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from
Saxapahaw
North Carolina...

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building
custom amps
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The Player's Guide to Ultimate Tone

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Report™

Germino

"I do not think there is any thrill that can go through the human heart like that felt by the inventor as he sees some creation of the brain unfolding to success... Such emotions make a man forget food, sleep, friends, love... everything" – Nikola Tesla

When former biscuit baker, shoe salesman, toolmaker, tap dancer and drummer Jim Marshall first began building bass and PA cabinets in his garage, his vision was limited to merely filling a need unserved; bass players were constantly carping about being overwhelmed by guitarists on stage, and there were no suitable PA speaker enclosures available in England in 1960. 'Build it and they



will come...' Frugal practicality proved the mother of invention again in 1962 when Marshall's service engineer, Ken Bran, dryly observed that wasn't it rather silly for Marshall to continue buying and selling imported guitar amplifiers when they could build and sell their own? Thus went the Big Bang that ultimately rocked the world of rock & roll, boom, boom, boom, boom.

Forty six years hence, should you wish to play a vintage Marshall pre-dating the move to printed circuit boards in 1973, it will cost you dearly, and as David Grissom observed, every one of them will sound different – often radically so. Marshall amps could also present unique challenges to working stiffs playing urban clubs... Our first Marshall purchase occurred in 1979 when we traded a '70s Martin D28 for a new, fawn-colored 2187 model 50 watt 2x12 combo. The Marshall proved to be a dicey guitar amplifier on several counts, but a remarkably efficient 50 watt radio receiver in downtown clubs, and after two weeks it was traded back to the store for a new Fender Twin Reverb with factory JBLs. If but for the now famous 'Bakos paper clip mod,' things might have been different... but probably not. That particular Marshall sounded like a cat on fire.

Our experience with older Marshalls since has reinforced our belief that nothing sounds quite like them, and none sound quite the same. But thanks to impassioned builders like Greg Germino, the expense and uncertainty attached to vintage Marshall amps needn't prevent you from acquiring one of the most desirable and dynamic sounds ever created for the electric guitar, and we refer here to big Marshall tones, not the smaller, more compressed voice of the vintage Lead and

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PA 20s, or the 20 watt Lead & Bass, all of which we have owned, played and reviewed in these pages.

No, my man, do not be cowed by mere numbers... The original JTM45 'Bassman' platform is indeed twice the amp of the 20 watt EL84-powered heads and combos in more ways than one, and for our money, if you want to get a real and enduring classic Marshall groove on in 2008, you can't do better than a Germino.

But before we cut to Greg Germino's inspiring story, let's agree to approach this Marshall thing with some intelligent thought and reflection... If you're thinking that playing a painstakingly faithful vintage Marshall reproduction (and a 40 watter at that) is a dim fantasy, please think, think again, and think some more. The original JTM 45 created by Ken Bran and Dudley Craven was indeed an unapologetic copy of the 5F6A Fender Bassman, albeit with components and transformers sourced in England and changes made to the feedback circuit that endowed Marshall amps with their signature, rich harmonic content and touch-sensitive dynamic response.



The JTM45 circuit design also produces far more clean headroom and flexibility than most people (who have never heard one) imagine, rendering a club-friendly amp that flawlessly complements pedals and virtually every type of guitar and pickup configuration ever devised. Like so many misconceptions that plague the world of guitar gear and wankers wanking about it online and in print, presenting all Marshall amps above 20 watts as being too loud and too horny for anything but 120 dB distortion orgies would be ill-informed. In fact, our e-mail inbox still overflows with inquiries from players seeking an amp with Fender-like clean tones "loud enough to be heard with a band" that can also turn on a dime with beautifully busted up scorch at will. Well, brother, that would and could be yer Germino. Will not calling it a Marshall help? OK... How 'bout we call it a 'Mender,' tailor made to mend yer broken tone? Look, we're not kidding here. Get your multi-meter out and try rebiasing your self for a change. Open your mind, forget what you've read, heard or been told, and you may be pleasantly surprised... shocked even. Are you game? Good. Now let's meet and greet Greg Germino, one of the finest custom amp builders working today. Listen, learn, and above all else, Enjoy!

TQR: OK, Greg... How did you become infected by the music and electronics bug?



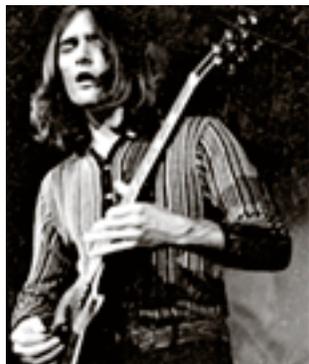
Exposure to music came very early to me as my mother played piano and that certainly was the first instrument I heard. The Beatles on Ed Sullivan was another huge influence. They captivated everyone from the school kids to young adults and beyond. I think what attracted me to them was their vocal harmony first and then the aspect of what they were playing in terms of music and the words. There was a lot of music being played in the house, and my uncle turned me on to a lot of different bands.

Right after the Beatles, I was exposed to Bob Dylan and Big Brother and the Holding Co. with Janis Joplin. A lot of music



of the day was being played, and I listened intently to whatever was being brought into the house. By 5th grade I had picked up an acoustic guitar, a Harmony flattop, all mahogany for \$47. A friend of mine and I would try to figure out Beatles tunes and play the simple D-C-G songs, invert the chords and play some other tunes. It was fun and very few kids in grammar school actually played an instrument. This was 1968-69 and my uncle kept pouring the music on me – The Who and *Tommy*, *Blonde on Blonde* by Dylan, and Zeppelin...

Then one day a friend comes over and he tells me that the Allman Brothers are coming to Duke University and we should go. I think I was 14 at the time – 8th grade, so we convince my grandparents that it was cool and that was my first "live show" and the first show I ever recorded. I had been playing around with a Sony stereo cassette recorder, and I recorded everything... We went to see the Allman Brothers

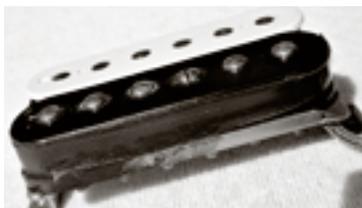


and ended up sitting on stage right in front of Greg's Hammond and I taped the whole show on cassette. That night basically changed my life and how I felt about the guitar. Unfortunately, Duane was gone and Dickey Betts had to step up. This must have been one of the very first shows they played after Duane's death. Betts

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played brilliantly and I got every bit of it on tape. I went home and began emulating everything I could from that cassette. I wore that tape out! It would break and I would splice it back together and keep playing and playing. It was pure hunger and obsession. I was going to play those licks I heard, I had them on tape and they were not going anywhere. It was just me and that recorder for a long time. I didn't listen to anything else for six months or longer. The acoustic I was playing had indentations on the strings from the frets and bending! At that point I had to have an electric guitar, and it had to be a Les Paul. My great-grandmother bought me a Univox Les Paul copy from a music store, and it did not whet my appetite at all. It just didn't look right. Even then I was scrutinizing instruments and looking at photos, reading anything I could about guitars, and the Univox was *not* a real Les Paul. So somehow the Univox was sold and I got my grandfather interested and I found a used '68 or '69 Les Paul Custom that he bought for me. Now I was in Les Paul land, and the Custom felt better and played better. I also picked up a used Ampeg B12XT Portaflex model with two Jensen Concert 12" speakers. That was my first rig, and it sounded great. By now I was in 9th grade and I started jamming with guys from high school who were about a year ahead of me.

I also started playing slide with a flat cigarette lighter. By this time I had graduated from listening to my cassette of the Allman Brothers to listening to Fillmore East and Duane. My live tape of '72 was amazing, and you can imagine as I heard Duane rip the intro to "Statesboro Blues" or play the blues on "Stormy Monday" just how damn hungry I became to absorb every bit of what I was hearing. It was pure obsession, and I was still hunting for another guitar. Even then, the gear quest was on! I saw an ad in the paper for a Gibson Les Paul for \$350. So I go to this guy's house and there is the guitar in a brown case. Now, I'm 15 and I don't really know, but at the same time I'm thinking this one is *different*... The guitar was in fact a 1959 sunburst that had been horribly refinished to a puke-orange color. It looked like it was painted with a brush, like one of those antique finishes for a chest of drawers. Anyway, it still looked cool and it played well. I bought it and sold my Custom the next day to the other guitar player in our little band. The '59 was great, and like everybody back then, one of the first things I did was put Grovers on, and after a few months removed the pickup covers. It had a double black in the bridge and a zebra in the neck position, and the frets were way larger than those on the Custom, so it was much easier to play. I played that guitar for a couple of years



until I sanded it down, and when people saw the wood, everybody wanted it. I foolishly traded for some money and a very nice '71 Goldtop which,

was one of those '54 reissues with P-90s and a wraparound. I also had a '57 Les Paul Special that I played a lot, and later I picked up a 61 SG with the sideways tremolo. Older guitars



were prolific then and none were over \$350-\$450. They were just used guitars being sold by individuals, and the vintage store thing had not

erupted in sleepy Durham, NC...but it was about to!

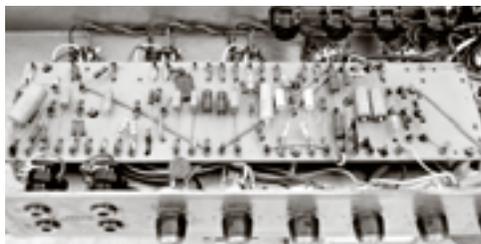
I began taking Electronics the first year of high school and the next two years as well. I had been exposed to my uncle working on motorcycles and my grandfather was an old car fanatic. He had '55 Chevies and a couple of old Triumphs, and even a great full-dress '49 Harley Panhead. He would pick me up from school on that bike. So I had been around this sort of mechanical tinkering and tools. The electronics idea captivated my need to know how certain things worked. I remember taking the P-90 from my '57 Les Paul Special to electronics class and asking the instructor to tell me how it worked. I finished up three years of Electronics in high school with just a good, basic idea of electronics. Back then it was something intended to help you get into fixing TVs.



I kept playing in a small band during high school, and eventually I had the

chance to trade my Ampeg for a '74 100 watt Marshall head. I jumped on the deal because that was what Dickey and Duane had used, although early on they had used 50 watters. A friend happened to have a June '69 Super Lead and when comparing it to mine, his sounded better. My friend and I decided to open both amps up and we found the component differences and changed the circuit in the '74 to make it like the '69, and we switched from 6550s to EL-34s. That was the first "hands on" work I did to an amp. Years rolled by with me continuing to play in cover bands and working regular jobs. I was a car mechanic for awhile and then later got a job working on just electrical systems of cars – all DC stuff. About this time I went back to community college and enrolled in a basic electronics course and commercial and industrial wiring. By that time I also started moonlighting for a place called The Tube Farm, where another future amp builder by the name of Steve Carr also did some side work

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early on. From there I slowly gravitated into doing sales and bench

tech work at a local music store in Durham, Fat Sound Guitars, which would eventually be my first dealer. I left that job and moved to the mountains of North Carolina and played with a great band called Chicken Fat Music Co. for the next three years. Afterwards, I worked doing amp repair at the famous Bull City Sound, whose motto was “In by Noon...Out by June.” It was a fabulous experience there, and I learned a great deal working with Russ, the owner. From there I wound up working for Mojo Musical in 2001 and the next year they commissioned me to build 30 amplifiers Andy Turner had designed called the “Tone Machine.” I was sub-contract labor basically wiring all the chassis on two 15-piece runs.

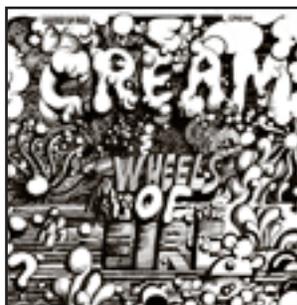
This was a two-channel amp on a Blackface Fender platform with channel one voiced like a Super reverb and channel two, like an early Matamp. The amp used EL-34s and Mojo



installed the chassis into either 1x12 or 2x10 combo cabs. I had owned many great pieces of gear and had a small but nice collection of amps – a couple of old Marshalls and a Soldano SLO-100. The Komet amps had also been out for awhile and I had always admired their build quality and the build quality of the SLO. I thought that it would be great to offer something of similar quality in a Marshall style amp – non master, 4 input style, because that was what I had always played, for the most part. Mike Kennedy of Riverfront Music had been kind enough to send me a prototype chassis of a Komet while I was at Mojo, and this became the prototype chassis for what would end up being the Lead 55.

TQR: As your experience grew, what were some of your favorite amps and designs, and why?

I was naturally drawn to the early Marshall sounds through the guitars sounds from the live *Wheels of Fire* recording, some of which was released as the *History of Eric Clapton...* the live “Spoonful” version, specifically. The *Who Live at Leeds...* Later, seeing the Allman Brothers live and becoming captivated with my recording of the early ‘72 show, and of



course Fillmore East. As time passed, I got deep into all the various Marshall models – JTM-45, JTM-50 and JMP-50 and their evolution, as well as the transformation of the 100 watt designs – JTM-45/100 to JTM-100 to JMP-100 in all the various models – Super Lead, Super Bass, Super Trem and Super PA models.

TQR: In your experience, how consistent were vintage Marshall Amps in terms of their sound, component specs, and the degree to which the original components have drifted and altered the sound of vintage amps?

That question alone could easily evolve into a book with many chapters. No one yet has accurately captured the evolution of the early years of vintage Marshall production and assembly techniques, and I think you have to break each model down and specifically ask about assembly and the evolution as it relates to that particular model. There were a lot of changes happening in the early days of production prior to the Rose-Morris distribution deal. Once that contract was inked, it seems that the first wave of parts began to be supplied for specific models – especially transformers. The early JTM-45s



used whatever could be purchased from suppliers like Radio Spares.

Over the years transformers were used from no less than three different companies, resistors from Spain and Yugoslavia, capacitors from Germany and the UK from different companies like Cornell Dublier, Phillips, Ora and Wima. Some parts used through the years came from US companies such as Carling, Cutler Hammer and Amphenol. When supplies ran out for a certain component, whatever could be used in place was used. If 100k carbon film resistors were out of stock, 100k carbon comps would be used in their place, or if mustard caps were out of stock, Cornell Dublier, R/S or Wima would



be used. It is evident from examining many

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old Marshalls that this practice was common and most importantly kept production moving along – that was the prime concern, no doubt. From '66 to the early '70s production was increasing rapidly.

It is my understanding that there were several different workstations where these amps were built – different assembly benches where each person performed a task such as wiring, fitting the panels, tag boards and final assembly. Each workstation had its own selection of parts, so it is possible to have amps very close to each other in test dates yet built with whatever was on hand at a particular workstation. Most likely there were separate workstations for the various models – Super PA's may have been assembled at a different bench than Super Leads for example. This in part explains the various assembly variations you observe from amp to amp from the same year within the different models. Certainly if you are using different components from various suppliers there is going to be a good possibility of variance in sound. Transformers are also crucial to the sound of any amp, and with Marshall using Radio Spares and Drake in the early JTM-45s and using both Drake and Dagnall in the 100 watt amps as the models progressed, there are definitely differences in how those amps sound.

Filtering also changed over the years as electrolytic capacitors were used with various .uf values depending on what was on hand. Many times, capacitors were used in series on the 100 watt amps just to meet voltage demands. Running caps in series doubles voltage, but capacitance is then half the value of the cap. Many of the early amps were under-filtered, which contributes to a certain feel and response. Voltages also changed over the years in the 100 watt production. The early Super 100 amplifiers ('65-'66) had around 550-560vdc at the plates. If you run these amps at 120vac you get voltages around 600vdc as the primary tap on the power transformer was meant to "see" around 110vac. If you apply 124vac straight from the wall, you will get crazy voltages and you will be exceeding the voltage rating of the caps, not to mention roasting some tubes! By '67 this was down to about 490vdc. By the end of '67 early '68 when the first Dagnall transformers appeared, this dropped to around 460-465vdc, but by the end of '68 this was back up to around 500-510vdc – another reason for variances in sound, headroom and response.

As the Super Lead circuit came into use at the end of '67 and early '68, these models were voiced for more upper midrange and cut – more 'crunch' as we refer to the sound. Prior to



1968, all Marshall 50 and 100 watt amps used a Bass circuit.

That is to say they were all voiced the same. It was not until 1968 and possibly the latter two months of '67 that the Lead circuit appeared. Afterwards, the Super Bass and Super PA models kept the earlier Bass circuit voicing. Fifty watt models were a bit slower in changing over to the Lead circuit values, but change they did. Early 50 watt Lead models had only a bright cap on the channel one volume control to distinguish them from their Bass counterpart. At the same time, the full Lead circuit was also being used. Again, the 50 watt Bass and PA and even the 50 watt Tremolo heads kept using the earlier voicing of the JTM era. It is interesting to note that while the Super Trems from '68 and later did employ the same circuit as a Super Lead, the 50 watt Tremolo models remained voiced as a Bass amp.



The 100 watt models also had many changes in trans-

former size and specs in primary impedance as well as voltage. The Dagnall transformers were smaller in size from the earlier Drake units. Different grade steel was also used. The early Drake units had a high primary impedance for KT-66 output tubes. This was later changed to low primary impedance by 1967. A low primary impedance makes the tubes work harder and you get more power and more efficient operation. It also increases odd order harmonics, which adds a lot of grit and crunch. Add to this the fact that the early Bass circuit has a rounder, flatter frequency response and the later Lead/Super Lead circuit is voiced for more treble response and less low end. As you can see, variances are inevitable from model to model and circuit to circuit.

TQR: Describe the various amp models you build, and how they resemble and offer significant departures or improvements over actual models from the past.

Each model is based on a certain era of the early Marshall amplifier production. My Classic 45 is based on the JTM-45. The Club 40 is very much like a JTM-50 or JMP-50 Bass model. The Lead 55 models are like a JMP-50 with lead circuit values.

The Classic 45 closely follows the roots of a JTM-45 with



the exact same circuit found in an original-

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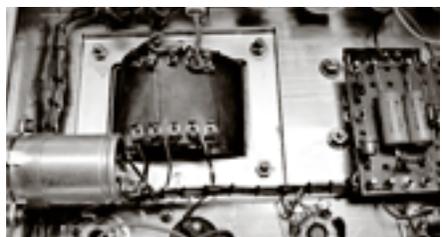
nal. I chose to use the earlier Radio Spares style output transformer because I felt it was a better sounding unit than the later Drake 1202-103 used from mid to late '65 thru '66.

Initially, I played around with decoupling the first two stages and giving each stage their own filtering, however, I felt the original method in which V1 and V2 share filtering was a bit more touch responsive. I had six different JTM-45s in the shop while working on the design of the Classic 45, ranging



from '64 thru '67. Most people have the impression that these were not made past 1966, however, one of my

test pieces was in fact an early '67 Style II combo built on an aluminum chassis with an EL-34 output tranny 784-139 and the first two stages decoupled. I noticed that in all these amps the voltage varied considerably, ranging from a low of around 420vdc to about 470vdc at the output stage. The few schematics available for the early JTM-45s normally show about 450vdc. I checked each amp at the appropriate voltage for the primary tap, and checked the voltage of the other primary taps to make sure each amp was running properly. Many of the early Marshall amps were meant to run on 110vac or 115vac. In fact, many early amps only had taps for 200vac/220vac/240vac. On each amp that gave me a different voltage reading, I was able to conclude that the HV secondary of the power transformer was wound a bit differently on each one. I'm not sure if this was planned or if it was just the difference in batch runs – yet another insight as to why some

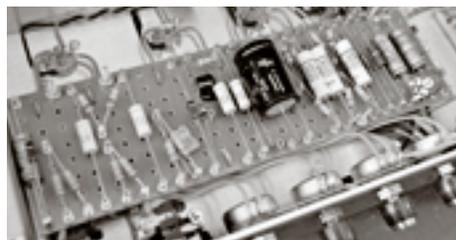


amps may sound better than others. Each amp sounded basically the same, but I preferred the higher voltage

spec of around 460-470vdc and that is what I use. I also found a way to wire the Radio Spares output tranny with a conventional impedance selector. The original trannies had turret lugs for the connections, and the output transformer secondary (speaker side) was unique in that it was three individually wrapped 4 ohm sections which were wired in series/parallel for the other impedances of 8 and 16. If you know the start and finish of each winding it is possible to connect them in series with a conventional rotary switch. This is a nice advantage over having to deal with an amp fixed at 16 ohms which is how many of the early JTM-45's were built. Heyboer transformers makes the Radio Spares output I currently use, and it is wound in the exact fashion as the originals with 6.6K/8K/9K primaries and the ultra-linear taps in

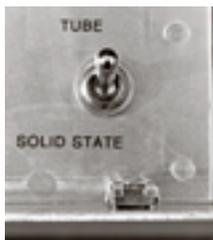
the original. I only use the 6.6K winding, however, the other windings influence the sound.

The Classic 45 layout and circuit is true to an original. I use 32uf of filtering for all sections except for 16uf for preamp and cathode follower stages together. The boards are hand perforated and I test each component for spec before assembly. This is a *great* club amp since the tranny is a 30-35 watt unit and you can get about 40 watts out of this model running either a 16 or 8 ohm load with the amp set at 16 ohms. This is because the tubes are operating rather inefficiently into the 6.6K load. When you run an 8 ohm load and the amp is set for 16 ohms, the primary impedance is cut in half and you have a 3.3K load. The amp is louder and feels a bit less loose – tighter, if you will. More midrange and more dynamic in response. I actually prefer 6L6GC's or 5881's in the Classic 45. Modern KT-66s lack the dimension and crunchy sparkle that the old GEC KT-66's had, and the very first JTM-45s used 5881s and 6L6s. Obviously, it was less expensive for Marshall to use a tube made in England, so the KT-66 began being used. My reason for using 6L6GC/5881 is simple; it is a better sounding tube (even modern examples) than modern KT-66s and, there are more choices in the NOS realm without breaking the bank. GEC's are what? \$400 a matched pair? You can still dig up RCA blackplates or GE 6L6GCs as well as original Tung Sol 5881 and Sylvania 6L6GB's. Current offerings from Tung Sol 5881 and SED 6L6GC's are excellent for what you pay and sound very good.



The Club 40 is based on the JTM-50, which was still tube rectified but with different trans-

formers for EL-34s. This amp retains the same circuit platform as a JTM-45, but with added filtering. This is a Bass circuit and pretty much everything built prior to '68 was a Bass circuit with Marshall. In the Club 40, filtering is stepped up to 32uf in all sections. Additionally, I have added a tube/solid state rectifier switch. This changes the feel of the amp with the solid state rectifier mode giving the amp a tighter feel and faster response on pick attack. Since this option was introduced, I increased the initial filtering to 64uf,



which makes the Club 40 very much like an early JMP-50 watt Bass model in solid state mode. The output tranny and EL-34s make for a different sounding amp than the Classic 45. You get the traditional upper midrange crunch with EL-34s and the full frequency spectrum of the Bass

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circuit. I do use a very low-value bright cap of 100pf. There is no need to bridge channels in these early Bass

circuit amps – there is plenty of low end and these amps love single coil guitars. The Bass circuit tends to work better with pedals also. The Club 40 has proven to be a very popular model and it bridges the gap between the early JTM-45 sound and the later lead circuit JMP-50 sound, which is more aggressive.

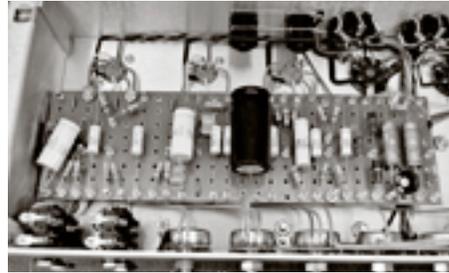
The 55LV model is the later lead circuit JMP-50. At the cusp of 1967 into '68, Marshall voiced their lead amps for more cut. This involved changing output stage coupling caps from .1uf (which allowed more lows through the circuit) to .022uf. Tone stack values were changed from 56K/270pf to 33K/500pf to voice the amp for more midrange and treble response. The shared cathode design of the Bass circuit was replaced with the split cathode arrangement giving each side of V1 a separate cathode resistor and bypass cap. This allowed channel one to be voiced differently. In conjunction with this, the coupling cap on the channel one side from the plate of V1 to the volume control was changed to a .0022uf as opposed to a .022uf, basically stripping out low end. Also, the value of the negative feedback resistor was changed from 27k to 47K allowing less negative feedback. This allows the output stage to clip sooner. All these changes made for a more aggressive (in the old school term) amp that broke up or crunched quicker.



And there was the high-value bright cap, usually labeled 5K or .005uf.

This was an automatic brightening circuit and when volume was set low, it stripped much of the low frequencies out of the amp on channel

one. As volume increased, the cap was 'working' less and less, and at full volume it was out of the circuit completely. This cap can make channel one very shrill at lower volumes, and it's why players began jumping the darker channel two side into channel one when running the amp at lower volumes. I typically do not use a high-value bright cap unless requested by a customer. I prefer the 100pf value, which is totally at the other end of the spectrum. Sometimes I will send Lead 55s out with both value caps and allow the customer to make the decision themselves.



The Lead 55LV employs these changes and is fairly different from the Club 40 even though

they share the same transformers, and the circuit difference accounts for a lot. The split cathode arrangement drops voltage in the preamp section and accounts for some of the earlier break up along with the higher value negative feedback resistor. Filtering is also increased to 100uf initially, followed by 50uf in screen supply and phase inverter. This gives the amp a tighter feel. Tone stage and preamp sections are at 32uf each. This was the same for Marshall up until late 1969 and early '70. The Lead 55LV originally used a GZ-34 rectifier only. With the tube/solid state rectifier switch being so popular in the Club 40, it is now standard for the Lead 55LV. In solid state rectifier mode, voltages are exactly what you would find in a '67 thru mid '69-era JMP-50. In GZ-34 mode, they are a little less, which works very well in keeping the amp tame in a small club.

TQR: The 100 watt models also correspond to early Marshall production pieces?

The Monterey 100 is a JTM-45/100, one of the most fabled amps ever produced. The key elements in this amp are a combination of



of the output transformer with very high primary impedance of 4K, very high voltage, very low filtering,

Bass circuit values, and the KT-66 tubes. The high primary is inefficient in operation, power supply and filtering is much less than what was used in later amps, giving a soft feel for a 100 watter. The high voltage gives enormous headroom and the KT-66s give their own sonic stamp. The original plate voltage spec of 560vdc is very hard on modern tubes. I offer Sylvania 7581As at an up-charge and these handle the high voltage easily. For those wishing to use modern tubes, I can drop plate voltage to 500vdc and modern KT-66/6L6GCs seem to hold up decently as long as swamp grid resistors are used. The best example of the sound of this amp is the famed Hendrix at Monterey recording, which is where I derived the name. Stellar cleans that are big and full are easily dialed in and the crunch rhythm tones are fantastic. This amp is also a great foundation for pedals.

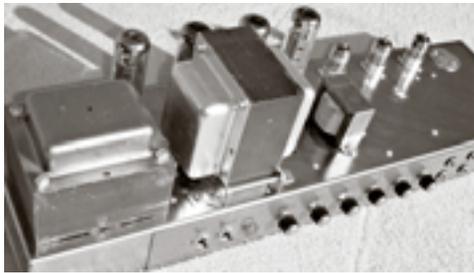
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The Fillmore 100 is based on the early JTM-100s when the switch to EL-34's was made. This model uses an output tranny with a

lower primary impedance for EL-34s.

Voltage is stepped down to around 480vdc at the output tubes, however, filtering is still very low for an amp of this type. The early/mid '67 JTM-100 models are one of the shortest lived production periods from Marshall. It is my belief Marshall was experimenting with these new transformers as the sound of rock was changing and players were demanding more from the amps than before. These early JTM models were nicknamed "Black Flag" for their reverse typeset JTM which appeared on the front panel of not all, but many 50 and 100 watters from early '67. The Fillmore 100 has the big, full cleans of the Monterey but with added grit from the EL-34s,



so there is a bit more crunch happening. Again, the power supply has much less filtering

than what you normally find in a 100 watter and as a result, there are some sub-harmonics happening, which is part of the sound. I find this model and the Monterey to sound similar, but the edge goes to the Monterey as a classic blueprint of the early 100 watter sound before the voicing of the lead amps was changed in late '67 and early '68.

The Headroom 100 is an exact replica of what Marshall delivered in early 1968. This model uses Lead circuit values,

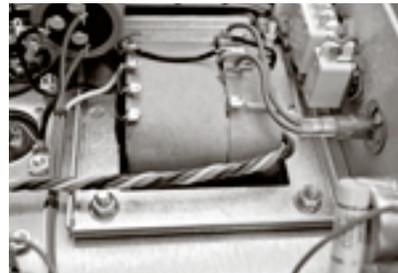


higher filtering, less voltage and a completely different transformer set. The output transformer set for this model is made by Merren Audio and is the best Dagnall 1.5" replica being made. This unit is exact in spec and performance to an original. Filtering is stepped up and power supply is much stronger. This paired with the voicing

of the Lead circuit and lower plate voltage of 460vdc are all key elements in allowing this amp to instantly reproduce excellent crunch and singing single notes with the depth and percussive attack that only a 100 watter has. This is a much more aggressive amp than the Fillmore 100 or Monterey 100 and feels much tighter when playing.

TQR: Since you have set out to reproduce the original designs, are there any other improvements you have made over the old amps?

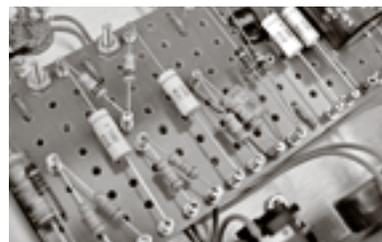
One of things I strive for in each build is to eliminate any errors that I saw in the early amps I was reproducing. Consistency of parts and making sure each component is



checked prior to assembly is very important. I upgraded laminates on the original designed power transformers for better cooling. Making sure that

the grounding scheme is correct and how wires are dressed is crucial. Chassis have folded and spot welded corners for strength, hardware is a mixture of brass or stainless steel. I use the finest components available and make everything bullet-proof as possible so the amps are completely roadworthy and can take physical abuse as well as being played for hours on end. I offer a lifetime warranty on all the amps, but I do not cover tubes and I also put a time limit on some components like filter caps and transformers. The transferable warranty follows the amp and underscores the attention to parts and detail.

TQR: Most custom amp builders emphasize features such as the types of capacitors, resistors and transformers they use. In practical terms, why is this important to understand? We suspect most players have no idea why they should care.



I use a combination of carbon film and carbon composition resistors. Carbon film resistors offer quieter operation than carbon comp, and the original

Marshall amplifiers used carbon film resistors unless there was a value they did not have in stock. Also, if there was a place on the board where the lead length on the carbon film resistor was not long enough, a carbon comp with the longer lead length would be used. Carbon comps were also used as decoupling resistors sometimes on the old amps.

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Sozo Caps



Tone capacitors and coupling capacitors are a huge topic of discussion today. Originally, Marshall used capacitors with film/foil construction. Very early

amps have Radio Spares, but even by '64 you see the fabled "mustard" caps by Philips being used. These have coveted status and a wonderful sound to them. John Gaynor at Sozo Amplification has done the best in replicating these, and this is what I use in my amplifiers. There are other brands that are also very good, and I will for an up-charge supply a customer with a set of the original mustard caps in a build. Caps and how they affect tone is very subjective.

Transformers are an equally deep subject... I have used Heyboer transformers for the majority of my amplifiers, and they supply me with some of the very best re-creations of the early Drake iron used in the 50 watt amps for both power and output. The 50 watt output tranny I use was based on a teardown of the 784-139, which is what was used from 1967 through the early '80s. With that said, specs did change on that unit and what was copied was an early unit that Brian Wallace had analyzed. He has a great site – www.marstran.com with great info and pictures of early amps.

Chris Merren makes some great transformers on his single wind machine that are spot-on to the old Dagnall 1.5" 100 watt output tranny, and a great Radio Spares JTM-45 unit. The type of steel laminate is crucial to an output tranny and how the annealing process is handled. Steel has changed over the years and sometimes the laminate used may need to be adjusted to fit the performance characteristics of the sound of the early amps.



While it is good to be aware of what makes an amplifier work and the components involved, I think it is important to remember that these pieces are here for us to use as *tools*. A musician should never get so wrapped up in the mechanics of the amp to the point of over analyzing how the components are shaping the sound;

rather, stay in tune with playing music and learning how to make the amp work for their playing style and type of music.

TQR: What kinds of speakers do you use, and why?

That was simple, actually. Celestion was the obvious choice for my amplifiers given they were used exclusively in the



majority of British amps back in the day. Since all of

my amplifiers are non-master volume, I needed a relatively low efficiency speaker that would break up as the output stage was clipping. The reissue Greenback 25 watt speaker at 97db efficiency is noticeably less loud than a G12H or the standard Vintage 30 at 100db. The newer Heritage G12M 20 watt speaker is even less efficient at 96db, and this speaker will really control volume. You might be surprised that a 2x12 open back cab with reissue Greenbacks is the same volume as a 4x12 closed back with the less efficient Heritage G12M 20 watt speaker. I tell folks this all the time and no one seems to 'get it' until they actually try them, and at that point, they are amazed. I'm a big fan of old speakers and these have an elusive sound and performance to them much like the old PAF pickups your magazine has discussed. It really is astounding. Celestion has come close with the Heritage 20 watt speaker, but not quite there. I use the reissue Greenback and the Heritage 20 watter more than any other speaker in the Celestion line. The new G12-65 is a great speaker for higher power handling with a low efficiency the same as a reissue Greenback. It is a darker/smooth speaker, so it tends to work better in open or semi-open back cabs.

TQR: You've mentioned the importance of tubes – but let's confirm which brands you use and why.



I have always used the SED "winged C" EL-34s. They are, in my opinion and many others, the best current production EL-34

being produced. Supply on these is not what it used to be. I believe that Marshall buys the majority of the production on this tube and what's left trickles out to the US distributor, so it is not as available as it once was. Groove Tubes used to sell this as EL-34 R2 and they have been unable to get enough to satisfy their requirements for a couple of years now. With any

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tube you are using it is imperative that they be burned in and tested. I see a lot of places that claim they burn in the tube for a long time, yet still arrive unmatched or poorly matched. A tube needs to see a voltage the same or very close to that in an amplifier and it needs to be burned in with signal applied in a perfect environment, as parameters change at that point. I have been very pleased with the SEDs as long as they are burned in well. I have also begun using the SED 6L6GC in the Classic 45 with excellent results. This tube offers much better sonics than the Chinese KT-66. I have long been a fan of 6L6s in the Classic 45 despite those who feel if you build a JTM-45 it has to be equipped with KT-66s. While a 6L6GC may not sound exactly like a KT-66, I would prefer to use a tube that I know sounds better and offers better longevity over what folks feel is traditional.

Sometimes new tubes will come out and everybody jumps on a bandwagon as it's just *got* to be good. People read specs and the usual hoopla on the Internet and it gets adopted. In truth, these folks become the 'testers' for new product and this is where the manufacturer becomes aware if a tube is actually good or not. I see this happen all the time.



Among current production 12AX7s I use the Tung Sol, the New Sensor Mullard (which I am still evaluating at this time) and sometimes

the TAD 7025 Hi-Grade, which is a Chinese 9th generation that is carefully selected. All tubes are checked for gain, microphonics and clarity in each amp I build. These are some of the best of the crop in current production 12AX7 types. Again, there are no tubes or very few that stand up to the standard of how the old tubes sound. Materials were so different back then and standards of making those old US and European tubes were strict. There is nothing like the sound of Mullard EL-34s, GEC KT-66s and the Mullard and Brimar ECC-83s. I have many old ECC-83s that are 30-40 years old that test perfect and sound amazing. You won't find that in a new tube.

TQR: How are your cabinets constructed and what types of wood do you use?

We use Baltic Birch from Finland or Russia in all cabinets throughout, and each cab is finger jointed in the corners for strength. Our cabinets are constructed with traditional methods and careful attention to the detail of construction in the old cabs they are patterned after. I offer both small box and large box heads for the various models, as well as 2x12 open

back extension cabs and both straight front and slant 4x12 cabinets. I also offer 1x12 and 2x12 combos, the latter in both a Style I and Style II cabinet. Each cab is built and covered at the one-man shop of Ken Jones. The cabs are exact in every way to the originals. The trend I see now is that many woodshops are using a Poplar/Birch ply, which weighs less. This is a result of the prices of full Baltic Birch prices doubling back in the fall of last year. I feel this wood is better and have continued to offer cabs constructed only of this type wood as it is superior in sound and quality.

TQR: How do you describe the sound of your amplifiers?



I want each and every amp coming out of the shop to sound as close to the original it is patterned after. Each model has its own sonic footprint, and they have similarities along with sonic differences. With stock tubes they deliver extremely close performance to what

you would find in the best examples of the original models they represent. Install a set of Mullard output and pre-amps tubes and the sonic footprint is spot-on to the original. They do sound a bit fresher, and that diminishes as the amps are played.

The attention to transformers is critical in the way the amplifiers sound, and they are truly the heart and soul of a piece. The power supply and how it is configured is also very important. I also feel that energetically building each and every amp by hand adds a quality that transcends into the sound.

TQR: For those unfamiliar with buying amps from small-production, custom builders, can you summarize the important details and enhancements you offer that are not available from more economical, mass-produced amps?



Probably the most important aspect of any business is customer service. I provide what I feel is some of the best customer care possible. I genuinely love what I do, and have been

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involved as a musician for over 36 years. I have an extensive background playing in bands and years of technical experience in repair, so I feel that I can listen to what a person describes and tell them honestly if one of my amplifiers will fit their needs and playing style. I want each customer to be pleased while considering my product before or after the sale. Questions regarding older amps I've built are equally as important as they are on a new piece.

I field many questions about speakers, tubes and various components, and many questions regarding the old Marshall amps and how they were built. I always tell it like it is, and offer my honest opinions and evaluations in relation to how they affect sound. You can pick up the phone or e-mail and connect to the person who is actually building the amplifier, whose name is on the product and whose reputation is on the line.

In regard to custom work, I am always willing to offer NOS tubes or old coupling caps if a person has that interest. Some of my models now have a rectifier switch to select either a tube or solid state rectifier. I really don't offer any custom circuits or anything of that sort. I do try to help folks get the most out of their amps by suggesting what will work in live settings, since I feel my amps are not intended for 'bedroom' use. They are made for players and to be used in live band setting and recording format. That is where they excel.

TQR: What's ahead?



More of the same, really. In 2007 I did a major facelift on all models including new chassis and

Perspex panels which are true to the originals in every way. Many esthetic touches were incorporated which made the amps identical to the models they are inspired by. At this point with all changes in place and a list of excellent parts and careful attention to minor detail, I feel the amps could not be built or perform any better unless I found a stash of NOS mustard caps and Mullard XF2s! The 1x12 combo format was brought out this year, which I feel will offer a more portable 'grab and go' amp for those who live in big cities or where transportation is paramount. The new Style II 2x12 will also be of interest for those who want a small combo with a big sound. **TQ**

www.germinoamps.com, 336-376-8354

Germino Club 40 & Classic 45



Unlike some 'custom' and replica amp builders

that would have you believe they practice their craft using the most costly, state-of-the-art, historically accurate components and meticulous layouts faithful to the original circuits they are 'recreating,' Greg Germino truly walks the walk. Yes, tone, feel and reliability are the qualities by which an amplifier must ultimately be judged, but when you pay for 'the best,' it's reassuring to know the builder is driven to deliver on that promise in ways only he would ever know. It seems that there are two kinds of 'custom' amp builders working today – those for whom 'good enough' is just that, and those who will spend top dollar for the best parts money can buy because to do otherwise wouldn't even occur to them. So rather than kicking off our reviews by charming you with seductive descriptions of a 40 watt wet dream arriving at your doorstep, we feel compelled to first give credit where credit is due. For example, Germino's transformers are indeed custom built to the *exact* specifications of the originals. Is this really necessary? No, but it is to him, and he has given a great deal of thought to the variations that occurred among vintage Marshall transformers and which will best serve players today. Germino also uses ultra-precise PEC pots (you can feel and hear the difference – they *work*), new old stock Cinch



tube sockets, premium F&T electrolytic caps made in Germany, Sozo film/foil replica 'mustard' caps, carbon film and NOS carbon comp resistors, hand-drilled

turretboards, robust power transformer mounting frames bolted to the chassis, and what we can confirm to be among the best sounding new production tubes available today. And yes, you *can* and will hear the difference. Even Germino's 'plexi'



panels are visibly superior to the off-the-shelf stuff used by most knock-off artists. And although they don't remotely affect

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tone, like the originals, the back panel and detachable power cord on the Classic 45 are a historically correct white. Are you feeling this? There is an attention to detail here that transcends necessity and profit.



The three Germino amps we requested for review all share a singu-

lar quality that makes any one of them worthy, if not essential to your stash of majestic, signature tones. They are among the most musical-sounding, tonally balanced, smooth, deep, responsive and richly satisfying amps we have ever played, including vintage Marshalls, Marshall clones, and any other new or used, similarly powered amps you wish to include. As you may have noticed, new amps can be plagued by a too-sharp, linear, one-dimensional voice that lacks the warmth, bloom and rich soundstage of an old classic. The tone may not be bad – it might even be good – but sometimes you may still feel oddly disconnected from what you hear coming out of the speakers. Individually, and as a group, Germino's amps give quite the opposite impression.



The Club 40 is appropriately named, although depending on the cabinet and speakers you're using, it will sound closer to 35 watts. We ran all the Germino amps through our Avatar 4x12, loaded with four NOS 2005 British-made Celestion 25

watt/75Hz Greenbacks acquired specifically for this issue. We haven't developed a studied opinion in the debate over whether or not the Chinese-made Celestions sound significantly different from the earlier speakers made in England, but we can tell you that our 4x12 straight-front cabinet loaded with the British Greenbacks is absolutely stunning – now destined to be our reference for appropriate amp and speaker reviews. And Greg Germino is right... running 25 watt speakers in a 4x12 does *not* produce the ear-shattering levels of volume you might expect. Just so you know...

With the exception of the Club 40's rectifier switch and stock EL34s, it's clear that both the Club 40 and Classic 45 are closely related. At roughly 35 watts, the Classic is slightly

less loud and powerful than the Club 40 rated at 50 watts, but a difference of ten watts or so can be deceptive depending on the speakers you choose and their configuration. The Club 40 with EL34s sounds a bit more aggressive in the midrange frequencies, while the 6L6s in the 45 present a wider, more open, even 'Fendery' tone with a deep and throaty bass response. With our 4x12 cab, both amps are capable of producing strong bass and low mids with the tone controls set well below 12 o'clock, and the Presence control further sharpens and defines the overall tone in the treble frequencies. Most players will live in the first input of Channel 1, since the lower gain bass circuit has been retained in Channel 2. This may be an area where you can discuss alternative voicing in your amp to make Channel 2 more usable for guitar.

You can run both amps with EL34s, 6L6s, 5881s, KT-66s, or even 6V6s (the Classic requires the 5AR4 rectifier to be changed to a 5Y3 or 5U4). We've yet to hear modern KT66 tubes we really liked, and 5881s and 6V6s will lower the threshold for clean headroom. We preferred the bigger, cleaner sound of 6L6s and EL34s, which brings us to a very important point related to these early Marshall designs... If your idea of the quintessential sound of a Marshall head is intense, '70s and '80s-era distortion with a razor-sharp edge that quickly erupts at low volume levels, this is *not* what the Club 40 and Classic 45 (or the original JTM45) deliver. Both amps produce subtle distortion very gradually as volume is increased, remaining comparatively clean until you reach 5-6 on the volume control. Distortion increases steadily beyond these settings as the low end blooms, but both amps produce a much cleaner overall sound than the late '60s and '70s Marshall 50 watt amps. The historical differences between various Marshall circuits generally reflect an increased emphasis on brighter sounding amps designed to produce more intense levels of distortion faster. While the early JTM amps were rowdy enough for their time when pushed, they were also a work in progress. As rock music and players' tastes rapidly changed, Marshall changed with them. This is not a question of which era is 'best' – the question is, "Which sound is best for *you*?" We find a lot to like about the Club 40 and Classic 45 for just this reason – both produce manageable, *usable* levels of volume for club work more in the style of a Fender 40 watter, and they are remarkably pedal friendly, yet you won't be fighting for clean tones with the amp set on '4' while your audience cringes in the back of the room. As such, these early Marshall designs can offer more versatile flexibility than many of the brutes that followed, and this is good. For more intense power tube distortion at lower volume levels, you'll need to rely on a good boost pedal. Our Xotic RC Boost, Klon and Timmy pedals all succeeded brilliantly at enabling both amps to sound more like a late '60s 50 watt without the additional volume. The next step up is the Germino 55 head celebrating the model 1987 JMP 50 watt Lead amps from 1968-'69 – arguably Marshall's 'golden era.'

Germino 55LV

The Germino 55LV is the end of the road in Marshall town – game over, everybody wins. Maybe you know the sound of a typical late '60s vintage JMP-50 cold... Or perhaps you have



no idea what one really sounds like, and if

asked, you'd readily admit it (*respect*). Sure, the extent to which the Germino 55LV resurrects and honors the sound of the original Lead head matters, but on another level, it's a useless and stupid debate. Roy Blankenship put it best when he said, "There is a lot of snob appeal and dick-measuring in this business..." We couldn't agree more. Some men become boys with toys all too quickly when the adrenaline starts pumpin' on the cusp of a new amp buy – tone is on the line, as well as a healthy dose of ego. To do the obvious by solely measuring the Germino 55LV against an arbitrary and grossly subjective comparison to 'the real thing' (which one, and according to whom?) would merely feed the perpetuation of DickQuest for the few lucky enough to own a vintage Marshall, while completely missing the magnitude of Germino's accomplishment for the majority who don't. With that out of the way, we'll attempt to describe how the 55 so beautifully captures the essence of such a historic amp *and* outguns the majority of vintage and boutique amps we have reviewed in these pages in the past nine years. You might want to place your order now.



Yes, David Grissom had it right – even 'identical' vintage Marshall amps can sound very different for reasons just detailed by Greg Germino. Our 1969 Lead 50W head was a great amp, but compared to the sound of the 55, the '69 is

inherently darker in its brightness if you can imagine that, the bass, mid and treble controls are far less precise with a very narrow, ineffective range, and no matter how you fuss with the tone and volume controls, the old Marshall amps really possess just one highly

variable and inconsistent tone – definitely 'vintage,' but also betraying a voice that can sound rather limited – great for *that* one sound, and undoubtedly a classic – but limited nonetheless. On the other hand, at their worst, many new 'replica' Marshall amps suffer from a distinct lack of warmth, harmonic depth and color, touch-sensitivity, fidelity, and the imperfect, rounded-off tone of a 40 year-old amp that has been used as intended. The treble tones in new replicas can be shrill and edgy, mids gritty and obnoxious, low end murky and indistinct, dynamic response stiff and uninteresting, and by the time you've reached '4' on the volume control the amp is in full burn displaying all the charm of a chainsaw. Something built to be sold, certainly, but not necessarily played and enjoyed.



You'll find none of these liabilities present in the 55LV. Its voice is fresh, lively, crisp and extraordinarily clear, but

Germino has also succeeded in avoiding the typically stiff, sharp, one-dimensional sound of a new amp, as well as many of the raw shortcomings that exist in vintage amps. Slight adjustments to the tone controls in the 55LV produce precise results that make a huge difference when you're dialing in the sound of different guitars and effects. The bright character of channel one stops well short of being too extreme (perfect for humbucking pickups), but if you need to shape tone for a Telecaster, Strat or P90 guitar, the tone controls respond with a smooth taper that dramatically enhances the versatility of this amp beyond 'vintage.' Jumping channels one and two with a patch cord also adds a fat foundation of low end that can be mixed with channel one to further shape and create your signature voice. And let's not forget the solid state/tube rectifier switch – the perfect solution when you need a little cushion for the pushin,' or it's time to bear down and make a tougher statement. We love The Switch, and so will you.

In terms of clean headroom versus the all-important distortion threshold, Germino typically installs a power transformer that produces higher plate voltages of 450vdc in the 55, and 426vdc in the 55LV (*low voltage*) that is more in line with the original '68-'69 Lead amps. Higher voltages raise headroom and volume, and the lower voltage in the LV produces earlier break up at lower volume levels, which the majority of Germino's customers prefer. In our experience, the amp remains comparatively clean up to 5-6 on the volume control, gradually intensifying to levels of thick, gloriously singing sustain beyond. At 50 watts, a little earlier break up is indeed desirable, and you'll still have headroom to spare. If you've never considered yourself a 'Marshall guy,' we understand, but perhaps your opinion was formed by past dalliances with

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one of the Bletchley gain monsters, eh? The 55LV demands an attitude adjustment, because you could easily run it with a 2x12 cab and dial in an absolutely bitchin' tweed Twin tone with ease. Yes, you could.



As impressive as the 55 LV is, it wasn't until we plugged in our Fiesta red relic Strat, now fitted with Jerry Amalfitano's exceptional SP pickups, that the full capabilities of the 55LV emerged. We had already enjoyed hours running the 55LV with still another new '59 Historic Les Paul equipped with early '60s humbuckers, the Nash Tele, and the Firebirds you're about to discover,

but the sound of the scooped single coils cutting through the Germino stopped time (circa 1969) – no pedals required. A3 The magical combination of the Strat with the Marshall circuit was perfect in every way, mesmerizing



and utterly inspiring. It is also interesting to note that we did re-bias the 55 for a pair of

NOS Mullard EL34s and add a pair of Amperex 12AX7s, resulting in a smoother, richer tone overall, but the stock 'Winged C' EL34s and reissue Mullard 12AX7s also sounded good enough to relieve you of the need to go hunting a \$400 pair of NOS EL34s and pricey 12AX7s. These amps rock with the stock tubes.



The 100 watt Leads and small-box '68 Plexi and aluminum panel 1969 50 watt heads are considered by many to be the best sounding Marshalls ever built. In fact, when Marshall A/B'd various vintage amps as they prepared to design the limited

edition handwired series, they chose to use a 1969 100 watt Lead as the modern benchmark for the new amps. It's no coincidence that Greg Germino also chose the vintage 1968-'69 50 watt amps as a basis for the Lead 55LV, enhanced with his impeccable attention to detail and a level of flexible versatility that simply did not exist in 1969. In all respects, Germino's work impresses us as 'better than vintage' in terms of value, build quality, versatility and tone. Having come this far, we all deserve a Germino.

Hoping to Fly...



Electric guitars achieved the status of pop culture icons decades ago, so it's no great surprise that a certain evolving cult of popularity separates guitars that are deemed 'cool' from those viewed as stodgy and decidedly *uncool*. Of course, tone has also played a significant

role in this fickle game... Can you imagine Carl Wilson having played "Little Deuce Coupe" with a Les Paul goldtop? As California surf music pounded the airwaves in the early '60s, Ted McCarty and company in Kalamazoo realized they had an image problem. In less than 10 years, Leo Fender had steadily gained national marketshare from Fullerton with colorful bolt-on-neck guitars that had not been taken seriously by more traditional manufacturers like Gibson and Gretsch, and now, surf music was dumping saltwater on an open wound at Gibson. Something had to be done.



Still smarting from the public's tepid response to Gibson's bleeding edge Flying V, Explorer and Moderne designs, McCarty commissioned a Detroit automobile designer, Ray Dietrich, to create a new line of solidbody electrics that could do what the SG had not – lure hip, young guitar players back to Gibson, *da doo ron ron, da doo ron ron...*

Dietrich delivered sketches for an asymmetrical body style and a peghead with a flipped-over Fender-ish shape that loosely invoked the off-set style of a Fender Jazzmaster, but in all other respects, Gibson was poised to develop a guitar as radical in construction (and tone) as anything previously built in Kalamazoo or Fullerton. Stumped for a suitable name, McCarty turned again to Ray Dietrich who, perhaps sensing some urgency, chose the name for the allegorical symbol of the phoenix, representing rebirth and renewal – the Firebird, risen from the ashes. It was a bold move.

The Firebird's neck-through design was born out of practicality rather than a zest for innovation. The factory floor was rich

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