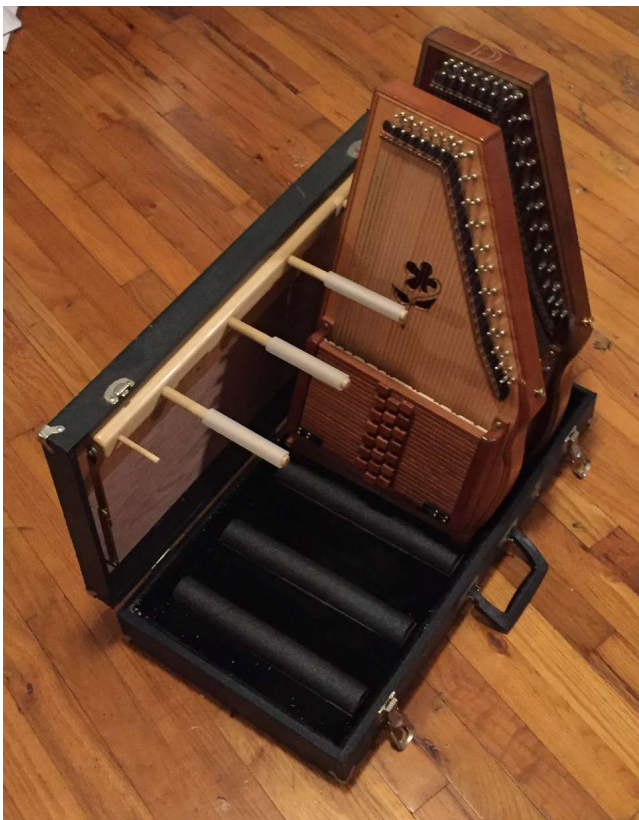


# A Stand for Five Autoharps

by Lindsay Haisley

For years I've been going to gigs and jams and ending up surrounded by a collection of autoharps - leaning against chairs, lying on the floor, some halfway out of their soft-sided cases. At jams, people would step over them muttering polite curses about autoharps and autoharp players. Drunk people would trip over them, necessitating repairs to the autoharps, and occasionally to the drunk people.

So I went shopping for a proper stand to hold my collection of five Orthey and Schreiber autoharps. People at music stores scratched their heads ("you play a WHAT??"). Some were dismissive, a few were kind and mildly helpful. I finally decided that if I wanted such a stand, I had to build it myself. My first quest was for a box or case which was *just* the right size. After a bit of searching, I realized that the exact right size box was ..... wait for it ..... an autoharp case!



*The finished product*

I no longer routinely use hardshell cases for my autoharps and have several of them lying about, so my starting point was obvious. I picked the oldest one I have and removed the pick-holder partition and the fabric inside the top to expose the plywood of the case top.

From here, it was pretty much a case of workshop jazz – make it up as you go along. I have to acknowledge the ample help I got from my sweetie, Cheryl, who is absolutely the Queen of Low Tech! She has many times come up with elegant, simple solutions to our lives' little inconveniences which my science-conditioned brain has overlooked. We came up, together, with many of the details for the end-product before I started making it. I have a small workshop here for small-project woodworking and metalworking. In addition to the usual hand tools such as clamps, hand drill, screwdrivers, rulers, etc., my essential

large power tools consist of an ancient 10" Craftsman table saw (of the "they don't make 'em like this anymore" type) and a relatively modern bench drill press.

Here's the finished stand with only two autoharps on it, showing off the details of the design.

Most, but not all of the materials I used for this project can be bought from your local big-box hardware store – Home Depot or Lowes. Some were ordered from Amazon and a few were bought from specialty online retailers. I'll provide sources for the materials and supplies I used as we go along. Any part for which a source isn't specified is available at almost any hardware store.

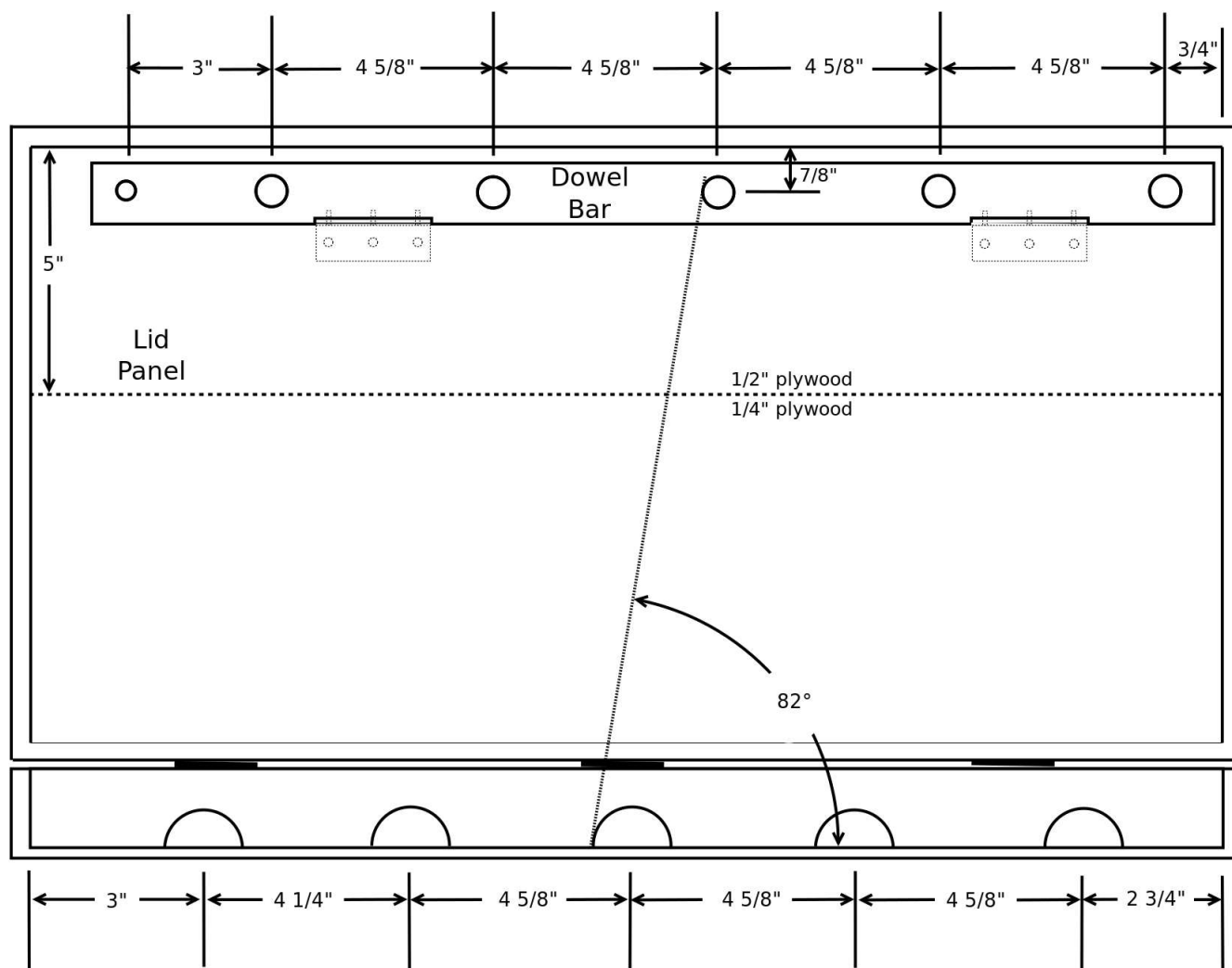
## Thinking and Planning

One of the first requirements for this stand, as it should be for any instrument stand, is that it be as light weight as possible, so as many parts as possible are wood instead of metal. If you already carry five autoharps around, weight matters! Once the stand is holding harps it will be plenty heavy enough to withstand a bit of wind or casual contact on stage. The autoharps will rest against padded dowels glued in a hinged wood bar (herein called the “dowel bar”) which folds down into the case for carrying. The plywood of the case lid, as on many instrument cases, is too thin to bear much weight or stress, so we'll add a thicker plywood panel (herein called the “lid panel”) to part of the lid to which this bar will be attached. This lid panel will be glued into the top of the case.

The dowel bar is attached to the lid panel with a pair of hinges. Six dowels are glued into the dowel bar. Five of them are to support autoharps and the sixth, smaller one, is to keep the left-most autoharp from falling off the stand. The dowel bar and its dowels fold down into the case lid and the case can be closed for carrying. Bracing and latching are added to keep things in place.

Experimenting with harp spacing will determine how autoharps will sit on this stand and how easy it will be to get them on and off. How you come down on this will depend on what kinds of autoharps you have. There are trade-offs, as always. The further apart one places the harps, the more space there is between them and the easier it is to get them on and off the stand. More space may result in a nice stand for only four autoharps, with plenty of room, which may be what you want. Placing the dowel bar with its dowels as high as possible in the lid makes it easy to get the harps on and off the stand, clearing the front of the case bottom without hitting the chord bar assembly against a dowel.

This design (see Figure 1) puts the autoharps at an angle of about 8° back from vertical, which is pretty stable. They won't overbalance forward and will naturally lean back against the dowels.



*Figure 1*

Note that the first and second autoharps (counting from the left) are  $\frac{3}{8}$ " inches closer at the bottom than are the others. This is a compromise. Making all the spacings equal would have put the other autoharps even closer together, and I already ran the risk of banging an autoharp against an adjacent dowel. The large dowels extend  $7\frac{3}{4}$ " out from the lid panel in the case lid, 6" over the bottom of the case, which provides solid support for most harps. They might well be made shorter, which would make it easier to get instruments on and off of the stand, but the dowels should be long enough to reach very close to the center line of gravity of the harps. The design is such that I can, if I wish, cut these dowels shorter at a later date. The small dowel on the left is a  $\frac{1}{4}$ " dowel, extending  $2\frac{1}{2}$ " out from the dowel bar, intended to prevent the left-most harp from falling off of the stand.

# Getting Down and Dirty With Shopcraft

I've broken this article down into several sections, which I'll cover in turn:

- **The case**
- **The dowel bar and dowels**
- **The lid panels**
- **The lid supports**
- **Harp spacers**
- **Finishing touches**

## The Case ...

My old 1970s vintage autoharp case, like many instrument cases, is made of relatively thin plywood. It's better than a cardboard or soft-sided case, but the lid isn't strong enough to support a brace for a load of autoharps. Some reinforcement is necessary. The lid panel which will hold the dowel bar assembly and its hinges is a 5" x 24" piece of ½" lauan plywood. Several pieces of this case are made of lauan, which is inexpensive, strong, attractive – and widely available.

The 2<sup>nd</sup> panel, below the lid panel, is c.a. ¼" thick lauan plywood. It's purpose is to cover the rest of the inside of the lid and provide an attachment base for two commercial lid supports. I tried using fabric and contact cement to cover the lower inside of the lid, but succeeded only in making a huge mess of gluey fabric and sticky fingers. I decided, in the interest of getting the job done, to use thin plywood instead of fabric.

So let's get started. Begin by removing the picks and accessories partition from the case bottom. It's probably stapled in and shouldn't be difficult to remove. Next, strip the fabric from the inside top of the lid, exposing the plywood beneath it.

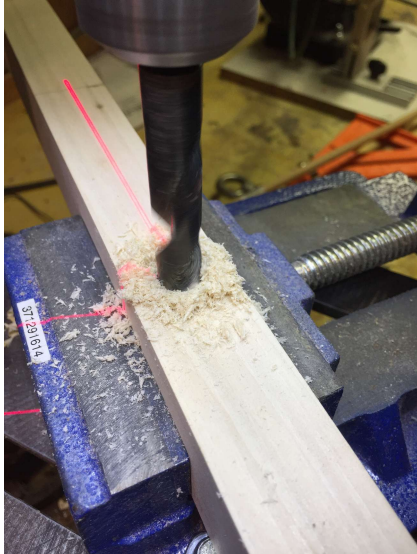
Cut both plywood lid panels to size, trim the ends and upper corners slightly to make sure they fit nicely in the case lid and lie flat, but don't glue these two panels in yet! It is *much* easier to work with the parts of this case *before* they are fastened together, and the panels glued into the case lid.



*Bottom view of the finished dowel bar assembly*

## The dowel bar ...

Our primary moving part in this stand is the fold-down dowel bar assembly which will support the autoharps. It's pictured here (upside down), fully assembled. The bar holding the dowels is cut from a  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " x 24" piece of lauan (Lowe's), cut down to  $1\frac{1}{2}$ " x  $1\frac{1}{8}$ " x 23". The dowels will be inserted into the  $1\frac{1}{8}$ " side. The five large dowels are  $\frac{1}{2}$ " poplar dowels. The small dowel is  $\frac{1}{4}$ " poplar.



*Use a drill press to make your dowel holes*

The dowel bar assembly is hinged and attached to the  $\frac{1}{2}$ " plywood lid panel with 2" brass hinges. Since the back and bottom faces of the dowel bar must sit flat against the lid panel, the hinges need to be recessed into the bar, just as door hinges are recessed into doors. I used a dado blade kit to cut the hinge recesses, shown in the photo above,  $\frac{3}{16}$ " deep - exactly the thickness of a folded hinge.

On a table saw, cut the dowel bar to size and, with a dado kit, cut the recesses for the hinges. Cut the  $\frac{1}{2}$ " dowels so they'll go about 1" into the dowel bar and extend  $6\frac{1}{4}$ " beyond it. Cut the  $\frac{1}{4}$ " dowel so that it will extend  $2\frac{1}{2}$ " or 3" beyond the dowel bar. Mark the dowel bar where the dowels will go and drill the holes to a uniform depth with your drill press, but *don't glue the dowels into the dowel bar*

yet. Round off and sand corners and edges to taste to give your finished stand a professional, polished look and feel. Round off the outer ends of the dowels with sandpaper as well, and sand all wood surfaces smooth. Lauan is a hardwood and will take a nice finish.

Now we come to the high-tech part of the project! We need some way to hold up the dowel bar assembly so that it will do what it's intended to do - hold up autoharps. We'll also need some way to latch the dowel bar into the case lid when it's folded down so that the case can be easily closed. I played around with a few ideas for toggles and latches of various sorts, and when I set the issue aside for a bit the answer came while I was thinking about something else. Isn't this always the way it goes? I just happen to have a number of



*Magnets will meet and hold when the dowel bar is lifted*



small neodymium “rare earth” magnets left over from a previous project. These are small, astonishingly strong cylindrical magnets,  $\frac{1}{4}$ ” long and  $\frac{1}{4}$ ” in diameter, which I’d ordered some time ago from totalElement (<https://totalelement.com>). I decided to use 7 pairs of these magnets, which I already had on hand, to hold the dowel bar in the open position, and 2 pairs to hold it flat against the lid when folded down.

Mounting these magnets in the right places isn’t hard, but requires a bit of shop magic. A  $\frac{1}{4}$ ” Forstner bit will be your friend here, but isn’t essential. If you’ve never encountered one, a Forstner bit is special bit used for drilling flat-bottom holes and it’s the best tool to make clean holes of uniform depth for your magnets. Mark positions for your magnet holes, evenly spaced and as close as practical to the edge of the dowel bar away from the hinges. Drill the holes for your magnets *very carefully* on your drill press, stopping to check depth frequently. One set of holes will be on the side of the dowel bar which will rest against the lid panel when it’s raised for holding harps. Two more will be on the side which contacts the lid panel when the dowel bar is lowered to close the case. Your holes should be just deep enough that a magnet will fit into it with the outside surface of the magnet about  $\frac{1}{64}$ ” below the surface of the wood, to allow space for glue. Put a magnet in a hole, check the depth, and use a string of magnets to pull it back out. When your holes are the right depth, glue the magnets in place, minding their polarity (see below). After some experimentation, I found that Loctite Heavy Duty 5 min. epoxy (available from Amazon) is an excellent glue for this job. Mix up a few drops of this, put a small amount around the rim of each hole, insert a magnet and press *hard* on the magnet until its just level with the surface of the wood. Don’t tap the magnets with a hammer! They’re quite brittle and are easily damaged. If you need to tap them into place, put a piece of wood over them to protect them. *Quickly* wipe away any excess glue. This stuff sets up really fast! Don’t try to glue more than two magnets with one



*Dowel bar assembly with lid support attached*

glue mix or it will set up while you’re working and you’ll be a rather unhappy camper. There may be a bubble beneath a magnet which will try to push it back out, so repeatedly push it and hold it in place until the glue sets. You won’t have long to wait.

Although our little magnets are pretty strong, there can a fair amount of force pulling the dowel bar down as harps are placed on and removed from the stand.

The last thing you need is for the stand to collapse on stage, or in a jam with lots of folks moving about. So we'll add a left hand lid support (Home Depot), to the left end of the dowel bar to latch it into the "up" position. Attachment of this lid support to the end of the dowel bar is a bit tricky. When the bar is folded down and the case closed, the hinged lid support will fold and extend beyond the lid into the case bottom (see the photo above). If the travel of the attachment point is too great, the folded lid support won't fit into the case bottom and the case won't close.

Without resorting to sorcery or advanced trigonometry, a little trial and error shows that the attachment point on the dowel bar must move no more than about 1" between raising and lowering. This doesn't let us get the most out of the lid support, but it's still an improvement over the magnets alone. Figures 2 and 3 show the position of the mounting hole on the end of the dowel bar which worked for me. Mark the hole position and drill a hole here which will hold a short pan-head wood screw snugly.

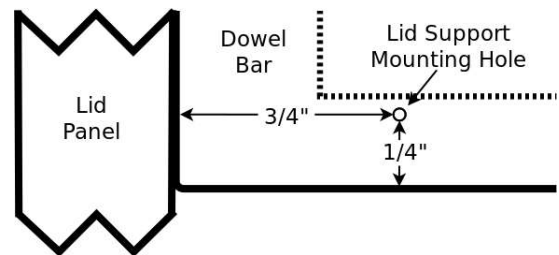


Figure 2 - Left end view

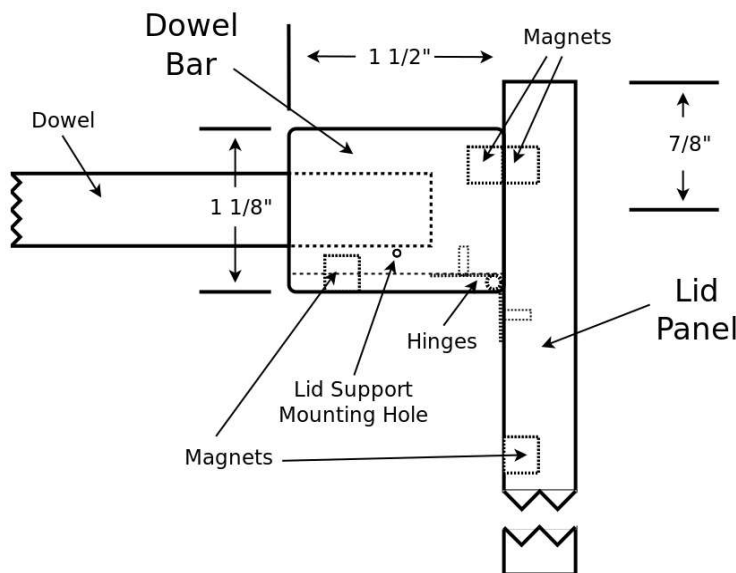


Figure 3 - Right end view

Now *temporarily* mount the dowel bar on the 1/2" lid plate. Mount the hinges on the dowel bar in their recesses, lay the support assembly on the back plate with the hinges exposed and carefully mark the positions of the hinge mounting holes on the lid panel. Use a hand drill or drill press to drill holes for all screws and assemble the lid panel, hinges and dowel bar. At this point, use only 4 screws per hinge rather than the supplied 6 since we'll be taking the dowel bar assembly off and on again before the job is

done. If you've done everything carefully, the dowel bar will lie flat against the lid panel in both open and closed positions.

Now let's position the magnets in the lid panel. To match them up perfectly with magnets in the dowel bar, you'll need a bit of colored fingernail polish or acrylic paint of the sort used for making letters on T-shirts. Put a small dot of paint on

each of the magnets in the dowel bar and while it's still wet, press the bar against the lid panel in both the folded and unfolded positions. You should end up with paint dots on the lid panel marking the locations of the matching magnets in the dowel bar in both opened and folded down positions.

Disassemble the whole she-bang, removing the hinges. Use your Forstner bit and drill press to drill holes for magnets in the lid panel and mount the magnets into it. ***It is very important that the polarity of all your magnets is correct when you glue them in place.*** North poles in the dowel bar must meet south poles in the lid panel, and vice versa. It's a good idea to align the polarity the same way for all the magnets in one piece, and the opposite way for the other. While not essential, it's just good housekeeping. What *is* essential is that each pair of magnets meet with poles of opposite polarity touching. The magnets aren't marked with their polarities. You'll need to use other magnets to determine this. Remember, unlike poles attract, like poles repel.



*Use fabric paint to mark magnet positions*



*Glue the dowels into the dowel bar*

**A note of caution here.** Neodymium magnets are *very strong*! Keep them away from small children. Were a child to swallow two or more of them, they could lock together in the child's tummy and GI tract, pinching sensitive flesh and causing potentially fatal damage. This goes for you, too! *Don't* swallow these little magnets, even if they look cute and tasty!

Once you have your dowel bar disassembled and your magnets mounted, you can glue the dowels into place. Lay the dowel bar on its back – dowel holes facing up – and put a drop of wood glue around the lip of each hole in turn, and a drop on each dowel. Push each dowel into its hole and drive it home with a mallet or hammer, holding a block of wood on top of the dowel to protect it. I prefer Titebond III Ultimate Wood Glue (Lowes) for such tasks. Quickly clean up the excess glue with a damp cloth, let the glue dry 5 minutes and sand the entire assembly again to remove any dirt or excess glue.



Now is the time to apply finish to the parts you've built. Apply several coats of clear finish to each panel, and to the dowel bar assembly. I like Deft semi-gloss clear wood finish (Home Depot) which is attractive, dries to the touch within a minute and can be sanded or re-coated within five.

## The Lid Panels ...

We're now ready to start putting it all together.

Glue the two plywood panels into the case lid. The  $\frac{1}{2}$ " panel which will hold the dowel bar assembly will take the most stress, so it should be glued firmly. I used Loctite Power Grab Express all purpose interior construction adhesive (Lowes), although any construction adhesive such as Loctite PL-400 deck adhesive would work as well. Apply glue to both the lid and the panel and clamp them together, using cloth to protect your newly-applied finish. The lower lid panel, of  $\frac{1}{4}$ " plywood, is *mostly* cosmetic and can be simply held in place until the glue sets up. Aside from looking good, its only purpose is to anchor the two lid supports.

## The Lid Supports ...

You'll need a *right hand* lid support to keep your case stand open when it's in use. I used a simple "Gatehouse" brass lid support from Lowes. As with the lid support for the dowel bar, it's important to get the anchor point in the right place so that the case will close properly with the lid support folded inside it.

For the bottom arm of this lid support, from the inside of the case, drill a pilot hole, nearly but not completely through the case side,  $5\frac{1}{2}$ " from the back *outside* of the case and  $1\frac{1}{2}$ " down from the top of the side (see illustration). Make this pilot hole small enough so that a short pan-head wood screw will go snugly into the wood and won't easily work loose. Use washers on either side of this lid



*Clamp and glue the lid panel firmly into the case lid*



*Use a right-hand lid support to hold the lid open at a 90° angle*

support and tighten the screw so the lid support arm is as close to the case side as possible but will still pivot freely on the screw.

Use a square to set the case lid at exactly a 90° angle to the case bottom. Mark the positions of mounting holes for the upper arm of the lid support on the ¼" plywood in the lid, drill pilot holes, and screw this part firmly to the plywood.

The left hand lid support helps hold up the dowel bar. Screw the left hand lid support onto the end of the dowel bar using the hole previously drilled in it. Use washers on both sides of the lid support so the lid support can pivot freely.



Lay the dowel bar assembly into the lid. It should click nicely into place against the magnets, with the hinges properly aligned. Screw down the hinges using all 12 screws.

With the case open and the dowel bar assembly in it's "up" position, extend and lock the left side lid support, mark and drill pilot holes in the ¼" panel and fasten the small metal plate on the lower lid support arm to the panel with two *short* wood screws. ½" screws and washers should do the job. The idea is to use screws stout enough to not work loose and short enough to avoid going through to the outside of the case.

## Harp Spacers ...

When you set an autoharp in this case/stand, you'll want the bottom of the harp to come down properly so that it sits comfortably and neither hits the adjacent harp nor overbalances and falls forward. To this end, you'll need to put some spacers along the bottom of the case.



A good material for this is foam pipe insulation, available at hardware and building supply stores. The

foam I used, which is pretty much the right size, is 1 ⅝" outside diameter. The inside diameter is a no-nevermind. You'll need to slice your foam tubing lengthwise, and a table saw, used with care, is exactly the right tool for this job. Note that this foam comes with a split along one side so that it can easily be opened to slip over a pipe. Make sure, when you cut your foam tube, that you cut along this split, or put it in the half that you'll discard. You'll want a *full half* of this tube for your spacers, so set your saw fence so that the cut is off-center and the blade kerf falls on the side you don't want.





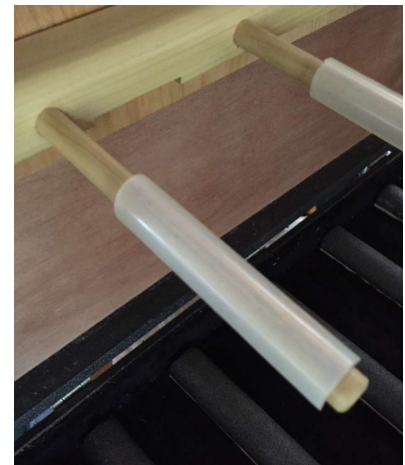
You'll be fastening these foam spacers into the bottom of your case stand. Since you've left the original fuzzy fabric in the bottom of the case, you'll need to mount your foam spacer pieces onto short lengths of wood which can be attached with screws through the bottom of the case. This is better than

gluing the foam directly to the case fabric a couple of reasons. First, it's more secure, since we're not depending on the fabric to hold the spacers in place. Second, should you decide to move the spacers, they can easily be unscrewed and removed.



Cut five wood bases for your spacers from lauan or clear pine,  $\frac{1}{4}$ " thick,  $1\frac{5}{8}$ " wide and about 11" long. Cut pieces of your sliced foam to the same length and glue them onto these wood strips with construction adhesive. Mark the positions for the spacers inside the case and drill shank holes in the case (from the bottom) and smaller matching thread pilot holes in the spacers. Screw the spacers in place from the bottom of the case using countersunk finish washers on the case bottom.

For a truly professional touch, you could paint the exposed edges of the wood spacer bases to match the foam, or the fabric in the case. I didn't go this far. If it works, I'm not inclined to fix it.



## Finishing Touches ...

You can use your stand as it is, but I added one additional feature. I noticed that when I set an autoharp on the stand and leaned it back against a dowel there was a noticeable "click" of wood on wood, amplified by the resonant body of the harp. Since the difference between "good enough" and "excellent" is often in the little details, I decided to deal with this issue by putting sleeves over the dowels where they contact harp bodies. My first attempt used widely available vinyl tubing. This was *kind of* OK, but the vinyl surface was nearly as hard as bare wood, and there was still an audible "tick", albeit not quite as loud, on contact with a harp. Casting around for alternatives, Cheryl found a source on Amazon for silicone tubing,  $\frac{1}{2}$ "

inside diameter, and this turned out to be exactly right. It's soft, pliable, fits easily over the dowels, and it nicely cushions the harps when they're set into the stand.

### .... afterthoughts ...

This case was built in an attempt to solve a problem. It's not ideal but it does its job in situations where I need to have several harps available quickly without having them sprawled out all over the place. Were I to build this again, or make one for someone else, there are a few improvements I might make.

- The small ¼" magnets I used are a potential weakness, which is why I added a left hand lid support to the design. Without this lid support, the dowel bar can fold down unexpectedly, throwing all the harps into a heap. These magnets were what I had on hand, but larger magnets are inexpensive, available from totalElement and might be strong enough to eliminate the need for the left hand lid support. It's also possible to get by without the magnets at all, using just the left hand lid support to hold up the dowel bar assembly. Using both gave the case a much more solid feel than using either one alone.
- Autoharp technician Bob Lewis pointed out to me that *some* autoharps, notably Oscar Schmidt "B" model harps, and probably some luthier made harps, won't sit squarely on their angled nether ends, but would tend to lean out from this stand and not be well supported by the dowel bar assembly. The addition of appropriate padded shims to the case bottom, positioned so as to make these autoharps sit upright, would most likely solve this problem. These shims could, like the spacers, be made of foam glued to wood.
- Making this stand hold 5 autoharps is pushing it! Spacing of dowels and bottom spacers to hold 4 harps would make it easier to use safely. I occasionally use five autoharps in the course of a gig or a jam, but if you only anticipate using 3 or 4 harps, increase the spacing between them.
- Overall, the only thing unique about this stand design is the use of an autoharp case and a folding dowel bar. Everything else is negotiable. There are dozens of variations on the details which are every bit as workable as mine, perhaps much more so. If you're clever in a woodshop I'm sure you can come up with variations and improvements on this design.