LONE WOLF BLUES COMPANY
VINTAGE TONE EFFECT PEDALS
FOR HARP AND GUITAR

THE LONE WOLF 3X6V6SE
ANOTHER ORIGINAL AND FREE HARP AMP PROJECT

Lone Wolf Blues Co 3X6V6 Harp Amp.qt

INTRODUCTION

This is the second of three free harp amp projects that LWBC will be offering to the public. The project details the build of a single-ended parallel 6V6 harp amp featuring three 6V6 tubes, the only one of its kind. This project is intended to be built as designed and not piece milled with other designs. The reason for this is that my design is a holistic design, meaning it is designed to all work together from the power supply to the speaker. Changes made in gain, tubes, capacitance, etc., will affect other stages in ways that may not be positive. I will offer alternatives along the way that will not affect the end result negatively, but I suggest you give it a try as shown because the end result will be a known good product.

Why three 6V6's in parallel? Why not. There are parallel 6V6 amps out there that put out

about 10 watts, and they are sometimes called a Champ on steroids; they are great sounding amps. Often a little more power is desired by harp players, and for those who love the single-ended Champ tone, there was nothing available. So I decided to design a 15 watt single-ended 6V6 amp.

In designing the schematic, I began with the same power supply as my 6L6SE project but with a larger power transformer. In the preamp, I decided to eliminate the voltage dividers with a local negative feedback loop and go with a 12AY7. I really like the tone of the 6L6SE preamp, but I wanted to try something different by lowering the overdrive of the second stage and revamping the high gain option by using a switchable cathode bypass cap on the second stage. I noted that when a high output mic was used in the High Gain input, the tone was too raspy for my taste, and I wanted the tone to be the same no matter which input was used.

My design goals, as always, included building an amp with a simple design, minimum parts, a fat tone, a good bass frequency response, early breakup, and feedback resistance. I will not duplicate the explanation of the power supply and preamp circuit as this information can be found on the **6L6SE project page**.

There are certain questions that beg to be answered when paralleling tubes. Will there be more distortion? Twice as much? Three times as much in this case? Well these questions are answered in this build. Previously I had bench tested and compared single-ended 6V6 and parallel 6V6 builds using an oscilloscope and a spectrum analyzer; I determined that the distortion was not increased but only that the amp was louder. This build had the same results, louder but no more distorted. This is probably a good thing, because a Champ with three or even two times the distortion is probably too much for anyone.

As always your input is welcome, and you are invited to join our forum to communicate ideas, successful builds, and help troubleshoot problems. Changes will be made to the project as we work together to make improvements, as long as it is a general consensus that it is a notable improvement that can be heard in the amp's performance and all possible effects of the change have been addressed. This project will be expanded in the future to include build options, such as different tone controls and final tubes.

THE PREAMP STAGE

As stated previously, there are a couple changes from my previous preamp design. The inputs no longer have a voltage divider between the High and Low inputs; this was replaced by a local negative feedback loop at the first stage on the 12AY7. The second stage has a cathode bypass capacitor that is grounded through the Low Gain input jack so that when the Low Gain input is used, the ground is lifted, reducing the gain of the second stage. The gain of the first stage is 5x, and the second stage is 10x in Low Gain mode and 15x in High Gain mode. The overdrive to bias voltage ratio of the second stage is about 2 to 1 depending on your mic's output.

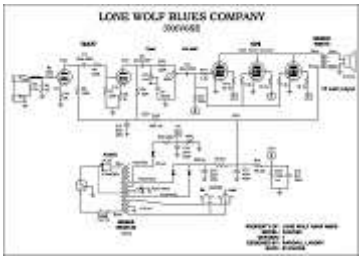
THE POWER STAGE

Single-ended amps produce a tone that is extremely popular with harp players, so much so, that many choose to mic their lower powered single-ended amps through a PA when performing, rather than use an amp with a push-pull configured final that produces more power. The typical single-ended amp produces around 5 watts, and to be significantly louder one needs at least 15 watts. In order to achieve this, I used three 6V6 tubes in parallel. One of the primary differences in this amp compared to the 6L6SE is that an adjustable fixed bias is used instead of a cathode bias. Reason being is that I wanted to offer something different in this design, and I wanted to be able to fine tune the plate current draw easily. The bias voltage is set low to allow for early breakup, and the screen voltage is filtered for added noise reduction. The plate impedance of a 6V6 at 315V and 35mA (producing 5.5W) is 8000 ohms, as noted on the RCA 6V6GT data sheet. Our operating parameters are 345V at 30mA (producing 5W) is close to that of the data sheet. When we place three in parallel, the plate resistance drops to 2700 ohms; keep this in mind when selecting your output transformer.

THE OT AND THE SPEAKER

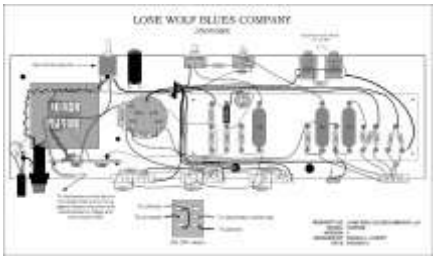
The output transformers are chosen based on the output power, current draw, load, and tonal quality. We use the same OT as in the 6L6SE; push it a little harder and it sounds great. The OT is rated at 15 watts at 80mA; we push 15 watts at 90mA through it, and it sounds great. The Weber WSE15 has a 5000 ohm primary; to get it down to the desired 2500 ohms, we use the 16 ohm secondary and connect it to an 8 ohm speaker. This effectively reduces the primary load to 2500 ohms. An overdriven output transformer can induce a great amount of distortion into the signal, higher order harmonics that sound harsh. But when overdriven moderately, you can get a great compressed tone. There are some who like a smaller transformer; indeed many of the vintage amps had the smallest OT that the builder could get away with. The larger transformer improves the bass response and is favored by many today, but if the OT is too large, the amp will sound sterile. Because the circuitry in this amp has such great low end performance, I did not

need to go with an oversized OT but was able to chose one that is the correct size according to the current draw and output power of the amp. The recommended speaker was chosen based on vintage qualities: early breakup, crunchy/compressed tone, and response. The Weber signature series speaker, smooth cone with an "H" dustcap, is my choice; it is economical and has great tone.



THE LAYOUT

This layout is designed to fit easily into a Hammond 13x5" enclosure although changes can be made for it to fit into a 9x5". I chose the larger because my cab will be large enough to fit a 10 to 12" speaker, and I will have enough room to fit the larger chassis. Features include: star grounding, shielded audio input, dual high and low gain inputs, and a turret board to mount the components. In this design, I utilized a can cap, which really used less space; this would be recommended when real estate is minimal. The turret board method is chosen because of the ease of changing components for those who cannot resist experimenting with mods. The turrets are hollow, and the components' leads are inserted into the center of the turret and soldered, and then the wires are wrapped around the post of the turret. Methods other than the turret mounts can be used such as eyelets, terminal strips, or point-to-point wiring. The designed layout as shown is proven to be noise-free with minimum to no 60Hz hum. A close comparison will show some differences between the layout shown and the photos; this is because I experimented with a local feedback loop on the input stage that I chose not to implement and a couple other things that can go either way. Information on the power supply, wiring, turret board, and the preamp design can be found on the 6L6SE project amp pages.



THE PARTS' LIST

The parts' list shows both the can cap that was used and the individual caps for the power supply. You may want to use the individual caps because they are a lot cheaper than the can cap. Custom circuit boards can be found at **Precision Design**, and here is the **3X6V6 Parts' List**.

For discussion, visit the LONE WOLF BLUES CO FORUM

For questions or comments, email us at customerservice@lonewolfblues.com