

Neo Fuzz

Owner's Manual

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Howdy!

Congratulations on purchasing the MI Audio *Neo Fuzz*. I sincerely hope that you like your new pedal, and that it gives you years of great tone. I've worked really hard on this one to produce something new and unique in the world of fuzz pedals, and it is my hope that I've created something which will be of great service to you tone wise.

In creating the Neo Fuzz I wanted to make something which would allow you not only to create the sounds of the past, but also which gives you the ability to tailor your sound to create new sounds. At last, a *new* fuzz pedal, not another clone or mod! Hence the name I chose for this pedal, the *Neo Fuzz*.

Introduction

It must be my grey hair, but over the last few years, I've found myself increasingly drawn to the sound of fuzz pedals. I've traditionally been a bit of an overdrive man, and my pedal output thus far has represented this. For those of you who've picked up one of my overdrive pedals, I hope you're enjoying using it. For those of you who haven't yet, ... pick one up **now** damn it! Despite my love for the sound of a good overdrive, there's just something about the sound of a great fuzz pedal which nothing else can capture. I've grown really fond of that sound. Believe it or not, I think that fuzz is a much more complex and tricky sound to get right compared to an overdrive, and in fact there are many 'tweaks' and parameters to control in a fuzz pedal. But a quick scan of the market quickly highlights two facts:

- 1) Fuzz pedals tend to be very basic, often just a fuzz and volume control. This is an accident of history since the first designs were very simple and no-one really thought about adding lots of features
- 2) There's been very little progress in the design of fuzz pedals in the last 30 years. Most pedals out there are just a Fuzz Face of Tone bender re-hash.

I must confess, I toyed around with the idea of following the same path, but I just couldn't bring myself to do it. Surely there was a way forward? Surely there was an opportunity here to unleash the hidden 'tweakable' potential of a fuzz, allowing the guitarist to produce a whole bunch of different tones, both old and new?

So to kick off the process, I began to analyse the various aspects of fuzz pedals which contribute to the production of their sound. I isolated a few of these, some more obvious than others:

- 1) Transistors! There's nothing which can create a great fuzz sound like transistors. Whatever the type, silicon or germanium, an overdriven transistor is the best way to produce a fuzz sound. Nothing else should get in the way, no diodes, opamps, FETs. This is vitally important. Obviously, the type and characteristics of the individual transistor is very important.
- 2) Symmetry or 'bias'. The operating point of the transistor is a very important factor in determining the sound of the fuzz. You can think of the bias as the 'neutral' position of the circuit when there's no signal. If this point is in the middle of the 'swing' range, then the signal can swing in equal amounts up and down. If it's at either extreme, then the signal can only swing a very small amount in one direction, and then has a lot of room to swing in the other direction. The 'fattest' sound is found when a circuit is biased in order to have symmetrical swing. Accordingly, bias is a very important factor for determining tone. It is actually one of the reasons (whether people realise it or not) for people swapping out transistors in fuzz pedals. By changing transistor gain, the bias point is shifted (as well as changing the overall amount of fuzz available)
- 3) Pickup loading. This is a very important aspect in the creation of a great fuzz sound, but not one that people usually think about. Most fuzz pedals typically have very low input impedances. A Fuzz Face for example, has an input impedance of the order of a kilo-ohm or so, which is very low. I don't believe that this was one of the design criteria for the creation of the first fuzz pedals. I think it was just one of those historical 'accidents', but an accident which nonetheless has contributed to the fuzz sound. This feature is very important, not so much because it varies the signal strength which hits the circuit, but because of the way that it affects the frequency response of the guitar. As you decrease input impedance, the first thing that goes is the top end of your guitar sound. The low end is a lot more resilient. What you end up with is a filtered, low pass signal, almost as if you've rolled off some top end with the tone control. At the end of the day, this is a good thing for a fuzz pedal. The major drawback though is that the tone of the fuzz pedal is very heavily dependant on the pickup that you're using, since different pickups will behave differently for a given load. For example, have you ever tried to use a high output bridge humbucker with a fuzz pedal? It sounds awful! The low input impedance is precisely the reason why this happens, and why a fuzz is almost always used in conjunction with a low impedance single-coil equipped guitar like a Strat.

So with these three principles in mind, I went about designing the Neo-Fuzz. The following is a description of the features of the Neo Fuzz:

Circuit

The Neo Fuzz features 3 gain selected NOS germanium AC128 transistors. These transistors are without doubt *the* transistors of choice for the ultimate fuzz sound. These transistors are about 30 years old, and I had to track them down on the other side of the world. Each and every transistor has been individually tested by me for both signal transconductance and leakage current. In the process of doing this, a large number (in fact the majority) of transistors were thrown out because they did not meet my criteria.

As you may be aware, germanium transistors are notorious for their temperature instability. Some traditional fuzz pedals had a tone which changed with temperature, and in some cases, even stopped working when the temperature got too hot or cold. Whilst there's no way of getting rid of this inherent property of germanium transistors, careful and clever design means that you can minimise this effect to the point where it is almost negligible. In experimenting with circuit designs, I came up with a design which I call a *dual feedback* design, which has proved to be remarkably stable. In fact, I don't know of any fuzz design which is as stable as the Neo Fuzz.

But enough about the guts, ... here are the features.

Fuzz

One of the things I never quite understood about a lot of fuzz pedals is just how limited the gain range is. Well, from a circuit analysis perspective, this limited range was due to the circuit design. But why not do something *new* which would allow a greater range of low gain sounds? So one of the first things I did was create a pedal with as wide a gain range as possible. In fact,

the Neo Fuzz can go from nothing to all out fuzz. This unleashes a new aspect of the fuzz circuit, namely its ability to create absolutely stunning low gain sounds. I was amazed at just how good the low gain sounds were. You may very well throw out your overdrive pedals and boosters when you hear this thing at low gain settings. At very low fuzz settings, you get a clean sound which bites when you dig in. It almost has a fender-like breakup. Turn up the fuzz to 10 O'clock, and you have some gorgeous old-school blues tones. From 12 O'clock and up, you're in traditional fuzz territory. I also designed the taper of the fuzz control to have a natural sweep.

Load

One of the unique features of the Neo Fuzz is the load control. This control gives you precise control over just how much load your pickups see. For a traditional fuzz face sound, keep the load control below 10 O'clock. This will keep that vintage low-pass of 'muffled' sound (in a good way!). If you're using humbuckers or high impedance pickups, try winding up the load a bit to match your pickups. If you want to get that low gain overdrive-ish tone I was talking about, keep the load control maxed to get the brightest tone and fastest response from your pickups. One thing to keep in mind is that the load control is very interactive with the fuzz control. If you want to keep the same amount of gain, you need to turn up the fuzz control as you turn down the load and visa-versa.

Bias

As the name implies, this control adjusts the bias of your transistor and hence the symmetry. I've given you free play here to adjust the bias anywhere you want. With the bias all the way down, the transistors will not conduct at all, and you won't get any sound out (unless you hit the neo fuzz with a really big signal). As you turn up the bias control, you start to get a gating effect, where the transistors conduct (and you get a signal out) as long as you're playing, but as soon as you stop, the pedal cuts out. If you wish you can set the pedal like this almost as a noise gate. I really like this setting, not for the 'noise gate' character, but rather because the fuzz sound is really cool here. It's almost as if the pedal is about to die!

As you turn the bias up and the transistors start to conduct with no signal, you're pretty much at the 'symmetrical' setting. The exact position that this happens depends on many things, including the characteristics of the transistors, internal trimmer setting, and other settings, so it's not possible to give an exact position for this point, but you should be able to tell by ear. At this point, the tone is the fattest, and the sound is very full. As a hint for finding this point by ear, it's the point at which the tone sounds like it has the most low end. Turn the fuzz up to 12 O'clock, turn up the load control, and adjust the bias whilst playing the low strings. The 'symmetrical' point is found where the tone is fattest. As you turn up the bias control, the tone starts to thin out and get edgier, but one of the interesting things about this range is also the 'pumping' effect that you get. The more you turn up the bias control, the more pumping you get from the fuzz. This feels like an 'attack time'. The notes take some time to settle.

As you can see thus far, these controls give you the ability to create a huge range of fuzz sounds by varying parameters associated with the generation of the fuzz. The next controls adjust the tone post-fuzz.

Body

This is a mid-range control. The mids are the most important set of frequencies for controlling how much the fuzz cuts through, and how it interacts with your amps, and sonically with other instruments in a live setting. A quick play with this control will reveal just how much range there is, allowing you to create outrageous and unheard of tones with the Neo Fuzz. Note that this control is very interactive with the tone control, and if the tone control is all the way down, the body control has no effect.

Tone

Like other MI Audio pedals, the Tone control is not a simple low pass filter. It's the low/high balancing control which I've found to be the most powerful single knob tone control available. It cuts and boosts the lows and highs depending on its position. All the way down, and the lows are boosted, and the highs are completely cut from the signal. At 12 O'clock, you have a perfect balance of low and highs. With the tone control maxed, the low end is completely cut out, and the highs are boosted. The tone control, in combination with the body control provides more flexibility than a 3 band tone control. To see what I mean, set the body to 12 o'clock and sweep the tone across its full range. It's

a remarkable range,... at times I think almost too much. But, look, I trust you to make a sensible choice!

Brightness switch.

The brightness switch, located at the audience end of the pedal, controls the 'bandwidth' of the fuzz. This feature was added to the neo fuzz towards the end of the development process. There are a few reasons why I added this feature:

- 1) Modern amps can be very bright. In fact, many are not designed to accept overdrive/fuzz pedals at all. Keeping all the top end in the fuzz signal results in a piercing tone. With the brightness switch, you can tame the top end to match your amp.
- 2) Matching overdrive pedals. If you use an overdrive pedal with a fuzz pedal, switching between them reveals very quickly that a fuzz pedal is generally much brighter and sharper sounding than an overdrive. This can be used as a good thing, but in many situations, this can be very annoying. With the brightness switch, you can now match your fuzz and overdrive sounds.

The brightness switch is a 3 position toggle switch. The middle position is the brightest.

Volume

Why is it that most fuzz pedals have barely enough output to match your dry signal? I've made the Neo Fuzz so that it has a huge amount of output volume. Now, you can use a fuzz pedal to overdrive your tube amp. The large amount of output volume in conjunction with the low gain settings achievable with the Neo Fuzz (and the super flexible tone control) means that you can use it as a pseudo clean-booster. In any case, you don't have to worry any more about not having enough output volume

Other features

- Tiny enclosure – I worked really hard to pack in a huge amount of features into a tiny enclosure. Pedal-board real-estate is very expensive these days! But don't let size fool you. This die-cast aluminium enclosure is very, very strong.
- The enclosure is professionally powder-coated and silk-screened.
- The Neo Fuzz can be powered by an internal 9V battery (which I highly recommend)
- Heavy duty 3PDT footswitch for true bypass and absolutely no signal loss when bypassed.
- High intensity pink LED – yeah baby!
- 9V DC plug for use with an external power supply (negative centre pin like a standard Boss power supply)

Important Safety Note: Even though the pedal can be powered using a standard power supply, the internal polarity is reversed since the germanium transistors require a negative supply voltage. This means that you cannot use the same power supply to power normal pedals as well. **You will most probably damage or burn out your power supply if you do this.** If you want to be safe, only use batteries with the Neo Fuzz.

Registration

To register your pedal, you can email your name, contact details, purchase date, and retailer details along with the pedal serial number to: registration@miaudio.com Alternatively, you can send the above information to the postal address on the front of this manual. **PLEASE REGISTER YOUR PEDAL.** In the long run, it will be difficult to have your pedal serviced if you need to if the pedal is not registered.

Warranty

This pedal carries a 5 year warranty that covers all repairs due to manufacturer error. It does not cover any damage due to user mishandling, shipping, acts of God, and abuse. The owner should contact MI Audio directly for all repairs, and any work done by anyone other than MI Audio voids the warranty. All shipping costs are the responsibility of the owner, and are to be paid in advance of any work performed on the pedal. The owner may be asked to provide a copy of the sales receipt for verification.

Disclaimer

The owner or user assumes responsibility for death, injury and/or damages relating to the operation of this device. MI audio assumes no responsibility for death, injury or damages relating from the operation of this device.