

Testing pickups for mountain dulcimers. Sam Rizzetta 1/23/12

There is much conjecture, discussion, opinion, and argument about what pickups and microphone arrangements work best for amplifying mountain, or fretted, dulcimers. Just because players claim that the pickups they use sound great does not necessarily mean that their audience, or yours, will hear a good sound. Most evaluations omit the most important information, which is precisely how pickups were tested, judged, and compared. What was the method; what were the criteria. And were they really hearing, and judging, only the amplified sound?

Many players simply plug the cable from their pickup, preamp, or microphone into an amp or sound system while they play the instrument themselves and try to listen. What they will hear is the familiar acoustic sound of their instrument enhanced with a background of extra volume from the speakers. This invariably sounds great to the player, but has little to do with what an audience hears. There are several much better ways to test pickups. Here they are in ascending order from good to best.

1. Often the simplest way to evaluate is to have a trusted friend with critical ears listen from a distance while you play. The listener should walk around the hall listening from a variety of locations, especially locations far from your instrument where it would otherwise not be heard well without amplification. This has the drawback of having someone else do the critical listening and then trying to describe in words the results and any needed changes. On the plus side, playing in a concert room allows you to test resistance to feedback.

2. If you can have another musician play your instrument onstage while you do the critical listening from a distance, you can make a firsthand evaluation of the sound. It might not be your playing or style, but it can be revealing and helpful.

3. Both the above methods require a skilled assistant. But there are a couple of good ways to make a solo evaluation. One way is to listen only through headphones that reduce external sounds as much as possible. I use headphones with large padded ear cups for sound isolation, and my amplifier, and my mixers for stage sound or recording, all have headphone outputs. Thus, I can play my own instrument while listening primarily to the amplified sound signal. Of course, everything in the signal chain has some influence on the sound, but it is possible to make good tone comparisons between various setups of pickups and microphones. And those pickups or microphones are arguably the most influential items in the signal chain for tone. Headphone isolation from the acoustic sound of the instrument through the air is not total. And you'll have to test resistance to feedback in a live hall with an amp or sound system. However, I find it is a good way to quickly make basic comparisons.

4. Making a **test recording** is the best way to totally isolate the live acoustic sound of an instrument from the electronically generated sound in order to truly and fairly evaluate and compare pickups and microphones. While not going into details of the recording process, and acknowledging that some tone color might come from the process and equipment in the recording chain, listening to a recording guarantees that you are hearing only sound generated by the pickups. I often record several different pickups, microphones, and microphone placements on different channels simultaneously. On listening back I can switch channels back and forth to make side by side comparisons. And I can play the test recordings over and over for myself and other listeners. Again, you will still have to test for feedback in a live hall. But recording permits the best side by side tone comparison.

Over the years I have tested large numbers of pick ups and microphones on many instruments, as well as electronic gear in the signal chain for amplifying and recording. I don't claim to have tested every pickup possible for mountain dulcimers. I have tested most types while acknowledging that there is new and unfamiliar gear coming out all the time. Here are my basic findings.

For pickups my favorites are under-the-saddle pickups mounted in the bridge, like the L. L. Baggs Dulcimer Pickup, current list price US \$119.00 from Blue Lion Dulcimers, not including wiring jack and installation cost. The Baggs has great tonal clarity and definition with a smooth tone while minimizing fretboard noises and feedback. Tone is very pleasing and reasonably similar to the acoustic tone. While it sometimes sounds slightly electric, in the piezo pickup manner, it does provide excellent volume before feedback. In difficult situations, like playing outdoors, or in large halls, or when playing with large ensembles or with electric or brass instruments, it will give your acoustic dulcimer the best chance of being loud enough to be heard. Since these pickups are built into the bridge and generally use an end pin jack with removable cable, they are totally unobtrusive to the instrument's looks or acoustic qualities. The pickup won't fall off or look like an ugly add-on. And the cable removes from the jack so there are no dangling wires when you're not using the pickup. Stick-on and "contact" style pickups generally lack these advantages, and for me that's a deal breaker.

Piezo film contact transducers, like Pick Up The World pickups, can sound rather attractive, mellow and natural, if you experiment enough and can find just the right spot to mount one. I've made my own pickups from piezo film; the commercially available models use the same material and sound the same. I admit that I don't like the dangling wires or stuff visibly stuck onto my dulcimer. The finish can be damaged by the adhesive and the pickup can come loose at just the wrong time. More permanent installations inside and out of sight can be problematic as options are difficult to test and the installation can change the sound. I don't want to wind up with a permanent installation of something I don't like using. Even when the tone is generally pleasing, these pickups can sound distant and echoey, lacking clarity and definition, when heard just through the electronic signal chain. This is often revealed only by recording tests side by side with microphones and bridge pickups, which have a more present, focused, and articulate quality. The slightly distant and reverberant sound is okay when you want that sound or only need a moderate amount of amplification. But it can also make the music sound a little muddy, not so good for uptempo tunes. And you don't have the option to dial it out. I've tried hard to like piezo film transducers but have only used them temporarily. Other pickups that temporarily stick on the soundboard have somewhat similar disadvantages, and many of them don't sound as pleasing or "acoustic" as the piezo film transducers.

I've experimented very little with magnetic pickups. They give an electric guitar type of sound with very good resistance to feedback. I don't really want a totally non-acoustic sound from my dulcimers but can understand why others might.

We are often drawn to pickups due to the problems, complexities, and limitations encountered when using microphones. It is often difficult to position a stage microphone close enough to a mountain dulcimer and to maintain the best position during a performance. The dulcimer is often played seated, and if the player moves even a little the sound can suffer. A good solution is to use a "lapel" or "clip-on" lavalier type mini-microphone temporarily fastened to the dulcimer. You've seen this sort of microphone clipped to the shirt or blouse of TV broadcasters. I've tried a great many, from cheap Radio Shack mikes to models by Sony and other familiar brands. Some sound much better than others, and you seem to get what you pay for. Most of these are electret condenser microphones. Inexpensive ones I've used tend to sound thin and harsh, but they are a quick, easy, and inexpensive solution that is worth a try. Apart from sound, some are more convenient than others for the acoustic instrumentalist. There are many similar mikes I have not tested. For a long time I've used and liked an Audio Technica ATM 15 cardioid condenser lavalier microphone, which came with a felt padded clip for attaching to a guitar soundhole. I can slide the padded clip onto the edge of a dulcimer soundhole without scratching the finish. The ATM 15 is an older model; the Audio Technica PRO 70 is the current version, list price US \$209.00. The best location is usually at a large soundhole on the lower bout of the dulcimer and out of the player's way. The mike is just above the soundboard, parallel to both the soundboard and the fretboard, at the edge of the soundhole or back from the edge and pointed toward the soundhole and middle of the instrument. The AT-15 or PRO 70 has a power module at one end of the cable and will operate on either phantom power or one internal AA battery. Battery power is handy for use with a portable amp.

Some EQ may be needed to attenuate low frequencies and keep the sound from being boomy, a common problem when mikes are placed on or close to an instrument. The ATM 15 and PRO 70 have a bass roll off switch for that purpose making them more convenient than other mikes. Always use that switch position. Other than that, the sound is generally better than most stage microphones, especially dynamic microphones, while keeping the mike in position for consistent sound and volume. Because the mike is very close to the instrument, you can usually have more volume before feedback than with microphones on stands. However, feedback resistance is not as good as a bridge pickup. In windy outdoor situations wind noise can make any microphone unusable while bridge pickups continue to work just fine. Battery powered lavalier mics can be used with amps that have microphone inputs, making them almost as convenient as built in pickups. To avoid feedback you will have to be careful in positioning the mike relative to the amp's speaker, and may have to limit volume levels. But lavalier mikes are adequate for most situations in which you might play a dulcimer, and it will definitely sound acoustic.

Lavalier mikes do have the problem of having to be attached and removed for each gig. In the past I did not like the inevitable wear and tear of attaching clips to the dulcimer soundhole. But I've added more padding to the soundhole mounting clips, and my newer carbon fiber dulcimers do not scratch easily. Large soundholes with simple shapes work best with soundhole attachment clips. Many of my older all-wood dulcimers do not have soundholes large enough and sturdy enough to use the lavalier clip. So, I installed bridge saddle pickups on those dulcimers that I regularly use with amplification. Perhaps I will eventually fashion a more universal lavalier mic mount that I can use with any dulcimer.

What is my personal preference? Well, I really like the convenience and feedback resistance of the bridge saddle pickup, and the Baggs is my favorite so far for mountain dulcimer. That is my default choice if the dulcimer is

equipped. I like the articulate clarity of tone and reduced fingerboard noise since I play with a lot of left hand slides, hammer-ons, and pull-offs. I even like the occasional slightly electric twang. However, I've gone back to using the lavalier mike a lot. It sounds more convincingly like the acoustic instrument it's attached to. It can be used with several instruments without requiring the labor or cost of separate permanent installations. Tone-wise, the Baggs pickup and the ATM 15 lavalier mike sound quite different from each other. Each one has advantages and disadvantages; both are good. I like the natural tone of the mike and the smooth sound with reduced fingerboard noise of the Baggs pickup. I have no clear preference so far and can happily use either. This is surprising since I am very demanding about instrument tone. Outdoors and in very large noisy venues I have more confidence that the pickup will not be the source of wind noise or feedback, although tone will be slightly less acoustic. But if I want more of the natural acoustic tone of a nice sounding dulcimer, then the lavalier mike is my choice. I've recently been experimenting with a very different bridge pickup and may eventually have more to say about that.

All tests are colored somewhat by the amplifying system used and the acoustic listening space in which tests are conducted, not to mention the ears, tastes, and preferences of the testers. One must be especially careful about judging tone by listening to different pickups and set ups at identical volume levels. By this I mean the loudness that you hear rather than the numerical settings of volume controls. It is easy to fall into the trap of hearing a louder sound as a better tone. However, if a variety of pickups and microphones are tested by the same methods in the same place at the same time, then useful comparisons and judgments will emerge. That said, keep in mind that sometimes louder is, indeed, also better. The goal is to be able to turn up the volume to desired levels without feedback occurring. And, other aspects of tone aside, bridge pickups can be turned up louder without feedback than can soundboard pickups or microphones.

What I have left out of this discussion is a detailed consideration of what constitutes a good or pleasing amplified sound. That is a topic for another discussion.

Sam