Tuning: Bring Your Ears

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FRANK CHEMOTTI

Use aural techniques along with electronic tuning devices. For his first few years, Frank used the RCT sparingly Since aural tuning is the traditional way and is used by all experienced tuners, he was glad to start aurally. When he started tuning at Classic Pianos, he could tune the same as the other tuners.

Advantages of the RCT

- Consistent Precise. Absolute pitch reference for the entire piano.
- Makes stability issues visual, which provides insight on hammer technique
    - Temperature changes show up
    - Hammer technique shows up
- Pitch-raise and over-pull mode is quick and quite accurate and quick
- The battery will last through about five tunings

Disadvantages of the RCT

- Might lose ability to tune by ear
- Such precise levels of measurements are not a guarantee of a solid tuning
- If not used with careful thought and letting the device do it all, yopu're leaving the results in the hands of the programmers.
- Sometimes the calculated tuning might not be very good on certain pianos.
- Sampling only five notes might not provide a full curve

Technique

1. Use the device quickly 30-40 minutes for one pass using Smart Tune with overpull
2. Use fine-tune on second pass, for another 40-60 minutes.
3. Check aurally.

Demonstrations:

- Settings on the RCT
    - Octave Tuning Style (OTS)
    - 4 (basic); P (perfect twelfths)
    - Tuning at 443 (top notes were slightly less stretched – flatter)
    - Estimated beat rates at certain intervals to test with actual piano
    - B=bass octave, T=4:2, D treble 4:6
- The temperament range is very trustworthy. The extremes occasionally but rarely need to be changed or improved.

Procedure

- Overpull
    - Starts at low tenor to provide a check point. Frank trusts the bass scale the least.
    - Start at the low note of each section.

    - Tune unisons as you go. This added tension is calculated into the overpull.
    - Octaves will not match while smart tuning because the tensions have not all been brought up yet.
    - Sometimes do a little less overpull in the high treble; high overpull throws things off a bit.
    - Bass does not need much overpull.
- Fine tuning
    - Tune unisons as soon as possible, so that any slippage will show up right away.
    - Tune temperament octave according to the device.
    - Check unison, 4ths, 5ths.
        - This is how the piano will sound when being played.
        - How is the fifth interval?
        - Are the unisons off?
        - The top two octaves use the first partial.
    - Once the temperament is set, tune the upper notes and check by octaves.
        - Correct anything that is off.
        - Check aurally as you go.
    - Pay attention to which partial the spinner is listening to
    - When tuning unisons, don't stare at the spinner: listen
- Tuning down into the bass
    - When tuning below, sometimes it reads partials.
    - Play the octave above and it won't read because 5 is not an even number.
    - Use checks going down: mnajor 6-minor 3rd.
    - Check with the RCT to make sure it's doing what you expect
    - If you come across a note you've already tuned and you don't like it, go back and fix it right away.
    - As you go farther down, it switches to the higher partials, and to a partial 10, which is not very helpful. A 5:10 is not a crucial partial.
    - Strive for the overall sound to be good, not just individual partials
    - Listen to the octaves and double octaves by ears but keep the RCT running and follow it. It is good through the bass but correct by ear to what you like.

Disagreements with the RCT

- After tuning notes to the display, we might find octaves that we don't like
    - There might be unevenness of the scaling vs a hypothetical smooth curve.
- The highest few notes don't always sound right.
    - Use the OTS4
    - Use your ear.
- There will be disagreements between the single and double octaves and the RCT
- The microphone might not pick up precise partials, but the pitch will be accurate

Stability

- Good hammer technique
- Sometimes pound harder
- If one section is farther off, or a few strings are noticeably out, start there.
- Tune unisons as you go. Check and refine tuned unisons.

- Do two quick passes rather than one slow one.
- If you get interrupted part-way through, it's better to do one full rough tuning than half of a fine tuning.

JOE GOHEEN

Joe tunes differently from Frank. Joe strips out the entire piano. If he has to change a note, he has a test note rather than changing all three. If he is close to pitch and doing Smart-Tune mode, he does unisons as he goes and pulls out the strip mute as he goes. Press the damper down so as not to mess up the trichord damper. If the piano is more out than ten cents, put the strip mute in every other unison and use two in the tenor section and the de capo section and tune all the center strings. If it's a grand he uses his Levitan C-lever, which reduces flag-poling. It's hard to tune intervals using this lever. He keeps his forearm close to his body. It works pretty well up to the treble break where it doesn't work as well. He uses his standard lever in the treble and the bass. It's a way to distribute the stress on his body.

After tuning the center strings, he pulls out the mutes and tunes by whole steps, tuning the row of pins closest to the back of the piano first and the pins closest to himself second. Tuning by whole strips he doesn't have to touch a mute: it's faster, but not as accurate. It's good for a quick pitch raise, but it's hard to use on a fine tuning or on unisons.
When Joes started, he tuned aurally. The Acutuner was not as good, people didn't know how to set pins, and they totally depended on the machine, so people did not trust device tuning at the time. Joe also didn't like the blinking light. When Joe was about to get a device, the RCT came out and he got one.

Joe samples all the A's, and follows the colors, striving for green. Green is .2 cents or less. Yellow is .2 to .5 cent. Joe tries to get the yellows at .3 if he can't get green. He then sets it on fine-tune, tunes the A's and listens to them to make sure his ear agrees with what the machine is calculating. Sometimes the treble is too sharp, so he might resample or make a note and suggest tuning the treble aurally. If he does agree with it, he goes from 1-88 on pitch-raise or smart tune. With a pitch raise, if you go up three cents it will drop one, so go for 2 cents accuracy.

When pitch-raising, he'll use a sample piano that is close. Once it is close, instead of re-setting, listen aurally. Figure out if the intervals are wide or narrow. Take each note and play contiguous intervals to find which is sharp or flat. Play 4ths, fifths, thirds, and other checks, to decide whether or not to move a note. If your piano is pretty close, just strip out the bass and tenor. Tune the temperament. As you're going up, tune octaves and twelfths. If you have more time, check the thirds. Go up by octaves and come down by fifths, and then fourths for the first octave above F4. Above there the fifths are harder to hear, so listen to 12ths. Ask yourself how much time you have, how hard it is to tune the piano, and is it worth it to correct these notes?

Steve Brady's Judgement Scale

- Tuning pin friction vs. string friction should be balanced.
    - Tight pins with low string friction are hard to tune.
    - Loose pins and tight strings

Especially on studio pianos, the devices tend to tune the low tenor flatter than he likes. The upper bass and the low tenor might come out better tuned by ear. Dan Levitan made a graph of inharmonicity where you can have either the octave or the fifth in tune, but not both. Don't let your thirds be upside-down. They should be in the ratio of 4:5. It's OK if they are the same in the problem area; you don't want the lower faster than the upper, so compromise with same speed.

Don Manino said sometimes a piano sounds bigger if you push the low bass down. With the RCT, make sure the chords are below where you want them to be. Joe thinks the pure 12^{th} tuning makes the 3rds a bit too fast. Joe tunes by 10ths down to C1, and then does 7ths below that.

Because the machines are so good, aural tuning is a dying art. Learn to tune well aurally. You are more a part of the piano. What if your device is broken or the battery dies?

DON'T LEAVE YOUR EARS IN THE CAR

Using Aural Checks to optimize Electronic Tuning

Joe Goheen, March 2020

Considerations:

How accurate does the tuning need to be:

- Time constraints
- Quality of Piano
- Player, (Audience)
- How was the tuning when you started? Think amount of improvement, not perfection
- What other work does the piano need?

Rank of importance of accuracy

- Unisons, especially octaves 4, 5 (6), then 3, bass, 7
- Octaves
- Temperament

Procedures:

Raising pitch: If 25 cents or more flat. Use a piano on file for pitch raise, and possible final tuning, especially if a tuning file for the same model is available.

For fine tuning, sample piano, then fine-tune all A's to RCT, check aurally (determine accuracy needed from above considerations)

If piano is, out 10 cents or more, strip mute all, tune all center strings to etd, unisons by whole steps. I usually add 7% overpull to compensate for not tuning unisons as I go.

Use Levitan C-lever for grands in tenor and Treble I, standard lever in bass and Treb II, Left-handed,

Moderate pitch correction: Maybe unisons as you go, Treb II lef- handed

Starting in good tune: Strip mute bass and Tenor, single mute treble, especially for uprights, papps mute. Grands: Unison down note by note in tenor, whole steps in bass bichords. Uprights: unisons in whole steps – mute every other unison, tune bottom row first.

Final tuning: Play through a temperament octave (or 2) on fine tune mode. Mental note discrepancies. Make obvious corrections. Play parallel 5ths, 4ths Fix worst interval(s) as time allows.

Play contiguous intervals, each note. Re tune as needed, go for worst one until time runs out.
Check parallel 3rds, M 6ths if time. Contiguous M3rds not upside down (maybe even)

Factors to consider in deciding whether to move a note

Time constraints

Tuneability (refer to Steve Brady's pin vs string friction graph)

Required accuracy: Decide on a bracket of acceptable accuracy

Will it improve most intervals, or make any worse? Use pre-tuned note an octave above, eg.

If time allows, use etd, Check notes aurally for acceptability

Below temp: 4^{th}, 5ths, M3rds, m3M6 octave test, parallel 3rds, 10ths, or M6ths

Above temp: Octave, 5^{th}, 4^{th}, 12^{th}, double octave, 19, triple octave. (quick check octave, 12^{th})

More refinement, 3,10,17 17^{th} should be between 3^{rd} and M6, (=M6 for pure 12^{th})

I typically use octave tuning style 4 in RCT. Sample piano, then tune all A's and check aurally. Many folks are tuning pure 12^{th}s.

Leave low bass mono chords flat to RCT, then tune aurally. They often sound better pushed down or tune out objectionable harmonic.

Check speed of M3rds going down from temperament. Not too fast or slow. Keep 10ths, 17ths alive all the way down (harder to hear on small pianos).
Other bass checks: 12ths, m14th (octave or 2 plus b7th)

Hammer technique

Practice and develop a variety of tuning techniques for different situations (your bag of tricks).
Practice on pitch raises and in less critical situations.

Rock up and down in line with string to test neutral position of pin, and whether sharp or flat

Tune from below. Feel pin move in block. A light lever makes this easier. Smooth pull to just above pitch, then settle (remove twist in pin). It may help to press down on lever (grand) when turning, especially with very tight pins, then pull up slightly to render string through friction points.

For very high string friction, less or no overpull. Maybe leave low and flex pin to pull pitch up.

Tuning from above: Turn pin to just flat, then raise to just sharp, settle. Maybe pull up from plane of string to counter pin flex, then push down to settle.

Flex pin in line with string (amount depends on piano) to test stability.

Light weight lever with ball end will be easier on your body.

Levitan C lever—I use this for raising pitch in grands, with etd. Harder to use with intervals. Keep upper arm close to your torso for better control. Settle pin back to remove twist. The theory is the pin doesn't flex, or "flag-pole", but I find flexing will often change pitch, especially to lower it. Great for tuning unisons in whole steps with strip mute every other unison. No moving mutes.

Impact lever (I use a Reyburn). Use with Etd, piano stripped out. Best for moderately tight pins. Not so useful for very tight or very loose (at least for me). Practice with pitch raises. Settle pin gently.