

17/16 Hammered Dulcimer Finished



MUSICMAKERS

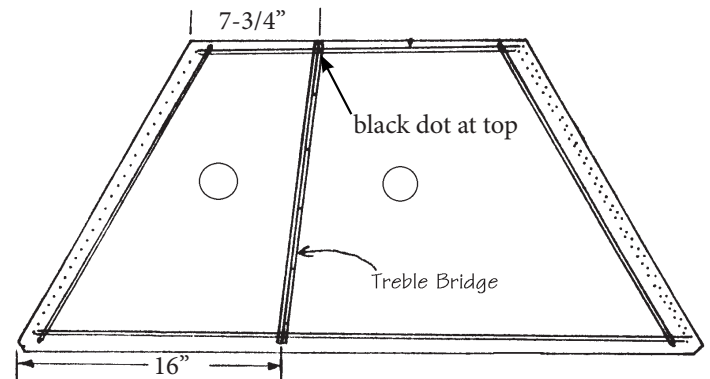
651-439-9120

www.harpkit.com

Below is the detailed stringing directions from our kit instructions. If you are restringing this entire instrument from scratch, having the entire process laid out can be helpful. If you are only replacing individual strings, please skip to step 3a.

1. Stand the TREBLE BRIDGE (the longer one) on the instrument so that the upper end is about 7-3/4" from the rear left corner of the box, and the lower end is about 16" from the front left corner, as shown. Hold it in place temporarily with a little masking tape.

NOTE: The black dots are important playing aids. The TREBLE BRIDGE should be oriented so the end with the black dots are at the top (rear rail).

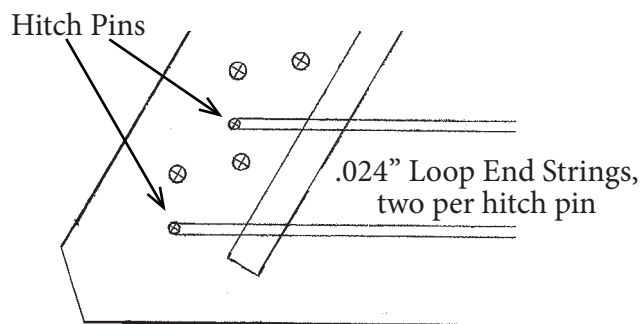


Now you are ready for stringing! You may want to ask a friend to help you with this part of the project, as it goes easier with more than two hands. You also will need the tuning wrench some masking tape, and a wire cutter for these next few steps.

Please note that you have a few wound strings for the lowest notes that are pre-made with a loop at one end. The loop is not big enough to pass over the top of the screws, so you need to remove a few screws and put them through the loops and then back into the wood. We apologize for this inconvenience for the bottom few strings, but we think you will appreciate the ease of installing the rest of the bulk wire using these pan-head screws that trap the wire under the head instead of using straight hitch pins with no head.

Anyway, you will begin by installing all the strings that cross the Treble Bridge first. Forget about the Bass Bridge for now -- we don't want to get you confused.

2. So find 4 of the Loop-End wound strings (size .024"). These will form the first two "courses" (pairs) of strings near the bottom (wide) front rail of the dulcimer. Insert a screw through two of those string loops and use the Square Drive Bit provided to install the screw into the wood, leaving a little space under the head of the screw so the wires can be pulled into alignment.



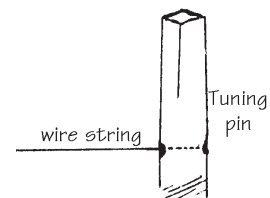
Left Side - Treble Bridge



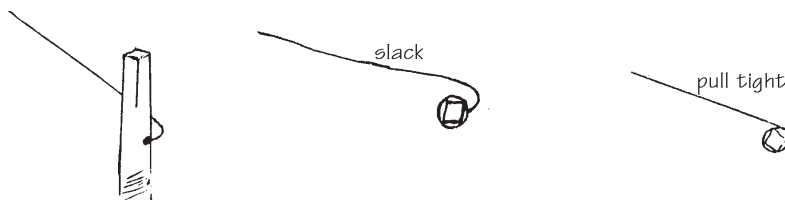
3. Trim one of the bottom loop-end strings about 2-3 inches longer than necessary to reach the first tuning pin on the right side of the instrument.

a) Poke the end of the wire into, but not all the way through, the small hole in the first tuning pin at the lower right corner of the dulcimer (on the inside row).

b) Use the tuning wrench to turn the pin **CLOCKWISE** about one-half turn before putting tension on the wire.



c) Pull on the wire to "set" it in the pin. This puts a kink in the wire at the point where it enters the tiny hole in the tuning pin. If the wire pulls out of the pin when you pull on it, cut off the kinked end and try again.



NOTE: This may seem like a silly exercise, especially if the wire keeps coming out of its place when you pull. We install strings this way because the sharp ends are left hidden in the tuning pins where they can't poke fingers or catch on clothing. It really does work, and it is worth learning the technique.

d) Keeping tension on the wire at all times, turn the pin about two complete revolutions with the tuning wrench, guiding the wire **DOWNWARD** as it winds around the pin, just enough to take up the slack and pull the wire slightly taut -- **BE CAREFUL** -- if you tighten too much the wire will break! Consult photos at right to check your work.



Install the second string of that pair to the next tuning pin, to the right of the first tuning pin. Then go to the next pair and install them in the same way. Then you will switch to plain music wire.

4. To hold the upper end of the treble bridge firmly in place, we recommend attaching the highest course (pair) of strings at the rear of the instrument. **FIND THE COIL OF WIRE MARKED .016" FOR THIS COURSE.**



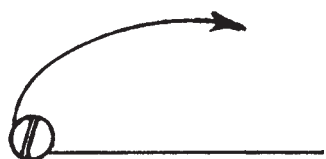
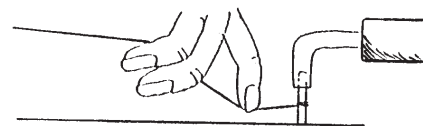
Installing the bulk wire is more complicated because you don't have a loop at the end. The first four steps are the same as what you just did:

a) Poke the end of the wire into, but not all the way through, the small hole in the **SECOND** tuning pin at the top right corner of the dulcimer (on the inside row).

b) Use the tuning wrench to turn the pin **CLOCKWISE** about one-half turn before putting tension on the wire.

c) Pull on the wire to "set" it in the pin. This puts a kink in the wire at the point where it enters the tiny hole in the tuning pin. If the wire pulls out of the pin when you pull on it, cut off the kinked end and try again.

d) Keeping tension on the wire at all times, turn the pin about two complete revolutions with the tuning wrench, guiding the wire **DOWNWARD** as it winds around the pin.

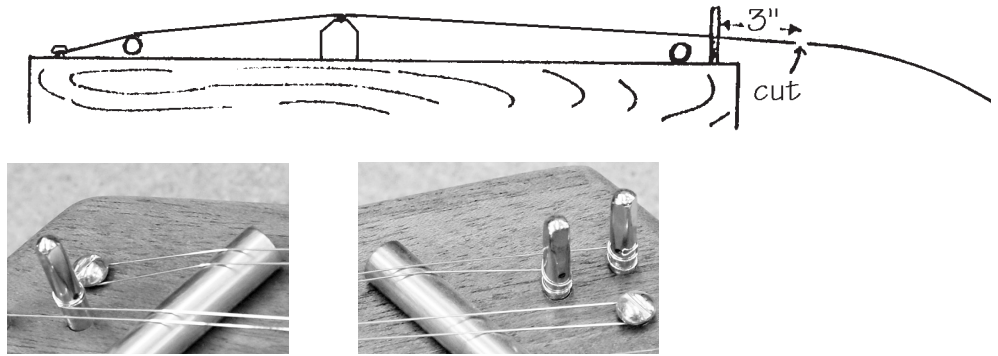


e) Maintain tension on the wire as you stretch it across the dulcimer (over the treble bridge) to the upper left corner and wind it clockwise around the top wood screw (hitch pin). Just a single pass around the screw is fine, although it won't hurt anything if you want to wind a complete 360 degree circle around the pin. The final tension will be equal on each pair of strings, so you don't need to worry about slippage.

IT IS IMPORTANT TO HAVE THESE STRINGS MAKE FIRM CONTACT WITH THE BRASS TUBES ON BOTH SIDES OF THE BOX, so that is why the windings must go down toward the surface of the instrument.

f) Pull the wire back across (over the treble bridge) to the right corner again and cut it off from the coil so that you have about 2 or 3 inches excess wire to wind onto the first tuning pin at the top (in the outer row).

Double-check your work against the photos at right for the top treble pair of strings.



IMPORTANT NOTE: The rest of the strings that cross the treble bridge will be attached to THE TUNING PINS on the right and THE HITCH PINS on the left. The pins on the opposite sides will be used for the strings that cross the bass bridge. We will get to those later.

5. Continue stringing the wires across the TREBLE BRIDGE, bringing them up to a reasonable tension, but not trying to actually tune them yet. Be sure to change sizes of wire according to the chart at right.

STRING SIZE CHART TREBLE BRIDGE

.024" loop-end - FRONT 2 COURSES (longest)
 .022" wire -- NEXT 5 COURSES
 .020" wire -- MIDDLE 4 COURSES
 .018" wire -- NEXT 4 COURSES
 .016" wire -- REAR 2 COURSES (shortest)

THIS MAKES A TOTAL OF 17 PAIRS OF STRINGS ON THE TREBLE BRIDGE, ONE OVER EACH "FOOT".

BASS BRIDGE

6. When all the wires are installed over the TREBLE BRIDGE, turn the instrument around so the rear rail faces you. This makes it easier to string the BASS BRIDGE in the same right-handed fashion.

Slide the BASS BRIDGE under the treble strings by tipping it on its side and then standing it up so the "feet" stick up between the treble strings, as shown.

HINT: You'll want the black dots to face inward on the instrument -- they will be easier to see as you play.

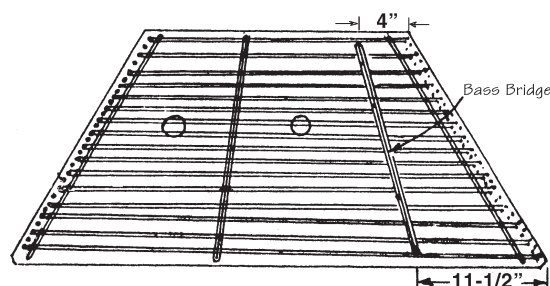
Place the BASS BRIDGE about 4" from the right corner of the box at the rear, and 11-1/2" from the right corner at the front.

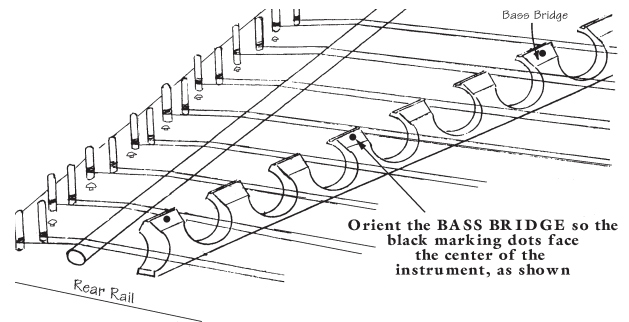
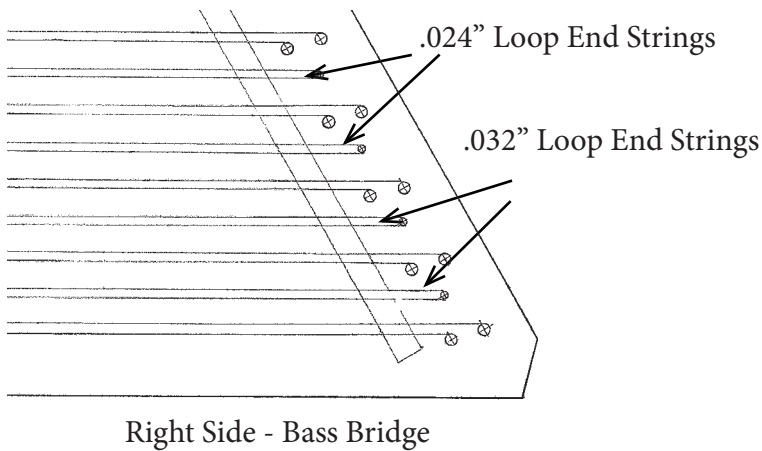
The BASS BRIDGE can be shifted around somewhat to fit the spacing of the treble strings. Unlike the TREBLE BRIDGE, it doesn't matter if you angle it a little differently than shown, because you will only play the strings on one side of this bridge.

7. Install the bass string wires in virtually the same manner as you did the treble strings, WITH ONE IMPORTANT EXCEPTION: the bass strings must go OVER THE BASS BRIDGE, and UNDER THE TREBLE BRIDGE! Just an interesting twist to complicate matters a little for you...

Begin stringing with the loop-end wound strings at the bass end, placing them as shown at left.

After those four pairs are installed, you'll switch to bulk music wire according to the string chart on the next page.



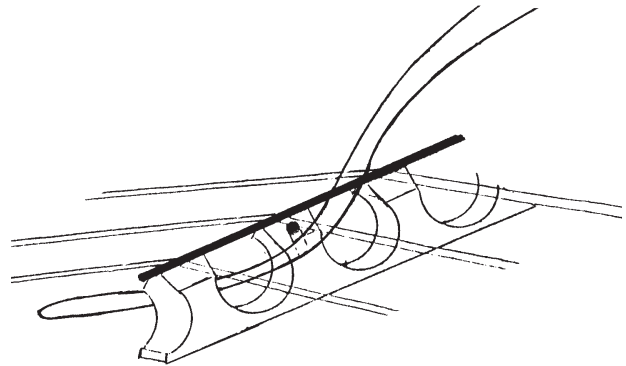


HINT: The loop end strings are fairly straight-forward to install but the bulk wire presents a bit of a challenge. We find the easiest way to put the bulk wire strings under the TREBLE BRIDGE is to put a bend in the wire about 2-3 feet from the end, then push that bend under the treble bridge and hook it around the hitch pin. After that the two ends can be cut to proper length and attached to the tuning pins.

STRING SIZE CHART BASS BRIDGE

.032" loop-end - FRONT 2 COURSES (longest)
 .024" loop-end - NEXT 2 COURSES
 .022" wire -- NEXT 2 COURSES
 .020" wire -- MIDDLE 4 COURSES
 .018" wire -- NEXT 4 COURSES
 .016" wire -- REAR 2 COURSES (shortest)

THIS MAKES A TOTAL OF 16 PAIRS OF WIRE ON THE BASS BRIDGE, ONE OVER EACH "FOOT".



TUNING

ALL PAIRS ARE TO BE TUNED IN UNISON

8. String all 16 bass courses in the same manner you did the treble ones, changing wire sizes according to the chart at left.

9. Before you can successfully tune this instrument, you must make sure the TREBLE BRIDGE is in just the right position. It must divide the vibrating portion of its strings into a perfect ratio of 2:3 in order to play a proper scale, because you will play some notes on the right side and some on the left, and the length of the strings helps determine their pitch.

You can slide the TREBLE BRIDGE sideways one way or the other to achieve this proper placement. You may make careful measurements and calculations to verify its location, or you may verify it "by ear", which is perhaps the better approach, since your ear is what will complain if the thing is out of tune!

Here's how to go about it:

- Pluck the lowest string (at the front of the instrument), on the right side of the TREBLE BRIDGE. If the string is so loose that it just "twangs", then tighten it up until you get a clear sound.
- Pluck THAT SAME STRING on the left side of the bridge to see if that note is a musical fifth interval above the first note. "So, what is a musical fifth interval?", you ask.

The FIFTH INTERVAL is the span between "do" and "sol" on the scale. So if you pluck the string on the right side of the TREBLE BRIDGE and consider that note as "do", then you can sing "do, re, mi, fa, sol" and check to see if the note on the left side of the bridge (same string) matches the note "sol". Or, a quicker way to sing the fifth interval is to hum the song "Twinkle, Twinkle, Little Star". The span between the first "Twinkle" and the second "Twinkle" is a fifth interval. Of course, if you can't sing in tune, then you'll need some help.

The most accurate method of tuning is to use an electronic "tuner" device that listens to the string as you pluck it, tells you what note it hears, and how accurately that note is tuned. Musicmaker's offers such devices in our catalog, and they make tuning any instrument a much more pleasant (and accurate) experience.

Another convenient tuning aid can be found on our web site at www.harpkit.com/freetuner which shows a piano keyboard with the notes and octave numbers clearly identified. You can click on any key to have it play the note for you. If you need a sharp or flat note, it will be on the short black piano key to the right (if sharp) or the left (if flat) of the white key of the same letter name (e.g., F#3 is the black key to the right of F3)

c) Now, if the note on the left of the bridge is HIGHER than it should be (more than a fifth interval above the right side), then you must LENGTHEN the amount of wire on that left side of the bridge to lower the pitch. Do that by sliding the bridge to the right, just a little (you may need to use a scrap wood stick and a hammer to tap against the bottom of the bridge). Then test the interval again.

d) If the note on the left side of the bridge is LOWER than it should be (less than a fifth interval above the right side), then you must SHORTEN the length of wire vibrating on the left side of the bridge to raise the pitch. Do that by sliding the bridge to the left, just a little. Then test the interval again.

e) Once you are satisfied with the interval on the longest string at the front of the dulcimer, test it also on the shortest string toward the rear of the dulcimer. Use the same technique for adjusting until you hear a perfect fifth.

f) Now that the front and rear of the TREBLE BRIDGE are correctly placed, you need only make sure that the rest of the bridge is lined up in a straight line between the ends. That should ensure that all the strings give a fifth interval from the right side to the left.

NOTE: If, after completing this exercise, you happen to find a string that does not sound a fifth interval across the TREBLE BRIDGE, then something else is amiss. Chances are, the string is not making firm contact with the BRASS TUBE along the right-hand side. To correct this problem, you must unwind the string part way and then re-wind it so that the windings go DOWNWARD toward the wood, so the wire makes firm contact with the brass tube. (This is only important for strings that cross the TREBLE BRIDGE. No need to worry about those that cross the BASS BRIDGE.)

10. WHEW! NOW YOU CAN ACTUALLY BEGIN TUNING! Start with just the BASS BRIDGE strings first, beginning at the lowest strings near the front of the dulcimer. You may want to cut out the TUNING CHART provided in the kit and slide it under the strings for ease in determining what note to tune the strings to. These strings will be tuned by turning the pins on the left side of the instrument.

The lowest pair of strings crossing the bass bridge will be tuned to the D below middle C (the middle line on the bass clef). The next pair crossing the bass bridge will be tuned to E below middle C and the next to F# below middle C, etc., as shown on the TUNING CHART below.

NOTE: We have added a number next to each note to indicate the correct octave. Middle C is C4, and all the notes below Middle C are marked with the number 3. The scale above Middle C is all marked #4 until you get to C above Middle C, which starts the next octave #5.

Some builders have tuned their instrument an octave lower than shown here, just to be cautious, but that makes the instrument sound dull. The actual frequencies of the notes at the bottom of each bridge are added to the chart, in case you have a tuner that gives you that information. It pays to start off on the correct pitch!

Be careful to check that you are turning the proper pin for the string you wish to tune. Then pluck the string and turn the pin while the string is still vibrating so you can hear the pitch change and you can stop turning when you reach the proper tone.

TUNING CHART

Treble Bridge	Bass Bridge
F6 -- Bb5	
E6 -- A5	Eb5
D6 -- G5	D5
C6 -- F5	C5
B5 -- E5	Bb4
A5 -- D5	A4
G5 -- C5	G4
F#5 -- B4	F4
E5 -- A4	E4
D5 -- G4	D4
C#5 -- F#4	Middle C4
B4 -- E4	B3
A4 -- D4	A3
G#4 -- Middle C#4	G3
F#4 -- B3	F#3
E4 -- A3	E3
(311 Hz) D#4 -- G#3 (208 Hz)	D3 (147 Hz)

Bold letters denote marked courses (black dots)
for illustrating the boundaries of diatonic scales.

11. Because the TREBLE BRIDGE is placed to give you a fifth interval from the right side to the left, you need only tune one side of that bridge -- the other side will automatically come into correct pitch. These strings will be tuned by turning the pins on the right side of the instrument.

Tune the longest pair of wires at the front of the instrument to a G# below middle C on the right side of the TREBLE BRIDGE. Double-check to verify that the same wires sound at the D# (Eb) on the left side of the bridge. If the left side is flat, slide the bridge to the left a little and try again. If the left side is sharp, slide the bridge to the right. Once the bridge is correctly placed, you should never have to move it again.

Tune the next pair to A below middle C (on the right side) and the next to B below middle C, etc., as indicated on the TUNING CHART, working your way up the TREBLE BRIDGE. Double-check the notes on the left side occasionally to be sure the bridge does not angle off course.

12. Now, don't expect the instrument to be playable yet.... By the time you finish tuning the highest string on the TREBLE BRIDGE, the bass strings will have already gone out of tune. Don't give up! This won't happen every time. Two things are occurring that contribute to the problem on a new instrument: 1) The wire is actually stretching a little, and 2) The box is flexing slightly under the tension of all those strings.

We usually tune a new instrument twice and then give it a little time to adjust (say, overnight) before tuning again. It should hold pretty well after the third tuning.

CONGRATULATIONS! YOU REALLY DID IT. We hope you enjoy learning to play your hammered dulcimer. With proper care, it should give you many years of musical pleasure.

Care and Feeding of a Hammered Dulcimer

STRINGS: You should not need to replace the strings of your instrument unless they break or become rusty. To prevent rusting, simply wipe the strings occasionally with a rag dipped in household oil.

TUNING PINS: Tuning pins can also rust if they are exposed to excessive moisture or salty ocean breezes. If you live in a humid climate or near the ocean, treat the tuning pins to an occasional oil rub-down too.

We occasionally hear from a customer with loose tuning pins. This can happen if the holes are drilled with a dull (or oversize) bit, or if the drilling was not straight and clean. Musicmaker's stocks liquid "Pin-Tite" for swelling the wood fibers, and if that is not sufficient, we keep a few oversize tuning pins for that situation. Check our catalog (hardware page) or web site for details.

CLEANING WOOD SURFACES: The main challenge will be to clean the dust from under the strings. Not that a little dust hurts anything, but when you decide enough is enough, you can try to push a rag through the narrow spaces with a small dowel or thin stick. Better yet, we like using a bristle brush along with a furniture polish such as Endust. Our "Dandy Duster" brush has long bristles that reach into tiny spaces that can't be reached with a rag.



Adjustable Hammered Dulcimer Stand
available as a kit or finished

ACCESSORIES FOR THE HAMMERED DULCIMER

We carry a number of items to help you enjoy playing this unusual instrument. Please refer to our website or catalog for current pricing.

- Spare Pair of double-side hammers
- Padded Gig Bag for Hammered Dulcimer
- Electronic Tuner (chromatic)
- External Pickup & Cord for Tuner
- Dandy Duster
- Various Instruction books & DVDs
- Stand for hammered dulcimer
(adjustable in height and angle)

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