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STROBE TUNERS

The Sound of Precision.

Steel Guitar Tuning Tips

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Strobe Tuners for Steel Guitar

STEEL GUITAR TUNING

What is sweetened tuning?

Up to now, the word temperament has been used mainly in conjunction with keyboard instruments and is defined as a way of placing the 12 notes of the chromatic scale at varying degrees of pitch from one another. We at Peterson Tuners thought it was high time a name was coined which described altering the pitch of some or all of those notes. We came up with the name “Sweetener” which means any variation from Equal temperament when tuning an instrument.

Choices when tuning

The old argument about whether one should tune to Equal Temperament or Just Intonation misses the point that a musician should view tuning as an ***effect*** - not a *right* way or *wrong* way to voice an instrument. There are ways to design a tuning to take advantage of a particular instrument’s attributes or compensate for an instruments flaws, but to do that, we need to know the difference between tuning one way as opposed to another.

Intervals

Two pitches sounded together create an interval. The most common intervals are
The fifth = two tones separated by 6 semitones in a chromatic scale (example C4 and G4 played together)
The fourth = two tones separated by 4 semitones in a chromatic scale (example C4 and F4 played together)
The major third = two tones separated by 3 semitones in a chromatic scale (example C4 and E4 played together)
The minor third = two tones separated by 2 semitones in a chromatic scale (example C4 and D# played together)

Consonance & Dissonance

The terms consonance & dissonance describe the degree of harmony of an interval. The closer the interval is to being beatless, the more consonant it is said to be, the farther away from that point the more dissonant it is said to be.

Perfect Intervals

Perfect intervals are those that are at their highest degree of harmony, the only perfect interval in Equal Temperament is the octave. Just Intonation offers perfect octaves & thirds and Pythagorean offers perfect octaves, fourths & fifths. Not all perfect intervals share the same degree of consonance, the octave and fifth are considered to be consonant, but the fourth and major & minor third, though also consonant, are said to be imperfectly consonant.

What makes an interval perfect?

When two pitches are sounded in a perfect interval, a third sound called the *resultant tone* is produced, this is half the difference in Hz between the other two pitches and will reinforce the harmonious quality of the interval by being perfectly consonant with the partials or overtones of one or both notes. In an equally tempered interval, this effect does not occur.

What is a Partial?

Every sound is made up of partials. Partials are the DNA of a note or the audio equivalent of mixing colors together to get another color (RGB), many refer to them as overtones. The first partial is the fundamental note, the second partial is one octave above that, the third partial is a fifth above the
fundamental and so on, each partial being a division of the one before it in the harmonic series of a sound.

Difference between Equal Tempered and Perfect intervals

Equally tempered fifths are 1.9 cents flat of being perfect
Equally tempered fourths are 1.9 cents sharp of being perfect
Equally tempered major thirds are 13.7 cents sharp of being perfect
Equally tempered minor thirds are 15.6 cents flat of being perfect

Does 1.9 cents make a difference?

Take an instrument like the violin or fiddle, tune it to Equal temperament and let a fiddler play it. The chances are that he/she will stop and retune immediately. When you're used to hearing perfect intervals, which is traditionally how violins are tuned (perfect fifths), the difference is very obvious when those intervals become Equally tempered imperfect intervals.

If I sweeten the tuning on my steel, won't I be out of tune with everyone else?

Other instruments use different tuning methods too! An orchestra comprises of stringed instruments tuned to perfect fifth intervals, horns in Just intonation and tuned percussion instruments which are often 8 cents sharper than the other instruments, last but not least the concert grand piano is stretch tuned to the tune of 20 cents flat in the lower octaves to 25 cents sharp in the upper octaves. The regular guitarist rarely has these things on his mind onstage, and many can only recognize an out of tune octave interval. The steel guitarist is almost like a horn player, having much more freedom and the harmonious interval is one of the reasons why, like a good horn section, a good steel guitar sound stands out from the band.

If perfect intervals are so good, why doesn't everyone use them?

Not all chromatic instruments can produce more than a few perfect intervals, very few stringed & fretted instruments can because the relationship between the notes changes when the root of a chord changes. This would involve retuning before every chord change, which is only possible on steel if we consider the fact that pedals & levers "retune" the guitar as does the bar.

If I can't make all intervals perfect, is there a point to trying at all?

Yes! The most important tools a musician has at his or her disposal are phrasing and voicing, the voicing of a less than perfect interval builds tension and fills the listener full of expectation and longing for a resolving perfect interval, to balance the dissonance of the preceding interval or chord.If you avoid the perfect interval by using strictly Equal temperament, you will be giving away this chance to play with the emotions of the listener and your sound will be bland & lifeless in comparison.

What about playing single note runs?

Many say that single note melody lines can be all over the place in terms of tuning, but most are trying to emulate the human voice, which is incapable of imperfect intervals and will always strive to be consonant by nature as the last note lingers in the mind. So although its not as apparent, melody needs to be harmonious too!

What about cabinet drop?

Cabinet drop is something we all have to live with, to a more or lesser extent, depending on the degree. **However, one more variable does not mean that we shouldn't strive for better tuning, to make our playing more eloquent.**

Preparation

1. Ensure that the strings are fresh and not old, dirty or damaged.
2. Operate pedals & levers a few times before tuning to check for smooth travel make sure nothing is snagging and that the strings are stretched sufficiently.

Interpreting the screen of a Peterson VS tuner

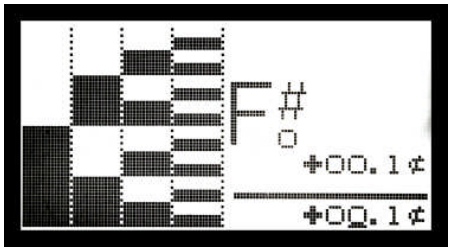
The image on the left drifts upwards to indicate a sharp note, and downward indicating a flat note. The note name is displayed on the right of the strobe image, accompanied by the octave in which that note is located.

How to measure a sweetened or favored tuning's offsets

As all temperaments or sweeteners are shown as offsets of Equal temperament, to measure a tuning you have arrived at by experimentation, the tuner needs to be set to the EQU preset. Then, press the Cent/Hz button,

use the ↑↓ buttons to stabilize the image for each note,

The offset cents value will be on the screen.



Write these offsets down one after another with the relevant note name until all have been measured. Don't forget to take note of whether you measured your tuning with pedals down or not.

How to program your own offsets into your Peterson StroboFlip Tuner

With the tuner in the OFF position, press & hold the ON and PROG buttons. You are now in "Program" mode.....

Using the ↑↓ buttons, choose either P-1, P-2, P-3 or P-4 programmable temperaments if you need separate control over root and key parameters. Choose S-1, S-2, S-3 or S-4 to have the root and key combined.

Press the PROG button once more to begin.

The note C will be the first note to be shown, use the ↑↓ buttons to enter the desired offset value (if any) for the note C.

To advance to the next note, press the PROG button again and enter the cent value for this note as above. Repeat until all offsets are entered. **To save the settings, press the Save button.**

Press the SAVE button once more to confirm, or press PROG to return to programming.

Using your newly Programmed offsets

When you wish to tune using your newly programmed offsets, press the temperament button and choose T-1, T-2, T-3, T4, S-1, S-2, S-3 or S-4 according to where you saved the offsets. If you want the tuner to load the offsets automatically as soon as it is switched on, simply press the Save button while your chosen preset is on the screen. Now when you switch on your StroboFlip, the screen will show that you are using your programmed offsets.

Existing Sweetened Tunings
Pedal Steel Guitar

Here are some sweeteners for Pedal Steel.
Offsets for pedals/levers are shown if they differ from open string offsets.

SE9 is the *newer* tuning devised by Jeff Newman Newman

Jeff Newman's **SE9 Offsets**
(E's at 09.8 cents)

Note	***Cent Offset***
F#	+05.9
D#	-03.9
G#	0-3.9
E	+09.8
B	+07.9
G#	-03.9
F#	+05.9
E	+09.8
D	+05.9
B	+07.9

0E9 is the *older* tuning devised by Jeff

Jeff Newman's **OE9 Offsets**
(E's at +00.0 cents)

Note	***Cent Offset***
F#	-03.9
D#	-13.7
G#	-13.7
E	+00.0
B	-01.9
G#	-13.7
F#	-03.9
E	+00.0
D	-03.9
B	-01.9

Jeff Newman's settings continued

* Raises/Lowers for pedals & Levers SE9		* Raises/ Lowers for pedals & Levers OE9	
Note	***Cent Offset***	***Note***	***Cent Offset***
A	+03.9	A	-05.9
C#	-05.9	C#	-15.7.
F	-17.8	F	-15.7
G	+05.9	G	-03.9

* These settings are also preset in the SE9 & OE9 Sweeteners

Jeff Newman's **C6 Offsets**

Note	***Cent Offset***
G	+07.9
E	-03.9
C	+09.8
A	-05.9
G	+07.9
E	-03.9
C	+09.8
A	-5.9
F	+5.9
C	+9.8

* Raises/Lowers for pedals & Levers C6

Note	***Cent Offset***
B	-05.9
C#	-17.8
D	-05.9
D#	+09.8
F#	-13.8
G#	+09.8
A#	+00.0

* These settings are also preset in C6

Emmons Guitar Co. **E9 Offsets**

Note	***Cent Offset***
F#	+4
D#	-10
G#	-11
E	+0
B	+0
G#	-11
F#	-15
E	+0
D	+0
B	+0

Raises/Lowers for Emmons Guitar E9

Note	***Cent Offset***
A	-7
A#	-10
C#	-17
D	-20
F	-26
F#	+4/-22/-26
G	-15

Randy Beavers' StroboStomp
E9 Offsets

Note	Cent Offset
F#	-02.2
D#	-15.0
G#	-10.4
E^	+02.0
B	+03.4
G#	+00.0
F#	+00.0
E	+04.6
D	-01.4
B	+00.0

Randy Beavers' StroboStomp
C6 Offsets

Note	Cent Offset
D	-03.0
E^	-10.0
C	+00.0
A	-12.0
G	+03.7
E	-08.0
C	+00.0
A	+00.0
F	+03.0
C	00.0

Sneaky Pete Kleinow's B-6 Tuning

Note	Cent Offset
B	*+0.00*
C	*-27.6*
C#	*-15.7*
D	*+00.0*
E	*-03.9*
F	*-23.6*
F#	*-01.9*
G	*+00.0*
G#	*-15.7*
A	*-09.8*
A#	*-15.7*

Robert Randolph's **E7 Offsets**

Note	***Cent Offset***
F#	+4
D#	-4
G#	-4
E	+8
D	+4
B	+8
G#	-4
E	+8
E	+8
B	+8

Robert Randolph's **E7 Offsets** – Knee Levers

LKL

6th String B to A#_____-12
10th String B to A#____-12

LKV

5th String D to D#_____-04

LKR

5th String D to C#_____-8
9th String E to D#_____+4

RKL

4th String E to F_____-24
8th String E to F_____-18
9th String E to F_____-18

RKR

4th String E to F#_____+4
8th String E to F#_____+4

Robert Randolph's **E7 Offsets** – Pedals

Pedal #1

3rd String G# to G_____+4
7th String G# to A#____-12
11th String G# to A#___-12
12th String E to F#____+4

Pedal #2

6th String B to C#_____-8
10th String B to C#____-8

Pedal #3

3rd String G# to A_____+4
7th String G# to A_____+4
11th String G# to A____+4

Pedal #4

9th String E to D_____+4

Pedal #5

3rd String G# to G_____+4
7th String G# to G_____+4
11th String G# to G____+4

Lap Steel

Here are some suggested tunings for lap steel:

C6 - Six string lap steel-

Note	***Cent Offset***
C	+09.8
E	-03.9
G	+07.9
A	-05.9
C	+09.8
E	-03.9

C6 - Six string lap steel- with Equally tempered root

Note	***Cent Offset***
C	+00.0
E	-13.7 (if you modulate a lot, tune this to 6.8)
G	-01.9
A	-15.7
C	+00.0
E	-13.7

A6 - Six string lap steel

Note	***Cent Offset***
A	+09.8
C#	-03.9
F#	-05.9
A	+09.8
C#	-03.9
E	+07.9

A6 - Six string lap steel - with Equally tempered root

Note	***Cent Offset***
A	+00.0
C#	-13.7
F#	-15.6
A	+00.0
C#	-13.7
E	-01.9

C13 - Six string lap steel

Note	***Cent Offset***
Bb	+00.0
E	-03.9
G	+07.9
A	-05.9
C	+09.8
E	-03.9

C13 - Six string lap steel - with Equally tempered root

Note	***Cent Offset***
Bb	-9.8
E	-13.7
G	-01.9
A	-03.9
C	+00.0
E	-13.7

E6 - Six string lap steel

Note	***Cent Offset***
E	+17.8
B	+07.9
E	+17.8
G#	-03.9
C#	-05.9
E	+17.8

E6 - Six string lap steel with Equally tempered root

Note	***Cent Offset***
E	+00.0
B	-09.9
E	+00.0
G#	-13.9
C#	-23.7
E	+00.0

C 13- Eight string lap steel

Note	***Cent Offset***
C	+09.8
Bb	+00.0
C	+09.8
E	-03.9
G	+07.9
A	-05.9
C	+09.8
E	-03.9

C13- Eight string lap steel-with Equally tempered root

Note	***Cent Offset***
C	+00.0
Bb	-09.8
C	+00.0
E	-13.7
G	-01.9
A	-15.7
C	+00.0
E	-13.7

B11 - Eight string lap steel

Note	***Cent Offset***
B	+09.8
F#	+07.9
B	+09.8
D#	-03.9
F#	+07.9
A	+00.0
C#	-05.9
E	+05.9

B11 - Eight string lap steel - with Equally tempered root

Note	***Cent Offset***
B	+00.0
F#	-01.9
B	+00.0
D#	-13.7
F#	-01.9
A	-09.8
C#	-15.7
E	-03.9

E13 - Eight string lap steel

Note	***Cent Offset***
E	+09.8
G#	-03.9
B	+07.9
D	-00.0
F#	-05.9
G#	-03.9
C#	-05.9
E	+09.8

E13 - Eight string lap steel - with Equally tempered root

Note	***Cent Offset***
E	+00.0
G#	-13.7
B	-15.7
D	-05.9
F#	-15.7
G#	-13.7
C#	-15.7
E	+00.0

Resonator Guitar/Dobro

Here are some suggested tempered tunings for Resonator/Dobro:

Open A Tuning

Note	***Cent Offset***
A	00.0
C#	-6.8
E	+1.9
A	00.0
C#	-6.8
E	+1.9

Open G Tuning

Note	***Cent Offset***
G	00.0
B	*-6.8*
D	+1.9
G	00.0
B	-6.8
D	+1.9

Open D Tuning

Note	***Cent Offset***
D	00.0
A	-6.8
D	00.0
F#	+1.9
A	-6.8
D	00.0

* Acoustic Guitar

Here are some suggested tempered tunings for acoustic guitar:

Regular Tuning

Note	***Cent Offset***
E	-12.0
A	-10.0
D	-08.0
G	-05.0
B	-07.0
E	-03.0

DADGAD Tuning

Note	***Cent Offset***
D	+1.9
A	00.0
D	+1.9
G	00.0
A	00.0
D	+1.9

* Above tunings are available as presets in StroboFlip and StroboStomp2 tuners.

Conclusions

Looking at the above, it is remarkable how few 00.0 cent values there are listed, it just goes to show how different settings can effect a tuning, and why there is good reason to explore their affect on an instrument.

A recent survey among Steel players revealed that over 80% use a non-Equal temperament to tune their guitars, Peterson tuners are the only tuners that give you all the tools you need to consistently and accurately tune your Steel.

Equal Temperament and all of these variants are always at your fingertips with a Peterson Virtual Strobe Tuner.

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StroboSoft™ with its included E9th and C6th tuning presets can be used to tune your Pedal or Lap Steel Guitar.
User Programmable to 0.1 cent

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Since 1948