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Marimba designer, Chris Banta, can tune and refinish your melodic bar percussion instruments so they'll look and sound like new.

Metal Bars Aluminum Steel	**Wood Bars** Honduras Rosewood African Padauk	**Engineered Composite Bars** Kelon (Musser) Klyperon (Deagan) Acoustalon (Yamaha) Techlon (Peripole-Bergerault)
 Orchestra Bells	 Xylophones	 Xylophones
 Vibraphones	 Marimbas	 Marimbas
 Orff Metallophones	 Bass Marimbas	
	 Orff	
	 Bass Tone Bars	

List of Services

(As of April 2018A)

BAR MATERIAL	COST PER BAR	DESCRIPTION OF WORK
BAR TUNING CHECK All Materials	**$50** (Entire Instrument)	Assessment of the quality of tuning of all bars on the entire instrument. Includes: • Determination of (1) the amount of *flatness* or *sharpness* of pitches and listening for *beating* or *wavering* of unison pitches, and (2) Listening for consistency of *sustain* or *ring tone* quality • This check requires that the bars be delivered to Chris Banta's shop. Call first for details. • If findings reveal that tuning is needed and client agrees, then the tuning check fee will be waived.
BAR TUNING ONLY Wood Metal Engineered Composite	**$15**	**Re-tune** fundamental (and harmonics as applicable) on all bars Typically using: • A-440 pitch standard for marimbas and vibraphones • A-442 for xylophone and orchestra bells *Note: Certain bar percussion manufacturers utilize composite bars on some of their instrument, each one has a specific tradename, e.g. Musser (Kelon®), Deagan (Klyperon®), and Yamaha (Acoustalon®), and Peripole-Bergerault (Techlon)..*
BAR REFINISHING AND TUNING Wood	**$25** (Clear Coat) **$30** (Stain and Clear Coat)	**(1) Prepare bar surface** - sand off old finish, splinters, and dents to create a satin-smooth bare wood surface. • Option: Recommend sanding a radius on the front edge upper corner of accidentals to discourage splintering and chipping. **(2) Spray three coats** of satin or semi-gloss waterbase polycrylic finish (satin or semi-gloss gloss). **(3) Re-tune** as stated above.
BAR REFINISHING AND TUNING Composite	**$30** (Color Coat)	**(1) Prepare bar surface** - lightly sand to create smooth surface. **(2) Apply primer coat** **(3) Apply two color coats** – To match (as closely as possible) the existing finish. **(3) Re-tune** as stated above.
BAR REPAIR Wood Only	**$15** (Repair only) **$30** (Repair & Retune) **$35** (Repair, Refinish & Retune)	**Limited only to end splits:** Cross-drill, glue, dowel, and clamp. *Note: Repair of a split or crack in the middle of the bar is not recommended because this is the primary mallet strike point. Even with an epoxy adhesive, repeated strikes will cause joined pieces to separate. Bar replacement is the better option.*

BAR REPLACEMENT Wood	Pitches below C2 – Call to discuss **$125** C2 (Cello C) to B2 **$100** C3 (Tenor C) to B3 **$ 75** C4 to C7	**Required when:** • Pitch is 1/8th step (25 cents) or more flat • Loss of sustain or ring time (Dead) • Buzzing • Severely damaged e.g. Cracked in two New bar is fabricated from scratch using dimensions of bad bar, including correct location of mounting holes. *Note in wood availability: Because of the huge demands, by guitar and marimba manufacturers, Honduras Rosewood will not be obtained. Recommended substitute woods are African Padauk, Bubinga, Santos Mahongany, Jarrah, and others as on-going testing reveals. Please call to discuss options.*
BAR REPLACEMENT Aluminum T-6061 bar stock Shop is not set up to fabricate steel.	Pitches below F2 – Call to discuss **$200** F2 – E3 **$175** F3 – E4 **$150** F4 – F5	**Required when:** • Pitch is 1/8th step (25 cents) or more flat • Loss of sustain or ring time (Dead) New bar is fabricated from scratch using dimensions of bad bar, including correct location of mounting holes. Aluminum type: T-6061 bar stock[3] | *Note: Vibes having gold bars will require two additional charges: 1) a local plating service to set up a gold anodizing bath, and 2) Chris Banta to oversee the delivery and pick-up process.*

Typical Cost by Instrument Range

Instrument Range	No of Notes	Tune Only $15/bar	Clear Coat/Tune $25/bar
2-1/2 octave orchestra bells (Steel) [G5 to C8]	30	$450	Not Applicable
3 octave vibraphone (aluminum) [F2 to F5]	37	$555	Not Applicable
3-1/2 octave xylophone (wood) [F4 to C8]	44	$660	$1,100
4 octave marimba (wood) [C3 to C7]	49	$735	$1,225
4-1/3 octave marimba (wood) [A2 to C7]	52	$780	$1,300
5 octave marimba (wood) [C2 to C7]	61	$915	$1,525

Bar Problem Case Studies

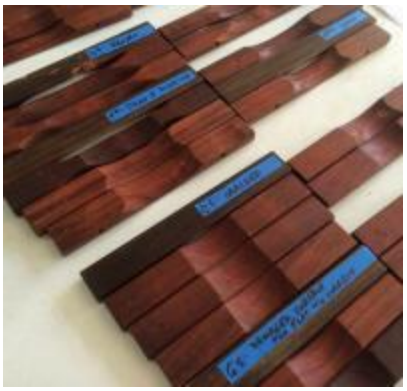
[CASE STUDY NO. 1] Several Damaged Bars in a Xylo-Marimba

Issue: Several bars had sufficient damage leading to everything from total breakage to cracks, buzzing, to being total dead or lacking ring time.

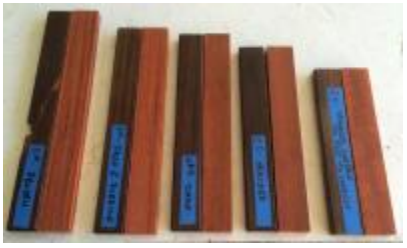
Remedy: Fabricate new replacement bars.

[BEFORE]

Only extreme physical abuse can lead to a bar that is cracked in half.



Numerous bars had several problems making it impossible to fix by a simple re-tuning.



The obvious option was to replace those bars that were beyond repair.

[AFTER]

A fully functional and in-tune bar set. Instrument owner was not concerned with different color of the replaced bars.

[CASE STUDY NO. 2]
Extreme Splintering of corner edges of xylophone bars

Issue: Splintering is a common occurrence in wooden xylophones. Especially in schools, xylophones tend to be exposed to the *endless glissando* scenario in which hard mallets are dragged back and forth causing the wood grain to splinter.

Remedy: Due to severe loss of sustain, a new bar was fabricated.

[BEFORE]

Corner edge of xylo bar has extreme splintering.

[AFTER]

The splintered bar was flat of pitch and an attempt was made to restore and sharpen its pitch. However, due to the amount of physical damage, the sustain of the bar was compromised so much that it no longer had the sustain or ring time consistent with its neighboring notes. A new replacement bar was the obvious solution.

[CASE STUDY NO. 3]
Sun Bleaching Ruins Marimba Bar Finish

Issue: Extreme outdoor exposure to the sun had caused the bar finish of a marimba to bleach-out to an ugly gray.

Remedy: Top of bar surface was sanded until virgin wood was exposed.

NOTE: This was an extreme repair. So much of the top surface was removed that it greatly flattened the pitch of each bar. Although tuning was successful, a lot of additional bar material had to be removed in the pitch sharpening process. The customer was cautioned that the sanding had thinned and weakened all bars to a point where they might not hold the tune (and could easily flatten) if the marimba was played too vigorously.

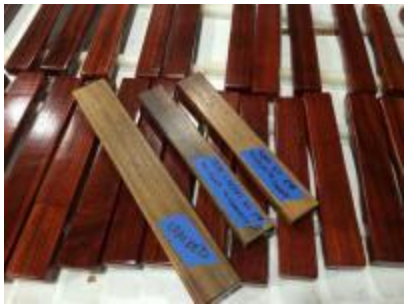
[BEFORE]

Sun bleached marimba bar set.

[Top] Sun-bleached surface
[Middle] During sanding
[Bottom] After Sanding

[AFTER]

Once the quality of the new exposed grain was consistent across the entire bar set, several clear coats of a semi-gloss, water-base finish were added to protect the new surface.



Direct comparison of before and after conditions.

[CASE STUDY NO. 4]
New Frame for a 1914 Deagan Steel Bell (whole tone scale) Bar Set

Issue: This old instrument was barely intact and needed a new support frame that would hold the steel bars and resonators. In its current condition, it was not easy to play the steel bars.

Remedy: Design a new frame to provide bar and resonator support at a proper height suitable for the percussionist.

[BEFORE]

A vintage steel bar set.

Without a proper stand, the bars could not be easily played.

Removing the bars revealed years of deterioration on the bar rails and end caps.

[AFTER]

The accurate transferring of the old bar rail dimensions was crucial to ensure proper alignment of the resonators directly under the acoustic centers of the bars.

Completed frame now at playable height. A mallet rack was also included in the new frame's design.

[CASE STUDY NO. 5]
Zimbabwean Bass Marimba Replacement of Cracked Bars

Issue: The low C2 and D2 bars on the Masanga Marimba Band's bass marimba had cracked from heavy playing due to many concerts.

Remedy: Fabricate a new C2 and D2 bars using hard maple..

[BEFORE]

Shown is a nasty crack in the low C2 Bass Marimba Bar. Bar material is hard maple, which is robust stuff when it comes to the aggressive pounding the Zimbabwean band marimbas take. The cracked bar held its pitch quite well. When disassembled all bars were checked for pitch. The C2 bar was only a few cents flat of A-440. Hard maple is amazing stuff!

[AFTER]

Two new bars were made, both clear coated and tuned.

Large resonators were also checked. It's a lot of fun hearing the sound of a freshly repaired bass marimba!

Tuning Accuracy and Guarantee

Real Strobe Tuners

Peterson tuners, having the mechanical rotating disc and flashing bulbs, are used. These devices are:

A) capable of 1-cent[1] resolution with 0.1 cent (1/10% of a cent) accuracy, and
B) the strobe display is capable of instantaneously showing exact pitch in a fraction of a second. This means the eye can easily discern whether the pitch is sharp or flat without guess work.

[Left] Chris Banta's Tuning Workstation
[Right] Peterson Strobe Tuners: (Top) Model 490 Autostrobe, (Bottom) Model SC5000-II Strobe Center

Pitch Standard

The pitch standard is typically A-440Hz for bass marimbas, marimbas and vibes, and A-442Hz for xylophones and orchestra bells.[2]

Tolerance

Bars are tuned between 68 and 72-degrees F. Several readings are taken on the entire bar set throughout the tuning process. The tuning tolerance is within +1/-0 cents.

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[1] The precision of musical instrument tuning is accomplished by dividing the octave into extremely small divisions called "cents." There are 1,200 cents per octave or 100 cents per half step (e.g. C to C#, C# to D, etc.). It is these fractional sub-divisions that the strobe tuner is aligned with, and which makes accurate pitch measurement possible.

[2] The difference in pitch standards (A-442 instead of A-440) has to do with the ear's ability to hear higher pitches in tune. Typically, as the pitch of the bar becomes higher in pitch, the ear tends to hear this as flat. A-442 is a compensation technique that makes the xylophone and orchestra bells sound "more in tune," as well as the ear perceiving these tones as being "brighter" sounding.

Tuning Limitation

Melodic bar percussion instruments are a limited tuning opportunity, unlike a piano string or horn, which are capable of endlessly repeatable tunings, bar tuning is not endlessly repeatable.

When correcting an out-of-tune bar, the bar requires material to be removed in specific amounts from specific regions within the bar. Once the material is removed, the bar will be in tune. Should the bar flatten from further stresses placed on the bar (e.g. aggressive heavy-handed playing), subsequent tunings become much more difficult. The bar can only be retuned a limited number of times.

At some point, it will not be possible to restore the bar's original pitch and replacement becomes the only option. See "Tips" for ensuring a lasting instrument and "Case Studies" for actions that lead to degraded or non-functional bars.

Quality of Sound

When the client receives their tuned bars, the accuracy of the tuning will allow them to take the instrument into a precision musical performance environment, such as a recording studio, a live orchestral or ensemble performance venue, and have the confidence that the instrument will sound in perfect unison with the other instruments.

Guarantee

CCBANTA Bar tunings are guaranteed for one (1) year from the date of release back to the client.

Guarantee is void when damage to the bar is obvious, such as: dents, scratches, chip-outs, splitting, cracking, and excessive over-exposure to outdoor elements. Clients will be charged accordingly to bring the bar back into a functional condition, presuming it is still possible to do so, or for the replacement of no-longer-functioning bars due to damage.

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How to Order this Service

Preparing Your Bars for Delivery/Shipment

To utilize this service please perform the following steps.

STEP 1 Contact Chris Banta via e-mail or phone (above)

Be prepared to discuss the following:

- Instrument type (Manufacturer and Model Number, if known)
- Bar material
- Number of notes
- Describe specific problems and overall instrument condition

We'll need to determine bar delivery logistics, type of work that will be needed, estimation of costs (including shipping), completion date, and any other details.

STEP 2 Remove Bars from the Instrument

Tuning jobs require only the bars themselves. Generally, the bars may be lifted off the frame with the mounting cord still intact. If the mounts contain closed holes, then the bars will need to be unstrung so they can be removed.

If problems are suspected of the frame or resonators, we should discuss them as well.

Once the arrangements for the work have been agreed upon, the shipping address will be provided.

STEP 3 Deliver or Ship Bars and Down Payment

Drop-Off's / Local Clients: Chris Banta's shop is in Thousand Oaks, CA which is on the boundary between the Los Angeles and Ventura County's. Clients living in those areas may choose to deliver the bars in person.

The address will be provided at the time of the phone call. A 50% down payment will be required at this time.*

Note: The client is welcome to bring the entire instrument. A general assessment of the instrument's condition will be performed at no cost. Please set up an appointment.

Distant Clients: Shipping, both ways is the responsibility of the client. A 50% down payment will be required at this time. *

STEP 4 If Shipping, Package Bars for Protection

Bars should be placed in a box with protective material, so they can't damage each other during transit. (Suggest placing a towel on top of the bars while they're still strung up and lying flat. Then, roll them up like a sleeping bag. For bars that are separate, small groups of bars can be wrapped in newspaper then placed in the box with foam or bubble-pak between the groups.)

For a lot of bars, it might be better to spread the load and reduce the weight by using smaller boxes. If using multiple boxes, then each box should be numbered. For example, if all bars fit into two boxes then number each box as follows: 1 of 2 and 2 of 2.

The same box and protective material will be reused for the return trip. The client is responsible for all shipping charges.

STEP 5 Begin Work and How Long Does it Take?

Bar sets requiring tuning only, can be completed in one (1) week.

Refinishing and tuning takes 2 weeks.

Repairs and replacements are determined by the size of the overall job.

STEP 6 Job Completed, Contact Client, and Final Payment

Drop-Off/Local Clients: Arrangements should be made to pick up the bars. The 50% balance can be made at that time. *

Distant Clients: Upon completion of the job, the bars will be re-packages, boxed-up, and shipped. The remaining 50% balance, including shipping cost, will added to the final invoice.*.

Note: Bars will not be released without full payment. Bars not picked up within 90 days will be sold to cover shop costs.

Tips to Ensure a Long-Lasting Instrument

Respect...Respect...Respect...

Over the years, I have received numerous wooden xylophones with their bars battered so much that it was possible to get a splinter if you weren't cautious when touching them. Xylophones suffer from the *endless glissando scenario* - the rapid dragging of a hard mallets across the bars over and over. Every time the corner edge of the bar is hit, a little piece of the grain fiber is weakened. Depending on the degree of force, successive glissandos may cause the fiber to separate from the grain. Bars can become quite unsightly.

Organic wooden bar percussion instruments have mechanical and acoustic limitations that must be respected for long-term serviceability to be possible.

Why Bars Flatten in Pitch and Crack:

Use of Wrong Mallets - Metal, plastic, or wood mallets used on wooden marimba or xylophone bars are too hard for the bar's material. They can exert pin-point stresses that are too aggressive for the bar's structure. Hard mallets are reserved for metal bar percussion. Hard rubber mallets may be used on wooden xylophone surfaces providing the playing touch is reserved. Soft to Medium-level yarn-wound mallets are best for marimbas.

Excessive Playing Force - Players should never give into the temptation of beating the instrument simply to sound louder. If the instrument is too soft within the ensemble, it should be amplified using a spread of microphones across the length of the instrument and mixed for balance.

Careless Handling of the Instrument - The configuration of the marimba and xylophone causes their bars to extend beyond the confines and protection of the instrument's frame. This exposure makes the instrument prone to damage from accidental bumping of the bars into door jambs or other fixed objects. Bars can potentially break or become misaligned due to bending of the support pegs on the bar support rails. Keep the bars clear of doorways and all objects when moving or transporting these instruments.

Exposure to Hostile Elements - Even protected wooden bars are influenced by the environment, especially with prolonged exposure which can severely degrade the quality of the instrument. Avoid direct sunlight, moisture, and wide swings in temperature.

DO'S and DON'TS:

DO	DON'T
• Play the instrument respectfully and with the correct mallets that relate to the specific instrument. • Resort to amplification when played with other amplified instruments. • Keep the instrument protected with a soft covering when not in use. • Store the instrument in a temperature and humidity-controlled environment.	• Strike the bars with objects other than the intended end of the mallet. • Pound the bars with excessive force. • Lay foreign objects directly on the bars. • Drop anything into the resonators. • Ram the instrument into doorways when moving it around. • Expose the marimba to direct sunlight, humidity, or rain

Clients (over the years)

David Ahlstrom
Ric Alviso
Dale Anderson
Atherton Baptist Homes
Larry Balera
Mark Barnett
Mark Berres
John Bergamo
Tim Boatman
Neal Brandt
Larry Bunker
Chuck Burkinshaw
California Institute of the Arts (Valencia, CA)
California State University (Fullerton, CA)
El Camino College
Jack Cenna
Central Washington University
Judy Chilnick
Wade Culbreath
Ivor Darreg
Wayne DeBord
Theresa Dimond
Danny Elfman
Mike Fisher
Steve Foreman
Eric Forrester
Ron George
Terry Gibbs
Jonathan Glasier
Dan Greco
Jules Greenberg
Horizon Hills Adult School, Thousand Oaks
Cliff Hullings
Francis Hookano
Munyungo Jackson
David Johnson
Chuck Jonkey
Kidspace Museum (Pasadena, CA)
Pinky Lee
Leuzinger High School
Onaji Murray
Pasadena High School
Joe Porcaro
Kurt Rasmussen
Fred Raulston
Brian Reitzell
Emil Richards
Carl Rigoli
Rod Rozzelle
Maria Ruiz
Richard Schwegerl
John Schneider
Dick Simonian
Paul Sternhagen
Richard Sweet
Bob Szuch
Dub Taylor
Nick Terry
Thousand Oaks High School
Steven Traugh
Christopher Wahl
Don Williams
Jerry Williams
Glen A. Wilson High School
Irv Wilson
University of Southern California
US Navy, Music School (Norfolk, VA)
Tommy Vig
Bob Zimitti