

## **PEAK PERFORMANCE**

*by Bill Conklin*

When it comes to giving a few suggestions for setting up guitars the first thing that comes to mind is the old adage, "keep it simple." So often we see books or manuals that make guitar and bass set-ups so scientific and so complicated that most players are actually fearful of adjusting their instruments; some are even afraid to change strings for fear that something may be adversely affected.

Well, forget all that. I'm going to show you how to set up a guitar the way it should be - using your senses. Playing guitar is a visceral experience, so why should setting up a guitar be any different? No one knows better than you how your instrument should be set up for your individual playing style.

If you are a heavy-handed player you will most likely want the action (string height) to run a bit higher to avoid any rattles. By contrast if you play with a light touch, the action can be set lower. Furthermore, if your guitar was playing fine just a day or two ago and has now developed a nasty fret buzz, it's time for a quick corrective measure. Before you grab your allen wrench and start raising the bridge saddles as high as they'll go, let's step back and look at the situation in proper perspective.

A set-up can include adjustments to the neck, nut, frets, pickups (if applicable) and bridge, but I am going to assume that your instrument is in good shape in terms of the basic construction (tight neck/body joint, level frets and properly cut nut height) and just needs a simple tweaking to compensate for climate changes or possibly string gauge and/or material changes.

There are normally two times a year when your neck will go haywire: spring and fall. In the spring the air becomes very humid and your fingerboard absorbs a lot of moisture causing it to back bow, which in turn, pulls the strings down onto the frets causing them to buzz. In the fall the air gets dry and your fingerboard has a tendency to bow forward and raise the strings making the neck uncomfortable. I often get the sensation that the neck feels thicker in the fall.

Similar situations will occur if you change the tension, gauge or material composition of your strings. Again, provided your instrument has not been damaged or experienced any trauma such as being dropped or loaned to a friend, the single most common source of trouble can be attributed to and alleviated by the truss rod. You can make your own truss rod adjustments quite easily and quickly without any special tools AND without fear of destroying your prize instrument if you're patient and careful. Before long you will begin to feel more confident about yourself and your guitar and it's just bound to come out in your playing ability.

The only tools you need to do a simple set-up are: a guitar tuner, the proper truss rod wrench, and an allen wrench to fit your bridge saddle height adjustment screws and intonation screws. (These last three items are based on my assumption that you are setting-up an electric guitar or bass).

If you notice that your neck is developing an overly concave(forward bow) or convex (backbow) condition you can easily check the amount of relief by fretting the low string at the first fret with your left hand and, at the same time, fretting the same string at the last fret with your right hand. Now look at the area around the 9th to 12th fret and notice the amount of space between the bottom of the string and the top of the frets. There should be a slight space between the string and frets, but not too much. This is where you usually hear about how guitar factories will use a feeler gauge to set the relief to some exact specification, but in reality, there is no "exact specification." There is no right or wrong unless there is absolutely no relief or an absurd amount of space.

The amount of relief you require for your guitar to play comfortably and without buzzing will vary and you, as a player, will have to develop a sense of "how much relief is right for you". This will probably take some time and you may have to make several adjustments to your truss rod before you get it "dialed in" just right for you.

Now that you have determined whether you need to loosen the rod to compensate for a backbow or tighten it to compensate for too much relief, it is time to find the location of your truss rod (either at the headstock or heel end of the neck), remove any covers, and identify the proper truss rod adjustment tool for your particular guitar.

Please note, there are as many truss rod wrenches as there are guitar manufacturers and it is critical that you check your owner's manual or contact your guitar's manufacturer if you have any doubts about using the right wrench. Using the wrong wrench can strip the nut. Secondly, never over-tighten a truss rod or force one that is frozen. Always loosen your strings before tightening a truss rod. Truss rods can break if over-tightened. You don't have to be scared, just be aware and be careful! So, with that in mind let's get started.

To loosen the rod, simply turn the wrench counterclockwise or use the old "lefty loosy" rule. To tighten the rod, first relieve the string tension and then turn the wrench clockwise("righty-tighty"). Never turn the rod more than a quarter rotation at a time before re-tuning and checking the relief again, using the procedure you learned above. Once you get it in the zone, let your instrument set for a day and then check it again. The neck will most likely take awhile to "settle in" and you may find that you need to make slight corrective adjustments.

Another adjustment that is worth taking a few minutes to learn is "action" or string height off the fretboard. Again, each player will have his or her own preferences based on playing style, but the technique is the same for all of us. The key is to do your best to match the height of the strings to the radius (curvature) of the fingerboard when viewed across the plane of the strings from the side of the fingerboard (perpendicular to the side of the fingerboard). Now, most players like their action as low as possible without buzz so, starting with the low E, adjust your low E bridge saddle as low as it can go without the string hitting the frets and then play the low E string up the neck from fret to fret. If it doesn't buzz, great- use that height as your reference and move to the next string. Using the radius of the fretboard as a guide, lower the A string down to where it is just slightly higher than the E when looking across the plane of the strings from the side. Again, play that string from fret to fret checking for buzzes.

Continue this process up to the D and G-strings which should basically be level with each other, but higher than any of the other strings. Then, start working your way back down on the B string (a little lower than G) and finally the E which should be a little lower than the B and roughly the same height as the low E on the other side. What you end up with is the perfect balance of string height from string to string and from strings to frets providing you with the lowest most comfortable action without buzzes.

If you should encounter a buzz on any string, you will need to raise that string just enough to alleviate the buzz and then re-set each of the other strings to achieve your balanced radius effect. If you just randomly set each string to wherever it happens to end up without buzzing, one may be significantly higher than the adjoining strings causing you to work harder and possibly miss notes.

One final adjustment that will give your guitar a better tone and maybe even make it easier to play is the pickup height (where applicable). Hold down each string at the highest fret and look to see how far away from the pickups the strings are at that position. You definitely don't want the string to make contact with the pickup or it will deaden the note or produce a rattling sound. As a general rule, active pickups such as EMG's have a low magnetic pull and should be placed up close to your strings for best results, whereas passive pickups have greater magnetic pull and should be lowered a bit to avoid unwanted distortion and lack of sustain. You can contact the pickup manufacturers via their websites for optimum set up suggestions.

The final adjustment to ensure that your guitar is playing and sounding its best is its intonation. Simply put, perfect intonation means that a string is in tune with itself as you play up the neck. To achieve this effect you will need: 1.) perfect pitch, 2.) a very good handheld tuner or 3.) preferably a strobe tuner. While most of us don't have a strobe tuner or perfect pitch, we can get darn close (usually so close as to be inaudible) to accurate intonation. The simplest way to do this is to plug your guitar into your tuner and tune the string of your choice. Next, play the 12th fret harmonic of the same string and tune it using the tuner. Now lightly fret that string at the 12th fret (right up next to the fret) and look at your tuner reading.

If the note is sharp you need to move your bridge saddle back just a tad (various bridges will require different methods to do this; see your owner's manual or contact the manufacturer). Re-tune that string and check it again. Repeat this procedure until the 12th fret harmonic and the 12th fret note are dead on. If the fretted note is flat you should move the saddle forward using the same procedure as above. This can get a bit nerve-wracking especially on a guitar with a tremolo bar, but with patience and perseverance, once you complete this process for each of the other strings, your guitar will play in perfect intonation.

Just like learning to play the guitar, learning to set one up is challenging, but with practice and determination, the results can be extremely rewarding. Knowing that you have your instrument set-up for peak performance will allow you to go out and give your own peak performance.

Good luck and best wishes,  
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