

Guitar Resonator GR-1



User Manual

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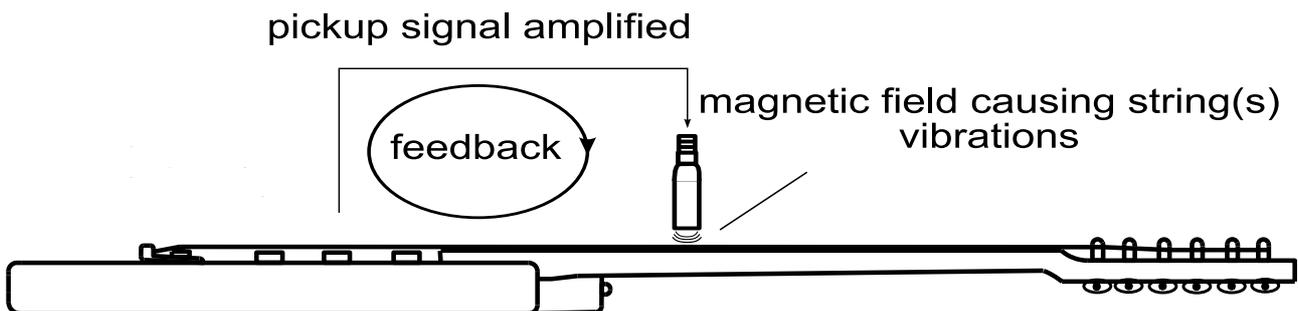
1 Introduction

Welcome to Vibesware ! Enjoy gorgeous feedbacks and have a lot of fun with the Guitar Resonator.

1.1 How does it work ?



The Guitar Resonator generates an alternating magnetic field from the guitar pickup signal. The string vibration is amplified when positioning the Resonators head near the strings. This vibration feeds back through the pickup so that a closed loop occurs:



With it you can create amazing feedback tones, sounding very natural because they come directly from the strings. Thus the sound is not comparable with well known electronically generated feedback sounds. It rather sounds like a turned up amplifier, where the string feedback comes from the sound waves.

But in contrast to sound wave feedback there are the following advantages:

- Feedback is possible *at any sound volume*, even if playing with headphones.
- This also works fine with crunch or clean sounds. With sound wave feedback it would take a really extreme amplifier gain to get the same feedback tones.
- The transition from normal tones into feedback can be controlled exactly and always reproducible. You don't need any time consuming experiments with amplifier gain and loudspeaker distance.
- By the strong magnetic field, you can generate extreme feedback tones which cannot be generated with normal amplifier/speaker feedback at all.

1.2 Differences to the EBow™ and well known Sustainers

The most popular magnetic string vibration device is the EBow™ developed in 1976. This ingenious gadget is a hand-held device build for *one* string vibrations and a lot of interesting tone effects can be produced with it. The typical EBow™ playing is a bow like movement rather than striking the strings. You put the plectrum away before playing the desired effects. With this technique cello like sounds can be produced for example. The EBow™ is used all over the world for special effects in dedicated lead phrases.

Then Sustainers entered into the guitar world, which can be found in special guitars or can be build in existing guitars. This is done by replacing the original neck pickup by a so called Sustainer pickup. Unlike the EBow™ you can play with both hands and you can play feedback with more than one string at the same time. Another difference to the EBow™ is that the sound cannot be controlled by the playing technique, because its position is fixed on the guitar.

By contrast the Guitar Resonator has the following features:

- You can use both hands for normal playing. Feedback comes by positioning the guitar neck to the Resonator. This is basically similar to the speaker positioning for normal amplifier feedback. However, feedback starting and harmonics can be controlled much better by the direct Resonator positioning. This feature is one of the main differences to the build in Sustainers. Unlike the EBow™ you get feedback with more than one string.

- Electric guitars can be used directly. You neither need a special guitar nor any guitar modifications. The Guitar Resonator is just added to the equipment you are familiar with.
- The Resonator has an external power supply, whereby the magnetic field is much stronger than battery powered devices. This gives you the ability to play with very high and low string feedback too.
- Built in Sustainers are connected to the bridge pickup, whereas the Resonator is driven by the selected pickup(s). Feedback playing with different pickups offers a lot of different feedback sounds. This feature is similar to the amplifier/speaker feedback.

In a nutshell, the Guitar Resonator is an all-purpose feedback machine. You can keep your familiar equipment and playing style when adding this new playing technique. It is easy to learn and it will give you a new dimension of guitar playing without any modification of your basic guitar sound. You can use it as a reliable tool for placing exact feedback harmonics whenever you want. But this is just the beginning. Exploring further, you will find new ways of playing guitar. And - as all good effects show - the Resonator sounds different with any player, because the sound comes not only from the device but also from the playing technique.

2 Fields of application

2.1 Feedback playing everywhere / composing / recording

- The ideal device for home recording, playing into the PC for example. Here you can directly record feedbacks even at night with earphones. So you get a sound like a turned up amplifier going into feedback harmonics. Together with PC recording tools (e.g. Guitar Rig™) professional recordings can be produced with a minimum effort.
- At recording studios you always get the desired feedback directly in the control room. Precisely and always reproducible. No matter where your roaring amplifier is placed. There are no time consuming experiments for getting the desired feedback.

2.2 On Stage

- Perfect for controllable and always reproducible feedback on stage. Independent from monitor settings and amplifier gain. This makes same results possible on large and small stages. Even if using head sets instead of stage monitors.
- There is no need to turn away from the audience to your amplifier for getting feedback. Simply move the neck to the Resonator for feedback. You can also fix the Resonator together with a microphone on a stand. Even extensive feedback actions are always possible facing to the audience.
- If you plug your guitar directly into the PA, feedback from the monitor never sounds so warm and rich like the feedback from the guitar speaker. With the Guitar Resonator you will always get the same good sound, even in this configuration.

2.3 New ways of playing

With a little practice, you will explore many new ways of feedback playing:

- Lead notes passing into feedback harmonics at once are making the playing much more powerful. It sounds very agile if tones are passing well directed into feedback while bending strings. During sustained feedback the harmonics can be changed by moving the Resonator to another neck position. This exact control is pure fun and cannot be reached with normal Amplifier feedback at all. It's either a matter of lack to get the desired harmonics or the feedback is quite out of control in case of high distortion sounds or extensive sound volume. This is probably one of the reasons, why predefined feedback tones are rarely embedded in lead compositions. In most cases, the lead is too short to wait for the feedback.
- Feedback tones create a more atmospheric playing. Some bad guys suggest it as the most effective therapy for „always speed players“. Following the less is more principle, sustaining notes with vibrato and variations of harmonics form important points of rest between speed phrases. Just these points of rest are giving the most freedom for impressiveness using feedback together with vibrato, bending and of course the tremolo !

- **Outstanding feedback can be generated from crunch sounds !**
Sounding like „ordinary feedback“ with high gain settings appears very filigree and dynamical with crunch or clean sounds. The transition to feedback is more distinctive and accentuating within the overall band sound. Particularly these feedbacks can hardly be created with normal amp feedback. We noticed that players start reducing distortion after using the Resonator for a while. Getting outstanding sustained tones with less distortion considerably improves your punch. However, more distortion makes feedback easier but it sounds more ordinary and less interesting, because these feedbacks hardly stand out in the overall sound. Someone told us he never had any problems in creating feedback. He simply cascades two distortion pedals and therewith he gets every feedback he wants. Ok, thats right. A simple solution. But that makes the difference ! Why we love tube sounds going smoothly into distortion ? A feedback tone is much more than an oscillation just to sustain the tone. It rather colors the sound depending on the individual playing technique !
- If you like playing with pitch shifting devices like the Whammy™ pedal you absolutely should work on several voice feedback giving amazing sounds neighter like a guitar nor a synthesizer.
- And of course it is interesting to use the Resonator together with other effects. Note that the Resonator Box should be connected directly to your guitar. Other effects should always plugged behind the Resonator Box. Delay effects in general sound good with feedback. But WahWah pedals and bottlenecks are well suited as additional effects too, since hands and foots are ready for control while using the Resonator. There are no limits for new ideas and settings at all.
- Last but not least, amazing sounds can be created with every piezo pickuped guitar that has steel strings ! **This is ideal for very clean feedback sounds.**

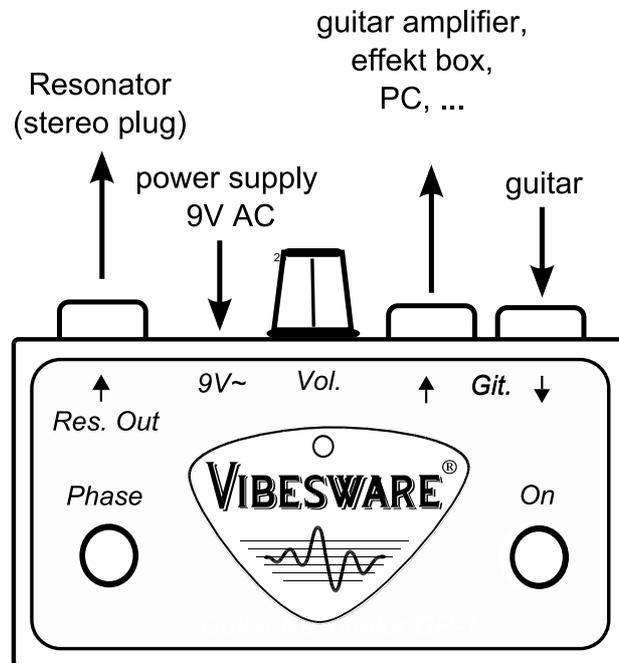
3 Start-Up

The Guitar Resonator consists of the following components:

1. Resonator Head with Gooseneck
2. Resonator Box
3. Power Supply: Prim. 230 V AC; Sec. 9V AC, 500 mA
4. Stereo Cable
5. Stand (optionally)

3.1 Connecting

Directly plug the guitar to the input of the Resonator Box. Guitar input and output are directly connected inside the Resonator Box in order to output the pure guitar signal. This output can be connected as usual with effects or guitar amplifier. With the stereo cable plug the Resonator output to the Resonator Head.



3.2 Control elements

Footswitch "On": Activates/deactivates the effect (green light).

Footswitch "Phase": Selects basic tone or harmonics feedback. The mode is displayed by the red and the blue LED at the Resonator head.

Volume for setting the Resonator power: The more power the stronger the magnetic field. High power means you don't need to go too close to the strings. More power increases the sensitivity towards undesired direct feedback from the Resonator to the pickup.

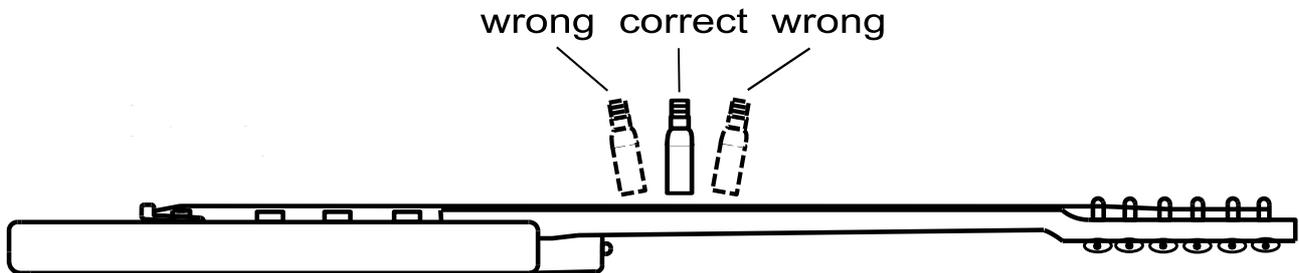
4 Playing techniques

4.1 Basics

It works easy and effective. Just hold the Guitar Resonator near the strings in the neck area. The closer the stronger the string(s) are agitated by the magnetic field. Feedback start and end can be easily controlled with the

distance. The best way to come near without touching the strings is to hold the Resonator's Head at right angles to the guitar neck.

positioning of the Resonator Head



The red or blue lights intensity depends on the signal that drives the Resonator. The brightness decreases when the string vibration dies away. Moving the Resonator closer to the strings amplifies the vibration whereby the brightness increases again. To drive the Resonator sufficiently, the gain at your guitar should be turned up to maximum. If you like playing often with reduced gain than this must be compensated with the gain of the Resonator Box. However, this will increase the unwanted feedback sensitivity at turned up guitar volume, so that eventually a reasonable compromise has to be found.

4.2 Harmonics control by positioning the Resonator

The nice thing is that you get different harmonics depending on the Resonator Head position along the neck. This is done by moving the guitar neck with your body or with a direct arm movement. Players with low hanging guitars prefer moving up the guitar neck to the Resonator (the typical Hendrix like position). Players with higher hanging guitars just need to move their body to the Resonator. However, the important thing is to come near enough without touching the strings. By the way: As we all know, new strings are essential for rich string harmonics. This holds true particularly with feedback harmonics !

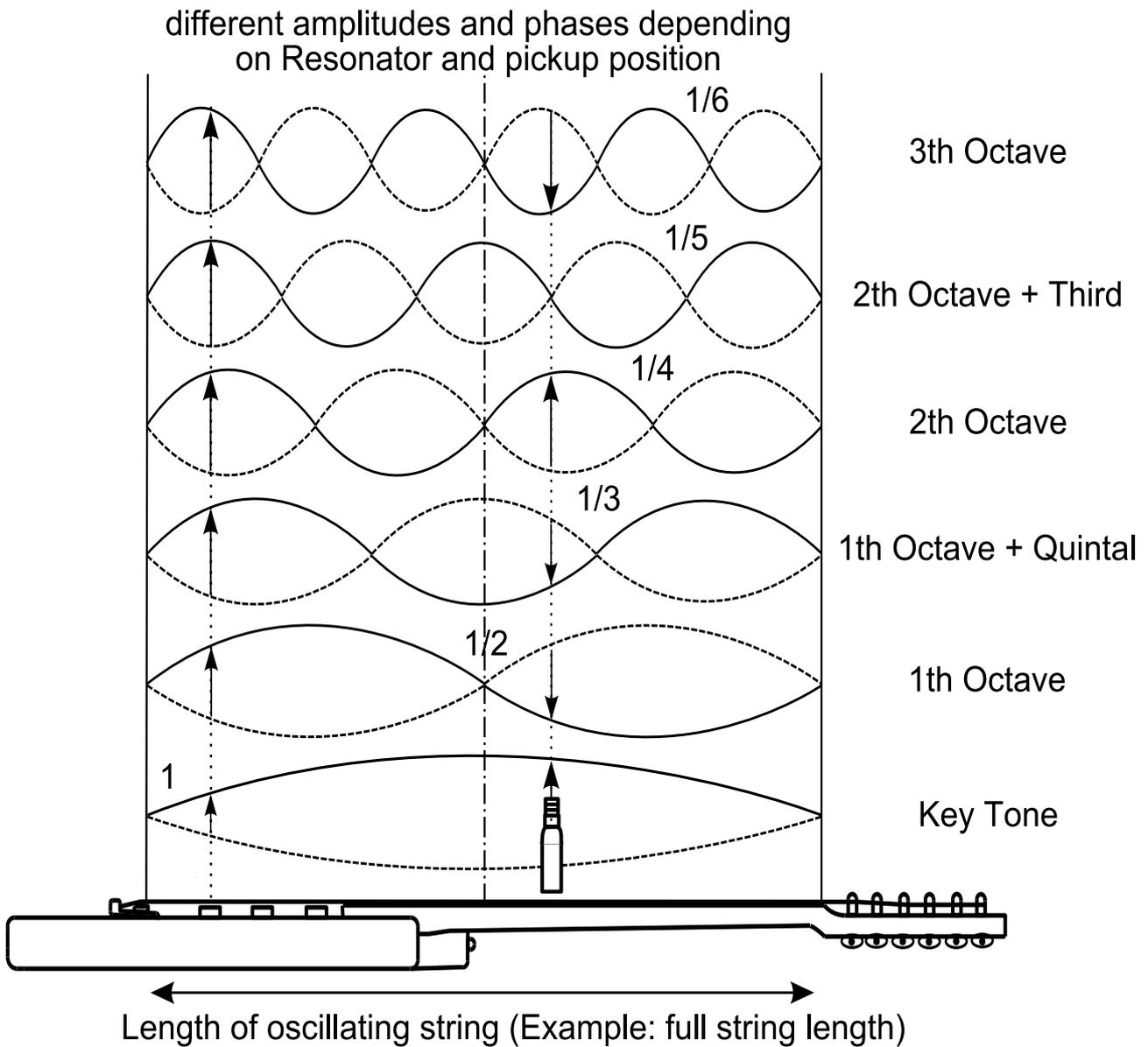
4.3 Changing harmonics by phase shifting

Phase shifting is another way to switch between basic and harmonics feedback. The phase position is indicated by the red and blue light. Phase shifting can be done as a preset or for changing the feedback tone while playing.

4.4 Some string vibration basics

Perhaps you would like to understand more about the dependencies of driven feedback harmonics, Resonator position, phase and pickup selection. In that

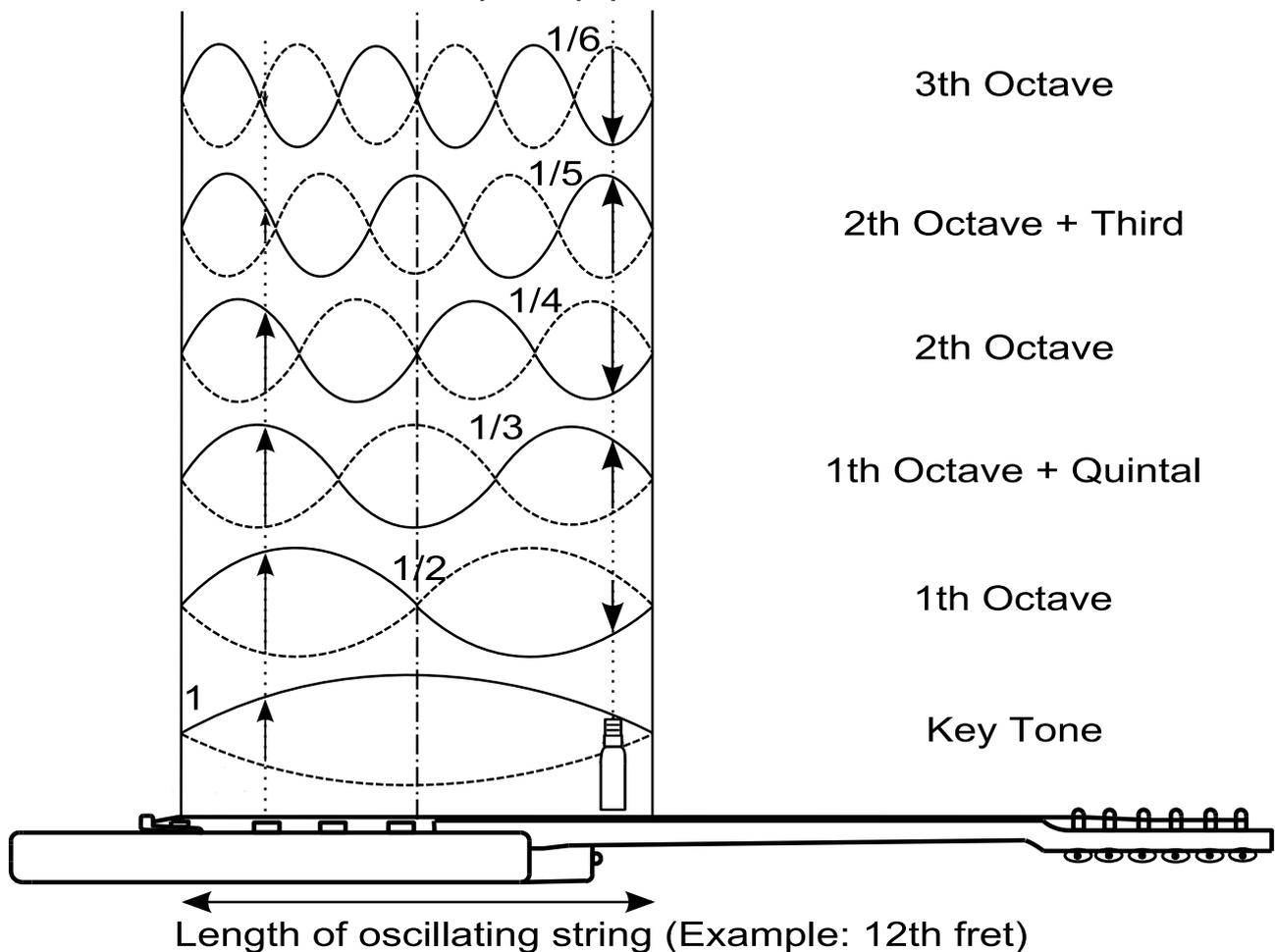
case, the theory of stationary waves might help:



The fundamental tone has one antinode with a maximum amplitude at the half length. Then the first octave occurs which has two antinodes, showing maximums at $1/4$ and $3/4$. At $1/3$ we can see three antinodes which can be found in the tone as the quintal from the first octave. The second octave shows at $1/4$ length and the third from the second octave at $1/5$. The third octave has six antinodes. The overall tone is given by the superposition of key tone and all these harmonics. The percentages of the key tone and the harmonics depend on the guitar characteristics (body, bridge etc.), the string(s), the notes played and also the way you strike the strings. The quality of the strings (old or new) also affects the harmonics mix. These pictures also show the phase shifting along the string length (the dashed lines mean the

backward string movement). The first octave for example can move in the opposite direction to the key tone along the neck. This explains why the feedback turns from the key note to the first octave when shifting the Resonators phase.

different amplitudes and phases depending on Resonator and pickup position



The Resonators oscillating magnetic field offers a spectrum of frequencies from which only string vibrations in phase are amplified. Finally, the harmonics with the largest amplitude is „the winner“. This frequency falls into feedback. At the same time, reverse phase vibrations are damped. The amplitudes of the harmonics change from zero to maximum along the guitar neck. However, phase and amplitude changes along the guitar neck are the reason for the different feedback harmonics on different Resonator positions.

If you like to go more into details, you can see that the pickup selection has an influence on the feedback harmonics too. Since the Resonator input comes from the selected pickup, amplitude and phase of the magnetic oscillation depend on the pickup position. The neck pickup for example shows much more key tone amplitude than the bridge pickup where the amplitude of the first octave is much lower. As a consequence, the pickup selection also controls the feedback harmonics. You can check this out simply by pickup switching while playing feedback.

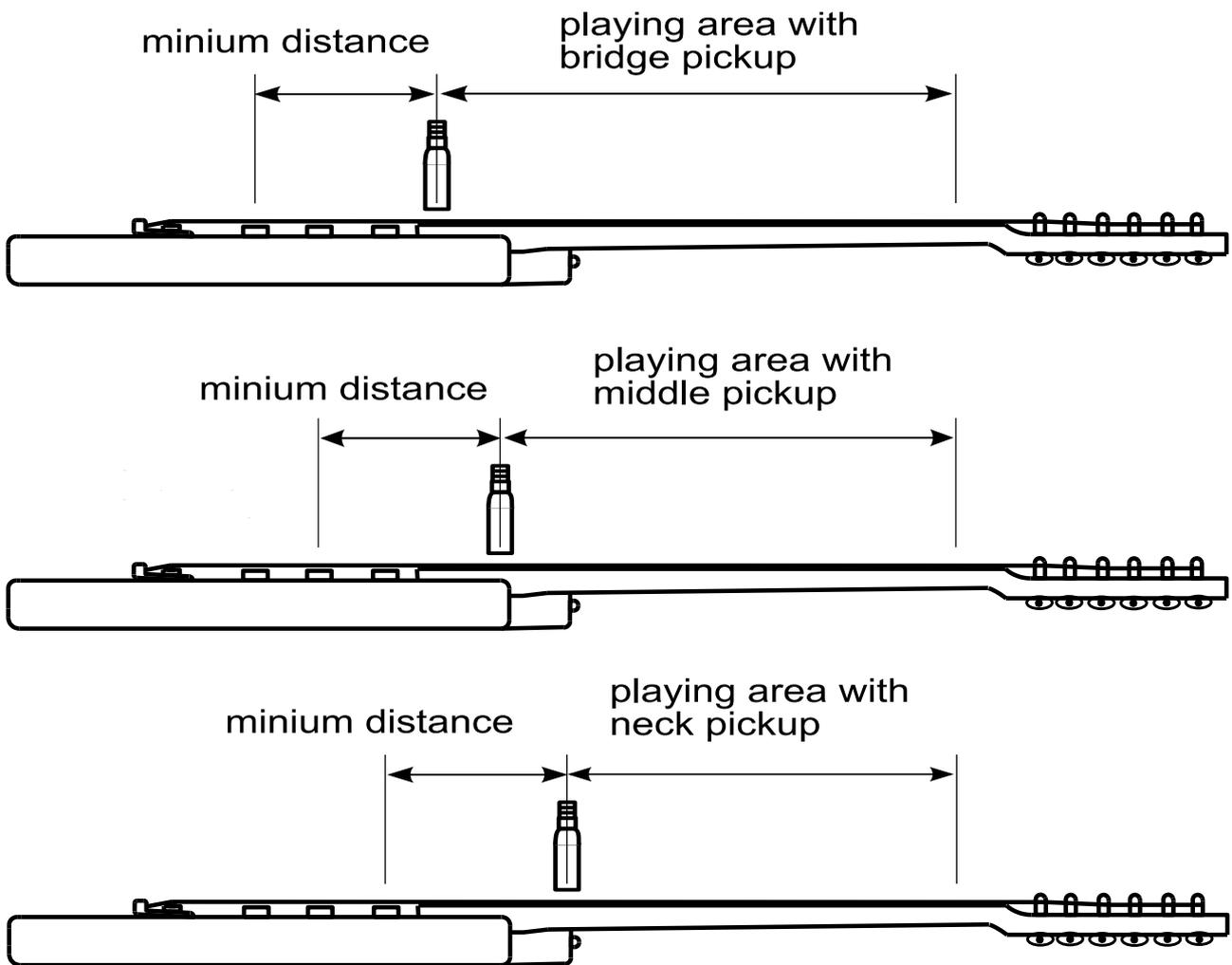
Last but not least the frequency characteristics of the pickups itself influence the feedback harmonics. All this together makes clear why the Guitar Resonator sounds individual depending on both, your instrument and your playing style.

4.5 Feedback of multiple strings

Up to three strings can be agitated at the same time. This can be used for feedback with power chords. It is normal here, that the feedback of one string dominates. This is similar to amplifier feedback but with the difference that the dominating string can be forced by the Resonators head position. This can be done by moving the Resonator from the lower to the upper strings or the other way round. By this the dominating string can be changed while playing.

4.6 Limits of playing, pickup selection and power setting

The Resonator has been designed for positioning in the neck area. Basic rule: **Keep away from the pickups!** If you are too close, an undesired direct feedback from the Resonator to the selected pickup occurs. The minimum distance to the active pickup depends on the Resonator power. 40% is a good starting point. Start playing with the bridge pickup. Normally, the overall neck area can be used with it. With the neck pickup the usable neck area is smaller.



The sensitivity not only depends on the Resonator power but also on the pickup. In general humbucker show less sensitive than single coils. With some practice you play closer by the strings which enables you to reduce the Resonator power. Then, you can also play with the neck pickup (or middle pickup). You should absolutely work it out, because these feedbacks are sounding very rich and amazing !

5 Frequently asked questions and troubleshooting

Problem	possible reason / corrective or workaround
The phase shifting does not work and there is only one LED color at the Resonator head.	Resonator Box and Head are not connected with a stereo cable
The light intensity at the Resonator Head is poor and the string agitation is weak	The guitar gain or Resonator gain is too low. Another reason might be that pickup tone control cuts the high frequencies which downgrades the string agitation particular on higher strings.
Pickup wheezing / impure tone caused by magnetic interference to the pickup(s)	<p>The distance between the selected pickup and the Resonator Head is too small or the gain of the Resonator Box is too high. Single coils are more sensitive than humbuckers. The sensitivity also depends a little bit on the phase setting. In most cases it is possible to find a gain setting where the overall neck area can be played with the bridge pickup. With the neck pickup playing up to the 12th fret should be possible.</p> <p>Another possible reason might be that there is another effect placed between the guitar and the Resonator box. In general, effect boxes should be connected after the Guitar Resonator.</p>
I am used to play with reduced guitar pickup gain and would like to use the Resonator also with this setting.	As a simple solution, you could use a volume pedal after the Resonator. If you don't want this, there is another workaround: Try to split the guitar signal with a splitter box. One signal goes to the amplifier and the other goes to a compressor/Sustainer pedal and then to the Resonator box. By this the Resonator gets a stronger signal. If the sensitivity at turned up guitar volume becomes too high, the compressor pedal can be bypassed.

