
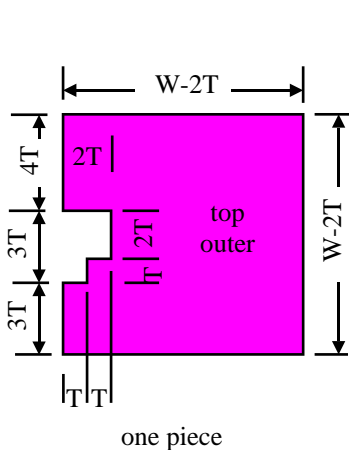
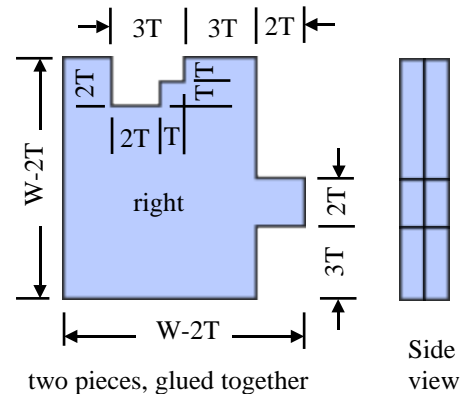
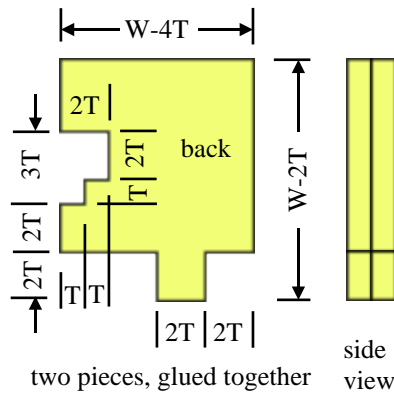
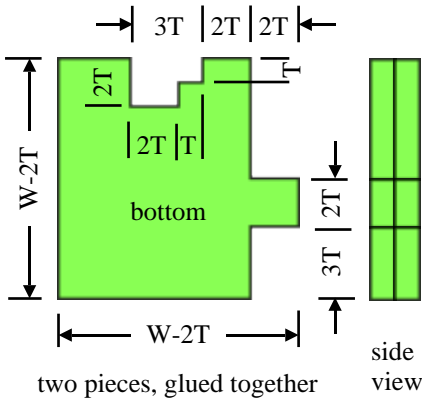
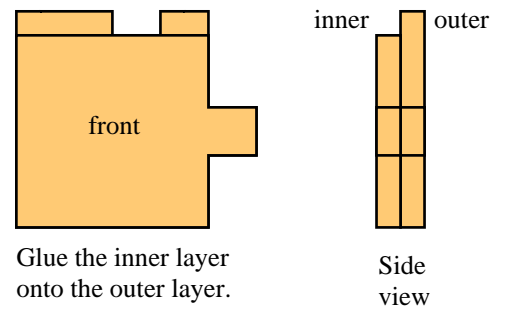
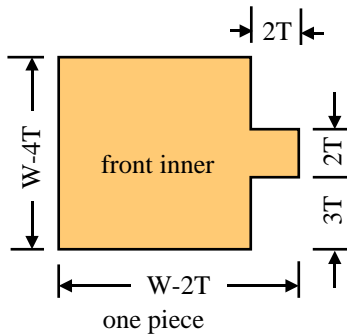
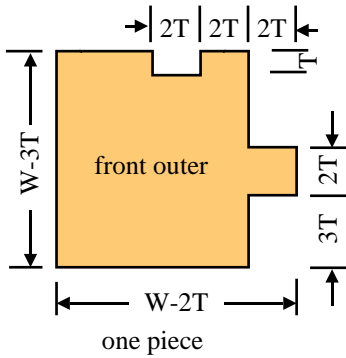
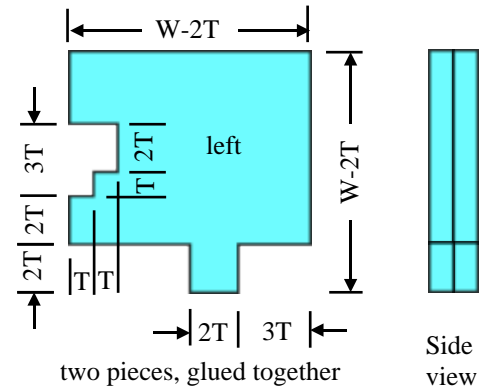
All the inner panels are made up of two layers, both 1/8" thick. We'll refer to this 1/8" as "T". The outer layer is the piece which is glued to the spacer; the inner layer is the piece facing the inside of the box.

These panels must move a distance of two times T.

There is a tongue on each panel which engages two notches on an adjacent panel. The width and length of this tongue should be no more than 2T.

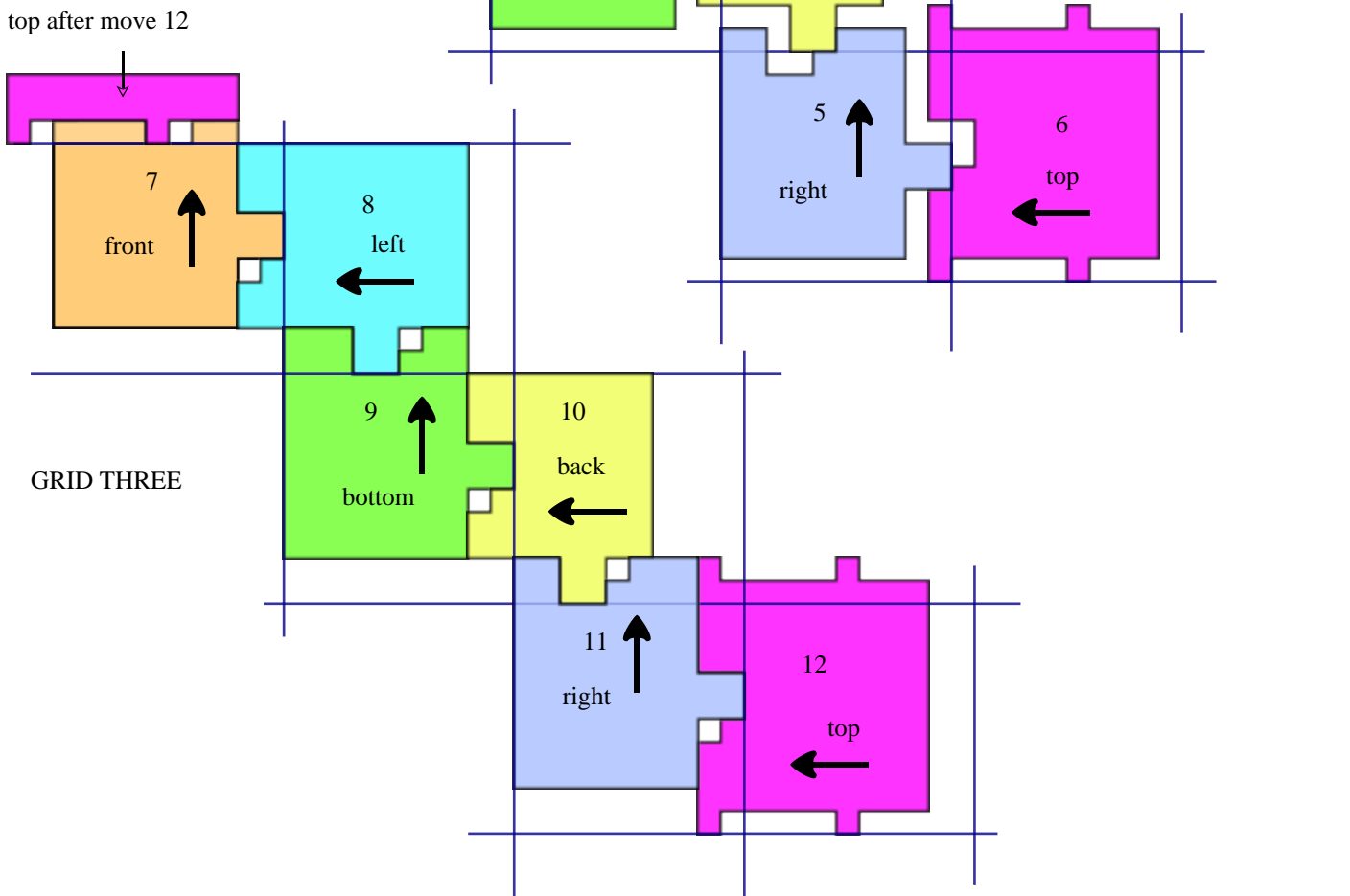
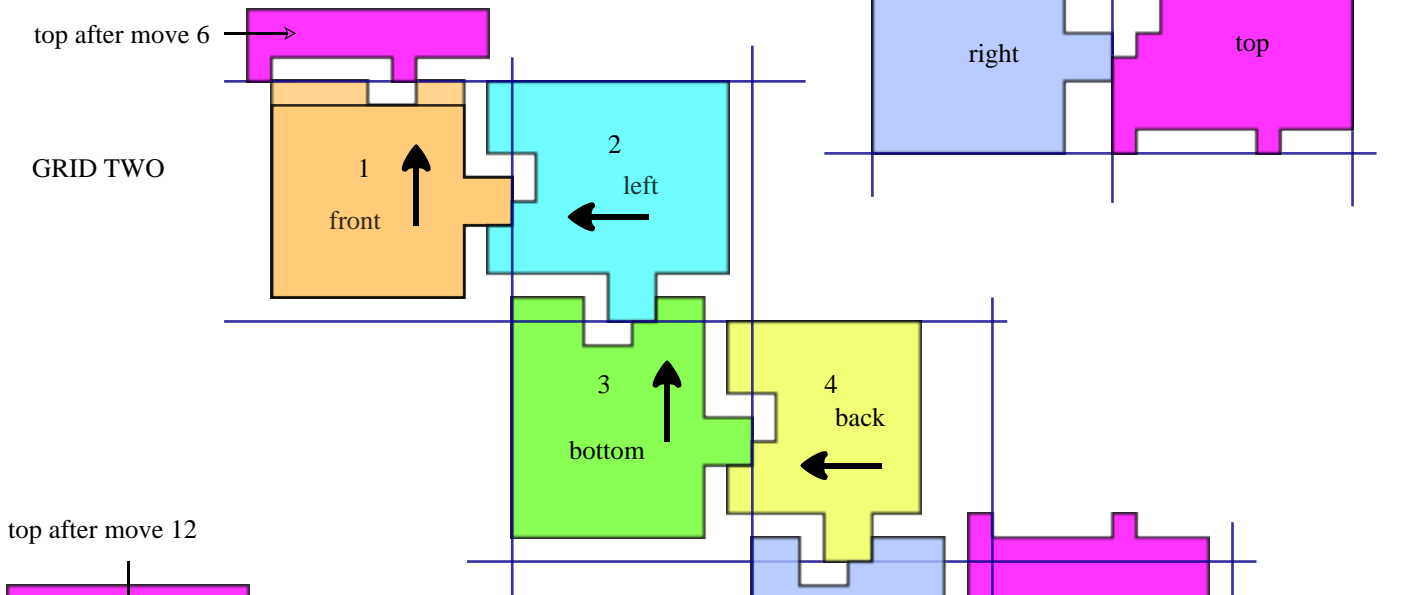
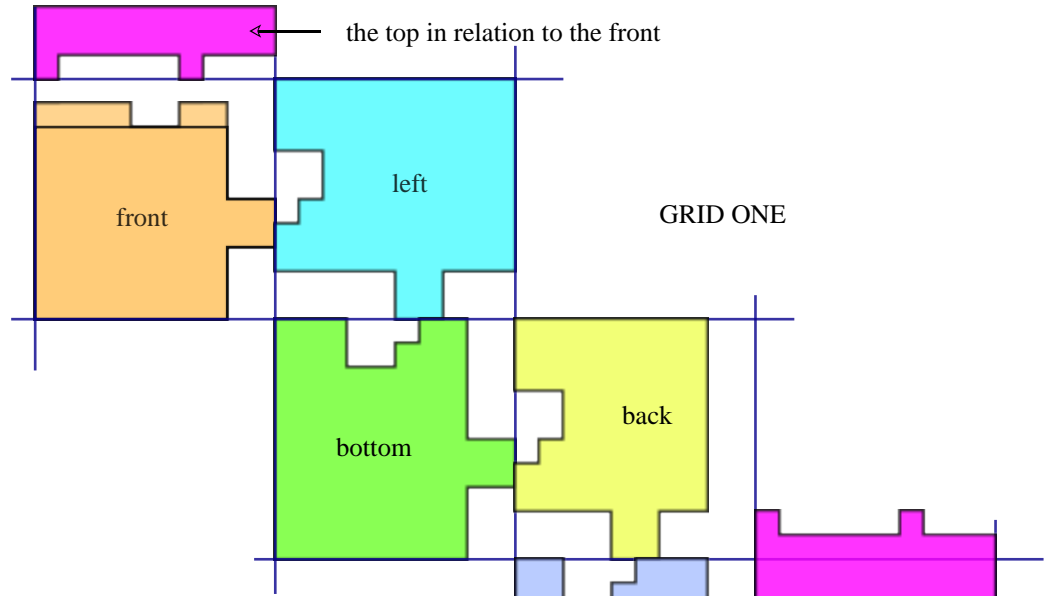
There are two notches on the edges of most of the panels. The outer notch is 3T wide and T deep; the inner notch is 2T wide and T deep. The total depth of both notches is 2T.

The overall size of the inner panels will vary according to the wood thickness, but the important dimensions are shown.. These measurements should ensure that the panels will fit into the box, and move the right distance.



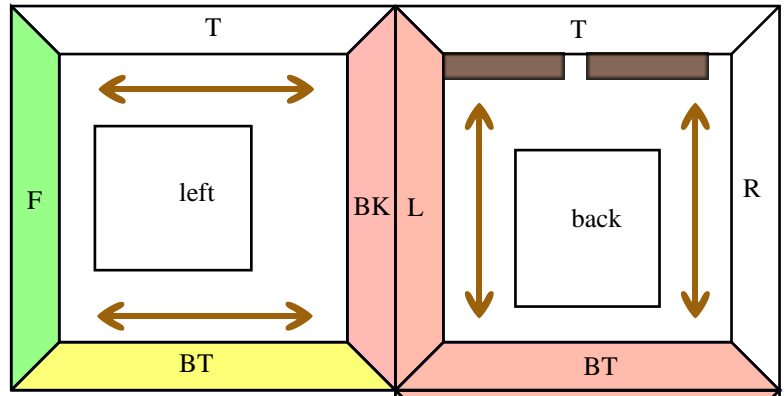
Page 3

Check that the panels will work, by laying them out in a grid, as shown on the right.
Move the pieces by number, in the arrow directions, from 1 to 6. The panels should look like the second grid.
Move them again, from 7 to 12, and the panels should look the same as the third grid.
At this point, the top should lift off.

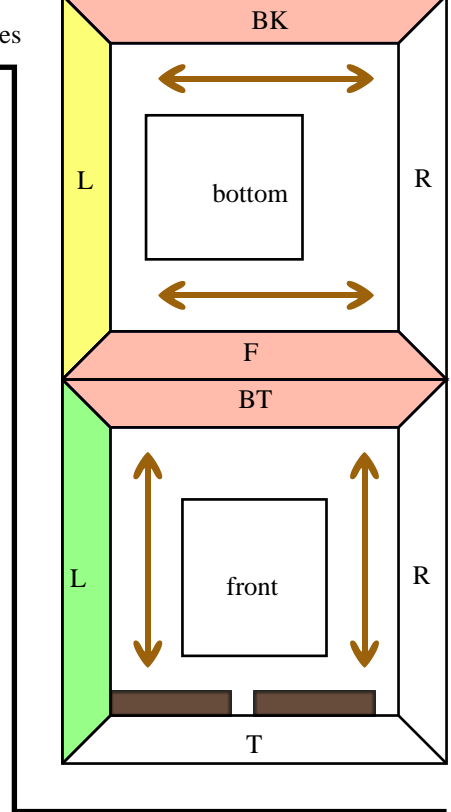


Page 4 Assembling the cube.

Lay the back, front, and two other panels down on their larger faces, as shown here: The two extra panels will be the left and bottom panels. Note the position of the holes in each panel. The brown arrows indicate the direction of the grain on the larger (outer) faces. Glue these four panels together at the beveled edges .



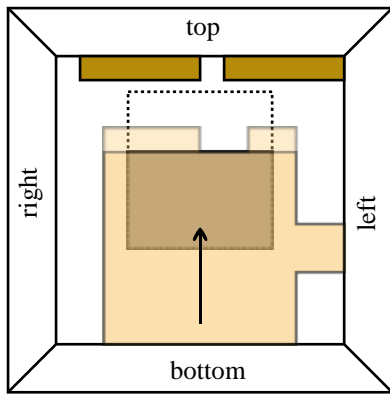
These are all inner faces



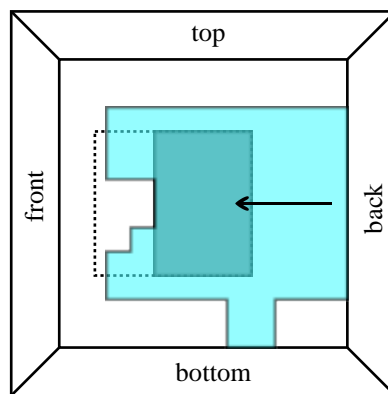
Glue the inside panels in place:

These views are the inside views of each face. The dotted outlines are the holes in the side panels, the darker grey areas are the spacer positions. The coloured areas are the actual inside panels. The arrows show the direction the inside panel will move. Position a spacer inside the hole, and glue the inside panel to the spacer. Take an outer panel, position it in the middle of the side panel so the bevels are facing inward, and glue to the other face of the spacer. When the inside panels are in these positions, the box will be locked.

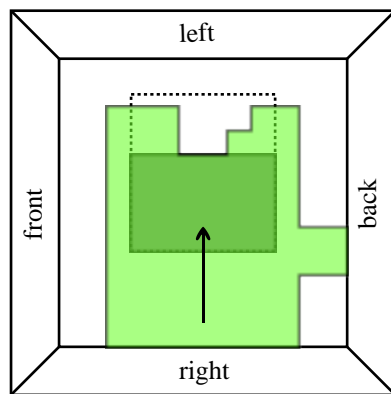
Gluing positions:



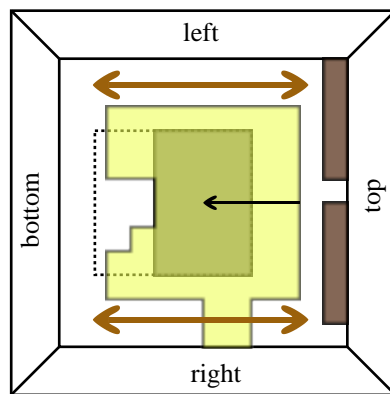
front inside view



left inside view

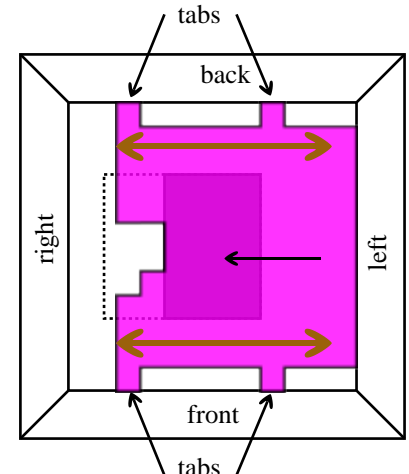


bottom inside view

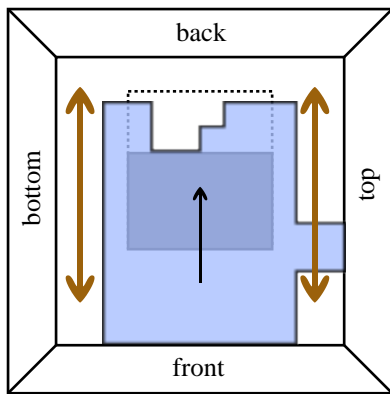


back inside view

Before gluing the top panel together, check that the tabs on the top inside panel will clear the gaps on the back and front rails. As the right panel is not yet in place, you can see inside the box to check. If this is alright, assemble the right panel, and glue to the front, bottom and back panels, **DO NOT GLUE THE TOP PANEL ON!**

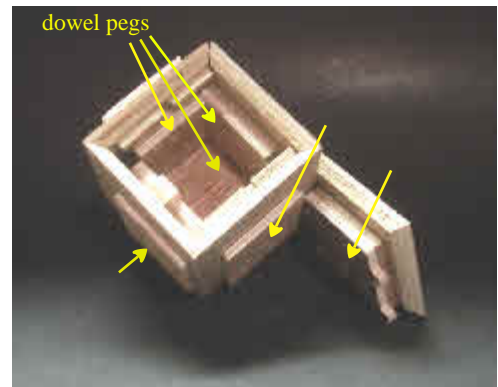


top inside view



right inside view

Cubey 2 is now finished, except for decoration. I stained and varnished the wood, and printed some Celtic patterns. After a dose of Artist's Fixative, these were glued onto the outer (sliding) panels. Some suggested patterns are below.



A tip: because there is such little area on the spacers, I strengthened these by blocking up the inside of the box with off-cuts, then drilling a 1/8" diameter hole right through the middle of the outer panel, spacer and inside panel. I cut a piece of 1/8" dowel rod, and glued it into this hole. This was done on all six panels. The outside was trimmed before applying the patterns. The inside of the dowel pegs are shown in the photo above.



JUST A MINUTE! THE BOX IS LOCKED, BUT THE TOP PANEL IS OFF! HOW DO I GET IT BACK ON?

See Page 3. The moves made to check the panels work, is also the solution to opening the box! You can open the box without the top panel being there, then put it on, and close the box up again. Or download the Solution...

What is a T-Plan?

A T-Plan is a way of showing the dimensions of the parts, which uses the thickness of the wood you are using, rather than an absolute measurement. For instance, you're using wood which is supposed to be 1/8" thick, and you have to cut a piece 1-1/2" long, and that length includes the thickness of two pieces of wood, then it would be 1-1/4" plus 1/4". If your wood was exactly 1/8" thick, then that measurement would be correct. But if the wood was slightly thicker, then the 1-1/2" would be too short. If we call the wood thickness "T", then the correct length would be 1-1/4" plus 2 times T (or simply 1-1/4"+2T).

A practical example: This puzzle.

The inside panels must move twice the thickness of your plywood. If this wood was exactly 1/8", that distance would be 1/4". So you cut your panels to allow a 1/4" gap for the next panel to move into. But the wood is a little thicker, and the 1/4" gap is not enough to allow the next panel to fit into. If we size the panel at width minus 2T (W-2T), then the gap will be correct.

Enjoy your puzzle!

While I've taken every care to ensure these plans are correct, if you find something wrong, please let me know so that I can correct them.

Top panel amended pages 2,3, and 4.
August 2011.

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