

# the ToneQuest Report™

The Player's Guide to Ultimate Tone

## Fawn Marshall Makeover



Seen the price of a vintage Marshall Plexi lately? Your three grand won't guarantee a virgin circuit or great tone, but if real Plexi tone is what you're all about, you can get there for a lot less, guaranteed. When TQR Advisory board member and Sheryl Crow guitarist Peter Stroud decided to make a Plexi from his late '70s fawn 100W head, we enlisted the capable assistance of our main toneman Don Butler and the team at **Mercury Magnetics**, home of

the **ToneClone** line of authentic vintage-style replacement transformers. **Mercury** has blueprinted and reproduced nearly every vintage transformer made for guitar amplifiers, and they can rewind any blown transformer to exact, original specs and sound. So settle back and enjoy the following discussion and review of Peter Stroud's successful conversion of a common (they built 1,000s) Marshall 100W into a stellar 100W Plexi.

**TQR:** What is the origin and general history of this Marshall amp?

**Peter:** I bought this amp about 10 years ago with the matching straight-front 4x12, 100 watt cab from a dealer down in Texas. It's a '77 Super Lead 100 watt 4-input. I was big into collecting the fawn-colored Marshalls at the time – a poor man's custom color. Around the same time, I had learned how to work on my own amps from the standpoint of preventive maintenance and tone tweaking, so I converted the amp over to a cascade-style master volume circuit like a late '70s head or JCM800. Eventually, I missed having the 4-input sound and put it back to its original wiring.

**Sergio:** A few words come to mind that would best describe my first impression of Peter's amp when we played it here at **Mercury Magnetics**, "Dull, uninteresting and fatiguing." It seemed to be devoid of all of the desirable tonal characteristics that made up the foundation of Marshall's benchmark reputation. The amp suffered from symptoms typical of a bastardized amplifier. I wouldn't be surprised, considering the age of the amp, that over the course of many years it was subjected to,

and occasionally the victim of field repairs, TV and audio repair shops and/or possibly unqualified tinkerers. The "less than desirable tone" is the result of too many hands swapping out parts, compounded by an early, crude PC board design.

**Don:** This amp was a standard 100 watt, non-master Marshall from the late '70s. Some mods had been done and then undone. A few coupling caps had been changed as well as a few resistors.

**Strengths:** Semi-loud. Typical PCB Marshall from this era. Better quality glass board than what's used now.

**Shortcomings:** Ceramic caps. This amp was voiced for brighter sound, less bottom, and quicker distortion onset that original '60s versions didn't employ. It still had a couple of the original filter cans. The amp sounded exactly the same no matter what guitar was plugged up to it – no tonal distinction between any instrument at all! Very over-emphasized, weird G string odd harmonics (most likely old filter cap related). I have to add from a personal note that this was the worst sounding Marshall I'd ever heard or played! In a word – no tone!

**TQR:** Describe the specific improvements that you wanted to make to the amp, both from a technical perspective, and sound-wise. What components were changed and why?

**Peter:** I don't know why – from my monkeying around with it perhaps (laughs), but this Marshall just sounded like crap. Every time I plugged in I would end up turning it off – totally uninspiring. I replaced tubes and a cap here and there but resigned to the notion that it might be the transformers. I had replaced all of the power supply caps, but not the 50/50µf in the preamp circuit. It could have been that – who knows? But in any case, I would have thrown it on eBay had it not been



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for the color. Instead, I decided to make it a guinea pig. I've been messing around inside my amps again recently and have had a real desire for that 100 watt Plexi sound and the cleaner, fuller tone they deliver. This head was far from it! Having read the ToneQuest interview with *Sergio* about **Mercury Magnetics transformers** and poking around their website, I figured the fawn 100 watt would be the perfect amp for a conversion – change out the **transformers** for high voltage models reminiscent of the Plexis and wire it up exactly like a '67. I was determined to demystify the whole Plexi thing once and for all for my own comfort. After seeing how **Mercury Magnetics** had “cloned” the power and **output trannies** of an old Plexi, I felt the missing link had now appeared. Then you stepped in and it mushroomed into a topic for ToneQuest, and a very deserved one indeed. Nothing better than to see if any Marshall can become a Plexi, especially since the latest prices on eBay for Plexis are more than I care to spend. I need amps that are bulletproof and easy to replace. I spoke with *Sergio* and Paul at Mercury and they eventually hooked me up with Don Butler. I was thrilled to have Don take over the job knowing his ear for tone and knowledge of Plexis. There were three CD's I used as a tone reference: bootlegs of Cream in '67 and Jeff Beck in '68, and the Hendrix at Monterey Pop Festival album.

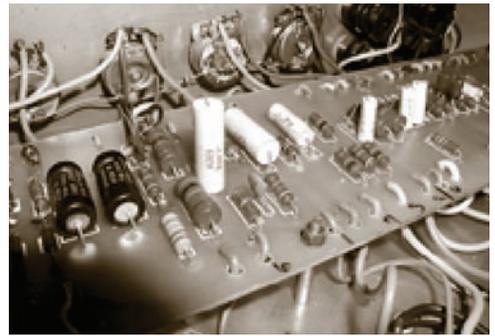


**Don:** Peter wanted the amp to sound like a mid-to-late '60s Plexi 100 watter. More specifically – a '67. I replaced all the little green (or were they grey?) ceramic caps with polyester tubular caps and replaced any resistors that needed to be changed with carbon comp types. Polyester caps were used in the '60s in all Marshalls for the main tone

and coupling caps. I know for the higher value caps in the pico farad range, Marshall generally used the ones from Lemco or RS that were a flat mica-looking cap covered in a baked on ceramic or wax dipped coating. I used silver micas for those in Peter's amp. I like the smoothness and more transparent quality of silver mica. The original polyester coupling and tone caps that Marshall used in the '60s were from a company in the Czech Republic called Iskra. I believe Phillips imported those to the U.K. Those are the ones everyone refers to as the mustard caps. I used **Mercury's** Plexi 100 **output tranny**, 10H choke and 100W Plexi **power tranny** that provides the B+ with around 525V DC after rectification. In my humble opinion, **Mercury** makes the best sounding, most accurate and most reliable clone **transformers** on the planet.

I also used the FRED rectifiers in place of the little cheap-o IN4007 diodes for the rectifier. I like the way they smooth out the harshness of the treble frequencies and take out that midrange bump that's common with a solid state rectifier in amps. They also seem to add more note clarity, harmonics, and detail to the sound and tone of an amp. I replaced the components, **transformers** and the remaining filter cans. I then converted the circuit to what was used in 1967 in terms of how it was wired and component values.

Really, it's not much. On the first valve/tube you remove the wire coming from pin #8 and shorten it and solder it to pin #3. The cathodes on that tube were shared and went to an 820 W resistor with a 250µf @ 25v cap paralleled with it to earth/ground. The second valve/tube did not have a cathode bypass cap in those days – only the resistor. There was a .68 cap I removed from that spot. I also removed the .004 cap from the volume pot on channel #1. That cap makes the amp distort quicker, and usually at just “2” on the volume pot you're out of clean headroom and well into distortion land. That's not what Peter wanted or what the old amps were like. I also used two 0.1/ 600V caps coming out of the phase inverter vs. the .022/600V caps that Marshall started using in around '69 to brighten up their amps.



On the later Plexis you will find a 500pf and 33K slope resistor on Lead models and a 250pf & 56K slope resistor on Bass & PA models. Most, if not all of the schematics I've seen for early 100 watt Plexis used the 250pf & 56K in the tone stack. Peter's amp had the 500pf and 33K. I replaced the 33K with the 56K for more bottom and hit a mid point between the 500pf & 250pf and used a 390pf cap for the treble control. Not too bright and not dark. With Some Lead amps, you have to turn the treble off and even then it can still be too much. I've found that by using a 390pf you get a happy medium point where the treble pot is still useable. All I did was put the amp into what Marshall's circuit was in 1967 and used the same values and type of components they used, with a few improvements like the FRED rectifiers.

**TQR:** Both **trannies** and the choke were changed. How many possible options were available among the entire **Mercury** line of **ToneClone** **trannies**? What were some of the key considerations that came into play?



**Sergio:** We have approximately a dozen different transformer options that would significantly improve the tone of Peter's amp. Knowing this, Peter approached me with the desire to deviate from the original theme of his particular model. He was hoping to have his amp sound closer to a first-generation Plexi amp. To accomplish this, I chose to use our **ToneClone®** O100JM-SL having the self-leaded, cloth wrapped secondary as used in the first generation Marshall Plexi amplifiers. The **power transformer** is also the **ToneClone®**

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of a first generation Plexi producing a screaming 520 volts of B+! Our Axiom part number for this **power transformer** is the Axiom MP100-67.

Last, but certainly not least, is the **choke**. Our **ToneClone®** part number MC10H was chosen for Peter's amp. It is a 10 Henry, high "Q" coil that completed the package. "Q" meaning the quality factor of the coil. This value or ratio is calculated by taking the reactance of the coil and dividing it by the series resistance in ohms. The **choke** plays a vital role in the overall dynamic of producing authentic sounding, vintage tone. For example, if we were to change the choke to the **ToneClone®** R103 model, the amp would yield a more "metal" sounding tone with an emphasis on midrange grind. This in turn would lead us away from Peter's "back to the roots" tonal requirements. Altering inductance and "Q" values should be considered as a "fine tuning" to any amp design. I say this only because the choke is an often-overlooked component by many designers, manufacturers, and modders.

**TQR:** What type and brand of tubes were selected and why?

**Don:** I used the Svetlana EL-34s, as I've found them to sound extremely close to what the old Mullard xf3s offered in tone, as well as reliability. I've compared them side by side in my old 50-watter and in my '64 VoxAC-50 and it's really close. Preamp tubes – I used the new Ei Elite gold pin 12AX7s. To me they sound very nice and close to old Brimars and Mullards. Don't forget that the Phillips Electronics Corp. once owned Mullard and Ei among many other subsidiaries. Ei seems to have made an excellent attempt at creating a good sounding, reliable 12AX7 that they pre-test before sending out. My favorite 12AX7-type of valve/tube for Marshall's are the Brimars, as they offer a bit of that aggressive old tone that Marshall's are famous for.



**TQR:** The amp was given a listening test at **Mercury** before being sent to Peter. What was your reaction the first time you were able to listen to the amp together?

**Sergio:** The most revealing Marshall signature tone hits you first. It was a bit like Elvis singing without the aid of a breath mint. Rich, wonderful tone with unfolding nuances obligating the player not to be sloppy because of the amp's vastly improved detail. Poignant, but not overbearing! This should satisfy Peter's requirement. If I could only stop Don and Paul from plotting to steal his amp... I could tell that the "new and improved" amp made it hard for them to put down the guitars and stop playing.

**Paul:** After an hour and a half of playing Peter's Marshall after the makeover, we (Sergio, Don and I) all agreed that the change of tonality in the amp was nothing short of amazing. The clean tone was so much sweeter. In the light, distorted mode, the amp had so much more tonal complexity. When overdriven, Don and I were just having a ball. I think the best way to sum up the

experience was to say that Don and I both did not want to stop playing. We just kept playing and playing. The different tones coming from the amp were bringing up memories of great songs by Led Zeppelin, Hendrix, Humble Pie, Queen, The Stones, ZZ Top, Bad Company, *etc.*... We ended up playing the amp for over two hours! Every guitar we used (we had the same four guitars as when we originally tried the amp) had a different and special tonality, where before, all the guitars basically sounded the same. The changes from one pickup to the next were very distinctive and pleasant.

**Don:** Well, since I worked on it here in my shop, I heard it first along with a friend of Peter's named Brad Frenquist (who plays with Michelle Branch) who happened to be here picking up an amp. Personally, I thought it sounded pretty damn good – like an old amp. So did Brad. Luckily, Paul and **Sergio** agreed when they heard it.

**TQR:** Peter, what was your reaction when you were finally able to play the amp for the first time? How had it changed and improved? Did you take it out on the road immediately?

**Peter:** It was like I finally had that sound! Growing up in North Carolina, there weren't a bunch of Marshalls floating around – more like Kustoms! The first Plexi head I ever physically touched was years later here in Atlanta. So the day this Marshall arrived, I couldn't stop playing through it. I plugged in every guitar in the house, played every song that came to mind. If it was a Strat – "Like A Rolling Stone," a Les Paul – Led Zeppelin, Free or Cream, an LP Junior – Leslie West, Mott The Hoople and Bad Company. Even Foreigner, who I think had some of the most badass Marshall-tones ever recorded. I brought the amp out on our next tour and it changed my whole sound, realigning my other amps for different uses and making the Marshall cover the creamier tones. It gives me the singing lead tone I've been looking for. We're using a backline of Kustom 412 cabs, so I've loaded one with G12Ms for the Marshall. Every guitar has its own very distinct sound with that amp, both good and bad. Being that it's so unforgiving, it makes me play cleaner. I've also been moved to weed out the duds in my guitar collection. One



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characteristic the amp now has – it’s loud as hell! A good third louder than before and clearly twice as loud as my 50 watt heads. It has clarity. It also has that unmistakable growl that Plexis have. Since we keep a pretty low stage volume, I use a THD Hot Plate and pull two of the power tubes. From a purist’s standpoint, that may make a few of your readers squirm, and Sergio too, but in reality, playing a 100 watt full out is a thing of the past, at least if I want to keep my gig. The Hot Plate is the best I’ve found for retaining that sound at a workable volume.

**TQR:** Finally, what did you all learn from this experience?

**Peter:** Hands down, you can recreate a Plexi out of any Marshall. Thanks to **Mercury Magnetics** interplanetary insanity and Don Butler’s tone sickness, I now have a Plexi in every sense of the word.

**Sergio:** If I may paraphrase a favorite artist of mine, “It’s all trumpet poop full of peanuts”! The first reader to identify that artist wins a free choke.

**Paul:** I want Peter’s fawn colored Marshall 100 watt amp! This amp now sounds as cool as it looks.

**Don:** That it’s nice to be able to take a bland amp like this one and make it into a really wonderful tone monster. I knew that before, really, from the many other amps I’ve done, but it’s always gratifying to have someone who’s the caliber of musician that Peter is and give him something that will give him enjoyment playing though. Also, it was a real pleasure to deal with Peter. Great guy and a spectacular musician!

*Sergio Hamernik*

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*For more info on Peter Stroud*

[www.SherylCrow.com](http://www.SherylCrow.com)



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