

# MORE FUN WITH HARMONICS

## TUNING, NATURAL, ARTIFICIAL, SLAP, TAP & PINCH HARMONICS

**B**elieve it or not, there is still more to be said about the harmonic overtone series. The focus of this issue's column is on useful and fun ways that guitar players have learned to use harmonics.

### Tuning

If you play the guitar, you may have used harmonics to tune your instrument or, at least, have seen other guitar players do that. There are at least two reasons why you might want to tune this way. One is that you get a sustained note because harmonics ring like a bell and seem to decay more slowly than a normal note. This gives you more time to make tuning adjustments. Another is that, with one exception, you can easily get matching harmonic pitches from adjacent pairs of strings. How perfect is that?

### TUNING WITHOUT HARMONICS (See Figure 1)

The most common method of tuning is without using harmonics: start by tuning the low E (6<sup>th</sup>) string to match a tuning fork, pitch pipe, electronic tuner or any other dependable reference pitch. Play that E string at the 5<sup>th</sup> fret and you will hear an A that should match the pitch of the next open string, the A or 5<sup>th</sup> string. This works because these strings are tuned a 4<sup>th</sup> apart. Remember that in a major scale there is a whole-step between 1 and 2, another whole-step between 2 and 3, and an additional half-step between 3 and 4. So if we add up the steps between 1 and 4 we get 2<sup>+</sup> steps or 5 half-steps. Since each guitar fret represents 1 half-step, 5 half-steps up translates to playing at the 5<sup>th</sup> fret. This relationship holds true for each pair of adjacent strings except for the G (3<sup>rd</sup>) and B (2<sup>nd</sup>) string pair. These strings are a musical 3<sup>rd</sup> apart. The interval of a 3<sup>rd</sup> consumes 2 whole-steps or 4 half-steps or 4 frets. As shown in **Figure 1**, every open string can be tuned by matching it to the 5<sup>th</sup> fret of its lower sounding neighbor except for the B (2<sup>nd</sup>) string that must be tuned to the 4<sup>th</sup> fret of its lower sounding neighbor, the G (3<sup>rd</sup>) string.

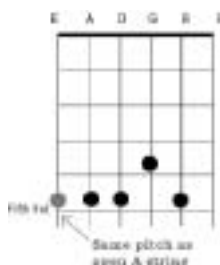


Figure 1

### TUNING WITH HARMONICS (See Figure 2)

Now let's look at how the notes lay out for tuning by harmonics on the guitar. As noted in **Figure 2**, this can be done in several steps:

Tune the low E (6<sup>th</sup>) string to some external reference.

Play the harmonic at the 5<sup>th</sup> fret E (6<sup>th</sup>) string and match that to the 7<sup>th</sup> fret A (5<sup>th</sup>) string harmonic.

Repeat step 2 method for the A (5<sup>th</sup>) and D (4<sup>th</sup>) string pair.

Repeat step 2 for the D (4<sup>th</sup>) and G (3<sup>rd</sup>) string pair.

As described in the above discussion about tuning without harmonics and shown in **Figure 1**, the B (2<sup>nd</sup>) string is a special case. Here, the 7<sup>th</sup> fret harmonic on the low E (6<sup>th</sup>) string is

played and used as a reference for tuning the open B (2<sup>nd</sup>) string.

Repeat step 2 for the 2<sup>nd</sup> and 1<sup>st</sup> string pair.

### DIFFERENT TYPES OF HARMONICS

Not all harmonics are the same, and guitarists employ a variety of methods to produce different types of harmonics.

### NATURAL HARMONICS (See Figure 3)

The most common and straightforward are the natural or open-string harmonics. Natural harmonics are produced when an open string is made to vibrate in a mode other than its fundamental mode. Remember, when a string vibrates at its full length with only the endpoints remaining stationary — that is its fundamental mode and will produce the lowest note associated with that string. By lightly touching a string with a finger of your left hand you will cause a node or stationary point at that spot when the string is played. In this manner you can cause the string to vibrate in various modes as seen in **Figure 3**. The harmonic overtone series, as mentioned in previous articles, is produced by dividing the string in half (at the 12<sup>th</sup> fret), into thirds (7<sup>th</sup> & 19<sup>th</sup> frets), into fourths, etc. You will see natural harmonics played at the 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 16<sup>th</sup> and 19<sup>th</sup> fret.



Figure 3

### ARTIFICIAL HARMONICS

While natural harmonics are played on open strings, artificial harmonics are played on closed strings—strings that are stopped or fretted. This technique is a bit more difficult. First, the position of the harmonic must be adjusted by the proper amount to compensate for the reduced length of the fretted string. For example, on a string stopped at the 2<sup>nd</sup> fret, a natural harmonic at the 12<sup>th</sup> fret becomes an artificial harmonic at the 14<sup>th</sup> fret. If you were to play the harmonics for each note in a chord you would need to reposition for each fretted note so that the layout of the harmonics would echo the shape of the fretted chord.

Secondly, since the left hand is already occupied with pressing down the frets of the chord, the right hand will have to do everything else to create the

harmonics. This means you must correctly position your right hand and lightly touch the string with either your thumb or a finger and then pluck the string with a different digit of your right hand. This is most likely how Eric Clapton played the harmonics in his break for *Bell Bottom Blues* on the *Derrick and the Dominoes* album.

One notable advantage of artificial harmonics is that it gives you the ability to apply additional effects to the harmonic. Since the string is already fretted before the harmonic sounds, you can then slide to a different fret, bend the note by squeezing the string sideways or apply vibrato.

### SLAP OR TAP HARMONICS

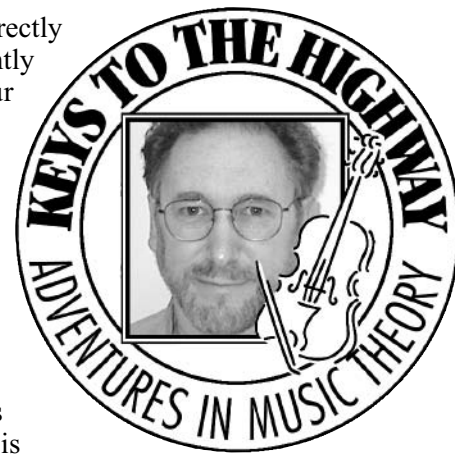
These are just natural or artificial harmonics that are played by slapping or tapping the string(s) at the spot where you would normally touch lightly to make a harmonic. This gives a percussive effect along with the harmonic sound.

### PINCH HARMONICS

Pinch harmonics produce an almost magical, squealing harmonic sound. It involves holding a pick so that just the corner is exposed and held at a slight angle to the string. Let the thumb lightly touch the string at the same time as the string is struck by the corner of the pick. A great example of this can be heard on the break for *La Grange* as played by Billy Gibbons of ZZ Top. You can also see and hear a 14 second video clip of this technique at <http://www.cyberfret.com/techniques/harmonics/pinch/index.php>.

This is how guitarists have fun with harmonics. Try some of these techniques for yourself; use them for tuning or adding interesting sounds to your music. So, keep having fun and as always stay tuned.

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