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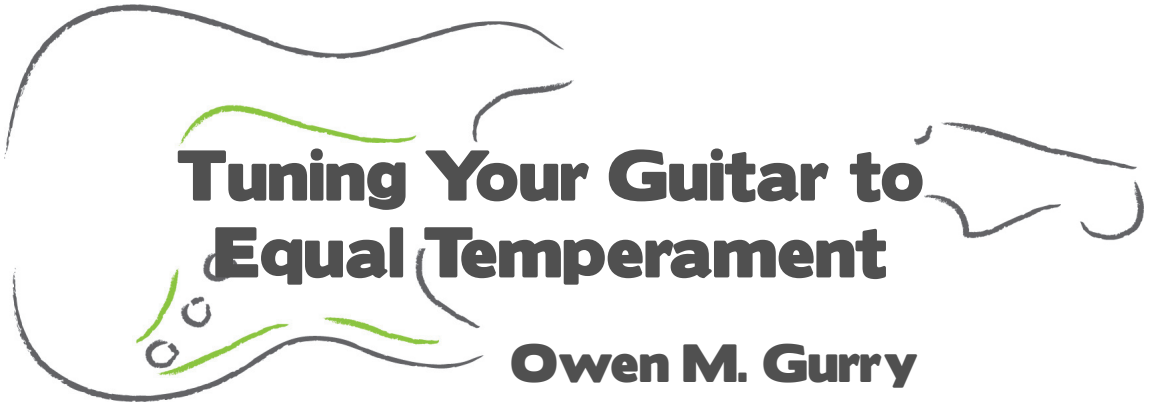

Tuning Your Guitar to Equal Temperament

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Owen Gurry Guitar Tuition

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Tuning Issues and Equal Temperament

Playing in tune is extremely important, and is too often neglected by guitarists. Tuning is a potentially difficult issue on the guitar.
In Western music (what most of our ears are accustomed to and judge “in tune” relative to) an octave is dividied into **12 equal steps**. This is often referred to as “twelve tone equal temperamant” or 12-TET for short. The problems start because when we divide an octave into 12 equal steps the intervals between each note do not match “pure” intervals (that is, mathematically accurate “harmonic ratios”). Critically, this means that if you tune to pure tones (by using an electronic guitar tuner for example) you will be unacceptably out of tune for most keys. This can get complicated so we will leave out some of the technicalities and concentrate on what the implications are for guitarists.

What it means for guitarists:
Having 12 notes and wanting to play in all keys means a compromise where each key must be equally (albeit slightly) out of tune. It is important to NOT use harmonics* at the 7th fret as a point of reference. Harmonic tones at the 7th are pure 5ths whereas 5ths in equal temperament must be lowered slightly. However, Harmonics on the 5th and 12th (being one and two octaves above the open string) are useful as reference tones.
In practice all this means being aware of how tuning works and how to tackle the challenges. You might have noticed that your open chords sound beautiful but chord forms higher up the neck sound out of tune despite your intonation being acceptable. This is likely to be the result of tuning open strings to pure tones.

Tip: To minimise tuning issues make sure that you always stretch your strings properly when you change them. For maximum stability, give each string a good tug at every fret after you’ve fitted them. Keep doing this until strings remain in tune.

Use the method overleaf to tune to equal temperament.

**NB: “Harmonics” are notes played by lightly placing your finger on the string above the indicated fret but NOT enough to fret the note against the finger board.*

Method for Tuning to Twelve Tone Equal Temperament

1. Tune the 1st (high e) and 6th (low E) strings

- Tune the 6th (low E) string using a tuner or by ear, referencing a well-tuned piano/keyboard.
- Play the harmonic at the 5th fret of the 6th (low E) string. This is your reference tone.
- As it sounds, adjust the 1st (high e) string until the open string is in pure unison with your reference tone.
- You now have the 1st (high e) and 6th (low E) strings in tempered tuning.

2. Tune the 4th (D) string

- Play a harmonic at the 12th fret of the, now in tune, 6th (low E) string. This is your reference tone.
- As it sounds, play an E note on the 2nd fret of the 4th (D) string and adjust the string until that E is in perfect unison with your reference tone.
- You now have the 1st (high e), 4th (D) and 6th (low E) strings in tempered tuning.

3. Tune the 2nd (B) string

- As above, play a harmonic at the 12th fret of the 4th (D) string. This is your reference tone.
- As it sounds, play a D on the 3rd fret of the 2nd (B) string and adjust the string until that D is in perfect unison with your reference tone.
- You now have the 1st (high e), 2nd (B), 4th (D) and 6th (low E) strings in tempered tune.

4. Tune the 3rd (G) string

- Play a harmonic tone at the 12th fret of the, now in tune, 4th (D) string. This is your reference tone.
- As it sounds, play a D on the 7th fret of the 3rd (G) string and adjust the string until that D is in perfect unison with your reference tone.
- Double check: play a harmonic tone at the 12th fret of the 3rd (G) string against a G played on the 3rd fret of the 1st (high e) string. The two notes should be in perfect unison.
- You now have the 1st (high e), 2nd (B), 3rd (G), 4th (D) and 6th (low E) strings in tempered tune.

5. Tune the 5th (A) string

- Play an A note on 2nd fret of the, now in tune, 3rd (G) string. This is your reference tone.
- As it sounds, play a harmonic at the 12th fret of the 5th (A) string, and adjust the string until that A is in perfect unison with your A at the 2nd fret of the 3rd (G) string.

Your guitar is now tuned to equal temperament.

Quick Reference Tuning Guide.

- Tune the Open E and e strings so that they are in perfect unison. The open high e string should be in unison with the harmonic at the 12th fret of the low E.
- Tune the E note on the 2nd fret of the D (4th) string to the harmonic at the 12th of the E (6th) string.
- Tune the D note played on the 3rd fret of the B (2nd string) against the harmonic on the 12th fret of the D (4) string.
- Tune the D note played at the 7th fret of the G (3rd) string against the harmonic on the 12th fret of the D (4) string.
- Check the harmonic at the 12th fret of the G (3rd) string against the G note played at the 3rd fret of the high e String. If this is not in tune, something has gone awry in a previous step.
- Tune the harmonic at the 12th fret of the A (5th) string against the A note played on the 2nd fret of the G (3rd) string.

Tuning Your Guitar to Equal Temperament

Being out of tune is an all too common problem for guitarists. One of the most common issues is that of equal temperament. In Western music (what most of our ears are accustomed to and judge “in tune” relative to) an octave is divided into 12 equal steps. This is often given the snappy title of “twelve tone equal temperament” or 12-TET for short. The crux of the issue that “pure” or ‘just” intervals (i.e. mathematical accurate difference between two given notes) cannot add-up to 12 equal steps. Use this step-by-step guide to tune as accurately as possible

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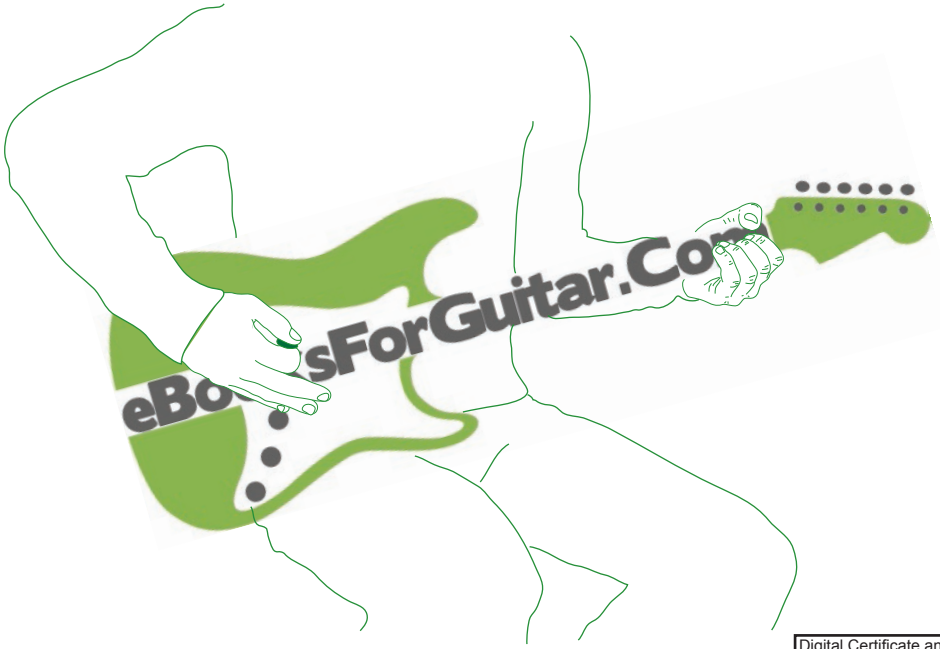

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