

Amp Upgrades Featuring *Mercury Magnetics*



Chop Shop *Mercury*-Style

In the interest of education and opening up a bigger can of [guitar rocking whoop-ass](#), SMG decided to turn our [Peavey 212 Valveking](#) over to *Mercury* for an output transformer and choke upgrade. In securing a qualified technician to perform the upgrade, *Mercury* recommended [Don Butler, AKA "The Tone Man."](#) Don, a professional musician since age 19, has been working on amps, guitars, and effects for over 30 years.

Before converting the Valveking into "Greased Lightning," Don took the amp for a test drive. I asked him about his initial impression:

"There isn't a lot of top end. There are some weird frequencies in the mids – almost abrasive and it doesn't clean up very well. I have the volume on three and it has an edge to it. I'm not sure

Transforming Tone

Upgrading an amp's stock components is a common way to maximize its performance. The easiest and most popular mods are replacing tubes and speakers. This is easily done and doesn't necessarily require any special training or knowledge. Lesser-known and more technical mods include upgrades that focus on an amp's core – the engine that drives the tubes, speakers, and other parts that make up the whole. These include [output and power transformers](#), and [chokes](#) when applicable. Imagine souping up grandma's old errand-running Mustang into a [tire burning muscle car](#), but with tube-based guitar amps. Leading the industry in these components is *Mercury Magnetics*.

Mercury's history dates back to 1954 as a designer and manufacturer of custom transformers including servicing the aerospace industry. In the late 1970s, [Sergio Hamernik](#), an electrical/audio engineer and musician, began shifting the company's focus toward high-end audio and guitar amplifiers. Steady growth into the early '80s resulted in *Mercury* leading the industry in premium quality

transformers and chokes, a position they maintain today. Every component is built and tuned by the hands of highly skilled technicians using custom-spec American steel. With a focus on premium quality, manufacturing is intentionally conducted as it has been historically, without the use of automated equipment. *Mercury* prides itself on consistency of product and guarantees that a transformer today will sound exactly like the same model produced 20 years ago. Initially, their offerings were only available to top musicians, amp collectors, and amp manufacturers, but as their inventory of designs grew, *Mercury* opened up their offerings to the public. Today they provide for a worldwide market and enjoy the distinction of having the largest selection of premium transformer designs including [replacements](#), [upgrades, restorations, and custom orders](#) for nearly every tube-based guitar amp in existence.



Don Butler, the "Tone Man."



Mercury's replacement compared to the stock output transformer!

if it's the speakers or the amp. Even clean, there should be detail, but it's masked, like there's a blanket over it – the real tone of the guitar isn't coming through. I'm surprised because Peavey can do clean really well."

I was actually a bit surprised by this because I thought the amp sounded pretty good. This got me more stoked about what the **Mercury** upgrade would do for the amp so I stepped aside while Don popped the hood.

The Output Transformer

There are at least two transformers in all tube-based amps: a [power transformer](#) and an [output transformer](#). The power transformer provides a voltage platform for the amp to work from. In essence, it takes the voltage from the wall socket you plug into and converts it into a usable source for the amp's components. The output transformer is similar in nature to the power transformer in that it takes incoming voltage and alters it for more appropriate use. The difference is that the output transformer interfaces between the output/power section and speakers, taking the outgoing voltage and dropping the impedance to provide the speakers a more usable signal. As such, it has a greater effect

Don Butler, the "Tone Man" at work in his shop.

on tone, taking responsibility for up to 40% of the sound. The key is in the iron. Generally speaking, more and better quality iron = greater headroom. **Mercury** prides itself as being the only company worldwide that has all-American steel custom-made to their spec, identical to the way they did it during the war time era. Many manufacturers will skimp on quality transformers and that is often reflected in both the quality of tone and cost. In comparing the **Mercury** to the Valveking's stock transformer, it was like comparing an oak tree to a [sad little Charlie Brown Christmas pine](#).

The Choke

Used in the power supply, a [choke](#) serves as a filtering element, blocking AC current while passing DC. It further serves to condition the DC power, smoothing out the ripples. Consider how shock absorbers affect the smoothness of a car's ride – that's one way to grasp the concept of the choke's role. This translates into less hum and better bass response. A less expensive shortcut used by some manufacturers is to use a high-wattage resistor rather than a choke. With more residual AC ripple in the chain, there is more background hum and looser touch response. Sure enough, when digging into the Valveking, Don encountered a [400 ohm resistor](#). We got rid of that sucker right quick.

Takin' Her For a Spin

After tightening all the hardware and closing the hood on the overhaul, Don fired up the "new" amp. The difference was immediately noticeable in greater dynamics, clarity, and an opening of the upper mid and high frequencies – the amp had more life to it. Don commented, "There's a lot more note clarity and improved harmonic response. With the same settings as before, there's more headroom and it's chimy, like a bell. It didn't have a good clean sound before, which you would expect with 100 watts. The amp is halfway up and still clean



and before it was losing it at three [on the Volume dial].”

The Final Wrap

While tube and speaker upgrades play an important role in improving tone, the heart of an amp is represented by its transformers and choke. In considering the modification of an amp, **Mercury Magnetics** should be the first place you look. You’ll likely invest more money with their upgrades, but more importantly the investment will be in your tone. And that, after all, is the point.

A few things to keep in mind: A qualified amp tech is highly suggested. I have intermediate level experience soldering and pulling things apart and putting them back together, but I was thankful for Don Butler’s expertise and test equipment. Having seen what he went

through, I would not have felt comfortable doing this upgrade myself. Also, results may vary unexpectedly depending on the amp being upgraded and will likely void any warranties. They will certainly benefit tonally and at the component level from the quality “iron” **Mercury** provides, but may result in revealing problems inherent to the amp that were masked by the cheaper stock components.

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