

The design and engineering of the
Patent-Pending

malletech® LOVE VIBE

By Leigh Howard Stevens



Why have we named this instrument the “Love Vibe”? First of all, you can “make love” to notes, chords and passages in a way never dreamed of before. Second, a lot of love (and time and investment!) has been put into the design concept, engineering and crafting of this new musical instrument. Lastly, you’re going to fall in love with this vibe. . . its got what every vibes player has lusted after.

Play it just like a “normal” vibe (using the first half of the pedal range), or push the pedal a bit further and:

Control the Speed of the vibrato in real time

- ♥ Make love to a note – add vibrato like a pop singer
- ♥ Make love to a chord!
- ♥ Link vibrato speed to the underlying tempo
- ♥ Improvise “vibrato rhythms” at will

Control the depth & strength of the effect in real time

- ♥ Fully open to fully closed resonators
- ♥ Patent-Pending “shutter technology”
 - no air leakage around pulsar disks (for softest ppp)
 - no blockage of bar vibrations by fans (for maximum fff)
 - no tube cut outs (full frequency spectrum and power of resonance)

Crescendo and diminuendo at will

- ♥ Strike note/chord and crescendo
- ♥ Strike note/chord and diminuendo
- ♥ “Hairpin” crescendo/diminuendo after attack

Lightweight, state-of-the-art, rock-solid frame design

- ♥ No motor: silent vibrato control
- ♥ One person quick set up
- ♥ Every parameter is user adjustable
- ♥ The most beautiful “electric guitar” choice of finishes ever seen on a vibraphone

Fully tunable resonators

- ♥ First vibraphone with Malletech’s Patented fully tunable resonators for maximum warmth, volume and control of sustain. You won’t understand how you ever lived without them.

Designer statement

I began the design process for this vibraphone more than 15 years ago. It seemed obvious to me that the noisy, unexpressive, motorized vibrato used on all vibraphones was musically uninspiring. Many vibraphone players even chose to create their music without use of the “vibra” part of the vibraphone, because even the best instruments frequently had motors and pulsar fan assemblies that were too noisy to use. Even on a brand new instrument that was working well, the musical result of a motor-produced vibrato was mechanical sounding and musically unsatisfying to my ears.

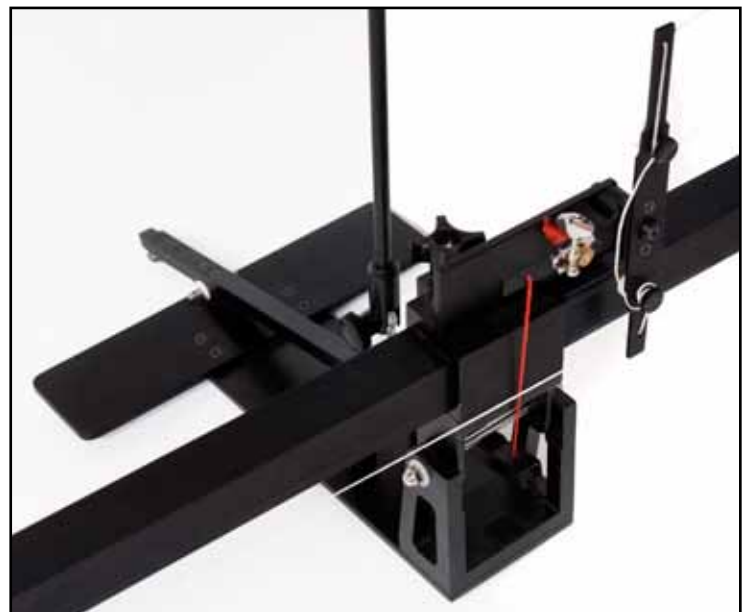
When I began to look more closely at vibraphones, I realized that there were an array of other problems that plagued the daily lives of vibes players: dampening systems that were impossible to adjust to musically critical standards (high and low range dampening at different times, or sharps and naturals dampening at different times); poorly engineered frames that flexed, squeaked and rattled under hard playing, or worse, with every push of the pedal (or the more recent “cement truck solutions” to the problem). Most of these frame and dampening problems experienced could not be fixed on a gig, and the basic design made set up and break down unnecessarily difficult and time consuming.

The four pages of this document cannot fully document all the features and improvements, but we will cover as much as we can in the space allotted. Much gratitude is owed to Roger Clerc and Josef Eberl, the two Swiss engineers who brought my ideas to mathematical and structural perfection, and to the several Mallettech employees who also contributed their time, effort and skills to the project. This was no easy thing to conceive or to perfect. If it were simple, other larger, well-funded companies would have solved these problems decades ago. The reaction to a prototype at the 2008 PASIC was more gratifying than we could have hoped for. Based on player input we solved the remaining ergonomic issues with the pedal and we are now proud to present the finished instrument that began shipping in August 2009. All of us who were involved in this project over the past few years hope you love our “Love Vibe”.

LHS

Vibrato from 1916 to 2008

Existing vibrato mechanisms have significant shortcomings. In addition to the obvious point that we have not been able to control the speed of the vibrato in any meaningful musical way, previous designs also do not permit variations of strength of vibrato. As the pulsar fans rotate on the shaft at the set speed of the motor, the strength or “depth” of the resonance varies in exactly the same way with each rotation (approximately 85% open to 15% closed). With the Love Vibe (and some practice!), there is a myriad of musical possibilities and applications for varying both the depth and speed of vibrato. With practice, you can actually play RHYTHMS with your pedal. Every nuance of the shutters is controlled through the super low friction cords attached to the pedal mechanism. If the tension ever needs adjustment (this is rare), you can adjust the thumb screws in less than 60 seconds!





Old style “leaky” pulsar fans limit the dynamic range of the vibrato effect

There are other less obvious problems with the old technology. The mechanism that produces the vibrato effect blocks a substantial portion of the resonance of the tube. The pulsar fans and shaft are both located within the resonator. In the “full open position” the pulsar fans are blocking the tone bar. The resonator is never really “closed” off from the tone bar because there is always “leakage” around the pulsar disk into the resonator. Thus, even in well made instruments, old fashioned motor driven vibrato never produces the full potential range of vibrato – never full volume when “open”, nor minimal volume when “closed”.

Another disadvantage of the old system of producing vibrato is that the upper open ends of the resonator tubes (nearest to the tone bars) must be notched out or otherwise deformed to accommodate the pulsar fan shaft. This notching of the tubes weakens the resonance and adds undesirable non-harmonic overtones to what remains.



Old style: Notched resonators

Malletech’s patent-pending shutter technology “ends the revolution” with a REAL REVOLUTION!



Shutter open



Shutter closed

With our new shutter technology, the resonators can be FULLY opened, FULLY shut or any portion thereof, in real time, in sync with the music. Your creativity will be limited only by your pedal technique. The resonators are also fully tunable, so the power and sustain of every note can be adjusted to your individual taste at any stage or outdoor temperature. The shutters and cord pull mechanism all turn on five precision, low-friction, silent ball bearings.

Damper and frame Issues

As every vibes player knows, EVERY vibraphone currently made has dampening problems such as:

- ♥ Top and bottom notes don’t dampen at the same time
- ♥ Sharps & naturals don’t dampen at the same time
- ♥ Middle of the instrument doesn’t dampen at the same time as the ends because damper bar is warped through constant pulling.

Our design addresses all these issues in novel ways.

Damper bar independent height adjustment

The damper bar is attached to the pivot arm mechanism through an adjustable silicone pad. This allows the damper bar to be slightly flexible, yet adjustable, up or down on each end of the instrument. Most damper bar adjustments can be made through this simple mechanism, completely independent of the spring tension and Harp Angle Adjustment.



Damper bar adjustment pad

Harp independent angle adjustment

The harp can be lowered or raised on either end, or front and back onto the damper bar in four different directions on silicone isolation points. For example, if the high end sharps are ringing longer than you want, screw the silicone point down a turn or two and that corner of the harp drops, dampening the high sharp bars sooner.



Harp silicone adjustable supports



If you have ever gone bowling, you can carry this harp with two fingers!

Lightweight detachable harp

- ♥ Harp lifts off the frame for easier transport (with or without bars)
- ♥ No stress on the harp/bar rails through dampening/pedaling
- ♥ No shock transmitted to the frame or resonators in heavy playing

The Malletech vibe utilizes jet airplane fuselage technology to lighten the frame without sacrificing rigidity. This costly process produces a frame with the stiffness of aluminum, but without the weight of previous designs. In fact, the Love Vibe weighs 100 lbs less than a well-known, less lovable design . . .



Harp cut outs

Damper Bar Pivot Mechanism

Most previous vibraphones have the problem of dampening the sharps and naturals at different times. This problem is primarily caused by the short pivot arms, which create a pronounced and undesirable arc at the point of contact.

The Malletech Love Vibe solves that problem by doubling the length of the pivot arms (to reduce the arc) and beefing up the whole system.



Old style: A short weak pivot arm produces too much wiggle and angular rotation

Pedal/Damper pull ratio

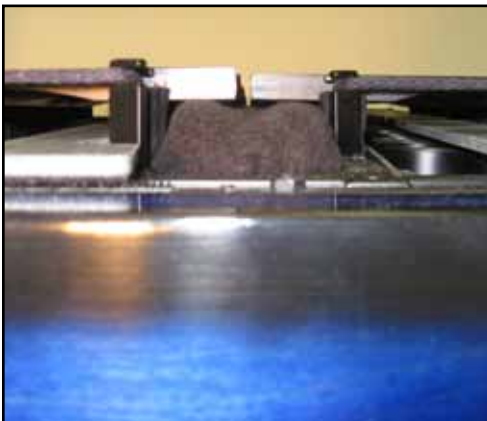
Instead of pulling on the damper bar directly, risking the deforming of the bar over time (or requiring the bar to be heavily reinforced -- which is the solution seen in the market so far), we have eliminated all stress on the damper bar by pulling on the pivot arms that move the damper bar. The Malletech Love Vibe has the additional advantage of being able to adjust the leverage of system (the "resistance" and "feel" of pedal and the amount of travel of the damper pedal, vs. how much the damper bar moves), without adjusting the spring tension. The malletech Love Vibe allows easy adjustment of all parameters INDEPENDENTLY.

- ♥ Adjust the damper pedal ratio of motion/resistance
- ♥ Adjust the damper bar stop height, top or bottom (two stops)
- ♥ Adjust the spring tension of the damper at top or bottom (two springs)
- ♥ Adjust the damper pad height or angle at top or bottom
- ♥ Adjust any corner of the harp up or down to increase or decrease dampening in any zone (high, low, sharps, or naturals)



Progressive Wave Dampening

All previous keyboard percussion dampening systems attempt to contact the bars with a flat felt damper that contacts the ends evenly, or with a fluid-filled bladder that first hits the ends and then swells to contact the tone bar closer to the node. In other words, existing designs attempt to dampen "most efficiently" by dampening at the most sensitive spot of the tone bar -- the end. This is efficient, but crude and not very "musical" in effect.



I have discovered that by dampening the bars first at a point closer to the non-vibrating node (where the string is) and then progressively dampening toward the more active end of the bar, the result is much more "musical" and natural. The tone "tapers" or "feathers" like the end of a note produced by a violin bow. This technology eliminates the unwanted buzzing that is so common with vibraphones -- buzzing produced by the dampening material coming in sudden contact with the strongly vibrating ends of the bars. With this new technology, much less pedal travel and spring pressure is needed, giving the musician far more musical control over the dampening process.

In summary, if you own a vibraphone made between 1916 and 2008, you might want to get it on eBay before the big rush . . .