

Best of Bassman Design Notes:

1. I plan to use an Output Transformer that I have on hand. It's imprinted with: "550V @ 110mA" and the voltage straight out of the PT HT leads is 625V. The Fender AA864 solid state rectifier diode array will bring it down some (I haven't calculated that yet) but I suspect not nearly enough, so I'm considering using a Zener Diode array at the Center tap to lower the voltage and allow the power supply to remain "stiff" (no sag) like the original stock circuit. It seems a better idea than using a brute-force (sag-prone) resistor(s).
2. I added a "Tube Emulation" switch which adds in a SAG resistor (if desired) to emulate tube rectification voltage drop based on current demand. This will drop the voltage around 30-ish Volts, but I'll see how the amp functions under that lower voltage and also how well it "sags" under load. See this link for what I'm basing the idea on:
https://robobinette.com/Generic_Tube_Amp_Mods.htm#B+1_Voltage
3. The PT that I have has a 5V secondary winding that will power a single 6V indicator bulb nicely. Might as well use the 5V secondary for something. I've added a trim pot to allow adjustment of the brightness of the indicator bulb. There've been times where a super bright indicator on an amp in a dark place has been annoying... and in bright places, a dim lamp is hard to see if it's on. ...maybe it's just me.
4. The 6.3 at 5A heater winding will need to be voltage dropped slightly since I calculate without that it will supply 6.552 V to the heater filaments. That's just a little above the maximum heater voltage recommendations. I know it's not much over, but I prefer to keep the heaters right on specs or a tiny bit below if I can. To get the voltage down a bit I calculate I'll need a 0.083 Ohm resistance. My plan is to use two 0.16 1W resistors on each side of the heater secondary AC (so in parallel) to share the load. That will bring the voltage to 6.3-ish according to the math.
5. I purchased a new Hammond OT listed as the stock replacement for the original circuit. I elected to get the one with both the 4 Ohm and 8 Ohm windings. (switching not indicated on the schematic) I also purchased the Hammond stock replacement filter choke.
6. Since my PT doesn't have the 54V secondary winding that Fender used for the bias circuit... I've added an alternative recommended by Sluckey and others. I also added an adjustable bias so each power tube can be adjusted separately. See:
https://robobinette.com/5F6A_Modifications.htm#Adjustable_Balanced_Bias
7. I added a mod by which the Negative Feedback can be 1. left stock, 2. turned off, or 3. Reduced, by way of a 3-position switch.
8. I added an "anti-pop/surge protection" resistor across the standby switch. 100K-150K 2 watt. See:
https://robobinette.com/5F6A_Modifications.htm#Pop_Reduction
9. I put a T300mA fuse on the HT center tap (B+ Center Tap on the Power Transformer) as an added safety measure.
10. I added an "Ice Pick Cap" to the Negative Feedback loop to Filter out the very highs by adding a 100pF cap across the NFB resistor.

11. I added a "soft start" inrush current limiter. See:

https://robrobnette.com/Generic_Tube_Amp_Mods.htm#Soft_Start_Inrush_Current_Limiter

12. I added a 0.1uF cap across the AC mains to pull out some of the line noise. Not sure if it will be noticeable, but saw that some newer amps do that so thought I'd try it.

13. I added an Effects Loop. I know there's some debate on the usefulness of an effects loop on a relatively "clean" amp like the Bassman, but an effects loop does give some interesting opportunities. First, it makes it possible to add a headphone/line out option. The "Master Volume/Send Level" potentiometer should be able to accommodate various output levels to match different types of pre-amp output needs. Second, There are some effects/devices that do sound/work better after the pre-amp (regardless of overdrive considerations)... or it might be more convenient to add them that way.

The way I have the "Send" output designed, the potentiometer acts both as a "Send Level" and something like a "Master Volume." Without any effects jack inserted, the shunted "Send" jack allows the signal to bypass through the "Send Level" potentiometer and on to the Phase Invertor. This allows some adjustment of the "volume" (attenuation) of the signal so it can function somewhat as a "Master Volume." Understanding that a Master Volume changes the overall tone and behavior of an amp... I have included a bypass switch to reduce the effect of this "Master Volume/Send Level" pot when a stock AA864 circuit is desired.

Upon insertion of the "Send" jack, the bypass is cut off and all of the signal passes through the Pot regardless and on to the "Send" output. Although obvious, it's worth stating that insertion of a jack plug into the "Send" jack will stop the amp's output to the Power section/speakers altogether and the signal will flow only to headphones or whatever device unless the signal is returned via the "Return" jack.

I have added a gain stage to the "Return" using the unused half of the Bass Channel's 2nd 12AX7 (V2b) as well as a potentiometer to adjust whatever that ends up putting out. This is necessary since it's unlikely that every device will return the ideal signal level required by the rest of the amp. With some amplification, the return signal level can be adjusted to properly supply the Phase Invertor and Power side of the amp.

With this circuit running like this (assuming it will all work as imagined), it opens up the possibility that if one were to insert a patch cable between the "Send" and "Return," one could, in essence end up adding an extra gain stage with a Master Volume of sorts to either channel. I haven't done all the math to see if it will work as intended, but then again, I don't know that I'd do the math correctly. I will be curious to see if it will work. The circuit that would result from the patch cable through the Effects Loop looks similar to common mid/high-gain amp circuits so I'm optimistic.

I know the way I have it laid out in my schematic is messy and not efficient, but I hope it's understandable. I'm basing the ideas on page 214 and 218 of Merlin Blencowe's book, "Designing Tube Preamps for Guitar and Bass."

14. I added a "Mid" pot to the "Normal" Channel. I figured that playing lead (non-bass) out of that channel could stand to have at least some Middle frequency adjustment like most other amps.

15. I know some might think it's a bit lame and a useless waste of cost and time, but I added several meters to monitor key readings in real-time as the amp is being used. I plan to install the Current/Amp Meter on the front of the amp which will display the total current draw in milliamps. Personally I think it will look cool to see that needle creeping up as one cranks it. On the back of the amp I will have Voltmeters displaying the various B+ voltages such as the main B+, the Power Tube Plates, and the Pre-Amp B+. I always figure that it would be nice to know what's going on without having to open it up and stick probes in there. No one likes having probes stuck in places. ;)