MOJO ZINE

THE DIY ZINE
FOR DIY BUILDERS

VOLUME 1
ISSUE 1

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WHAT DOES THIS THING DO?

UNLOCK THE MYSTERIES OF WHATS GOING ON INSIDE YOUR AMP.
BY **DAVE HUNTER**

INTERVIEWS WITH

DUSTIE WARING OF BETWEEN THE BURIED & ME

DAN PETRZELKA DIY AMP CREATOR

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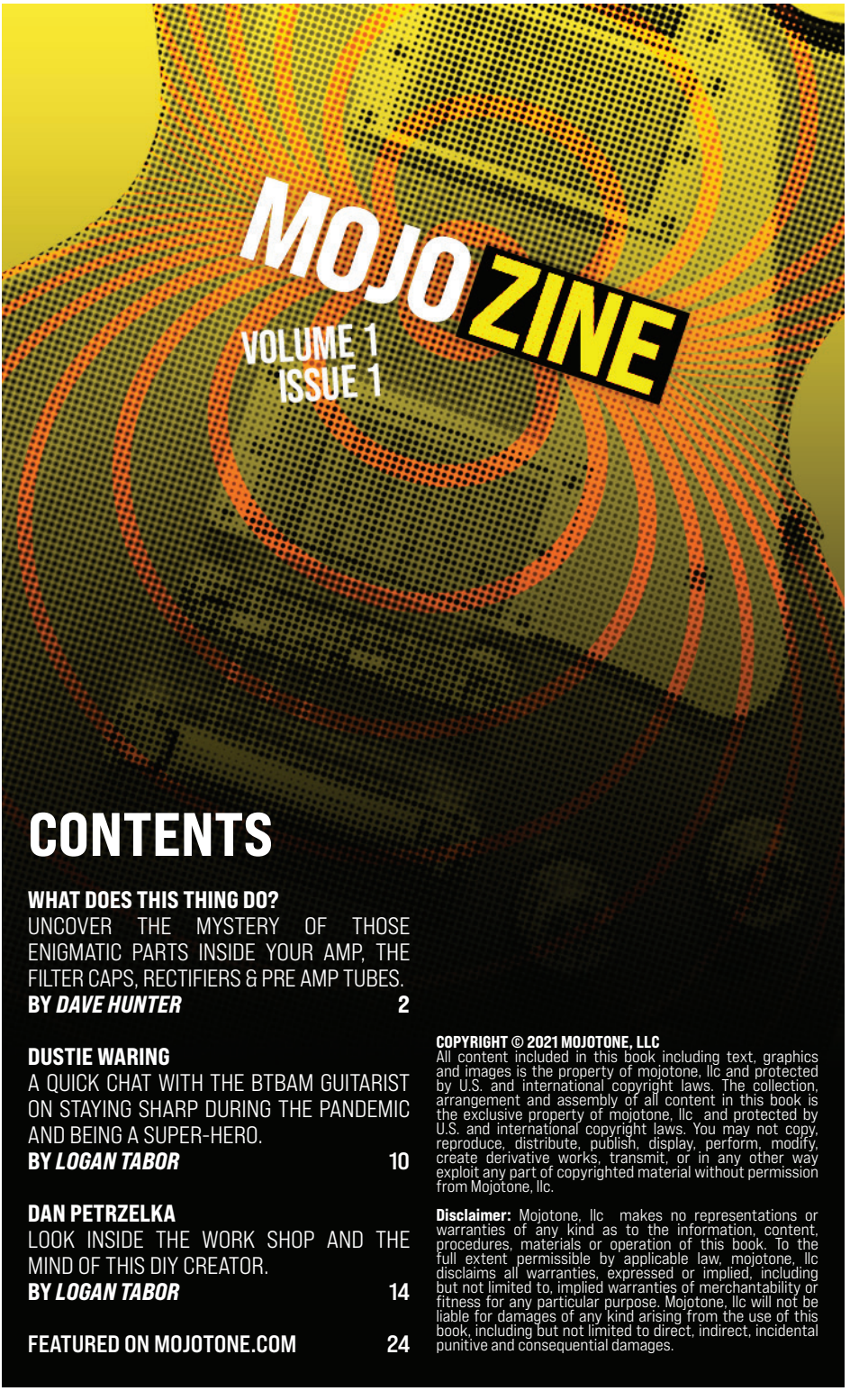

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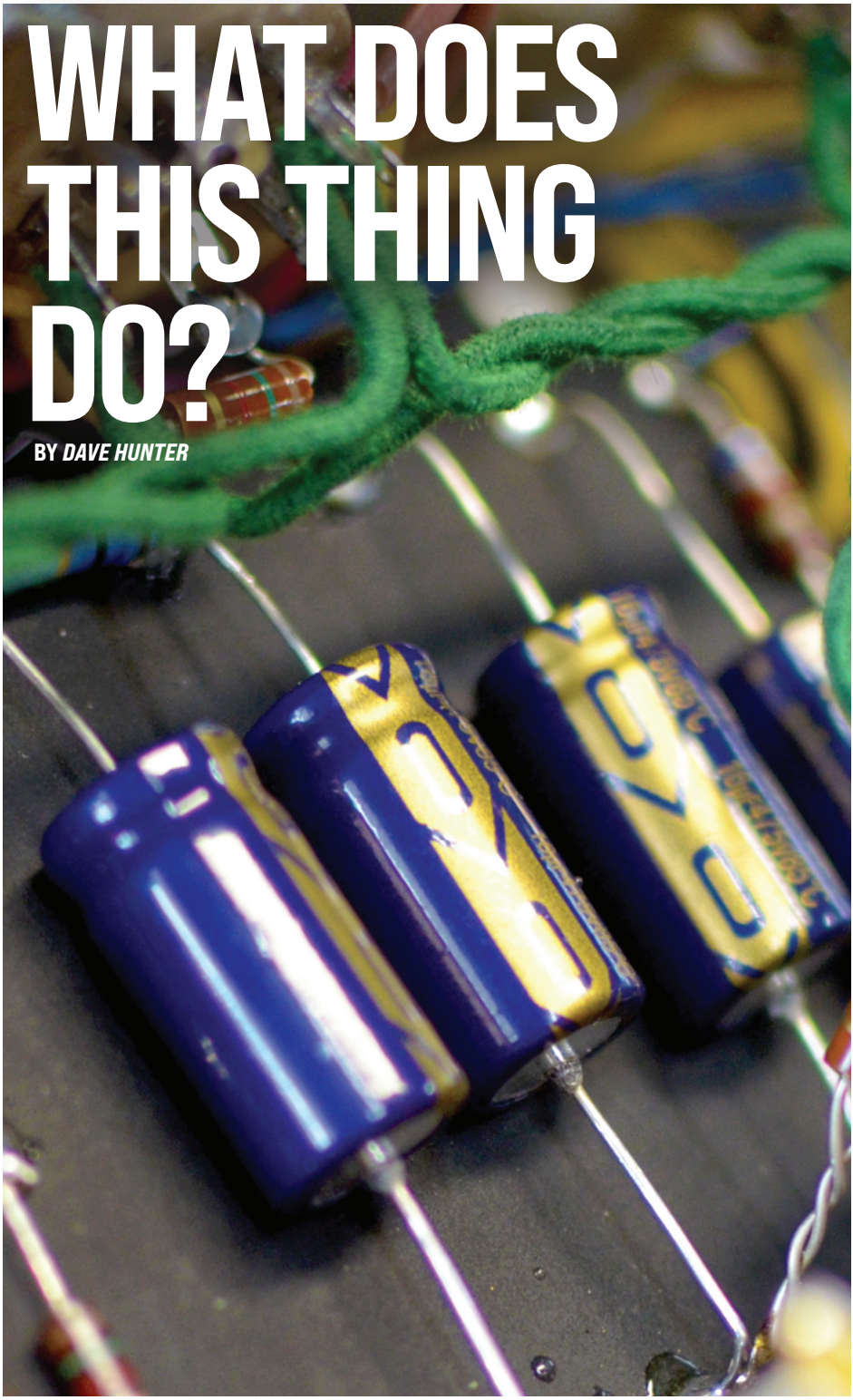
WHAT DOES THIS THING DO?

BY *DAVE HUNTER*



There are a lot of enigmatic components within any guitar amp, many of which remain mysterious even to hobbyists who have built a DIY project or two. In the Mojotone's new series *What Does This Thing Do?* **we're taking a look at what's really going on inside your amp**

FILTER CAPACITORS

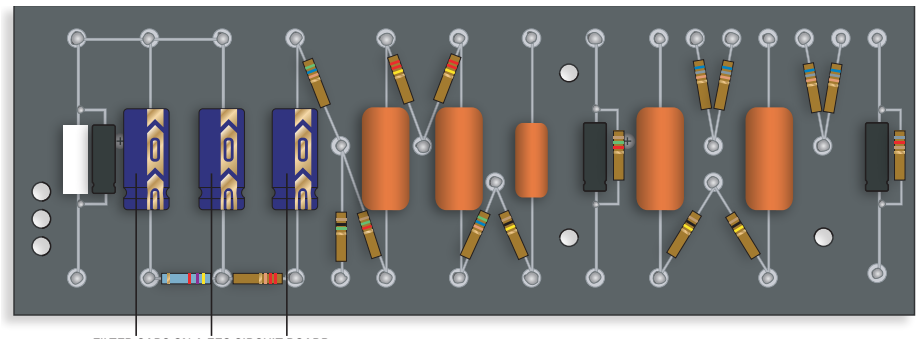
Those chunky, cylindrical things that either lie bunked in a row inside the chassis near the power transformer, under a "cap can" on the underside of the chassis of larger Fender black- and silver-panel amps, or protruding from the top side of many Marshall-style amp chassis like stubby, permanent metal tubes.

Filter capacitors, or "caps" for short, are more formally known as electrolytic capacitors. The name is derived from the fact that they are filled with an electrolyte—often in the form of paper soaked in electrolytic gel or liquid—which separates the component's positive and negative plates. In simple terms, electrolytic capacitors filter excess electronic noise from your guitar amp's electrical supply (hence the "filter cap" nickname) to reduce noise in its output. At the same time, this task also helps to determine the firmness of the amp's low-end, and to influence the overall tightness and immediacy of its playing response. It's worth noting that filter caps do these things even though they are placed in the amp's power supply, and your guitar signal never passes through them on its journey from input to output.

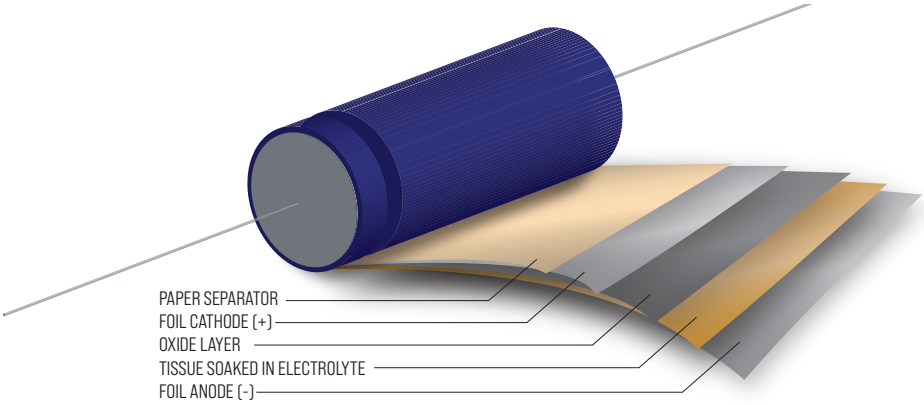
Like a lot of things happening simultaneously within any tube amp, the way in which filter caps do this trick is both rather simple and quite ingenious. The micro of "what it does": this capacitor takes noise-inducing ripple out of a DC electrical current that passes through it from positive to negative via that electrolytic layer mentioned above, and stores it for safekeeping, while passing the "cleaner" DC current along to the next component in line. The macro of that results not only in a quieter amp, but more efficient performance from the output tubes in particular, which enhances the muscularity of the amp's bass reproduction.

Guitar amps use several large filter capacitors to get this power-conditioning job done properly. Even smaller amps tend to use at least three, arrayed side-by-side in stages to filter the supply at points where the DC is passed along to the output transformer, the output tubes, and the preamp tubes, respectively. Larger amps might have twice as many filter caps, or more.

In the case of individual filter caps, size does matter. Those of larger value (which usually means larger size, too) are not only more efficient at reducing electrical noise, but usually serve to tighten up low-end performance proportionally, too. That being said, you can't simply load the largest filter caps available into any given amplifier. Some smaller tube amps, and particularly those using lower-rated 5Y3 rectifier tubes, don't perform well with electrolytic caps beyond a certain value (most data sheets indicate a maximum



FILTER CAPS ON A 5E3 CIRCUIT BOARD



of 20µF, though different conditions can sometimes work with slightly higher values). Smaller electrolytics might also contribute to the traditional feel of some vintage-style amps, so it's usually best to stick with the specs and/or schematics for any amp you're building or working on.

One thing you'll probably have noticed if you've built any amp kits already, checked out common schematics, or even observed these filter capacitors up close, is that they have a polarity, with a "+" indicated at one end and a "–" at the other. This is because they are directional in the way they're connected in the circuit: the positive terminal (anode) connects to the power supply, and the negative terminal (cathode) connects to ground.

Electrolytic capacitors definitely have a limited lifespan, which tends to be around 15 to 20 years in most cases. They might keep functioning just fine after this point, but also might fail at any time. Indications of one or more failing caps are often hears as excessive noise or a softer and "flubbier" low end than an amp of that type should produce, and proper diagnosis of this component failure—and safe replacement—is usually a job for an experienced tech.

The way in which they do their job also means that electrolytic capacitors retain a static electric charge, which can result in several hundred volts being stored within them for extended periods of time, even when the amp is switched off and unplugged. For that reason, you should never work inside the chassis of a tube amp—even one that is switched off and unplugged from the wall's AC receptacle—without fully understanding how to safely discharge these components before contacting anything inside the amp (be aware that they are often passing this high-voltage charge along to other points within the circuit, too, so simply "not touching the caps" won't keep you safe).

Before concluding, it's also worth mentioning that you'll find electrolytic capacitors doing other jobs within a tube-amp's circuit, most commonly as smaller 25µF/25V (on average) units being used as cathode-bypass capacitors connected around the resistors used to bias preamp tubes, and occasionally output tubes in cathode-bypassed circuits. These filter caps are not being used for their noise reducing capabilities, but are found in these positions because polarized electrolytic capacitors are physically smaller than coupling capacitors (aka tone caps) of the same value, making them an easier fit in those parts of the circuit.

RECTIFIERS

The rectifier, which can comprise either a tube or solid-state diodes, is one of the more enigmatic parts of any tube amplifier, and they all have them. This component—which is responsible for converting AC voltage from your receptacle to the DC voltage that the tubes use in their amplification duties—

isn't in contact with the guitar signal that flows through other parts of the amp's circuit, yet the way in which it does its job can impact the playing feel of any amplifier, and therefore will also influence certain elements of its sound.

That being said, there's really no good/better/best relationship between different types of rectifiers; it's all a matter of using one that's appropriate to the design of the amplifier itself, and which enhances the type of performance the maker seeks to achieve from that amp.

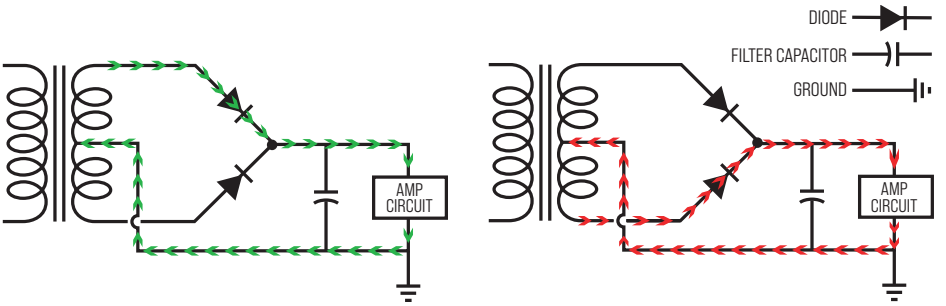
Not that many of today's amp makers would admit that, of course. Many promote the inclusion of a tube rectifier as if it's inherently superior to solid-state, which—as hinted at above—it is not. A tube rectifier is better if you're trying to build an amplifier that benefits from aspects of that component's properties, and if that's the kind of amplifier that's best for your music and playing style. In other cases, though, a tube rectifier will work against what you're hoping to achieve from a guitar amp, which makes it inferior in that circumstance, by definition.

Let's cover the rectifier's function in a little more detail, while still keeping it simple. Normally located relatively close to the amp's power transformer (PT), the rectifier converts the positive and negative lines of AC current from the PT into a single line of DC current that enables the preamp and output tubes to do their thing. Tube and solid-state rectifiers in guitar amps are all diodes, just of different types.

In the course of this AC-to-DC conversion, a rectifier usually increases the resultant DC voltage level. In fact, the voltage levels are increased twice on their way to the big output tubes: using a Fender Deluxe Reverb as an example, the AC comes into the amp from your wall socket at around 120V, is ramped up by the PT to around 330V AC, and converted by the tube rectifier to more than 400V DC to feed a pair of 6V6GT output tubes. (Big power resistors reduce this voltage by roughly half by the time it gets to the preamp tubes.)

The rectifier's affect upon the feel, and therefore to some extent the sound, of an amp comes into play according to how quickly and efficiently it performs this voltage-conversion task, and that differs somewhat from rectifier to rectifier, and amp to amp.

As tube rectifiers run from larger and more powerful to smaller and less so, they tend by and large to both produce a little less DC from the AC voltage that is input, and to also do the job a little more slowly. For example, the GZ34 (or functionally near-equivalent 5AR4) in a pre-CBS Fender Super Reverb or a JMI Vox AC30 is one of the more robust tube rectifiers in use for guitar amps. It will produce higher levels of DC when asked to, and will recover more quickly to full efficiency when hit for a demand for power while working hard. One of the smaller tube rectifiers in common use, the 5Y3—original equipment to tweed Deluxes and Princetons and many other small to medium-sized amps—is not only incapable of producing the same amount of DC voltage from any given AC supply,



FULL WAVE RECTIFIER CIRCUIT WITH A TWO PHASE HIGH VOLTAGE SECONDARY

5Y3 RECTIFIER TUBE IN A MOJOTONE CUSTOM **BLACKOUT TWEED SELECT**

but it also struggles a little to get back up to full efficiency when demand is high. There are other factors involved here, and other tube types in between, but this gives us a good comparison, at least.

In use, with both amps working similarly hard (say, at 2 o'clock on their respective volume controls), the difference between these two examples will be a tighter, punchier, more articulate and more immediately responsive feel from the amps with the GZ34 rectifier, with a relatively softer, more compressed, and slightly more sluggish response from the 5Y3-equipped amps, and the impression of some "bloom" and swell as their power stages recover. Either might be perfectly appealing, it just depends on what you're after, and the type of dynamics, touch responsiveness and compression best suit your playing style.

Compared to these, solid-state rectification is the most efficient of all, yielding maximum DC from the AC input, and also recovering quickly. This makes it the choice of many high-powered amps where a bold response and high-volume performance are key, and solid-state diodes have been the rectifiers of choice for amps like the Fender Twin Reverb, Marshall 50- and 100-watt Plexi types, Hiwatts, and many others as a result.

But does this mean that amps with solid-state rectifiers don't sag and compress? No, not at all, because the preamp and output tubes themselves will also sag and compress and bloom in response to their workload when you're playing hard and pretty loud—more in some designs, less in others—and that also contributes to the touch-sensitivity element of any given guitar amp. Indeed, some very talented designers of smaller high-quality amps have occasionally found tube rectifiers unnecessary even when a slightly softer, more touchy-feely playing response was desired, because when used right the output tubes in their designs will do that job for them.

Given a good amp designer and builder's ability to manipulate many factors regarding playing feel and response, and the broad range of rectifier performance discussed above, chances are that in many cases most guitarists wouldn't immediately notice the effect of one type of rectifier or another, unless it's drastically underrated for the task at hand. In others, the change from a rectifier type favorable to the amp's overall design to one that is less so might be readily apparent. Overall, though, makers of higher-quality tube amps generally aren't selecting their rectifier type according to cost savings or promotional considerations, but purely because the choice is correct for the intended sonic goal.

On the other hand, many of the more affordable, mass-manufactured tube amplifiers available today do use solid-state rectifiers in favor of tube largely because that approach is more affordable. The change-up involves not only replacing the tube itself, the socket, and related wiring with a few pennies' worth of silicon diodes, but also enables the use of a somewhat simpler and therefore less-expensive power transformer, which doesn't need the extra windings used to produce the specific current that heats the rectifier tube's filament (and which is different from that which heats the filaments of standard preamp and output tubes).

In general, though, it's worth learning to see an amp's rectifier type not as an "upgrade" or "deluxe feature," but as something that should be appropriate to the design, and which helps make the amp as a whole suitable to your playing needs.

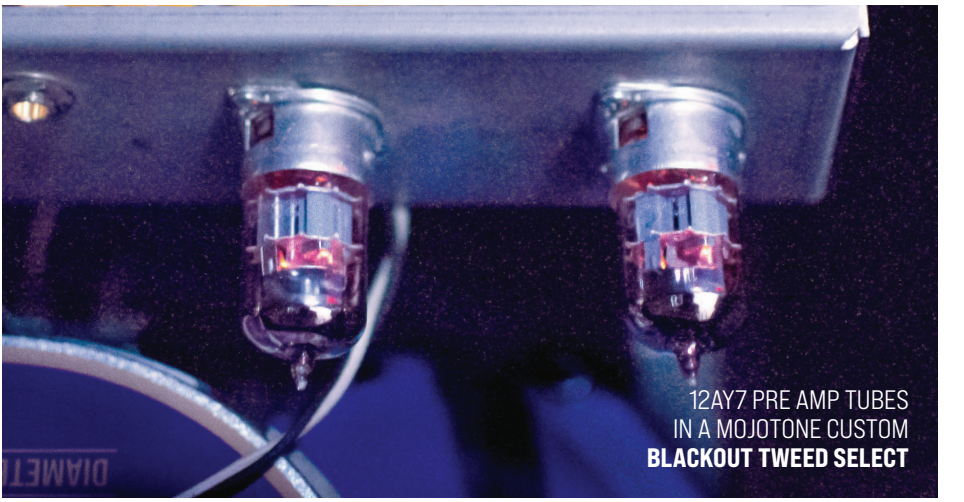
PRE AMP TUBES

We're here because we love the sound of tubes in guitar amplifiers, right? But even if you feel that's something you know inherently, which tubes are you actually listening to when you're enjoying that "great tube tone?" Several different types of tubes perform different duties within any all-tube amp—with more types and a greater variety of duties existing within the more complex and feature-lade amps available—so it's worth isolating the job of each somewhat in order to better understand how they're all working together to make the amp function.

First off, it's worth emphasizing that none of the tubes within any guitar amp should be considered to have "a tone" all on their own, irrespective of the circuit in which they are being used. Other components such as capacitors and resistors help to voice an amp by determining the general frequency range in which it operates, and the range and function of its tone controls and so forth. That aside, different tubes do also present different sonic characteristics, and this means that even different types used to perform the same function can sometimes slightly alter the overall feel and sound of an amp.

As a rule, the preamp tubes are the smaller tubes in most types of guitar amplifiers. They're generally found positioned nearer the input, usually arrayed between the input and the larger output tubes. So-called preamp tubes might be used in different stages of the amp, however, which can include the preamp proper (the first gain stages of the amp, or extra gain stages which follow other stages); EQ stages; any built-in tube-driven effects such as reverb and tremolo; and the phase inverter which feeds directly into the output tubes.

The vast majority of preamp tubes



12AY7 PRE AMP TUBES IN A MOJOTONE CUSTOM **BLACKOUT TWEED SELECT**

are of the nine-pin variety (sometimes call noval), which became popular in the mid 1950s as a so-called "miniaturized" tube type to replace the somewhat larger eight-pin (octal) preamp tubes that are still found in some vintage amps and retro designs. The 12AX7 is far and away the most common nine-pin type, which you'll often see listed as its British designation ECC83, though some equivalents and similar-looking, though differently-functioning, nine-pin preamp tubes are also in use. 12AX7s and their equivalents are dual-triode tubes, which means they contain two small amplification units in one bottle, each made up of one element, plus a shared filament, or "heater". Some other nine-pin preamp tubes still in use today such as the EF86 or the 5879 are pentode tubes that contain only one amplification unit, but made up of five elements. (For that reason, don't try to swap one for the other, and always check equivalency and compatibility before swapping any tube types.)

In short, the job of the preamp tube—when used in an actual preamp stage rather than an effects or phase-inverter stage—is to take a low-voltage audio signal that comes into it and ramp that up to a higher-voltage signal that is sent along to the next stage of the amplifier. In most common guitar amplifiers, the first significant thing the very low-voltage signal from your guitar pickups hits after it goes through the amp's input is a preamp tube that comprises that amp's first gain stage (usually via just a single resistor and a short length of wire). The preamp tube or tubes that do this job don't transform the signal into one that can drive a speaker, but they quite literally amplify it to a point where the amp's output tubes can receive it, amplify it even further, and send it on to an output transformer, which can indeed drive a speaker.

A preamp tube doesn't physically "shape" or "voice" the guitar signal in and of itself, but each time the signal hits a gain stage all along the signal chain from input to output stage the entirety of it is amplified by that tube, so the way the tube performs this amplification task has a significant impact upon the resultant sound and feel of the signal. And different makes and types of preamp tubes do their thing a little differently—less or more efficiently, cleanly vs grittily, tightly vs more compressed, and so on. Some preamp tubes distort earlier or later, react relatively quickly or slowly, are predisposed to enhancing the highs or lows or midrange, or whatever. However slight these differences might be, they can add up to noticeable variations in tone from different tubes plugged into the exact same circuit.

When driven hard, preamp tubes can also distort, and will particularly distort when one preamp tube is driven hard into another, and perhaps yet another, along several chained-up gain stages in some high-gain amps in particular. As much as some players like to rave about "output-tube distortion" (something we'll cover more in a future installment) the majority of distortion you hear from most tube amps is either largely or at least partly the result of preamp-tube distortion.

All of this adds up to tell you that, as far as altering the overall tone of any guitar amp via tube swaps goes, a change of preamp tube often has the biggest effect. And of those swaps, a change of tube in the first gain stage—what's often referred to as "V1" (for "valve one," using the British term for "tube")—makes the most significant impact on tube-induced tonal tweaks. Fortunately, you can almost always change preamp tubes within your guitar amps without making any internal adjustments to the amplifier. Let them cool down before swapping, wiggle them gently on the way out, line up the pins accurately for replacement (you'll see there's a gap in the array to help you fit it into the socket), and push gently but firmly into place.

Hopefully understanding a little bit more about what makes your amp work enables you to better fathom how they may—or may not—help fine-tune your amp's tone, and get you a little closer to sonic bliss as a result. ◘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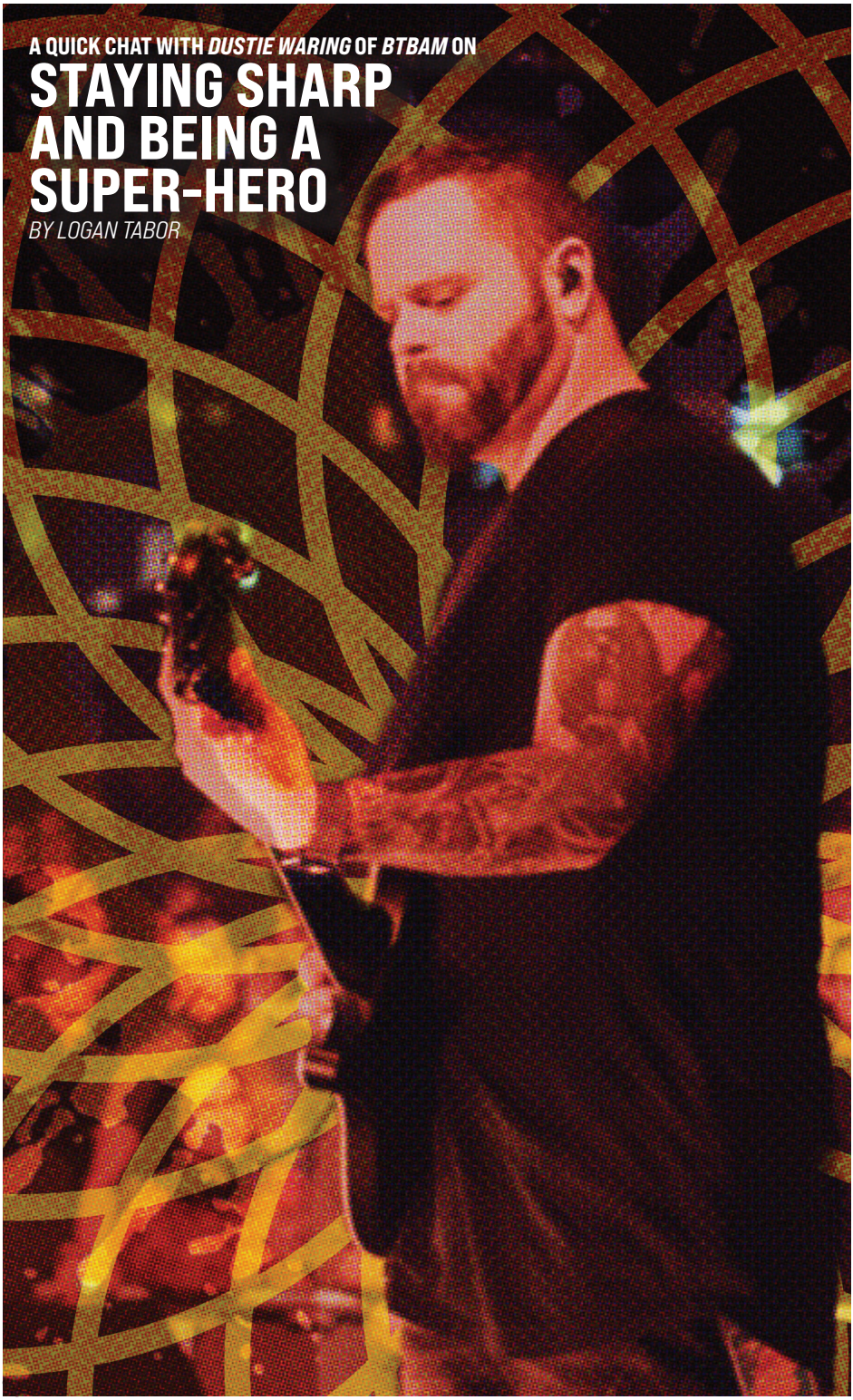
A QUICK CHAT WITH *DUSTIE WARING* OF *BTBAM* ON

STAYING SHARP AND BEING A SUPER-HERO

BY LOGAN TABOR



Although North Carolina has produced its fair share of noteworthy musical acts throughout history, few have been as remarkable as Raleigh-founded Between The Buried And Me.

BTBAM has evolved brilliantly over the years, proving both their relevance and adaptability as a band. Not only are they some of the most technically proficient musicians in the game, but their breadth of style has made them both delightfully unpredictable and supremely entertaining.

Today, we'll have a quick chat with BTBAM's guitarist Dustie Waring, an official member of the Mojotone Artist Roster. Dustie is a rock-solid musician and human being whose technical and stylistic understanding of the craft that is GUITAR has made him an absolute force in the industry.

I Wanted To See How Dustie Had Managed To Stay Sharp Over The Last Couple Of Years...

I know we're all tired of referencing the COVID-19 pandemic but the harsh reality is that, for most of the music industry, the end of the tunnel is only just now catching a bit of light. With that in mind, what were Dustie and the gang up to all this time...

"I've had so much time on my hands with the whole pandemic thing dismantling the music business. BTBAM wrote and recorded a new album, for one, and we're extremely happy with how it came out. Looking forward to sharing this one with the world."

Okay so it looks like the crew not only stayed sharp musically, but found a way to put their "downtime" to proper use. Dustie also noted that he's been pushing hard to stay in top physical shape, which has its obvious merits when it comes time to hit the road again...

"I've also been in the gym a ton just trying to get in the best shape I can before we hit the road again. Watching lots of boxing and working on our setlist for the next tour."

Despite His Super-Human Abilities As A Guitarist, Dustie Waring Is Still An Earthling...And An Earthling Must Surely Run Into Issues Staying Motivated, Right? I Wanted To Know What Some Of His Challenges Were Over The Last Year Or So...

"The challenge of being an artist is that it's hard to separate your personal life from your life in music. This isn't a normal 9-5. Your motivation and edge all depend on where you're at mentally and what's going on around you. Luckily, I've stayed healthy and in good spirits throughout this last year. I had a lot of responsibility with the new album and the streams, so I was able to force myself to stay disciplined with my playing and keeping up my chops."

But BTBAM isn't just a plug-and-play sort of act. I've seen Dustie's rig and, to me, it looks pretty intimidating. There's more to keep up with than just PLAYING the guitar; any touring musician responsible for producing and manipulating a healthy palette of sounds in one set will tell you that the entire "dance" has to be rehearsed and maintained...

"The hardest part about playing BTBAM material is the coordination it takes to play the parts while switching presets and pickup selections. That usually takes a few weeks to really dial in. There have been periods where I didn't really touch a guitar for a few weeks. I do that after tours and after albums to kind of refresh and cleanse myself so I'm not burnt out. But again, it comes at a cost because there's always a rebuilding process. It's like a marathon runner who just takes a few weeks off; it takes several days to feel dialed in again. I'm always aware of what a gift music is, and what an opportunity I have to do what I'm doing. So if there's ONE thing I'm disciplined about, it's my career."

Dustie noted that his at-home practice routine varied from day to day. Sometimes he would sit on his couch with a small digital Yamaha amp and his laptop just getting through the set with his hands. Other times he’d hook up his Kemper and pedalboard so he could align his hands with the infamous “dance.”

In the latter half of 2020 Dustie and Mojotone released the GEN2 version of Dustie’s Signature Pickup, the DW Tomahawk. This pickup is available at Mojotone.com but it also comes stock in every one of Dustie’s Signature CE24

Guitars by PRS.

It's an understatement, but his signature guitars haunt my dreams in a rather pleasant way. They're sleek, versatile, and masterfully-built.

When attending a BTBAM show, expect the unexpected. You will be watching top-tier artists perform some of the most advanced and mind-shattering music imaginable. You will also likely see a large portion of the crowd observing in silence and stillness; this is not for a lack of enthusiasm, but rather the simple fact that many of BTBAM's followers are fellow musicians and have come to witness a spectacle. They have come to learn. To take notes. To find inspiration.

BTBAM can be seen live this summer on their "An Evening With" tour. Dates are posted below but, for posterity, here is a link to their official site where you can find details and purchase options:
www.betweentheburiedandme.com

Check out Dustie's Signiture PRS, the **DW CE24 Floyd** at :
www.prsguitars.com

Or install his signiture **DW TOMAHAWK GEN. 2** humbuckers into your guitar. Of course those are available at:
www.mojotone.com

DUSTIE'S SIGNATURE PRS, **THE DW CE24 FLOYD**, COMES STOCK WITH HIS SIGNATURE MOJOTONE **DW TOMAHAWK GEN. 2** HUMBUCKERS

AN ANALOG BREAK FROM A DIGITAL WORLD

INTERVIEW WITH *DAN PETRZELKA*

BY LOGAN TABOR

The biggest inspiration for our team here at Mojotone is the DIY community we've been so lucky to be a part of all these years. We learn as much from our customers as they learn from us, so it's only fitting for us to honor some of the creative minds who spend so much time honoring their craft. Today we'll be talking with **Dan Petrzelka** -- husband, father of three sons, creative director, and deeply-driven DIYer of all things "guitar".

I Wanted To Know How Dan's Relationship With Music Began, How It Has Progressed, And Where It Is Today.

Like many of us, Dan's father was always rockin the "oldies" station, and his grandmother would even play her favorite albums for him...

"...from Otis Redding and Chuck Berry to Wes Montgomery, and Louis and Ella. Those were the early foundations of my love for music."

He recalls his grade school band class experience; starting out on clarinet, then moving to saxophone, and finally over to trumpet. But those instruments didn't resonate with Dan in a way that made him feel he'd found his musical voice...

"Convincing the jazz band teacher that they needed an electric bassist was a breakthrough moment. I could get school credit and get my parents to help me pay for a bass all in one move—there was no going back after that."

Dan's Resourcefulness Has Immediately Been Proven, And That Jazz Band Just Got A Heck Of A Lot Cooler.

Now, we all have those special moments buried in our memories where we heard and felt something moving and inspiring for the first time. Those all too palpable recollections that led us down the path of pursuing music as a passion in any capacity. Dan was able to recall some of those critical moments, and they were nothing short of spectacular...

"Hearing Niko Case for the first time in the basement of a bar in college. Walking into a nearly empty Tacoma Dome: PJ Harvey's Firebird and incredible voice filling an entire stadium before the floor was full. Walking into the Hendrix exhibit at Bumbershoot in the early 90's, hearing Red House blasting over the PA and seeing artifacts from Jimi's all-too-short history.The sonic artistry of Karl Blau as a kid growing up in the Skagit Valley."

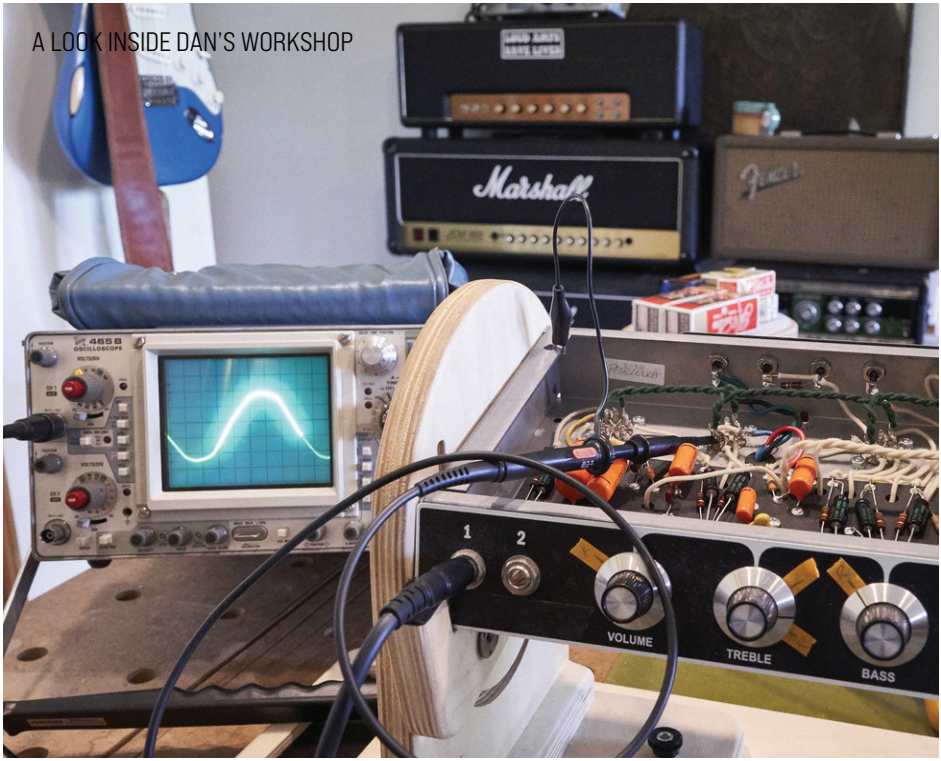
It's easy to see how Dan was captivated by music. But how does this translate into a love for electronics? Some musicians just stick to playing their instrument, right? Well it seems Dan had a similar early-life experience in the world of electronics as he did in the world of music itself....

"Electronics have always been a part of my life. Some of my earliest memories are working out in my dad's workshop; from repairing our appliances, to remote control planes, and experimenting with electronics kits. It's always been a combination of necessity and fun. I learned early on to take notes on how something came apart so that there would be some hope of putting it back together. My uncle and dad's friends were all electronics junkies; from racks of Tektronix gear, calibrators to calibrate your calibrators, signal generators and o-scopes, to russian night vision and geiger counters. There was so much cool stuff to experiment with growing up."

And Now It's Perfectly Easy To See How Dan Was Captivated By Electronics.

Put this foundation in electronics work together in a bubbling cauldron with a love for music, and what do you get? Yep, an absolute guitar and amp wizard.

One of Dan's earliest projects that still gives him a sense of accomplishment was his first attempt at winding his own



A LOOK INSIDE DAN'S WORKSHOP

single-coil pickup. This was in the early 90s, so the only places to read about guitars and amps were print magazines, the Angela Catalog, and by getting lucky to find a schematic somewhere in the world of 14.4k dial-up internet...

"The pole pieces I turned from steel screws chucked up in a drill press and filed to shape. The flatwork I cut from my dad's hobby styrene stash. And the coil wire, first unwound from a spare electric motor, was wound back on by chucking the whole thing up in a corded electric drill. From reading about it, I couldn't quite figure out wax potting, so candle wax was dripped around the outside of the too-loose coil. The miracle of the whole thing is that, with a ceramic fridge magnet stuck on the back, it would make sound. That is the moment that guitar electronics really began for me."

This was obviously when things really seemed to click for Dan. From there, he was always the guy who was pumped to work on a friend's guitar; intonation, filing nut slots, etc. He eventually discovered Dan Earlewine's early instructional material as well as the "old soft-back Groove Tubes book with all the schematics," and his journey deepened.

Fast forward to today and Dan is able to attribute further growth to social media platforms, as I'm sure many of us can with such great proliferation of knowledge and easy-to-find resources out there...

"Instagram, with all of its distractions and filler, has been incredible the past couple of years connecting me to a global community of builders, techs and players. I do everything I can to help those who reach out asking for advice or tips, and I've been blown away by how generous others have been with tricks and inspiration."

When I Asked Dan What Some Of His Driving Factors Are When It Comes To The Craft Of DIY Guitar And Amp Work, He Had Some Really Incredible Things To Say.

Now, he gave me a number of bullet-pointed philosophies by which he carries out his work, and under each of those bullet points he gave a truly insightful description of them. For now, I'm going to highlight just the bullet points, but for those who want more detail on Dan's philosophies, I'll include his full description of each at the bottom of this article...

- **Take Care Of People.**
- **Leave It Better Than You Found It.**
- **Know When To Say "No."**
- **Keep A Secret, And Give Everything Else Away.**
- **Stay Curious.**

I've been following Dan on Instagram for a while now and I can say without a doubt that he is one of the most meticulous and detail-oriented techs I have ever witnessed. Everything he builds, repairs, or modifies is handled with the utmost care. Dan believes it's his responsibility to listen to what any given client is excited about and to help them get what they want out of their gear. He notes that...

"Every length of wire matters, the angles that components intersect, their proximity to one another, the quality of a solder joint, it all matters. As does the coating on the wire used for winding my pickups, the gauss of the alnico, and the mixture of wax for potting. I do measure and document the specs of every cap and resistor that goes into or comes out of an amp, the inductance of each pickup wound, etc. But it's not just the measure of the ingredients that go into it that counts; it's also how they come together and your intention when working."

Do yourself a favor and follow Dan on Instagram. He has two accounts: **@dpetrzelka** & **@harrowedstrings**.

You'll get the benefit of seeing some killer gear, top-notch tech work, and beautiful photography. And if you happen to be in the Mount Vernon, WA area, you might just want to hit Dan up for some tech work; you'll definitely be in good hands.

For those of you who want to read more, please do check out Dan's full descriptions of the bullet points from above; they're well-worth the read. We want to thank Dan for taking the time to talk with us and for pulling together these great images for the article. Builders, repair shops, and curious minds are the lifeblood of Mojotone, and we are forever grateful for those in pursuit of pristine tone. Thanks for reading and we'll see you all next time.

Here Are Dan's Fully-Detailed Bullet Points...

Take care of people.

People of all means, and all aspirations will come by your bench. No two of them are on the same journey, have come by the same path, or have the same dreams—respect that, and do whatever you can to do right by them. This is big "world view" kind of stuff, but also as simple as respecting the instrument they came in with. My job isn't to tell a kid how much better it would be "if we..." or if they "upgrade to..." My goal is to help that musician feel inspired, and excited to play, and to follow their lead in helping find that mojo.

Leave it better than you found it.

This is true of the trail and the turret board, and in both cases that means leaving as little of a footprint as you can, making sure that what you've done can be undone, and that you clean up after yourself. With my acoustic instrument repair, it's a simple thing like using hide glue whenever possible, so that if a tech down the line can do it better, they have a clean way to undo my work. With amplifiers it means working with what is there, respecting and preserving vintage components and parts whenever it's reasonable to do so, and always returning removed/replaced parts to the owner. Much of this was here before us, and with care it will be here long after we're gone—leave it better than you found it, or leave it alone.

Know when to say "No"

It's sometimes hard to pass up on a project you really want to tackle, but that you know is outside your expertise—respect your client by respecting your own limits and know when to pass on a project. In that same spirit, you must also have the confidence to push yourself, and embrace opportunities to learn. I think it was Luke Single who pointed out what a mistake it can be to start learning to refret on a cheap, bogus neck or fretboard. Just like repairing amps that are true basket cases, those repairs are fraught with challenges that do nothing to help you grow. I love taking on projects that are going to challenge me, but I always work to be honest with a client before starting, and have an exit strategy or a friend you can call.

Keep a secret, and give everything else away.

There are very few things that have been shared with me in confidence over the years, and those things I keep in the vault—everything else I try to share as freely and widely as possible. Guys like Dan Erlewine and Erick Coleman were key in my instrument repair learning (and still are), techs like Skip Simmons, Colleen Fazio and Lyle Caldwell have been instrumental influences in my amp work. Ian Davlin, that guy knows how to knock out a repair. They are excellent role models for the idea that we all get better the more we share our knowledge and skills. I don't know anything when it really comes down to it, but I'm happy to share whenever I can.

Stay curious.

I just love sound—yes, music, but also sound. The tones that wood and metal, electrons and paper can make. The perception of it all, what we expect to hear, what we think we actually hear and how it makes us feel. There is no perfect amp, nor perfect guitar, no final pedal that will make the board complete. There's just the possibility of discovering new tones, new ways of making sound, and new ways to get people excited to play.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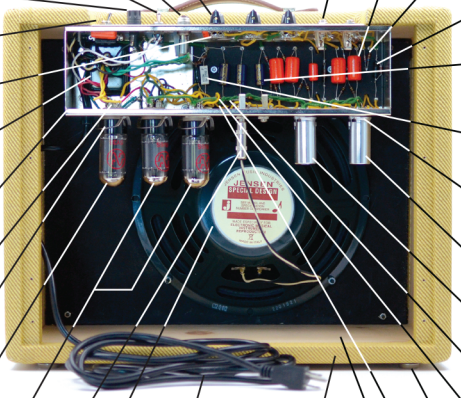

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MOJOTONE KING CAP CAPACITORS
CERAMIC RESISTOR
9-PIN TUBE SOCKET AND TUBE SHIELD
12AY7 PRE AMP TUBE
12AX7 PRE AMP TUBE
METAL OXIDE RESISTOR
18 GAUGE SOLID PRE-TINNED CLOTH COVERED WIRE
CHROME GLIDES
22 GAUGE SOLID PRE-TINNED CLOTH COVERED WIRE
SOLID PINE CABINET WITH FINGER JOINTS

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