Noise Gate

Hello dear GupTech community!

As a first review, I decided to tackle a pedal that quickly becomes interesting to integrate into a system when you start to crank up the gain a little. This type of product has experienced a meteoric rise in popularity in recent years and several variations have resulted. And yes, I named Ze Noise Gate!

Since when?

Historically, according to my quick research, the first Noise Gate to emerge are the *Keyable Program Expander - The Kepex*, built by *Valley People* in the 1970s in the format of a rack module (style 500 series), and, in the 80s, the *Drawmer's DS201*, a 19" rackmount noise gate. It's hard not to mention the *Boss NF-1*, built between 1979 and 1988, or the *Boss NS-2*, still in production since 1987. A mention also to their big brother *Boss NS-50* appeared in the 90s in half-rack format during the rackmount roaring twenties. Also, around 1983-1984, Rocktron released their product *HUSH*, a noise gate model specifically oriented for the guitar. I believe that the three Boss models mentioned above were my first contact with the noise gate world. Fortunately, there has been a lot of evolution since: P! I obviously can't name them all, but here are some other popular noise gates: ISP Technologies (*Decimator, G-Str ing, ProRack G*, etc.), *MXR (Smartgate and NoiseClamp), TC Electronic Sentry, Fortin Zuul, GupTech Guul*, etc….

A noise what ?!?

First of all, what is a noise gate? The noise gate is a device for cutting or attenuating unwanted noise in the signal according to the sensitivity threshold usually established with the Threshold potentiometer. The noise gate will act to let sound through and close its door when the signal level drops below the preset sensitivity threshold. For example, when you stop playing the guitar, the noise gate notices the drastic drop in the signal and closes its door completely until just letting the small portion of the signal below the sensitivity threshold pass.

Are you sensitive?

If the sensitivity threshold is too low, even with the door fully closed, some sound residue will remain in the signal, i.e. noise, preamp hiss, or other unwanted auditory artifacts created by a component positioned before the noise gate (eg: a preamplifier with the gain at 1000/10). If the sensitivity threshold is too high, the gate will sometimes cut off a portion of the signal that we would have liked to keep intact. For example, by holding a note long at the end of a *guitaristically* incredible solo, a noise gate with a sensitivity threshold set too high will unfortunately cut the majestic note too quickly when it drops below the sensitivity threshold in terms of amplitude or signal strength. The balance between threshold and signal strength is therefore very important and can sometimes vary depending on the components in the chain (guitar, preamplifier, amp, etc.). Importantly, the noise gate will only take action on the signal placed before it. It will not be able to attenuate or cut the signal / noise created by a component positioned after.

In order to continue the description of what and how a noise gate works in more depth, why not simultaneously present a GupTech pedal! I think Emilie, and Gup would agree! I even convinced myself that Tiff would also be happy about that! Let's go!

GUULian origin

As a noise gate, GupTech has among others the Guul in their arsenal. The circuit and the name of the Guul are inspired by the Fortin Zuul. Gup + Zuul = Guul. For its part, the Fortin Zuul is based on the noise gate circuit found in the Marshall JCM800 amp, Kerry King signature version. There are now multiple noise gate variations derived from or inspired by this circuit. The circuit became so popular that the internal "chip" to make it quickly ran out of stock, or at least, more difficult to access. Gup himself confirmed to me that he was working to modify the circuit (while maintaining its efficiency and integrity) in order to get away from this supply problem related to this type of "chip". In terms of the differences with the Zuul, Gup has also developed the circuit so as to offer users who wish it the possibility of using the pedal in 4CM mode, that is to say with 4 cables (method discussed in the section next).

The key to success and the different connections

The popularity of this noise gate lies in its efficiency, speed and ease of use. When used in its optimal configuration, in an amp FxLoop with the key input as a reference, this noise gate becomes the perfect tool for ensuring guitar performance without unwanted noise. Personally, this is where I usually get the best results (see Figure 1). The key input on the side of the pedal sends the input it receives to the noise gate as a reference signal. The purer the signal, that is, the closer it is to the guitar, the better the response and the efficiency of the noise gate at cutting or attenuating unwanted noise. By comparison, if the key input receives a saturated or distorted signal and passes it to the noise gate as a reference signal, the resulting processing will certainly be less precise. The noise gate will have more difficulty in properly analyzing the signal and its efficiency will suffer at the same time.

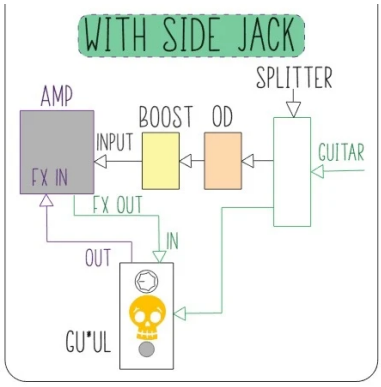

Figure 1. 3cm method

As mentioned in a previous section, the noise gate can attenuate or cut only the unwanted noise generated by the components positioned "before its gate". All noise generated by components placed after the noise gate circuit cannot be removed. The positioning of the gate is therefore crucial. Adding the Key Input allows you to indicate an external reference to the noise gate, regardless of its location. Usually the noise gate simply uses the incoming signal as a reference which can greatly affect its efficiency depending on its location.

As an example, let's take the configuration of Figure 1 by removing the input from the key input. We end up with a noise gate plugged in as in Figure 2. Although functional, this system makes life difficult for the poor gate of the noise gate. Indeed, it receives as a reference the saturated signal from the preamplifier plus the saturation of the OD / Boost placed on the front. The sound processing of the noise gate is therefore much less efficient and the sensitivity threshold will have to be higher in order to compensate for this lack of finesse in the analysis. This inevitably

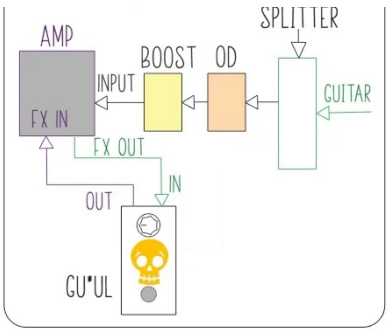

Figure 2. Method not recommended 2CM

Figure 3. The key to information

results in a loss of momentum or a feeling that the notes are ending or cutting faster than desired. Simply put, the door no longer knows when exactly it should close. The user ends up considerably raising the sensitivity threshold in order to compensate for this lack of responsiveness of the door. This is when key input gets off the ground and becomes very useful. This small key of information allows the door to see more clearly through the signal clutter by giving it access to an external reference. As a result, it is essential to use a pure sound source for the key input and very close to the guitar signal. The ideal is to place a buffer / splitter directly at the start of the chain. Thus, the key input will receive an exact copy of the guitar signal, unmodified by any effect or overdrive.

At the risk of repeating myself, when the key input is plugged in, the noise gate no longer relies on the signal coming in through its top connectors (in the case of the Guul) to decide whether to close or open its door. Rather, the noise gate relies on the flow of information arriving through the key input. In 4CM (see Figure 4 for the connection), the signal which enters by the key input is quite simply transmitted to the connector on the opposite side of the case (see Figure 3) to continue the chain of effects as if nothing had happened. This method is used in the event that a person does not wish to add a buffer / splitter to their system. In 3CM, the left connector simply remains unused (see Figure 1).

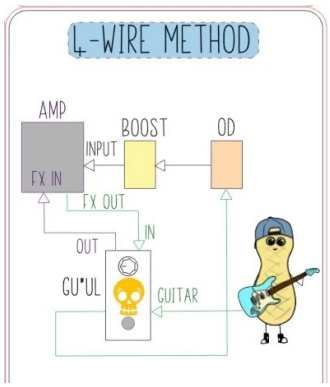

Figure 4. 4CM method

Finally, the beauty of key input is that you can assign whatever signal you want as a reference for the noise gate, no matter where the noise gate is located.

Yes, it is all beautiful, but how do I plug it all in?

Connection with FxLoop of an amplifier

The ideal is to opt for the 3CM method (see Figure 1) or otherwise, to fall back on the 4CM method (see Figure 4). I tend to favor the 3CM method because it is easier to later isolate the possible "ground" problems that can be caused by this type of connection. The 4CM method tends to be more finicky at times, but can also give interesting results. I will come back to this subject at the end of this chronicles as a bonus ;) !

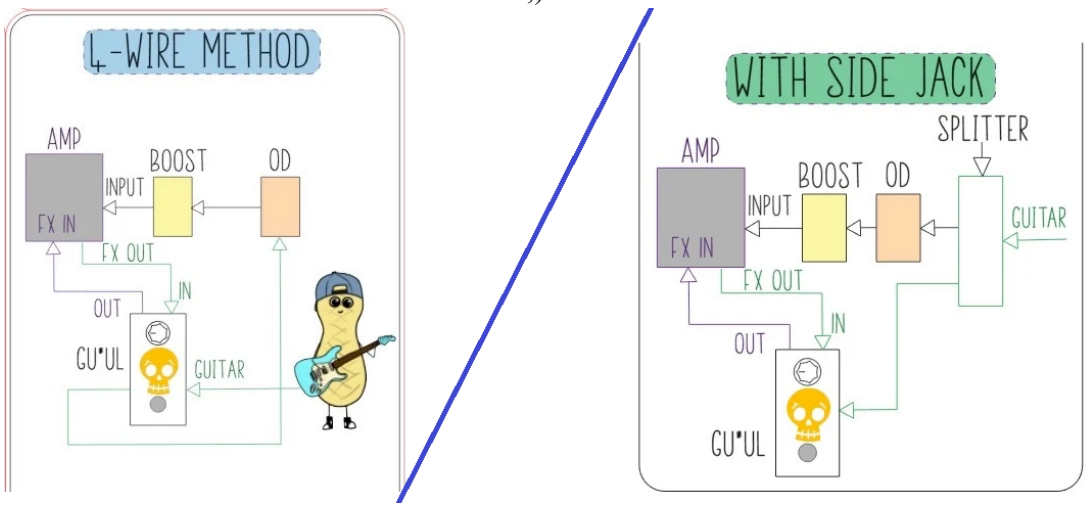

Figure 5. Recommended connections with amplifier FxLoop

Connection without FxLoop

Right off the bat, you have two options: use the key input or not use this little key of information. If you opt not to use it, you just need to plug everything in as shown in Figure 6. As a guide, this way if you are using the saturation of one channel of your amplifier, you will not be able to remove the hiss / noise generated by the latter. Due to its position, the noise gate can only attenuate the noises created by the components placed in front of it (eg: pedals on the front panel + the guitar).

If you want to use the key input, you can refer to Figure 7 which illustrates this connection. This scheme becomes particularly interesting if your system includes overdrive / distortion pedals on the front panel. By opting for the key input, the noise gate will thank you and ensure flawless performance, no matter how much gain your favorite distortion pedal sends. I have illustrated this connection in 3CM (3-wire method), but it can also be

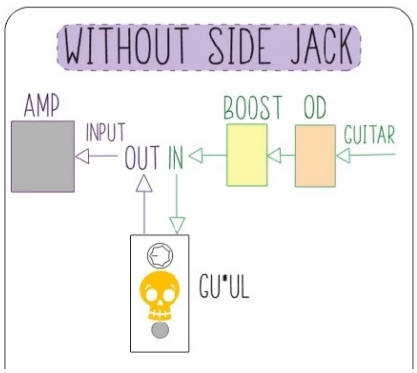

Figure 6. Guul on the front

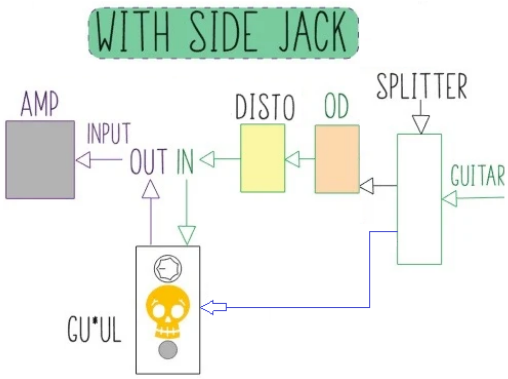

Figure 7. Using the 3CM key input on the front

done in 4CM (4-wire method). It would suffice to plug the wire of the guitar directly into the key input of the noise gate and connect the left output of the latter to the first pedal in the chain, that is to say the OD (taking the example of Figure 7). Again, it is important to stress that due to its positioning, the noise gate will not be able to attenuate or cut out the noises generated directly by your amplifier circuitry. At the risk of repeating myself, the positioning of the noise gate is crucial in its operation, as is the established sensitivity threshold (the Threshold potentiometer).

Ze LowMode and HighMode threshold switch

In this regard, I believe it is relevant to deepen the operation of GupTech's Guul by emphasizing the need to properly configure the internal switch. The latter changes the extent of the potentiometer controlling the sensitivity threshold. By setting the switch to HighMode, the sensitivity threshold range becomes much wider, which helps the gate to function properly when it receives "BIG signal". Conversely, with the switch on LowMode, the range of the sensitivity threshold becomes smaller. Thus, you will have to increase the potentiometer more to succeed in attenuating unwanted sounds or noises of high caliber. Usually it is suggested to set HighMode when the noise gate is positioned after a preamplifier and / or in the FxLoop of an amplifier. Conversely, it is generally advisable to set the internal switch to LowMode when the noise gate is placed on the front panel. Having said that, it is best to test both options in your setup and see which one works best for you. Again, the scale is very thin. The better the sensitivity threshold calibration, the better your sound flow will be, as will your *guitaristically* incredible solos ;) !

With the other pedals, where do we put it?

Chains of effects have some basics to follow, but the ideal is to test with our own ears and our own system. However, it is imperative to position the noise gate before time-based effects (eg: Delay, Reverb, Echo, etc.). Otherwise, the noise gate will attenuate and / or cut the effect's drag when it drops below the set sensitivity threshold. For example, the delay repeats will be "eaten", or the reverb will be muffled by the noise gate crashing into its cavernous hiss.

In terms of efficiency, it is smart to position the noise gate after the components that generally create a lot of noise. Again, this may depend on companies, product lines and system configuration, but usually the effects or components that generate noise are: overdriven amp channels, distortion pedals, overdrive pedals, saturated tube preamplifiers, etc…. Roughly speaking, anything that amplifies the volume or affects the gain of the signal.

Bonus section : Ze Ground Loop!

The ideal system would probably be a configuration where the noise gate has no place because the noise level is negligible and low. In reality, as soon as the gain rises, the noise has no choice but to increase in terms of sound amplitude as well. As a result, the noise gate quickly becomes interesting / necessary as an element to add to a system (especially if you play "HEAVY" music). On the other hand, it can sometimes be capricious to integrate into a system depending on the desired configuration. The 3CM and 4CM methods (3-wire or 4-wire method) tend to create ground loop disorders. This phenomenon comes into play as soon as a product is grounded with several points at different places in the chain (be it a noise gate, a pre / post delay, a pre / post multi-effects, etc.). In the case of the Zuul / Guul, the box becomes grounded at a place in the system with the connectors at the top of the pedal, while the connector on the side (or the connectors in the case of the Guul in 4CM), becomes grounded at another location in the chain. This results in the appearance of "huuuummmmm" noise that cannot be suppressed with the noise gate, even if the sensitivity threshold is raised to its maximum.

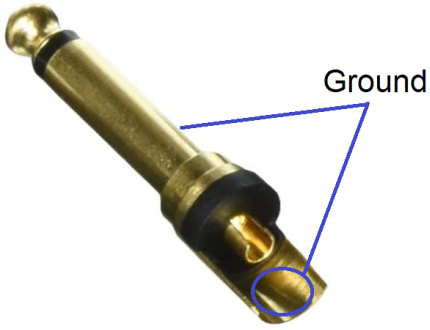

Figure 8. Location of the ground

The trick to fixing this type of problem when it occurs is to remove a ground point being connected to the noise gate housing. In the case of the Zuul / Guul, the easiest way is to disconnect the ground from the cable plugged into the key input. To do this, some buffers / splitters integrate this function which is called "Ground lift". Once this function is activated, the ground part of the cable is bypassed from the signal, which has the effect of removing the excess ground, and at the same time, the noise associated with the ground loop. Another way to do this is to simply manually cut the ground part of the connector plugging into the key input.

Figure 9. Grounded, not grounded?

Ideally, you should open the cable, unsolder the ground part of the connector and take care to secure everything when closing. As an indication, the part of the cable attached to the ground will be soldered on the part circled in blue in Figure 8. The part below the black ring located at the end correspond to the ground section making contact with the key input of the noise gate box in this specific case.

In summary, by "ground-lifting" with a product having this function (eg: buffer / splitter), or by manually disconnecting the ground from the cable plugged into the key input, the noise gate box now becomes grounded in one place in the chain with its 2 connectors located at the top of its housing

(see Figure 9).

And after that? Why not two?

Question of ending the text in opening, some users even now advocate the idea of adding a second noise gate to the chain in order to act even more quickly and more effectively on unwanted noise. A system structured in this way would include a noise gate on the front of the amplifier, as well as a second noise gate in the latter's FxLoop. I have never tried the experience, but I intend to test it soon. In my opinion, the ideal would be to use two Guul in 3CM with, on the front, a 1x3 buffer / splitter equipped with isolation transformers. The splitter would transmit the signal to the main chain and simultaneously to the two key inputs of the two Guul. In this way, the Guul in front of the amplifier as well as the Guul in the FxLoop would receive an identical signal through their respective key input. Then, it would be sufficient to simply adjust a different sensitivity threshold for each Guul and test, in both cases, which of the internal switch positions is best suited to the location of the noise gate.

Here you are giving me ideas. I went back to my tests. I will probably come back to you in a near future with another Gear-Gup chronicles ;) !

Gear On / Rock On

Plem