The Blue Guitar

Peavy Classic 50:
Tweed Bassman Mod

Introduction

The previous article on the basic mods for my Peavy Classic 50-410 (w/ FX loop) was essentially just a port of the basic Classic 30 mods over to the Classic 50 chassis with only a few minor changes. While there was a definite improvement over the stock sounds on the OD channel, I still wished that the amp sounded more like the 5F6A tweed bassman that it resembles cosmetically. The advanced mods for my Classic 30 with all of the added switched and controls covered the modern Boogie/Marshall territory adequately and I wanted to do something radically different with my Classic 50-410.

The idea in the back of my mind was to rewire the OD channel along the lines of the 5F6A bassman, with V2 wired as a dc-coupled pair (V2B being the cathode follower). As a strictly intellectual exercise, I decided to see if I could convert the circuit by just moving jumpers and components, and without having to cut traces. After a few false starts the basic circuit just fell into place, requiring only some tweaking to fine-tune the sounds. In order to retain the Normal channel some variations from the 5F6A circuit were required, namely the addition of a fourth gain stage between the cathode follower and the tone stack. Other mods in this article include "Fenderizing" the input jack circuitry, fine-tuning the tone stack, and reworking the power supply for higher preamp voltages closer to the specs for a 5F6A tweed bassman.

So how does my Classic 50 sound with these mods completed? With the changes to the input circuitry and power supply, the Normal channel sounds much more like a BF Fender than before. The OD channel has definite tweed bassman qualities to it, and lower gain settings produce clean sounds that complement the Normal channel. With 2 separate gain controls for the OD channel, you can get more overdrive and distortion than from a stock tweed bassman, and the master volume offers even more control over the sound and gain. In any case, both channels now offer some of the classic tones from vintage Fender and Marshall amps, ranging from clean to crunchy.

"Fenderizing" the inputs

The stock input circuitry of the Peavy Classic 50 is more complicated than the standard BF Fender high/low input jacks. There is a 0.1uF/250 poly cap in series with the input jacks, possibly for protection against customer misuse of the amp. The "Bright" input uses a contour network consisting of a 0.01uF cap and a 100K resistor to attentuate the low frequencies while also reducing the overall signal level. By converting the input circuitry to BF Fender specs, the signal from the guitar is slightly hotter, which translates to a sound that is both brighter and fuller, and with more responsiveness as it can better

drive the initial gain stage (V1A). The jack labeled "Bright" will become the low gain Fender-style input (typically labeled "#2").

The details of this mod are as follows: remove all of the resistors and capacitors directly behind the two input jacks except for C13, the large yellow 0.047uF coupling cap coming from V1A (see Figure 1 below and Note 1). More specifically, the resistors to be removed are R21(470k), R26(47k) and R27(100k); the caps are C16(0.1uF), C22(39pF) and C23(0.01uF). As noted elsewhere, some of the caps that Peavy uses may not look like traditional capacitors, such as the tubular caps that look like resistors, and the small tan "blobs". After removing these six components and properly preparing the copper traces (see Note 5), you are ready to add in the 3 resistors and two jumpers noted on Figures 1 and 2 below:

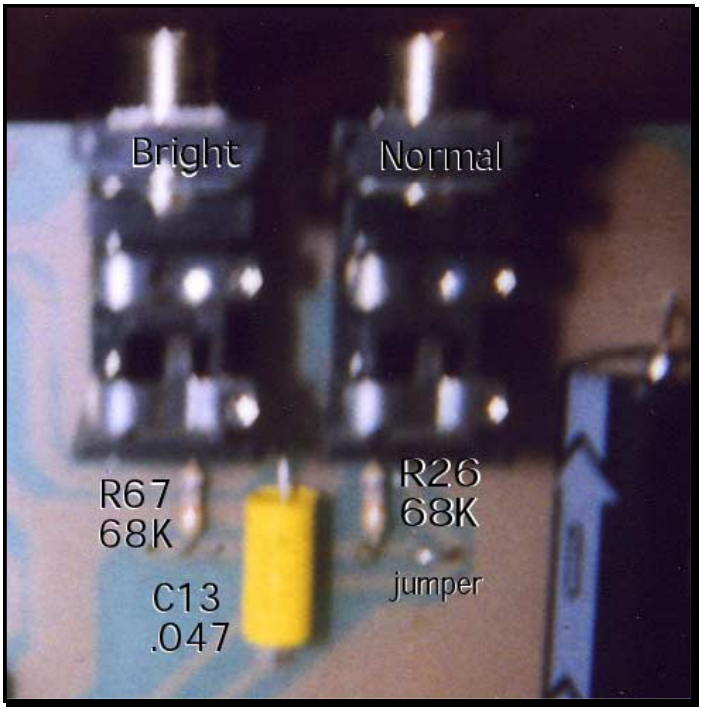

Figure 1. Main board: input jacks (top)

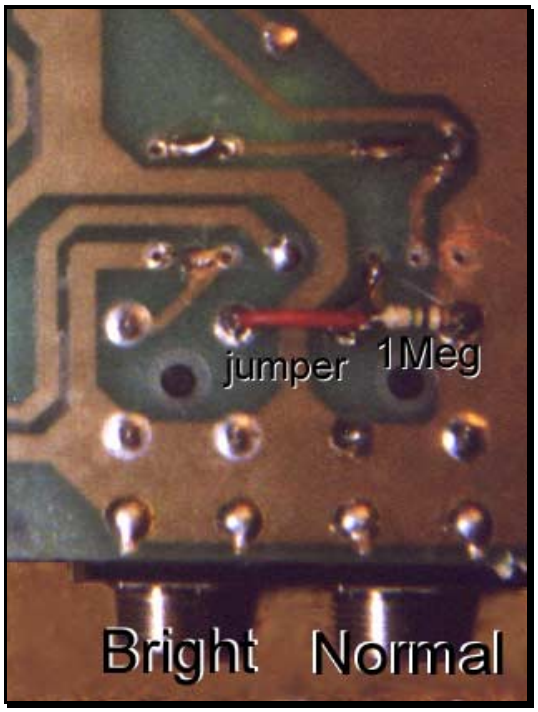

Figure 2. Main board: input jacks

Normal and OD Channel mods on the Main board

To simplify the instructions for these mods, we will start at the input jack end of the board and work our way towards the tone stack. Most of these components are located directly behind the board-mounted pots; in some cases I have located the new component on the copper side of the board.

The Normal volume pot has two components directly behind it: the 0.001uF cap (C46) and the 470k resistor (R19). I recommend replacing C46 with a 1000pF 500V

silver mica cap for a brighter sound or a 0.001uF Sprague Orange Drop cap for a fuller sound.Although not indicated on Figure 3, I added an optional 12pF silver mica (aka "SM") bright cap between the two non-grounded terminals of the Normal volume pot (VR1). This cap was mounted on the copper side of the board, using a pin vise and a small gauged bit (like 61ga) to drill a hole on the copper pad. You may want to experiment with higher values (22pF, 47pF) if you want more brightness at lower settings of the Normal volume pot.

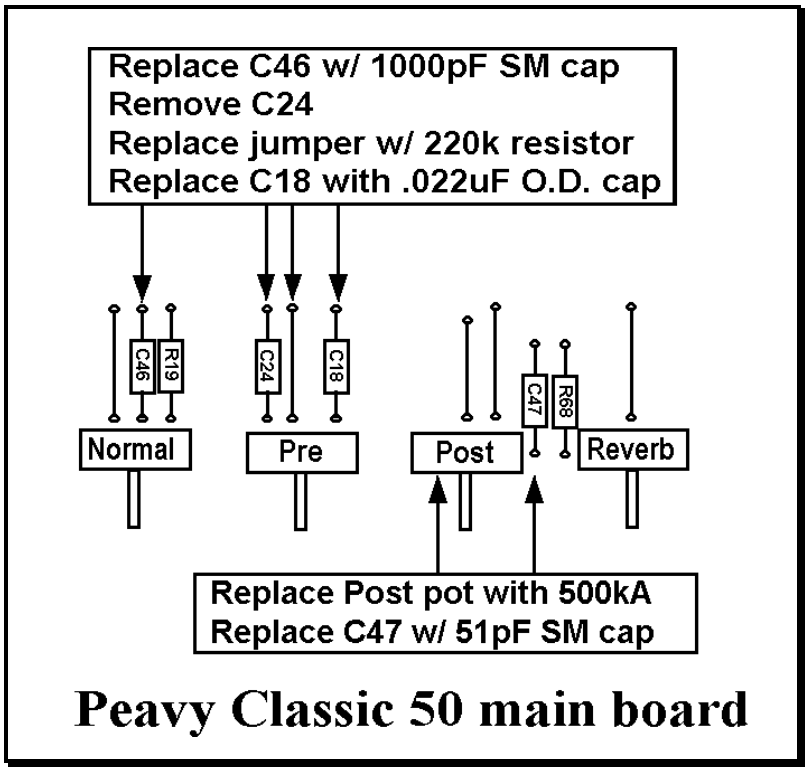

Figure 3. Main board: channel volume controls

Moving on to the OD channel Pre volume pot, I first removed the two caps and jumper wire directly behind the pot. I then soldered in a 220k 1/2 watt resistor in place of the jumper. This resistor is required so that the Normal channel isn't seriously affected by higher settings of the OD Pre gain control (see Note 2). I tried several values for C18, which produced distinctly different sounds from the OD channel. A 0.001uF/600v Orange Drop ("O.D.") (see Note 4) cap produced cleaner sounds at lower signal levels and with less bass response; with this cap a 100k resistor provided adequate isolation between the two channels. However I ended up going back to the 0.022uF cap and 220k resistor because it produced a nice crunchy tone at the higher gain settings. While I was able to squeeze the 0.001uF O.D. cap behind the pot, it was a lot easier to mount the 0.022uF cap on the copper side of the board (making sure that the protruding leads don't short out anything). I also added in a 12pF silver mica bright cap on the copper side of the board right on the pads for the non-grounded terminals of the Pre-gain pot.

The stock 10kA Post volume pot (VR3) for the OD channel has too low of an impedance for the reworked OD channel, and I had considered ordering a 1mA Pre gain pot directly from Peavy. However, I ended up using a small case 500kA volume pot (with a diameter of 21/32") commonly used on imported guitars. By soldering the tabs directly to the copper side of the board, the pot shaft lined up perfectly with the other pots. I happened to have some chicken-head knobs around that mount to a 1/4" shaft with a set screw and they blend in well with the stock knobs. Incidentally, the 500kA pot has a split knurled shaft for push-on guitar knobs; I added a 3/16" x 5/16" piece of 20ga

sheet metal between the two prongs so that the knob set screw didn't deform the split shaft.

The signal going to the Post volume pot has much of the high frequencies bled to ground through C47 and R68. The stock value of 0.015uF for C47 can be replaced with something like a 51pF silver mica cap to take the edge off the OD sound without swallowing up the high frequencies. If you revise these mods for higher gain OD sounds you may want to use a larger value cap here, such as a 100pF.

On the drawing above, there are two jumpers behind the Post gain pot. The jumper on the left can be replaced with a resistor between 47k to 100k to smooth out the response of the 500kA pot, albeit with a slight reduction of gain (I used a 68k resistor here). The jumper on the right should be removed and the center conductor of a 10" length of shielded cable soldered to the copper pad nearest to the pot; the ground shield can be soldered to the metal bracket securing the pot to the circuit board. (The other end of this cable will be connected to the coupling cap after V2B on the preamp tube board later.)

Tone Stack mods on the Main board

Most of these mods were covered in my original article on the Classic 50 and I will summarize them here listing the revised values currently used. The basic game plan is to replace the stock 0.022uF bass and mid caps with higher quality caps like the 600v Sprague Orange Drops (see Note 4); the stock 270pF tubular ceramic treble cap should be replaced with a 330pF/ 500v silver mica cap for a fuller, less trebly sound. The original article also described adding in a 750pF mid-boost cap wired in parallel with the treble cap; for the Tweed Bassman mod I prefer a more subtle boost and am using a 390pF mica cap (which adds up to 720pF in conjunction with the 330pF treble cap). To switch the boost on and off without drilling a hole in my Classic 50, I replaced the stock SPST channel-switching toggle switch with a full-sized DPDT center-off toggle switch. Using a pin vise and a 61 ga bit I drilled 4 holes to mount the 390pF boost cap and two shielded cable leads going to the DPDT toggle switch. (Alternately, you can wrap the 2 shielded conductors around the legs of the 330pF cap and locate the 390pF boost cap on the toggle switch.) In either case you

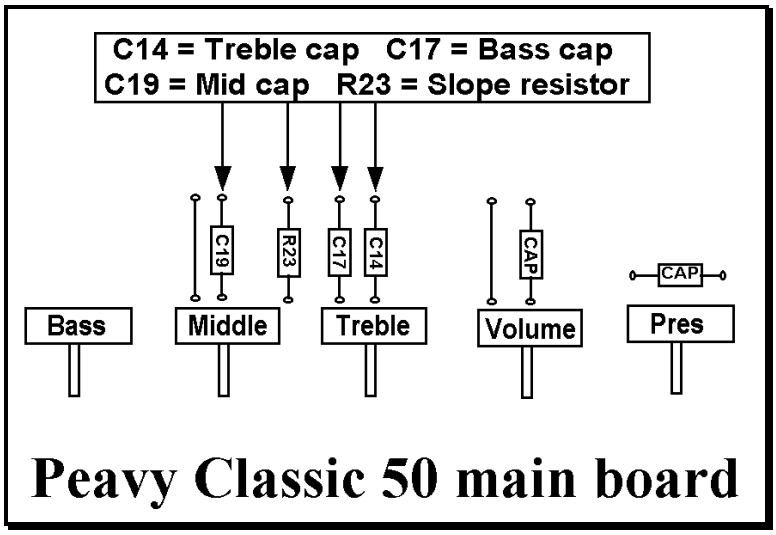

Figure 4. Main board: tone stack

should solder a 220k resistor between the switching contacts to eliminate any noises when switching the boost cap in or out.

The original article had discussed replacing the 0.022uF bass cap with a 0.047uF cap to increase the bass response a bit; a much better solution is to use the 0.022uF cap, but replace the 68k slope resistor (R23) with a 56k resistor. The combination of a 56k slope resistor, a 330pF mica treble cap, and two 0.022uF Orange Drops for the bass and mid caps works great here, especially in conjunction with the 390pF boost cap.

Power Supply mods

Before moving on to the changes to the preamp tube board, there are a few other changes to make to the main board. The stock B+ voltages to the preamp tubes on the Classic 50 are very low which result in a distorted "brown" sound. To bring these voltages up closer to those of a 5F6A tweed bassman I replaced R59 and R60, which are the two 1 watt flameproof resistors mounted on standoffs on the main circuit board. R60 is the 10k resistor on the end of the board near the input jacks; I replaced it with a 4.7k 2 watt resistor. R59 is the 22k resistor mounted towards the middle of the main amp board; I replaced that with a 12k 2 watt resistor. A note on removing these resistors: the component leads were bent over like a hook when they were installed. After removing the solder, straighten the leads out and then heat up the tip of the standoff at the indentation: the resistor lead should pull right out using hemostats or needle nose pliers.

With these changes, B++ (going to V1B and V3) runs about 306 volts and B+ (going to V1A and V2) runs about 289 volts. (The stock voltages were almost 40 volts lower than these for a more distorted "brown" sound.) Through the 100k plate resistors I measured 196vdc at V1P1, 208vdc at V1P6, and 174vdc at V2P1.

Preamp tube board mods (An Overview)

The most radical changes in the "Tweed Bassman Mod" for the Peavy Classic 50 amp involved extensive rewiring of the preamp tube board. By moving jumpers and components I was able to convert V2 into a dc-coupled pair, with V2B being the cathode follower (like a 5F6A tweed bassman or early Marshall amp). The 100k plate resistor for V2A was soldered directly on the tube socket pads on the copper side of the board, along with the jumper from Pin #1 to Pin #7 (see Figure 7). The 150k plate resistor for V2B was removed and replaced with a jumper that goes over to the B+ pad originally connected to the 150k plate resistor for V2A (R1). The stock 1.5k cathode resistor (R13) and 0.47uF bypass cap (C6) for V2A were replaced with the standard 820 ohm resistor from the 5F6A design along with an added 1.0uF/50v e-cap to boost the gain and warm up the sound a bit for the OD channel. (You can omit the C6 cap for less gain and a cleaner sound.)

The 150k plate resistors for V1A and V1B (R2 & R5) were replaced with 100k 1/2 watt resistors. (The 1/2 watt flameproof resistor for V1B would not fit under the tube

socket like the stock 1/4 watt resistor so I mounted it on the copper side of the board.) I also replaced the 22uF cathode resistor bypass cap for V1A (C5) with a 2.2uF/50v e-cap. The 22uF cathode resistor bypass cap for V1B (C9) can be replaced with a lower value (like 0.68uF to 2.2uF) for a cleaner sound, but I put the 22uF cap back because it produced a crunchier sound at higher gain settings.

Here is what the stock preamp board looked like after removing only the C1 and C2 coupling caps:

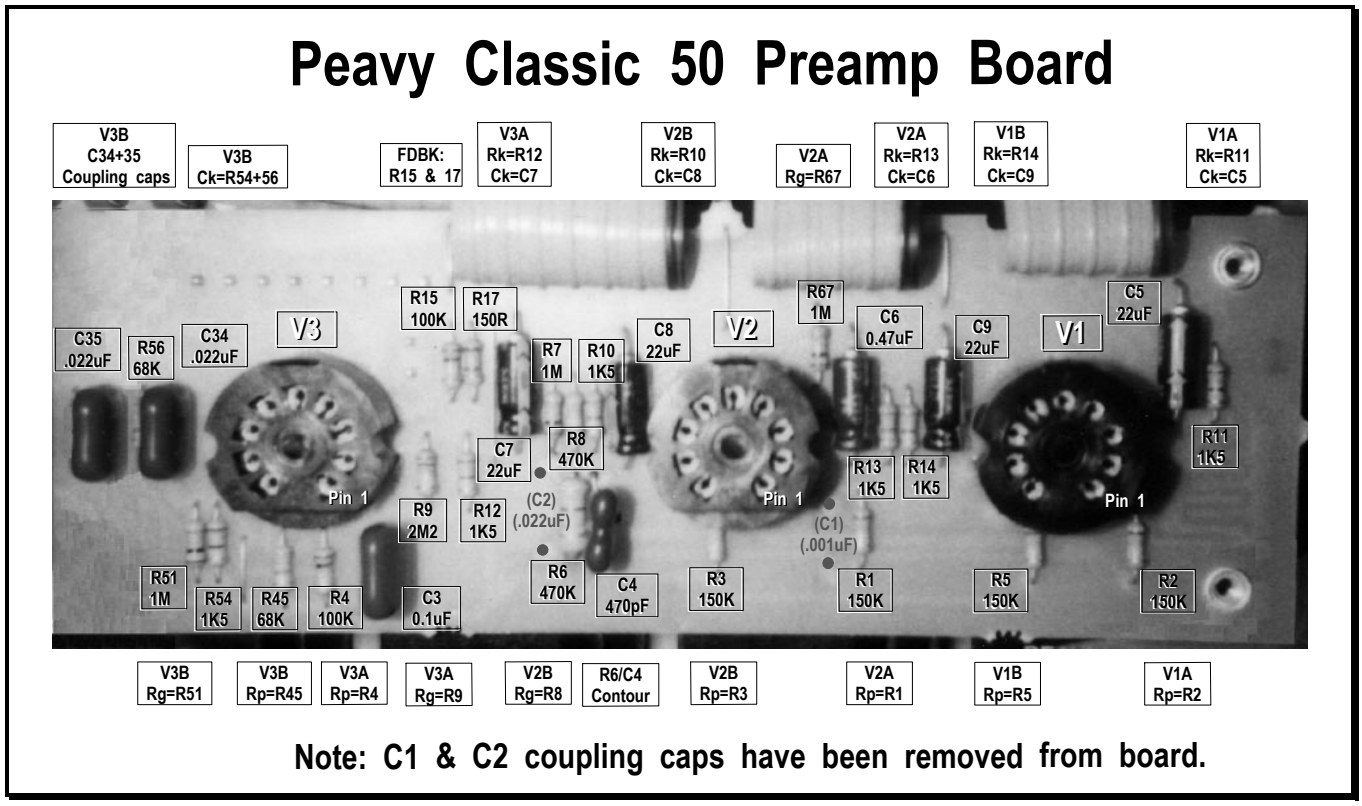

Figure 5. Component side of preamp tube board before mods begun.

Preamp tube board mods (The Details)

Up to this point the mods have been easily reversible; if you don't like the sounds you could just reinstall the stock parts. However, we are now going to remove 90% of the components for the OD channel on the preamp tube board, and if you don't proceed methodically here you could ruin your amp. The work itself is quite simple to do, but you need to keep track of what you are doing. As you remove components you may want to tape them to a piece of cardboard and label them with their reference numbers. I would also recommend writing the reference numbers on the component side of the printed circuit board as you remove the parts in case you decide to reinstall them later. Some of the parts being removed will be replaced with a different value; you may want to install those new parts right away to keep everything as simple as possible.

Step One:

We will first remove the parts that are being replaced with different values. Starting at the V1 tube socket on the right, replace C5(22uF), R2(150k), and R5(150k) with a 2.2uF/50v electrolytic-cap and two 100k 1/2 watt flameproof resistors. (I soldered R5 to the copper side of the board since the "tube" end of the resistor mounts under the tube socket.)

Moving towards the V2 tube socket, replace R13 (1K5) with an 820 ohm resistor and C6 (0.47uF) with a 1.0uF/50v e-cap. To the left of the V2 tube socket is a 22uF cap (C8); remove this cap and replace it with a 100k 1/2 watt resistor which will be the cathode resistor for the cathode follower (V2B).

Step Two:

Next, we will remove the parts that will be scrapped in the redesign of the OD channel. Starting at the right end of the board, remove R1(150k), C1(.001uF), R3(150k), C4(470pF), R6(470k), C2(.022uF), R10(1K5), R8(470k), and R7(1M). Put C1(.001uF) aside as we will using this cap in the next step as a coupling cap after the cathode follower V2B. As mentioned earlier, you may want to label the board as you remove these components in case you want to reverse these mods later. (I suggest using a fine point Sharpie© marker and putting brackets around the reference numbers not being used in the Tweed Bassman mod.)

Step Three:

We will now put the 0.001uF cap (C1) removed in the previous step back onto the circuit board in its new location. Looking at the block of 3 resistors (R7,R8,R10) between V2 and V3 near the ribbon cable, we want to locate the 0.001uF cap between the pad for R10 that goes to V2 pin #8 and the pad for R7 nearest the ribbon cable. Due to the OD channel bleeding through to the reverb and pre-driver circuits, it was necessary to reroute the signal from the V2B coupling cap to the OD channel Post volume pot using shielded cable. Since I added in this cable after rewiring the preamp tube board, I decided to simply remove the black coded lead from the far left ribbon cable and solder the shielded cable center conductor to that copper pad. (After slicing back the insulation a bit I bent up the ribbon cable lead and put a short length of heat shrink tubing on it.)

I found that the coupling cap after V2B is very critical to the sound of the OD channel; the 0.001uF cap recommended here produces very clear and bright blues tones (which can be smoothed out a bit by using an Orange Drop cap). For a fuller, crunchier sound a larger valued Orange Drop cap can be used, such as 0.01uF or 0.022uF. I liked all of these sounds so much that I added in a full-sized center-off DPDT toggle switch to select between the 0.001uF on the board and the added 0.01uF or 0.022uF cap on the switch (see Note 3).

Step Four:

To complete these mods we now need to wire up a resistor and two jumpers to the V2 tube socket. The first jumper goes on the component side of the board from the "tube" end of the R3 plate resistor removed in Step Two to the "B+" end of the R1 plate resistor (also removed in Step Two). The "tube" end of this jumper goes underneath the tube socket; be sure to cover this jumper with heat shrink tubing for safety reasons.

The resistor and other jumper are mounted on the copper side of board directly to the pads for the tube socket (see Figure 7). I used desoldering braid to remove all of the solder from tube socket pins #1, #6, and #7. The 100k resistor (R1) goes between pins #1 and #6. The jumper goes from pins #1 and #7, and should be covered with heat shrink tubing so that it doesn't short out to the traces it crosses.

Notes on the preamp tube board:

Be very careful when moving the boards around that you don't put undue stress on the hard-wired ribbon cables. After pulling the preamp tube board out a dozen times the ribbon cable adjacent to V1 finally broke. I had tried splicing in a short length of 24 ga bus wire, but after doing that the lead next to it broke so I ended up replacing the entire ribbon cable with 20 ga solid wire in assorted colors.

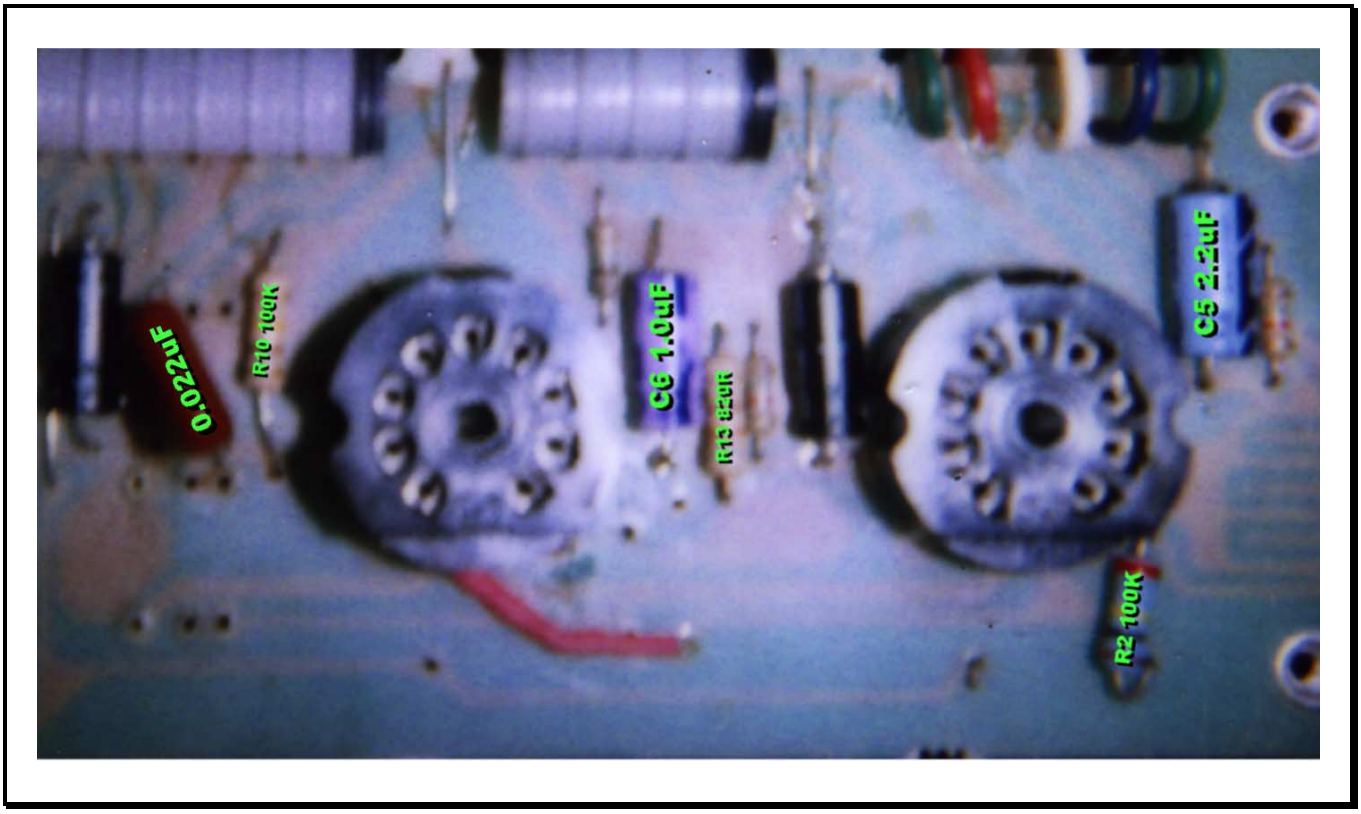

Figure 6. Component side of preamp tube board after mods completed.

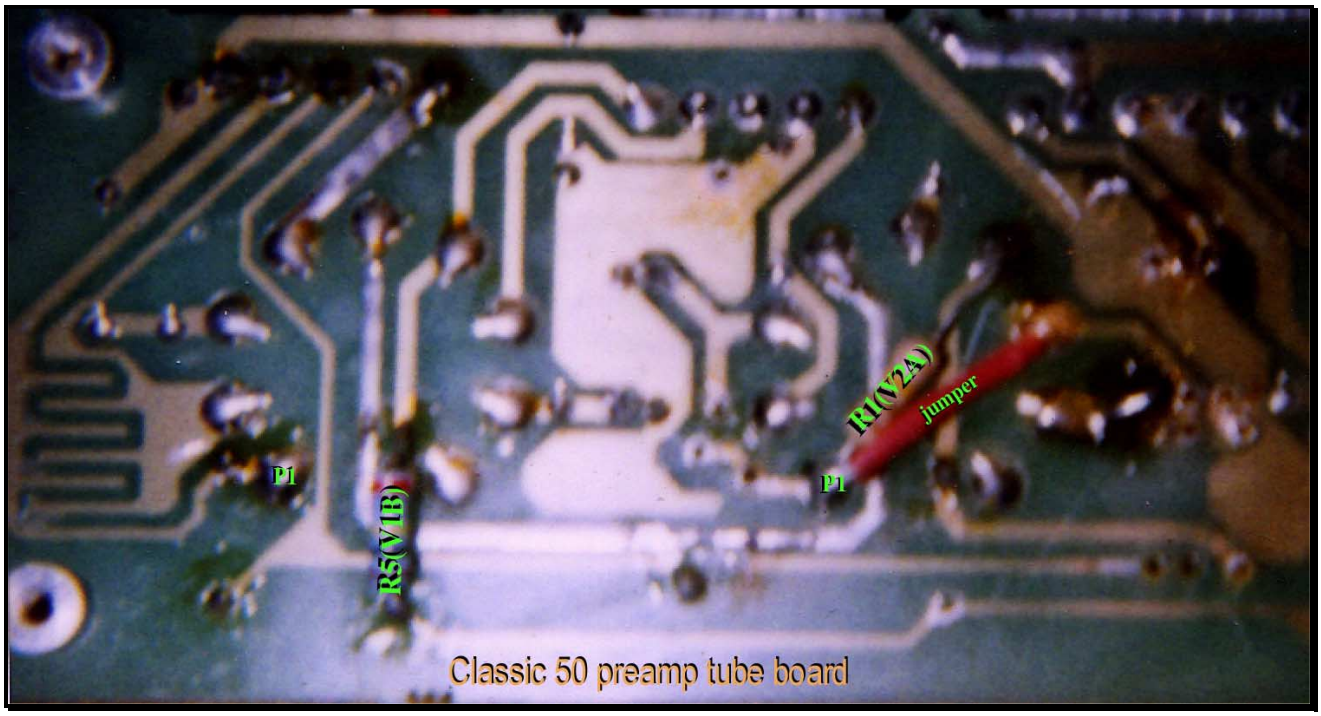

Figure 7. Copper side of preamp tube board after mods completed.

Final notes

After mulling over the idea of doing such radical modifications to my Peavy Classic 50 amp for almost a year, I am frankly surprised at how well the project went and am very satisfied with the results. I experimented with higher and lower gain versions of these mods before settling on the circuit presented here which offers a nice range of clean and crunchy sounds on the OD channel. The mods also gave the Normal channel a more authentic BF vibe. The end result is an amp that is a veritable encyclopedia of classic blues and blues/rock tones from vintage Fenders and plexi-era Marshalls.

Good luck!

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Other Peavy Classic 50 files:

http://www.blueguitar.org/c50_bias.pdf

http://www.blueguitar.org/c50_mod1.pdf

http://www.blueguitar.org/c50sch_a.pdf

http://www.blueguitar.org/c50sch_b.pdf

Endnotes:

Note 1: I eventually replaced C13 with a 0.047uF/600v Sprague Orange Drop cap for a fuller sound on both channels.

Note 2: Even with a 220k resistor there is a noticeable effect on the Normal channel when the Pre gain pot is set 12, with some of the highs being bled to ground through C18 and the K1B contacts of the relay. I eventually moved the "mute point" to the other side of C21 (the 0.047uf/400v cap) to lessen this effect, which did require some modifications to the copper traces on the circuit board.

Note 3: There is one location on the Classic 50 where an extra switch or control could be added and would be fairly accessible: this is on the back-side of the chassis (actually facing towards the front of the amp) over the small circuit board for the footswitch and fx loop jacks. With the open side of the chassis face down on your work bench, drill a 1/2" hole approximately 2 13/32" from the bottom edge and 1 1/2" in from the side to mount a full-sized DPDT toggle switch. With the hole drilled in this location a full-sized toggle switch will fit between the main circuit board and the footswitch/fx loop board; a larger heavy-duty style toggle switch might not fit.

To wire in the switch to select between 3 values for the coupling cap after V2B, I used 2 conductor shielded cable with one conductor soldered to each end of the 0.001uF/600v Orange Drop cap mounted on the preamp tube board. I soldered a 0.01uF and 0.022uF/600v Orange Drop cap to either of the two outer terminals of the toggle switch and the 2 conductors from the shielded cable to the two inner (common) terminals of the toggle switch. (Since the coupling caps are not polarized, it doesn't matter which way you hook up the two center conductors.) To eliminate any switching noises, I soldered in two 1M resistors between the switching contacts on either side of the toggle switch. When reinstalling the circuit boards, first mount the footswitch/fx loop board before mounting the added toggle switch to the chassis.

Note 4: The 600V Sprague Orange Drop caps that I prefer to use are Type SBE418P which are available from Torres Engineering. You could alternately use Type 715P which is available from Mouser Electronics; although less expensive, they are slightly larger and some people can hear a difference between the two types.

A Type 418P or 715P cap is called a "polypropylene film capacitor" and tends to have less highs and more lows than a polyester cap (also known as "mylar" which is the registered name for a type of polyester produced by DuPont). If the response of an amp is too bright, replacing some of the polyester caps with Orange Drops can reduce the highs a bit. Similarly, if an amp is getting too dark sounding after adding in Orange Drop cap you might want to change a few of them back to polyester.

Note 5: There are certain tricks for working on printed circuit boards like those used in the Peavy Classic 50. It is important that you check your work out with a DMM after replacing any parts to insure that there is continuity with the intended traces and no solder bridges to adjacent traces. Desoldering braid is very useful for both sucking up the old solder and preparing the trace for fresh solder. The copper traces have a coating which must be removed to make a good solder connection; slightly-used desolder braid works great for removing this coating by rubbing it back and forth with the tip of your soldering iron. When the trace is a shiny silver color it is ready; if you overdo it the trace will flake off. When replacing parts, it is very easy to damage the copper traces. Check the schematic carefully and bridge any gaps in the traces with 24 gauge bus wire or the actual component lead.

To add parts or jumpers to the circuit board I used a pin vise with a 61 gauge drill to make small holes, usually adjacent to the copper pads. I would then bend the component lead over to the pad and if possible make a secure connection before soldering it in. To join two leads that did not have to connect to a copper trace I would drill two holes and then twist them together as with perfboard.

With the Classic 50 main board mounted to the chassis with stand-offs there is plenty of room on the copper side of the board to mount components such as Orange Drop caps which would not fit easily on the component side of the board.

Note 6: There are also some tricks in removing the circuit boards from the Classic 50-410 chassis. There are 5 screws which secure the tweed board which covers the back of the chassis; after removing the board, you will find 2 sheet metal screws that hold the chassis to the side of the cabinet. These screws are at the bottom of the chassis towards the opening. With these two screws removed you can then loosen the two machine screws on the top that hold the chassis. Make sure that you have unplugged the speaker and reverb cables, and have removed the black plastic cable clamp securing the power cord. The bulk of the weight of the chassis is on the side nearest the power and standby switches; before removing the last screw I will be supporting the chassis with my left hand (with my palm to the immediate left of the speaker jacks). Make sure that the chassis doesn't fall back towards the speakers; pulling the chassis from the speaker magnets can be a real pain.

With the chassis out, I will first remove the tube cover plates with a 1/4" nutdriver and then use a 1/2" nutdriver to remove the nuts and washers from the following jacks: footswitch, fx send and return, and the normal and bright inputs. (You do not need to remove the speaker jack board for any of the modifications in this article.) At this I will unplug all of the molex connectors on the main and output tube boards after clearly labeling their location and orientation with a fine tip Sharpie© marker; some of the plugs are polarized so that they can't be reconnected backwards but many of them aren't. With a small phillips head screwdriver I then remove the 8 screws holding the two tube boards and the 3 small screws on the back of the chassis. I label the tubes before pulling them out

so that I know which socket they came from. To keep from dropping the small screws inside the chassis I would slap a ceramic magnet onto the shaft of my screwdriver; this trick is also handy when you need to screw them back in later. To remove the pot nuts that secure the main board to the chassis, pull off the 8 chicken head knobs and use an 11/32" nutdriver. To remove the channel select switch you can use a 9/16" socket or a large adjustable wrench.

The boards can now be removed from the chassis. First remove the long jack for the reverb cables by squeezing the two prongs and pull that jack out of the way. The footswitch/fx loop jack board should be removed next. You are now ready to remove first the output tube board and then the preamp tube board, taking care not to flex the ribbon cables too much at the solder connections. With the auxiliary boards loose, the main board should slip right out.

To put everything back together when you are done with these mods, basically just reverse all of these instructions.

Note 7: One common complaint about the construction of the Classic 50 is that the split pot shafts do not hold the chicken-head knobs securely and tend to break if you try to pry the prongs apart. The problem here is that the pot metal used for the shafts has very little strength, especially with the smaller diameter shafts used on the Classic 50 (3/16" vs. the more common 1/4").

To reinforce the shafts, I cut some 20 gauge sheet metal into strips 1/8" wide, and cut those strips into pieces approximately 1/4" long. After centering those inserts between the prongs of each pot shaft, I added a drop or two of Krazy Glue© to secure them in place. Not wanting the glue to get into the bushings, I tipped the chassis up on its side (heavy transformer down) and propped up the back approximately 1/2" so that any excess glue would migrate towards the end of shaft. I allowed the glue to set overnight before reinstalling the knobs. If after adding these inserts the knobs are still too loose, you can tightly wrap several thicknesses of plumbers teflon tape around the shaft. If the knobs are too tight you can file down the knurled shaft a bit.

To repair a broken shaft, I epoxied an 1/8" by 1/4" strip of sheet metal to the unbroken prong, holding it in place with a hemostat. After the epoxy had cured, I secured the broken shaft piece to the insert with epoxy and a hemostat. Allow the epoxy to cure overnight before reinstalling the knob, making adjustments as necessary if the knob is too loose or too tight. (Note: for reinforcing the more common 1/4" shafts, I use a 3/16" strip of sheet metal approximately 5/16" long; this trick is handy when using knobs with set screws on split-shaft pots.) If the broken shaft piece has disappeared Dan Erlewine explains how to repair it using a wooden dowel in the February 1999 issue of Guitar Player.